

ACADEMY OF SCIENCES OF THE USSR
FAR EAST BRANCH
INSTITUTE OF BIOLOGY AND SOIL SCIENCES

KEYS TO THE INSECTS OF THE FAR EAST OF THE USSR

IN SIX VOLUMES

Volume II

HOMOPTERA AND HETEROPTERA

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LENINGRAD
NAUKA PUBLISHING HOUSE
1988

Transliteration of the Russian title: *Opredelitel' nasekomykh Dal'nego Vostoka SSSR v shesti tomakh. Vol. 2. Ravnokrylye i poluzhestkokrylye.*

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INTRODUCTION TO THE ENGLISH TRANSLATION

This translation is purported for free distribution only, not for printing or purchase. It was ordered by the Systematic Entomology Laboratory, Research Service, U. S. Department of Agriculture, Washington, DC. The Cicadinea have been translated by Vera A. Richter, the Heteroptera by Lilyana I. Farka, and all other groups by A.V. Stekolshchikov. The layout is by Tatiana V. Dolnik. All the work was carried out under supervision of I.M. Kerzhner.

For convenience of users, the text is divided into the Title and Introduction, introductory text to Homoptera, and six separately paginated chapters corresponding to the major taxonomic subdivisions. Indices are separate to each chapter and attached at their ends. The original page numbers are given in brackets in bold face within the text of the translation; the indices refer to these original pages. The numeration of figures follows the Russian original work.

Information on the taxa occurring in the Russian Far East and their names is updated where possible. These updatings are given in { }. Footnotes, especially those containing holotype information, were usually inserted in the text.

Only the following abbreviations are used in the translation:

Amur. – Amur Province
C – Central (in distribution only)
Chuk. – Chukotka Autonomous District
E – Eastern
Kamch. – Kamchatka Peninsula
Khab. – Khabarovsk Territory
Koryak. – Koryak Autonomous District
Kur. – Kuril Islands
Mag. – Magadan Province
N – Northern
Prim. – Primorsk Territory
Prov. – Province
S – Southern
Sakh. – Sakhalin Island
W – Western

The names of veins are abbreviated as follows:

A – anal vein;
C – costal vein;
Cu – cubital vein;
CuA – anterior cubital vein;
CuP – posterior cubital vein;
M – medial vein;
pt – pterostigma;
R – radial vein;
RS – radial sector;
Sc – subcostal vein.

Roman numbers are used in the figures for segments, sternites, and tergites of abdomen.

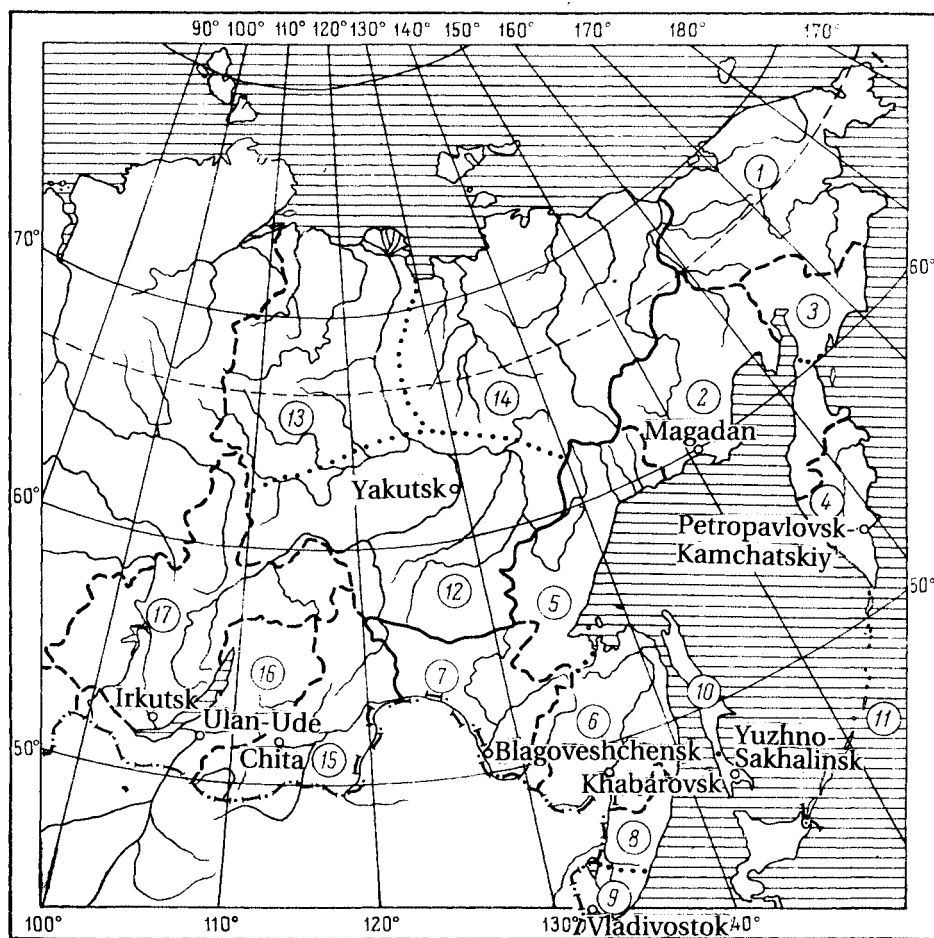
I.M. Kerzhner

INTRODUCTION

The 2nd volume of the "Keys to the insects of the Far East of the USSR" is the first attempt to summarize the information on two economically important orders of Hemimetabola: Homoptera and Heteroptera. All chapters of this book are original and written by specialists working on respective groups. The chapters on cicadellids and scale insects are based on recently published monographs (see References in these chapters), whereas the keys to cicadina other than cicadellids, to psyllids, white flies, aphids, and bugs are published for the first time and represent a result of many years of studies by the authors. The chapter on aphids is particularly worthy of note. Before the start of this work, only 120 species of aphids were recorded from the Far East of the USSR, but now more than 400 species are known. The information on the bug fauna has sufficiently changed in the last decade, 797 species are currently known. Most of insect species included in this volume develop on plants, many of them are important agricultural or forest pests and vectors of viral diseases of plants. Some bugs, especially of the families Nabidae and Anthocoridae, are useful predators.

The following specialists have taken part in preparation of this volume: G.A. Anufriev (Gor'ki State University) and A.F. Emeljanov (Zoological Institute, USSR Academy of Sciences, Leningrad) – suborder Cicadinea; Z.V. Konovalova (Institute of Biology and Soil Sciences, Far East Branch of the USSR Academy of Sciences, Vladivostok) – suborder Psyllinea; E.M. Danzig (Zoological Institute, USSR Academy of Sciences) – suborders Aleyrodinea and Coccinea; N.F. Pashtshenko (Institute of Biology and Soil Sciences, Far East Branch of the USSR Academy of Sciences) – suborder Aphidinea. The work on the families of Heteroptera was subdivided as follows: I.M. Kerzhner (Zoological Institute, USSR Academy of Sciences) – Dipsocoridae, Enicocephalidae, Microphysidae, Miridae, Nabidae, Anthocoridae, Cimicidae; E.V. Kanyukova (Institute of Biology and Soil Sciences, Far East Branch of the USSR Academy of Sciences) – Nepidae, Belostomatidae, Corixidae, Ochteridae, Naucoridae, Aphelocheiridae, Notonectidae, Pleidae, Mesoveliidae, Hebridae, Hydrometridae, Veliidae, Gerridae, Reduviidae, Aradidae, Piesmatidae, Berytidae, Pyrrhocoridae, Urostylidae, Plataspididae, Acanthosomatidae, Cydnidae, Scutelleridae, Pentatomidae; N.N. Vinokurov (Biological Institute, Yakutian Division of the Siberian Branch of the USSR Academy of Sciences, Yakutsk) – Saldidae, Lygaeidae; V.B. Golub (Voronezh State Pedagogical Institute) – Tingidae; G.P. Tshernova (Chuvash State Pedagogical Institute, Cheboksary) – Stenocephalidae, Coreidae, Rhopalidae.

The borders of the Far East and adjacent territories of the USSR, with their abbreviated names used in the text are shown in the map. Abbreviations (see respective lists) are used for some frequently occurring words and names of the authors of the genera and species. For most genera and families, the numbers of species in the World and the USSR faunas are given. The number of species in the Far East is given after description of each taxon. In the distributions, the Far East regions are listed first and followed (after semicolon) by adjacent and other territories of the USSR. The distribution in foreign countries is given at the end, after full stop and dash. The regions are listed in the following sequence: Chuk., Mag., Koryak., Kamch., Komandorskie Islands, Khab., Amur., Prim., Sakh., S Kur. (Kunashir); Yakutia, Chita Prov., Buryatia, Irkutsk Prov., Siberia, Kazakhstan, Middle Asia (Soviet Central Asia),



Map of the Far East and adjacent territories of the USSR.

1-11, Far East, i.e. territory of the USSR east of Yakutia and Chita Prov.: 1, 2, Magadan Prov.: 1, Chukotka Autonomous District (Chuk.), 2, remaining territory of the province (Mag.); 3, 4, Kamchatka Prov.: 3, Koryak Autonomous District (Koryak), 4, Kamchatka Peninsula (Kamch.); 5, 6, Khabarovsk Territory: 5, north of the Tugur River (N Khab.), 6, south of the Tugur River (S Khab.); 7, Amur Prov. (Amur.); 8, 9, Primorsk Territory (Prim.): 8, north of the line lake Malaya Khanka – Rudnaya Pristan' (N Prim.) and south of the above line (S Prim.); 10, Sakhalin Island (Sakh.): north of Poyasok Isthmus (N Sakh.) and south of Poyasok Isthmus (S Sakh.); 11, Kuril Islands (Kur.): Paramushir, Shumshu and neighboring small islands (N Kur.), from Onkotan to Urup (C Kur.), and south of Urup (S Kur.); 12-17, territories adjacent to the Far East: 12-14, Yakutian SSR: south of Aldan and Vilyuy Rivers (S Yakutia), west of Verkhoyansk Range and north of Vilyuy River (W Yakutia), east of the Lena valley and north of Aldan River (E Yakutia); 15, 16, Transbaikal: 15, Chita Prov., 16, Buryat ASSR; 17, Irkutsk Prov.

Caucasus, European USSR. – Japan (Hokkaido, Honshu), Korean Peninsula, China (including Taiwan), Mongolia, Afghanistan, Iran, Asia anterior, W Europe, N Africa, N America, Philippines, SE Asia, India, Australia. If the species occurs in all regions of the Far East, "everywhere" is given in the distribution without listing of regions. Body sizes (except if noted otherwise) are given in millimetres ("mm" is omitted). Harmful species are marked with an asterisk (*). The names of vascular plants follow S.K. Cherepanov (Vascular plants of the USSR, Leningrad, 1981, 510 pp.).

The editorial work was subdivided among the members of the editorial board as follows: E.V. Kanyukova – Heteroptera, Aleyrodinea and Coccinea; Z.A. Konovalova – Psyllinea; S.Yu. Storozhenko – Cicadinea; A.S. Lelej – Aphidinea and general editing of the volume.

The editorial board is thankful to all authors for their work. In addition to the authors, artists O.V. Zvyagintseva, S.I. Karpov, N.E. Zakharova and T.G. Kuchina participated in making figures. M.M. Kazantseva helped in the work with the manuscript. The editors are thankful to all those who contributed to publication of this book.

A.S. Lelej

ABBREVIATIONS OF THE AUTHORS' NAMES

Aiz.	– Aizenberg	J. Sahlb.	– J. Sahlberg
Am. et Serv.	– Amyot et Serville	Kalt.	– Kaltenbach
Anufr.	– Anufriev	Kbm.	– Kirschbaum
Bal.	– Balachowsky	Kby.	– Kirby
Bär.	– Bäremsprung	Kerzh.	– Kerzhner
B. d. F.	– Boyer de Fonscolombe	Kir.	– Kiritshenko
Bergr.	– Bergroth	Kirk.	– Kirkaldy
Boh.	– Boheman	Klimasz.	– Klimaszewski
Borchs.	– Borchsenius	Kol.	– Kolenati
Buckt.	– Buckton	Konov.	– Konovalova
Burm.	– Burmeister	Korm.	– Kormilev
Car.	– Carayon	Kusn.	– Kusnezov
C. B.	– C. Börner	Kuw.	– Kuwayama
Chol.	– Cholodkovsky	L.	– Linnaeus
Ckl.	– Cockerell	Lansb.	– Lansbury
C. Sahlb.	– C. Sahlberg	Lap.	– Laporte de Castelnau
Curt.	– Curtis	Latr.	– Latreille
Dahlb.	– Dahlbom	Lep. et Serv.	– Lepeletier et Serville
Dall.	– Dallas	Lest.	– Leston
DeL.	– DeLong	Leth.	– Lethierry
Dist.	– Distant	Lindb.	– Lindberg
Dlab.	– Dlabola	Lndgr.	– Lindinger
Duf.	– Dufour	Lnv.	– Linnavuori
Dwor.	– Dworakowska	Log.	– Loginova
Edw.	– Edwards	Lundbl.	– Lundblad
Em.	– Emeljanov	MacG.	– MacGillivray
E. Wagn.	– E. Wagner	Mam.	– Mamontova
F.	– Fabricius	Mats.	– Matsumura
Fall.	– Fallén	M.-D.	– Meyer-Dür
Fieb.	– Fieber	Mel.	– Melichar
Fl.	– Flor	Metc.	– Metcalf
Först.	– Förster	Miy.	– Miyamoto
Funkh.	– Funkhouser	Miyaz.	– Miyazaki
Geoffr.	– Geoffroy	Mont.	– Montandon
Germ.	– Germar	Mordv.	– Mordvilko
Gill.	– Gillette	M. R.	– Mulsant et Rey
Gmel.	– Gmelin	Motsch.	– Motschulsky
Goot	– van der Goot	Nevs.	– Nevsky
Guér.	– Guérin-Méneville	Newst.	– Newstead
Guerc.	– del Guercio	Ol.	– Olivier
Gz.	– Goeze(Goetze)	Osh.	– Oshanin
Hart.	– Hartig	Oss.	– Ossiannilsson
Heyd.	– Heyden	Panz.	– Panzer
Hob.	– Hoberlandt	Pass.	– Passerini
Hodk.	– Hodgkinson	Pér.	– Péricart
Horv.	– Horváth	Popp.	– Poppius
Hpt.	– Haupt	Put.	– Puton
H. R. L.	– Hille Ris Lambers	Rem.	– Remane
H.-S.	– Herrich-Schäffer	Reut.	– Reuter
Hung.	– Hungerford	Rib.	– Ribaut
Hutch.	– Hutchinson	R. Sahlb.	– R. Sahlberg
Ish.	– Ishihara	Schell.	– Schellenberg
Iv.	– Ivanovskaja	Schill.	– Schilling
Jacz.	– Jaczewski	Schumm.	– Schummel
Jak.	– Jakovlev	Scop.	– Scopoli
Jos.	– Josifov	Scudd.	– Scudder

Seid. – Seidenstücker
Shap. – Shaposhnikov
Sign. – Signoret
Sir. – Siraiwa
Southw. – Southwood
Spin. – Spinola
Steph. – Stephens
Stich. – Stichel
Szeleg. – Szelegiewicz
Tam. – Tamanini
Targ. – Targioni-Tozzeetti
Terezn. – Tereznikova
Theob. – Theobald
Tullgr. – Tullgren

Uhl. – Uhler
Us. – Usinger
V. D. – Van Duzee
Vilb. – Vilbaste
Vin. – Vinokurov
Walk. – Walker
Wall. – Wallengren
Walt. – Walton
Westw. – Westwood
Will. – Williams
Wróbl. – Wróblewski
W. Wagn. – W. Wagner
Wyg. – Wygodzinsky
Zachv. – Zachvatkin
Zett. – Zetterstedt

[p. 727] **21. Order HETEROPTERA (Hemiptera) – bugs**

N.N. Vinokurov, V.B. Golub, E.V. Kanyukova, I.M. Kerzhner,
and G.P. Tshernova

The bugs are terrestrial or aquatic insects, usually with moderately flattened and oval body. Mouthparts piercing-suctorial; rostrum almost always attached to anterior part of head; antennae 4- or 5-segmented, rarely 3-segmented; hemelytra lying flat on back at rest, very rarely rooflike; apical part of hemelytra usually membranous; basal part of hemelytra thicker, leathery; legs ambulatorial or cursorial, hind legs rarely natatorial or fore legs raptorial; metathorax of most species with scent glands; metamorphosis incomplete.

Apical part of head (Figs. 486: 3-5, 487: 3, 4) usually divided dorsally by two longitudinal sutures into clypeus situated medially and genae (in Pentatomoidea called mandibular plates, Fig. 487: 3) situated laterally; in Miridae the lower part of genae is separated to form the lora (Fig. 486: 4). Frons and vertex lying posterior to clypeus and genae, not divided from each other. Rostrum 4- or 3-segmented, rarely one-segmented; base of rostrum covered ventrally by labrum. Ventral side of head lateral to rostrum often with longitudinal laminate elevations, bucculae. Vertex between the eyes often with 2 ocelli. Antennae attached anterior or ventral to eyes, in some groups pressed at rest to venter of body; antennae of water bugs very small, not visible in dorsal view; projections to which the antennae are attached are called antenniferous tubercles.

Pronotum (dorsal part of prothorax; Figs. 486: 1, 487: 1) often divided by a transverse depression into an anterior and posterior part; anterior part often with a transverse raised area (calli), which is sometimes divided in two. A narrow ring (collar) is sometimes separated at anterior margin of pronotum by a transverse groove. Of the mesothorax, only scutellum is visible in dorsal view. Usually scutellum is as small triangle; sometimes it is very large and covering almost the whole dorsal side of abdomen (Scutelleridae, etc.); in Tingidae, Gerridae and most Corixidae, scutellum completely covered by posterior process of pronotum. Metathorax usually not visible in dorsal view. Openings of scent glands in Cimicomorpha and Pentatomomorpha situated on lateral ventral sides of metathorax, between middle and hind coxae; usually they are continued outward as grooves called canals of scent glands. In representatives of other infraorders, scent glands open by one opening or two openings close together on ventral side of thorax.

Fore wings, or hemelytra (Figs. 486: 1, 487: 1) usually divided into 3 main parts: an apical, usually transparent part, the membrane, and 2 leathery parts separated by an oblique longitudinal suture, the clavus lying on the inside, contiguous to the scutellum, and the corium lying on the outside, which is usually larger than clavus. Corium is usually divided by a longitudinal suture (medial fracture) into the outer part (exocorium, or embolium) and inner part (endocorium); in some families (Miridae, Anthocoridae, etc.), a transverse costal, or cuneal, fracture separates the

apical part of corium (cuneus). Parts of the hemelytra are sometimes fused, or the hemelytra are uniformly leathery, reticulate or membranous. [p. 728] The line of contact of opposite clavi posterior to scutellum is called commissure of the hemelytra. Many species have shortened hemelytra in all or in part of the specimens (sometimes only in females). Various degrees of shortening of the hemelytra are observed, from reduction and incomplete overlapping of membranes (in which case hemelytra still cover the entire abdomen dorsally) to complete disappearance of membranes, fusion of clavus and corium and reduction of the hemelytra to small plates situated lateral to the scutellum. Brachypterous specimens sometimes differ markedly from macropterous specimens of the same species, especially in the development of the thoracic segments. Hind wings (or simply wings) membranous, covered completely by the hemelytra at rest.

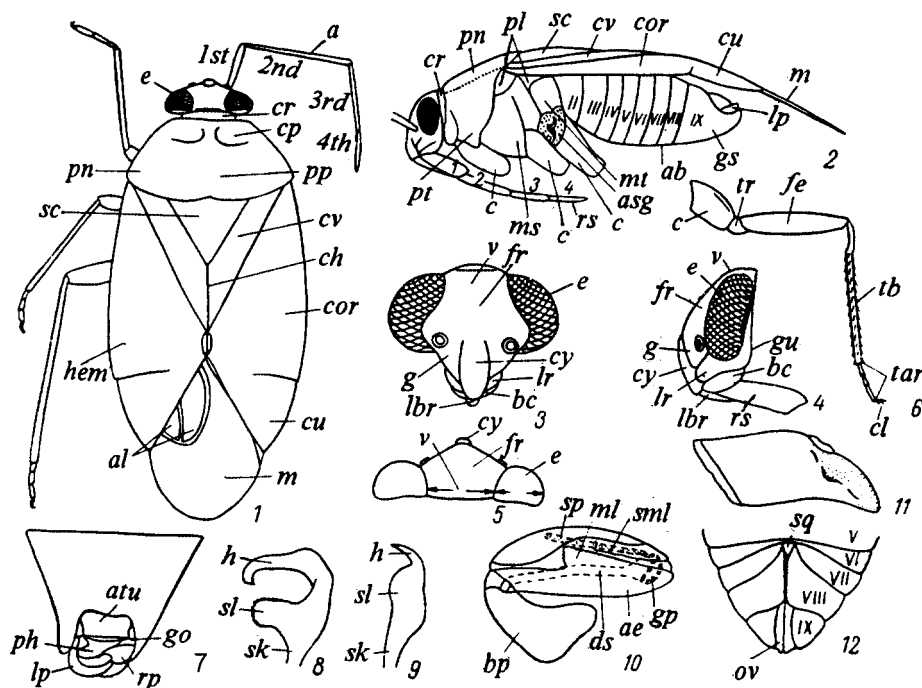


Fig. 486. Heteroptera. Family Miridae. *Lygus pratensis* (after Kerzhner and Jaczewski).

1, 2, male, dorsal and lateral (a, antenna; e, eye; rs, rostrum; pn, pronotum; cr, collar of pronotum; cp, calli of pronotum; pp, posterior lobe of pronotum; pt, prothorax; ms, mesothorax; mt, metathorax; asg, aperture of scent gland; c, coxa; pl, pleurites; sc, scutellum; hem, hemelytron; ch, commissure of hemelytra; cv, clavus; cor, corium; cu, cuneus; al, cells; m, membrane; ab, abdomen; gs, genital segment; lp, left paramere; 1st-4th, antennal segments; 1-4, rostral segments; II-IX, abdominal segments); 3-5, head, anterior, lateral and dorsal view (e, eye; fr, frons; v, vertex; g, gena; lr, lorum; gu, gula; cy, clypeus; lbr, labrum; bc, buccula; rs, rostrum; arrows indicate where width of vertex and eyes are measured); 6, leg (c, coxa; tr, trochanter; fe, femur; tb, tibia; tar, tarsus; cl, claw); 7, male genital segment, dorsal (atu, anal tube; go, genital opening; lp, left paramere; rp, right paramere; ph, phallosome); 8, 9, left and right parameres (h, hypophysis (= apical process); sl, sensory lobe; sk, stalk); 10, scheme of penis (sp, spicula; ml, large membranous lobe of aedeagus; sml, small membranous lobe of aedeagus; gp, gonopore; bp, base of penis; ae, aedeagus; ds, ductus seminis); 11, phallosome; 12, apex of abdomen of female (sq, squama; ov, ovipositor; V-IX, abdominal segments).

Legs (Fig. 486: 6) consisting of coxa, trochanter, femur, tibia and tarsus. Tarsus 3- or 2-segmented, rarely one-segmented, usually with 2 claws at apex. In the Miridae (Fig. 509), the structure of the parempodia (arolia) and pseudopulvilli, lamellate or setiform processes between the claws, and the form of the pulvilli (pseudarolia), lamellate processes on the claws, are used for identification.

The abdomen (Figs. 486: 2, 487: 2) consists of 11 segments, but segment XI and telson are reduced, segment X forms the anal tube, and segment I persists only as narrow tergum; the first visible abdominal segment is therefore the second. Abdominal segment IX, sometimes also VIII, form the genitalia. The sides of abdomen [p. 729] are often separated by a groove as a more or less wide connexivum.

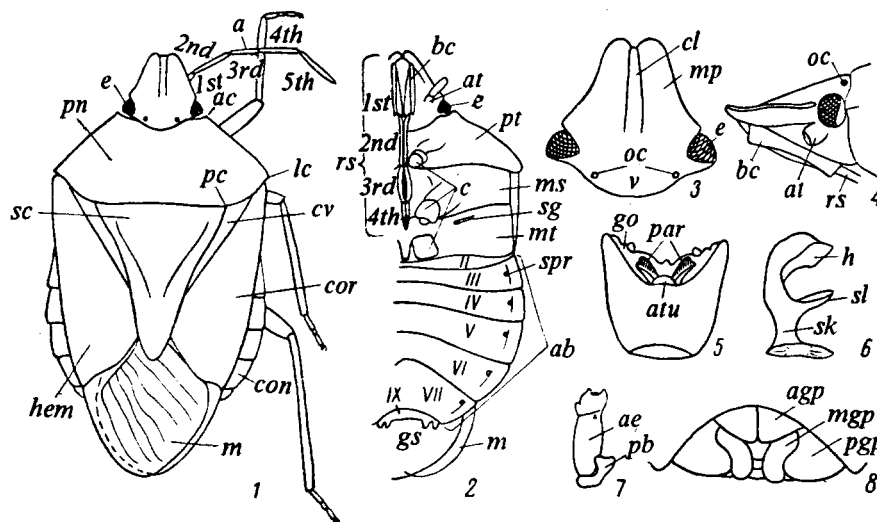


Fig. 487. Heteroptera. Family Pentatomidae. *Dolycoris baccarum* (after Kerzhner and Jaczewski).

1, 2, male, dorsal view and left half of venter (*at*, antenniferous tubercle; *a*, antenna; *e*, eye; *rs*, rostrum; *bc*, buccula; *pn*, pronotum; *ac*, anterior corner of pronotum; *lc*, lateral corner of pronotum; *pc*, posterior corner of pronotum; *pt*, prothorax; *ms*, mesothorax; *mt*, metathorax; *sg*, aperture of scent gland; *c*, coxae; *sc*, scutellum; *hem*, hemelytron; *cv*, clavus; *cor*, corium; *m*, membrane; *ab*, abdomen; *spr*, spiracle; *con*, connexivum; *gs*, genital segment; *1st-5th*, antennal and rostral segments; *II-IX*, abdominal segments); 3, 4, head, dorsal and lateral (*e*, eye; *v*, vertex; *cl*, clypeus; *mp*, mandibular plate; *at*, antenniferous tubercle; *oc*, ocelli; *bc*, buccula; *rs*, rostrum); 5, male genital segment, dorsal (*atu*, anal tube; *go*, genital opening; *par*, parameres); 6, right paramere (*h*, hypophysis; *sk*, stalk; *sl*, sensory lobe); 7, penis with theca (*pb*, phallobase; *ae*, aedeagus); 8, genital plates of female (*agp*, anterior genital plate; *mgp*, middle genital plate; *pgp*, posterior genital plate).

The male genital segment (segment IX) either occupies the apex of abdomen (Miridae, Nabidae, etc.), or is invaginated in the preceding segments so that only its posterior margin is visible (Pentatomidae, Coreidae, Lygaeidae, etc.) or the segment is completely invisible externally (most aquatic Heteroptera). Genital opening situated on dorsal side or apex of genital segment, usually broad, rarely slitlike (Nabidae). A flattened or cylindrical anal tube lies in the dorsal or anterior part of the genital opening. Two articulated appendages (parameres) are present at the sides of the genital opening (Figs. 486: 7-9, 487: 5, 6), sometimes completely visible on the outside (Nabidae, Anthocoridae, etc.), sometimes concealed within segment (some Pentatomomorpha). Parameres in Miridae, Coreidae and some other groups are asymmetrical, sharply differing in their shape; in some Anthocoridae, only the left paramere present. The paramere consists of stalk, body, sensory lobe and hypophysis.

The penis (Figs. 486: 10, 487: 7) lies within the genital segment. The part of the penis immediately taking part in copulation is called aedeagus. It is usually soft and membranous, sometimes provided with strongly sclerotized hooks, rods (spiculae) and other structures. The aedeagus is sometimes almost completely sclerotized or

ends in a twisted tube. The whole aedeagus or its apical part is often covered at rest with a thin but strong theca.

For dissection of the male genitalia, the genital segment or the apex of abdomen of dry or slightly moistened specimens should be cut off using dissecting or entomological pins (the genital segment of Pentatomomorpha can be squeezed out by a pin stuck into the abdomen ventrally or laterally in front of its apex). The separated part is placed on a slide in a drop of water for 0.5-5 minutes, until it becomes soft. Then, using pins, the genital segment is cleaned of remnants of other segments and ruptured, and the parameres and the penis are then separated. For examination of inner structures of the aedeagus the theca has to be removed. Inflation of the membranous parts of the aedeagus can be attained by placing the penis in 10% alkaline solution [p. 730] (NaOH or KOH) and then in distilled water. But the better method is dissection of the genitalia after short boiling of the genital segment or apex of abdomen in 10% alkaline solution and subsequent washing in water with addition of acetic acid. After such treatment, the parameres and penis may be easily separated and the genital segment preserved intact. If inflation of membranous structures of aedeagus is needed, dissection is to be made in distilled water after boiling in the alkaline solution, and washing in water with added acid made subsequently. The genitalia should be examined in water or glycerine. After examination, the genitalia should be glued to a piece of cardboard which is pinned under the insect; a water soluble glue should be used (in absence of special glue, saturated sugar solution is acceptable). The dissected genitalia can be also preserved in glycerine; the drop of glycerine is to be injected in microvials with rubber stopper, soldered in sections of transparent plastic tubes for cocktail, or placed in pits on pieces of correx ribbon covered with flat covers cut off from the same ribbon; in all cases the preparation is to be pinned under the specimen.

The external genitalia of the female consist of an ovipositor or of 3 pairs of genital plates if the ovipositor is reduced; the genital plates of Rhopalidae are more or less invaginated. For examination of the ectodermal parts of the internal female genitalia (bursa copulatrix, spermatheca) the apex of abdomen should be boiled in alkaline solution, washed and then dissected on a slide using preparatory or entomological pins. The female genitalia are examined and preserved like the male genitalia.

All measurements should be made in dorsal view. The length of body is to be measured from apex of head to end of hemelytra or (in brachypterous specimens, to end of abdomen), width of vertex in its narrowest part and width of eyes in their broadest part (Fig. 486: 5). For all parts of the body as base is considered the area nearest to and as apex the area most remote from the hind margin of pronotum; for rostrum, antennae, legs, and their segments, also for parameres and aedeagus as base is considered their part nearest to the place of attachment.

Larvae show the main morphological characters of imagines, but hemelytra and wings are in form of more or less large buds not contacting with each other and not separated distinctly from the scutellum; dorsum of abdomen usually with 1-3 pairs of openings of scent glands; ocelli always absent; tarsi never more than 2-segmented; antennae never more than 4-segmented.

The biology of Heteroptera varies widely. There are aquatic, semi-aquatic and terrestrial species. Some terrestrial species live in concealed habitats (e.g. beneath litter or bark, in the soil, etc.). Corixidae feed on algae and small aquatic animals; all other water bugs, all bugs living on the surface of water (water striders) and at the shores (Saldidae, Ochtheridae) are predacious. Among typical terrestrial Heteroptera, Dipsocoridae, Enicocephalidae, Nabidae, Anthocoridae, Reduviidae are predacious,

Cimicidae are blood-sucking parasites of warm-blooded animals (man, bats and birds). Tingidae are phytophagous; Miridae are mostly phytophagous, but some species are predacious or with mixed feeding (zoophytophages); most Pentatomomorpha are phytophagous, only some Lygaeidae and Pentatomidae secondarily became predacious. Most phytophagous species prefer generative organs of plants (flowers, ovaries and fruits), some may feed on mature seeds. Narrow food specialization is typical, especially of Tingidae and Miridae. The range of food plants of the adults is sometimes wider than that of larvae. The food plants are usually angiosperms, more rarely gymnosperms, but some species feed on algae (some Corixidae), mushrooms (most Aradidae, some Miridae), mosses (some Tingidae) and ferns (some Miridae). [p. 731]

The terrestrial Heteroptera deposit eggs in plant tissues (Miridae, Nabidae, etc.) or lay them on the surface of plants and other objects (Reduviidae, all Pentatomomorpha). The mode of life of the larvae is similar to that of the imagines. Larvae undergo 5 moultings (very rarely 4). Miridae (of the USSR fauna) hibernate mainly as eggs, most other families hibernate as adults, but there are exceptions in both groups. Hibernation of larvae, or of various stages of development at the same time, is rarely observed. Some species migrate to adjacent forests or mountains for hibernation; some aquatic bugs (Naucoridae) and the water striders hibernate on dry land. Usually one generation per year, in the south and in some smaller species there may be two or more generations; some Reduviidae have 2-year development period.

Many Heteroptera, both aquatic and terrestrial, have devices of various position and structure for sound production. Some species, especially among Corixidae and Miridae, are attracted to light.

There are a number of serious agricultural and silvicultural pests among the Heteroptera, but only few of them occur in the Far East (*Aelia* spp., *Eurydema* spp., *Lygus* spp., *Trigonotylus caelestialium*, *Adelphocoris lineolatus*, etc.). Sucking of the vegetative organs of the plant is injurious to shoots, in adult plants it is injurious only in heavy infestation. Much greater damage is caused by sucking of ovaries and seeds, reducing the yield, the rate of germination and the consumption quality of the seeds; however, there are observations that sucking of the seeds by Miridae increase their germinating ability. Some (very few) species are recorded as vectors of viral diseases of plants. The harm caused to man by bed bugs is well known. Water bugs serve as food for fish, but sometimes they destroy spawn and fry. There are data on feeding of water bugs on larvae of mosquitoes. Predacious bugs, especially some species of Anthocoridae, Miridae and Nabidae, reduce the number of agricultural pests. Small species of Anthocoridae and Miridae are prospective for use in biological control.

Water Heteroptera and water striders are usually collected with a water net. They are kept dry or in 70% alcohol. Terrestrial Heteroptera are collected with a hand net from herbs, shrubs and trees, by shaking off from trees and shrubs in a net of larger diameter (to 1 meter) or examination of soil, litter and under plants, better when lying on ground. Some species (those living under bark, in the soil, on shores, etc.) are collected with special methods. Insects (except for the largest ones) are taken by aspirator. The specimens are killed in special container with cyanide or acetic ether (chloroform or sulphureous ether may be used as well). Large species with hard integument are pinned through the right side of scutellum; smaller species (usually less than 5 millimeters), narrow insects (Berytidae and some others) and delicate species (all Miridae, many Nabidae) are glued to rectangular or triangular pieces of cardboard which are then pinned. Small Corixidae are glued on triangles, larger ones pinned on the right hemelytron. Antennae and legs should be spread (as in Figs, 486:

1, 487: 1); wings should not be spread.

About 40 thousand species of Heteroptera are described. They are subdivided into about 50 families (up to 75 in the opinion of some authors). More than 2000 species of 40 families have been recorded from the USSR. About 800 species of about 300 genera are found in the Russian Far East. The fauna of the south of Primorsk Territory is the richest in the region. [p. 732]

LITERATURE. Esaki, T. 1932, 1950. Heteroptera. In: Esaki, T. et al. Iconographia Insectorum Japonicorum, ed. 1: 1556-1696, ed. 2: 179-270. Tokyo. [In Japanese]. – Hsiao Tsai-yu et al. 1977, 1981. A handbook for the identification of the Chinese Hemiptera-Heteroptera, vol. 1, 330 pp., vol. 2, 654 pp. Beijing. [In Chinese]. – Kerzhner, I.M. and T.L. Jaczewski, 1964. Order Hemiptera (Heteroptera) – bugs. In: Bei-Bienko, G.Ya. (ed.). Opredelitel' nasekomykh evropeiskoi chasti SSSR [Keys to the insects of the European USSR] 1: 655-845, Leningrad. [In Russian; English translation: 1967, Israel Program for Scientific Translation, Jerusalem, pp. 851-1118]. – Kiritshenko, A.N. 1951. Nastoyashchie poluzhestkokrylye evropeiskoi chasti SSSR (Hemiptera): opredelitel' i bibliografiya [True bugs (Hemiptera) of the European USSR: keys and bibliography]. 423 pp. Moscow & Leningrad. [In Russian]. – Kiritshenko, A.N. 1957. Metody sbora nastoyashchikh poluzhestkokrylykh i izucheniya mestnykh faun. Izdanie vtoroe [Methods of collecting of true bugs and study of local faunas. 2nd ed.]. 123 pp. Moscow & Leningrad. [In Russian]. – Miyamoto, S. and T. Hidaka. 1965. Heteroptera. In: Iconographia Insectorum Japonicorum colore naturale edita 3: 75-108. Tokyo. [In Japanese]. – Putshkov, V.G. 1972. Order Hemiptera (Heteroptera) – bugs. In: Nasekomye i kleshchi – vrediteli sel'skokhozyaistvennykh kul'tur [Insects and mites injurious to agricultural plants], vol. 1, p. 222-262. Leningrad. [In Russian]. – Putshkov, V.G. and L.V. Putshkova. 1956. Eggs and larvae of true bugs injurious to agricultural plants. Trudy Vsesoyuz. Entomol. Obshch. 45: 218-342. [In Russian]. – Stichel, W. 1955-1962. Illustrierte Bestimmungstabellen der Wanzen. II. Europa. Vols 1-4. Berlin. – Vinokurov, N.N. 1979. Nasekomye poluzhestkokrylye (Heteroptera) Yakutii [Heteroptera of Yakutia], 232 p, Leningrad. [In Russian; English translation: 1988, Amerind, New Dehli].

KEY TO FAMILIES

E.V. Kanyukova and I.M. Kerzhner

1. Antennae very short, much shorter than head, situated ventral to eyes, not visible or almost not visible in dorsal view 2
- Antennae long, longer than head, or as long as head, well visible in dorsal view (sometimes hidden under body at rest) 9
2. Ocelli present. Living on humid ground on shores 6. **Ochteridae** (p. 745)
- Ocelli absent. Aquatic 3
3. Apex of abdomen with respiratory tube, long or short, often withdrawn. Body length, with respiratory tube, more than 17 4
- Apex of abdomen without respiratory tube. Body length less than 17 5
4. Middle and hind legs simple, cursorial. End of abdomen with long (short in *Nepa hoffmanni*) respiratory tube 3. **Nepidae** (p. 737)
- Hind legs natatorial, with dense setae. Respiratory tube short, withdrawing, often invisible 4. **Belostomatidae** (p. 738)
5. Body dorsoventrally flattened, hemelytra lying almost flat on back 6
- Body not flattened, hemelytra lying rooflike on back, forming a distinct rib in posterior part of dorsum 8
6. Body elongate, with parallel lateral margins; pronotum is stretched in the form of triangle backwards and covering scutellum, or (*Micronecta*) body very small, shorter than 4 5. **Corixidae** (p. 739)
- Body broad-oval or almost round; pronotum not covering scutellum; body length not less than 7 7
7. Head almost twice as broad as long. Rostrum reaching only fore coxae 7. **Naucoridae** (p. 745)
- Head approximately as broad as long. Rostrum reaching at least metathorax 8. **Aphelocheiridae** (p. 745)

8. Body elongate, length about 12-15 9. **Notonectidae** (p. 746)
- Body very small (not longer than 3), almost spherical..... 10. **Pleidae** (p. 747)
9. Venter of body covered with dense, short, adpressed silvery hydrofuge setae. Living on surface of water, sometimes in humid moss or on humid shores .. 10
- Venter of body without dense, short, adpressed silvery setae, but sometimes covered with different setae. Terrestrial, sometimes occuring on humid shores or on aeric parts of aquatic plants 14
10. Small species (to 4) 11
- Large (6-17) 13
11. Claws situated in lateral depression before apex of tarsus. Antennae 4-segmented 15. **Veliidae** (p. 757) [p. 733]
- Claws situated at the apex of 2nd tarsal segment 12
12. Antennae 5-segmented 13. **Hebridae** (p. 756)
- Antennae 4-segmented 12. **Mesoveliidae** (p. 755)
13. Body very elongate and narrow, needle-shaped. Head very elongate; eyes situated far from anterior margin of pronotum 14. **Hydrometridae** (p. 757)
- Body not so narrow. Head short; eyes more or less near anterior margin of pronotum 16. **Gerridae** (p. 758)
14. Antennae 4-segmented (rarely with small intercalary segments). Scutellum covering less than 1/3 of abdomen length 15
- Antennae 5-segmented. Scutellum covers not less than 1/3 of abdomen length, sometimes even all dorsum 33
15. Fore tibiae strongly thickened to apex; fore tarsi 1-segmented (Fig. 488: 8) 2. **Enicocephalidae** (p. 737)
- Fore tibiae, as a rule, not thickened to apex, fore tarsi 2–3-segmented 16
16. 1st and 2nd antennal segments thick and short; 3rd and 4th segments very thin, filiform, covered with long erect setae; 3rd segment markedly longer than 2nd segment (Fig. 488: 1). Small species: 1-2.5 1. **Dipsocoridae** (p. 735)
- Antennae of different form; if the 3rd antennal segment is longer than 2nd segment, it is thicker, not filiform, and body with more or less hard integument, usually longer than 2.5 17
17. Veins of hemelytral membrane form 4-5 large closed cells, no veins originating from them (Figs. 494: 1-3). Ocelli contiguous or separated; in this case, distance between them not greater than diameter of ocelli. 3rd (penultimate) segment forming almost 3/4 of total length of rostrum..... 11. **Saldidae** (p. 747)
- Membrane venation different, if longitudinal cells present, their number not more than 3 or some veins originate from cells 18
18. Pronotum pentagonal; its posterior margin produced into large triangular process completely covering scutellum. Hemelytra, as a rule, with alveolate or reticulate structure 22. **Tingidae** (p. 857)
- Pronotum tetragonal or hexagonal; scutellum free dorsally 19
19. Eyes and ocelli (if present) displaced to the sides of the head and not visible in dorsal view. Fore femora very thick; fore tibiae sword-shaped, half as long as femora, fore tarsi displaced to the lateral side of tibiae 23. **Reduviidae** (part, genus *Phymata*) (p. 869)
- Eyes and ocelli visible in dorsal view; fore legs of different structure 20
20. Rostrum curved, not apposed to venter, while body length not less than 6 ... 21
- Rostrum not curved, apposed to venter at rest; if rostrum curved (some Anthocoridae, Microphysidae), body less than 5 22
21. Head without transverse groove anterior to ocelli. Rostrum 4-segmented (1st segment very short). Membrane of macropterous forms with 3 cells

- 17. **Nabidae** (p. 761)
- Head with transverse groove separating vertex with ocelli. Rostrum 3-segmented. Membrane of macropterous forms with 2 cells ... 23. **Reduviidae** (part) (p. 869)
- 22. Clypeus triangular (base of triangle anteriorly). Habitus as in bed bug. Ocelli absent. Hemelytra much shortened 19. **Cimicidae** (p. 776)
- Clypeus with more or less parallel lateral margins. If habitus resembles bed bug (some Anthocoridae), ocelli present and hemelytra complete 23
- 23. Mesothorax and metathorax with separated lateral parts (pleurites) (Fig. 486: 1). If hemelytra complete, a triangular section (cuneus) is separated by fracture at the apex of coriaceous part (Fig. 486: 2) 24 [p. 734]
- Mesothorax and metathorax entire, with fused pleurites. Hemelytra without cuneus 26
- 24. Rostrum 4-segmented. Membrane, if hemelytra complete, with 2 (rarely with 1) cells. Ocelli absent; if ocelli present (Isometopinae), head strongly flattened anteriorly, in form of rectangular plate in front view, with eyes situated in dorsolateral corners of plate and antennae situated below its ventral margin (Figs. 511: 3, 4, 6, 7) 21. **Miridae** (p. 778)
- Rostrum 3-segmented. Membrane usually with indistinct venation or 1 cell. Ocelli present 25
- 25. Membrane without closed cells, usually with indistinct venation or 3-4 almost straight veins. Tarsi usually 3-segmented 18. **Anthocoridae** (p. 768)
- Membrane with small cell, one short vein originating from its apex. Tarsi 2-segmented 20. **Microphysidae** (p. 777)
- 26. Tarsi 2-segmented 27
- Tarsi 3-segmented 28
- 27. Scutellum very small 1/6 to 1/3 as long as pronotum. Clavi of hemelytra not tapering posteriorly, contiguous posterior to scutellum; pronotum and hemelytra with cellular structure. Hemelytra covering dorsally the whole abdomen 25. **Piesmatidae** (p. 881)
- Scutellum large, almost of the same length as pronotum. Clavi of hemelytra tapering posteriorly, not contiguous posterior to scutellum. Pronotum and hemelytra without alveolate structure. Hemelytra not covering at least part of sides of abdomen 24. **Aradidae** (p. 873)
- 28. Membrane of hemelytron with few veins (not more than 8); veins sometimes indistinct. If hemelytra shortened, body not green and less than 7 29
- Membrane of hemelytron with numerous veins. If hemelytra shortened (*Myrmus*), body green and more than 7. Ocelli always present 31
- 29. Ocelli absent 28. **Pyrhcoridae** (p. 902)
- Ocelli present 30
- 30. Head with transverse groove anterior to ocelli. Eyes near the middle of head length. 1st antennal segment much longer than head 26. **Berytidae** (p. 882)
- Head without transverse groove anterior to ocelli. Eyes closer to posterior margin of head 27. **Lygaeidae** (p. 883)
- 31. Openings of scent glands well visible laterally, often ear-shaped 32
- Openings of scent glands badly visible, situated between middle and hind coxae 31. **Rhopalidae** (p. 906)
- 32. Genae conical, projecting far beyond apex of clypeus (Fig. 556: 1). Antennae with broad dark and whitish rings 29. **Stenocephalidae** (p. 903)
- Genae not conical, shorter than clypeus. Antennae of different color, often uniformly colored 30. **Coreidae** (p. 904)
- 33. Antennal fossae well visible dorsally 32. **Urostylidae** (p. 909)

- Antennal fossae not visible dorsally, being covered by sides of head 34
- 34. Tarsi 2-segmented 35
- Tarsi 3-segmented 36
- 35. Scutellum rounded, reaching apex of abdomen. Species from Far East almost hemispherical and almost completely black 33. **Plataspidae** (p. 911)
- Scutellum triangular, covering not more than 2/3 of length of abdomen. Body not hemispherical, not black 34. **Acanthosomatidae** (p. 912)
- 36. Tibiae with long thick spines; legs fossorial. Abdominal sternite II [p. 735] completely or almost completely covered by metathorax 35. **Cydnidae** (p. 915)
- Tibiae without long thick spines. Abdominal sternite II free 37
- 37. Scutellum very large, covering almost the whole abdomen and reaching its apex; base of scutellum broader than posterior margin of pronotum between its posterior corners (but not between its lateral corners) 36. **Scutelleridae** (p. 918)
- Scutellum either covering less than 2/3 of length of abdomen, or reaching apex of abdomen (Podopinae); in this case, base of scutellum narrower than pronotum between its posterior corners 37. **Pentatomidae** (p. 919)

Infraorder DIPSOCOROMORPHA

1. Family DIPSOCORIDAE

I.M. Kerzhner

Very small, grayish, brown, or black. Ocelli close to eyes. 1st and 2nd antennal segments rodlike; 3rd and 4th segments very slender, filiform, with long protruding bristles. Rostrum with 4 segments. Pronotum trapezoidal. Hemelytra without distinct division in coriaceous and membranous parts, often somewhat shortened. Predators. Adults hibernate (at least in some species). Small family, most species tropical. – 2 genera, 5 species (in USSR 3 genera, 11 species).

KEY TO GENERA

- 1. Rostrum slender, reaching hind coxae or beyond them; 2nd segment of rostrum tapering apically. Fracture separating cuneus hardly distinguishable or absent. Male genital segment symmetrical. (Subfamily Ceratocombinae) 1. **Ceratocombus**
- Rostrum thick, not reaching farther than middle coxae in species from Far East. Fracture separating cuneus well distinguished, milk-whitish. Male genital segment asymmetrical. (Subfamily Dipsocorinae) 2. **Cryptostemma**

KEY TO SPECIES OF FAMILY DIPSOCORIDAE

Subfamily CERATOCOMBINAE

Sometimes regarded as a separate family. In USSR 1 genus.

1. **Ceratocombus** Sign. Dark gray to black, macropterous (with membranes overlapping) or brachypterous (with hemelytra more or less reaching apex of abdomen or reaching beyond it, but not overlapping). – 4 species (in USSR 5).

- 1. Lateral margin of pronotum with 3 long erect bristles (Fig. 488: 1). Posterior part of eye with a bristle protruding laterad. Corium with small triangular cell inside of large cell (Fig. 488: 2). Fore tarsi in male 3-segmented, thickened, in female 2-

- segmented, slender; middle tarsi 2-segmented; hind tarsi 3-segmented. (Subgenus *Ceratocombus* Sign.). Brachypterous males 1.45-1.6; females 1.6-1.9; macropterous females (very rare) 2.15. – S Khab., Amur., Prim., S Kur. – Forest zone of Palearctic. – In the litter in forests, sometimes in meadows. April to May and August to October. (Fig. 488: 1) **C. (C.) coleoptratus** Zett.
- Lateral margin of pronotum and eye laterally without bristles. Corium without additional triangular cell (Figs. 488: 3-5). All tarsi in both sexes slender, 2-segmented. (Subgenus *Xylonannus* Reut.) 2 [p. 736]

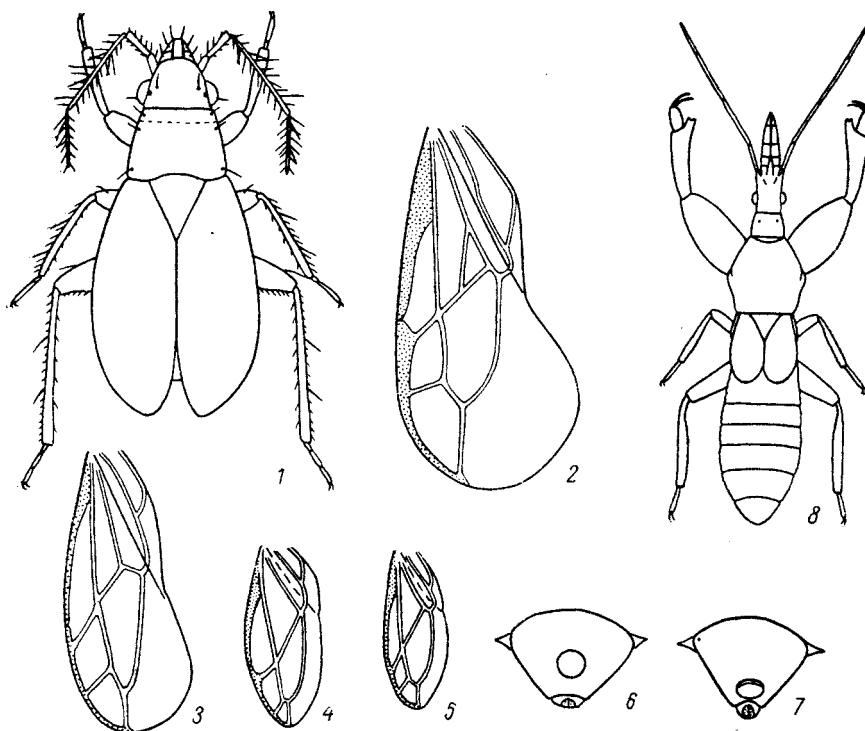


Fig. 488. Heteroptera. Families Dipsocoridae and Enicocephalidae (after Kerzhner and original).

1, 2, *Ceratocombus coleoptratus*: 1, brachypterous female; 2, hemelytron of macropterous female; 3-5, hemelytra of brachypterous female: 3, *C. corticalis*; 4, *C. plebejus*; 5, *C. japonicus*; 6, 7, apex of female abdomen: 6, *C. plebejus*; 7, *C. japonicus*; 8, *Boreostolus sikhotalinensis*, brachypterous female.

2. Larger: brachypterous males and females 1.8-2.1; macropterous males and females 2.1-2.45. – S Prim., S Kur. – Forest zone of Palearctic. – Under bark of stubs and felled trees in old forests. August and September **C. (X.) corticalis** Reut.
- Even macropterous specimens not more than 1.75. In litter in light oak forests 3
3. Of the 3 veins connecting the hind cell of corium with the hemelytron margin, 2 distal ones markedly drawn together with bases or even beginning with common trunk (Fig. 488: 4). In females, distance between anal opening and apex of ovipositor nearly equal to the width of the opening (Fig. 488: 6); pronotum in brachypterous females 2-2.2 times, in macropterous females 2.25-2.5 times as wide as long, with strongly diverging lateral margins. Males always macropterous. Males 1.5-1.7; brachypterous females 1.3-1.5; macropterous females 1.7-1.75. – S Prim. (Khasan District). – Japan. – August and September **C. (X.) plebejus** Popp.

- Base of the middle of the 3 veins mentioned above only 1.5-2 times more distant from the base of the proximal vein than from the base of the distal one (Fig. 488: 5). In females, anal opening almost adjoining apex of ovipositor (Fig. 488: 7); pronotum in brachypterous females 1.5 times, in macropterous females 1.95-2.05 times as wide as long; its lateral margins less diverging; males unknown. Brachypterous females 1.25; macropterous females 1.6-1.7. – S Kur. (Kunashir I.). – Japan. – August and September **C. (X.) japonicus** Popp.

Subfamily DIPSOCORINAE

In USSR 2 genera, 6 species. [p. 737]

2. **Cryptostemma** H.-S. (*Dipsocoris* Haliday). – 1 species (in USSR 4).

1. Light brown; hemelytra shining, whitish brown, always complete; legs, antennae and rostrum yellow. 1.8-2. – S Prim. – Japan. – Under stones on wet sand on river banks. Adults hibernate and can be met until early June; adults of the new generation from late August **C. japonicum** Miy.

Infraorder ENICOCEPHALOMORPHA

2. Family ENICOCEPHALIDAE (HENICOCEPHALIDAE)

I.M. Kerzhner

Body elongate. Head strongly elongate; eyes situated near the middle of head length; a deep transverse groove posterior to eyes; ocelli situated behind this groove. Antennae 4-segmented, slender. Rostrum 4-segmented, very thick and short (shorter than head). Fore femora thickened to the middle; fore tibiae strongly widened to apex and with process in inner corner; fore tarsi in USSR species 1-segmented, with 2 claws of different lengths. Predators. Most species in tropics. – 1 genus, 1 species (in USSR 2 genera, 2 species).

KEY TO SPECIES OF FAMILY ENICOCEPHALIDAE

1. **Boreostolus** Wyg. et Štys. In USSR 1 species.
1. Dirty yellow to dark brown. Hemelytra usually shortened, only 2.5-3 times as long as scutellum, in this case ocelli very small and pronotum hexagonal; rarely hemelytra complete, in this case ocelli large and pronotum almost trapezoidal. 3.3-4.1. – Mag., Prim. – Under stones on wet sand on river banks. May to early June and late August to September; probably adults hibernate. (Fig. 488: 8). Specimens from Mag. (Dukcha River, 25 km NE of Magadan) have eyes larger and antennae longer than in specimens from Prim. In these characters they are similar to *B. americanus* Wyg. et Štys from USA **B. sikhotalinensis** Wyg. et Štys

Infraorder NEPOMORPHA

3. Family NEPIDAE

E.V. Kanyukova

Middle and hind legs with relatively weakly developed setae. Respiratory tube in larvae shorter and thicker than in adults. Predators. Badly swimming, walking at bottom of waterbodies or on aquatic plants. In USSR 2 genera, 5 species.

KEY TO GENERA

1. Body oblong-oval, flat (Fig. 489: 3). Head across eyes narrower than anterior margin of pronotum. Pronotum trapezoidal. (Subfamily Nepinae) 1. **Nepa**
- Body very elongate, rodlike (Fig. 490: 1). Head across eyes broader than anterior margin of pronotum. Pronotum long and narrow, its posterior part widened. (Subfamily Ranatrinae) 2. **Ranatra**

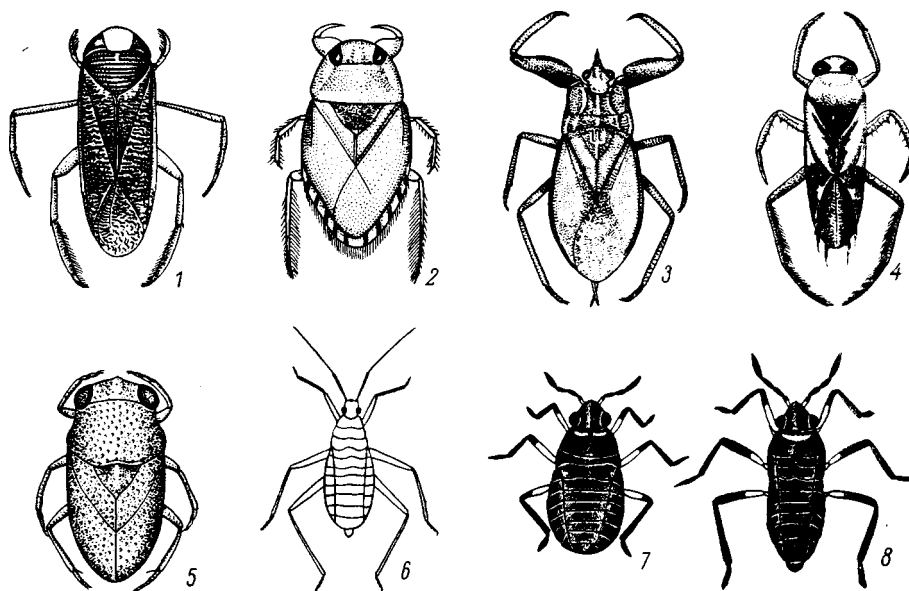


Fig. 489. Heteroptera (after Esaki, Jaczewski, and Macan).

1, *Hesperocorixa distanti*; 2, *Ilyocoris cimicoides*; 3, *Nepa hoffmanni*; 4, *Notonecta triguttata*; 5, *Plea indistinguenda*; 6, *Mesoveliea furcata*; 7, *Microvelia reticulata*; 8, *M. buenoi*.

KEY TO SPECIES OF FAMILY NEPIDAE

1. **Nepa** L. In USSR 2 species. [p. 738]
 1. Respiratory tube short, not longer than 3. Scutellum with 3 longitudinal ribs (Fig. 489: 3). 20-23. – S Prim. (very rare). – Japan, E China **N. hoffmanni** Esaki
 - Respiratory tube longer: 8-12. Scutellum almost smooth, longitudinal ribs poorly expressed. 18-22. – S Prim. – Almost whole Palearctic, except north **N. cinerea** L.
2. **Ranatra** F. – 2 species (in USSR 3).
 1. 37-53. Hind femora longer, reaching beyond suture between ultimate and penultimate sternites of abdomen. Process of mesothorax between middle and hind coxae as in Fig. 491: 2. – S Khab., Prim., S Kur. – Japan, Korea, China, Vietnam. (Fig. 490: 1) **R. chinensis** Mayr
 - 24-32. Hind femora shorter, not reaching suture between ultimate and penultimate sternites of abdomen. Process of mesothorax as in Fig. 491: 1. – Prim. – Japan, Korea, China **R. unicolor** Scott

4. Family BELOSTOMATIDAE

E.V. Kanyukova

Largest aquatic bugs; distributed mainly in tropical regions. Eggs laid on back of males. Predators. In USSR 2 genera, 2 species.

LITERATURE. Lauck, D.R. and A.S. Menke. 1961. The higher classification of the Belostomatidae (Hemiptera). Ann. Entomol. Soc. Amer. 54 (5): 644-657.

KEY TO GENERA

1. Pubescence of ventral side of segment IV of connexivum reaching lateral margin of abdomen. Fore tarsus with 1 claw. Body longer than 60. (Fig. 490: 4) 1. **Lethocerus** [p. 739]

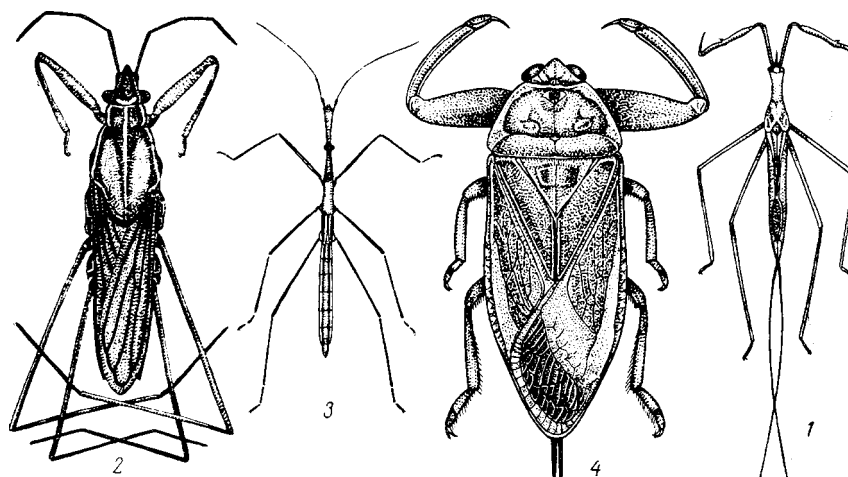


Fig. 490. Heteroptera (after Wróblewski, Miyamoto, and original).

1, *Ranatra chinensis*; 2, *Gerris insularis*; 3, *Hydrometra gracilentia*; 4, *Lethocerus deyrollei*.

- Pubescence of ventral side of segment IV of connexivum not reaching lateral margin of abdomen. Fore tarsus with 2 claws. Body shorter than 30 2. **Diplonychus**

KEYS TO SPECIES OF FAMILY BELOSTOMATIDAE

1. **Lethocerus** Mayr. In USSR 1 species.

1. Body yellow-brown. 65-75. – S Prim. – Japan, Korea, E China, SE Asia. – In rivers. (Fig. 490: 4) **L. deyrollei** Vuillefroy

2. **Diplonychus** Lap. In USSR 1 species.

1. Dorsum of body dark brown. 20-28. – S Khab., Amur., Prim., S Sakh. – Japan, Korea, E China. – In stagnant waters. To this species refer records of *D. japonicus* Vuillefroy (*lewisi* Scott) from USSR, including those from S Sakh. **D. major** Esaki

5. Family CORIXIDAE

E.V. Kanyukova

Head vertical; anterior part of head directed ventrad and bent under thorax. Palearctic species without ocelli. Abdominal segments and copulatory apparatus of male asymmetrical; abdominal tergum VI usually with strigil, consisting of one or several combs. Female without ovipositor. Adults and larvae with well developed and functioning scent glands. Feeding on plants and animals; sometimes exterminating larvae of mosquitoes. Aquatic; hibernating in the water. Most species fly well, and are often attracted to light at night. – 7 genera, 26 species (in USSR 9 genera, more than 70 species).

KEY TO GENERA

1. Scutellum covered by posterior margin of pronotum (Fig. 489: 1). Antennae 4-segmented; 3rd antennal segment the longest. Claws of hind tarsi reduced, located laterally, not reaching end of 2nd segment 2
- Scutellum free. Antennae 3-segmented; 3rd antennal segment the longest. Claws of hind tarsi at the end of 2nd segment. (Subfamily Micronectinae) 7. **Micronecta** [p. 740]
2. Anterior side of rostrum with transverse ribs. (Subfamily Corixinae). Tarsi of fore legs widened, spatulate or spoon-shaped, in male with 1 or 2 rows of short thick pegs (Figs. 491: 15, 19, 22, 25; 492: 1, 3, 5, 7, 9, 11, 14, 17, 20, 22). Males of most species with strigil (Figs. 491: 3, 17) 3
- Anterior side of rostrum smooth. (Subfamily Cymatiinae). Fore tarsi rodlike, in male without pegs. Strigil absent in males 6. **Cymatia**
3. Body width not less than 5. Lateral lobes of prothorax trapezoidal, truncate (Fig. 491: 4). Strigil of male large, longitudinally elliptic, situated at the left side (Fig. 491: 3) 1. **Corixa**
- Body width not more than 3.5. Lateral lobes of prothorax tongue-shaped, rounded at the end (Fig. 491: 5). Strigil of male at right side or absent (males with left-side position of strigil very rarely met) 4
4. Eyes moderately convex; head rim narrow posterior to eyes. Frons of female convex; frons of male with differently developed depression, without dense setae 5
- Eyes strongly convex; head rim broad posterior to eyes (Fig. 491: 6). Frons in female flat, in male depressed, in both sexes covered with dense tufts of setae 5. **Glaenocorisa**
5. Pronotum with distinct longitudinal keel not less than in 2/3 of its length 3. **Arctocorisa**
- Pronotum without keel or with vestigial keel in the form of oblong tubercle near anterior margin 6
6. Body length not less than 9.5 in Far East species 2. **Hesperocorixa**
- Body length not more than 9 in Far East species 4. **Sigara** [p. 741]

KEYS TO SPECIES OF FAMILY CORIXIDAE

1. **Corixa** Geoffr. Largest representatives of the family. – Occurrence of 1 species possible (in USSR 5).

1. Light pattern on hemelytra interrupted by dark one, not forming distinct trans-

verse lines. Frons of female convex; frons of male with slight depression. Male fore tarsus with 1 row of pegs subparallel to dorsal margin of tarsus. Strigil as in Fig. 491: 3. 13-16. – ?Amur.; Siberia. – N and C Europe..... **C. dentipes** Thomson

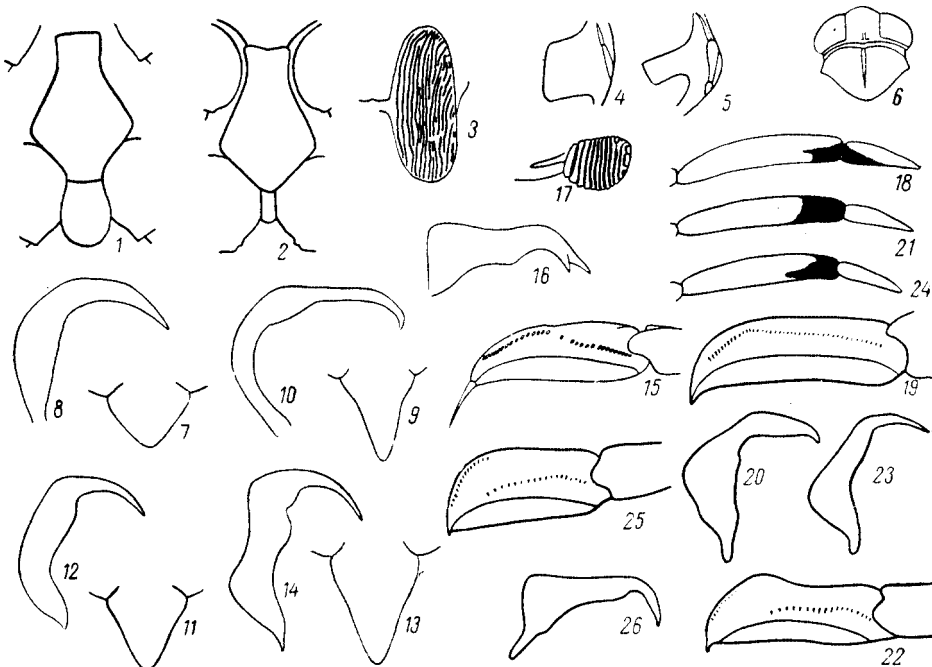


Fig. 491. Heteroptera. Families Nepidae and Corixidae (after Stichel, Jansson, Jaczewski, and original).

1, 2, process of mesothorax: 1, *Ranatra unicolor*; 2, *R. chinensis*; 3, *Corixa dentipes*, strigil; 4, 5, lateral lobe of prothorax: 4, *Corixa* sp.; 5, *Sigara* sp.; 6, *Glaenocoris propinqua*, head and pronotum, dorsal view; 7, 8, *Hesperocoris mandshurica*: 7, xyphus of metathorax; 8, right paramere; 9, 10, *H. spatulata*: 9, xyphus of metathorax; 10, right paramere; 11, 12, *H. ussuriensis*: 11, xyphus of metathorax; 12, right paramere; 13, 14, *H. distanti*: 13, xyphus of metathorax; 14, right paramere; 15-17, *Arctocoris kurilensis*: 15, fore tarsus of male; 16, right paramere; 17, strigil; 18-20, *Sigara concinna*: 18, hind tarsus; 19, fore tarsus of male; 20, right paramere; 21-23, *S. praeusta*: 21, hind tarsus; 22, fore tarsus of male; 23, right paramere; 24-26, *S. producta*: 24, hind tarsus; 25, fore tarsus of male; 26, right paramere.

2. **Hesperocoris** Kirk. Light pattern on hemelytra consists of distinct transverse lines. Frons of male with well developed depression; fore tarsus with 1 row of pegs. – 4 species (in USSR 9).

1. Xyphus of metathorax (process between hind coxae) broad-triangular (Fig. 491: 7). The first two pale lines on pronotum somewhat wider than other and fusing together at the sides of pronotum. Right paramere as in Fig. 491: 8. 9.5-11. – Prim. – Korea, NE China **H. mandshurica** Jacz.
- Xyphus of metathorax elongate (Figs. 491: 9, 11, 13) 2
2. Xyphus of metathorax with markedly concave lateral margins (Fig. 491: 9). Male fore tarsus apically widened and turned inside. Right paramere as in Fig. 491: 10. 9.5-10. – Prim. – NE China **H. spatulata** Hung.
- Xyphus of metathorax with weakly concave lateral margins (Figs. 491: 11, 13). Male fore tarsus apically slightly widened and not turned inside 3
3. Xyphus of metathorax shorter (Fig. 491: 11). Right paramere with narrower basal half, with hardly emarginated external margin (Fig. 491: 12). 9.5-10.5. – Prim.; Chita Prov. – NE China **H. ussuriensis** Jacz.

- Xyphus longer (Fig. 491: 13). Right paramere with more wide basal half, with distinctly emarginated external margin (Fig. 491: 14). 9.5-11.5. – Sakh., S Kur. – Japan. (Fig. 489: 1) **H. *distanti*** Kirk.

3. *Arctocoris* Wall. – 1 species (in USSR 5).

1. Pronotum with about 10 pale transverse lines. Fore tarsus of male strongly concave, with 1 row of pegs (Fig. 491: 15). Strigil almost rounded (Fig. 491: 17). Right paramere bifurcate at apex (Fig. 491: 16). 8-9.5. – Mag., Kamch., Komandorskie Islands, N Khab., Kur. Records of *A. carinata* C. Sahlb. and *A. convexa* Fieb. from Far East refer to this species **A. *kurilensis*** Jansson

4. ***Sigara*** F. Frons in females convex, in males with more or less developed depression. The species of this genus can be united in small natural groups on the basis of similarity in details of structure. Classification of the genus unstable, needing further work; some authors consider subgenera *Paracoris* and *Callicoris* as genera. – 13 species (in USSR more than 40). {Subsequently added: *S. (Vermicoris) lateralis* Leach, S Prim.}.

1. Hind tarsi with distinct black spots of different form and position. Strigil reduced 2
- Hind tarsi without dark spots. Strigil developed, sometimes absent 4
2. Dark spot on hind tarsi at the end of 1st and at the base of 2nd segments (Fig. 491: 18). Male fore tarsus with 1 row of pegs (Fig. 491: 19). (Subgenus *Paracoris* Stich.). Right paramere as in Fig. 490: 20. 7-7.5. – Amur., Prim. – Southern part of Palearctic. In Far East subspecies *amurensis* Jacz. ... **S. (P.) *concinna*** Fieb. [p. 742]
- Dark spot on hind tarsi mainly at the apical part of 1st segment; 2nd segment pale or darkened only at the margins and at the end, but its base always pale. Male fore tarsus always with 2 rows of pegs. (Subgenus *Callicoris* B. White) ... 3
3. Black spot at the end of 1st segment of hind tarsi large, quadrangular (Fig. 491: 21). Fore femora of male without tuft of long setae at the anterior side. Fore tarsus of male with semicircular subapical bulge at dorsal margin which is slightly turned inside; pegs situated as in Fig. 491: 22. Right paramere as in Fig. 491: 23. 7-8. – Mag., Kamch., Amur. – Transpalearctic **S. (C.) *praeusta*** Fieb.
- Black spot at the end of 1st segment of hind tarsi not very large, often occupying only inner apical corner of the segment or forming black border at apical part of 1st, at margins and at the end of 2nd segments (Fig. 491: 24). Fore femora of male with dense tuft of long setae at the anterior side. Fore tarsus of male without subapical bulge at dorsal margin; pegs situated as in Fig. 491: 25. Right paramere as in Fig. 491: 26. 7-8.5. – Mag., Kamch., Khab., Amur., Sakh. – N Hol-arctic **S. (C.) *producta*** Reut.
4. Fore tarsus of male with 2 rows of pegs, basal and apical, separated by a space or more sparse pegs 5 [p. 743]
- Fore tarsus of male with 1 longitudinal row of pegs (Figs 492: 9, 11); sometimes there is a 2nd short row of parallel pegs at the apical part of tarsus (Fig. 492: 7) 7
5. Claw of middle leg as long as tarsus. Strigil large, longitudinally ellipsoid. (Subgenus *Sigara* F.). Male fore tarsus with 2 rows of pegs separated by more sparse pegs (Fig. 492: 1). Right paramere as in Fig. 492: 2. 8-9. – Amur., S Khab., Prim., Sakh.; E Siberia – E Mongolia **S. *jaczewskii*** Lundbl.
- Claw of middle leg longer than tarsus. Strigil small. (Subgenus *Subsigara* Stich.) 6

6. Pronotum with 6-7 regular transverse pale lines. Dorsal side of hind femora with only 3-4 small spinules. Male fore tarsus as in Fig. 492: 3. Strigil small. Right paramere as in Fig. 492: 4. 6-7. – Amur., Prim.; Chita Prov. – Korea, NE China, E Mongolia **S. (S.) weymarni** Hung.

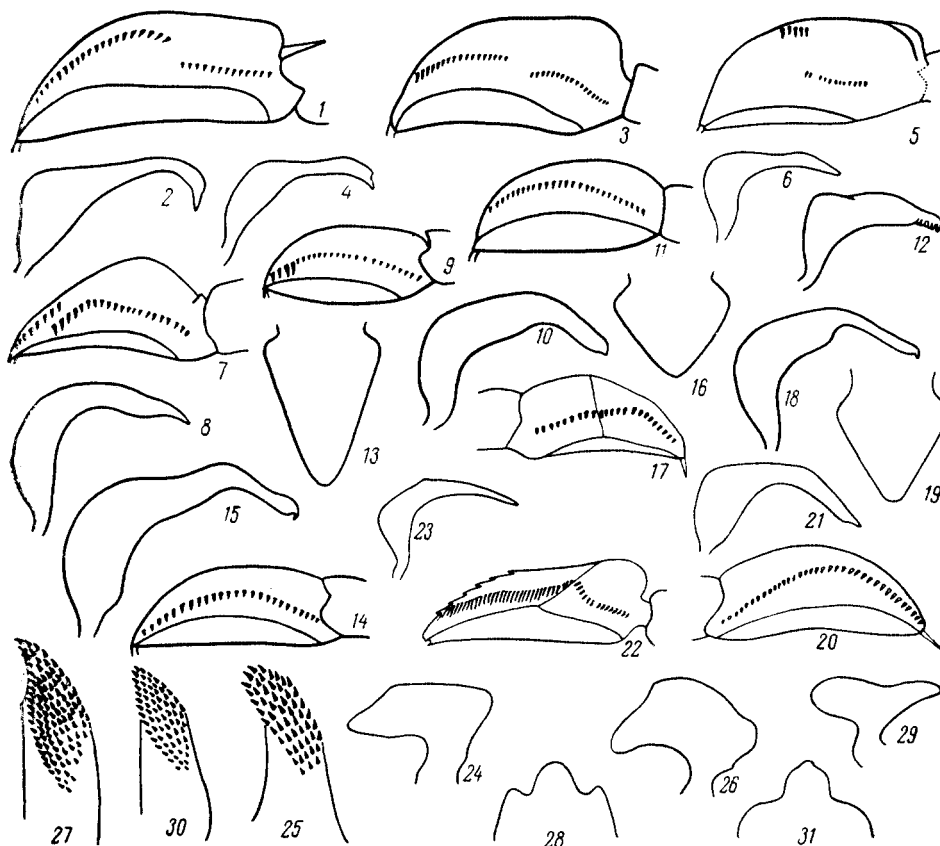


Fig. 492. Heteroptera. Families Corixidae and Notonectidae (after Jaczewski and original).

1, 2, *Sigara jaczewskii*: 1, fore tarsus of male; 2, right paramere; 3, 4, *S. weymarni*: 3, fore tarsus of male; 4, right paramere; 5, 6, *S. fallenoidea*: 5, fore tarsus of male; 6, right paramere; 7, 8, *S. kerzhneri*: 7, fore tarsus of male; 8, right paramere; 9, 10, *S. septemlineata*: 9, fore tarsus of male; 10, right paramere; 11, 12, *S. gaginae*: 11, fore tarsus of male; 12, right paramere; 13-15, *S. substriata*: 13, xyphus of metathorax; 14, fore tarsus of male; 15, right paramere; 16-18, *S. nigroventralis*: 16, xyphus of metathorax; 17, fore tarsus of male; 18, right paramere; 19-21, *S. toyohirae*: 19, xyphus of metathorax; 20, fore tarsus of male; 21, right paramere; 22, 23, *Glaenocoris propinqua*: 22, fore tarsus of male; 23, right paramere; 24, 25, *Notonecta glauca*: 24, paramere; 25, gonapophysis of ovipositor; 26-28, *N. amplifica*: 26, paramere; 27, gonapophysis of ovipositor; 28, abdominal sternite VII of female; 29-31, *N. reuteri*: 29, paramere; 30, gonapophysis of ovipositor; 31, abdominal sternite VII of female.

- Pronotum with 7-8 transverse pale lines divided into two in their median part. Dorsal side of hind femora with longitudinal row of 6-12 short spinules. Fore tarsus of male trapezoidal, with 2 rows of pegs, basal row consisting of very small rudimentary pegs (Fig. 492: 5). Strigil small. Right paramere as in Fig. 492: 6. 7-8. – Kamch., Amur. – Boreal part of Holarctic. Records of *S. distincta* Fieb. from Kamch. refer to this species **S. (S.) fallenoidea** Hung.
- 7. Male fore tarsus with 2 rows of pegs closely drawn together in apical part of tarsus; its dorsal margin strongly convex, arch-shaped (Fig. 492: 7). (Subgenus *Retrocorixa* Walt.). In male, depression of frons narrow and deep, reaching well beyond hind margin of eyes. Strigil small. Right paramere as in Fig. 492: 8. 5-6. – S Prim. **S. (R.) kerzhneri** Jacz.

- Male fore tarsus with 1 row of pegs 8
- 8. Lateral angles of pronotum broadly rounded. Strigil small. (Subgenus *Pseudovermicorixa* Jacz.). Male fore tarsus as in Fig. 492: 9. Right paramere as in Fig. 492: 10. 5-6. – S Khab., Prim. – Japan, Korea, China, Vietnam **S. (P.) septemlineata** Paiva
- Lateral angles of pronotum blunt. Strigil medium sized or absent. (Subgenus *Tropocorixa* Hutch.) 9
- 9. Strigil present. Xyphus of metathorax very short. Depression of frons in male wide and deep, reaching well beyond hind margins of eyes. Male fore tarsus as in Fig. 492: 11. Right paramere as in Fig. 492: 12. 5-5.5. – Amur., Prim.; Transbaikal **S. (T.) gaginae** Jacz.
- Strigil absent; its stalk absent as well. Xyphus of metathorax medium-sized or long. Depression of frons in male weakly expressed 10
- 10. Xyphus of metathorax not longer than its width (Figs. 492: 16, 19). Posterior margin of male tergite VI without pointed process at the right side. Fore tarsus and paramere of male different 11
- Xyphus of metathorax markedly longer than its width (Fig. 492: 13). Posterior margin of male tergite VI at the right side with pointed process directed posteriorly. Male fore tarsus as in Fig. 492: 14. Right paramere curved in apical part as in Fig. 492: 15. 5.5-6. – S Khab., Prim. – Japan, Korea, S China (Taiwan) **S. (T.) substriata** Uhl.
- 11. Body relatively narrower. Xyphus of metathorax as in Fig. 492: 16. Apex of middle tibia without darkening. Male fore tarsus with oblique transverse rib (particularly distinct in insular specimens) (Fig. 492: 17). Paramere as in Fig. 492: 18. 5-6.3. – Prim., Sakh., S Kur. – Japan, Korea, S China (Taiwan) **S. (T.) nigroventralis** Mats.
- Body wider. Xyphus of metathorax as in Fig. 492: 19. Apex of middle tibia darkened. Male fore tarsus without oblique transverse rib (Fig. 492: 20). Paramere as in Fig. 493: 21. 5.1-6. – S Kur. (Kunashir I.). – Japan **S. (T.) toyohirae** Mats. (*maikoensis* Mats., *asahinai* Jacz.) [p. 744]

5. **Glaenocorisa** Thomson. Pronotum and basal half of hemelytra with distinct microsculpture consisting of thin longitudinal grooves. Long setae on margins of fore tarsus in both sexes comparatively sparsely distributed. Only one boreal-alpine species widely distributed in N Holarctic.

- 1. Pronotum and hemelytra dark brown. Pronotum with 8-10 narrow pale lines. Light pattern of hemelytra slightly darkened. Male fore tarsus tetrahedral, with longitudinal rib on posterior side and oblique rib at end of basal half of tarsus on anterior side (Fig. 492: 22). Claws of middle legs shorter than tarsi. Strigil not large. Right paramere as in Fig. 492: 23. 8-9. – Mag., Kamch. – Boreal part of Holarctic **G. propinqua** Fieb.

6. **Cymatia** Fl. Frons in females flat, in males depressed. Pronotum and hemelytra smooth, without rastration. Claws of middle legs shorter than tarsi. – 1 species (in USSR 3). {Subsequently added: *C. apparens* Dist., S Prim.}.

- 1. Hemelytra with reticulate pattern consisting of narrow, slightly smudged, transverse pale lines. Pronotum uniformly brown with very indistinct, hardly visible, transverse pale lines. 6-6.5. – Mag., Khab., Prim., Sakh. – Transpalearctic **C. bonsdorffii** C. Sahlb.

7. *Micronecta* Kirk. Small insects; species from Far East less than 3.5. Claws of male fore tarsi lobe-shaped. Asymmetry of male abdomen right-sided; strigil present. Macropterous and brachypterous forms occur; brachypterous forms with shortened pronotum, with hemelytra markedly tapering toward their end, and shortened hind wings. Body size variable within the species. – 5 species (in USSR 11).

1. Not longer than 2.3. (Subgenus *Micronecta* Kirk.) 2
- Longer than 2.7. (Subgenus *Basileonecta* Hutch.) 4
2. Right paramere curved (Fig. 493: 1); left paramere as in Fig. 493: 2. 1.8-2.1. – Prim.; environs of Balkhash Lake. – Japan, China, Mongolia **M. guttata** Mats. [p. 745]

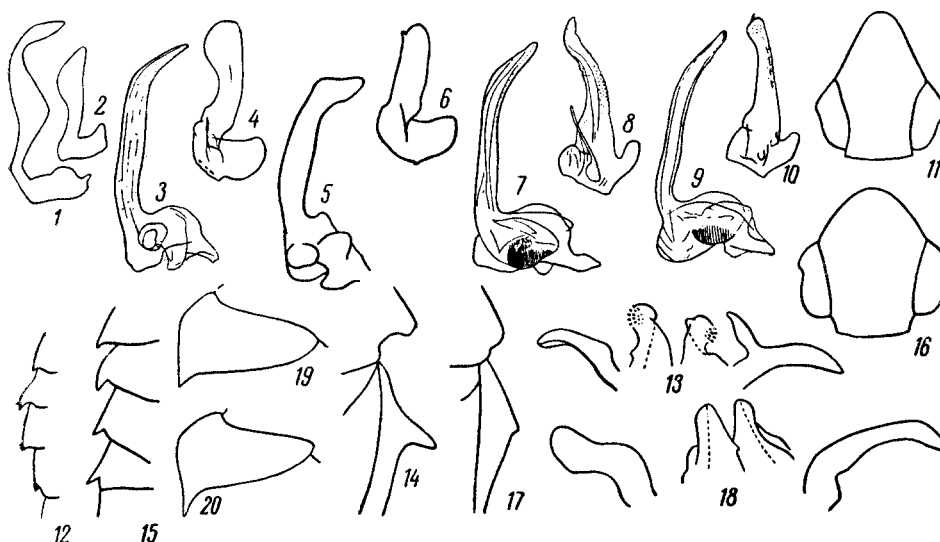


Fig. 493. Heteroptera. Families Corixidae, Notonectidae, and Aphelocheiridae
(after Wróblewski, Lundblad, and original)

1, 2, *Micronecta guttata*: 1, right paramere; 2, left paramere; 3, 4, *M. kiritshenkoi*: 3, right paramere; 4, left paramere; 5, 6, *M. wui*: 5, right paramere; 6, left paramere; 7, 8, *M. sahlbergi*: 7, right paramere; 8, left paramere; 9, 10, *M. sedula*: 9, right paramere; 10, left paramere; 11-13, *Aphelocheirus amurensis*: 11, head; 12, female abdomen, lateral; 13, male genitalia; 14-16, *A. ussuriensis*: 14, lateral margin of pronotum and hemelytron, 15, female abdomen, lateral; 16, head; 17, 18, *A. improcerus*: 17, lateral margin of pronotum and hemelytron; 18, male genitalia; 19, 20, trochanter of middle leg: 19, *Notonecta triguttata*; 20, *N. kiangsia*.

- Right paramere not curved 3
- 3. Right paramere as in Fig. 493: 3; left paramere without tooth before apex (Fig. 493: 4). 1.8-2.1. – Prim **M. kiritshenkoi** Wróbl.
- Right paramere as in Fig. 493: 5; left paramere with tooth before apex as in Fig. 493: 6. 1.9-2.3. – S Khab., Prim.; E Siberia – China, Mongolia, SW Asia **M. wui** Lundbl.
- 4. Right paramere as in Fig. 493: 7; left paramere curved at apex as in Fig. 493: 8. Male fore tarsus inflated at external side. 2.8-3.4. – S Khab., Amur., Prim. – Korea, China (including Taiwan) **M. (B.) sahlbergi** Jak.
- Right paramere as in Fig. 493: 9; left paramere not curved, with small tooth at apex (Fig. 493: 10). Male fore tarsus not inflated at external side. 2.7-3.3. – Amur., S Khab., Prim. – Japan, Korea, S China (Taiwan) **M. (B.) sedula** Horv.

6. Family OCHTERIDAE

E.V. Kanyukova

Body broad, oval, slightly compressed. Eyes large, convex; well developed ocelli present. Antennae 4-segmented, situated ventral to eyes, shorter than head. Rostrum reaching base of abdomen. Fore and middle tarsi 2-segmented; hind tarsi 3-segmented. Predators. In USSR 1 genus, 1 species.

KEY TO SPECIES OF FAMILY OCHTERIDAE

1. **Ochterus** Latr. In USSR 1 species.
1. Velvety black; sides and posterior margin of pronotum, external margin and adjacent to it 3 spots on hemelytra, and legs yellow. 4-6. – S Kur.; Transcaucasus. – S Asia, Mediterranean, Africa. – On humid soil on shores **O. marginatus** Latr.

7. Family NAUCORIDAE

E.V. Kanyukova

Middle and especially hind legs oar-shaped, with dense natatorial setae. Predators. Living in water, but hibernating on land. In USSR 1 genus, 1 species.

KEY TO SPECIES OF FAMILY NAUCORIDAE

1. **Ilycoris** Stål. In USSR 1 species.
1. Dark brown; head and pronotum paler. 12-15. – Prim. – Korea, NE China, W Palearctic (except extreme north) to Altai. – In stagnant, sometimes brackish water. (Fig. 489: 2) **I. camicoides** L.

8. Family APHELOCHEIRIDAE

E.V. Kanyukova

Body strongly flattened, often showing wing polymorphism. Predators. Living in rivers and pure lakes, sometimes at great depth, able to breathe oxygen dissolved in the water, and therefore capable of [p. 746] remaining submerged without having to surface to renew the air supply. In USSR 1 genus, 8 species. Sometimes included in Naucoridae as a subfamily.

LITERATURE. Kanyukova, E.V. 1974. Water bugs of the family Aphelocheiridae (Heteroptera) in the fauna of the USSR. Zool. Zhurn. 53: 1726-1731. [In Russian]

KEY TO SPECIES OF FAMILY APHELOCHEIRIDAE

1. **Aphelocheirus** Westw. – 3 species (in USSR 8).
1. Head strongly elongate; its preocular part conical (Fig. 493: 11). Lateral margin of hemelytra forming angulate projection. Male abdominal sternites III and IV and female abdominal sternites III-VI with distinct teeth at the middle of posterior margin (Fig. 493: 12). Male genitalia as in Fig. 493: 13. Yellow-brown. 7.7-9. – S Khab., Prim. – NE China **A. amurensis** Kir.

- Preocular part of head more rounded (Fig. 493: 16) 2
- 2. Posterior angles of pronotum with deep notch; lateral margin of hemelytra with projection in the form of tooth (Fig. 493: 14). Female abdominal sternites III-VI with pointed median projections at posterior margin (male unknown) (Fig. 493: 15). Body short-oval. Color argillaceous. Head as in Fig. 493: 16. 9.5. – S Prim. .
..... **A. ussuriensis** Kir.
- Posterior angles of pronotum with small notch; lateral margin of hemelytra angulate, but without projection (Fig. 493: 17). Abdominal sternites III-VI in both sexes without distinct pointed projections at posterior margin. Body elongate-oval, weakly widening in posterior part. Dark brown. Male genitalia as in Fig. 493: 18; aedeagus with teeth. 7-8. – S Prim. – NE China .. **A. improcerus** Kir.

9. Family NOTONECTIDAE

E.V. Kanyukova

Hemelytra without characteristic sculpture, mat, not transparent. Hind wings always developed. Predators. Living and hibernating in water. Swimming with venter upwards. – 1 genus, 5 species (in USSR 2 genera, 7 species).

LITERATURE. Kanyukova, E.V. 1973. Water-boatmen (Heteroptera, Notonectidae) of the fauna of the USSR. Entomol. Obozr. 52: 352-365. [In Russian].

KEY TO SPECIES OF FAMILY NOTONECTIDAE

1. **Notonecta** L. Relatively large insects; species from Far East longer than 10. – 4-5 species (in USSR 6).

- 1. Trochanter of middle leg with process at posterior margin (Figs. 493: 19, 20). (Subgenus *Paranecta* Hutch.) 2
- Trochanter of middle leg without process at posterior margin. (Subgenus *Notonecta* L.) 3
- 2. Process at the posterior margin of middle-leg trochanter broad-triangular (Fig. 493: 19). Hemelytra with large black spots on clavus and corium sometimes fusing together; membrane smoky black, rarely with yellow spots (Fig. 493: 4). 13-15. – S Prim., S Kur. – Japan, Korea **N. (P.) triguttata** Motsch. (*immediata* Kir.)
- Process at the posterior margin of middle-leg trochanter elongate needle-shaped (Fig. 493: 20). Hemelytra pale in major part; dark spots present on lateral margin of corium, closer to apex; membrane pale or with small black spots; rarely hemelytra entirely pale. 12-13. – Prim. – Korea, E China **N. (P.) kiangsis** Kirk.
- 3. Scutellum entirely velvety black. Hemelytra, with yellow-brown tinge, with a row of black spots at lateral margin. Paramere [p. 747] and gonapophysis as in Figs. 492: 24, 25. 13-16. Possibly occurs in Amur. – From Transbaikal to W Europe
..... **N. glauca** L.
- Scutellum pale, sometimes with dark spot in the middle, but with pale lateral margins 4
- 4. Hemelytra sometimes with yellow or reddish tinge. Paramere and gonapophysis as in Figs. 492: 26, 27. Lateral angles of female abdominal sternite VII protruded (Fig. 492: 28). 12-18. – S Khab., Amur., Prim.; Transbaikal. – Korea, NE China, Mongolia **N. amplifica** Kir.
- Hemelytra without yellow or reddish tinge. Paramere and gonapophysis as in Figs. 492: 29, 30. Lateral angles of female abdominal sternite VII rounded (Fig. 492: 31). 12-15. – S Khab., Prim., S Sakh. – From Japan to W Europe
..... **N. reuteri** Hung.

10. Family PLEIDAE

E.V. Kanyukova

Hemelytra with dense sculpture consisting of minute polygonal pits. Hind wings usually vestigial. Predators. Living in stagnant water. In USSR 1 genus.

KEY TO SPECIES OF FAMILY PLEIDAE

1. **Plea** Leach. – 1 species of subgenus *Paraplea* Esaki et China (in USSR 2 species).
1. Color dirty white. 1.5. – S Prim. – Japan, Korea, E China, Oriental Region. (Fig. 489: 5) **P. (P.) indistinguenda** Mats.

Infraorder LEPTOPODOMORPHA

N.N. Vinokurov

Small species, flattened, body oval or, more rarely, inversely ovoid. Coloration black, often with pale spots, or mostly white. Eyes small. Ocelli close together or contiguous. Antennae slender, 4-segmented. Rostrum 4-segmented, reaching middle or hind coxae. Hemelytra in species from Far East complete or slightly shortened (with narrower membranes). Clavus, with rare exceptions, black, usually with triangular pale spot near apex, this spot may be absent in dark-colored specimens. Corium divided in 2 fields: outer (exocorium) and inner (endocorium). Pattern of corium important diagnostically; usually it consists of spots and stripes varying in form and size. Coloration of corium in the same species may vary from uniformly pale to entirely black with all intermediates between them (*Note:* Hemelytra shown in figures without membranes). Legs saltatorial or cursorial. All femora not thickened. Male genital segment not invaginated in the abdomen, with 2 symmetrical parameres at margins of genital opening; hind margin of the opening with 2 processes (parandria). Apex of female abdomen with ovipositor, usually produced into small process. Female abdominal sternite VII produced far caudad in form of a plate (subgenital plate) partly covering ovipositor. Predators. In humid habitats: banks of lakes, streams, rivers and seas, in humid meadows and swamps. Moving quickly, very mobile, therefore hard for collecting. – 8 genera, about 30 species (in USSR 9 genera, about 60 species). [p. 748]

LITERATURE. Cobben, R.H. 1985. Addition to the Eurasian saldid fauna, with a description of fourteen new species (Heteroptera, Saldidae). Tijdschr. Entomol. 128 (4): 215-270.

KEY TO GENERA

1. Membrane of hemelytron (Fig. 494: 1) with 5 cells. (Subfamily Chiloxanthinae) 1. **Chiloxanthus**
- Membrane with 4 cells, or membrane more or less shortened, or its veins indistinct. (Subfamily Saldinae) 2
2. Calli of pronotum markedly convex, reaching lateral margins. Lateral margins of pronotum more or less distinctly notched. Pronotum shining like a mirror, with long erect setae 5. **Chartoscirta**
- Calli of pronotum not reaching lateral margins 3
3. All antennal segments, including 1st and 2nd segments, uniformly thick. Dorsum of body with long black erect setae, a few erect setae also on membrane

- 4. **Calacanthia**
- Antennae slender; at least 2nd antennal segment markedly more slender than 1st segment. Hemelytra covered with short recumbent setae, rarely covered with erect setae. Membrane without setae 4
 - 4. Length less than 3 (in females rarely to 3.4). Calli broader than base of scutellum 6. **Micracanthia**
 - Longer than 3; sometimes shorter, but in this case base of scutellum broader than calli 5
 - 5. The innermost cell of membrane projecting anteriorly beyond next cell by 1/2 – 2/5 of its length, or markedly not reaching posterior margin of next cell and also not reaching posterior margin of the 3rd from inner margin cell (Fig. 494: 2). 6
 - The innermost cell of membrane projecting anteriorly beyond next cell by less than 1/3 of its length, posteriorly reaching or almost reaching posterior margin of next cell or posterior margin of 3rd from inner margin cell (Fig. 494: 3) 7
 - 6. 2nd antennal segment with short recumbent and in addition with several erect setae 2. **Salda**
 - 2nd antennal segment only with short setae 3. **Teloleuca**
 - 7. Antennae long; 2nd-4th antennal segments combined more than 2.5 times as long as collar of pronotum. Body length not less than 4 7. **Macrosaldula**
 - Antennae short; 2nd-4th antennal segments combined less than 2.5 times as long as collar of pronotum; if longer (*S. nobilis* and *S. hasegawai*), dorsum with long erect setae and 2nd antennal segment also with a few similar setae 8. **Saldula**

KEYS TO SPECIES OF FAMILY SALDIDAE

Subfamily CHILOXANTHINAE

1. **Chiloxanthus** Curt. Broad-oval; hemelytra widened, often slightly shortened. – 3 species (in USSR 5). In addition, *Salda sericans* Stål was described from Kamch.; this name was later considered as synonym of *Ch. pilosus* Fall., but the type specimen has characters intermediate between *Ch. pilosus* and *Ch. arcticus*.

1. Head and pronotum with long erect setae; scutellum and hemelytra with short erect setae. Hemelytra shining. Corium, with exception of the darkest specimens, with large pale spots fused in one large spot in pale specimens. 4.1-6.4. Chuk., Mag. – Holarctic **Ch. arcticus** J. Sahlb.
- Dorsum with short setae. Sides of pronotum without erect bristles. Hemelytra mat; pale spots, if present, situated interiorly to cubital vein 2 [p. 749]
2. Sides of pronotum with white borders, sometimes, in dark specimens, with only narrow light stripe on ventral side. Cubital vein with pale base. Endocorium of pale specimens with large pale spots in middle and, more rarely, in apical part. 5.4-8.3. – Chuk. (including Wrangel Island), Mag. – Circumpolar holarctic **Ch. stellatus** Curt. (*borealis* Stål)
- Sides of pronotum and cubital vein black. Corium of pale specimens only with 1 light spot at apex, interiorly to cubital vein. 6.1-7.1. – Mag., Amur. – E Siberia ... **Ch. suturalis** Jak.

Subfamily SALDINAE

2. **Salda** F Broad-oval, with short setae (except *S. splendens* having dorsum with long erect setae); hemelytra complete or shortened. – 5 species (in USSR about 10).



Fig. 494. Heteroptera. Family Saldidae (original).

1-3, hemelytral membrane: 1, *Chloxanthus stellatus*; 2, *Saldia littoralis*; 3, *Macrosaldula rivularia*; 4, 5, hemelytron: 4, *Saldia littoralis*; 5, *Teloleuca pellucens*; 6-8, *T. bifasciata*: 6, 7, variability of pattern of hemelytra; 8, paramere; 9, 10, *T. kuznezovi*: 9, hemelytron; 10, paramere; 11, *Calacanthia trybomi*, coloration of pronotum and hemelytra; 12-15, *Chartoscirta elegantula*: 12-14, variability of pattern of hemelytra; 15, paramere; 16-22, *Micracanthia bergrothi*: 16-21, variability of pattern of hemelytra; 22, paramere; 23, 24, *Saldula nobilis*: 23, hemelytron; 24, paramere; 25-28, paramere: 25, *Macrosaldula rivularia*; 26, *M. simulans*; 27, *M. violacea*; 28, *M. koreana*.

1. Dorsum mat or with dull shine. Hemelytra complete or shortened, in last case (except for *S. kiritshenkoi*) membrane with distinct venation, more or less transparent 2
 - Dorsum with more or less strong metallic shine, with distinct blue hue at high magnification. Hemelytra often shortened, with coriaceous membrane. If body with long erect setae (*S. splendens*), corium without pale spots 4
2. Corium entirely black, rather densely and evenly pilose. 2nd-4th antennal segments black. Legs dark brown to almost black. 4.8-5.8. – S Khab., S Prim., S Kur.; ?Kirgizia, ? Ukraine. – Japan, NE China **S. kiritshenkoi** Cobben
 - Corium with pale spots and stripes 3
3. Pronotum more than 2.6 times as wide as long. Exocorium with 2 longitudinal stripes interrupted in the middle. 4.3-5.9. – Mag., Amur., Sakh.; Transbaik. – Mongolia, N Europe **S. sahlbergi** Reut.
 - Pronotum less than 2.6 times as wide as long. Exocorium entirely dark or with pale spot near cubital vein; endocorium with several pale spots (Fig. 494: 4). 5.1-7. – Mag., Kamch., Komandorskie Islands, Khab., Prim., Sakh., Kur. – Holarctic.. **S. littoralis** L.
4. Corium with pale spots interiorly to cubital vein; its external part with dull, and internal part with more bright shine. Exocorium with scattered short setae. Membranes of macropterous specimens between veins brown. 2nd antennal segment brown or black-brown. Legs yellow-brown or almost black. 5.9-7.2. – S Prim., Amur., S Sakh. – Forest zone from Japan to Europe **S. morio** Zett.
 - Corium black, without pale spots 5
5. Pronotum and hemelytra rough, less shining than ventral side of lateral margin of prothorax; dorsum with short (0.04-0.06) adpressed setae. 4.8-7.5. – S Khab. – Transpalearctic **S. muelleri** Zett.
 - Pronotum and hemelytra smooth and as shining as ventral side of lateral margin of prothorax; dorsum with longer (more than 0.06) recumbent and erect setae 6
6. Head, except for 3 pairs of trichobotria, with short adpressed setae; pronotum and hemelytra with scattered recumbent and sometimes with a few erect setae. 4.8-6.5. – Yakutia, Irkutsk Prov., Tuva. – Mongolia **S. micans** Jak.
 - Head, pronotum, and hemelytra with sparse, long, erect setae. 5.1-6.2. – Yakutia, Transbaik. – Korea **S. splendens** Jak.

3. *Teloleuca* Reut. 3 species (in USSR 4). [p. 751]

1. Exocorium with pale spot in apical part (Fig. 494: 5). Femora mostly dark brown. Hemelytra with semierect, short, rigid setae. 4.7-6.3. – Chuk., Mag., Khab., Amur., Prim., Sakh. – Holarctic **T. pellucens** F.
 - Exocorium with 2 pale spots: in the middle and in apical part. Femora yellow with dark spots 2
2. Sides of prothorax ventrally with pale border; clavus often with pale spot at base. Hemelytra as in Figs. 494: 6, 7. Paramere as in Fig. 494: 8. 4.7-6. – Mag., Kamch., N Khab. – Holarctic **T. bifasciata** Thoms.
 - Sides of prothorax black; clavus without pale spot at base. Hemelytra as in Fig. 494: 9. Paramere as in Fig. 494: 10. 5.3-7. – S Khab., Amur., Prim. – Japan {Correct spelling: *kusnezovi*} **T. kusnezovi** Lindb.

4. *Calacanthia* Reut. In USSR 1 species.

1. Black. Anterior part of head, lateral margins of pronotum (in male, also dorsal

side of 1st and 2nd antennal segments) white. Hemelytra usually white with contrasting black pattern, rarely black in its greater part (Fig. 494: 11). Legs whitish, with black spots. 4.5-6. – Chuk. (including Wrangel Island), Mag. – Circumpolar holarctic. – In tundra **C. trybomi** J. Sahlb.

5. **Chartoscirta** Stål. Pronotum and scutellum strongly shining. Pronotum strongly tapering anteriorly. – 1 species (in USSR 4).

1. Hemelytra with erect, long, black setae; eyes shortly pilose. Lateral margins of pronotum strongly emarginate. 3rd and 4th antennal segments not thickened. Variability of pattern of hemelytra as in Figs. 494: 12-14. Paramere as in Fig. 494: 15. 3-4.5. – S Prim. – Palearctic. – In marshes **Ch. elegantula** Fall.

6. **Micracanthia** Reut. – 1 species (in USSR 3).

1. Variability of pattern of hemelytra as in Figs. 494: 16-21. Light yellow border of outer margin of corium sometimes interrupted in the middle, at apex sharply bent mesad and fused with apical pale spot of exocorium (rarely the spot isolated; in dark specimens, the spot absent; in very dark specimens, the pale border not bent mesad). Endocorium in pale specimens with 2 pale spots; apex of clavus with 1 pale spot. Membrane with dark traits between veins. Paramere as in Fig. 494: 22. 2.2-3.4. – Chuk., Mag., Kamch., Amur.; E Siberia, Altai. – Mongolia. – In humid meadows, at the margins of swamps and lakes **M. bergrothi** Jak.

7. **Macrosaldula** Southw. et Lest. Large; dorsum with short or erect long setae; mat or with metallic shine. – 3 species (in USSR 11).

1. Dorsum mat 2
- Dorsum shining 3
2. Femora brown-yellow, with dark brown spots and black longitudinal stripes at posterior margin. Membrane of hemelytron brown, with pale transverse stripes at base and at apex, rarely without pale stripes. Paramere as in Fig. 494: 25. 4.4-6.4. – Mag., Kamch., S Prim.; Yakutia. – Korea, Mongolia, N America. – On shingle on river banks **M. rivularia** J. Sahlb.
- Femora almost black, pale only at the very apex. Membrane of hemelytron brown, without pale spots. Paramere as in Fig. 494: 26. 6.2-6.8. – Irkutsk Prov., Tuva. – Mongolia **M. simulans** Cobben [p. 752]
3. Dorsum strongly shining, with very fine copper-colored pubescence. Head between eyes without admixture of silvery setae. Paramere as in Fig. 494: 27. 5.9-6.9. – S Prim. – Japan **M. violacea** Cobben
- Dorsum moderately shining, with dense, recumbent, rough, golden setae. Head between eyes with admixture of silvery setae. Paramere as in Fig. 494: 28. 5.7-7.3. – S Khab., Sakh.; Transbaik. – Korea, E Mongolia. – On river banks **M. koreana** Kir.

8. **Saldula** V. D. Oval; body medium-sized, rarely small; dorsum with short, sometimes with long setae. – 12 species (in USSR about 20).

1. 2nd antennal segment with several long erect setae; dorsum with long erect setae 2
- 2nd antennal segment with only short recumbent setae; dorsum with short recumbent pubescence. If head and pronotum with erect setae (*S. ambigua*, *S. pilosella*), body length less than 3, or frons very wide (Fig. 496: 1) 3

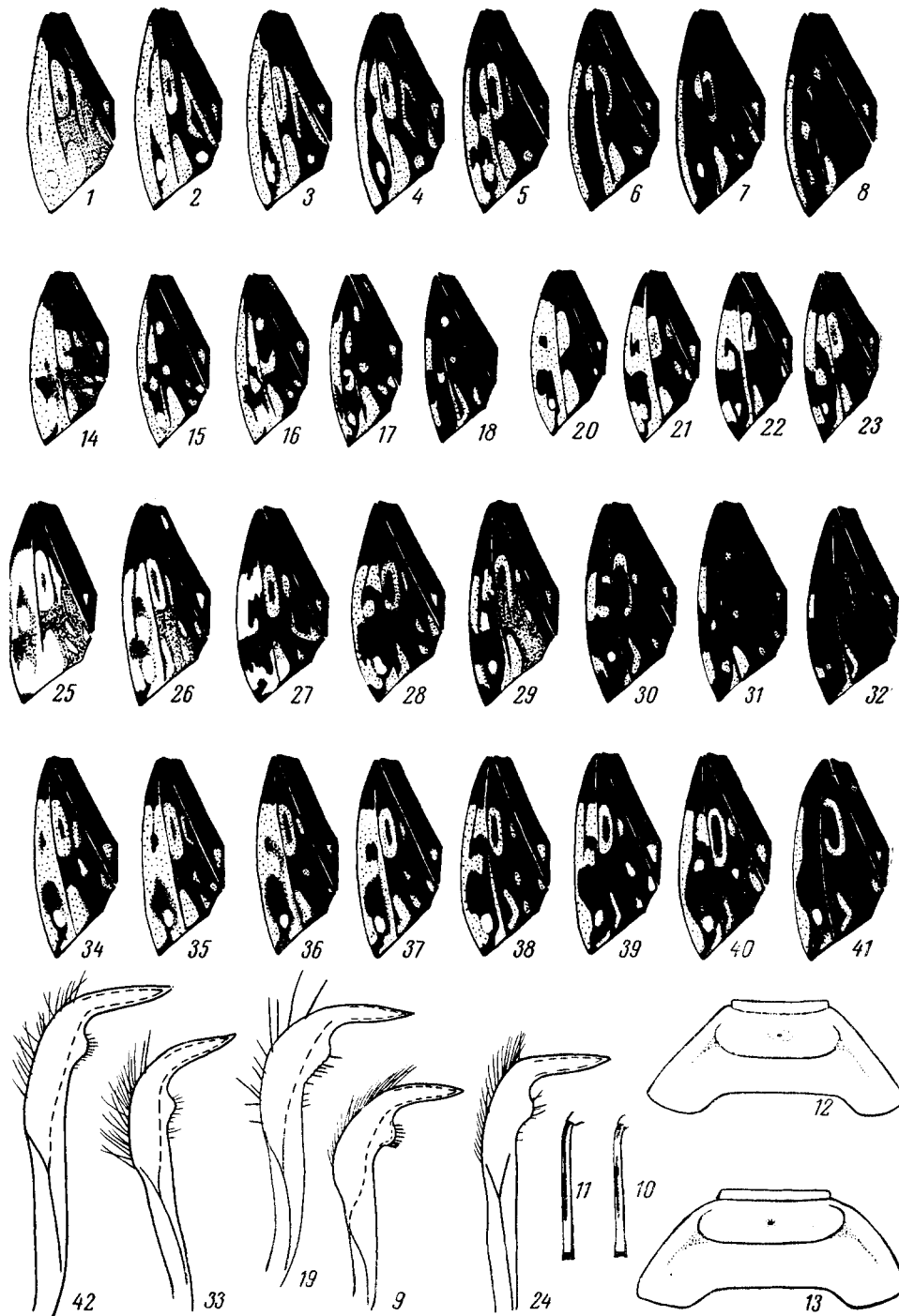


Fig. 495. Heteroptera. Family Saldidae (original).

1-9, *Saldula opacula*: 1-8, variability of pattern of hemelytra; 9, paramere; 10-11, fore tibia: 10, *S. saltatoria*; 11, *S. pallipes*; 12-13, pronotum: 12, *S. kurentzovi*; 13, *S. saltatoria*; 14-19, *S. arsenjevi*: 14-18, variability of pattern of hemelytra; 19, paramere; 20-24, *S. kurentzovi*: 20-23, variability of pattern of hemelytra; 24, paramere; 25-33, *S. saltatoria*: 25-32, variability of pattern of hemelytra; 33, paramere; 34-42, *S. fucicola*: 34-41, variability of pattern of hemelytra; 42, paramere.

2. Larger: 4-5.6. Spots on hemelytra as in Fig. 494: 23. Paramere as in Fig. 494: 24. – S Khab., Amur., Prim., S Sakh., S Kur. – Palearctic. – In humid meadows **S. nobilis** Horv. (*reuteri* Jak.)
- Smaller: 3.1-3.5. Long erect setae covering, in addition to body, antennae and legs; eyes shortly pilose. 1st and 2nd antennal segments pale; 3rd and 4th darker. Legs entirely yellow. Clavus black, without yellow spots; endocorium black, with 2 small yellow spots (one in the middle at cubital vein; the other in inner corner); exocorium with wide brown stripe along outer margin and with 2 large yellow spots at base and at apex. Membrane complete or shortened, pale, with dark veins. 3.1-3.5. – S Prim. – Japan **S. hasegawai** Cobben
3. Fore tibiae pale, with the only black spot at base 4
- Fore tibiae on dorsal (outer) side with longitudinal black or brown stripe continuous or interrupted near the base 6
4. Head between eyes with very long, pronotum with shorter erect setae. Pronotum with straight lateral margins and strongly shining. Clavus with pale spots at apex and at base. Endocorium with 4, exocorium with 3 pale spots; outer margin of hemelytra with pale longitudinal stripe. 2.9 – S Prim. **S. ambigua** Lindskog
- Head between eyes only with short adpressed pubescence, sometimes with short, rigid, erect setae. Pronotum with more or less straight or convex lateral margins, dull shining 5
5. Pattern of corium consists of pale stripes on dark background, often with bluish white coating; the outermost stripe not interrupted (Figs. 495: 1-8). Clavus always with 1 spot. Paramere as in Fig. 495: 9. 3-4.7. – Mag., Kamch., Khab., Amur., Prim., S Sakh., S Kur. – Holarctic. – In swamps, on banks of rivers and lakes **S. opacula** Zett.
- Pattern of corium different. Endocorium with 2 small yellow spots in the middle, rarely with large C-shaped spot in very pale specimens. Clavus with apical pale spot and rarely with small pale spot at base. Variability of pattern of hemelytra as in Figs. 495: 14-18. Paramere as in Fig. 495: 19. 2.9-3.6. – S Prim., S Sakh., S Kur. – On river banks **S. arsenjevi** Vin.
6. Fore tibiae with longitudinal stripe interrupted at base (Fig. 495: 10) 7
- Fore tibiae with continuous, not interrupted, longitudinal stripe (Fig. 495: 11) . 9
7. Lateral margins of pronotum straight or almost straight (Fig. 495: 12). Endocorium with 1 large pale spot in the middle and with suffused [p. 754] reddish brown stripe inside this spot. Variability of pattern of hemelytra as in Figs. 495: 20-23. Paramere as in Fig. 495: 24. 3-4.2. – S Prim., S Sakh., S Kur. – On river banks **S. kurentzovi** Vin.
- Lateral margins of pronotum distinctly convex (Fig. 496: 13) 8
8. Large black spot behind the middle of exocorium (with exception of pale specimens) reaching external margin of corium and connected with basal spot in the anterior part of exocorium by Z-shaped stripe. In very pale specimens, exocorium with 2 isolated dark spots in addition to basal and apical ones; in very dark specimens, only several pale spots remaining on corium. Rarely corium with narrow pale stripe along cubital vein. Variability of pattern of hemelytra as in Figs. 495: 25-32. Macropterous, rarely in females hemelytra shortened. Body of paramere short (Fig. 495: 33). 3.3-4.5. – Chuk., Mag., Kamch., Khab., Amur., Prim., S Sakh., N Kur., S Kur. – Holarctic. – In swamps, on banks of rivers and lakes **S. saltatoria** L.
- Large black spot behind the middle of exocorium (with exception of very dark specimens) not reaching external margin of corium. 1 additional small spot (isolated in pale specimens) present between basal and medial spots [p. 755]; it is

connected with medial spot and rarely with basal spot by a narrow stripe. Exocorium in pale specimens with only 2 indistinct dark spots additional to basal and apical ones; in dark specimens, exocorium with narrow, interrupted border at its outer margin. Corium often with pale stripe along cubital vein. Variability of pattern of hemelytra as in Figs. 495: 34-41. Macropterous, rarely in females hemelytra shortened. Body of paramere long (Fig. 495: 42). 3.5-4.8. – Mag., Kamch., Khab., Amur., Prim., Sakh., S Kur. – Transpalearctic. – On banks of rivers and lakes *S. fucicola* J. Sahlb.

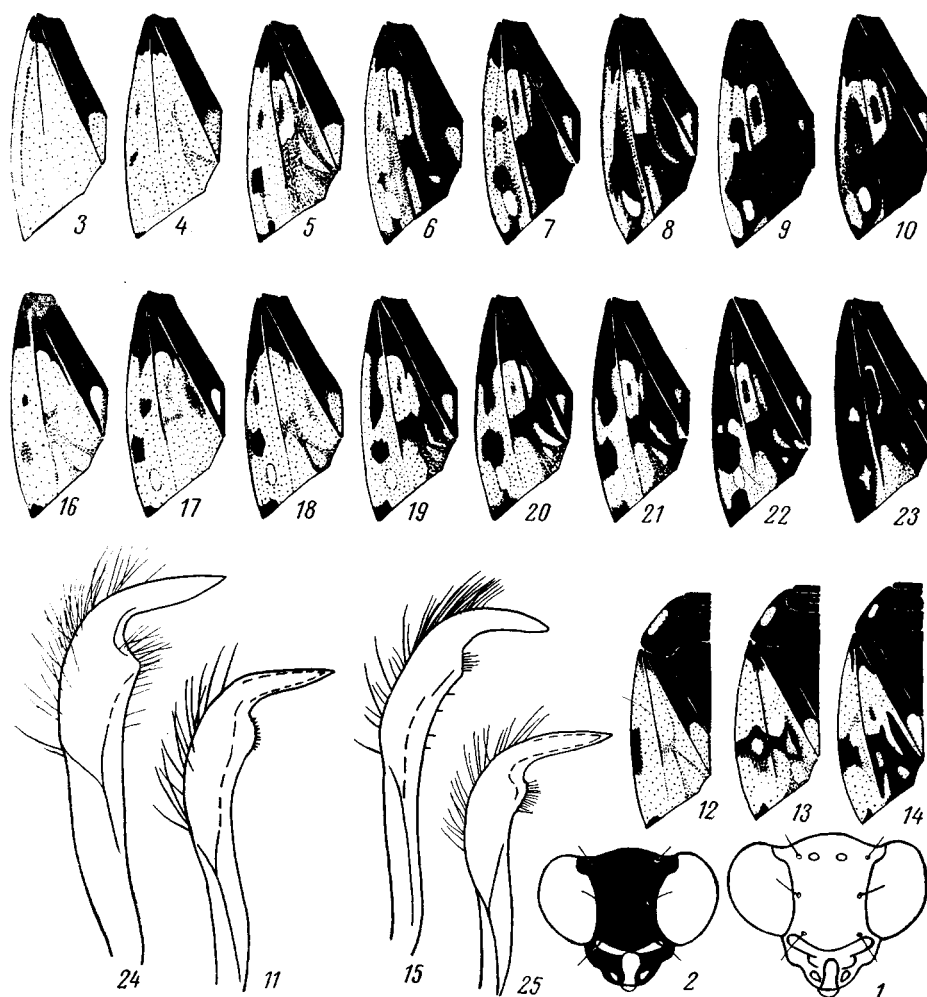


Fig. 496. Heteroptera. Family Saldidae (original).

1-2, head, anterior view: 1, *Saldula pilosella*; 2, *S. pallipes*; 3-11, *S. pilosella*: 3-10, variability of pattern of hemelytra; 11, paramere; 12-15, *S. arenicola ussurica*: 12-14, variability of pattern of hemelytra and pronotum; 15, paramere; 16-24, *S. pallipes*: 16-23, variability of pattern of hemelytra; 24, paramere; 25, *S. palustris*, paramere.

9. Head dorsally with long, pronotum and hemelytra with shorter erect setae (better seen in lateral view). Width of frons almost equal to distance between clypeus and ocelli (Fig. 496: 1). Variability of pattern of hemelytra as in Figs. 496: 3-10. Paramere as in Fig. 496: 11. 3.6-4.6. – S Prim. – Transpalearctic. – On banks of rivers and lakes *S. pilosella* Thomson

- Head dorsally with short recumbent setae (better seen in lateral view); width of frons less than distance between clypeus and ocelli (Fig. 496: 2) 10
- 10. Lateral margins of pronotum with longitudinal yellow spot. Variability of pattern of hemelytra as in Figs. 496: 12-14. Paramere as in Fig. 496: 15. 3.8-4.5. – S Prim. **S. arenicola ussurica** Vin.
- Lateral margins of pronotum black. (A group of hardly distinguishable species; can be identified on the basis of the structure of the male genitalia only) 11
- 11. Males: sensory tubercle of paramere with long (40-50 mkm) setae (Fig. 496: 24). Pale spot at apex of clavus in pale specimens always bordered, in dark specimens often absent. Variability of pattern of hemelytra as in Figs. 496: 16-23. 3.4-4.1. – Mag., Chuk., Kamch., Amur., Prim., S Sakh., S and C Kur. – Holarctic. – On banks of rivers and lakes **S. pallipes** F.
- Males: sensory tubercle of paramere with short (10-20 mkm) setae (Fig. 496: 25). Pale spot at apex of clavus in pale specimens not bordered, in dark specimens rarely absent. Variability of pattern of hemelytra as in *S. pallipes*. 2.9-4.5. – Mag., Kamch., Prim., Sakh., S Kur. – Holarctic. – On banks of rivers and lakes **S. palustris** Douglas et Scott

Infraorder GERROMORPHA

12. Family MESOVELIIDAE

E.V. Kanyukova

Macropterous specimens relatively rare, their corium hard, with several well-developed veins, clavus membranous, membrane without veins. Living on water surface, on floating leaves of aquatic plants, or on humid shores. Predators. In USSR 1 genus, 5 species.

LITERATURE. Kanyukova, E.V. 1979. Water striders of the family Mesoveliidae (Heteroptera) of the USSR fauna. In: P.A. Ler (ed). *Nazemnye chlenistonogie Dal'nego Vostoka* [Terrestrial Arthropoda of Far East]: 1979. 19-22. Vladivostok. [In Russian].

KEY TO SPECIES OF FAMILY MESOVELIIDAE

1. *Mesovelia* M. R. In USSR 5 species.

1. In apterous specimens, dorsum yellow-green with brown pattern in the form of indistinct spots on thoracic and abdominal segments; all sutures pigmented, brown. In macropterous specimens, pigmentation of clypeus, posterior lobe of pronotum, and veins of hemelytra almost black. Posterior margin of hind femora with 4-10 black [p. 756] spinules. Sternite VIII in both sexes without processes (Fig. 497: 1). Paramere as in Fig. 497: 2. 3-4. – S Prim.; Yakutia, Chita Prov., south of Soviet Central Asia, European USSR, N Caucasus. – Entire Europe. (Fig. 489: 6) **M. furcata** M. R.
- In apterous specimens, dorsum without brown pattern; sutures usually not pigmented, pale. In macropterous specimens, pigmentation of clypeus, posterior lobe of pronotum, and veins of hemelytra brown or light brown. Posterior margin of hind femora with 1-7 black spinules or without spinules 2
2. Posterior margin of hind femora with 1-7 black spinules (sometimes in *M. thermalis* spinules absent). Abdominal sternite VIII of male with 2 groups of brown spinules (Fig. 497: 3) 3
- Posterior margin of hind femora without black spinules. Male abdominal stern-

- ite VIII with median process covered with brown spinules (Figs. 497: 7, 9) 4
3. Posterior margin of hind femora with 1-4 black spinules. Female abdominal sternite VIII with 2 slender processes at posterior margin (Fig. 497: 4). Paramere as in Fig. 497: 5. 2.5-3.5. – Prim.; Soviet Central Asia, Transcaucasus, south of the European USSR. – Hungary **M. thermalis** Horv.

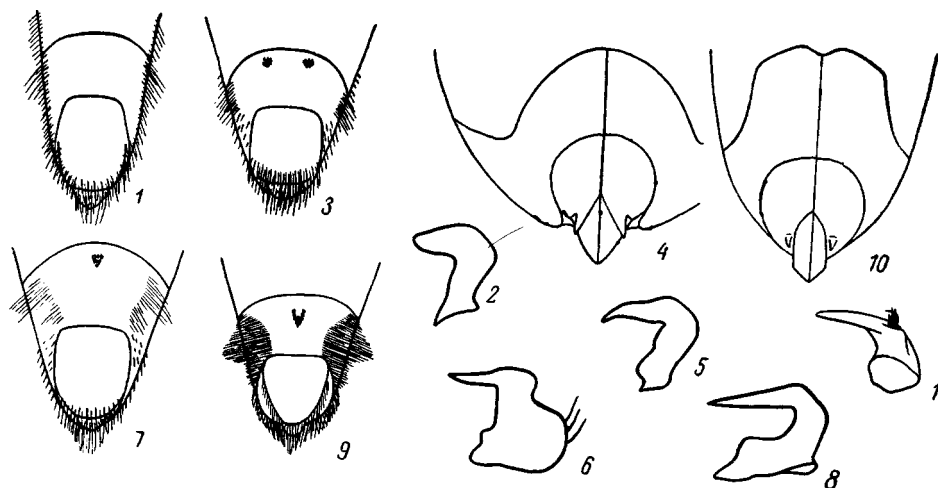


Fig. 497. Heteroptera. Family Mesoveliidae (original).

1, 2, *Mesovelia furcata*: 1, apex of male abdomen; 2, paramere; 3-5, *M. thermalis*: 3, apex of male abdomen; 4, apex of female abdomen; 5, paramere; 6, *M. miyamotoi*, paramere; 7, 8, *M. vittigera*: 7, apex of male abdomen; 8, paramere; 9-11, *M. egorovi*: 9, apex of male abdomen; 10, apex of female abdomen; 11, paramere.

- Posterior margin of hind femora with 3-7 black spinules. Female abdominal sternite VIII without processes. Paramere as in Fig. 497: 6. 3-4. – Prim., S Sakh., S Kur. **M. miyamotoi** Kerzh.
- 4. Female sternite VIII simple, without processes. Paramere as in Fig. 497: 8. 2.5-4. – Prim. – Tropical and subtropical regions of Old World **M. vittigera** Horv. (*orientalis* Kirk.)
- Female sternite VIII with 2 processes at posterior margin (Fig. 497: 10). Paramere as in Fig. 497: 11. 3.2-4.2. – S Sakh. **M. egorovi** Kanyukova

13. Family HEBRIDAE

E.V. Kanyukova

Scutellum of macropterous specimens free, not covered by laminate process of posterior margin of pronotum. Clavus of hemelytra membranous; membrane without veins. Living on banks of water bodies and on aquatic plants, in marshes, in humid moss. Predators. In USSR 1 genus. [p. 757]

KEY TO SPECIES OF FAMILY HEBRIDAE

1. **Hebrus** Curt. – 1 species (in USSR finding of 6 species possible). {Subsequently added: *H. pilosellus* Kanyukova}.
1. Color in major part brown-black; membrane smoky-gray; legs light brown. 2. – Prim. – Japan, Korea, Oriental Region {This species does not occur in Russia. The data refer to *H. pusillus* Fall.} **H. nipponicus** Horv.

14. Family **HYDROMETRIDAE**

E.V. Kanyukova

Hemelytra of macropterous specimens homogeneous, not divided into clavus, corium and membrane, with 2 longitudinal veins connected by several transverse veins. Living on surface of calm water, slowly moving on it, also on floating leaves of aquatic plants, on banks of water bodies, on humid soil and moss. Predators. In USSR 1 genus, 2 species.

LITERATURE. Kanyukova, E.V. 1973. On the distribution of the Hydrometridae (Heteroptera) of the fauna of the USSR. Zool. Zhurn. 52: 1253-1254. [In Russian].

KEY TO SPECIES OF FAMILY HYDROMETRIDAE

1. **Hydrometra** Latr. – 1 species (in USSR 2).

1. Body slender, long, as in Fig. 490: 3. 7.5-9. – Amur., Prim., S Kur. – Almost all Palearctic, except extreme north **H. gracilentia** Horv.

15. Family **VELIIDAE**

E.V. Kanyukova

Hemelytra of macropterous specimens homogeneous, not divided into clavus, corium and membrane, with 3-4 longitudinal veins which form several cells. Apterous specimens occur in USSR more often, than macropterous forms. Living on surface of water, on floating leaves of aquatic plants. Predators. – 2 genera, 3 species (in USSR 3 genera, 8 species). {Subsequently added: *Xiphovelis* Lundblad with *X. glauca* Esaki et Miy., S Prim.}.

KEY TO GENERA

1. 1st antennal segment reaching beyond apex of head not more than by 1/2 of its length 1. **Microvelia**
- 1st antennal segment reaching beyond apex of head more than by 2/3 of its length 2. **Pseudovelis**

KEYS TO SPECIES OF FAMILY VELIIDAE

1. **Microvelia** Westw. Mainly in stagnant water bodies. – 2 species (in USSR 3).

1. Pale band parallel to anterior margin of pronotum interrupted in its middle (Fig. 489: 7). 1.4-1.8. – Amur., Prim., Sakh., S Kur. – From Japan to W Europe **M. reticulata** Burm.
- Pale band parallel to anterior margin of pronotum not interrupted in its middle (Fig. 489: 8). 1.7-2. – Kamch., Khab., Amur., Prim., Sakh. – Holarctic **M. buenoi** Drake (*umbricola* Wróbl.) [p. 758]

2. **Pseudovelis** Hob. In USSR 1 species.

1. Brown-black, with spots of silvery setae. Pronotum, especially its anterior part, and connexivum brownish. Macropterous specimens rare; hemelytra brown, with black veins and several white spots. 2-2.7. – S Kur. (Kunashir I.). – Japan, Korea. – On backwater of rivers **P. tibialis** Esaki et Miy.

16. Family GERRIDAE

E.V. Kanyukova

Hemelytra homogeneous, not divided into clavus, corium and membrane, with 3-4 longitudinal veins which form several oblong cells (Fig. 490: 2). Predators. Rapidly gliding on the surface of water. – 1 genus, 14 species (in USSR 2 genera, 24 species). {Subsequently added: *Rhyacobates* Esaki with *Rh. chinensis* Hung. et Mats., S Prim., representative of the subfamily Ptilomerinae}.

LITERATURE. Kanyukova, E.V. 1982. Water-striders (Heteroptera, Gerridae) of the USSR. Trudy Zool. Inst. Akad. Nauk SSSR 105, (1981): 62-93. [In Russian]. – Miyamoto, S. 1961. Hemiptera: Gerridae. Insecta Japonica 3: 1-39.

KEY TO SPECIES OF FAMILY GERRIDAE

1. **Gerris** F – 14 species (in USSR 23). {*Limnoporus* and *Aquarius* are now considered separate genera. Subsequently added: *G. (G.) lobatus* Andersen et Chen, S Prim.}.

1. Apical angles of abdominal segment VII protruded as pointed spines. Large, not less than 12 2
- Apical angles of abdominal segment VII in the form of broad triangular blades, but not spines; if the apical angles protruded as spines (in females and macropterous males of *G. nepalensis*), they are often bent with their apices inside and upwards (Figs. 498: 16, 17). Length not more than 10 3
2. Pronotum rust-colored, with 2 black spots in the anterior part; hemelytra brownish. Antennae longer or at least as long as half of body. Hind femora markedly longer than middle ones. (Subgenus *Limnoporus* Stål; regarded as separate genus by some authors). Always macropterous. 13-17. – Mag., Kamch., Khab., Amur., Prim., Sakh., S Kur. – Transpalearctic **G. (L.) rufoscutellatus** Latr.
- Pronotum and hemelytra entirely dark brown or black, without spots in anterior part of pronotum. Antennae shorter than half of body. Hind femora as long as middle femora, or hardly longer. (Subgenus *Aquarius* Schell.). Brachypterous and macropterous. 11.5-16. – S Khab., Prim., S Sakh., S Kur. – Transpalearctic **G. (A.) paludum** F
3. Pronotum in the middle and posterior part rust-colored or brown, with pale median stripe anteriorly. (Subgenus *Gerriselloides* Hung. et Matsuda, part) 4
- Pronotum black, with pale median stripe anteriorly 9
4. Mainly apterous, not having even vestiges of hemelytra. Body strongly widened at level of middle legs, markedly tapering anteriorly and posteriorly. Apices of male and female abdomens as in Figs. 498: 1, 2. 7-8.5. – Amur.; Transbaik. – N Mongolia. – In peatbogs **G. (G.) brachynotus** Horv.
- Macropterous or brachypterous with small vestiges of hemelytra. Body only slightly widened at level of middle legs, slender, gradually tapering anteriorly and posteriorly. Larger: 9 and more 5
5. Apical margin of abdominal sternite VII in female concave in the middle (Fig. 498: 5). Apex of male abdomen (ventral view) as in Figs. 498: 3, 4. Often apterous. 9-11. – Mag., N Khab. – North and forest zone of Palearctic **G. (G.) lateralis** Schumm.
- Apical margin of abdominal sternite VII in female protruded backwards and covering considerable part of sternite VIII (Figs. 498: 6, 10, 12). Apex of male abdomen different 6 [p. 759]
6. Apical angles of abdominal segment VII in female almost right, not pointed and not protruding beyond posterior margin of sternite VII (Fig. 498: 6). Apical scler-

- ite of male vesica bifurcate (Figs. 498: 7, 9). Dorsal plate of aedeagus as in Fig. 498: 8 7
- Apical angles of abdominal segment VII in female pointed, protruded beyond posterior margin of sternite VII (Figs. 498: 10, 12). Apical sclerite of male vesica not bifurcate at apex (Figs. 498: 11, 13). Dorsal plate of aedeagus as in Fig. 498: 14 8

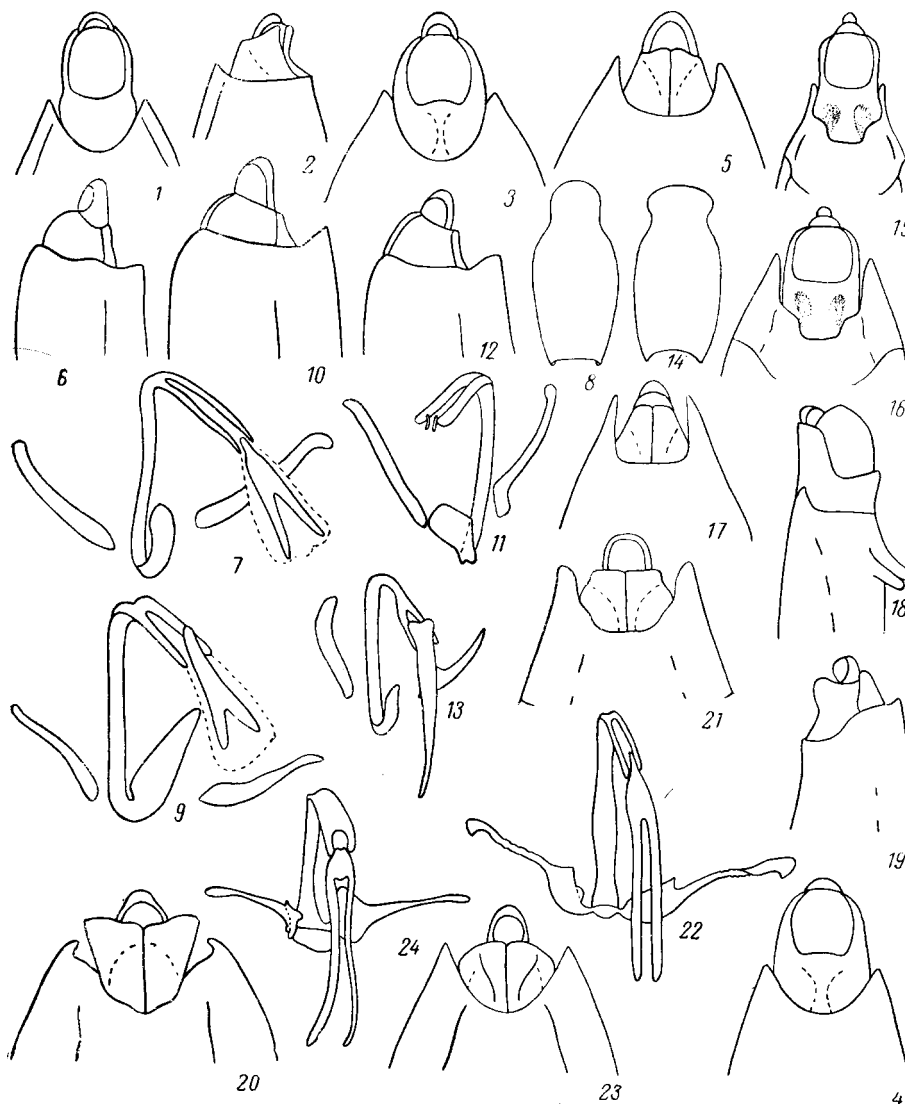


Fig. 498. Heteroptera. Family Gerridae (original).

1, 2, *Gerris brachynotus*: 1, apex of male abdomen, ventral; 2, apex of female abdomen, oblique lateral; 3-5, *G. lateralis*, apex of abdomen, ventral: 3, macropterous male; 4, brachypterous male; 5, macropterous female; 6-8, *G. insularis*: 6, apex of female abdomen, lateral; 7, sclerites of male vesica; 8, dorsal plate of aedeagus; 9, *G. shansiensis*, sclerites of male vesica; 10, 11, *G. gracilicornis*: 10, apex of female abdomen, lateral; 11, sclerites of male vesica; 12-14, *G. yezoensis*: 12, apex of female abdomen, lateral; 13, sclerites of male vesica; 14, dorsal plate of aedeagus; 15-17, *G. nepalensis*, apex of abdomen, ventral: 15, brachypterous male; 16, macropterous male; 17, macropterous female; 18, 19, *G. odontogaster*, apex of abdomen, lateral: 18, male; 19, female; 20, *G. angulatus*, apex of female abdomen, ventral; 21, 22, *G. lacustris*: 21, apex of female abdomen, ventral; 22, sclerites of male vesica; 23, 24, *G. latiabdominis*: 23, apex of female abdomen, ventral; 24, sclerites of male vesica.

7. Sternite VII of male abdomen with 2 black spots at base; sternite VIII without spots formed by silvery setae. Base (not bifurcate part) [p. 760] of apical sclerite of male vesica short; base of axial sclerite shorter than half of medial part of sclerite (Fig. 498: 7). 10-13. – S Prim. – Japan. (Fig. 490: 2) **G. (G.) insularis** Motsch. (*yasumatsui* Miy.)
- Sternite VII of male abdomen without black spots at base; sternite VIII may bear 2 large spots formed by silvery setae. Base of apical sclerite of male vesica long; base of axial sclerite longer than half of medial part of sclerite (Fig. 498: 9). 10-13. – S Prim. – E China **G. (G.) shansiensis** Miy.
8. Apical angles of female abdominal segment VII longer and more pointed (Fig. 498: 10). Apical sclerite of male vesica almost vestigial; base of axial sclerite widened in the form of a spade (Fig. 498: 11). 10-14.5. – S Khab., Prim., S Kur. – Japan, Korea **G. (G.) gracilicornis** Horv. (*jankowskii* Jak.)
- Apical angles of female abdominal segment VII shorter and more blunt (Fig. 498: 12). Apical sclerite of male vesica strongly elongate; base of axial sclerite not widened in the form of a spade (Fig. 498: 13). 9.5-14.5. – S Khab., Prim., Sakh., S Kur. – Japan, NE China **G. (G.) yezoensis** Miy.
9. The whole middle of the head shining. Sternite VIII of male abdomen with 2 spots of silvery setae (Figs. 498: 15, 16). Apical angles of abdominal segment VII in females and macropterous males protruded as pointed spines (Fig. 498: 17). (Subgenus *Gerriselloides* Hung. et Matsuda, part). Apterous, rarely macropterous. 6.5-10. – S Prim. – Japan, E China, Nepal **G. (G.) nepalensis** Dist.
- The middle of the head mat, rarely with thin shining line between eyes, or shining only anteriorly, but not entirely. Sternite VIII of male abdomen bare, without spots of silvery setae. Apical angles of abdominal sternite VII in both sexes not protruded as pointed spines. (Subgenus *Gerris* E) 10
10. Sternite VII of male abdomen with 2 teeth directed obliquely cephalad (Fig. 498: 18). Sternite VIII in females with transverse depression (Fig. 498: 19). Brachypterous and macropterous. 7-9. – Mag., Kamch., Khab., Amur., Prim., Sakh. – Transpalearctic **G. odontogaster** Zett.
- Sternite VII of males and sternite VIII of females without such peculiarities of structure 11
11. Male metathorax with tubercle bearing the gland opening. Abdominal segment VIII of females with lateral lobes (Fig. 498: 20). Macropterous. 9-11.5. – S Prim. – Korea, NE China **G. angulatus** Lundbl.
- Male metathorax without tubercle. End of female abdomen without lateral lobes at segment VIII 12
12. Dorsal side of fore femora pale; their outer side with black stripe (with femora spread laterad and tibiae directed downwards) 13
- Almost entire dorsal side of fore femora with wide, black, longitudinal stripe, only base and sometimes apex pale. 6.3-9. – Amur., Prim.; Transbaik. – Japan, NE China **G. babai** Miy.
13. Apical angles of abdominal segment VII in females longer and bent upwards (Fig. 498: 21). Ventral side of abdomen usually yellow. Lateral sclerites of male vesica with apices bent in the form of hooks and margins serrate in middle part (Fig. 498: 22). Brachypterous and macropterous. 8-10. – S Khab., Amur., Prim., Sakh., S Kur. – Transpalearctic **G. lacustris** L.
- Apical angles of abdominal segment VII in females shorter, more pointed and not bent upwards (Fig. 498: 23); ventral side of abdomen usually black. Lateral sclerites of male vesica with rounded apices and not serrate margins (Fig. 498: 24). Mainly macropterous. 8.5-11. – Prim., S Kur. – Japan, Korea, China **G. latiabdominis** Miy. [p. 761]

Infraorder CIMICOMORPHA

17. Family NABIDAE

I.M. Kerzhner

Body usually oblong, almost cylindrical or more or less flattened dorsally. Ocelli present; head before them without transverse groove. Antennae slender, 4-segmented. Rostrum curved, 4-segmented; 1st rostral segment very short. Fore and middle femora more or less thickened; fore and middle tibiae usually with so called fossa spongiosa at apex. If hemelytra complete, cuneus not separated; membrane usually with 3 elongate cells; numerous short veins originating from them. Predators; feeding on different insects. Living on ground and herbs; 1 species on trees. Hibernating as adults or eggs. – 5 genera, 20 species (in USSR 6 genera, 49 species).

(Note. In the revised classification of the genera of the tribe Nabini prepared for print and accepted here for the Far East species, most of the genera distinguished before are included in *Himacerus* and *Nabis* as subgenera).

LITERATURE. Kerzhner, I.M. 1981. Bugs of the family Nabidae. Fauna SSSR (New Ser., No. 124) Nasekomye Khobotnye 13 (2): 1-324. [In Russian].

KEY TO GENERA

1. Collar of pronotum indistinct. Fore femora strongly thickened, with 2-3 rows of black spinules on ventral (adjacent to adpressed tibia) side (Fig. 499: 1). (Subfamily Prostemmatinae) 5. **Prostemma**
- Collar of pronotum distinct. Fore femora more or less spindle-shaped, moderately thickened, without rows of black spinules on ventral (adjacent to adpressed tibia) side (Fig. 499: 2). (Subfamily Nabinae) 2
2. Fore coxae rodlike. Fore tibiae markedly curved, with fossa spongiosa vestigial, practically invisible. (Tribe Gorpini) 1. **Gorpis**
- Fore coxae conical, not more than twice as long as wide. Fore tibiae straight or weakly curved, with fossa spongiosa (Fig. 499: 2). (Tribe Nabini) 3
3. Connexivum separated ventrally from the rest of abdomen by distinct depression or groove. Femora pale at apex 4. **Nabis**
- Connexivum not separated ventrally by depression. Femora, at least hind ones, with wide black or brown ring at apex 4
4. Posterior lobe and collar of pronotum with distinct punctation ... 2. **Stenonabis**
- Pronotum without punctation or with very indistinct one 3. **Himacerus**

KEYS TO SPECIES OF FAMILY NABIDAE

Subfamily NABINAE

1. **Gorpis** Stål. In USSR 1 species, belonging to subgenus *Oronabis* Hsiao.
1. Brownish or yellowish red. 8.5-11.7. – S Prim. (1 record from Odarka River W of Spassk-Dalniy in 1911). – Japan, Korea, E China. – In Japan collected in oak-pine forests on bushes. Adults hibernating **G. (O.) brevilineatus** Scott
2. **Stenonabis** Reut. Dirty yellow to dark brown; head, pronotum and scutellum with longitudinal dark stripe; legs pale; apices of middle and hind femora [p. 762] with dark ring. Hemelytra usually shortened. In USSR 2 species, both living in forest meadows, mainly at ground surface; possibly hibernating as eggs.

1. Lateral corners of scutellum and entire connexivum pale. 3rd antennal segment 1.2-1.4 times as long as 2nd; 4th antennal segment slightly longer than 3rd. Shortened hemelytra covering about half length of abdomen, reaching the middle of tergite V. Paramere and vagina as in Figs. 499: 3, 501: 1. 7.6-9.5. – S Prim. – N Japan. – Usually under *Calamagrostis*. July and August *S. extremus* Kerzh.



Fig. 499. Heteroptera. Family Nabidae (after Kerzhner).

1, 2, femur and tibia of fore leg: 1, *Prostemma* sp.; 2, *Nabis ferus*; 3-5, vagina, dorsal: 3, *Stenonabis extremus*; 4, *S. yasumatsui*; 5, *Himacerus apterus*; 6, 7, posterolateral field of corium (at left) and adjacent cell: 6, *Nabis ferus*; 7, *N. punctatus*; 8-14, inflated aedeagus: 8, *N. sauteri*; 9, *N. ussuriensis*; 10, *N. demissus*; 11, *N. limbatus*; 12, *N. majusculus*; 13, *N. nigrovittatus*; 14, *N. americolimbatus*.

- Lateral corners of scutellum and spots at posterior margin of segments of connexivum black. 3rd antennal segment as long as 2nd; 4th antennal segment slightly shorter than 3rd. Shortened hemelytra covering about one-third length of abdomen, reaching the middle of abdominal tergite III. Paramere and vagina

as in Figs. 499: 4, 501: 2. 8-9.2. – S Prim. (Khasan District). – Korea. – August to October **S. yasumatsui** Miy. et Lee [p. 763]

3. **Himacerus** Wolff. Hemelytra usually strongly shortened. – 2 species (in USSR 7).

1. 1st antennal segment as long as head; 2nd antennal segment longer than pronotum. (Subgenus *Himacerus* Wolf). Brown; legs and antennae yellow with brown spots and rings; anterior corners of abdominal segments yellow; hemelytra, anterior and posterior margins of pronotum dirty ochreous. Paramere and vagina as in Figs. 499:5, 501: 3. 8-11.5. – S Khab., Amur., Prim., S Kur. (Kunashir I.); Siberia from Yenisei to Altai, Caucasus. – Japan, Korea, E China, Europe. – Adults on trees and bushes; larvae of junior stages on herbs. Late July to October. Eggs hibernating. (Fig. 500: 1) **H. apterus** F

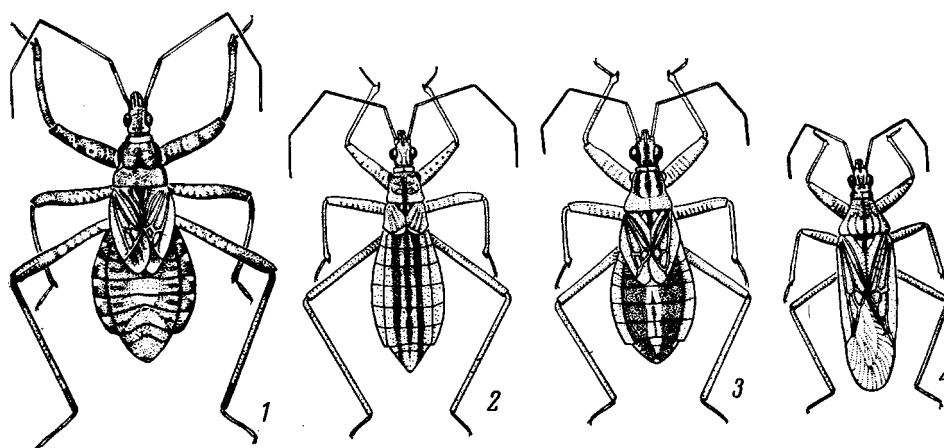


Fig. 500. Heteroptera. Family Nabidae (after Kerzhner).

1-3, brachypterous female: 1, *Himacerus apterus*; 2, *Nabis limbatus*; 3, *N. flavomarginatus*; 4, *N. ferus*, female.

- 1st antennal segment considerably shorter than head; 2nd antennal segment shorter than pronotum. (Subgenus *Stalia* Reut.). Black; anterior corners of abdominal segments and antennae (except apex of 2nd segment) yellow. Legs yellow; femora in major part or entirely black. Male genital segment asymmetrical. Parameres wedge-shaped (Fig. 501: 4). 7-11. – S Prim., S Kur.; mainly steppe regions of USSR from Transbaikal to E Ukraine. – Japan, E China, Mongolia, Turkey, Spain. – In meadows under herbs and on ground surface. Late July to early September. Probably eggs hibernating **H. (S.) dauricus** Kir. (*kurilensis* Mats.)

4. **Nabis** Latr. Yellowish or grayish, rarely slightly reddish; head, pronotum and scutellum usually with longitudinal brown or black stripe. On herbs. – 14 species (in USSR 26).

1. Lateral corners of scutellum with shining bare area, sometimes, especially in macropterous specimens, very small, visible only in oblique lateral view. Hemelytra usually strongly shortened, leaving uncovered not less than half the abdomen; if rarely hemelytra longer, 3 dark spots on veins in posterior part of corium and base of membrane absent. Dorsum of abdomen, with exception of connexivum, usually with longitudinal pale and dark stripes. In bogs and meadows. Eggs hibernating 2

- Lateral corners of scutellum without smooth area. Hemelytra complete or slightly shortened, but almost reaching apex of abdomen; as a rule with 3 dark spots on veins (Fig. 500: 4). Dorsum of abdomen, with exception of connexivum, entirely black, rarely entirely pale. Adults hibernating 9 [p. 764]

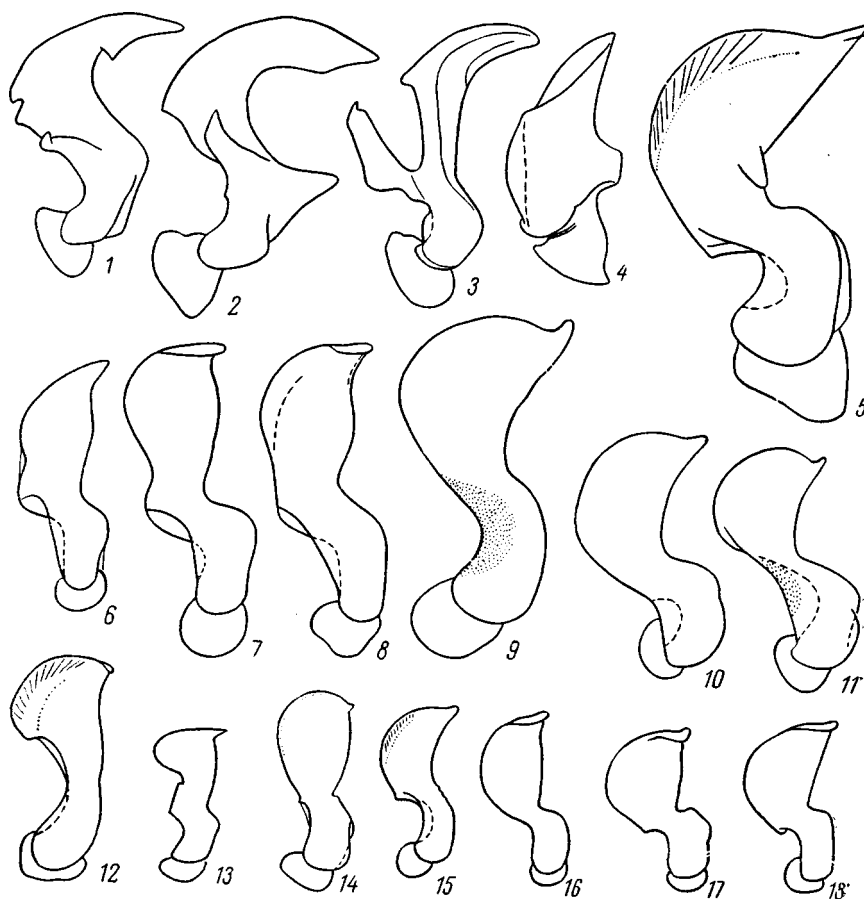


Fig. 501. Heteroptera. Family Nabidae, paramere (after Kerzhner).

1, *Stenonabis extremus*; 2, *S. yasumatsui*; 3, *Himacerus apterus*; 4, *H. dauricus*; 5, *Nabis flavomarginatus*; 6, *N. sauteri*; 7, *N. ussuriensis*; 8, *N. demissus*; 9, *N. majusculus*; 10, *N. limbatus*; 11, *N. americanlimbatus*; 12, *N. nigrovittatus*; 13, *N. reuteri*; 14, *N. ferus*; 15, *N. stenoferus*; 16, *N. punctatus*; 17, *N. intermedius*; 18, *N. inscriptus*.

2. Connexivum ventrally flat. Scutellum transversely concave anterior to the middle. Lateral margin of hemelytra curved obtuse-angulately near the middle. Margins of head beyond eyes converging posteriad. (Subgenus *Nabicula* Kby.). Width of abdomen in male not less than 2, in female 2.7. Dirty yellow or brownish; head, pronotum and scutellum mesally, sides of anterior lobe of pronotum, and abdomen, with exception of connexivum and usually 2 narrow longitudinal stripes, black. Membranes of shortened hemelytra overlapping at least partly. Paramere with tooth (Fig. 501: 5); vagina as in Fig. 502: 4. 7.2-10. – Chuk., Mag., Kamch., Khab., Amur., Prim., Sakh., S Kur. – Forest zone of Holarctic. – In meadows. July to September. (Fig. 500: 3) **N. (N.) flavomarginatus** Scholtz
- Connexivum ventrally at least slightly thickened in the form of a bolster in inner part. Scutellum almost flat. Lateral margin of hemelytra straight or arch-shaped;

- margins of head beyond eyes diverging or parallel, and shortened hemelytra with vestigial, not overlapping membranes; rarely lateral margins of hemelytra obtuse-angulate, margins of head beyond eyes slightly converging posteriad and membranes of shortened hemelytra large and overlapping (*N. sauteri*), in this case width of abdomen not more than 1.8 in male and 2.2 in female. Yellow or pale brownish; head, pronotum and scutellum with median brown stripe sometimes incomplete and indistinct. Dorsum of abdomen as a rule with 1-3 narrow [p. 765] longitudinal dark stripes; in *N. sauteri*, abdomen brownish mesally and paler laterally 3
3. Margins of head beyond eyes diverging; if parallel or slightly converging posteriorly (*N. sauteri*), shortened hemelytra reaching at least abdominal tergite VI. In females, external part of connexivum bent down and invisible dorsally (except *N. sauteri*). Aedeagus with 3-4 more or less large hooks or plates (Figs. 499: 8-10). Vagina with thin-walled sac separated by a strangulation (Figs. 502: 1-3). (Subgenus *Limnonabis* Kerzh.) 4
- Margins of head beyond eyes parallel or slightly converging posteriad. Shortened hemelytra as a rule not reaching beyond posterior margin of abdominal tergite III. In females, external part of connexivum not bent down. Aedeagus with 1-2 large hooks (Figs. 499: 11-14). Vagina without thin-walled sac separated by strangulation (Figs. 502: 5-8). (Subgenus *Dolichonabis* Reut.) 6
4. Margins of head beyond eyes parallel or slightly converging. Shortened hemelytra with partly overlapping membranes, reaching at least base of abdominal tergite VI. Paramere, aedeagus and vagina as in Figs. 499: 8, 501: 6, 502: 1. Male 6.8-7.6; female 7.7-9. – S Sakh., S Kur. – Japan, Korea, E China. – On seaboard marshes. Late July to late August **N. (L.) sauteri** Popp.
- Margins of head beyond eyes diverging. Shortened hemelytra not reaching beyond posterior margin of abdominal tergite II; their membranes practically invisible. Male more than 8; female more than 9.5 5
5. Postocular part of head 0.5-0.75 times as long as eye; distance between ocelli and posterior margin of vertex equal to distance from ocellus to nearest eye. Length of 1st antennal segment 1.7-1.9 times the width of head. In brachypterous specimens, hemelytra with straight hind margin. Paramere, aedeagus and vagina as in Figs. 499: 10, 501: 8, 502: 3. Male 8-9.5; female 11-12.5. – S Khab., Prim., S Kur. – E Mongolia. – In marshes. Mid-July to early September **N. (L.) demissus** Kerzh.
- Postocular part of head as long as eye; distance between ocelli and posterior margin of vertex less than distance from ocellus to nearest eye. Length of 1st antennal segment 2.6-2.8 times the width of head. In brachypterous specimens, hemelytra rounded posteriorly. Paramere, aedeagus and vagina as in Figs. 499: 9, 501: 7, 502: 2. Male 8.5-9.5; female 10-11.5. – S Prim., S Kur. – In marshes. Late July to mid-September **N. (L.) ussuriensis** Kerzh.
6. Length of paramere (without articulatory capitulum) about 0.8 (Fig. 501: 9). Aedeagus with 2 membranous projections covered with dark tubercles (Fig. 499: 12) near the middle. Vagina with 2 parietal glands (Fig. 502: 5). In specimens from Far East, length of 2nd antennal segment 2.9-3.1; body length in male 8.5-9.2; in female 9.6-10. – S Khab., Amur., Prim.; Transbaik. – E Mongolia. – In osier-beds along rivers. Mid-July to late August **N. (D.) majusculus** Kerzh.
- Length of paramere no more than 0.6 (Figs. 501: 10-12). Aedeagus without 2 projections covered with tubercles (Figs. 499: 11, 13, 14). Vagina with 1 parietal gland (Figs. 502: 6-8). In specimens from Far East, length of 2nd antennal segment 1.7-2.9, body length in male not more than 8.5, in female not more than 9.5 7

7. Body of paramere not semicircular (Fig. 501: 12). Aedeagus with row of small sharp spicules in apical part (Fig. 499: 13). Vagina with asymmetrical parietal gland (Fig. 502: 8). Vertex, as a rule, more than 1.75 times as wide as eye. Male 6-8.2; female 7.5-9. – Mag., Amur. – Holarctic, west to Armenia and the Urals, mainly in steppe regions. – In dry meadows and forb steppes. July and August
 **N. (D.) nigrovittatus** J. Sahlb.

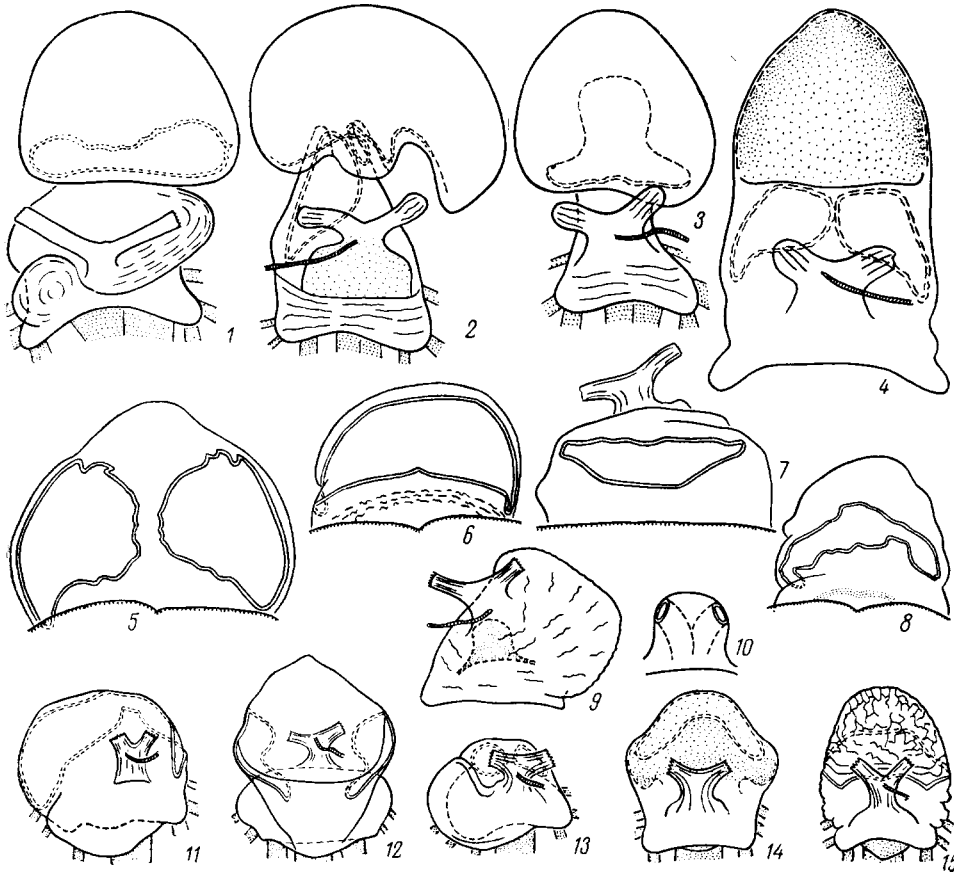


Fig. 502. Heteroptera. Family Nabidae, vagina (after Kerzhner).

1, *Nabis sauteri*; 2, *N. ussuriensis*; 3, *N. demissus*; 4, *N. flavomarginatus*; 5, *N. majusculus*; 6, *N. americanlimbatus*; 7, *N. limbatus*; 8, *N. nigrovittatus*; 9, 10, *N. reuteri*; 11, *N. ferus*; 12, *N. stenoferus*; 13, *N. punctatus*; 14, *N. intermedius*; 15, *N. inscriptus*. 5-8, ventral view; 10, sclerotized part, ventral; 1-4, 9, 11-15, dorsal view.

- Body of paramere semicircular (Figs. 501: 10, 11). Aedeagus with a stripe of sclerotized platelets near apex (Figs. 499: 11, 14). Vagina with symmetrical or nearly symmetrical parietal gland (Figs. 502: 6, 7). Vertex, as a rule, less than 1.75 times as wide as eye 8
- 8. Body of paramere in the form of slightly expanded semicircle, stalk not widened distally (Fig. 501: 10). Aedeagus without minute sclerotized platelets in medial part (Fig. 499: 11). Vagina with easily extending [p. 766] walls; parietal gland not turning on its dorsal side (Fig. 502: 7). In specimens from Far East, length of 2nd antennal segment 2.5-2.9. Male 7-8; female 8-9.5. – Kamch., S Khab., Amur., Prim., Sakh., ?S Kur. – Forest zone of Palearctic. – In humid forest meadows and glades, sometimes in sparse forests. Early July to late August (rarely until Octo-

- ber). (Fig. 500: 2) **N. (D.) limbatus** Dahlb.
- Body of paramere in the form of proper semicircle; stalk widened distally (Fig. 501: 11). Aedeagus with minute sclerotized platelets in medial part (Fig. 499: 14). Vagina with not extending walls; parietal gland slightly turning on dorsal side (Fig. 502: 6). Male 6.8-8.5; female 8-9.5. – Kamch., S Khab., Amur., Prim., Sakh., S Kur.; E Siberia, Tatarstan. – N Mongolia, N America. – In bogs and humid meadows on banks of water bodies. Mid-July to early September **N. (D.) americolimbatus** Car.
 - 9. Connexivum almost flat ventrally. In the species from Far East, paramere of peculiar form (Fig. 501: 13). Vagina with strongly sclerotized ventral sac; 2 parietal glands situated in anteroir corners of this sac (Figs. 502: 9, 10). In females, connexivum with dark spots. In the species from Far East venter of abdomen, with exception of connexivum, entirely black. (Subgenus *Milu* Kirk. = *Reuteronabis* Kerzh., syn. n.). Grayish-yellowish; head and pronotum sometimes slightly reddish. Hemelytra [p. 767] with brown dots at the bases of setae, usually slightly shortened, i. e. reaching slightly beyond or not reaching beyond apex of abdomen, with slightly narrowed membranes, wings being only twice as long as scutellum. 6.2-7.5. – S Khab., Amur., Prim., S Kur. – Japan, Korea, E China. – On herbs and on bushes in sparse forests and edges **N. (M.) reuteri** Jak.
 - Connexivum ventrally in the inner half inflated like a bolster. Paramere of different form. Vagina without sclerotized sac. Connexivum usually without dark spots. Venter of abdomen usually with 2 yellow stripes or entirely pale 10
 - 10. Macropterous, i. e. membranes of hemelytra wider than corium and practically entirely overlapping; hemelytra reaching well beyond apex of abdomen; wings almost as long as hemelytra (in *N. punctatus* wings sometimes shorter, but at least half as long as hemelytra). Disk of paramere not semicircular (Figs. 501: 14-16). (Subgenus *Nabis* Latr., part) 11
 - Usually subbrachypterous, i. e. membranes of hemelytra narrower than corium and only partly overlapping; hemelytra usually not reaching beyond apex of abdomen; wings vestigial, in the form of scales. Disc of paramere semicircular (Figs. 501: 17, 18). Vagina symmetrical, with 1 parietal gland (Figs. 502: 14, 15) 13
 - 11. Pubescence of hemelytra dense and uniform; posterolateral field of corium (Fig. 499: 6) with more than 45 (usually 60-70) setae, without brown spots at the bases of setae, rarely the spots present, but very small and of equal sizes. Width of pronotum 1.5-1.9. Paramere with rounded apex and with sharp subapical denticle (Fig. 501: 14). Vagina with 1 parietal gland sometimes divided into two glands in the narrowest place (Fig. 502: 11). 7.3-8.7. – Kamch., Khab., Amur., Prim., Sakh., S Kur. – Mainly in forest zone of Palearctic; south from forest zone in mountains, on banks of rivers, lakes and seas. – In meadows and fields. (Fig. 500: 4) **N. ferus** L.
 - Pubescence of hemelytra more sparse; posterolateral field of corium (Fig. 499: 7) with less than 45 (usually 20-30) setae, with brown spots of unequal sizes at bases of setae; if spots absent (often in *N. stenoferus*), width of pronotum not more than 1.5. Paramere of different form (Figs. 501: 15, 16); vagina with 2 parietal glands (Figs. 502: 12, 13) 12
 - 12. Paramere with distinct upturned recurrent plate at apex (Fig. 501: 16). Vagina asymmetrical; parietal glands close together (Fig. 502: 13). Dark spots at bases of setae on corium well visible. 6.4-8.7. – Kamch., Amur., S Prim. – From Portugal to Yakutia, Korea and E China, mainly in steppe zone. In E Palearctic – ssp. *mimoferus* Hsiao (*lindbergi* Rem.). In steppes and dry meadows 13

- **N. punctatus** A. Costa (*feroides* Rem.)
- Paramere without recurrent plate at apex (Fig. 501: 15). Vagina symmetrical; parietal glands widely spaced (Fig. 502: 12). Dark spots at bases of setae on corium absent or scarcely distinct. 6.6-8.7. – S Khab., Amur., Prim., S Kur. – Japan, Korea, E China. – In meadows and fields. 2 generations differing in appearance: specimens of non-hibernating generation smaller, narrower, paler, with longer antennae and legs **N. stenoferus** Hsiao (*palliferus* Hsiao, *mandschuricus* Rem.)
 - 13. Setae on hemelytra short, usually hardly visible, without dark spots at their bases. In subbrachypterous specimens, membrane without closed cells. Disk of paramere of proper semicircular form; upturned recurrent plate snub-nosed (Fig. 501: 17). Aedeagus with 2 hooks. Vagina with sclerotized apical part (Fig. 502: 14). (Subgenus *Nabis* Latr., part). 5.5-6.6. – S Khab., Amur., Prim., Sakh.; E Siberia. – N Korea, NE China, N Mongolia. – In humid meadows and herbaceous and shrub marshes **N. intermedius** Kerzh. [p. 768]
 - Setae on hemelytra well visible, with dark spots at their bases. Even in subbrachypterous specimens membrane with 2-4 closed cells. Disk of paramere slightly attenuate apically; recurrent plate narrow (Fig. 501: 18). Aedeagus without hooks. Vagina with wrinkled apical part occupied by a parietal gland with sclerotized border forming a belt on dorsal and ventral sides of vagina (Fig. 502: 15). (Subgenus *Reduviolus* Kby.). 5.1-6.4; macropterous specimens 6.2-6.9. – Mag. (up to boundary with Chuk.), Kamch., N Khab. – Holarctic, in the north and in mountains. – On sedge meadows **N. (R.) inscriptus** Kby.

Subfamily PROSTEMMATINAE

5. **Prostemma** Lap. Brachypterous, rarely macropterous. On ground surface under stones and plants, mostly in dry habitats. Feeding on bugs, particularly of the family Lygaeidae. Adults hibernating. – 2 species (in USSR 5).

1. Pronotum and scutellum entirely black. Clavus red or black; corium red or (f. *flavipenne* Fukui) yellow, rarely black (f. *nigerrimum* Kerzh.). Femora red or yellow, often black at apex, sometimes entirely black. Shortened hemelytra truncate posteriorly; membranes forming narrow borders at their posterior margins; almost entire abdomen free dorsally. 7.3-10. – S Khab., Amur., Prim.; S Siberia and SE Kazakhstan west to Dzhungarian Alatau. – Japan, Korea, E China, Mongolia **P. kiborti** Jak.
- Pronotum and apex of scutellum red. Clavus red; corium at apex black with white spot. Membrane with a spot and posterior margin white. Femora and tibiae reddish yellow, not darkened. Shortened hemelytra covering not less than 2/3 of length of abdomen; membranes long, tongue-shaped. 5.6-6.2. – S Prim. – Japan, Korea, NE China **P. hilgendorffii** Stein

18. Family ANTHOCORIDAE

I.M. Kerzhner

Small or very small (1.5-5), markedly flattened. Head elongated anteriorly (except Oriini). Ocelli present. Antennae 4-segmented. Rostrum 3-segmented, curved. Pronotum trapezoidal. Scutellum triangular. Corium divided by fractures to exocorium, endocorium and cuneus. Membrane with 4 straight veins, often indistinct, sometimes forming 3 closed cells. Legs of simple construction. fore and middle tibiae sometimes with small fossa spongiosa. Tarsi 3-segmented, rarely 2-segmented (*Bilia*).

In males of *Lyctocoris*, 2 parameres of similar form, but the right one much smaller than the left one; in other species of USSR fauna only left paramere present. Ovipositor of ordinary construction. Most species living openly on plants, but there are also specialized species living on bark and under bark of trees, in plant debris, etc. Predators, feeding on small insects, their larvae and eggs, mites. Some Oriini feeding partly or exclusively on vegetable food, especially pollen. Hibernating as adults; in *Scoloposcelis* and some species of *Lyctocoris*, also larvae hibernating. Laying eggs in plant tissues, in putrefying plant debris and under bark. Economical significance have *Scoloposcelis* and *Lyctocoris kurentzovi* exterminating scolytid beetles, and species of *Orius* and *Anthocoris*, feeding on openly living small-sized agricultural and forest pests. – 11 genera, 34 species (in USSR 14 genera, 74 species).

LITERATURE. Péricart, J. 1972. Hémiptères Anthocoridae, Cimicidae et Microphysidae de l'ouest-Paléarctique. 406 pp. Paris. (Faune de l'Europe et du bassin méditerranéen, t. 7). [p. 769]

KEY TO GENERA

1. 3rd and 4th antennal segments thinner than 1st and 2nd segments and differently pilose (Fig. 503: 1): setae on 1st and 2nd antennal segments short, oblique, on the 3rd and 4th vertical, sparse, long (longer than doubled diameter of the segment); if structure and pubescence of antennae different (*Scoloposcelis*), fore femora with small denticles on the anterior side. Canal of scent gland curved in the form of arch or angle, with apex directed cephalad (Figs. 503: 3, 4). (Subfamily Lyctocorinae) 2
- 3rd and 4th antennal segments similar to 1st and 2nd segments (or at least to 2nd one) in width and pubescence; setae on 3rd and 4th segments oblique or recumbent, their length less than doubled diameter of the segment (Fig. 503: 2); rarely (*Bilia*) setae on 2nd and 3rd segments erect and as long as doubled diameter of the segment, in this case head strongly transverse and clypeus (in dorsal view) hardly protruding beyond anterior margin of eye. Fore femora always without denticles. Canal of scent glands more or less straight (Figs. 503: 5, 7) or (Oriini) curved cephalad. (Subfamily Anthocorinae) 5
2. Fore femora with denticles, thickened and flattened. Hind femora strongly thickened and flattened, 2.5-3 times as wide as middle femora. (Tribe Scolopini) 3. **Scoloposcelis**
- Fore femora without denticles. Hind femora at most 1.5-2 times as wide as middle femora 3
3. Hemelytra and posterior lobe of pronotum with distinct, dense, fine punctation. (Tribe Lyctocorini) 1. **Lyctocoris**
- Hemelytra and posterior lobe of pronotum smooth or slightly shagreened, but without distinct punctation 4
4. Posterior margin of pronotum straight or weakly notched; collar indistinct. Hemelytra bare or very shortly pilose. In species from Far East, pronotum and scutellum black. (Tribe Xylocorini) 2. **Xylocoris**
- Posterior margin of pronotum deeply notched; collar distinct (Fig. 503: 9). Setae on hemelytra markedly longer than width of antennae (better seen in lateral view). In species from Far East, pronotum and scutellum yellow or brown. (Tribe Dufouriellini) 4. **Amphiareus** [p. 770]
5. Collar distinct, entirely or partly protruding anteriorly beyond anterior corners of the remainder of pronotum (Figs. 503: 10, 12, 13); if collar indistinct (*Elatophilus*), clavus and corium whitish yellow. (Tribe Anthocorini) 6

- Collar not so distinct, not protruding anteriorly beyond anterior corners of the remainder of pronotum (Fig. 503: 11). Clavus and corium dark yellow, brown or black. (Tribe Oriini) 10

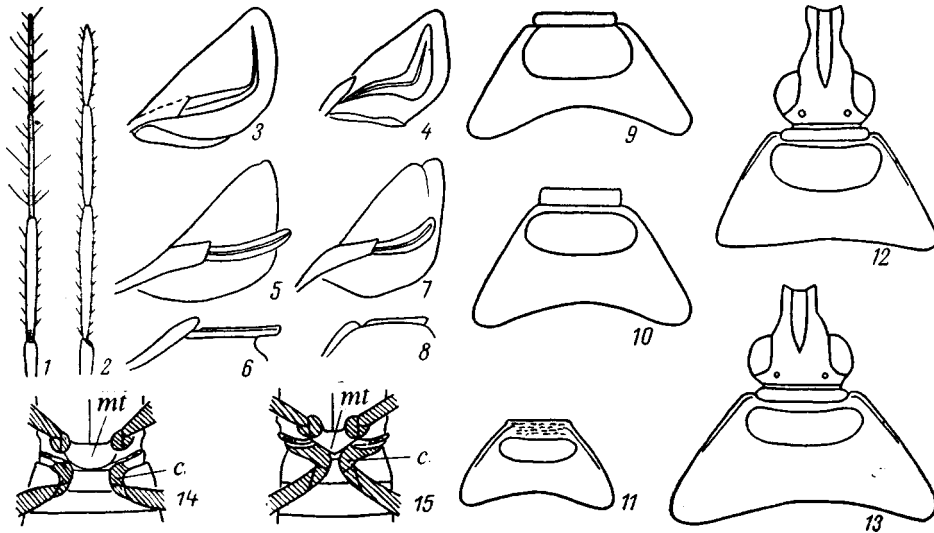


Fig. 503. Heteroptera. Family Anthocoridae (after Vinokurov, Kerzhner, Péricart, and original).

1, 2, antenna: 1, *Lyctocoris*; 2, *Anthocoris*; 3, 4, metathorax, oblique ventral view: 3, *Lyctocoris campestris* E; 4, *Xylocoris cursitans*; 5-8, metathorax, oblique ventral (5, 7) and posterior (6, 8) views: 5, 6, *Tetrableps bicuspis*; 7, 8, *Acompocoris alpinus*; 9-11, pronotum: 9, *Amphiareus obscuriceps*; 10, *Anthocoris limbatus*; 11, *Orius minutus*; 12, 13, head and pronotum: 12, *Tetrableps bicuspis*; 13, *T. aterrima*; 14, 15, apex of thorax and base of abdomen, ventral (bases of legs shaded; *mt*, apex of metathorax; *c*, hind coxa): 14, *Temnostethus*; 15, *Anthocoris*.

- 6. Apex of metathorax truncate or weakly rounded; hind coxae widely spaced (Fig. 503: 14) 7
- Apex of metathorax triangular; hind coxae almost contiguous (Fig. 503: 15) 8
- 7. Lateral margins of pronotum notched at the border of collar and anterior lobe. Hemelytra black with a white spot (Figs. 505: 10, 12) 6. **Temnostethus**
- Lateral margins of pronotum straight. Hemelytra whitish yellow, sometimes with black cuneus 5. **Elatophilus**
- 8. Hemelytra smooth or shagreened. Rostrum not reaching beyond anterior coxae. Collar entirely anterior to anterior corners of the remainder of pronotum (Fig. 503: 10). On deciduous trees and bushes (but *A. chibi* on pines) .. 7. **Anthocoris**
- Hemelytra distinctly shagreened. Rostrum reaching beyond anterior coxae; if rostrum not reaching beyond anterior coxae, collar only half protruding beyond anterior corners of the remainder of pronotum (Figs. 503: 12, 13). On conifers .
..... 9
- 9. Canal of scent glands with outer end directed laterad or slightly posteriad and elevated over surface of metathorax (separated from it!) (Figs. 503: 5, 6) 8. **Tetrableps**
- Canal of scent glands with outer end directed slightly cephalad and not elevated over surface of metathorax (Figs. 503: 7, 8) 9. **Acompocoris**
- 10. Cuneus almost as wide as long. Preocular part of head as long as eye. Sides of pronotum usually almost straight (Fig. 503: 11) 10. **Orius**
- Cuneus much wider than long. Preocular part of head markedly shorter than

eye. Sides of pronotum very broadly rounded at the anterior corners
 11. **Bilia**

KEYS TO SPECIES OF FAMILY ANTHOCORIDAE

Subfamily LYCTOCORINAE

1. **Lyctocoris** Hahn. Short-oval or almost round. – 3 species (in USSR 7).

1. Vertex with long vertical bristle between each eye and ocellus. Hemelytra whitish yellow; basal third of clavus and narrow stripe at its inner margin usually brownish. 3.8-4. – S Prim. – Japan, Korea, E China. – In plant debris in fields, haystacks, barns, on firewoods, etc. **L. beneficus** Hiura
- Vertex without such bristles. Hemelytra colored differently 2
2. Hemelytra entirely dark brown or black (except for membrane). Paramere as in Figs. 505: 1, 2. 3.1-3.5. – S Prim., Sakh., S Kur. (Kunashir I.). – On scaly polypori, sometimes under bark of trees **L. obscurus** Kerzh.
- Hemelytra light brown or dirty yellow in anterior part; cuneus always darker than base of corium. Paramere as in Figs. 505: 3, 4. 3.75-4.15. – S Prim. – On dry trunks of *Pinus koraiensis* and *Picea ajanensis*, feeding on small arthropods, including larvae and eggs of scolytid beetles **L. kurentzovi** Kerzh. [p. 771]

2. **Xylocoris** Duf. – 4 species (in USSR 13).

1. Hemelytra always complete, light or brownish yellow; cuneus and commissure sometimes brown. Species from Far East in plant debris. (Subgenus *Proxylocoris* Car.) 2
- Hemelytra complete or shortened; if hemelytra complete, at least cuneus and outer half of corium dark brown. Species from Far East under bark of trees. (Subgenus *Xylocoris* Duf.) 3
2. On the average, larger and paler. Paramere curved almost semicircularly (Fig. 505: 7). Spermalege of female secondary copulative organ (situated at right between abdominal tergites II and III) with large, well sclerotized pear-shaped reservoir (Fig. 505: 8). 2.2-3.1. – Prim.; Soviet Central Asia, Caucasus. – Afghanistan, Europe, N Africa, Madagascar; distribution in other regions needs verification .
 **X. (P.) galactinus** Fieb.
- Paramere curved arcuately (Fig. 505: 5). Spermalege with small membranous reservoir (Fig. 505: 6). 2.2-2.7. – S Prim.; steppe zone from Transbaikal to Crimea. – Mongolia **X. (P.) tesquorum** Kerzh. et Elov
3. 2nd antennal segment in basal half light yellow, in apical half dark brown; its length distinctly greater than width of vertex and one eye combined. Always macropterous. 2.6-3. – Mag., Khab., Amur., Prim.; E Siberia. – Mongolia
 **X. piceus** Reut.
- 2nd antennal segment uniformly colored, usually dark brown; its length not greater than width of vertex and one eye combined. Brachypterous specimens 1.75-2.4; macropterous specimens 2.25-2.5. – Amur., Prim., S Kur. (Kunashir I.). – Forest zone of Holarctic. (Fig. 504: 1) **X. cursitans** Fall.

3. **Scoloposcelis** Fieb. Body more or less elongate and strongly flattened dorsoventrally. Under bark of trees, mainly conifers. Exterminating larvae of scolytid beetles. In USSR 2 species.

1. Entirely black or dark brown, including hemelytra and legs. 2.7-3.5. – S Khab.,

- Amur. – Forest zone of Palearctic **S. obscurella** Zett.
 – Considerable part of hemelytra whitish; tibiae and tarsi light yellow. 2.8-4.2. –
 Amur., S Prim., S Sakh. – Forest zone of Palearctic. (Fig. 504: 2)
 **S. pulchella** Zett. (*nigriscens* Harada) [p. 772]

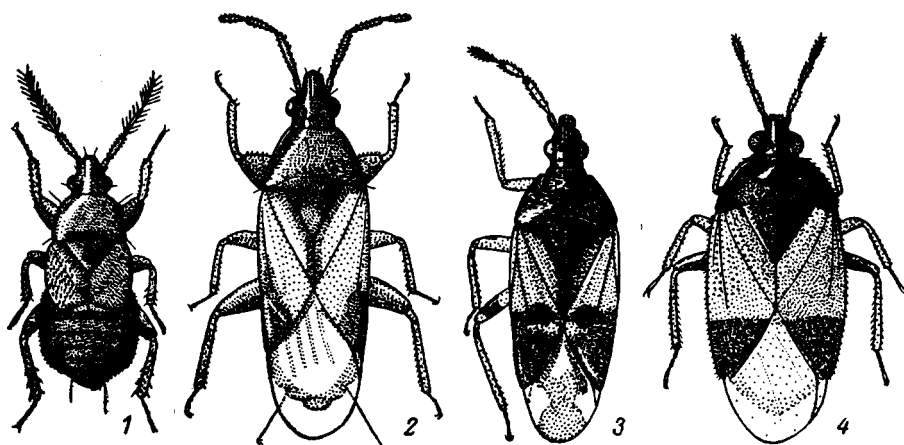


Fig. 504. Heteroptera. Family Anthocoridae (after Péricart).

1, *Xylocoris cursitans*, brachypterous male; 2, *Scoloposcelis pulchella*; 3, *Anthocoris nemorum*; 4, *Orius minutus*, female.

4. **Amphiareus** Dist. Metathorax between hind coxae with forked process. Mainly under plant debris (in straw heaps, under decaying leaves, firewoods, etc.). In USSR 2 species.

1. Light yellow, only inner corner of corium with suffused brown stripe along border with membrane. 2.1-2.6. – S Prim. – Japan, tropical regions of earth
 **A. constrictus** Stål
- Head, usually also pronotum and abdomen dark brown. Hemelytra uniformly yellow or brown. 2.7-3. – S Prim., S Kur. (Kunashir I.); Krasnodar Territory (possibly imported; on rice fields). – Japan, Korea **A. obscuriceps** Popp.

Subfamily ANTHOCORINAE

5. **Elatophilus** Reut. In USSR on *Pinus sylvestris*. – 1, possibly 2 species (in USSR to 4).

1. 2nd antennal segment light yellow entirely or in the middle. Cuneus brown only in outer half. 3.1-3.6. – Amur. – Forest zone of Palearctic **E. stigmatellus** Zett.
- All antennal segments dark brown. Cuneus entirely brown. 2.6-3. – Forest zone from Transbaikal and E Mongolia to Scandinavia. Possibly will be found in Far East. Rare **E. nigrellus** Zett.

6. **Temnostethus** Fieb. On bark of deciduous trees. – 2, possibly 3 species (in USSR 5).

1. Rostrum not reaching beyond or hardly reaching beyond fore coxae. (Subgenus *Ectemnus* Fieb.). Brachypterous, rarely macropterous. Paramere as in Fig. 505: 9. 2.1-2.7. – E Mongolia. Possibly will be found in Far East. – On *Ulmus pumila*
 **T. (E.) ulmi** Elov et Kerzh.
- Rostrum reaching at least the middle of mesothorax. (Subgenus *Temnostethus* Fieb.) 2

2. Pale band on endocorium strongly displaced caudad in comparison with pale band on exocorium (Fig. 505: 10). Hemelytra strongly shining. Hind tibiae dark brown. Always macropterous. Paramere as in Fig. 505: 11. 2.7-3. – S Sakh., S Kur. – On various deciduous trees **T. distans** Kerzh.
- Pale band on endocorium of macropterous specimens less strongly displaced caudad (Fig. 505: 12). Hemelytra weakly shining. All tibiae light yellow. Mostly brachypterous (Figs. 505: 13, 14). Paramere as in Fig. 505: 15. 2.3-2.9. – S Prim. – Forest zone from Irkutsk to W Europe. – More often on *Betula* and *Alnus* **T. gracilis** Horv.

7. **Anthocoris** Fall. More or less elongate-oval. Body black or dark brown; hemelytra whitish to brown; membrane usually with dark pattern; tibiae often pale; femora sometimes also pale. On deciduous trees (but 1 species on pine), feeding on aphids, psyllids and other small insects. – 9 species (in USSR 20).

1. Hemelytra dull at least partly (to compare with shining pronotum), uniformly brown or black, or light brown with dark brown pattern 2
- Hemelytra entirely shining (like pronotum), whitish or pale yellow with brown pattern (with exception of *A. chibi* with differently colored hemelytra) 6 [p. 773]
2. Only exocorium and outer part of cuneus shining (Fig. 505, 16) 3
- Exocorium, whole cuneus and posterior part of endocorium shining (Fig. 505: 17) 4
3. Hemelytra paler than pronotum, more or less widely light brown at base; membrane with transverse white band sometimes interrupted in the middle and whitish anterior corner. Tibiae, middle of 2nd antennal segment, sometimes femora reddish. 3.1-4. – Kamch., S Khab., Amur., Prim., S Sakh. – Forest regions of Palearctic **A. confusus** Reut.
- Hemelytra black, with the only small whitish spot on membrane at apex of cuneus (Fig. 505: 18). Legs and antennae black. 4-4.5. – S Prim. (Khasan District), S Kur. (Kunashir I.). – On *Kalopanax* **A. kalopanacis** Kerzh.
4. Membrane with distinct angulate white band (Fig. 505: 19). Entirely black, or hemelytra, except cuneus, dark brown. 3.3-3.8. – S Prim. [p. 774] (Khasan District), S Kur. (Kunashir I.). – Japan, Korea. – In Japan on *Zelkova serrata* **A. japonicus** Popp.
- Light pattern on membrane different (Figs. 505: 20, 21). Larger: 3.8-4.8. On *Ulmus* 5
5. Entirely black, with exception of spots on membrane black; rarely hemelytra and legs dark brown. 4.3-4.8. – S Sakh., S Kur. – Japan **A. takahashii** Hiura
- Hemelytra with light brown bases, rarely entirely dark brown; tibiae, sometimes also femora and the middle of 2nd antennal segment reddish. 3.8-4.5. – S Khab., Prim. – Korea, Mongolia **A. ussuriensis** Lindb.
6. Posterior lobe of pronotum yellow. 3-3.5. – Chuk., Mag., Khab., Amur., Prim. – Forest zone of Palearctic. – On *Salix* **A. limbatus** Fieb.
- Pronotum entirely black 7
7. Coriaceous part of hemelytra black, only basal 2/3 of corium dark brown. Base of membrane with angulate white band. Femora black; tibiae yellow. 2.4-3. – S Prim. (Khasan District). – Japan. – On *Pinus densiflora* **A. chibi** Hiura
- Hemelytra colored differently, in major part light yellow 8
8. Base of corium with black or dark brown spot; posterior lobe of pronotum smooth, separated from anterior lobe by deep groove. 3.1-3.7. – S Prim.

(Khasan District), S Sakh., S Kur. – Japan. – Mainly on bark of trees.....
 A. *miyamotoi* Hiura

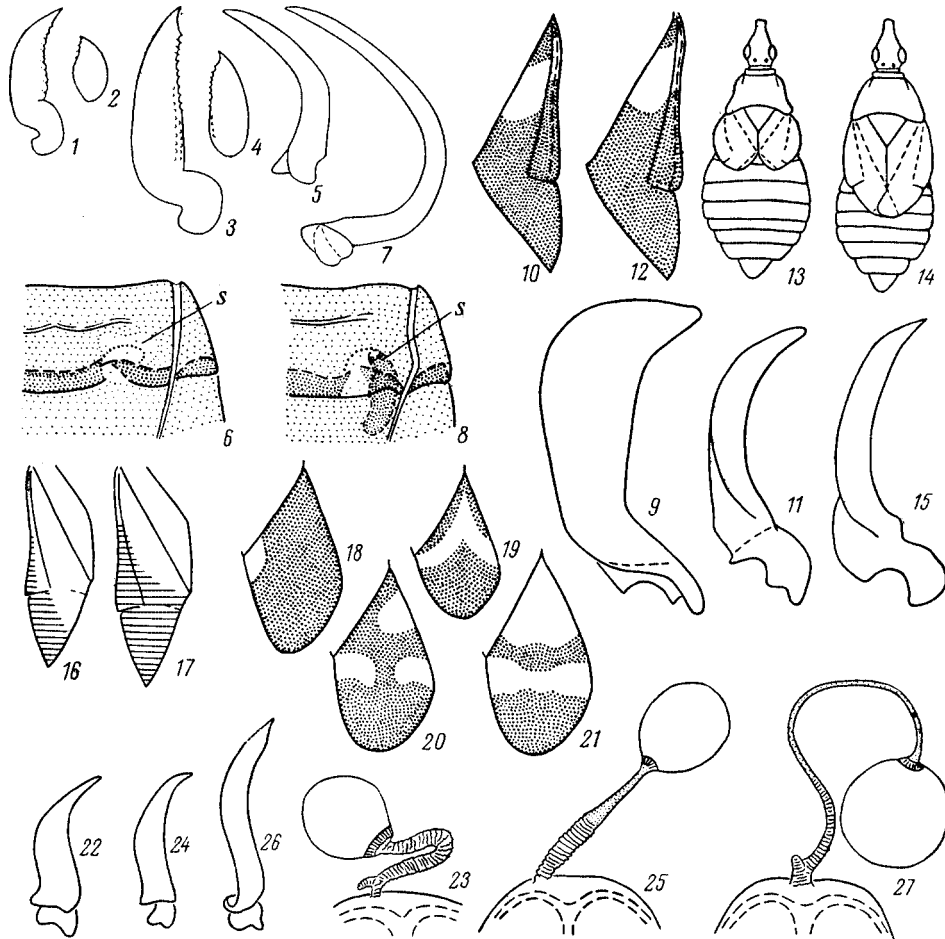


Fig. 505. Heteroptera. Family Anthocoridae (after Kerzhner, Elov, and original).

1-4, left (1, 3) and right (2, 4) parameres: 1, 2, *Lyctocoris obscurus*; 3, 4, *L. kurentzovi*; 5-8, paramere (5, 7) and right side of female abdomen treated in alkaline solution (6, 8) (s, spermalege): 5, 6, *Xylocoris tesquorum*; 7, 8, *X. galactinus*; 9, *Temnostethus ulmi*, paramere; 10, 11, *T. distans*: 10, corium and cuneus; 11, paramere; 12-15, *T. gracilis*: 12, corium and cuneus, macropterous female; 13, 14, body of typical and atypical brachypterous female; 15, paramere; 16, 17, coriaceous part of hemelytron (shining areas shaded): 16, *Anthocoris confusus*; 17, *A. ussuriensis*; 18-21, membrane of hemelytron: 18, *A. kalopanacis*; 19, *A. japonicus*; 20, 21, *A. takahashii*; 22-27, paramere (22, 24, 26) and vagina (23, 25, 27): 22, 23, *Acomporis brevirostris*; 24, 25, *A. pygmaeus*; 26, 27, *A. alpinus*.

- Base of corium light yellow. Posterior lobe of pronotum with wrinkles, not separated from anterior lobe by groove. 3.5-4.3. – Mag., Kamch., Khab., Amur., Prim., Sakh. – Forest zone of Palearctic. – Usually on leaves (Fig. 504: 3)
 A. *nemorum* L.

8. **Tetraphleps** Fieb. Body, antennae, and usually femora black; hemelytra dirty yellow to almost black. Feeding on aphids. In USSR 2 species.

1. Preocular part of head considerably longer than eye, constricted at the level of

the middle of clypeus (Fig. 503: 12). 2nd antennal segment usually red with black ends. 3-4.1. – Mag., Kamch. – Forest zone of Palearctic. – Usually on *Larix*

- **T. bicuspis** H.-S.
 – Preocular part of head approximately as long as eye, without constriction or with indistinct one (Fig. 503: 13). 2nd antennal segment black. 3.2-4.2. – Chuk., Mag., Khab., Prim., S Sakh. – Forest zone west up to Finland. – On *Picea*, *Abies*, *Larix* **T. aterrima** J. Sahlb. (*ezoensis* Hiura)

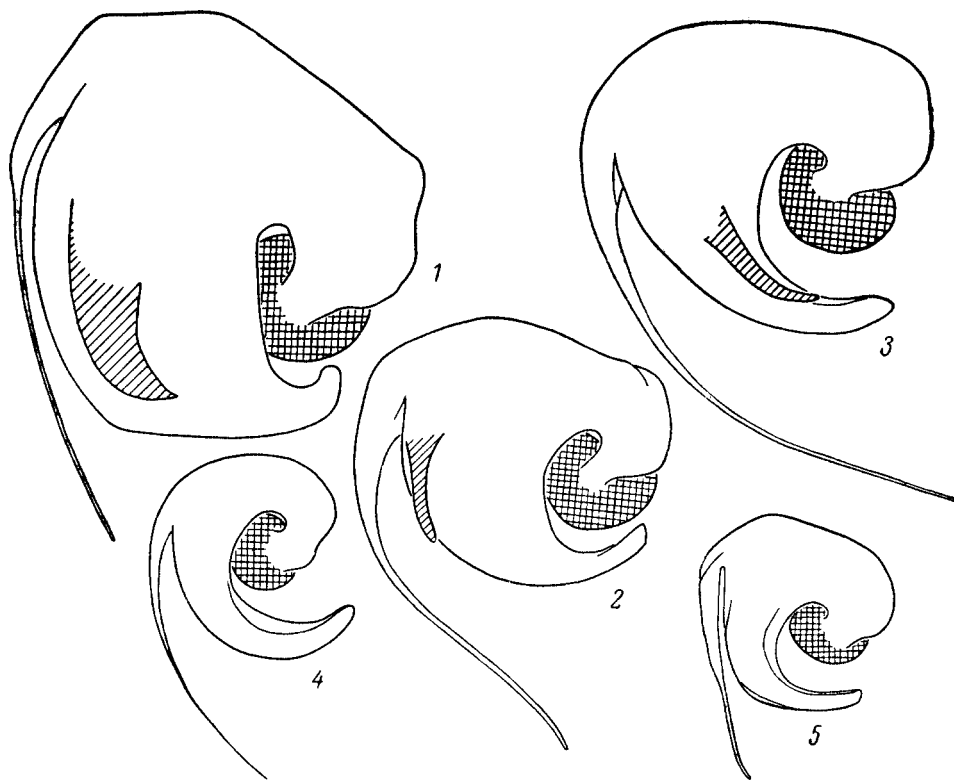


Fig. 506. Heteroptera. Family Anthocoridae, paramere (original).

1, *Orius majusculus*; 2, *O. minutus*; 3, *O. laticollis*; 4, *O. agilis*; 5, *O. sauteri*.

9. **Acompocoris** Reut. Coloration as in *Tetraphleps*. Feeding on aphids. – 3 species (in USSR 5).

1. Rostrum as a rule not reaching beyond the middle of distance between fore and middle coxae, rarely almost reaching anterior margin of middle coxae. Membrane dark. Paramere wide (Fig. 505: 22). Female copulative tube running into intersegmental membrane to the left of median line, with lateral process at base (Fig. 505: 23). 3.25-4.05. – Mag., Kamch., Prim., Sakh., Kur. – On *Pinus pumila*
 **A. brevirostris** Kerzh.
- Rostrum reaching or almost reaching middle or even hind coxae. Paramere narrower (Figs. 505: 24, 26). On *Pinus*, more rarely on other conifers 2
2. Membrane usually dark; hemelytra more often dark brown. Paramere longer (Fig. 505: 26). Female copulative tube running into intersegmental membrane mesally, with lateral process at base (Fig. 505: 27). 3-3.6. – Mag. – Forest zone of

- Palearctic east to Yakutia and Transbaikal **A. alpinus** Reut.
 – Membrane usually colorless; hemelytra as a rule dirty yellow. Paramere shorter (Fig. 505: 24). Female copulative tube running into intersegmental membrane at the left [p. 775], without lateral process at base (Fig. 505: 25). 2.5-3.5. – Mag., Khab., Amur. – Forest zone of Palearctic **A. pygmaeus** Fall.

10. **Orius** Wolff. Oval; body black or dark brown, rarely (females of *O. laticollis*, teneral specimens of other species) reddish; hemelytra, antennae and legs usually at least partly yellow or light brown. – 5 species (in USSR 11).

1. Process of paramere (its apical part distal to origin of flagellum) without tooth, more or less evenly curved and tapered to apex (Figs. 506: 4, 5). (Subgenus *Dimorphella* Reut.) 2
 – Process of paramere with tooth, mainly sharply curved and tapered to apex (Figs. 506: 1-3). (Subgenus *Heterorius* E. Wagn.) 3
2. Flagellum of paramere gradually tapering to apex (Fig. 506: 4). Calli of pronotum strongly flattened, small, separated by large uneven space. Body strongly flattened dorsoventrally. Female sometimes with shortened hemelytra. 1.5-2. – Amur.; Kazakhstan, Tajikistan, Altai, European USSR. – Mongolia, N and C Europe. – Mainly in tussocks of large grasses **O. (D.) agilis** Fl.
 – Flagellum of paramere thick up to the middle, then slender (Fig. 506: 5). Calli of pronotum convex, large, not separated in the middle. Body less flattened. Always macropterous. 1.6-2.3. – S Khab., Amur., Prim., Sakh., S Kur. – Japan, Korea, E China. – On herbs, bushes, and trees **O. (D.) sauteri** Popp.
3. Tooth adjoining to margin of paramere (Fig. 506: 2). In females, head and pronotum black. 1.8-2.5. – Mag., Khab., Amur., Prim. – From Japan to W Europe. – On herbs, bushes, and trees. (Fig. 504: 4) **O. (H.) minutus** L. [p. 776]
 – Tooth not adjoining to margin of paramere (Figs. 506: 1, 3). In females, either head and pronotum reddish, or body not shorter than 2.6 4
4. Process of paramere very wide; flagellum short (Fig. 506: 1). In females, lateral margins of pronotum straight; head and pronotum black. Larger than other species: 2.4-3. – S Prim.; Kazakhstan, European USSR, Caucasus. – E Mongolia, W Europe, Turkey. – In marshy habitats on herbs **O. (H.) majusculus** Reut.
 – Process of paramere narrow; flagellum very long (Fig. 506: 3). In females, lateral margins of pronotum markedly rounded at anterior corners; head and pronotum reddish. 1.9-2.5. – Khab., Prim. – Transpalearctic. – On *Salix*. Rare **O. (H.) laticollis** Reut.

11. **Bilia** Dist. Rounded or short-oval; black or dark brown; antennae and rostrum, with exception of their 1st segment, and also legs (at least partly) yellow. On bushes and trees on the lower side of leaves. In USSR 2 species.

1. Middle and hind femora (except their apices) and bases of middle and hind tibiae (sometimes also fore femora in part) black or dark brown. 1.8-2.4. – S Kur. (Kunashir I.). – Japan **B. esakii** Car. et Miy.
 – Legs entirely yellow. 1.7-2.1. – S Prim. (Khasan District). – Japan **B. japonica** Car. et Miy.

19. Family CIMICIDAE

I.M. Kerzhner

Body strongly flattened dorsoventrally, short-oval. brownish or yellowish red. Clypeus widened anteriorly; ocelli absent. Pronotum tapering posteriad, with deep notch anteriorly. Hemelytra shortened, slightly longer than scutellum, without

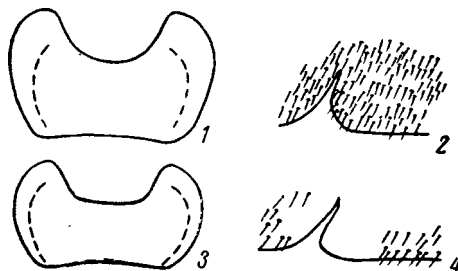


Fig. 507. Heteroptera. Family Cimicidae (after Péricart, modified).

1, 2, *Cimex lectularius*; 3, 4, *C. pipistrelli*. 1, 3, pronotum; 2, 4, area of female abdominal sternite V adjacent to genital sinus.

membranes. Males differ from females by crescent-shaped paramere on the left side at apex of abdomen. Parasites of men, bats, and birds. – 1 genus, 2 species (in USSR 2 genera, not less than 4 species).

LITERATURE. Usinger, R.L. 1966. Monograph of Cimicidae (Hemiptera-Heteroptera). 585 p. Baltimore.

KEY TO SPECIES OF FAMILY CIMICIDAE

1. **Cimex** L. In USSR 2 species (not considering questionable ones).
 1. Flattened sides of pronotum in the widest place twice as wide as an eye (Fig. 507: 1). Abdominal sternite V (4th visible) of female uniformly pilose, including the area around paragenital sinus (excision of posterior margin of segment on the right side) (Fig. 507: 2). 4.3-6.5. Everywhere. – Distributed worldwide. – On men, on hen, sometimes on pigeons, bats, and rodents. Blood-sucking. (Fig. 545: 3) ***C. lectularius** L.
 - Flattened sides of pronotum not wider than eye (Fig. 507: 3). Abdominal sternite V of female [p. 777] in the area around paragenital sinus, particularly mesad to it, not pilose (Fig. 507: 4). 4.5-6.5. – S Prim. – Transpalearctic. – Feeding on blood of bats **C. pipistrelli** Jenyns

20. Family MICROPHYSIDAE

I.M. Kerzhner

Minute; flattened dorsoventrally; usually dark colored. Males macropterous, resembling in appearance small Anthocoridae. In females, abdomen roundly widened to the middle; hemelytra either much shorter than abdomen, or covering it dorsally but not reaching beyond its apex; membrane always absent. Ocelli present (in female small). Rostrum 4-segmented, curved. Hemelytra of male with cuneus. Tarsi 2-segmented. In litter, moss, on trunks of old trees. Probably predators. – 2 genera, 3 species (in USSR 3 genera, 10 species).

LITERATURE. See: Family Anthocoridae.

KEY TO GENERA

1. In the species from Far East, 2nd antennal segment longer than the 4th one; posterior margin of pronotum deeply concave; frons of male with wide longitudinal depression; hemelytra of female covering the whole abdomen (Fig. 508: 1) 1. **Loricula**
- 2nd antennal segment not longer than the 4th one; posterior margin of pronotum straight or weakly concave; frons of male without depression; in species from Far East, hemelytra of female much shorter than abdomen (Fig. 508: 3) 2. **Myrmedobia**

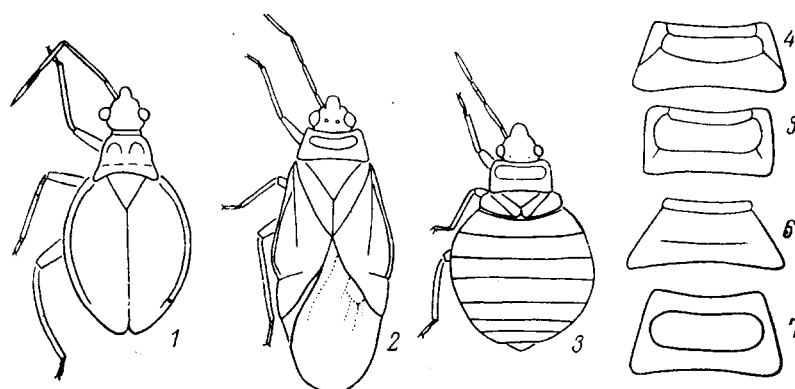


Fig. 508. Heteroptera. Family Microphysidae (after Kerzhner and Péricart, modified).

1, *Loricula pilosella*, female; 2-5, *Myrmedobia exilis*: 2, male; 3, female; 4, 5, pronotum (4, male; 5, female); 6, 7, *M. distinguenda*, pronotum (6, male; 7, female).

KEYS TO SPECIES OF FAMILY MICROPHYSIDAE

1. **Loricula** Curt. (*Microphysa* Westw.) – 1 species (in USSR 5).

1. Males dark brown with red cuneus; females rust-colored with red head and scutellum. Male 2.5-2.9; female 2.1-2.2. – S Prim., S Sakh., S Kur. (Shikotan I.); Yakutia. – N Japan. – In forest litter. Late June to late July. (Fig. 508: 1) **L. pilosella** Miy.

2. **Myrmedobia** Bär. Dark brown or black; head of female sometimes red. – 2 species (in USSR 5).

1. Pronotum of male weakly widened posteriad; laminate border reaching the middle of its lateral margins (Fig. 508: 4). Pronotum of female shining, with parallel lateral margins (Fig. 508: 5). Male 1.8-2.2; female 1.2-1.6. – Khab., [p. 778] Amur., Prim. – Forest zone of Palearctic. – In moss and litter, mainly in coniferous forests. Mid-June to early September. (Figs. 508: 2, 3) **M. exilis** Fall. (*tenella* Zett.)
- Pronotum of male more strongly widened posteriad; laminate border well expressed only near anterior corners (Fig. 508: 6). Pronotum of female dull, with distinctly diverging lateral margins (Fig. 508: 7). Body sizes as in the preceding. – S Prim. – Forest zone of Palearctic. – On fallen trunks and on branches of trees inclined to ground, sometimes in litter. June to August (more often in July) **M. distinguenda** Reut.

21. Family MIRIDAE (CAPSIDAE)

I.M. Kerzhner

Medium-sized or small (2-11) bugs with rather soft integuments. Body from almost round to strongly elongate, usually moderately elongate. Coloration variable, often green. Eyes usually large and situated at posterior margin of head, in male usually larger than in female. Ocelli absent (with exception of Isometopinae). Antennae usually long and slender. Pronotum usually trapezoidal; anterior margin of pronotum often separated by a groove, forming a narrow collar. Two calli of pronotum lying behind collar often strongly smoothed and almost invisible. Scutellum more or less flat; its anterior part (base) separated by a groove and often entirely covered by posterior margin of pronotum. Hemelytra divided into corium, clavus, cuneus and membrane. Membrane with 2 closed cells contiguous with cuneus, rarely with one cell. Hemelytra sometimes more or less shortened, especially in females. Legs slender, usually long; hind femora sometimes thickened. Tarsi 3-segmented, very rarely 2-segmented. Apical segment of tarsus with 2 claws bearing setiform or lamellate appendages of 2 types (Fig. 509): parempodia (arolia) originating from the medial part of the unguitactor plate (to which claws are attached) and pulvilli (pseudarolia) originating directly from claws; sometimes also pseudopulvilli originating from outer corners of unguitactor plate present. The structure of claws and their appendages is an important diagnostic character. The claws have to be examined under the microscope because of their small size. Genital segment of male usually conical; parameres asymmetrical, left paramere usually larger than right one. Penis with sclerotized external part (theca) through the opening of which the aedeagus, membranous or in major part sclerotized, is pulled out during copulation. Female with well developed ovipositor.

Living on plants; most species phytophagous, some zoophytophagous (feeding on plant and animal food) or predators. Most phytophagous and zoophytophagous species feeding on angiosperms (herbs, bushes and trees), but some species feeding on gymnosperms, ferns and arboreal fungi. Eggs deposited in tissues of plants, usually in stems. Hibernating as eggs, rarely (*Lygus* and some others) as adults. Most species with 1 generation per year. Many mirids are agricultural and forest pests. – 103 genera, 309 species (in USSR about 200 genera, more than 800 species).

LITERATURE. Carvalho, J.C.M. 1955. Keys to the genera of Miridae of the World (Hemiptera). Bol. Mus. Paraense E. Goeldi 11 (2): 1-151. – Carvalho, J.C.M. 1957-1960. Catalogue of the Miridae of the World. Arq. Mus. Nac., vols 44, 45, 47, 48, 51. – Putshkov, V.G. 1966. Glavneishie klopny-slepyaki – vrediteli sel'skokhozyaistvennykh rastenii [Principal Miridae injurious to crops]. 172 pp. Kiev. [In Russian].

KEY TO GENERA

1. Ocelli present. (Subfamily Isometopinae). Head strongly flattened anteriorly, in form of more or less rectangular plate with eyes situated in dorsolateral corners of the plate and antennae situated below its ventral margin (Figs. 511: 3, 4, 6, 7) 2 [p. 779]
- Ocelli absent. Head not flattened, more or less triangular in front view (Figs. 510: 4-6, 22-24) 3
2. Width of eye several times the distance between eyes in the narrowest place (on frons) 1. **Myiomma**
- Width of eye approximately equal to the distance between eyes in the narrowest

- place, which is on vertex (Figs. 511: 3, 4, 6, 7) 2. **Isometopus**
3. Membrane with 1 cell, the inner posterior corner of cell strongly protruded posteriad (Fig. 510: 3). Eyes strongly projecting; collar of pronotum distinct (Fig. 510: 2). Claws with pseudopulvilli and setiform parempodia, without pulvilli (Fig. 509: 3). (Subfamily Bryocorinae, tribe Monaloniini) 10. **Dimia**
- Membrane with 2 cells or without cells (in brachypterous specimens); if membrane with 1 cell, the inner corner of the cell rounded and not protruded posteriad 4
4. Each claw with denticle close to apex (to examine at high magnification); claws without pulvilli and pseudopulvilli, with setiform parempodia (Fig. 509: 1). Tarsi slender, 2-segmented. In species from Far East, dorsum of body bare or with hardly visible setae. (Subfamily Cylapinae, tribe Fulviini) 5

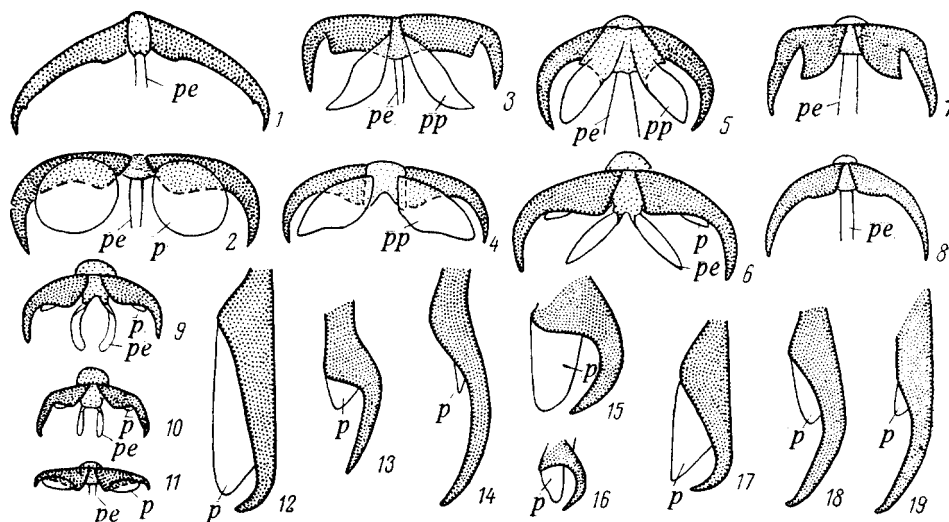


Fig. 509. Heteroptera. Family Miridae, claws (after Kerzhner and original).

1-11, both claws, ventral: 1, *Punctifulvius kerzhneri*; 2, *Sinevia tricolor*; 3, *Dimia inexpectata*; 4, *Monalocoris filicis*; 5, *Neodicyphus annulifer*; 6, *Adelphocoris lineolatus*; 7, *Deraeocoris ater*; 8, *Alloeotomus simplus*; 9, *Orthotylus interpositus*; 10, *Brachyarthrur limitatum*; 11, *Psallus ulmi*; 12-19, one claw, lateral: 12, *Dacota hesperia*; 13, *Excentricoris pictipes*; 14, *Atractotomus morio*; 15, *Macrotylus cruciatus*; 16, *M. mundulus*; 17, *Acrotelus pilosicornis*; 18, *Plagiognathus chrysanthemi*; 19, *Plesiodema stlaniki*. p, pulvilli; pp, pseudopulvilli; pe, parempodia.

- Claws without denticles close to apex. Tarsi 3-segmented (in some species, especially those of the tribe Eccritotarsini, border between 2nd and 3rd segments hardly visible, but dorsum distinctly pilose and claws with pulvilli) 7
5. Dorsum convex. Hemelytra densely punctate. Posterior margin of pronotum straight; sides of pronotum rounded (to examine in lateral view) 5. **Punctifulvius**
- Dorsum more or less flat. Hemelytra not punctate. Posterior margin of pronotum concave or wavy; sides of pronotum carinate at least in posterior half 6
6. Sides of pronotum only narrowly carinate in posterior half; posterior and lateral margins of pronotum concave 3. **Fulvius**
- Sides of pronotum laminate along their full length; posterior margin of pronotum wavy; lateral margins of pronotum straight 4. **Peritropis**
7. Tarsi distinctly thickened to apex (Fig. 510: 1). (Subfamily Bryocorinae, part)

- 8 [p. 780]
- Tarsi not thickened to apex 11
 - 8. Membrane in species from Far East with 2 cells (Figs. 511: 8, 9). Claws with setiform parempodia, without pseudopulvilli and with large rounded pulvilli (Fig. 509: 2). (Tribe Eccritotarsini) 9
 - Membrane with 1 cell, or hemelytra shortened, without membranes. Claws without parempodia and pulvilli, with lamellate pseudopulvilli (Fig. 509: 4). (Tribe Bryocorini) 10
 - 9. Dorsum not punctate. Base of scutellum separated by a transverse groove (mesoscutum) widely open (Fig. 511: 9) 6. **Michailocoris**
 - Pronotum, clavus and corium (with exception of its outer margin) distinctly punctate. Base of scutellum covered by pronotum and invisible dorsally (Fig. 511: 8) 7. **Sinevia**
 - 10. Body short-oval. Hemelytra always complete. Rostrum reaching middle coxae. Length of 1st antennal segment less than half the width of head 11. **Monalocoris**
 - Body (Figs. 511: 10, 11) elongate (macropterous specimens, usually males) or pear-shaped (brachypterous specimens, usually females). Rostrum not reaching beyond fore coxae. Length of 1st antennal segment more than half the width of head, sometimes equals to width of head 12. **Bryocoris**
 - 11. Claws with lamellate pseudopulvilli and with setiform parempodia between them (Fig. 509: 5). (Subfamily Bryocorinae, tribe Dicyphini) 12
 - Claws only with lamellate or setiform parempodia (Figs. 509: 6-11) 13
 - 12. Calli of pronotum flat. Distance between posterior margin of head and eye approximately equals to the width of 2nd antennal segment 8. **Cyrtopeltis**
 - Calli of pronotum convex. Distance between posterior margin of head and eye much greater than width of 2nd antennal segment 9. **Neodicyphus**
 - 13. Claws with more or less widened and flattened lamellate parempodia (Figs. 509: 6, 9) 14
 - Claws with setiform parempodia (Figs. 509: 7, 8, 11), with exception of *Brachyarthrum* (Phylini) having lamellate parempodia (Fig. 509: 10) 73
 - 14. Parempodia with diverging apices (Fig. 509: 6). Collar convex, separated by a groove reaching beyond sides of pronotum; if collar flattened and not separated, vertex with longitudinal groove or transverse depression, or appearance more or less myrmecomorph. (Subfamily Mirinae) 15
 - Parempodia with converging apices (Fig. 509: 9). Pronotum without collar or with very indistinct one; vertex without longitudinal groove 50
 - 15. Pronotum with collar distinctly separated by deep groove. 1st segment of hind tarsi not longer or insignificantly longer than 2nd segment (exceptions: *Stenotus*, *Erimiris*). Vertex without longitudinal groove (exceptions: *Erimiris*, *Allorhinocoris*, *Creontiades*, sometimes *Irbisia*). Hemelytra at least reaching or almost reaching apex of abdomen 16
 - Pronotum without collar or with strongly flattened and not so distinctly separated one. 1st segment of hind tarsi twice or almost twice as long as 2nd segment 42
 - 16. 3rd antennal segment longer than 2nd one (in species from Far East 1.1-1.2 times); antennae considerably longer than body (in species from Far East approximately 1.5 times). Vertex with deep longitudinal groove (Fig. 524: 1). Genae protruding in form of tubercles on each side of base of clypeus. 1st segment of hind tarsi almost twice as long as 2nd segment (Tribe Mecistoscelini) 52. **Erimiris**

- 3rd antennal segment shorter than 2nd antennal segment. Vertex without groove; 1st segment of hind tarsi shorter or slightly longer than 2nd segment; if one of these characters not fitting, antennae not longer or hardly longer than body. (Tribe Mirini)..... 17
- 17. Pronotum, sometimes also hemelytra more or less distinctly punctate, or pronotum roughly wrinkled; [p. 781] if punctation indistinct, posterior margin of vertex distinctly carinate 18
- Pronotum without punctation or rough wrinkles; posterior margin of vertex without carina 32
- 18. Pronotum and scutellum with long erect setae. Median length of collar of pronotum twice the width of 2nd antennal segment 21. **Tinginotum**
- Pronotum and scutellum without setae, or with recumbent setae, or with short oblique setae. Collar of pronotum usually not longer than width of 2nd antennal segment 19
- 19. Body covered dorsally and ventrally with more or less flattened, golden or silvery setae (easily rubbed off!) 20
- Body, at least ventrally, without flattened golden or silvery setae, covered with fine pubescence or almost bare 21
- 20. Median length of collar of pronotum twice the width of 2nd antennal segment. 1st segment of hind tarsi as long as 2nd segment. Dorsum deeply punctate 19. **Charagochilus**
- Length of collar of pronotum equals to width of 2nd antennal segment. 1st segment of hind tarsi shorter than 2nd segment. Punctuation of dorsum not deep 20. **Polymerus**
- 21. Pronotum at posterior margin only 1.3-1.5 times as wide as head. Antennae attached at the very ventral margin of eyes or even ventrad to it 22
- Pronotum at posterior margin 1.6-2.3 times as wide as head. Antennae usually attached somewhat above ventral margin of eyes 25
- 22. Pronotum with well visible dorsally, dense setae; its posterior lobe wrinkled. Posterior margin of vertex carinate. Length of 1st antennal segment equals to width of vertex..... 18. **Irbisia**
- Pronotum dorsally seems bare (very short and sparse setae visible in lateral view); its posterior lobe punctate. 1st antennal segment shorter than width of vertex..... 23
- 23. Posterior margin of vertex without carina. Not shorter than 5 17. **Capsus**
- Posterior margin of vertex carinate. Not longer than 4.5 24
- 24. Collar of pronotum shining, yellow. Hemelytra dark 22. **Camptozygum**
- Collar of pronotum more or less dull, black. Hemelytra pale 23. **Zygitus**
- 25. Length of 2nd antennal segment less than or equals to width of head 31. **Agnocoris**
- Length of 2nd antennal segment greater than width of head 26
- 26. Ventral margin of antennal fossa situated ventral to the ventral margin of eye (Fig. 510: 4); inner margins of eyes weakly concave. Calli of pronotum raised, bordered posteriorly with deep groove. Claws curved distal to the middle 24. **Lygidea**
- Antennal fossa situated markedly dorsal to ventral margin of eye (Figs. 486: 3, 510: 5, 6); inner margins of eyes strongly concave; calli of pronotum not raised. If ventral margins of eyes and antennal fossae lying almost at one level and calli of pronotum raised and bordered posteriorly with deep groove (*Lygocoris rugicollis*, especially in females), claws curved in the middle 27
- 27. 2nd antennal segment spindle-shaped, in the thickest place being 2.3-3 times as

- thick as 3rd antennal segment. Bright red or yellowish red with black pattern ..
 30. **Eolygus**
 – 2nd antennal segment at most twice as thick as 3rd antennal segment 28
 28. Frons almost dull, with shallow longitudinal groove and oblique transverse
 grooves diverging from it (Fig 510: 6). Hemelytra with more or less spotty dis-
 tributed, short, curved, silvery setae and erect black setae 29. **Salignus**
 – Frons without grooves, strongly shining (Figs. 486: 3, 510: 5) 29

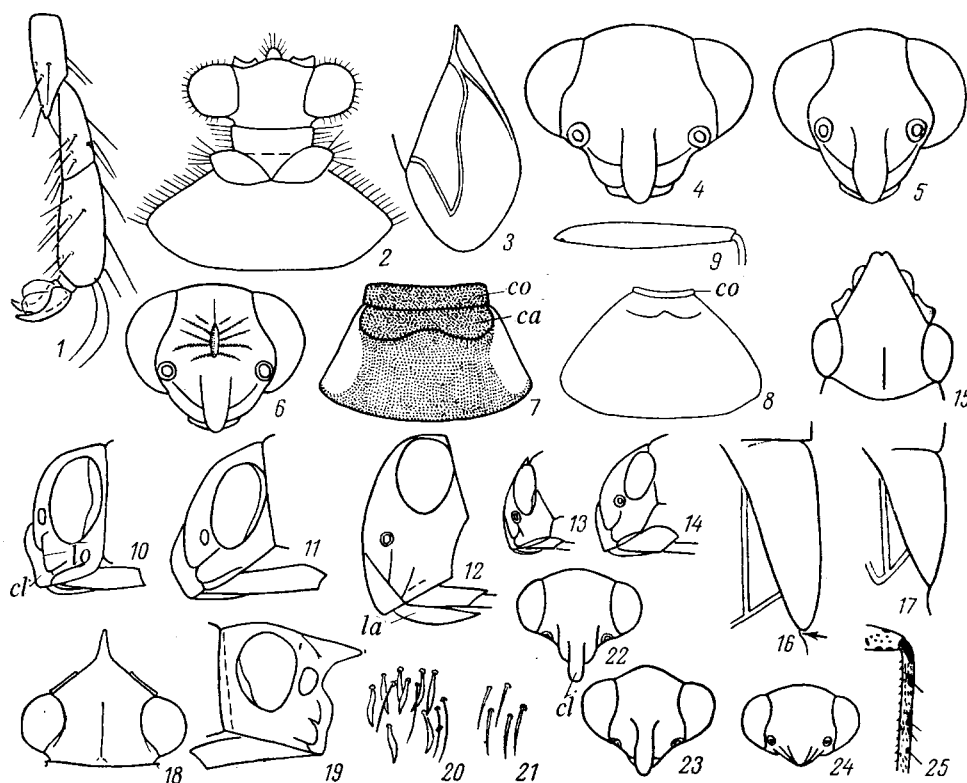


Fig. 510. Heteroptera. Family Miridae (after Wagner, Josifov, Kerzhner, and original).

1, *Sinevia tricolor*, tarsus; 2, 3, *Dimia inexpectata*: 2, head and pronotum; 3, membrane; 4-6, head, anterior view: 4, *Lygidea illota*, male; 5, *Lygocoris pabulinus*, male; 6, *Salignus distinguendus*, female; 7, 8, pronotum: 7, *Capsodes gothicus*; 8, *Deraeocoris ater*; 9, *Phytocoris populi*, hind femur; 10-14, head, lateral: 10, *Loristes decoratus*; 11, *Calocoris fulvomaculatus*; 12, *Myrmecoris gracilis*; 13, *Pilophorus cinnamopterus*; 14, *Orthocephalus funestus*; 15, *Notostira* sp., head, dorsal; 16, 17, cuneus and adjacent area of membrane, male: 16, *Mecomma ambulans*; 17, *Cyrtorhinus caricis*; 18, 19, *Acrorrhinium inexpectatum*, head of female, dorsal and lateral; 20, 21, pubescence of hemelytra: 20, *Psallus* sp.; 21, *Monosynamma bohemani*; 22-24, head, anterior view: 22, *Criocoris crassicornis*; 23, *Psallus haematodes*; 24, *Campylomma* sp.; 25, *Plagiognathus chrysanthemi*, apex of femur and base of tibia of hind leg. *la*, labrum; *ca*, calli; *cl*, clypeus; *lo*, lorum; *co*, collar.

29. Outer side of tibia with dark spot at the knee and another dark spot distal to the first one; if 2nd spot absent, pronotum and hemelytra with coarse punctation and scutellum flat 26. **Lygus** [p. 782]
 – Outer side of tibia without dark spots or only diffusely darkened on the knee, in the last case pronotum with very fine and sparse punctation or scutellum strongly convex 30
 30. Color green; if not green, either body longer than 6.5, or spines of hind tibiae originating from brown dots; punctation of pronotum always fine

- 25. **Lygocoris**
- Color usually not green; body always not longer than 6.8. If coloration partly yellow-green (sometimes in females of *Orthops*), body length less than 6 and spines of hind tibiae not originating from brown dots. If body longer than 6 or spines of hind tibiae originating from brown dots (*Pinalitus nigrescens*), punctuation of pronotum coarse and dense 31
31. Length of 2nd antennal segment greater than, equal to, or slightly (by 1/10) less than width of pronotum. Spines on tibiae yellow or light brown 28. **Pinalitus**
- Length of 2nd antennal segment only 2/3 to 3/4 of width of pronotum at base. Spines on tibiae black or dark brown 27. **Orthops**
32. Collar of pronotum almost as long as calli (to measure along median line!) (Fig. 510: 7) 33
- Collar of pronotum much shorter than calli 34
33. Dorsal margin of head almost level with pronotum and scutellum. Dorsum with erect setae. Antennae slender 34. **Capsodes** [p. 783]
- Body strongly convex: dorsal margin of head situated not higher than middle of thorax height. Dorsum with very short adpressed setae. 1st and 2nd antennal segments thick, much thicker than 3rd and 4th antennal segments 33. **Eurystylus**
34. Hind femora flattened (Fig. 510: 9), long, mainly reaching beyond apex of abdomen. 1st antennal segment longer than pronotum, with at least several erect setae on inner side 42. **Phytocoris**
- Hind femora not flattened, cylindrical (in *Stenotus* slightly flattened). 1st antennal segment mainly shorter than pronotum, with all setae adpressed or recumbent 35
35. 1st segment of hind tarsi 1.5-2 times as long as 2nd segment 32. **Stenotus**
- 1st segment of hind tarsi not longer than 2nd segment 36
36. Vertex with longitudinal groove 37
- Vertex without longitudinal groove 39
37. Sides of pronotum (in lateral view) rounded 35. **Creontiades**
- Sides of pronotum carinate 38
38. Frons roundly triangular anteriorly, projecting above base of clypeus in profile. 2nd antennal segment twice as long as 3rd and 4th combined. Dorsum with black and silvery setae 36. **Pantilius**
- Frons rounded anteriorly, not projecting above base of clypeus. 2nd antennal segment approximately as long as 3rd and 4th combined. Dorsum only with black setae 37. **Allorhinocoris**
39. Median length of collar less than or equals to basal width of 2nd antennal segment. Genital segment of male with denticle at the left side ... 41. **Adelphocoris**
- Median length of collar greater than basal width of 2nd antennal segment. Genital segment of male without denticle 40
40. Dorsum of body only with black setae 38. **Mermelocerus**
- Dorsum of body with pale or black and pale setae 41
41. Lora partly covering genae laterally (Fig. 510: 10). Pronotum black, shining, with dull yellow collar 39. **Loristes**
- Lora not covering genae laterally (Fig. 510: 11). Pronotum differently colored .. 40. **Calocoris**
42. Vertex with longitudinal groove or transverse depression (both often absent in *Actitocoris*). Hemelytra of brachypterous specimens (*Leptopterna*, *Actitocoris*) not shorter than one-third of abdomen length; in macropterous or submacropterous

- specimens, either cuneus separated by distinct fracture and membrane with 2 cells, or (*Teratocoris*) body green, or (*Actitocoris*) pronotum partly yellow. Not resembling ants. (Tribe Stenodemini) 43
- Vertex without groove or depression. Mostly brachypterous, with hemelytra not longer than one-third of abdomen length; rarely macropterous, in this case cuneus not separated by fracture and membrane with 1 cell. Color not green; pronotum black or red. Brachypterous specimens resembling ants at least vaguely. Connexivum usually bent upwards and adpressed to convex abdomen 49
43. Scutellum and posterior part of pronotum distinctly punctate. Pronotum covering base of scutellum 43. **Stenodema**
- Scutellum smooth or with transverse wrinkles. Pronotum with indistinct punctuation, not covering base of scutellum 44
44. Head longer than wide 45
- Head shorter than wide, rarely (*Teratocoris depressus*) head as long as wide but in this case 1st antennal segment bare 47
45. Hind tibiae with long, slender, erect setae, without spines. Not shorter than 7.5 46
- Hind tibiae with very short recumbent setae, with short black spines. Not more than 6.5 46. **Trigonotylus**
46. Frons protruded above base of clypeus in the form of triangle, truncate or slightly incised at apex (Fig. 510: 15) 45. **Notostira**
- Frons not protruded above clypeus, rounded at apex 44. **Dolichomiris** [p. 784]
47. 1st rostral segment not reaching anterior margin of prothorax. Usually green; pronotum not with 2 longitudinal black stripes; femora without dark spots 47. **Teratocoris**
- 1st rostral segment reaching beyond anterior margin of prothorax. Not green; in species from Far East pronotum with 2 longitudinal black stripes (in *Actitocoris* mostly divided into separate spots); femora with dark dots 48
48. 2nd antennal segment not clavate. Body longer than 7 48. **Leptopterna**
- 2nd antennal segment clavate. Body not longer than 5.8 49. **Actitocoris**
49. Abdomen not tapering to base. Labrum flattened dorsoventrally in the form of a triangular plate covering the base of rostrum. Lora not differentiated. Of the mesonotum, only triangular scutellum free. Brachypterous specimens vaguely resembling ants. (Tribe Pithanini) 50. **Pithanus**
- Abdomen sharply tapering to base, almost pedunculate. Labrum flattened laterally, contiguous to base of rostrum in form of laminate crest (Fig. 510: 12). Lora well marked. (Tribe Myrmecorini). Resembling ants markedly; mesonotum entirely visible dorsally, pentagonal 51. **Myrmecoris**
50. Posterior margin of vertex not covering anterior margin of pronotum; if covering (Halticinae, part), the whole clypeus well visible laterally. Theca not coalescent with genital segment 51
- Head slanting posteriad; posterior margin of vertex sharp, covering anterior margin of pronotum; base of clypeus not visible laterally (Fig. 510: 13). Often brown or black, usually with bands of silvery setae. Hind tibiae often more or less flattened in the middle and slightly curved. Aedeagus strongly sclerotized, with comb before apex (Figs. 530: 3, 6, 9, 12, 16). Theca coalescent with walls of genital segment. (Subfamily Phylinae, tribe Pilophorini) 72
51. 1st rostral segment usually more than twice as thick as 2nd one. Distance between eye and apex of clypeus (better seen in lateral view, Fig. 510: 14) usually

- greater than diameter of eye. Left paramere usually spoon-shaped or flag-shaped; right paramere usually geniculate, right-angled. Aedeagus membranous, often with 1 or 2 spiculae or other sclerotized structures inside. (Subfamily Halticinae) 52
- 1st rostral segment less than twice as thick as 2nd one. Usually distance between eye and apex of clypeus less than or equal to diameter of eye. Parameres of different form, often with teeth or processes. Aedeagus usually including 2 or more strongly ramified and toothed or simple sclerotized branches. (Subfamily Orthotylinae) 57
52. Abdomen markedly constricted at base. Brachypterous specimens resemble ants; in macropterous specimens, cuneus not separated anteriorly and membrane without cells 53. **Myrmecophyes**
- Abdomen not constricted at base. Brachypterous specimens not resembling ants; in macropterous specimens cuneus usually distinctly separated, lateral margin of hemelytra incised proximal to cuneus, and membrane with 2 cells 53
53. Posterior margin of head not sharp, or if sharp than not overlying anterior margin of pronotum. Eyes more or less round (see in profile) 54
- Posterior margin of head sharp, more or less overlying anterior part of pronotum, sometimes reaching calli of pronotum. Eyes higher than long 56
54. Hemelytra with distinct dense punctation. Dorsum strongly shining 55. **Euryopicoris**
- Hemelytra rough, but not punctate. Dorsum more or less dull 55
55. 1st segment of hind tarsi as long as or slightly longer than 2nd one. Eyes more or less pedunculate 54. **Labops**
- 1st segment of hind tarsi 0.5-0.65 times as long as 2nd. Eyes not pedunculate. 56. **Orthocephalus** [p. 785]
56. Antennae shorter than body. Hind femora less than 1.5 times as long and also less than 1.5 times as thick as middle femora 57. **Strongylocoris**
- Antennae longer than body. Hind femora twice as long and twice as thick as middle femora 58. **Halticus**
57. Pronotum behind calli with more or less distinct transverse groove prolonged on pleural parts of prothorax; if the groove indistinct, sides of pronotum with distinct depression between anterior and posterior lobes 58
- Pronotum behind calli without groove or with shallow groove not prolonged on pleural parts of prothorax 64
58. Green almost entirely; only posterior corners of pronotum. spot at base of each tibia and partly antennae black 69. **Blepharidopterus** (part)
- Coloration different 59
59. Calli of pronotum not separated by longitudinal depression 60
- Calli of pronotum separated from each other by distinct longitudinal depression; females usually brachypterous 63
60. In species from Far East, scutellum entirely black (in *D. kanyukovae* sometimes with orange longitudinal stripe); anterior lobe of pronotum pilose 60. **Dryophilocoris**
- Scutellum yellow (in males of *Cyllocoris nakanishii* brownish yellow) with black or brown base; the whole pronotum bare 61
61. Head uniformly yellow or yellow with black pattern, but genae always pale 59. **Campylotropis**
- Head black, sometimes with pale spot on vertex; rarely (in very pale specimens of *Cyllocoris equestris*) the whole dorsum of head pale, but genae always black 62

62. 1st antennal segment half as long as width of pronotum. Hind coxae contiguous 61. **Ulmocyllus**
- 1st antennal segment more than half as long as width of pronotum. Hind coxae distinctly spaced 62. **Cyllecoris**
63. Pronotum, scutellum, hemelytra, and sides of thorax with silvery scales (easily rubbed off!). In males, posterior margin of vertex with sharp carina. In females, 2nd antennal segment not clavate or weakly clavate; shortened hemelytra covering more than half the abdomen; abdomen not widened 63. **Globiceps**
- Body without scales. In males, posterior margin of vertex without carina. In females, 2nd antennal segment strongly clavate; shortened hemelytra covering less than half the abdomen; usually abdomen strongly widened 64. **Mecomma** (part)
64. Body, antennae and legs black. Dorsum of body with dense white scales (easily rubbed off!) 65
- At least corium and legs pale. If body entirely black, scales absent 66
65. 1st antennal segment strongly thickened to apex; 2nd antennal segment spindle-shaped and strongly flattened 67. **Excentricus**
- Antennae of ordinary construction 68. **Heterocordylus**
66. Pronotum entirely black; legs pale 67
- Pronotum pale at least partly, or (males of *Orthotylus discolor*) both pronotum and femora black 68
67. Head short, only slightly protruded anteriorly beyond eyes; clypeus not protruding beyond apex of frons. Hemelytra shortened or complete, in the last case apex of cuneus projecting outward beyond outer margin of membrane (Fig. 510: 16) 64. **Mecomma** (part)
- Head distinctly protruded anteriorly beyond eyes; clypeus protruding anteriorly beyond apex of frons. Hemelytra always complete; apex of cuneus not projecting beyond outer margin of membrane (Fig. 510: 17) 65. **Cyrtorhinus**
68. Distance between eyes and posterior margin of head not less than 1/4 eye length; in questionable cases (*Ulmica*), femora with black longitudinal stripes 69
- Eyes contiguous or almost contiguous with anterior margin of pronotum 71
69. Dorsum partly black 66. **Mecommopsis**
- Dorsum green 70 [p. 786]
70. Dorsum with black setae (with admixture of white in places) and areas covered with silvery scales. Legs and antennae with black spots and stripes 71. **Ulmica**
- Dorsum with pale setae, without scales. Legs without dark pattern; antennae with red pattern 70. **Zanchius**
71. Setae on pronotum pale, on hemelytra pale and brown 69. **Blepharidopterus** (part)
- Either black and brown setae present on both pronotum and hemelytra, or all setae on pronotum and hemelytra pale 72. **Orthotylus**
72. Silvery setae or scales uniformly scattered on the whole surface of hemelytra or forming wide band (wider than length of scutellum) in their anterior part. Body not more than 2.5 times as long as wide 73. **Hypseloecus**
- Silvery setae on hemelytra forming 2 narrow bands, first in anterior part of coreus, the other in its posterior half and on clavus. Body usually more than 2.5 times as long as wide 74. **Pilophorus**
73. Anterior margin of pronotum with convex collar separated by distinct groove (Fig. 510: 8). Pronotum distinctly punctate. Male genitalia of Mirinae type

- (aedeagus membranous; theca not coalescent with genital segment). (Subfamily Deraeocorinae) 74
- Pronotum without collar or with collar less distinct, more or less flattened. Pronotum not punctate, sometimes wrinkled. Male genitalia of Phylinae type (aedeagus in major part sclerotized; theca coalescent with the wall of genital segment). (Subfamily Phylinae, part) 77
74. Hemelytra only with 2 rows of distinct punctures: at outer margin of clavus and in outer half of corium. (Tribe Hyaliodini). Scutellum raised in the form of a high carinate tubercle 14. **Stethoconus**
- Hemelytra with uniform punctation (in *Bothynotus* less distinct). Scutellum flat or weakly convex 75
75. Hemelytra shagreened or with irregular punctation, the latter is less distinct than on posterior part of pronotum. (Tribe Clivinemini). Membrane pilose or (in brachypterous females) almost absent 13. **Bothynotus**
- Hemelytra as distinctly punctate as posterior part of pronotum. (Tribe Deraeocorini). Membrane not pilose, always complete 76
76. 2nd and 3rd segments of hind tarsi combined not more than 1.4 times as long as 1st segment. Claw without basal tooth (Fig. 509: 8). Scutellum punctate 15. **Alloeotomus**
- 2nd and 3rd segment of hind tarsi combined 1.5-2.5 times as long as 1st segment. Claw with a stout basal tooth (Fig. 509: 7); if the tooth small (*D. annulipes*), scutellum not punctate 16. **Deraeocoris**
77. Pronotum with flattened collar. (Tribe Hallodapini) 78
- Pronotum without collar. (Tribe Phylini) 80
78. Frons with pointed process (Figs. 510: 18, 19). Dorsum with hardly visible setae 75. **Acrorrhinium**
- Frons without process. Dorsum with well visible setae (better seen in lateral view) 79
79. Eyes contiguous with posterior margin of head or distance between eyes and posterior margin of head not greater than width of 2nd antennal segment. Clypeus separated from frons by distinct depression (see in profile). Abdomen not constricted at base 76. **Hallodapus**
- Eyes far distant from posterior margin of head. Clypeus not separated from frons by depression. Abdomen, especially in females, strongly constricted at base 77. **Systellonotus**
80. Rostrum hardly reaching beyond fore coxae. Body length not less than 5.9; color not green and not entirely black 83. **Harpocera**
- Rostrum reaching at least middle coxae. Not longer than 5.5; if longer, color green or entirely black 81
81. In the species from Far East, femora black, hind femora narrowly yellow at apex; fore and middle tibiae [p. 787] yellow with basal third black; hind tibiae narrowly yellow at bases, then black on 1/5, and then again yellow 91. **Orthonotus**
- Coloration of legs different; tibiae usually uniformly colored or pale with numerous spots 82
82. Dorsum with more or less flattened, pale, silvery or golden setae (scales) easily rubbed off (usually pubescence is better preserved on cuneus, margins of hemelytra and border of corium and clavus); among them usually with simple, slender, usually black setae (Fig. 510: 20) 83
- Dorsum without flattened silvery or golden setae, only with simple setae (Fig. 510: 21); in questionable cases, body green 90

83. Claws long, straight, only at the very apices strongly curved; pulvilli fused with claws along almost whole length and almost reaching the apices of claws (Fig. 509: 12). Tarsi and antennae entirely black; tibiae black or red 89. **Dacota**
- Claws curved more uniformly, usually from the middle; pulvilli small (Figs. 509: 13, 14). Tarsi at least partly yellow or brownish yellow; if entirely black, either 3rd and 4th antennal segments yellow (*Atractotomus*), or tibiae white with black spots (*Excentricoris*) 84
84. 2nd antennal segment strongly clavate or spindle-shaped, in the thickest place 2-4 times as thick as at base 85
- 2nd antennal segment slender or thick, but its thickness almost uniform along the whole length of segment 86
85. Head as long as pronotum. 1st antennal segment inversely conical; 2nd antennal segment 4 times as long as thick. Claw with basal tooth (Fig. 509: 13). Tibiae white with large black spots 90. **Excentricoris**
- Head much shorter than pronotum. 1st antennal segment, except for its base, cylindrical. Claw without tooth (Fig. 509: 14). Tibiae uniformly colored 88. **Atractotomus**
86. Eyes almost smooth. Dorsum with pale setae only. Tibiae pale with black spots, including the spot at base (on knee). Aedeagus S-shaped, with 2 apical processes (Figs. 538: 1-4). On *Artemisia* 100. **Plagiognathus** (part)
- Eyes more or less granulate (except for *Criocoris* and some species of *Phoenicocoris*). Dorsum usually with at least admixture of black or brown setae. Tibiae uniformly colored; if tibiae with dark spots, their bases usually pale 87
87. Clypeus markedly projecting anteriorly and ventrally (Fig. 510: 22); head twice as high as an eye in anterior view. In species from Far East, femora black with pale apices and tibiae whitish yellow, without dark spots. Aedeagus C-shaped, very slender (Fig. 536: 14). On *Galium* 92. **Criocoris**
- Clypeus less projecting anteriorly and ventrally (Fig. 510: 23); head less than twice as high as an eye. Usually either tibiae black, brown or with dark spots, or femora not black. Aedeagus either C-shaped but massive, or S-shaped 88
88. In species from Far East, dorsum with only pale setae or also with some brown setae on cuneus; hemelytra whitish with brown dots or brownish red, in the last case body length not more than 2.8. Aedeagus S-shaped with apical process curved at the end (Figs. 536: 15, 16) 93. **Compsidolon**
- Either pubescence consisting greatly or mostly of black setae, or hemelytra colored differently, or body length more than 3 89
89. Aedeagus strongly S-shaped, often with 2 long, slender apical processes (Figs. 537: 1-4). Body length not more than 3.5. On pines ... 94. **Phoenicocoris** [p. 788]
- Aedeagus of different structure, mostly massive (Figs. 533-535). If on pines (only on *Pinus pumila*), body length more than 4.5 87. **Psallus**
90. Pulvilli reaching apices of claws and fused with claws only by their bases (Figs. 509: 15-17) 91
- Pulvilli not reaching apices of claws and fused with claws along almost the whole their length (Figs. 509: 18, 19) 92
91. Claws strongly curved, very wide at bases (Figs. 510: 15, 16) 82. **Macrotylus**
- Claws weakly curved, less wide at bases (Fig. 510: 17) 81. **Acrotelus**
92. Dorsum dirty reddish yellow with 2 scarlet spots at each side: at apex of cuneus and in posterior outer corner of corium. Spines on tibiae pale 103. **Rubrocuneocoris**
- Coloration different. Spines on tibiae black or pale 93

- 93. Tibiae without dark spots at bases of spines, sometimes entirely brown or black 94
 - Tibiae with dark spots at bases of spines 102
- 94. Color green, whitish green, orange or lemon-yellow. Antennae entirely pale..... 95
 - Coloration different, at least head and antennae at least partly black or brown 97
- 95. Rostrum reaching beyond hind coxae 80. **Megalocoleus**
 - Rostrum not reaching beyond hind coxae 96
- 96. Pale green. Hemelytra with yellowish or brownish setae 100. **Plagiognathus** (part)
 - Orange- or lemon-yellow. Hemelytra with black setae..... 79. **Eurycolpus**
- 97. 2nd antennal segment shorter than width of head. Hemelytra usually strongly shortened and not covering almost half the abdomen..... 101. **Chlamydatus** (part)
 - 2nd antennal segment longer than width of head. Hemelytra complete or weakly shortened, always covering apex of abdomen 98
- 98. Femora black, their apices and tibiae yellow 97. **Sejanus**
 - Femora and tibiae colored identically, usually yellow 99
- 99. Head (see from above) black with 2 yellow spots near the eyes 78. **Tytthus**
 - Head entirely black or (in pale females of *Brachyarthrum*) with yellow posterior margin, rarely entirely yellow 100
- 100. Spines on tibiae light yellow, hardly visible. Posterior margin of vertex with low carina. In species from Far East, body in both sexes black, shining; male genital segment ventrally with short carina at apex 86. **Phylus**
 - Spines on tibiae brown or black. Posterior margin of vertex without carina. In males, body black; in females, at least hemelytra yellow (except for *Plesiodema* from Kur. and Sakh.) 101
- 101. Claws strongly curved (almost at right angle); parempodia lamellate (Fig. 509: 10). Male genital segment ventrally with long high laminate carina. In females, only head black or brown 85. **Brachyarthrum**
 - Claws very weakly curved (Fig. 509: 19); parempodia setiform. Male genital segment without carina. In females, head, pronotum and scutellum (or also hemelytra) black or brown 84. **Plesiodema**
- 102. Color green or whitish green 103
 - Color not green 105
- 103. Membrane with distinct smoky gray pattern. Scutellum and clavus with black or brown spot at apex..... 104. **Atomoscelis**
 - Membrane uniformly colored. Scutellum and clavus without dark spot 104
- 104. Head strongly transverse (Fig. 510: 24); eyes large, almost reaching ventral margin of head (see in profile) 102. **Campylomma**
 - Head less transverse; eyes far not reaching ventral margin of head 100. **Plagiognathus** (part) [p. 789]
- 105. Head black with pale spot as in Fig. 537: 12. Color yellow, red or reddish brown. Theca with saclike process (Fig. 537: 16) 98. **Sacculifer**
 - Head colored differently. Theca without process 106
- 106. Base of tibia externally with black or brown spot (Fig. 510: 25), rarely tibiae entirely dark brown. Femora with numerous black spots or stripes 107
 - Base of tibia without dark spot; if tibiae entirely dark brown or black (some species of *Chlamydatus*), femora black with yellow apices 108
- 107. 3rd segment of hind tarsi shorter than 2nd segment.....

- 100. **Plagiognathus** (part)
- 3rd segment of hind tarsi markedly longer than 2nd segment, almost as long as 1st and 2nd segments combined 99. **Parapsallus**
- 108. Pleura of thorax with silvery scales (better seen in lateral view). Posterior margin of vertex forming a high, sharp carina 95. **Salicarus**
- Pleura of thorax without scales. Posterior margin of vertex without carina or with weakly marked one 109
- 109. Head at least with pale oblong spots adjacent to eyes. Dorsum usually not entirely black 96. **Monosynamma**
- Head at most with pale posterior margin. Dorsum entirely black 101. **Chlamydatus** (part)

KEYS TO SPECIES OF FAMILY MIRIDAE

Subfamily ISOMETOPINAE

On trunks and branches of deciduous trees, feeding on fungi (some authors consider them predators feeding on coccids). In USSR 2 genera.

1. **Myiomma** Put. Resembling *Isometopus*, but differing in eyes close together and less flattened head. One larva apparently belonging to a new species was found in S Prim. (Khasan District) on *Quercus*.

2. **Isometopus** Fieb. Rounded, flattened, densely punctate, shortly pilose. – 2 species (in USSR not less than 5).

1. Face (anterior part of head) with distinct dark punctation, with transverse groove in ventral third (Figs. 511: 3, 4). Head yellowish; clypeus and genae black; pronotum black with narrowly pale lateral margins and in females also with pale posterior corners. Scutellum black with white apex. Hemelytra in males whitish, semi-transparent. In females, hemelytra white; a spot at bases of clavus and endocorium, broad band at posterior margin of corium, and membrane black. Antennae brown; apex of 1st antennal segment and basal half of 2nd one whitish. Femora widely black in the middle. Parameres as in Figs. 512: 1, 2. 2.5-3. – Amur, S Prim. – August. (Figs. 511: 1, 2) **I. amurensis** Kerzh.
- Face in dorsal part with hardly visible pale punctation, in ventral part with 5 transverse white ribs (Figs. 511: 6, 7). Black; only face, apices of hind femora, and in females also apices of 2nd antennal segments pale. Parameres as in Figs. 512: 3, 4. 2.7-3. – S Prim. (Khasan District). – Late July to early August. (Fig. 511: 5) **I. rugiceps** Kerzh.

Subfamily CYLAPINAE

Feeding on fungi. Eggs hibernating. In USSR 3 genera.

Tribe *FULVIINI*

3. **Fulvius** Stål. Body almost 3 times as long as wide. Under bark and on fungi. – 1 species (in USSR 2). [p. 790]

1. Brown; bases of hemelytra to the level of apex of scutellum yellow; posterior outer corner of corium white; legs and antennae yellow or brownish yellow. Parameres as in Figs. 512: 7, 8. 3.1-4. – S Prim. – July to September **F. ussuriensis** Kerzh.

4. *Peritropis* Uhl. Body wide, 2-2.4 times as long as wide. In USSR 1 species.

1. Brownish to almost black; the whole dorsum with dense, yellowish white dots. Legs and antennae dark brown or black; 2nd antennal segment and tibiae with white spot in the middle. Parameres as in Figs. 512: 5, 6. 3.5-4.2. – Amur., S Prim. – On polypori. Late July to early September *P. advena* Kerzh. [p. 791]

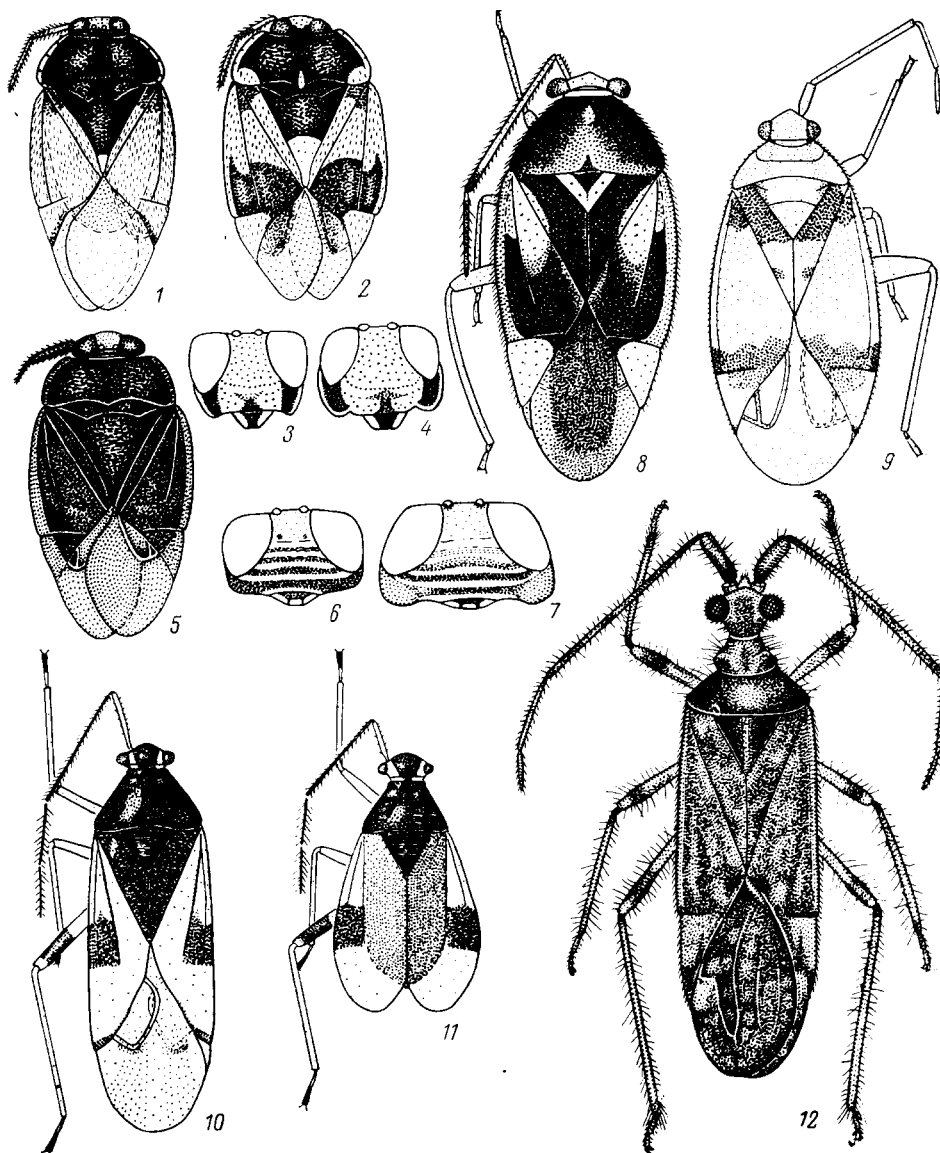


Fig. 511. Heteroptera. Family Miridae (after Kerzhner and original).

1-4, *Isometopus amurensis*: 1, male; 2, female; 3, head of male; 4, head of female; 5-7, *I. rugiceps*: 5, female; 6, head of male; 7, head of female; 8, *Sinevia tricolor*, male; 9, *Michailocoris josifovi*, female; 10, 11, *Bryocoris montanus*: 10, male; 11, female; 12, *Dimia inexpectata*.

5. *Punctifulvius* Schmitz. Monotypic genus.

1. Black; head with yellow spot near each eye; legs and antennae yellow with

black. 3.5-4. – S Prim. – On polypori. Late July to mid-September
 **P. kerzhneri** Schmitz

Subfamily BRYOCORINAE

Collar always well developed. Body from rounded flattened to elongate cylindrical.

Tribe *ECCRITOTARSINI*

In Palearctic 2 genera.

6. **Michailocoris** Štys. Monotypic genus.

1. Bright yellow; eyes, base and apex of corium, base of clavus and a spot beyond middle of clavus (in females) or the whole clavus (in males), cuneus entirely or partly, and also veins of membrane adjacent to cuneus red. In females, apices of genae and a spot behind each eye black, pronotum sometimes with 2 reddish longitudinal stripes. In males, head, except for its venter and vertex, 2 wide diverging stripes on pronotum, 1st antennal segment and bases of 2nd-4th antennal segments black; abdomen, lateral corners and median line on scutellum brown. 3.1-3.9. – S Prim. (Khasan District). – Korea. – On branches of trees; attracted to light. August. (Fig. 511: 9) **M. josifovi** Štys (*kerzhneri* Štys)

7. **Sinevia** Kerzh. Monotypic genus.

1. Dirty yellow; outer margin of corium red. The following areas are black or brown: sides and calli of pronotum (in females), or almost the whole pronotum, except for collar (in males); triangular spot at base of scutellum; inner margin of clavus (in females) or almost entire clavus (in males); curved stripe in posterior part of corium (in females) or a major part of corium (in males); membrane; ventral side of thorax and abdomen; apex of 2nd antennal segment; 3rd and 4th antennal segments. Parameres as in Figs. 512: 9-11. 4.2-4.4. – S Prim. (Khasan District). – Collected at lights. Mid-August. (Fig. 511: 8) **S. tricolor** Kerzh.

Tribe *DICYPHINI*

Body elongate, impunctate, pilose. Legs long, thin. In species from Far East, eggs hibernating. In USSR 4 genera.

8. **Cyrtopeltis** Fieb. In USSR 1 species {now placed in *Nesidiocoris* Kirk.}.

1. Greenish white; clypeus, apices of scutellum and cuneus, spot at posterior margin of corium, bases of tibiae, middle of 1st antennal segment, bases of 2nd and 3rd and apex of 2nd antennal segments black or brown; hind femora with brown dots. 3.2-3.5. – Amur. (Tambovskiy District, 1 specimen found in 1931, possibly imported); Armenia. – S Asia, Africa, N and C America. – On Solanaceae (tobacco-plant, tomato, etc.). In Far East in September **C. tenuis** Reut.

9. **Neodicyphus** McGavin. In USSR 1 species. {*Neodicyphus* is a synonym of *Tupiocoris* China et Carv.}

1. Whitish yellow; head, wide stripes on sides of pronotum (except collar), scutellum, ventral side of thorax, antennae (except base of 1st segment) black or dark

[p. 792] brown; middle and hind femora with brown dots. 3.7-4.5. – Mag., Khab., S Sakh., S Kur.; S Siberia west to Altai. – On *Rubus*. Late July to early September
 **N. annulifer** Lindb.

Tribe *MONALONIINI*

In Palearctic 1 genus.

10. *Dimia* Kerzh. Monotypic genus.

1. Brown, with dense whitish spots and dots, also on membrane. Veins of hemelytra and inner margin of cuneus red. Antennae black almost entirely, with dense erect setae. Legs white, with brown spots. Parameres as in Figs. 512: 12-14. 8-10. – S Prim. (Khasan District). – On *Quercus dentata*. Late July to late August. (Fig. 511: 12) **D. inexpectata** Kerzh.

Tribe *BRYOCORINI*

All species of USSR fauna living on ferns. In USSR 2 genera.

11. *Monalocoris* Dahlb. Adults hibernating. In USSR 1 species.

1. Black; head reddish yellow; antennae and legs yellow; apex of 2nd antennal segment, distal part of 3rd and entire 4th antennal segment, often a ring on each femur or major part of femora black. 2.2-3.4. – Kamch., Khab., Prim., S Sakh., S Kur. – Forest zone of Palearctic **M. filicis** L. (*japonensis* Lnv.)

12. *Bryocoris* Fall. Dirty yellow. In macropterous specimens, pronotum, scutellum, clavus, a spot in posterior external corner of corium and the apex of cuneus, venter of body (except for apex of abdomen), and often median part of head black. In brachypterous specimens, hemelytra reaching apex of abdomen; posterior lobe of pronotum, scutellum, and hemelytra in some species entirely pale. Eggs hibernating. In USSR 3 species.

1. Apex of hind femur dorsally and usually ventrally dark brown; hind tibia often brownish closer to base. 2nd antennal segment in both sexes usually entirely black. Males macropterous; apices of their tibiae usually pale; proximal process of left paramere bent at almost right angle, insignificantly shorter than distal process (Fig. 512: 19). Females brachypterous; hemelytron with black spot behind the middle of outer margin; pronotum usually entirely black. Brachypterous 2.4-2.7; macropterous 3.3-3.8. – S Khab., Prim., S Sakh., S Kur. – Late July to early September. (Figs. 511: 10, 11) **B. montanus** Kerzh.
- Apex of hind femur and base of hind tibia pale; very rarely in males of *B. persimilis* apex of hind femur with brownish spot dorsally. Proximal process of left paramere curved in the form of hook, markedly shorter than distal process (Figs. 512: 15-18). In brachypterous females, 2nd antennal segment dark only at apex; posterior lobe of pronotum entirely pale or only partly black; hemelytra in specimens from Far East without black spots 2
2. Males always macropterous; their 2nd antennal segments usually entirely black; apices of fore or of all tibiae darkened. Brachypterous 2.3-2.4; macropterous 3.2-3.6. – Amur., Prim. – Early July to late August **B. persimilis** Kerzh.
- Males brachypterous or macropterous; their 2nd antennal segments always with widely pale bases; apices of all tibiae pale or only in fore tibiae darkened. Brachypterous 2-2.7; macropterous 2.9-3.6. – Kamch.; S Siberia. – Europe. – August **B. pteridis** Fall. [p. 793]

Subfamily DERAEOCORINAE

Mainly oval or almost rounded, shining. Dorsum or only pronotum distinctly punctate. Predators. In USSR 4 genera.

Tribe *CLIVINEMINI* {*CLIVINEMATINI*}

13. **Bothynotus** Fieb. Males elongate, macropterous; females mostly brachypterous, strongly widened posteriad. Dorsum densely pilose. In USSR 1 species.

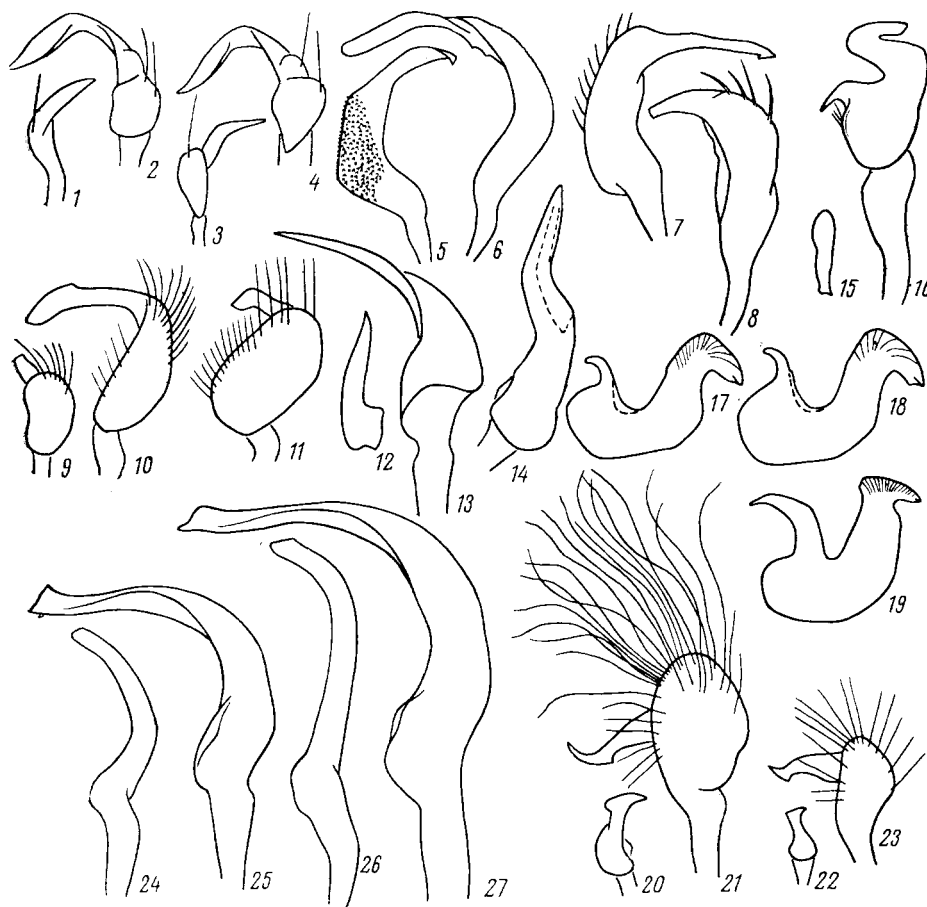


Fig. 512. Heteroptera. Family Miridae (after Josifov, Kerzhner and original).

1, 2, *Isometopus amurensis*; 3, 4, *I. rugiceps*; 5, 6, *Peritropis advena*; 7, 8, *Fulvius ussuriensis*; 9-11, *Sinevia tricolor*; 12-14, *Dimia inexpectata*; 15-17, *Bryocoris persimilis*; 18, *B. pteridis*; 19, *B. montanus*; 20, 21, *Alloeotomus simplex*; 22, 23, *A. chinensis*; 24, 25, *Deraeocoris pallidicornis*; 26, 27, *D. josifovi*. 1, 3, 6, 8, 9, 12, 15, 20, 22, 24, 26, right paramere, lateral; 2, 4, 5, 7, 10, 11, 13, 14, 16, 21, 23, 25, 27, left paramere, lateral; 17, 19, same, dorsal.

1. Brown or black; legs, sometimes head and partly antennae yellow or red. Males 5-7; females 3.3-4.7. – Mag., Khab., Amur., Prim., S Sakh., S Kur. – Widely distributed in Palearctic, mainly in forest zone. – In humid habitats, especially in conifer forests. Attracted to light. Rare. July and August **B. pilosus** Boh. (*kiritshenkoi* Lindb.)

Tribe *HYALIODINI*

14. **Stethoconus** Fl. Feeding on bugs of family Tingidae; Palearctic species feeding on species of genus *Stephanitis*. – 1 species (in USSR 3). [p. 794]

1. Broad-oval; light yellowish; spots on head and pronotum, entire or almost entire scutellum, base and apex of clavus, wide band on corium, apices of antennal segments and of hind femora brown or black. 3.5-4. – S Prim. (Khasan District). – Japan, E China, USA (imported). – Feeding on *Stephanitis pyrioides*. August
..... **S. japonicus** Schumacher

Tribe *DERAEOCORINI*

15. **Alloeotomus** Fieb. Yellowish or brownish red; species from Far East with black punctation; 2nd (sometimes only at apex), 3rd and 4th antennal segments black. On pines. Adults hibernating. – 2 species (in USSR 4).

1. Tibiae on outer margin only with dark spot at base. In males, posterior lobe of pronotum and scutellum always pale, calli of pronotum sometimes black. Narrow white border of posterior margin of pronotum mostly not prolonged on sides of pronotum. Parameres as in Figs. 512: 20, 21. 5-6. – Amur., Prim., S Kur. – Japan, Korea. – On *Pinus sylvestris*, *P. pumila*, *P. koraiensis* **A. simplus** Uhl. (*linnavuorii* Jos. et Kerzh.)
- Tibiae on outer margin with 2 black longitudinal lines at sides or entirely black. In males, posterior lobe of pronotum and scutellum usually dark brown and calli of pronotum always pale. Narrow white border of posterior margin of pronotum prolonged as a distinct white carina on sides of pronotum (to examine in lateral view). Parameres as in Figs. 512: 22, 23. 4.5-5.5. – S Prim. (Khasan District). – E China. – On *Pinus densiflora* **A. chinensis** Reut.

16. **Deraeocoris** Kbm. Hibernating as eggs, more rarely as adults. – 14 species (in USSR more than 20); species from Far East belong to subgenera *Camptobrochis* Fieb. (abbreviated below as *C.*), *Deraeocoris* Kbm. and *Knightocapsus* E. Wagn. (K.).

1. Scutellum distinctly punctate 2
- Scutellum not punctate 4
2. Not longer than 5. 1st antennal segment shorter than width of vertex. Dirty yellow, with black or dark brown spots. 4.2-4.7. – Mag., Kamch., Khab., Amur., Prim., S Sakh. {records from Prim. refer partly to *D. pulchellus* Reut.} – Widely distributed in Palearctic, except the north. – Usually on weeds. Adults hibernating. (Fig. 525: 1) **D. (C.) punctulatus** Fall.
- Not shorter than 7. 1st antennal segment markedly longer than width of vertex 3
3. Collar of pronotum shining. Coloration very variable. More commonly dorsum entirely black or only base of cuneus white or red. Less commonly sides of pronotum and outer margin of corium at its base dirty yellow. Very rarely scutellum and base of corium, or even almost the whole dorsum yellow. 7.2-9. – Amur., S Khab., Prim; south of Siberia west to Altai. – Japan, Korea, E China. – In forests on trees, bushes and herbs. Late June to mid-September. (Fig. 522: 1) ...
..... **D. ater** Jak. (*sibiricus* Kir.)
- Collar of pronotum dull. Usually dirty yellow or brown; middle of scutellum, posterior margin of corium, and apex of cuneus black; base of cuneus red or whitish. Rarely almost entire dorsum dirty yellow or black. 11-13. – S Khab., Amur., Prim., S Sakh.; south of Siberia. – Japan, NE China, N Mongolia, Europe. –

- On *Salix*, *Malus* and other deciduous trees. Late June to mid-August (rarely until October) **D. olivaceus** F. (*brachialis* Stål) 5
4. Collar of pronotum shining 5
- Collar of pronotum dull 10
5. Dorsum with dark punctation. Yellowish brown; pronotum (except for its posterior margin and sides) and scutellum (except sides) black; apex of cuneus, a diffuse spot at posterior margin of corium, rings on legs, and antennae brown. 4.6-5.3. – [p. 795] S Khab., Prim. – Korea. – On *Salix*. Adults hibernating **D. (K.) claspericapilatus** Kulik
- Dorsum with pale or concolorous punctation. Light yellow, partly brownish or brown, but without black pattern 6
6. Dorsum (except for the middle of scutellum) with short dense setae. Reddish or dark brown; margins of scutellum and head near eyes yellow. 1st antennal segment and apex of 2nd one usually black; legs yellow, femora with 1-2 red or brown spots in apical half. 4.9-6.2. – S Prim. (Khasan District). – Korea. – On deciduous trees (*Alnus*, *Salix*, etc.). July to early September **D. koreanus** Lnv.
- Dorsum bare. Coloration paler, in major part or entirely yellow 7
7. Base of tibia with brown spot at outer margin. Dorsum pale yellow, almost whitish. 5.6-6.5. – S Khab., Prim. – Korea. – On *Salix*. August **D. salicis** Jos.
- Base of tibia without spots or with red spot. Dorsum yellow 8
8. In specimens from Far East, corium and clavus usually partly brownish; cuneus paler than adjacent part of corium. Sides of clypeus red. 5.9-6.8. – S Prim. – Japan, NE China, SE Mongolia. – On *Ulmus*. August **D. kerzhneri** Jos. (*pallidus* Horv.)
- Corium and cuneus concolorous, not darkened. Sides of clypeus yellow. On *Quercus* 9
9. Smaller: body length 5.3-6.4, width of pronotum 1.8-2.1. Right paramere almost uniformly curved along its full length (Fig. 512: 24); left paramere with angulate apex of sensory lobe (Fig. 512: 25). – S Khab., Prim., S Kur. (Kunashir I.). – Japan, Korea. – On *Quercus mongolica*. Late July to early September **D. pallidicornis** Jos.
- Larger: body length 6.9-7.5, width of pronotum 2.3-2.5. Right paramere curved only at apex (Fig. 512: 26); left paramere with rounded apex of sensory lobe (Fig. 512: 27). – S Prim. (Khasan District). – On *Quercus dentata*. Late July to early September. **D. josifovi** Kerzh.
10. Hemelytra yellow or brown with dark pattern 11
- Hemelytra black 12
11. Legs black, with a few yellow or brown areas. Head, pronotum and scutellum black, with a few yellow spots. 7-8.3. – Mag., N Khab.; E Siberia. Altai, Urals. – N Mongolia, mountains of C Europe. – On *Larix*. Late June to early August **D. annulipes** H.-S.
- Head and legs yellow. Scutellum bright yellow, in males often brown or black partly or almost entirely. 5.5-6.5. – Prim., Sakh., S and C Kur. – On *Alnus*. Late July to mid-September **D. ainoicus** Kerzh.
12. Posterior corners of pronotum with narrow yellow border. Tibiae yellow. Head entirely black; very rarely scutellum red. Cuneus often with 2 yellow speckles. 4-4.5. – S Khab., Prim. – Japan, Korea. – On *Salix*. Adults hibernating **D. (K.) elegantulus** Horv.
- Posterior corners of pronotum black. Tibiae in specimens from Far East entirely black or black with pale rings. Head with pale posterior margin. Scutellum more commonly red or yellow. Cuneus without yellow speckles. Larger 13
13. Evaporatorium of scent gland white. In the subspecies from Far East (ssp. *megophthalmus* Jos. et Kerzh.), collar of pronotum usually white; tibiae with 2,

rarely 1 yellow rings. 5.5-6.8. – S Khab., Amur., Prim. – Mainly in steppes from Korea and Transbaikal to E Europe. – On *Artemisia*. Early July to early August ...

- **D. ventralis** Reut.
 – Evaporatorium of scent gland black with white posterior margin. Collar of pronotum black; tibiae entirely black or widely brownish in the middle. 6.1-8. – S Khab., Amur., Prim. – Forest zone of Palearctic. – In forest meadows. Early July to early August **D. scutellaris** F [p. 796]

Subfamily MIRINAE

Medium-sized, more rarely small. Body from rounded-oval to strongly elongate. Right paramere small, not flattened, more or less cylindrical, with short straight or curved hypophysis. Left paramere with long hypophysis often situated in one plane with the sensory lobe. When at rest, parameres lying along margin of genital segment opening so that sensory lobe, hypophysis of left paramere and body of right paramere form almost continuous line. Penis of Mirinae type. – 35 genera, 127 species (in USSR about 60 genera, about 250 species).

Tribe *MIRINI*

Body comparatively wide, from short-oval to elongate-oval. Coloration variable. Phytophagous, rarely zoophytophagous.

17. **Capsus** F (*Rhopalotomus* Fieb.). Round-oval, convex, shortly and densely pilose. Body black or partly red-yellow. On grasses. – 4 species (in USSR 5), records of *C. ater* L. from Far East erroneous.

LITERATURE. Vinokurov, N.N. 1977. On systematics and interspecific variability of capsid bugs of the genus *Capsus* F (Heteroptera, Miridae). Entomol. Obozr. 56: 103-115. [In Russian].

1. Hemelytron with red-yellow stripe at both outer and inner margins. 2nd antennal segment slender, not clavate. Head and pronotum red-yellow; clypeus and sometimes 2 stripes on pronotum black. 5.2-6. – S Khab., Amur., Prim. – NE Mongolia. – In tussock bogs, apparently on *Calamagrostis angustifolia*. Late June to early August **C. palustris** Kulik (*bilineatus* Kulik)
- Hemelytra entirely black, rarely with pale stripe at outer margin. 2nd antennal segment at least slightly clavate 2
2. Posterior margin of head with continuous red or red-brown stripe. Body and legs black, rarely apex of femur with 1, tibia with 1 or 2 pale rings. Parameres and spicula of aedeagus as in Figs. 513: 1-6. 5-6.4. – S Khab., Amur., Prim., Sakh., S Kur.; forest zone of USSR. – Korea, China, Germany. – On *Molinia coerulea*, *Calamagrostis langsdorfii*. Late June to late August **C. pilifer** Rem.
- Posterior margin of head black or with pale stripe interrupted in the middle; if posterior margin of head with continuous red stripe, pronotum at least partly pale 3
3. In specimens from Far East, femora dark brown or black with pale apices; tibia yellowish or dark brown with black ring at apex and rarely with indistinct dark ring at base; pronotum entirely black. Right paramere longer, its hypophysis (to examine in lateral view) weakly protruding (Figs. 513: 7-9). Left paramere and apex of aedeagus spicula as in Figs. 513: 10, 11. 5.2-6.3. – Mag., Kamch., Khab. (south to the lower Amur); Siberia, Kazakhstan, Tien Shan, Caucasus, NE and south of European USSR. – NW China, N Mongolia, Turkey, N America. – On *Calamagrostis*, *Agropyron*, *Bromus*. July and August **C. cinctus** Kol. (*simulans* Stal)

- In specimens from Far East, femora red-yellow; tibia entirely pale or with 1-2 dark rings; pronotum sometimes partly or entirely pale. Right paramere shorter, its hypophysis (to examine in lateral view) strongly protruding (Figs. 513: 12-14). Apex of aedeagus spicula as in Fig. 513: 15. 5.4-6.3. – S Khab., Amur., Prim., S Sakh., S Kur. – Forest zone of Palearctic. – On *Calamagrostis*, *Elytrigia repens*. Mid-June to late August. (Fig. 525: 2) **C. wagneri** Rem. (*intermedius* Reut.)

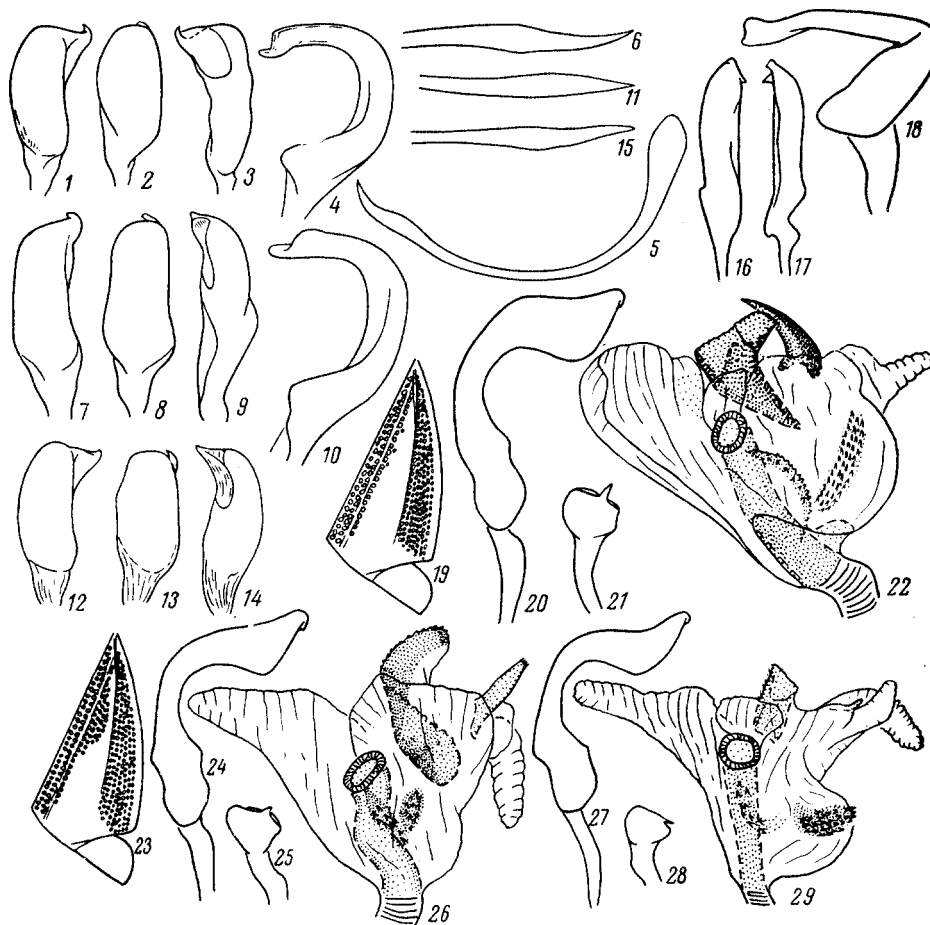


Fig. 513. Heteroptera. Family Miridae (after Vinokurov and original).

1-6, *Capsus pilifer*; 7-11, *C. cinctus*; 12-15, *C. wagneri*; 16-18, *Irbisia sericans*; 19-22, *Charagochilus angusticollis*; 23-26, *Ch. spiralifer*; 27-29, *Ch. gyllenhali*. 1-3, 7-9, 12-14, 16, 17, 21, 25, 28, right paramere; 4, 10, 18, 20, 24, 27, left paramere (4, 10, 18, external view; 20, 24, 27, internal view); 5, spicula of aedeagus; 6, 11, 15, its apex; 19, 23, scheme of corium punctation; 22, 26, 29, inflated aedeagus.

18. *Irbisia* Stål. In Palearctic 1 species (many species in N America). [p. 797]

1. Black, with dense pale setae. Tibiae dirty yellow with black bases. Evaporatoria of scent glands and thorax around coxal cavities whitish at least partly. Hemelytra reaching apex of abdomen (brachypterous specimens) or beyond apex of abdomen (macropterous specimens). Parameres as in Figs. 513: 16-18. 4.8-6.3. – Mag., Kamch., Komandorskie Islands, N Kur. – Pacific coast of N America. – In meadows on *Calamagrostis langsdoorfii*. Late July to mid-September **I. sericans** Stål

19. **Charagochilus** Fieb. Strongly convex, black: cuneus usually entirely or partly reddish; a spot at base of corium, posterior margin of pronotum, apex of scutellum, a spot near each eye, antennae, partly legs yellow. On Rubiaceae. Adults hibernating. – 2 species (in USSR 3).

1. Corium exterior to cubital vein with 1 row of punctures, rarely with a few punctures of 2nd row (Fig. 513: 19). Triangular area of corium between cubital vein and oblique longitudinal groove (medial fracture) smooth and usually at least partly mat, thus differing [p. 798] well from adjacent punctate areas. Left paramere with very wide hypophysis (Fig. 513: 20); right paramere with larger tooth (Fig. 513: 21). Tooth of aedeagus large, strongly sclerotized, not flattened; right stripe of spinules long (Fig. 513: 22). 3.3-4.5. – S Khab., Prim., S Sakh., S Kur. – Japan. – Probably on *Galium* **Ch. angusticollis** Lnv.
- Corium exterior to cubital vein with 3-4 rows of punctures closer to base (Fig. 513: 23). Triangular area of corium between cubital vein and medial fracture slightly shagreened and entirely shining. Left paramere with less wide hypophysis (Figs. 513: 24, 27); right paramere with smaller tooth (Figs. 513: 25, 28). Tooth of aedeagus very small or flattened, pale; right stripe of spinules short (Figs. 513: 26, 29) 2
2. Sclerotized plate of aedeagus in the form of spirally curved stripe; tooth comparatively large, flat, usually finely denticulate at apex (Fig. 513: 26). 3.3-4.6. – S Khab., Amur., Prim.; W Siberia (Tobol'sk). – Mongolia (confluence of rivers Dzakhryn-Gol and Menzya). Holotype (male, Prim., Nature Reserve Kedrovaya Pad', on *Rubia*, 13.VIII.1982, Kerzhner) and paratypes (36 specimens) in Zoological Institute, USSR Academy of Sciences, Leningrad **Ch. spiralifer** Kerzh., sp. n.
- Sclerotized plate of aedeagus almost rectangular with weakly turned up lateral margins; tooth very small, not flattened, with pointed apex (Fig. 513: 29). 3.3-4.8. – From C Yakutia and Transbaikal to W Europe. Records from Far East refer to 2 previous species, but finding in Amur. is not improbable. – On *Galium* and *Asperula*. {Correct spelling: *gyllenhali*} **Ch. gyllenhali** Fall.

20. **Polymerus** Hahn. – 7 species (in USSR 13).

1. Scutellum, pronotum and entire or almost entire hemelytra uniformly black; only small spots on posterior margin of corium and on cuneus and also posterior margin of pronotum sometimes pale. (Subgenus *Polymerus* Hahn) 2
- Apex of scutellum or the whole scutellum and at least a large spot at base of corium pale, yellow or brownish yellow. (Subgenus *Poeciloscytus* Fieb.) 4
2. Antennae and legs (except bases of tarsi) entirely black. 4.5-5.5. – Yakutia, S Siberia, E European USSR (rare). – Mongolia, C Europe (in mountains). – In humid habitats on *Galium boreale*. Late June to early August **P. carpathicus** Horv.
- Antennae and legs at least partly yellow 3
3. 2nd antennal segment entirely pale. Femur yellow with 2 black rings. Tibia yellow with 1-2 brown or black spots or rings near base. Cuneus with pale base and outer margin. Venter of abdomen with yellow spots. 4.3-5.5. – S Khab., Amur., S Prim. – Rare. Late June to mid-July **P. amurensis** Kerzh.
- 2nd antennal segment black or (in females) pale only in the middle. Femur black, sometimes with 1-2 yellow rings at apex. Tibia with wide black rings occupying about half its length. Cuneus pale only at apex. Venter of abdomen entirely black. 5-6.5. – S Prim. – Japan, Korea, E China. – July. Probably that species was recorded from Prim. as *P. funestus* Reut. **P. pekinensis** Horv.

4. Head black, only a spot near each eye yellow 5
 - On head in addition to 2 spots near eyes at least lora, part of genae, bucculae, and ventral side of head yellow; often head yellow entirely or in major part. Outer margin of corium (to examine in lateral view) narrowly black along the whole length 6
 5. Cuneus with black band from outer to inner margin, sometimes with [p. 799] orange border anteriorly and posteriorly. Outer margin of corium (to examine in lateral view) pale along its whole length or in major part. 4.3-5.5. – Amur., S Prim. – S Palearctic from Korea to W Europe. – In dry habitats on *Galium verum*. Mid-June to early September **P. (P.) brevicornis** Reut.
 - Dark band on cuneus black at its outer margin, becomes red to its inner margin (in faded specimens sometimes only outer black part of the band preserved). Outer margin of corium (to examine in lateral view) often with black stripe along its whole length. 4-6. – Mag., Kamch., Khab., Amur., Prim., S Sakh., S Kur. – Forest and steppe zones of Palearctic from Japan to W Europe. – Group of several (in Far East not less than 2) similar species, of which also *P. palustris* was recorded from Far East. The whole group is to be revised. – On *Galium palustre*, *G. boreale*, *G. aparine*, etc. Mid-June to early September **P. (P.) unifasciatus** F.
 6. Anterior corners of pronotum (behind eyes) with a large, mat, pitch-black spot. Usually major part of pronotum and part of hemelytra black; sometimes the black pattern weakly developed. Cuneus usually black in outer part and brown-red in inner part. 3.8-5.2. – S Khab., Amur., Prim. – S Palearctic from Korea and E China to W Europe. – Preferently on chenopodiaceous weeds; in W Palearctic injurious to sugar beet and other plants; in Far East rare. Late June to early September ***P. (P.) cognatus** Fieb.
 - Anterior corners of pronotum pale; if with black spot, this spot shining. Straw-colored or greenish with some brown or black spots and lines on pronotum and hemelytra, sometimes without dark spots. Cuneus with purple-red spot and sometimes with a narrow black stripe at outer margin. 4-5.5. – Mag. – Central belt and south of Palearctic from Yakutia and Baikal to W Europe. – On *Galium*, *Asperula*, Leguminosae, and other plants. In W Palearctic injurious to agricultural plants. Early July to mid-August ***P. (P.) vulneratus** Panz.
21. **Tinginitum** Kirk. Reddish or yellowish brown; pronotum and scutellum to black. Hemelytra with more or less visible pale spots. In USSR 2 species.
1. Head pale. Tibiae and 2nd antennal segment black with white rings; 1st antennal segment with 2 black longitudinal stripes. Rostrum not reaching beyond hind coxae. Length of setae on pronotum to 0.4. 4.2-5. – S Prim. – Korea. – On *Pinus koraiensis*. Early August to mid-August **T. pini** Kulik (*distinctum* Miy. et Lee)
 - Head black or dark brown entirely or in ventral half. Tibiae and 1st and 2nd antennal segments pale. Rostrum reaching the middle of abdomen. Length of setae on pronotum to 0.15. 3.9-4.3. – S Prim., S Sakh., S Kur. – On *Picea* (*P. glehnii*, etc.). Late July to late August **T. rostratum** Kerzh.
22. **Camptozygum** Reut. On pines. In USSR 1 species.
1. Black-brown, sometimes brown-yellow; head, collar, antennae and legs yellow, often with black spots. 4-4.5. – Amur. – Forest zone of Palearctic to W Europe. – On *Pinus sylvestris*. July, rarely August **C. aequale** Villers (*pinastri* Fall.)
23. **Zygmus** Fieb. Monotypic genus.

1. Light green; head, pronotum, base of scutellum, ventral side of prothorax and metathorax black. 4-4.5. – Khab.; Yakutia, N of forest zone of Europe. – On *Juniperus communis*. Rare. Mid-July to late July **Z. nigriceps** Fall. [p. 800]

24. **Lygidea** Reut. In USSR 1 species.

1. Pale green; internal posterior corner of corium often with brown or black spot; sometimes also clavus, base of scutellum and 2 spots on posterior margin of pronotum black. Posterior lobe of pronotum coarsely punctate. Dorsum with pale, dense, adpressed setae. Parameres as in Figs. 514: 1, 2. 5.8-6.5. – S Khab., Amur., Prim., S Sakh.; E Siberia, Kuznetskiy Alatau, C Kazakhstan. – NE China, Mongolia, On *Salix*. Late June to mid-August **L. illota** Stål

25. **Lygocoris** Reut. Body oval; pronotum with very fine punctation, rarely wrinkled; hemelytra with very shallow and indistinct punctation, appearing shagreened or almost smooth. – 40 species (in USSR 43). {*Apolygus* and *Arbolygus* now considered separate genera; *L. falkovitshi*, *L. kerzhneri*, and *L. potanini* placed in *Castanopsides* Yas., *L. rubronasutus* placed in a separate genus *Lygocorides* Yas. and the population from Russia described as a new species *L. izjaslavi* Yas.; *L. syringae* is a synonym of *L. hilaris*}.

1. Tibiae with pale spines and without dark dots at their bases. Carina on posterior margin of vertex usually visible only at sides; if carina marked along the whole margin, it lowers to the middle. Green, without black pattern. (Subgenus *Lygocoris* Reut. = *Plesiocoris* Fieb.) 2
- Tibiae with brown or black spines; if spines brown, then with black or brown spots at their bases. Carina on posterior margin of vertex distinct; if not, color not green 5
2. Posterior lobe of pronotum coarsely wrinkled, relatively flat. Calli of pronotum raised. Parameres as in Figs. 514: 3, 4. 5-6.5. – Chuk., Mag., Kamch., Khab. (south to lower Amur), N Sakh. – Forest zone of Holarctic. – On *Salix*. Mid-July to late August **L. rugicollis** Fall.
- Posterior lobe of pronotum with fine punctation, more convex. Calli of pronotum almost not raised 3
3. Body of right paramere tapering to apex and gradually passing into hypophysis (Fig. 514: 5). Left paramere as in Fig. 514: 6. Theca with semicircular keel. Spicula of aedeagus with complexly curved apex. 1st and 2nd tarsal segments pale, yellowish. 5.5-6.5. – S Sakh., S Kur. – Japan. – On herbs in forest glades and edges, and among bushy vegetation. Early July to late September **L. pabulinoides** Lnv.
- Body of right paramere with truncate or rounded apex, hypophysis originating laterally (Figs. 514: 7, 9). Theca with hooklike keel. Spicula of aedeagus with straight apex. 1st and 2nd tarsal segments usually more or less brown, especially in specimens from Sakh. and Kur. 4
4. Hypophysis of right paramere not curved towards the middle of genital segment (Fig. 514: 7). Left paramere as in Fig. 514: 8. Vertex in males 1.1-1.2 times, in females 1.5-1.6 times as wide as an eye. Eyes black, more rarely gray. 5-7. – Mag., Khab., Prim., Sakh., S Kur. – Forest zone of Holarctic. – On herbs in forest glades and edges. Late June to early September **L. pabulinus** L.
- Hypophysis of right paramere strongly curved towards the middle of genital segment (Fig. 514: 9). Left paramere as in Fig. 514: 10. Vertex in males 0.77 times, in females 1.3 times as wide as an eye. Eyes gray. 5.8-7. – S Kur. (Kunashir I.). – Japan. – In forest glades. Late July to late August. Rare **L. idoneus** Lnv.

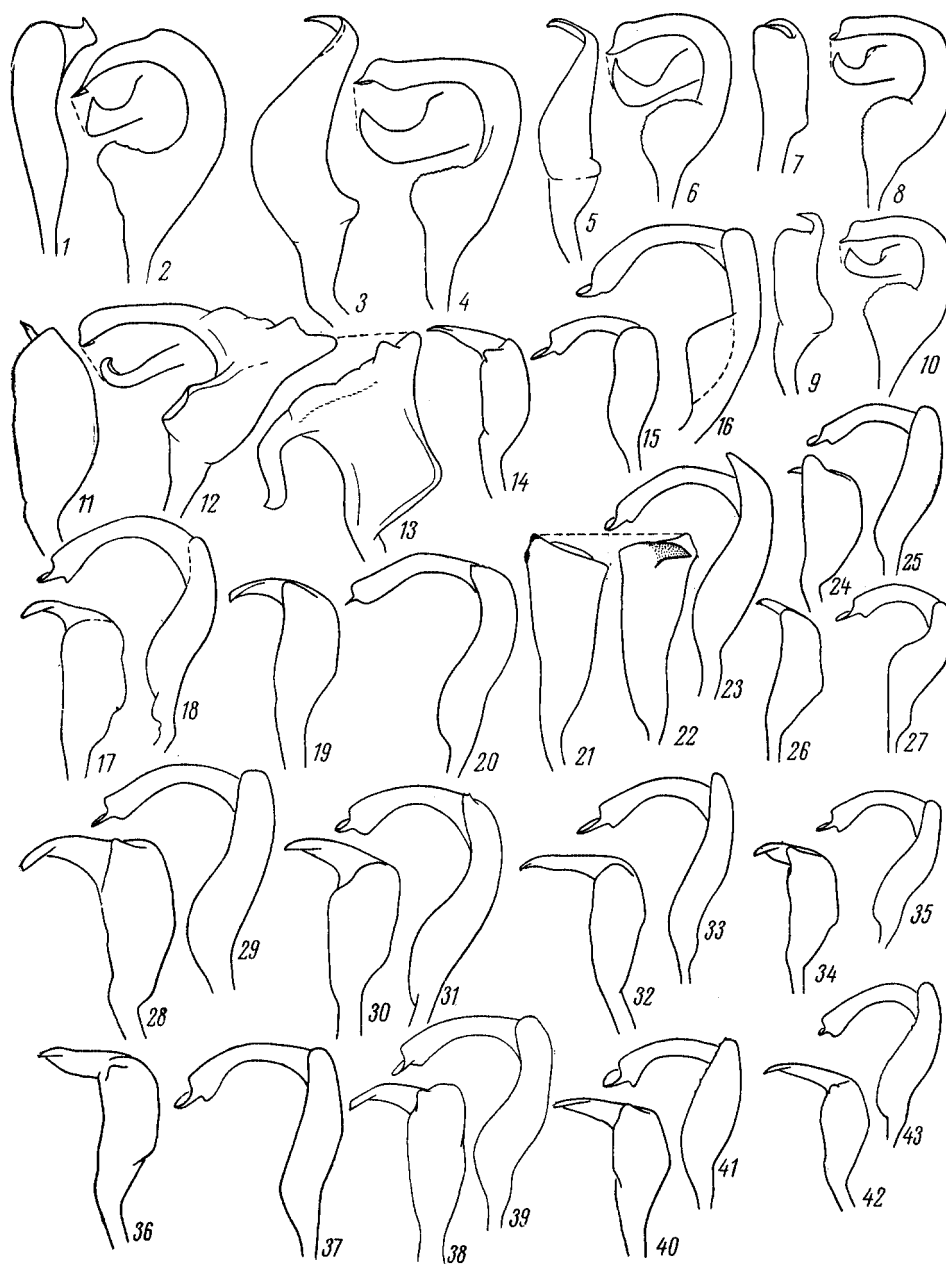


Fig. 514. Heteroptera. Family Miridae (after Kerzhner and original).

1, 2, *Lygidea illota*; 3, 4, *Lygocoris rugicollis*; 5, 6, *L. pabulinoides*; 7, 8, *L. pabulinus*; 9, 10, *L. idoneus*; 11-13, *L. rubronasutus*; 14, 15, *L. contaminatus*; 16, *L. juglandis*; 17, 18, *L. aceris*; 19, 20, *L. lobatus*; 21-23, *L. vityazi*; 24, 25, *L. hoberlandti*; 26, 27, *L. pteleinus*; 28, 29, *L. honshuensis*; 30, 31, *L. fraxini*; 32, 33, *L. longiusculus*; 34, 35, *L. tiliicola*; 36, 37, *L. viridis*; 38, 39, *L. philyrinus*; 40, 41, *L. nemoralis*; 42, 43, *L. coryli*. 1, 3, 5, 7, 9, 11, 14, 17, 19, 21, 22, 24, 26, 28, 30, 32, 34, 36, 38, 40, 42, right paramere; the remaining figures, left paramere (in figs. 2, 4, 6, 8, 10, 12 apex of hypophysis dorsally is also shown).

5. Tibiae with brown spines and with dark spots at their bases (in *L. rubronasutus* without spots). 2nd antennal segment longer than width of pronotum at base. Green (*L. honshuensis* sometimes pale red), rather often with black spots. (Subgenus *Neolygus* Knight). On deciduous trees 6

- Tibiae either with black spines (with or without dark spots at bases) or with brown spines, but in the latter case without dark spots at their bases and color of body not green 21
- 6. Tibiae without dark spots at bases of spines. Apex of cuneus black. Yellowish green or almost golden yellow; calli of pronotum usually pale orange. Clypeus brown entirely or apically. 2nd antennal segment black entirely or apically. Parameres as in Figs. 514: 11-13. [p. 802] 6-7. – S Prim. (Khasan District). – Japan. – On *Quercus dentata*. Early July to late August L. (N.) **rubronasutus** Lnv.
- Tibiae with dark spots at bases of spines. Apex of cuneus pale 7
- 7. Body of left paramere short, wide, not tapering to apex (Fig. 514: 15). Aedeagus with pale spicula (Fig. 515: 1). Right paramere as in Fig. 514: 14. Body without dark spots, only inner corner of corium sometimes brownish, but in specimens from Kamch. and from N America usually also clypeus or its apex, inner margin of clavus, sometimes vertex and posterior margin of pronotum brown. 5.7-6.5. – Mag. (up to boundary with Chuk.), Kamch. – Forest zone of Holarctic. – On *Betula*. Late July to early October L. (N.) **contaminatus** Fall.
- Body of left paramere narrow and more or less tapering to apex. In mature specimens, spiculae of aedeagus dark brown. In more southern regions of Far East.. 8
- 8. Pronotum with 2 black spots drawn close together in posterior part (Fig. 521: 1). Whitish green; apex of clypeus, spot in inner corner of corium, and internal part of clavus black or dark brown. Left paramere as in Fig. 514: 16. 5.9-6.7. – S Prim. – On *Juglans mandshurica*. Late June to mid-August L. (N.) **juglandis** Kerzh.
- Pronotum without spots or with black band on posterior margin 9
- 9. Aedeagus with 2 spiculae (Fig. 515: 2). Parameres as in Figs. 514: 17, 18. Apex of clypeus pale. Spot in inner corner of corium and usually stripe on inner margin of clavus dark brown. 5.8-6.1. – S Prim. (Khasan District). – On *Acer ginnala*. July L. (N.) **aceris** Kerzh.
- Aedeagus with 1 spicula 10
- 10. Lobe of aedeagus with sclerotized stripe in the middle and almost membranous margins; its apex not pointed; spicula directly truncate at apex (Fig. 515: 3). Parameres as in Figs. 514: 19, 20. Apex of clypeus black. Inner corner of corium, clavus (at least partly), and sometimes band on posterior margin of pronotum brown or black. 5.5-6.2. – S Sakh., S Kur. – Japan. – On *Betula*. Late July to late September L. (N.) **lobatus** Lnv.
- Lobe of aedeagus with different distribution of sclerotized areas; its apex pointed. Spicula of aedeagus (with exception of *L. pteleinus*) not truncate at apex 11
- 11. Sensory lobe of left paramere ends with pointed, strongly protruding projection (Fig. 514: 23). Hypophysis of right paramere very short, not protruding beyond the margin of paramere (Figs. 514: 21, 22). Aedeagus as in Fig. 515: 4. Pale green; apex of clypeus pale; in males (female unknown) posterior margin of corium with brown band in internal half. 5. – S Prim. (Khasan District). – Early August L. (N.) **vityazi** Kerzh.
- Sensory lobe of left paramere rounded at apex. Hypophysis of right paramere slightly (*L. hoberlandti*) or markedly longer 12
- 12. Lobe of aedeagus with laminate semicircular projection, together forming a plica for insertion of spicula (Fig. 515: 5). Parameres as in Figs. 514: 24, 25. Head, pronotum, and hemelytra without dark spots. 5-5.5. – S Prim., S Kur. – In Prim. on *Tilia amurensis*, in Kur. on *Acer pictum*. Mid-July to late August L. (N.) **hoberlandti** Kulik



Fig. 515. Heteroptera. Family Miridae, non-inflated aedeagus (after Kerzhner and original).

1, *Lygocoris contaminatus*; 2, *L. aceris*; 3, *L. lobatus*; 4, *L. vityazi*; 5, *L. hoberlandti*; 6, *L. fraxini*; 7, *L. pteleinus*; 8, *L. longiusculus*; 9, *L. honshuensis*; 10, *L. tiliicola*; 11, *L. viridis*; 12, *L. philyrinus*; 13, *L. nemoralis* (a, variability of lobe apex).

- Lobe of aedeagus without such projection 13
- 13. Spicula of aedeagus strongly curved near the middle, directly truncate at apex (Fig. 515: 7). Paramere as in Figs. 514: 26, 27. Males often with spot in inner corner of corium, clavus and hind third of pronotum pale brownish; females without dark pattern. Apex of clypeus pale, rarely slightly brownish. 4.5-5.5. – S Kur. (Kunashir I.). – On *Ulmus propinqua*. Mid-July to late August L. (N.) **pteleinus** Kerzh.
- Spicula of aedeagus straight or curved, not truncate at apex 14 [p. 804]
- 14. Lobe of aedeagus strongly widened to apex, sclerotized on external margin and in area of apical process (Figs. 515: 6, 9). Apex of clypeus usually or (in *L. fraxini*) always black 15
- Lobe of aedeagus less widened and differently sclerotized. Apex of clypeus pale or black 16
- 15. Spicula of aedeagus strongly arcuately curved apically; lobe of aedeagus with short apical process (Fig. 515: 9). Parameres as in Figs. 514: 28, 29. Inner corner of corium, often also clavus, rarely a band on posterior margin of pronotum brown or black. 5.7-6.5. – Sakh., S Kur. – Japan. – On *Hydrangea*. Early July to early September L. (N.) **honshuensis** Lnv.
- Spicula of aedeagus moderately curved; lobe of aedeagus with long apical process (Fig. 515: 6). Parameres as in Figs. 514: 30, 31. Pronotum slightly yellowish; band on posterior margin of inner 1/2-2/3 of corium brown; clavus sometimes slightly brownish. 5.5-6.3. – S Prim. – On *Fraxinus rhynchophylla*. Late June to early August L. (N.) **fraxini** Kerzh.
- 16. Lobe of aedeagus with internal margin bent, more strongly sclerotized, and ending with straight apical process (Fig. 515: 8). Antennae usually longer than body, their length usually about 7. Parameres as in Figs. 514: 32, 33. Apex of clypeus pale. Inner corner of corium with brown spot; sometimes in males also clavus and band on posterior margin of pronotum brown or black. 5.7-6.6. – S Prim., S Sakh., S Kur. – On *Betula* and *Alnus*. Late July to early September L. (N.) **longiusculus** Kulik
- Lobe of aedeagus of different structure. Antennae shorter than body, their length about 5 17
- 17. Lobe of aedeagus wide; spicula massive (Fig. 515: 10). Apex of clypeus usually black or brown; corium sometimes with brown spot in inner corner. Parameres as in Figs. 514: 34, 35. 4.4-5.7. – S Prim., S Kur. (Iturup I.). – Korea. – On *Tilia* and other trees. Late June to early September L. (N.) **tiliicola** Kulik
- Lobe of aedeagus narrower, spicula thinner. Apex of clypeus pale; if black (in dark males of *L. viridis*), posterior margin of pronotum and clavus also black 18
- 18. Spicula of aedeagus wider than lobe of aedeagus at its base; lobe with curved internal margin (Fig. 515: 11). Parameres as in Figs. 514: 36, 37. Inner corner of corium often with brown spot; in males rather commonly clavus and band on posterior margin of pronotum brown or black. 5.2-6.5. – Khab., Prim., S Sakh. – Europe. – In Europe more often on *Tilia*; in Far East on various deciduous trees. Late June to late August L. (N.) **viridis** Fall.
- Spicula of aedeagus slender, its width less than width of lobe at its base; internal margin of lobe (except apex) almost straight (Figs. 515: 12, 13) 19
- 19. Width of male head 1.1-1.2 times the length of aedeagus spicula (Fig. 515: 12). Lobe of aedeagus with very short apical process. Parameres as in Figs. 514: 38, 39. Pale green; in males, posterior margin of corium usually with brown band in inner half; females without dark spots. Membrane light gray, without pattern. 5.1-5.7. – S Prim. (Khasan District). – On *Tilia amurensis*. Early July to early August ... L. (N.) **philyrinus** Kerzh.

- Width of male head 1.7-1.9 times the length of aedeagus spicula; lobe of aedeagus with longer apical process (Fig. 515: 13) 20
- 20. Dark green; inner corner of corium rather commonly with brown spot; membrane comparatively dark with still darker spots, especially in posterior corners of cells. Sensory lobe of left paramere with straight internal margin (Fig. 514: 41); sensory lobe of right paramere more strongly than in *L. coryli* protruding beyond base of hypophysis (Fig. 514: 40). Apical process of aedeagus lobe usually shorter (Fig. 515: 13). 5.2-6. – Mag., Khab., Amur., [p. 805] Prim., Sakh., S and C Kur.; Chita Prov. – NE Mongolia. – On *Betula* and *Alnus*. Early July to early September **L. (N.) nemoralis** Kulik
- Pale green, without dark spots; membrane pale gray, uniformly colored. Parameres as in Figs. 514: 42, 43. 4.9-5.5. – Amur., Prim.; Chita Prov. – On *Corylus heterophylla*. Late June to late August **L. (N.) coryli** Kulik
- 21. Not longer than 6.3. Pronotum not black with yellow longitudinal stripe. Hypophysis of left paramere without projection directed caudad (Fig. 516: 2). (Subgenus *Apolygus* China) 22
- Longer than 6.3; if shorter (*L. falkovitshi*), pronotum black with longitudinal yellow stripe. Hypophysis of left paramere with sharp projection directed caudad (Figs. 517: 2, 6, 11, 15; 518: 3, 9, 14). (Subgenus *Arbolygus* Kerzh.) 34
- 22. On Kamchatka. Head pale; clypeus, genae and lora, and a stripe on frons black. Pronotum, scutellum, corium and clavus black, rarely pronotum and hemelytra with a few greenish areas. Cuneus whitish green, very narrowly black at apex. Legs green, partly brown. 5.2-6.2. – Endemic of Kamch. – On *Artemisia vulgaris*. Mid-June to mid-September **L. (Ap.) malaisei** Lindb.
- In other regions of Far East 23
- 23. All femora green (becoming yellow in preserved specimens). Dorsum green, sometimes with more or less developed dark pattern 24
- Femora, at least apical half of hind femora red, orange or bright yellow. Dorsum not green (sometimes in *L. adustus* light olive with dark pattern) 26
- 24. Clavus black, brown or at least with pale brown stripe. Clypeus from pale to black. In pale specimens, corium with dark spot in inner corner; in dark specimens, posterior 2/3 of pronotum, scutellum almost entirely, and corium except its external margin black. Apex of cuneus with black spot. 4.7-6.5. – S Khab., Prim., Sakh., S Kur. – Japan. – Along sea coast on *Thermopsis lupinoides*. Mid-July to late September. To this species refer most records of *L. nigronasutus* Stål from Far East; the latter is distributed only in S Siberia (from Altai to Baikal), in Mongolia and in central part of China **L. (Ap.) nigrovirens** Kerzh.
- Clavus entirely pale 25
- 25. Clypeus usually black entirely or in ventral half. Apex of cuneus pale, less commonly brown. Corium often with dark spot in inner corner. Parameres as in Figs. 516: 1, 2 (parameres of other species of the subgenus have similar form). 4.7-6.2. – Khab., Amur., Prim., Sakh., S Kur. – Transpalearctic. – On *Artemisia* spp. Late June to early October **L. (Ap.) lucorum** M.-D.
- Clypeus entirely pale or blackened in less than 1/3 of its length. Apex of cuneus usually dark brown or black. Usually of paler green color than the previous species. Corium very rarely with dark spot in inner corner. 4.7-6.2. – Mag., S Khab., Amur., Prim., Sakh., S and C Kur. – Transpalearctic. – On high herbs and on bushes, especially of Rosaceae. Late July to late September **L. (Ap.) spinolae** M.-D.
- 26. Cuneus black only in inner corner. Body dorsally and ventrally yellow; apex of clypeus, scutellum (except its apex), clavus and band on posterior margin of

corium, apices and sometimes also bases of 2nd, 3rd, and 4th antennal segments, spot on external margin at base of each tibia, sometimes a spot on posterior lobe of pronotum black. In pale specimens, outer margin of clavus and sometimes entire scutellum pale, dark band on corium not reaching its external margin. Hind femur often with 2 brown or red rings at apex. 4.5-6. – S Khab., Amur., Prim. – Forest zone of Palearctic. – On *Salix*. Mid-July to mid-August

..... **L. (Ap.) limbatus** Fall.

- Cuneus black apically and basally (or in inner corner) or entirely 27 [p. 806]



Fig. 516. Heteroptera. Family Miridae (original).

1, 2, *Lygocoris lucorum*: 1, right paramere, lateral, and its apex, dorsal; 2, left paramere, lateral, and its apex, dorsal; 3-5, partly inflated aedeagus (A-E, homologous formations): 3, *L. subpulchellus*; 4, *L. infamis*; 5, *L. syringae*.

27. Corium black in inner part but pale in outer part (along the whole length); bright yellow; clavus, inner corner of corium, apex and inner corner of cuneus, scutellum, 2nd antennal segment apically or entirely, 3rd and 4th antennal segments, bases of tibiae, sometimes also clypeus and trapezoidal spot on posterior margin of pronotum black. 4.3-4.5. – S Prim. – On *Maackia amurensis*. Early August to mid-August **L. (Ap.) maackiae** Kulik
- Corium either entirely black, or the black spot in its posterior part reaching outer margin 28
28. Hind (or all) femora bicolorous: red in apical half and yellow in basal half. 2nd antennal segment blackened apically or in major part of its length but almost always pale at base. Yellow or orange-yellow; in pale specimens, only clypeus, posterior margin of corium, apex and base of cuneus black; in dark specimens, also the following areas black: 2 spots at base of scutellum, or a spot on scutellum notched posteriorly, or entire scutellum except apex, clavus, sometimes

- frons, part of pronotum and major part of corium (with exception of 1-2 pale spots). Aedeagus without spicula (Fig. 516: 3, compare with Figs. 516: 4, 5, E). Males 3.9-4.9; females 4.4-5.2. – S Prim. (Khasan District). – Japan. – On *Lespedeza bicolor*. Early July to mid-October **L. (Ap.) subpulchellus** Kerzh.
- Hind femora unicolorous, yellow, red, or reddish brown; if red with yellow bases, body size larger. Scutellum pale or black, rarely black with pale apex. Aedeagus with spicula (Figs. 516: 4, 5, E) 29
29. Hind (or all) femora bright red, sometimes with yellowish bases, always without brown rings. Head yellow with black clypeus and usually with brown spots on other parts; sometimes in males almost the whole head black. 2nd antennal segment [p. 807] black in apical half, sometimes also in basal fourth, very rarely entirely black. Pronotum, scutellum, and hemelytra black, only apex of scutellum and a spot on cuneus sometimes pale. Aedeagus (being situated and inflated as in the figure) with a finely denticulate on margin sclerotized plate at the base of right hook (Fig. 516: 4, c). Right paramere with long hypophysis. Males 4.7-5.1; females 5.1-5.3. – S Khab., Prim., S Kur. – On *Phellodendron amurense*, *Ph. sachalinense*. Early July to mid-September **L. (Ap.) infamis** Kerzh.
- Coloration different. If pronotum black and hind femora red, femora with 1-2 brown rings at apices (see from below). Aedeagus with 2-3 rows of denticles forming a stripe at base of right hook (Fig. 516: 5, c). Hypophysis of right paramere shorter 30
30. 2nd antennal segment widely pale at base (very rarely in *L. adustus* black at base) 31
- 2nd antennal segment black at base (disregard a narrow white ring on articulation!); often the segment entirely black 32
31. Pale part of cuneus whitish yellow, without orange or red tints. Corium with black base and apex, and usually also outer and inner margins; these dark areas border a whitish yellow oblique spot; very rarely corium entirely black. Clavus and clypeus black. Scutellum yellow with black base and sides, sometimes entirely yellow or black with pale longitudinal stripe in apical part. Pronotum whitish or greenish yellow, rarely brown-black posteriorly or in major part. Males 4.8-5.5; females 4.6-5.9. – S Khab., Prim. – Mid-June to late August **L. (Ap.) adustus** Jak.
- Pale part of cuneus bright yellow, usually orange or red on inner margin; rarely cuneus entirely black. Corium brownish black entirely or (rarely) only in apical third; if (very rarely) corium darkened basally and apically, the pale spot reaching its outer margin. Otherwise coloration similar to previous species, but pronotum more bright yellow and scutellum often entirely black. Males 5-5.8; females 5.3-6. – Prim., S Kur. (Kunashir I.). – On *Fraxinus rhynchophylla*, *F. mandshurica*. Late June to mid-August **L. (Ap.) fraxinicola** Kerzh.
32. Clypeus black only apically or also laterally. Orange-yellow; posterior margin of corium with wide black band; cuneus black basally and apically. Usually in males, rarely in females, also scutellum and clavus darkened. Males 4.5-4.9; females 4.4-5.2. – S Khab., Amur., Prim. – Japan, Korea. – On *Lespedeza bicolor*. Early August to mid-September (in Japan from mid-June) **L. (Ap.) hilaris** Horv.
- Clypeus entirely or almost entirely black 33
33. Coloration (except clypeus) as in *L. hilaris*. Aedeagus as in Fig. 516: 5 (in *L. adustus*, *L. fraxinicola*, *L. hilaris*, and *L. furvus* aedeagi similar in structure). Males 4.8-5; females 5.2-5.5. – Prim. Japan. – On *Syringa amurensis*. Late June to late July (in Japan until late September). {It is a junior synonym of *L. hilaris*. Records from *Syringa* occasional} **L. (Ap.) syringae** Kerzh.
- Usually pronotum, scutellum and hemelytra (entirely or with exception of a spot

on cuneus) black, but in all specimens from Shikotan and some specimens from Kunashir, smaller on the average, pronotum entirely or with exception of calli and usually also apex of corium brownish orange. Both sexes 4.8-5.7 (in the pale form 4.6-5.3). – S Sakh., S Kur. – On *Hydrangea paniculata*. Late July to late August **L. (Ap.) furvus** Kerzh.

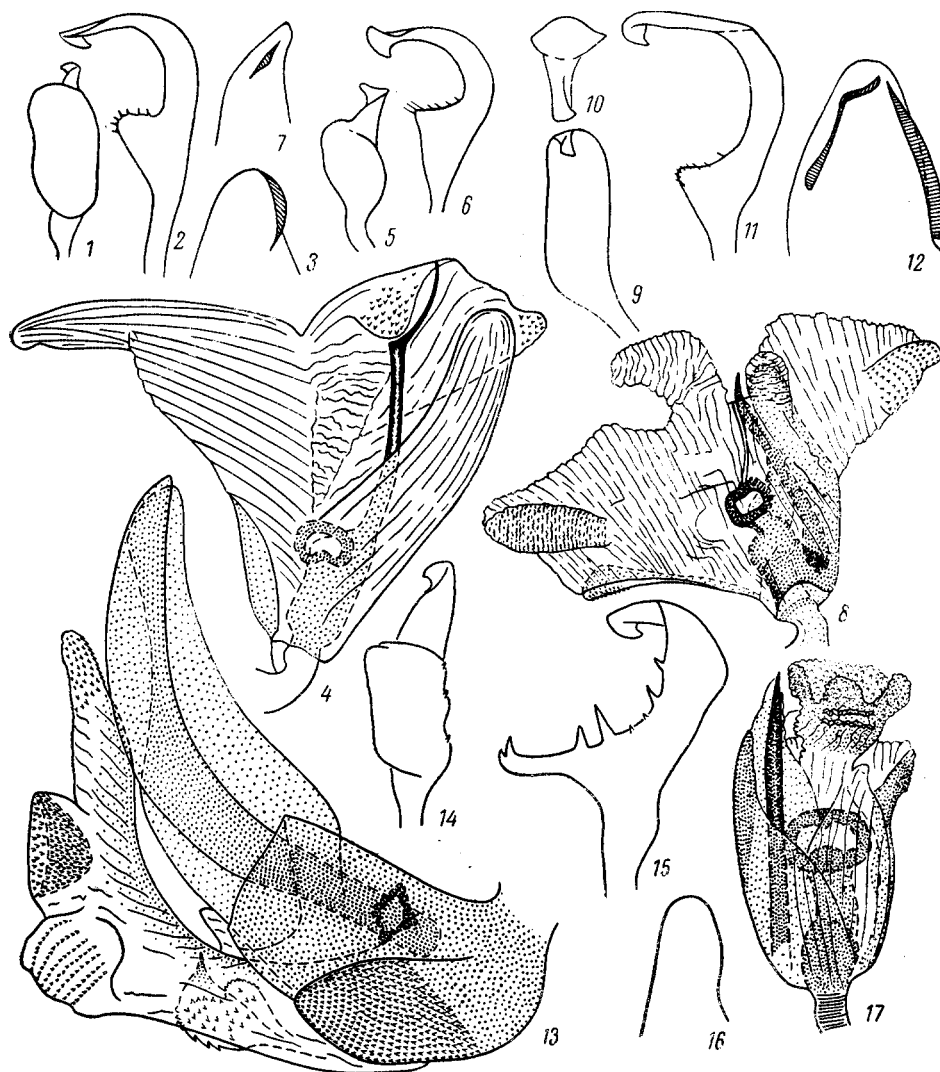


Fig. 517. Heteroptera. Family Miridae (after Kerzhner and original).

1-4, *Lygocoris falkovitshi*; 5-8, *L. potanini*; 9-13, *L. fulvus*; 14-17, *L. kerzhneri*. 1, 5, 9, 10, 14, right paramere (1, 5, 14, external view; 9, internal view; 10, dorsal view); 2, 6, 11, 15, left paramere; 3, 7, 12, 16, apex of theca; 4, 8, 13, 17, aedeagus.

34. Pronotum and scutellum black with a narrow, longitudinal, yellow stripe (sometimes almost absent on scutellum). Dark brown or black; in addition to the above-mentioned yellow stripe, also collar of pronotum, posterior and apex of lateral margins of pronotum, major part of cuneus, veins of hemelytra (not always), and legs (except apices of hind and sometimes middle femora) yellow. Male genitalia as in Figs. 517: 1-4. 5.4-6.3. – S Prim. – Late June **L. (Ar.) falkovitshi** Kerzh. [p. 808]

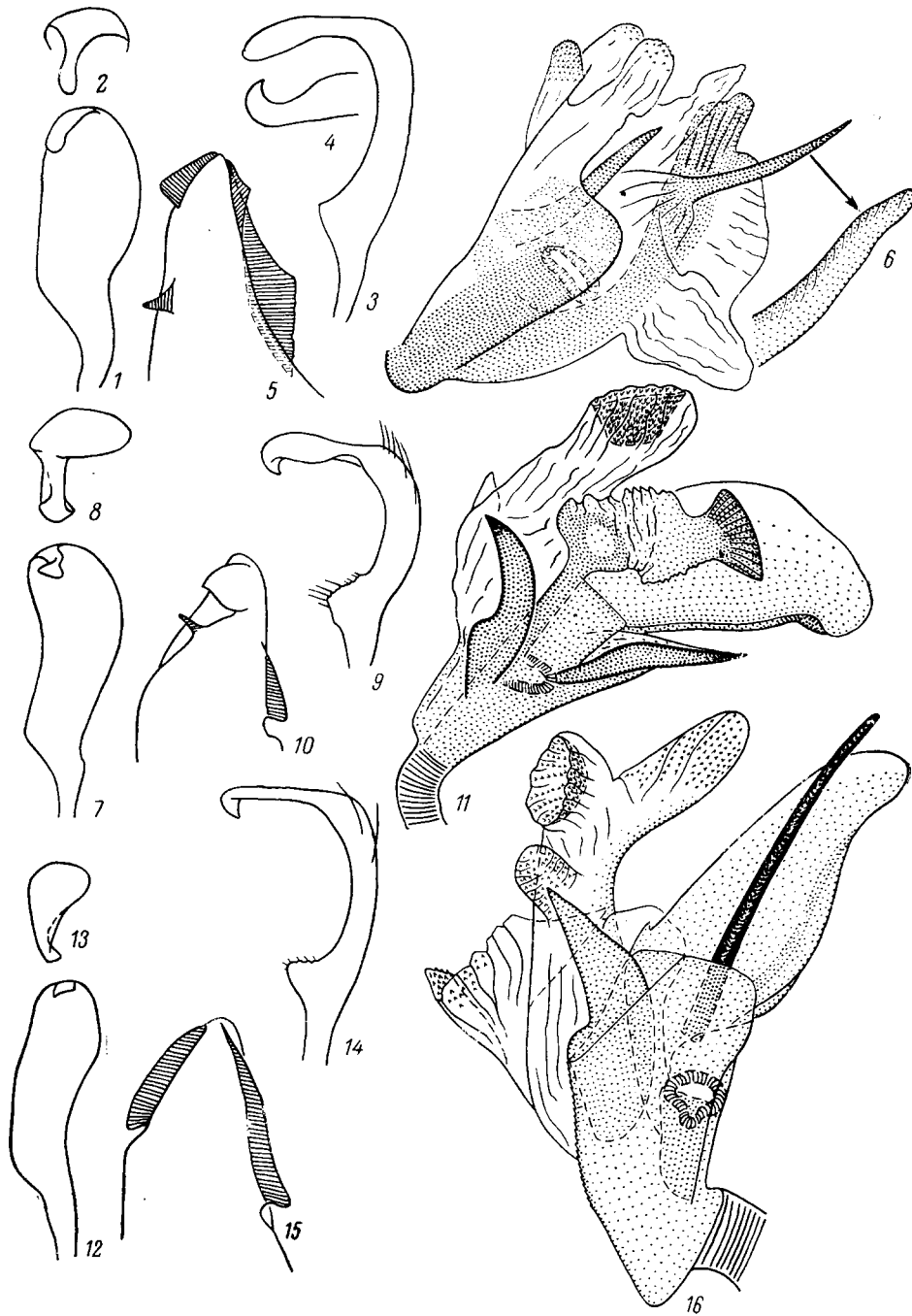


Fig. 518. Heteroptera. Family Miridae (after Kerzhner and original).

1-6, *Lygocoris glaber*; 7-11, *L. ulmi*; 12-16, *L. rubripes*. 1, 2, 7, 8, 12, 13, right paramere (1, 7, 12, internal view; 2, 8, 13, dorsal view); 3, 9, 14, left paramere; 4, its hypophysis, dorsal; 5, 10, 15, apex of theca; 6, 11, 16, aedeagus.

- Pronotum and scutellum either almost entirely pale or black but without longitudinal pale stripe; if pronotum black with longitudinal pale stripe (sometimes in *L. potanini*), scutellum almost entirely pale. Larger: 6.5-9.5 35

35. Tibiae with black spines and hind femora not black. Light specimens pale reddish yellow, only spots on calli of pronotum, apex of cuneus, and apex of 2nd antennal segment black. In darker specimens, corium and clavus brownish, pronotum with black band close to posterior margin or (less commonly) almost entirely black. Male genitalia as in Figs. 517: 5-8. 6.5-8.5. – S Khab., Amur., Prim., S Kur. (Kunashir I.). – E China. – On *Quercus mongolica*, *Q. dentata*. Late June to late August **L. (Ar.) potanini** Reut. (*amurensis* Lindb.)
- Either tibiae with brown spines or hind femora black 36
36. Body entirely red or brownish red; cuneus entirely red 37 [p. 810]
- Color of dorsum mostly black or black-brown; cuneus basally white 38
37. All femora and tibiae reddish yellow. Spines on tibiae brown. Calli of pronotum in females entirely pale, in males black. Male genitalia as in Figs. 517: 9-13. 7.7-8.5. – Prim. – Late July to late August **L. (Ar.) fulvus** Jak.
- Femora black (fore and middle femora sometimes brown). Tibiae, at least hind ones and at least partly, black. In both sexes, calli of pronotum with 2 black dots close together. Male genitalia as in Figs. 517: 14-17. 7.2-7.7. – Prim. – Japan, Korea. – On *Quercus mongolica*. Late June to late July **L. (Ar.) kerzhneri** Jos.
38. Pronotum, scutellum and hemelytra seem to be bare: setae on them much shorter than distance between bases of setae. Usually all tibiae or at least hind ones entirely black or with pale ring near apex occupying not more than one-fourth of tibia length. Scutellum with the only pale spot at apex. Pronotum without pale pattern in anterior corners. Femora with 2 black rings. Male genitalia as in Figs. 518: 1-6. 6.5-8. – S Prim. (Khasan District). – Japan. – On *Quercus dentata*. Early July to early August **L. (Ar.) glaber** Kerzh.
- Pronotum, scutellum, and hemelytra with well visible setae, either uniformly long and dense (*L. rubripes*) or shorter and more sparse on pronotum (*L. ulmi*). Tibiae pale entirely or with 1-3 black rings occupying not more than half their length. Scutellum mostly with white spot in each corner. On the average larger 39
39. Pronotum behind collar entirely black or with 2 small yellow spots; posterior half of pronotum rather commonly dirty yellow entirely or partly. Hind femora with 2 black rings (at apex and near the middle). Male genitalia as in Figs. 518: 12-16. 6.5-9.5. – S Khab., Amur., Prim., S Kur. – Japan. – On *Quercus mongolica*, less common on other trees. Late June to early September **L. (Ar.) rubripes** Jak. (*flaviventris* Reut.)
- Pronotum behind collar usually with 2 yellow spots and with pale pattern in lateral corners, less commonly only the 2 spots remain or sometimes they also disappear. Hind femora in apical half black or less commonly with 2 black rings. Male genitalia as in Figs. 518: 7-11. 6.5-9.3. – S Prim., S Sakh., S Kur. – NE China. – On *Ulmus japonica*. Late June to mid-October **L. (Ar.) ulmi** Kerzh.

26. **Lygus** Hahn (*Exolygus* E. Wagn.). Pronotum and hemelytra with well visible punctation. Coloration very variable. On herbs. Adults hibernating. – 5 species (in USSR 8), most of them difficult in identification. Records of *L. pratensis* L. from Far East erroneous.

1. Spines on tibiae pale. Hind tibiae on outer margin with large brown spots at bases of spines or with brown longitudinal stripe. Scutellum very convex, black with pale longitudinal stripe widened posteriad and often with 2-4 pale spots at base (Fig. 519: 1). Hemelytra with fine uniform punctation and dense and rather long pubescence. Male genitalia as in Fig. 519: 2-6. 4.3-5.2. – S Khab., Amur.,

- Prim., S Sakh., S Kur. – Japan, Korea, NE China. – In meadows; possibly developing on grasses. Sometimes this species was included in the genus *Orthops* {now it is placed in *Cyphodemidea* Reut.} *L. saundersi* Reut.
- Spines on tibiae black. Outer margin of tibiae without spots at bases of spines. Scutellum weakly convex, without dark pattern or with different pattern (Figs. 519: 12-14, 17-19, 21-23, 25-27) 2
2. The whole surface of corium with fine, dense punctures (distance between punctures less than their diameter) of equal sizes 3

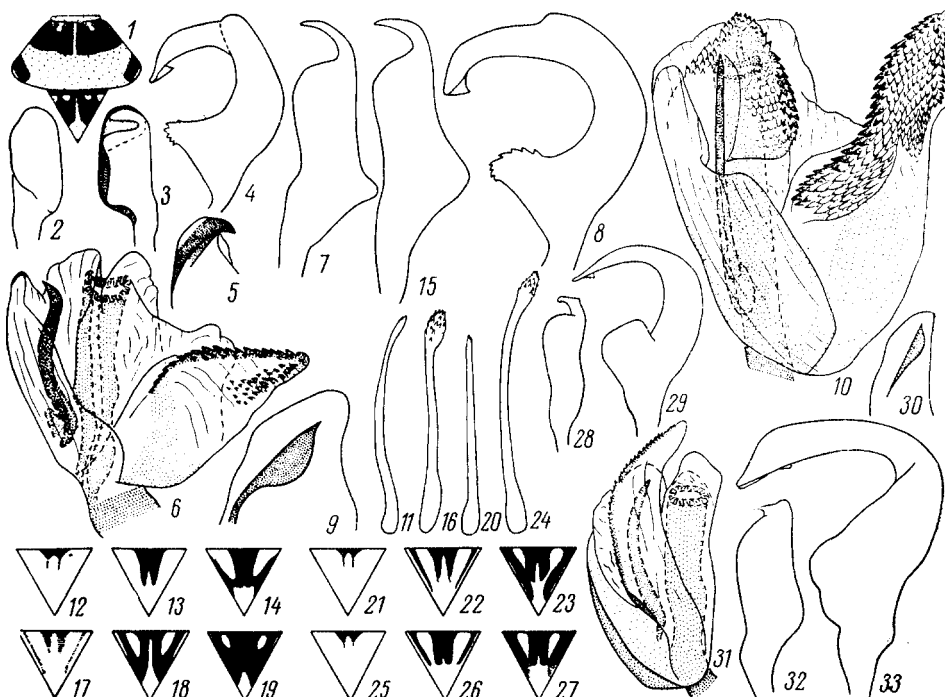


Fig. 519. Heteroptera. Family Miridae (original).

1-6, *Lygus saundersi*; 7-14, *L. rugulipennis*; 15-19, *L. wagneri*; 20-23, *L. adspersus*; 24-27, *L. punctatus*; 28-31, *Orthops sachalinus*; 32, 33, *Agnocoris rubicundus*. 1, pronotum and scutellum; 2, 7, 15, 28, 32, right paramere, external view; 3, same, internal view; 4, 8, 29, 33, left paramere; 5, 9, 30, apex of theca; 6, 10, 31, inflated aedeagus; 11, 16, 20, 24, spicula of aedeagus; 12-14, 17-19, 21-23, 25-27, variability of dark pattern on scutellum.

- In medial part of corium, closer to its posterior margin, there is a triangular [p. 811] area with punctures of unequal sizes and depths, distance between many of them greater than their diameter, on the average punctures on corium larger (very rarely in *L. adspersus* corium with almost uniform punctation {this note refers to *L. sibiricus*, see below}). Pubescence of hemelytra very short and sparse, hardly visible; hemelytra strongly shining 4
3. External margin of cuneus usually narrowly black along its whole length (see in profile). Setae on hemelytra dense, thus hemelytra seem slightly mat. Scutellum with median black stripe, less commonly without stripe or with W-shaped black spot, in the last case middle «rods» of the spot fused (Figs. 519: 12-14). Male genitalia as in Figs. 519: 7-11. Right paramere with angulate projection at base (Fig. 519: 7); spicula of aedeagus slender (Fig. 519: 11). In specimens from the south of Far East, males usually with developed dark pattern in posterior 2/3 of

pronotum and on hemelytra; females dirty greenish, almost without dark pattern. In northern populations, both sexes more commonly with pale pronotum, background color often rufescent to reddish brown. 5-6.1. – Chuk., Mag., Kamch., Khab., Amur., Prim., Sakh., S Kur. – Transpalearctic, mainly in forest zone. – The most common species in the south of Far East. Pest of cereals and vegetables .

- ***L. rugulipennis** Popp. (*disponsi* Lnv.)
- External margin of cuneus usually black only at apex and at base. Pubescence on hemelytra on the average shorter and more sparse (especially in the south of distribution range); hemelytra shining. Scutellum most often with W-shaped black spot with separated middle «rods», less commonly lateral parts of the spot not connected with middle one or (in females) absent; in the northern populations, scutellum sometimes entirely black, with exception of apex and 2 spots at base (Figs. 519: 17-19). Right paramere with smaller projection at base (Fig. 519: 15); spicula [p. 812] of aedeagus widened at apex and with many denticles (Fig. 519: 16). General color of dorsum from dirty greenish to reddish brown. Pronotum in dark specimens with black calli and (or) spots behind them and sometimes with black lateral margins, but without isolated black spots in posterior corners. In dark specimens, venter of abdomen brown in the middle and on margins or entirely brown or black. Head often with developed dark pattern, especially in males. 5.2-6.8. – Mag., Kamch., Khab., Amur., N Sakh. – Transpalearctic, mainly in forest zone **L. wagneri** Rem.
 - 4. Color green, sometimes with rufescent hue. External margin of cuneus usually black in not less than half its length (see in profile). Pronotum usually with dark spots in posterior corners, usually with 1-2 dark spots behind calli of pronotum, very rarely calli entirely black. Scutellum almost entirely pale or with longitudinal black stripe, sometimes black stripes present near lateral margins, very rarely all stripes fused, forming W-shaped spot (Figs. 519: 21-23). Hemelytra often with black spots. Venter of abdomen entirely pale or with black spot in the middle. Head usually without dark spots. Spicula of aedeagus not widened at apex (Fig. 519: 20). 5.3-7.3. – S Khab., Amur., Prim., N Sakh. – Transpalearctic, in forest and steppe zones. – Usually on *Artemisia*. {Records from Amur. and Prim. partly refer to *L. sibiricus* Aglyamzyanov} **L. adspersus** Schill. (*gemellatus* f. *autumnalis* E. Wagn.)
 - Dorsum red. External margin of cuneus usually entirely pale. Dark pattern as in *L. adspersus*, but calli of pronotum almost always black, hemelytra without dark spots, and venter of abdomen sometimes black not only in the middle, but also along lateral margins. Scutellum as in Figs. 519: 25-27. Spicula of aedeagus widened at apex (Fig. 519: 24). 5.8-7.3. – S Khab., Amur., N Prim., rare; records from Mag. and Sakh. doubtful. – Transpalearctic, in forest zone. – In Europe often in heaths **L. punctatus** Zett.

27. **Orthops** Fieb. Adults hibernating. – 1 species (in USSR about 10), many species recently transferred to *Pinalitus*.

1. Pronotum and hemelytra with distinct punctation. Color from dirty yellow or dirty greenish to brownish; males usually darker than females. Calli or, less commonly, major part of pronotum black. Scutellum light yellow, in males usually with median black spot. Clavus and posterior half of corium often brown partly or entirely. Cuneus entirely pale or with brown apex. Legs yellow. Male genitalia as in Figs. 519: 28-31. 4-5.7. – S Khab., Amur., Prim., Sakh., S Kur.; Siberia. – Japan, Korea, NE China, N Mongolia. Records of *O. kalmii* L. from Far East refer to this species. – On Apiaceae. {Junior synonym of *O. scutellatus* Uhler} **O. sachalinus** Carvalho (*flavoscutellatus* Mats.)

28. *Pinalitus* Kelton. On trees. – 5 species (in USSR 8). {*P. festivus* and *P. nigrescens* now placed in *Pachylygus* Yas.}.

1. Scutellum almost flat. Dorsum or at least hemelytra more or less uniformly colored, reddish yellow, red or reddish brown; collar and posterior margin of pronotum, apex of scutellum, antennae, and legs light yellow; femora (all or hind ones) mostly reddish. On conifers 2

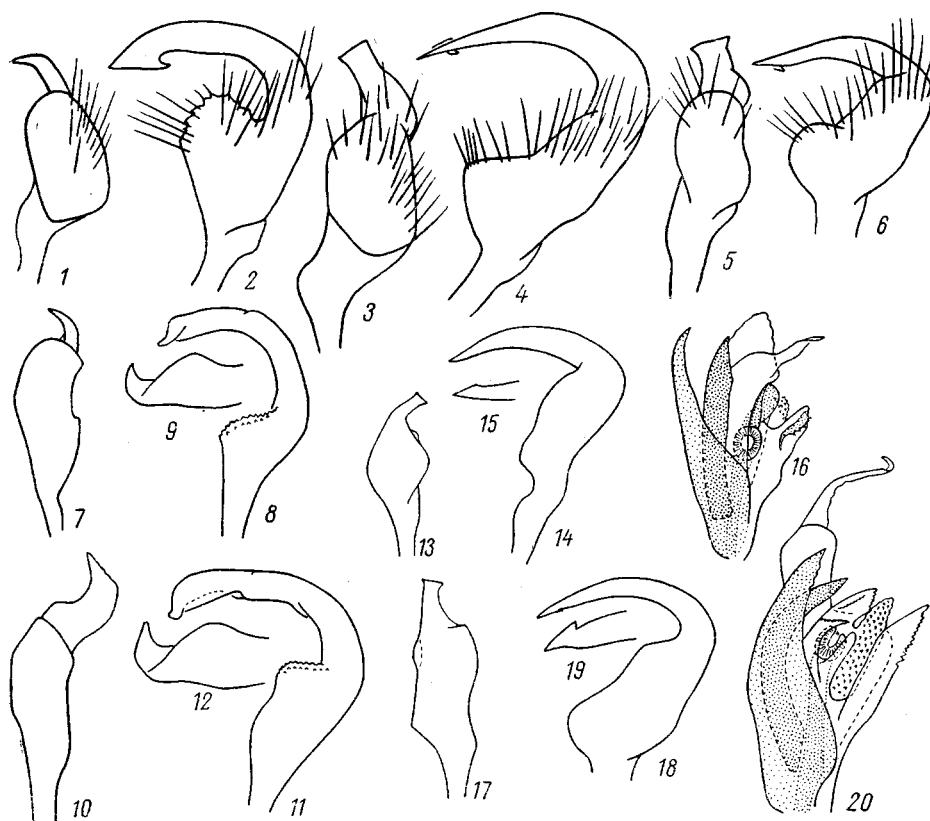


Fig. 520. Heteroptera. Family Miridae (after Kerzhner).

1, 2, *Pinalitus rubricatus*; 3, 4, *P. rubeolus*; 5, 6, *P. nigriceps*; 7-9, *P. festivus*; 10-12, *P. nigrescens*; 13-16, *Salignus distinguendus*; 17-20, *S. duplicatus medius*. 1, 3, 5, 7, 10, 13, 17, right paramere (1, 3, 5, 7, 10, external view; 13, 17, internal view); 2, 4, 6, 8, 11, 14, 18, left paramere; 9, 12, 15, 19, its hyphophysis, dorsal; 16, 20, aedeagus.

- Scutellum strongly convex, knoblike. Coloration different. On *Kalopanax septemlobus* 4
- 2. Head and pronotum (with exception of collar and posterior margin) black. Base of cuneus not paler than corium. Parameres as in Figs. 520: 5, 6. 4-5. – S Prim. (Khasan District). – On *Pinus densiflora*. Mid-July to mid-August ***P. nigriceps* Kerzh.**
- Head and pronotum red or at least with reddish or brownish hue, rarely (in males of *P. rubricatus*) black, but in this case base of cuneus paler than corium 3 [p. 813]
- 3. Cuneus whitish or light red, with narrowly dark brown apex. Parameres as in Figs. 520: 1, 2. 3.7-5. – S Prim., Sakh. – Forest zone of Palearctic, N America (? imported). – On different conifers. Mid-July to late August ***P. rubricatus* Fall.**

- Cuneus unicolorous, bright red (females), brown-red or brown (males). Parameres as in Figs. 520: 3, 4. 5.2-5.7. – S Khab., Prim. – Korea. – Probably on *Pinus koraiensis*. Mid-July to late August **P. rubeolus** Kulik
- 4. Hemelytra yellowish; corium in posterior half and clavus pale brown; apex of cuneus reddish. Pronotum yellow with calli and usually also posterior margin black. Scutellum black with longitudinal yellow stripe. Parameres as in Figs. 520: 7-9. 4.6-5.5. – S Kur. (Kunashir I.). – Late July to late August **P. festivus** Kerzh.
- Hemelytra unicolorous, dark brown to almost black. Pronotum in major part black or brown. Scutellum as in *P. festivus*, but the pale stripe usually remains only at its apex. Parameres as in Figs. 520: 10-12. 5.5-6.8. – S Kur. (Kunashir I.). – Mid-July to late August **P. nigrescens** Kerzh.

29. **Salignus** Kelton. Posterior lobe of pronotum with fine and dense punctation. Dorsum with adpressed silvery setae, hemelytra in addition with black setae. Dark brown, sometimes yellowish or reddish brown; rarely head, pronotum, and scutellum [p. 814] black. At least 2 spots near eyes, collar, and narrow border of posterior margin of pronotum, apex of scutellum and transverse band on cuneus yellowish white. Antennae and legs mostly yellow with brown spots. On *Salix*. Adults hibernating. In USSR 2 species.

1. Smaller: 4.4-5.1. Sides of prothorax with yellow stripe anteriorly, below lateral margin of pronotum. Male genital segment without tubercle at the left on margin of the opening. Hypophysis of left paramere with hardly marked denticle before apex (Figs. 520: 14, 15). Right paramere and aedeagus as in Figs. 520: 13, 16. – Chuk., Mag., N Khab., Prim., S Sakh.; Siberia west to Altai. – China (Sichuan), Mongolia, ? N America **S. distinguendus** Reut.
- Larger: 5.4-7.5, the subspecies from USSR 5.4-6.2. Sides of prothorax usually without yellow stripe anteriorly below lateral margin of pronotum. Male genital segment with pale tubercle at the left on margin of the opening. Hypophysis of left paramere with well developed denticle directed posteriad (Figs. 520: 18, 19). Right paramere and aedeagus as in Figs. 520: 17, 20. – Sakh., S Kur. (ssp. *medius* Kerzh.). – China (Sichuan, Gansu – ssp. *duplicatus*). – On *Salix udensis (sachalinensis)* **S. duplicatus** Reut.

30. **Eolygus** Popp. (*Amphicapsus* China). In USSR 1 species.

1. Pronotum, hemelytra, and scutellum with dense punctation. Bright red or yellow-red; the following areas are black: head except posterior margin, anterior part of pronotum, 4 spots at its posterior margin (middle ones sometimes in form of bands), middle of scutellum, commissure of hemelytra, inner half of corium, a spot on each outer half of corium and in centre of cuneus, membrane, antennae, legs (with exception of middle of middle tibiae and sometimes rings on middle and hind femora). most part of venter. 5.5-6. – S Sakh. – Japan, Korea. – Late June to early August **E. rubrolineatus** Mats.

31. **Agnocoris** Reut. Adults hibernating. – 1 species (in USSR 3).

1. From reddish yellow to red-brown; head, anterior part and narrow border on posterior margin of pronotum, and at least partly antennae and legs always pale. Parameres as in Figs. 519: 32, 33. 4.1-5.1. – Mag., Kamch., Khab., Amur., Prim. – Palearctic, mostly in forest zone. – On *Salix* **A. rubicundus** Fall.

32. **Stenotus** Jak. – 2 species (in USSR 4).

1. Femora yellow or slightly orange. Pronotum entirely pale or with 2 black spots behind calli. Hemelytra greenish yellow, in males often orange; in females sometimes, in males always each hemelytron with longitudinal black stripe not touching commissure. 5.5-7. – S Sakh., S Kur., Altai, Caucasus. – Europe, N America (? imported). – On meadow grasses (*Phleum*, *Deschampsia*, etc.). Late July to early September. (Figs. 525: 3, 4) **S. binotatus** Jak.
- Femora red or reddish brown. Pronotum with 2 red or black stripes along the whole length. Hemelytra pale yellow, each of them with red to almost black stripe contiguous to commissure. 4.6-6.2. – S Khab., Prim., S Sakh., S Kur. – Japan, E China. – In marshes. Late July to late September **S. rubrovittatus** Mats. (*rubrocinctus* Lnv.)

33. **Eurystylus** Stål. – 1 species (in USSR 2).

1. Black; 2 ocellate spots and sometimes narrow longitudinal stripe on pronotum, corners of scutellum, spot at outer margin of corium closer to its base, venter of body, and bases of femora yellow; base of cuneus yellow or [p. 815] red. 6.5-8. – S Khab., Prim., S Kur. – Japan, E China. – On deciduous trees and bushes. Late July to late August **E. coelestialium** Kirk. (*bioculatus* Reut.)

34. **Capsodes** Dahlb. – 1 species (in USSR 5).

1. Black; head near eyes, sides of pronotum, scutellum, outer margin of corium, and cuneus (usually with exception of apex) yellow or orange. In females, hemelytra usually not reaching beyond apex of abdomen. 5.5-8.5. – S Khab., Amur., Prim., Sakh., S Kur. – Transpalearctic. In Far East ssp. *graeseri* Reut. – On herbs, especially on flowering Fabaceae and Apiaceae. Mid-June to late August. (Fig. 522: 2) **C. gothicus** L.

35. **Creontiades** Dist. In USSR 2 species, both on deciduous trees. {*C. tricolor* now placed in *Orientomiris* Yas. and *C. vitreus* in *Neomegacoelum* Yas.}.

1. Hemelytra not whitish and not transparent. Yellowish brown to red-brown or almost black; head, pronotum and scutellum usually black or almost black; in pale specimens, cuneus cherry-red. Parameres as in Figs. 521: 2, 3. 9-10. – S Kur. (Kunashir I.). – Japan. – Late July to mid-September **C. tricolor** Scott
- Hemelytra semitransparent, whitish, with cherry-red cuneus and black posterior margin of corium. Head, pronotum and scutellum black, sometimes posterior margin of pronotum yellowish, in females also head and collar yellowish and disk of pronotum dirty brown. Paramere as in Figs. 521: 4, 5. 6-7.5. – Amur., S Prim. – On *Quercus*. Late July to late August **C. vitreus** Kerzh.

36. **Pantilius** Curt. In USSR 1 species.

1. Dorsum greenish yellow or red, with brown dots; cuneus whitish with dark apex; venter of body, legs, and outer margin of cuneus yellow or greenish; apices of 2nd and 3rd antennal segments mostly black. 8-9.5. – S Prim. – Forest zone of Europe. – On *Betula*, *Alnus*, *Corylus*. Late August to mid-October **P. tunicatus** F.

37. **Allorhinocoris** Reut. Monotypic genus.

1. Green, dorsally with short, recumbent, black setae. Both sexes macropterous, but females shorter than males and with more rounded lateral margins. 8.5-10.5. – N Khab. (Ayan River); Siberia, Kazakhstan, European USSR west to Komi ASSR,

Kursk Prov. and E Ukraine. – On Fabaceae (*Caragana*, etc.). June to August
 **A. flavus** J. Sahlb.

38. **Mermitelocerus** Reut. Monotypic genus.

1. Green; scutellum and cuneus often paler; usually spots on head and pronotum, apex of cuneus and 2-3 indistinct longitudinal stripes on corium, and also venter partly or entirely black. Antennae black, basal one-fourth to half of 2nd and 3rd antennal segments and usually also 1st antennal segment pale. Parameres as in Figs. 521: 6, 7. 7.5-9.5. – S Khab., Prim., S Sakh., S Kur. – N Japan, NE China. On islands – ssp. *prasinus* Reut. – On herbs, with preference of large Liliaceae. Late May to late August **M. annulipes** Reut. (*varicornis* Reut.)

39. **Loristes** Jos. et Kerzh. Monotypic genus.

1. Black; collar and posterior margin or posterior corners of pronotum, apex of scutellum, and large spots on each hemelytron whitish yellow. Antennae black; basal half [p. 816] of 3rd segment pale. Venter of body in the middle and legs yellow; femora sometimes partly brownish. Parameres as in Figs. 521: 8, 9. 8-9. – S Khab., Prim. – Korea, NE China. – On *Lonicera*. Early June to mid-July
 **L. decoratus** Reut.

40. **Calocoris** Fieb. Large, living on trees and on herbs. Phytophagous or zoophytophagous. Collective genus. – 4 species (in USSR about 20). {Now *C. pulcherrimus* is placed in *Rhabdomiris* E. Wagn., *C. opacipennis* in *Polymerias* Yas., and the remaining two species in *Closterotomus*}.

1. Pronotum and scutellum (with exception of its sides) bare; hemelytra with very short, slender, pale setae. (Subgenus *Calocoris* Fieb.). Yellow or greenish yellow; head, 2 wide longitudinal stripes on pronotum, borders of veins on corium and clavus, apex of cuneus, membrane, antennae except basal half of 2nd and usually entire 1st segment, venter partly, and usually apical half of hind femora black. Parameres as in Figs. 521: 16, 17. 7.5-8.5. – Prim. – The related species *C. striatellus* F. (*ochromelas* Gmel.) in Europe on *Quercus*. Late May to mid-July
 **C. pulcherrimus** Lindb.
- Pronotum, scutellum and hemelytra with curved silvery setae (in *C. fulvomaculatus*, hemelytra in addition with straight black setae). (Subgenus *Closterotomus* Fieb.) 2
2. Body, antennae and legs black, only 2 spots on vertex near eyes and tarsi except apices of 3rd segments yellow. Parameres as in Figs. 521: 10, 11. 6-7.5. – S Prim. – Korea. – On *Lonicera ruprechtiana*. Early June to mid-July
 **C. (C.) opacipennis** Lindb.
- Hemelytra with pale areas, at least part of cuneus white, yellowish or red. Antenna pale, apices of 2nd and 3rd segments, 4th segment and sometimes 1st one black. Legs pale; femora usually reddish with brown spots 3
3. 2nd antennal segment 3-3.15 times as long as 1st segment. Dark specimens black, only cuneus widely white or red at base. Palest specimens rufescent yellow; only part of head, 2-4 spots on pronotum, and apex of cuneus [p. 817] black. Parameres as in Figs. 521: 12, 13. 6-7.5. – Mag., Kamch, Khab., Amur., Prim. – Forest zone of Palearctic. – On deciduous trees. Late June to late August
 **C. (C.) fulvomaculatus** De Geer
- 2nd antennal segment 2.1-2.3 times as long as 1st segment. Dirty yellow; sometimes hemelytra slightly reddish in apical part. Apex of clypeus or (in males)

major part of head, 3 longitudinal stripes on pronotum in males fusing posteriorly, indistinct black bands near middle and at apex of corium, in males also inner margin of clavus, apex and a spot in anterior outer corner of cuneus, and spots on venter black. Parameres as in Figs. 521: 14, 15. 7-7.5. – S Prim. – Possibly on *Syringa*. Late June to late July **C. (C.) ussuriensis** Kerzh.

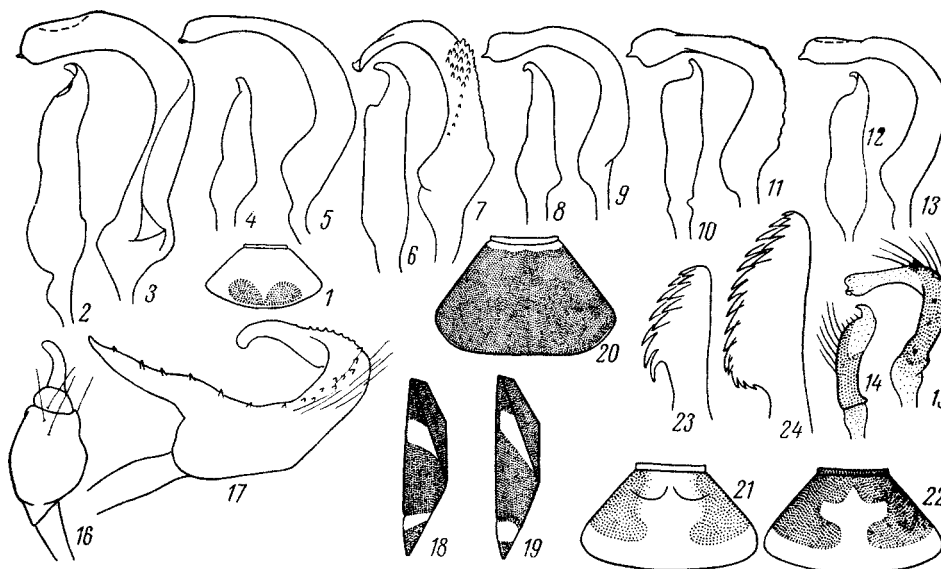


Fig. 521. Heteroptera. Family Miridae (after Josifov, Kerzhner, and original).

1, *Lygocoris juglandis*; 2, 3, *Creontiades tricolor*; 4, 5, *C. vitreus*; 6, 7, *Mermitelocerus annulipes*; 8, 9, *Loristes decoratus*; 10, 11, *Calocoris opacipennis*; 12, 13, *C. fulvomaculatus*; 14, 15, *C. ussuriensis*; 16, 17, *C. pulcherrimus*; 18, *Adelphocoris albonotatus*; 19, *A. obliquefasciatus*; 20, *A. reicheli*; 21, 22, *A. corallinus*; 23, *A. ponghvariensis*; 24, *A. lineolatus*. 1, 20-22, pronotum; 2, 4, 6, 8, 10, 12, 14, 16, right paramere; 3, 5, 7, 9, 11, 13, 15, 17, left paramere; 18, 19, corium and clavus; 23, 24, comb of aedeagus.

41. Adelphocoris Reut. (*Trichophoroncus* Reut.). Phytophagous, living on herbs, especially on Fabaceae. – 14 species (in USSR 17).

1. Body black; hemelytra with 2 distinct white bands: at base of cuneus and on corium; base of corium black (Figs. 521: 18, 19). Legs and antennae black, 3rd antennal segment with pale base. Evaporatoria of scent glands white 2
- Coloration different; if hemelytra black with pale base of cuneus and pale spot on corium, the spot is prolonged on base of corium 3
2. Collar and 1st antennal segment yellow (at least partly). Pale band on corium intersects it in the anterior third; cuneus white not more than in half its length (Fig. 521: 18). 6.5-8. – S Khab., Amur., Prim. – Japan, Korea, E China. – Early July to mid-September. (Fig. 522: 3) **A. albonotatus** Jak.
- Collar and 1st antennal segment black. Pale band on corium oblique, adjacent to clavus and slightly not reaching outer margin of corium; cuneus white in 2/3 of its length (Fig. 521: 19). 7.5-8.5. – Amur., Prim. – NE China. – On *Lespedeza bicolor*. Late June to late September **A. obliquefasciatus** Lindb.
3. Scutellum and hemelytra with only pale setae, sometimes several black setae present at apex of cuneus; if major part of straight setae on hemelytra seems black (*A. corallinus*, *A. rufescens*, sometimes *A. triannulatus*), cuneus with black (in *A. corallinus* dark red) apical spot, 2nd antennal segment apically black, and general

- color not green 4
- Scutellum and hemelytra with well visible black or dark brown setae additional to pale setae. General color light green or red, in the last case cuneus and 2nd antennal segment entirely pale 13
 - 4. Evaporatoria of scent glands in anterior half (anteriorly to the openings) gray or black; 2nd antennal segment entirely black, other segments yellow. Usually the entire dorsum and femora black and tibiae yellow; sometimes also the following areas are pale: base of cuneus and femora, less commonly collar and posterior margin of pronotum, very rarely a spot in the middle of pronotum, base and outer margin of corium. 7-8.5. – S Khab., Amur., Prim., S Kur.; Transbaikal. – Korea, NE China. Related to *A. seticornis* F and maybe merely its eastern subspecies. – On *Vicia* and possibly other Fabaceae. Early July to mid-September **A. tenebrosus** Reut.
 - Evaporatoria of scent glands entirely white. 2nd antennal segment at least at base or in the middle pale 5
 - 5. In specimens from Far East, collar and narrow band behind it bright yellow, the remainder of pronotum black (Fig. 521: 20). Head and scutellum black. Hemelytra whitish yellow; entire or almost entire clavus, large triangular spot on corium and entire cuneus black. Legs and 1st antennal segment pale. 8-9. – S Khab., Amur., Prim. – Forest and forest-steppe regions of Palearctic from [p. 818] Korea to W Europe. – On herbaceous Fabaceae. Mid-July to mid-September..... **A. reicheli** Fieb.
 - Pronotum differently colored 6
 - 6. Apex of cuneus with a black spot; corium not green, unicolorous or grading from brown in inner part into dirty yellow at base and on outer margin. 1st antennal segment black or pale 7
 - Apex of cuneus pale; if apex of cuneus with more or less marked black spot, either corium whitish, with distinctly outlined, large, triangular, black spot (*A. variabilis*) or basic color of body green (*A. lineolatus*). 1st antennal segment pale. 10
 - 7. Pronotum entirely black, with exception of narrow band on posterior margin. Corium and clavus either entirely pale, dirty yellow, or brown or black, but with paler outer margin or anterior corner of corium. Hemelytra reaching well (males) or slightly (females) beyond apex of abdomen. 6.5-9. – Mag., Khab., Amur., N Sakh.; Siberia west to Altai, Urals, Leningrad Prov. – N Mongolia. – In forest meadows. Early July to late August **A. laeviusculus** Vin.
 - Pronotum dirty yellow entirely or partly, rarely entirely black, but in this case corium also entirely black or dark brown. Corium and clavus unicolorous, dirty yellow, red, brown, or black. Females not differing sharply from males in the length of hemelytra 8
 - 8. Pronotum dirty reddish yellow with black or brown pattern in anterior half (Figs. 521: 21, 22). Cuneus red with darker apex. [p. 819] Corium, clavus and scutellum unicolorous, dark red or reddish brown. 8-8.7. – S Khab. (?), Prim. – Rare. – Early July to early September **A. corallinus** Kerzh.
 - Pronotum entirely yellow, entirely black, or yellow with black band behind calli. Cuneus with white band or spot 9
 - 9. Corium and clavus usually red or with distinct red hue. 2nd antennal segment blackened in apical 1/6; yellow color of basal part of the segment grading through red into black. 1st antennal segment yellow; pronotum always with black band posteriorly. Black setae on hemelytra always well visible. 7-8. – Amur., S Prim. – Korea, E China. – On *Lespedeza bicolor*. Mid-August to early Sep-

- tember *A. rufescens* Hsiao
- Corium and clavus not red. 2nd antennal segment blackened in apical 1/3-1/2; transition from yellow color to black rather sharp. 1st antennal segment black or yellow; pronotum often without black band. Very variable, probably collective species. 6.8-9. – S Khab., Amur., Prim., S Sakh., S Kur.; E Siberia west to Altai. – Japan, Korea, E China, Mongolia. – On *Trifolium*. Early July to mid-September ..
- *A. triannulatus* Stål (*funnebris* Reut.)

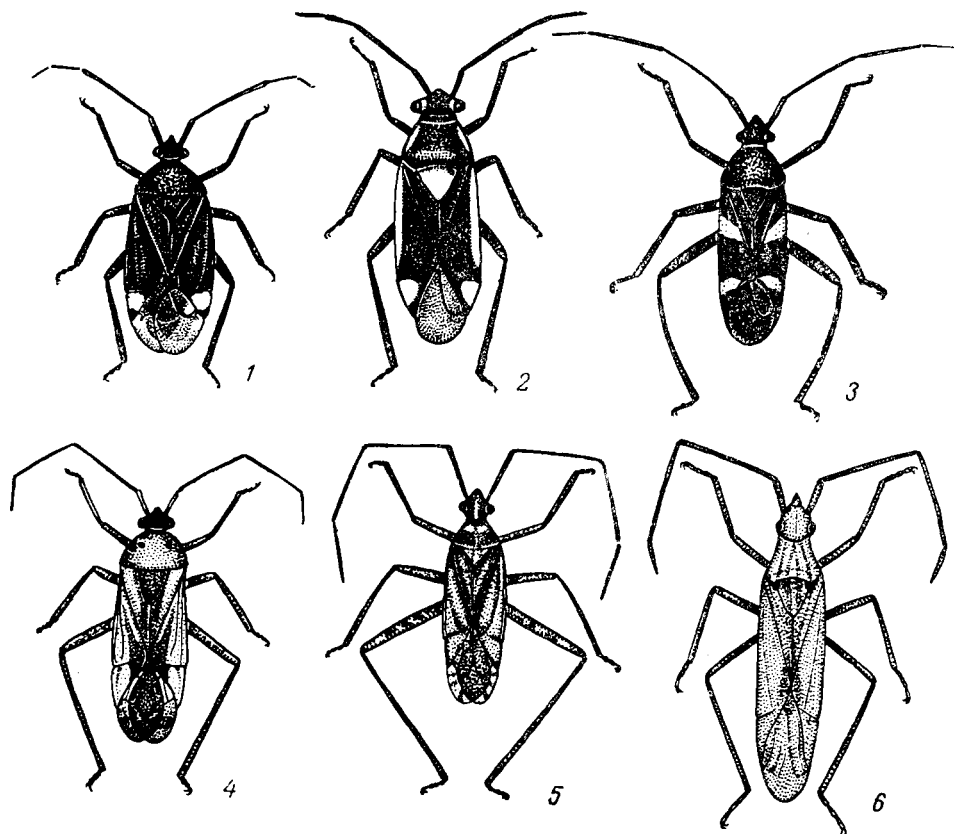


Fig. 522. Heteroptera. Family Miridae (after Esaki).

1, *Deraeocoris ater*; 2, *Capsodes gothicus*; 3, *Adelphocoris albonotatus*; 4, *A. suturalis*; 5, *Phytocoris nowickyi*; 6, *Trigonotylus* sp.

10. 1st antennal segment by 1/5 shorter than width of head. Dorsum with silvery white setae. Greenish yellow or light green; spots on femora, often 2 or 4 spots on pronotum (2 anteriorly and 2 posteriorly), and 2 longitudinal stripe on scutellum black. Corium with more or less developed triangular brownish spot. 3rd, 4th, and apex of 2nd antennal segments sometimes rust-colored 11
- 1st antennal segment by 1/3 shorter than width of head. Dorsum with yellowish setae 12
11. Color mostly greenish. If pronotum with 4 dark spots, anterior spots usually smaller than posterior spots. Comb of aedeagus with 12-16 denticles in the longer row, sizes of denticles decreasing to the base of the comb (Figs. 521: 24). 7-9. – Khab., Amur., Prim., S Sakh., S Kur. – Transpalearctic. – On Fabaceae, seriously injurious to them; feeding on other plants accidental. Late June to mid-

- October. (Fig. 525: 7) ***A. lineolatus** Gz.
- Color more yellowish; head and pronotum sometimes orange in places. Pronotum always with 2 black spots anteriorly, 2 posterior spots smaller than anterior ones or even absent. Comb of aedeagus with 7-9 denticles of equal sizes in longer row (Fig. 521: 23). Smaller: 6-7.5. – S Prim. – Korea, E China. – On Fabaceae. Early July to early September **A. ponghvariensis** Jos.
 - 12. Pronotum entirely pale or with 2 rounded black spots. Pale green, yellowish or slightly reddish; sometimes head, scutellum (entirely or partly), part of clavus and a spot in inner corner of corium blackened. Femora with brown spots; hind femora sometimes brown in major part. 6-8. – S Khab., Amur., Prim., S Sakh., C and S Kur. – Japan, Korea, E China. – On *Trifolium*. Late June to late September. To this species refer records of *A. ticinensis* M.-D. from Far East. (Fig. 522: 4) **A. suturalis** Jak.
 - Pronotum with 2 longitudinal black stripes or black entirely or partly. Whitish green, yellowish, or slightly orange; head, scutellum (entirely or almost entirely), clavus (often entirely), triangular spot in inner part of corium and usually apex of cuneus black. Femora usually dark brown, sometimes tibiae also brown. 7-8.5. – S Sakh., S Kur. – Japan. – On *Trifolium*. Early August to late September. Maybe it is merely a dark form of *A. suturalis* **A. variabilis** Uhl.
 - 13. 2nd antennal segment pale or slightly brownish at apex; its length not more than 2.5 times the width of head. Dorsum red, rufescent, or rarely greenish, but veins of membrane almost always red; pronotum sometimes posteriorly with black band or 4 spots. Hemelytra without dark spots. [p. 820] 7-8. – S Khab., Amur., Prim., S Kur. – Japan, Korea. – On *Lespedeza bicolor*. Late July to mid-September .. **A. piceosetosus** Kulik
 - 2nd antennal segment often black at apex; its length 2.6-3 times the width of head. Green; pronotum without spots or posteriorly with 4 brown spots forming a transverse row and sometimes fused in a band; part of clavus and oblique stripe or triangular spot on corium often brown. Veins of membrane not red. 8-9.5. – S Khab., Amur., Prim., S Sakh., S and C Kur. – From Japan and S China to W Europe, mainly in forest zone. – On various herbs, more often not on Fabaceae. Early July to mid-October **A. quadripunctatus** F (*annulicornis* J. Sahlb., *karafutonis* Mats.)
42. **Phytocoris** Fall. Usually with more or less marked, spotted, brown or red pattern. Aedeagus with a serrate plate, so-called comb. On trees and herbs, zoophytophagous. – 7 species (in USSR more than 50).
1. Dorsum with more or less marked brown or black pattern. 3rd antennal segment black or brown, with pale ring at base. Hemelytra normally developed in both sexes. (Subgenus *Phytocoris* Fall.). On trees 2
 - Dorsum with more or less marked red or rufous pattern. 3rd antennal segment entirely pale. In females, membranes often small and hemelytra hardly reaching or not reaching beyond apex of abdomen. (Subgenus *Ktenocoris* E. Wagn.). On herbs 7
 2. 1st antennal segment (see on all sides) with 3 longitudinal pale stripes (without dark speckles); intervals between stripes often entirely black (Fig. 523: 1). [p. 821] Pronotum, hemelytra and legs with intensely dark pattern. Male genitalia as in Figs. 523: 2-4. 6-7.5. – Amur., Prim. – Forest zone of Palearctic. On deciduous trees. Late July to early August **Ph. populi** L.
 - 1st antennal segment entirely covered with brown speckles on pale background

- or with 1 wide longitudinal pale stripe exteriorly..... 3
3. Pronotum entirely pale, sometimes slightly brownish on sides. Male genitalia as in Figs. 523: 5-7. 6.1-7.7. – S Prim., S Sakh., S Kur. – On deciduous trees, more commonly on *Betula*. Early August to mid-September **Ph. pallidicollis** Kerzh.
- Pronotum black or brown posteriorly or in major part 4

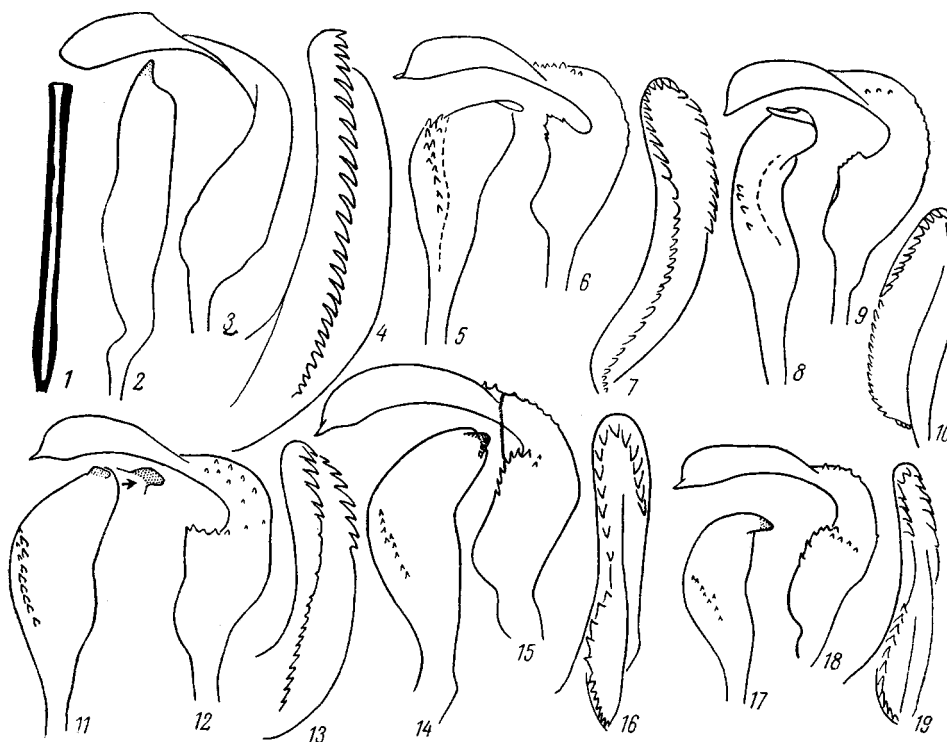


Fig. 523. Heteroptera. Family Miridae (after Kerzhner and original).

1-4, *Phytocoris populi*; 5-7, *Ph. pallidicollis*; 8-10, *Ph. scotinus*; 11-13, *Ph. longipennis*; 14-16, *Ph. intricatus*; 17-19, *Ph. shabliovskii*. 1, 1st antennal segment, external view; 2, 5, 8, 11, 14, 17, right paramere, internal view; 3, 6, 9, 12, 15, 18, left paramere; 4, 7, 10, 13, 16, 19, comb of aedeagus.

4. Femora with dark spots along the whole length, only hind femora narrowly pale at bases. Fore and middle tibiae with dark rings also at their apices. Male genitalia as in Figs. 523: 8-10; comb of aedeagus strongly convex mesally. 6.5-7.7. – S Prim., S Sakh., S Kur. – Japan. – On conifers. Late July to early September..... **Ph. scotinus** Kerzh.
- Femora without dark spots in basal 1/3-1/4 (in *Ph. intricatus* sometimes with sparse, reticulate, brown pattern at base). Apices of fore and middle tibiae (in *Ph. intricatus*, only of middle ones) pale. Comb of aedeagus concave mesally. 5
5. 1st antennal segment as long as or longer than head and pronotum combined. Length of hind tibia 3.5 times the width of pronotum. Male genitalia as in Figs. 523: 11-13. 6.5-7.7. – S Khab., Amur., Prim., Sakh., S Kur. – Forest zone of Palearctic. – On deciduous trees. Mid-July to mid-September..... **Ph. longipennis** Fl.
- 1st antennal segment shorter than head and pronotum combined. Length of hind tibia 3 times the width of pronotum 6
6. Base of cuneus whitish or partly rufescent, not contrasting sharply with the remainder of cuneus. Rings on tibiae usually pale brownish. Male genitalia as in

- Figs. 523: 14-16; hypophysis of right paramere directed obliquely upwards. 6.5-7.2. – Khab., Amur. – Forest zone to W Europe. – On conifers. Early to late July **Ph. intricatus** Fl.
- Base of cuneus almost milky-white, standing out sharply as a pale arched band against the background of hemelytra. Rings on tibiae black. Male genitalia as in Figs. 523: 17-19; parameres relatively small, hypophysis of right one directed laterad. 5.5-6.5. – S Prim. – On deciduous trees. Early July to mid-September.. **Ph. shabliovskii** Kerzh.
 - 7. Length of at least some of erect setae on 1st antennal segment greater than width of the segment. Usually (especially males) with intense, speckled, red pattern. Membrane veins almost always red. Male genital segment without process. 5.5-7.3. – S Khab., Amur., Prim., S Sakh., S Kur. – From Japan to W Europe. – In meadows; probably on Fabaceae. Sometimes swept from trees. Late July to late September. (Fig. 522: 5) **Ph. (K.) nowickyi** Fieb.
 - Length of erect setae on 1st antennal segment equals to width of the segment. Pale yellow with slight rufescent pattern. Membrane veins usually not red. Anterior margin of genital segment opening in the middle with bifurcate (in specimens from Far East, almost trifurcate) process. Males 6.2-7.5, females 5.3-6.5. – Amur., S Prim. (sea coast, on rocks). – Transpalearctic, mainly in steppes, but in Europe up to Sweden and Leningrad Province. – In dry habitats; probably on Fabaceae. In Far East, mid-August to late August **Ph. (K.) insignis** Reut.

Tribe *STENODEMINI*

Usually species with narrow, elongate body; more commonly greenish or yellowish. Living on grasses and sedges, phytophagous. In USSR 9 genera. [p. 822]

43. *Stenodema* Lap. Greenish or yellowish, sometimes in median half brownish. Fertilized females hibernate. On grasses. – 4 species (in USSR about 10); records of *S. virens* L. from Far East erroneous.

1. Hind femora with 2 or 3 subapical teeth. (Subgenus *Brachystira* Fieb.) 2
- Hind femora without teeth. (Subgenus *Stenodema* Lap.). Species from Far East more or less brown in the middle and pale at sides 3
2. Hind femora with 2 teeth close together (Fig. 524: 2). 7-8. – S Khab., Amur., Prim., S Sakh., S Kur. – Widely distributed in major part of Palearctic. (Fig. 525: 6) **S. (B.) calcarata** Fall.
- Hind femora with 3 teeth; two of them large, widely spaced, third tooth small, situated near apical large tooth (Fig. 524: 3). 6.5-8.6. – Mag., Khab., Amur., Prim. – Widely distributed almost in whole Holarctic **S. (B.) trispinosa** Reut.
3. Frons slightly prolonged anteriorly above clypeus and covering dorsally the suture between clypeus and frons. 7-9. – S Khab., Amur., Prim., S Sakh., S Kur.; S Siberia west to Altai. – Korea, NE China, N Mongolia **S. sibirica** Bergr. (*lateralis* J. Sahlb.)
- Apex of frons situated almost in one plane with base of clypeus and not covering dorsally the suture between them. 5.5-7.5. – Mag., ?Kamch., N Khab. – Forest regions of Palearctic (mainly in north and in mountains) **S. holsata** F.

44. *Dolichomiris* Reut. In USSR 1 species.

1. Dirty yellow; 3 longitudinal lines on head, 2-4 stripes on pronotum, and 2 stripes on scutellum brown or reddish. Legs with minute reddish speckles. 9-12.

– S Sakh., S Kur. – Japan. – On *Sasa*, mainly under forest canopy. Mid-July to late August **D. kuwayamai** Miy.

45. **Notostira** Fieb. Fertilized females hibernate. – 1 species (in USSR 4).

1. Dirty yellow or slightly pinkish. In males, 3 longitudinal lines on head, 4 on pronotum, and 2 on scutellum black or brown; hemelytra pale brownish in inner half and paler on margins. In females, dark pattern absent or hardly marked. 7.5-9.8. – S Khab. (extreme west), Amur.; Siberia from Yakutia and Transbaikal to Altai. – NE China, Mongolia. – On grasses **N. sibirica** Golub

46. **Trigonotylus** Fieb. Green; antennae and apices of tibiae usually red. (Fig. 522: 6). On grasses. – 2 species (in USSR more than 5).

1. Aedeagus without spicula (Fig. 524: 4). 1st antennal segment with 3 bright red longitudinal stripes. 5-6. – Kamch., Khab., Amur., Prim., S Sakh., S Kur. – Widely distributed in almost whole Holarctic. – Injurious to cereals. Mid-June to mid-September. {Correct spelling: *caelestialium*} ***T. coelestialium** Kirk.
- Aedeagus with curved spicula (Fig. 524: 5). 1st antennal segment pale green, usually with reddish subapical ring and longitudinal reddish spots but without distinct red stripes. 5.5-6.5. – Chuk., Mag., Kamch., Khab., Amur., Prim., Sakh., S Kur.; E Siberia. – Distribution outside Far East and interrelations with related species *T. ruficornis* Geoffr. need refinement. Old records of *T. ruficornis* from Far East refer to *T. coelestialium* and *T. bianchii*. Late June to early September. {Synonym of *T. viridis* Provancher} **T. bianchii** Kir.

47. **Teratocoris** Fieb. Green, sometimes with black pattern. In marshes and on banks of waterbodies on sedges. – 5 species (in USSR 6). [p. 823]

1. Sides of head between eyes and antenniferous tubercles parallel (Fig. 524: 6). Vertex 4-4.5 times as wide as eye. 1st antennal segment longer than head, pronotum, and scutellum combined, bare. Membrane entirely not transparent, coriaceous. Bright green without dark spots. Males 4.2-4.9; females 5.4-6. – S Kur. (Shikotan I.). – Mid-August **T. depressus** Kerzh.
- Sides of head anterior to eyes converging. Vertex not more than 2.5 times as wide as eye. 1st antennal segment shorter than head, pronotum, and scutellum combined. Membrane entirely or at least partly not coriaceous, transparent .. 2
2. Setae on hind tibiae very short, visible only at high magnification. Male genital segment without process above base of left paramere. Green or yellowish; in males and dark females, head, pronotum, and scutellum partly or almost entirely black; hemelytra with black stripe along commissure. Males 3.4-3.7; females 4.8-6. – S Prim. – Mid-August to late August **T. ussuriensis** Kerzh.
- Length of setae on hind tibiae subequal to width of tibia. Male genital segment with process above base of left paramere. Hemelytra without black stripe 3
3. Process of male genital segment short and wide (Fig. 524: 8) 4
- Process of male genital segment slender, fingerlike (Fig. 524: 7). Legs and antennae not red. Males often with a black stripe on head, pronotum, and scutellum. In females, 1st antennal segment as long as head and pronotum combined. 4.5-6.5. – Mag., Kamch., Khab. (south to Amur River), N Sakh., N Kur. – Northern part of forest zone of Holarctic. – On *Carex* and *Scirpus*. Late June to late August **T. saundersi** Douglas et Scott
4. Left paramere with wider and straight apex of hyhophysis (Fig. 524: 9). Legs and antennae usually partly red. Males usually without black pattern. In females, 1st

- antennal segment as long as head and pronotum combined. 4.5-6.2. – Mag., Kamch., Amur., S Prim., S and C Kur. (Iturup I., Urup I.). – Forest zone of Holarctic. – On *Carex*. Mid-July to late August **T. paludum** J. Sahlb. [p. 824]
- Left paramere with narrower and curved apex of hyhophysis (Fig. 524: 10). Legs and antennae not red. Males with black pattern on head, pronotum, and scutellum. In females, 1st antennal segment 0.75 times as long as head and pronotum combined. 4.5-6.3. – Chuk., Mag. – Holarctic, mainly in north. – Mid-July to late August **T. viridis** Douglas et Scott

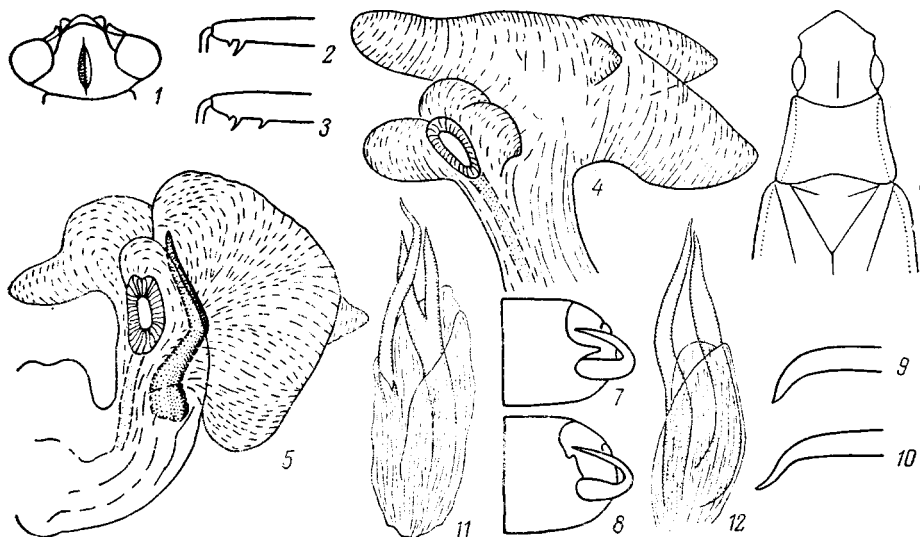


Fig. 524. Heteroptera. Family Miridae (after Vinokurov, Kelton, Kerzhner, and original).

1, *Erimiris tenuicornis*, head, dorsal; 2, 3, apex of hind femur: 2, *Stenodema calcarata*; 3, *S. trispinosa*; 4, 5, inflated aedeagus: 4, *Trigonotylus coelestialium*; 5, *T. bianchii*; 6, *Teratocoris depressus*; anterior part of body; 7, 8, male genital segment, lateral: 7, *T. saundersi*; 8, *T. paludum*; 9, 10, hypophysis of left paramere: 9, *T. paludum*; 10, *T. viridis*; 11, 12, non-inflated aedeagus: 11, *Leptopterna ruficornis*; 12, *L. kerzhneri*.

48. **Leptopterna** Fieb. Males macropterous; females macropterous or brachypterous. Yellow, whitish or orange; usually middle of head and 2 stripes on pronotum and scutellum black; inner margins of hemelytra often brown or black. On grasses. – 2 species (in USSR 9). Records of *L. ferrugata* Fall. and *L. dolabrata* L. from Far East erroneous.

LITERATURE. Vinokurov, N.N. 1982. Mirid bugs of the genus *Leptopterna* (Heteroptera, Miridae) in the fauna of the USSR and adjacent territories. Trudy Zool. Inst. Akad. Nauk SSSR, 105 (1981): 93-115. (In Russian).

1. Males: both spiculae of aedeagus not bifurcate apically (Fig. 524: 12); apex of 2nd and entire 3rd antennal segment black; usually major part of head black or if frons with longitudinal black stripe, it is not bifurcate anteriorly. Females: length of 2nd antennal segment 3.87-4.75, it is 3.7-3.9 times the width of head. 7.2-9. – Mag., Kamch., Khab., Amur., Sakh., S Kur.; Yakutia, Transbaikal, ?Komi ASSR. – Early July to late August **L. kerzhneri** Vin.
- Males: one of the two spiculae of aedeagus bifurcate apically (Fig. 524: 11); 2nd and 3rd antennal segments red; frons with longitudinal black stripe bifurcate apically. Females: length of 2nd antennal segment 3.6-3.82, it is 3-3.2 times the width of head. 7.5-9. – S Khab., Amur., Prim. – Early July to mid-August **L. ruficornis** Vin.

49. *Actitocoris* Reut. (*Actinocoris* Reut.). Monotypic genus. {now the original spelling *Actinocoris* restored}.

1. Dirty yellow with brown-black pattern consisting of spots and longitudinal stripes; club of 2nd antennal segment, 3rd segment (with exception of base), 4th segment, and usually 1st one, also apices of hind femora black. Brachypterous, rarely macropterous. 3.8-6.1. – Mag.; E Siberia, Altai. – Extreme north of Europe, N Mongolia, N America. – On marsh sedges. Early to late July
..... *A. signatus* Reut.

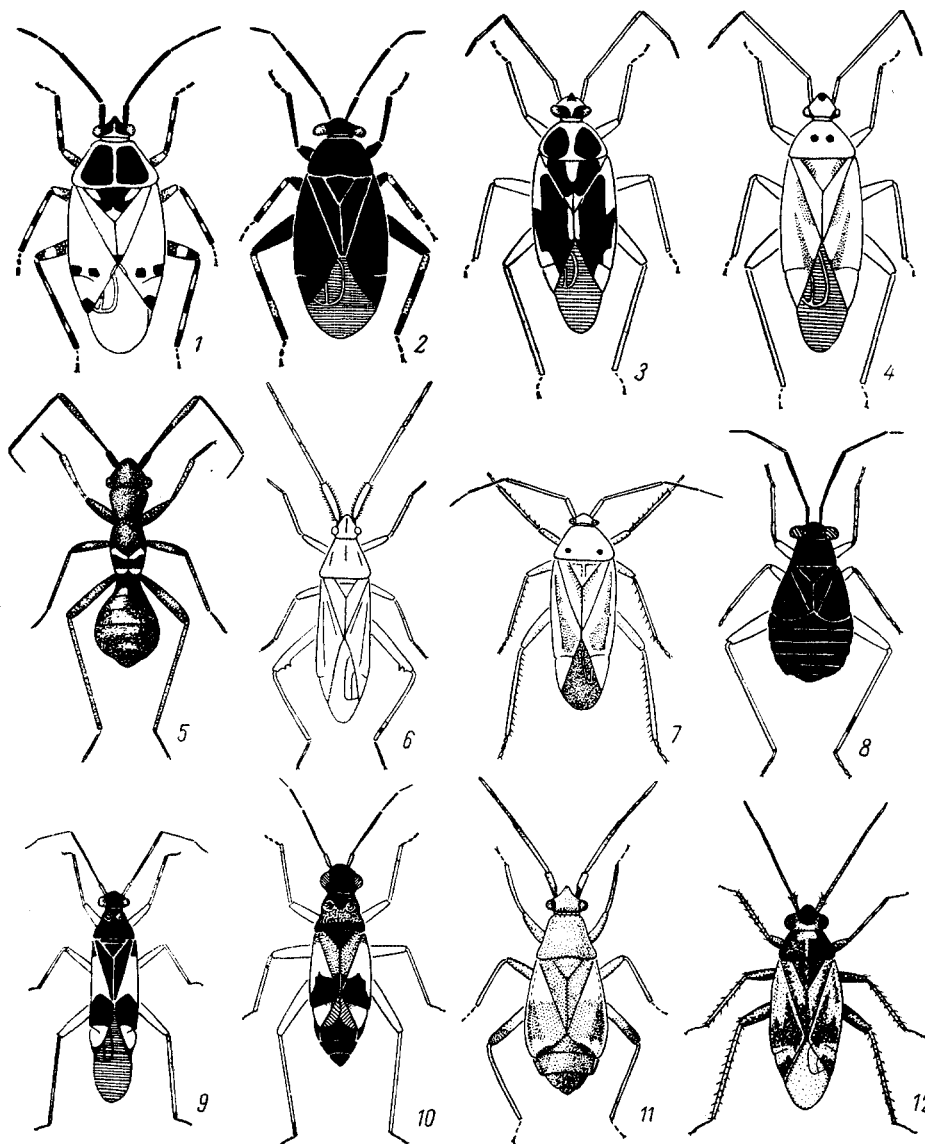


Fig. 525. Heteroptera. Family Miridae (after Wagner, Hahn, Jensen-Haarup, Southwood and Leston).

1, *Deraeocoris punctulatus*; 2, *Capsus wagneri*; 3, 4, *Stenotus binotatus*: 3, male; 4, female; 5, *Myrmecoris gracilis*; 6, *Stenodema calcarata*; 7, *Adelphocoris lineolatus*; 8, *Mecomma ambulans*, female; 9, 10, *Globiceps flavomaculatus*: 9, male, 10, female; 11, *Hallodapus rufescens*; 12, *Monosynamma bohemani*.

Tribe *PITHANINI*

1 genus in the tribe. {Pithanini and Myrmecorini now included in Stenodemini}.

50. *Pithanus* Fieb. – 1 species (in USSR 2).

1. Usually hemelytra strongly shortened. Black; legs, partly antennae, rostrum, in females also connexivum and median stripe on the ventral side of abdomen yellow or reddish; outer margin of corium white; apical 1/4 of hind femora black or brown. 3.5-5.3. – Mag., N Khab. – Forest zone of Holarctic, in Europe only in the north and in W Carpathians. – In meadows. Late June to late July..... *P. hrabei* Stehlik

Tribe *MYRMECORINI*

In USSR 1 genus.

51. *Myrmecoris* Gorski. Resembling ants of genus *Formica*. Pronotum markedly tapering posteriad; mesothorax entirely uncovered, strongly convex between bases of hemelytra. Monotypic genus. [p. 825]

1. Body and apex of 2nd antennal segment black-brown, rarely body partly reddish; legs and antennae usually red. In brachypterous specimens base and posterior margin of hemelytra, in macropterous specimens base and band in the middle of hemelytra white. 4.5-6. – Khab., Amur.; Siberia, European USSR. – W Europe. – In meadows. Mid-July to mid-August. (Fig. 525: 5) *M. gracilis* R. Sahlb.

Tribe *MECISTOSCELINI* {*MECISTOSCELIDINI*}

In USSR 1 genus.

52. *Erimiris* Miy. et Hasegawa. Body elongate; in males hemelytra complete, reaching well beyond apex of abdomen; in females hemelytra either not longer than abdomen, with small membrane, or complete as in males. Monotypic genus. [p. 826]

1. Black; posterior lobe of pronotum yellow, with 2 velvety black, almost square spots; hemelytra whitish, semitransparent, more or less brown along median line of body; legs yellow or reddish; femora with dark spots. 5-6.8. – S Sakh., S Kur. – Japan. – On *Sasa*. Late July to early October *E. tenuicornis* Miy. et Hasegawa

Subfamily HALTICINAE

Appearance varying widely, but most species are characterized by the short-oval body, black color, shortened hemelytra (especially in females) and thickened saltatorial hind femora. Phytophagous. Often regarded as tribe of the subfamily Orthotylinae. – 5 genera, 11 species (in USSR 15 genera, about 80 species).

53. *Myrmecophyes* Fieb. 1 species possibly will be found in Far East (in USSR more than 20 species, most of them in mountains of Soviet Central Asia and Caucasus).

1. Vertex between eyes concave (in anterior view). Black; posterior margin of hem-

elytra (in brachypterous specimens) or wide band on them (in macropterous specimens) white; legs and antennae usually yellowish. 3-5. – Recorded in XIX cent. from the area «from Shilka to Nikolaevsk-na-Amure», possibly will be found in Amur. – From Yakutia and Transbaikal to C Europe. – On grasses, especially on *Elytrigia* spp. Late June to mid-August **M. alboornatus** Stål

54. **Labops** Burm. Hemelytra in males normal, in females usually slightly shorter than abdomen and with rudiments of membrane, less commonly normal. Black; head with 6 yellow spots (lateral to clypeus, under eyes, and on vertex); tibiae in species from Far East yellow in the middle. On grasses and sedges. – 4 species (in USSR 5).

1. Eyes (in anterior view) highly raised above level of median part of vertex, strongly pedunculate (Fig. 526: 1). Hemelytra entirely black, with short adpressed setae and white scales (easily rubbed off!). 4.7-5.5. – Mag., Kamch., Khab., Prim. – Forest zone of Siberia and Europe. – On grasses. Early June to early August **L. sahlbergi** Fall.
- Eyes not raised or weakly raised above level of median part of vertex, less pedunculate (Fig. 526: 2). Hemelytra with semierect or erect setae, without scales or (in *L. burmeisteri*) with a few ones only on border between corium and clavus 2
2. Hemelytra entirely black. Femora of females without pale ring in the middle. 3.5-5.3. – Chuk., Mag., Kamch., N Khab.; Siberia west to Tarbagatai and lower Yenisei, N Urals. – N Mongolia, N America. – On grasses. Mid-July to mid-August **L. burmeisteri** Stål (*nigripes* Reut.)
- Hemelytra yellow on lateral margin. In females, femora, at least hind ones, pale in the middle on ventral side 3
3. In males, pale band occupying entire base of corium at least up to the middle of clavus; in females (sometimes also in males), entire border between corium and clavus pale (Figs. 526: 3-5). Scutellum of females pale apically. 3.3-5. – Mag.; Yakutia, Chita Prov. – Late June to mid-July **L. bami** Kulik
- In males, pale band not touching clavus; females without pale band along border between corium and clavus (Figs. 526: 6, 7). Scutellum in both sexes entirely black. 3.5-4.4. – Khab. (lower Amur). – Mid-June to mid-August. Records of *L. setosus* Reut. from Far East refer to this and the previous species **L. nivchorum** Kerzh.

55. **Euryopcoris** Reut. In USSR 1 species.

1. Black, only lora and narrow stripe along each eye yellow. Hemelytra shortened, rarely normal. Dorsum not pilose. 3-5. – Mag., Khab., Amur., [p. 827] Prim., Sakh. – Transpalearctic, mainly in forest zone. – On herbaceous Fabaceae. Early June to early August **E. nitidus** M.-D.

56. **Orthocephalus** Fieb. – 1 species (in USSR about 10).

1. Black; vertex with 2 yellow spots; femora, tibiae, and 1st antennal segment yellow, in females often brownish or black. Dorsum with black setae and dense silvery scales (easily rubbed off!). Males macropterous, females usually brachypterous. – 4-7. – Khab. (north to Shantarskie Islands), Amur., Prim., Sakh., S Kur. – Japan, Korea, NE China. – On *Artemisia vulgaris* s. l. Early June to early September **O. funestus** Jak.

57. **Strongylocoris** Blanch. Body more or less oval, shining, very shortly pilose. – 1 species (in USSR 4).

1. Black; legs, except tarsi, and usually also head and 1st antennal segment yellow or red. 4-5.5. – S Khab., Amur., Prim. – From Japan to W Europe and NW Africa. – On *Campanula*. Mid-June to early August **S. leucocephalus** L.

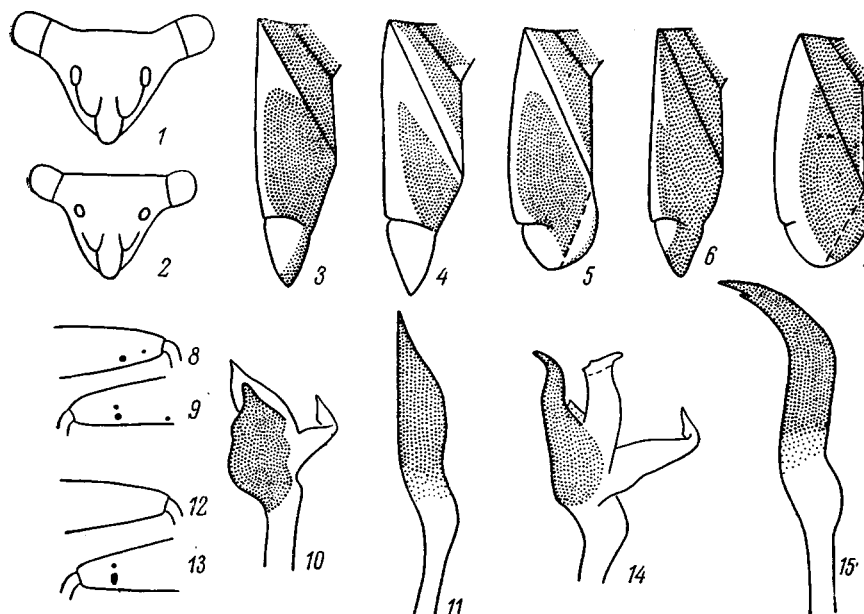


Fig. 526. Heteroptera. Family Miridae (after Vinokurov, Josifov and Kerzhner).

1, 2, head, anterior view: 1, *Labops sahlbergi*; 2, *L. burmeisteri*; 3-7, coloration of coriaceous part of hemelytron and scutellum: 3-5, *L. bami* (3, 4, dark and light males; 5, female); 6, 7, *L. nivchorum* (6, male; 7, female); 8-11, *Halticus bicoloratus*: 8, 9, apex of hind femur, dorsal and ventral; 10, left paramere; 11, right paramere; 12-15, *H. comitans*: 12, 13, apex of hind femur, dorsal and ventral; 14, left paramere; 15, right paramere.

58. **Halticus** Hahn. Small, shining, main color black or dark brown; in species from Far East, 1st antennal segment, 2nd antennal segment entirely or in major part, and also tibiae yellow. – 4 species (in USSR 9).

1. Femora orange or yellow. Pronotum smooth. Both sexes macropterous 2
- Femora (at least hind ones) black with yellow apex. Pronotum in posterior half with rough punctation or fine transverse striae. Body entirely black 3
2. Hind femora dorsally with 2, ventrally with 3 subapical dark spots (Figs. 526: 8, 9). Head (except apex) and prothorax yellow or reddish yellow. [p. 828] Base of hemelytra in addition to setae with silvery scales (easily rubbed off!). Parameres as in Figs. 526: 10, 11. 2.5-3. – S Prim. – On *Trifolium*. Mid-July to early August ..
..... **H. bicoloratus** Kulik
- Hind femora dorsally without dark spots, ventrally with 2 subapical spots (Figs. 526: 12, 13). In specimens from USSR, head and prothorax black. Hemelytra with only simple setae. Parameres as in Figs 526: 14, 15. 2-3. – S Prim. (Yakovlevka). – Korea, E China. – Mid-July to late July **H. comitans** Jos. et Kerzh.
3. Pronotum with fine transverse striae. Head with small yellow spot near inner margin of each eye. In Far East, all coxae, fore and middle femora entirely yellow (but in Khab. specimens are met with all coxae and femora, except apices,

- black). Brachypterous (2-2.5) or macropterous (2.8-3.4). – S Khab., Amur., Prim., S Sakh. – Major part of Palearctic. – On herbaceous Fabaceae, sometimes injurious. Late June to early September ***H. apterus** L.
- Pronotum with dense punctate-rugose sculpture. Head completely black. All coxae and all femora, except apices, black. Always macropterous. 2-3. – Amur. – From Yakutia to W Europe. – On *Galium*. Mid-July to mid-August **H. pusillus** H.-S.

Subfamily ORTHOTYLINAE

Usually elongate, less commonly short-oval. Color varying: green, black, or variegated. Femora and tibiae usually without dark dots. Usually predacious or zoophytophagous. – 14 genera, 35 species (in USSR about 20 genera, 80 species).

59. *Campylotropis* Reut. Monotypic genus.

1. Dirty yellow (females) to reddish brown (males); scutellum, veins of hemelytra, and base of cuneus always pale; head usually with black spots; in dark specimens, pronotum and base of scutellum partly black. Legs and antennae pale; femora with brown spots. Venter of body from almost entirely pale (females) to almost entirely black (males). Parameres as in Figs. 527: 1, 2. 6.8-7.8. – S Prim. – Korea, NE China (Alashan). – Mid-July (in China, from mid-May) **C. jakovlevi** Reut.

60. *Dryophilocoris* Reut. On *Quercus*, in Far East on *Quercus mongolica*. – 2 species (in USSR 3).

1. Pronotum posterior to calli entirely shining. Hemelytra with hardly visible adpressed setae. Black; usually lateral margins of hemelytra yellow, posterior lobe of pronotum at least partly red or orange, posterior margin of head whitish, and legs yellow; but in very dark males body and legs entirely black. Parameres as in Figs. 527: 3-5. 5.7-7.2. – S Prim. – Korea. – Early to late June **D. kanyukovae** Jos. et Kerzh.
- Pronotum posterior to calli mat, but closer to posterior margin shining. Hemelytra with well visible erect setae. Black, only apex of cuneus white and legs dirty yellow. Parameres as in Figs. 527: 6-8. 6.3-6.9. – S Prim. – Korea. – Late June (in Korea, late May). Previously erroneously recorded from USSR as *D. saigusai* Miy. {The true *D. saigusai* subsequently found in Prim. as well} **D. jenjouristi** Jos. et Kerzh.

61. *Ulmocyllus* Seid. Monotypic genus.

1. Black; posterior margin of head, triangular spot between calli and longitudinal stripe on posterior margin of pronotum, scutellum (except base), base and inner margin of corium, cuneus (except apex), and [p. 829] legs (except tarsi) pale: green (only corium), yellow or orange. Parameres as in Figs. 527: 9, 10. 4.8-5.5. – Amur.; Transbaikal. – China, NE Mongolia. – On *Ulmus pumila*. Late June to mid-July **U. virens** Seid. (*Cyllecoris ulmi* Kulik)

62. *Cyllecoris* Hahn. Body black, usually with yellow pattern; hemelytra often brown or reddish. The following areas usually pale: 1st antennal segment, part of pronotum, scutellum (except base), cuneus (except apex), and legs (except tarsi), sometimes also outer margin of corium and oblique stripe along its vein. – 4 species (in USSR 6).

1. Pronotum with horseshoe-shaped black spot occupying calli of pronotum, part of posterior lobe, and sometimes collar; the spot not reaching posterior margin of pronotum. On *Quercus* 2
 - Pronotum entirely black (in dark males) or with 2 wide black stripes along its whole length or on posterior lobe; if with horseshoe-shaped black spot, the lateral parts of the spot reaching posterior margin of pronotum. On *Ulmus* 3
2. Pronotum entirely shining. Collar usually yellow. Yellow band in anterior third of corium usually not continued along its inner margin. Parameres as in Figs. 527: 11, 12. 6.5-7.2. – Amur., Prim. – Japan. – On *Quercus mongolica*. Early June to early July. Records of *C. histrionicus* L. from Far East refer to this species **C. vicarius** Kerzh.
- Pronotum entirely mat. Collar black. Yellow band of corium continued along its inner margin. Parameres as in Figs. 527: 13, 14. 7.2-7.5. – S Prim. (Khasan District). – Apparently on *Quercus dentata*. Early July **C. opacicollis** Kerzh.
3. Anterior margin of femora usually with brown stripe. 1st antennal segment often black, especially in apical part, usually longer than 1. Not only the wide sclerotized branch of aedeagus, but also one of the narrow ones serrate at apex (Fig. 527: 17). Parameres as in Figs. 527: 15, 16. 5.6-7. – S Prim., S Sakh., S Kur. – Japan. – On *Ulmus propinqua*, in Japan on *U. davidiana*. Mid-July to early September **C. nakanishii** Miy.
- Femora without brown stripe. 1st antennal segment usually light red or yellowish, usually shorter than 1. Both narrow sclerotized branches of aedeagus non-serrate (Fig. 527: 20). Parameres as in Figs. 527: 18, 19. 5-6.5. – S Prim.; Transbaikal. – NE China, NE Mongolia. – On *Ulmus pumila*. Early to late July. Record from S Sakh. and S Kur. refers to *C. nakanishii* **C. equestris** Stål (*sordidus* Lindb.)

63. **Globiceps** Lep. et Serv. Black; 1st antennal segment and legs yellow or orange; anterior half of corium (except for very base) and cuneus (except apex) white. Females usually brachypterous, with hemelytra not covering apex of abdomen. – 2 species (in USSR 8). All records of *G. fulvicollis* Jak. (*cruciatus* Reut.) from Mag. and Yakutia refer to *G. salicicola* and from the south of E Siberia to *G. flavomaculatus*.

1. In males, carina at posterior margin of vertex arch-shaped; parameres as in Figs. 527: 21, 22. In females, 2nd antennal segment entirely black; vertex and calli of pronotum markedly more convex. 4.5-7.2. – Amur., S Prim. – Forest zone of Palearctic. – Usually in humid habitats. Early July to mid-August. (Figs. 525: 9, 10) **G. flavomaculatus** De Geer
- In males, carina at posterior margin of vertex straight; parameres as in Figs. 527: 23, 24. In females, 2nd antennal segment in basal half pale; vertex and calli of pronotum almost flat. 4-6.5. – Mag., Kamch., Khab. – North of forest zone of Palearctic. – In marshes. Early July to early August **G. salicicola** Reut.

64. **Mecomma** Fieb. Body black, legs and rostrum yellow or reddish yellow. Females mostly with hemelytra very short and abdomen widened to the middle. – 2 species (in USSR 2 or 3). [p. 831]

1. Calli of pronotum high. (Subgenus *Globicellus* Kir.). In both sexes, hemelytra whitish; almost whole clavus, posterior 2/3 of corium, in macropterous specimens also apex of cuneus smoky-gray. In females, 1st antennal segment and basal half of 2nd segment pale, 2nd antennal segment clavate, shortened hemelytra not widened caudad. Parameres as in Figs. 527: 25, 26. 3-4.5. – Mag., Sakh. – Transpalearctic, mainly in forest zone and in mountains; possibly the same species also in N America. – In marshes, in tussocks of sedges and grasses. Mid-July to late August **M. (G.) dispar** Boh. (*gracilis* Jak., *angustatus* Mats.)



Fig. 527. Heteroptera. Family Miridae (after Wagner, Josifov and Kerzhner, and original).

1, 2, *Campylotropis jakovlevi*; 3-5, *Dryophilocoris kanyukovae*; 6-8, *D. jenjouristi*; 9, 10, *Ulmocyllus virens*; 11, 12, *Cyllocoris vicarius*; 13, 14, *C. opacicollis*; 15-17, *C. nakanishii*; 18-20, *C. equestris*; 21, 22, *Globiceps flavomaculatus*; 23, 24, *G. salicicola*; 25, 26, *Mecomma dispar*; 27, 28, *M. ambulans*; 29, 30, *Cyrtorhinus caricis*; 31, 32, *Mecommopsis cruciata*; 33, 34, *Excentricus planicornis*; 35, 36, *Heterocordylus alutaceus*. 1, 3, 6, 9, 11, 13, 15, 18, 21, 23, 25, 27, 29, 31, 33, 35, right paramere; 2, 4, 5, 7, 8, 10, 12, 14, 16, 19, 22, 24, 26, 28, 30, 32, 34, 36, left paramere; 17, 20, sclerotized branches of aedeagus.

- Calli of pronotum almost flat. (Subgenus *Mecomma* Fieb.). In males, hemelytra whitish, major part of clavus and apex of cuneus smoky-gray or almost black. In females, hemelytra entirely black; if hemelytra shortened, then markedly widened caudad; 1st and 2nd antennal segments black, 2nd antennal segment not

clavate. Parameres as in Figs. 527: 27, 28. 2.8-5. – Mag., Kamch., Khab., Sakh. – Forest zone of Palearctic. – On herbs in meadows, especially under forest canopy. Mid-July to late August. (Fig. 525: 8) **M. ambulans** Fall.

65. **Cyrtorhinus** Fieb. In USSR 1 species.

1. Light green or yellowish; head (except 2 spots near eyes). antennae, pronotum, scutellum, thorax ventrally, and in males also abdomen black; hemelytra usually brownish along commissure. Parameres as in Figs. 527: 29, 30. 3.3-4. – Kamch., Amur., Prim., S Sakh., S Kur. – From Japan to W Europe. – In marshes on sedges. Early July to early September **C. caricis** Fall.

66. **Mecommopsis** Kerzh. Monotypic genus.

1. Pale green or whitish; head, pronotum (except for collar and narrow band behind it), scutellum, clavus (except for its outer margin), curved band in posterior third of corium, 2nd-4th antennal segments, thorax ventrally, and sides of abdomen black or brown; 1st antennal segment often red. In females, black pattern sometimes preserved only partly. Parameres as in Figs. 527: 31, 32. 4.5-5. – S Prim., Sakh., S Kur. – Under canopy of shady forest and in forest edges on herbs. Early August to early September **M. cruciata** Kerzh.

67. **Excentricus** Reut. (*Platytomatocoris* Reut.). In Palearctic 1 species.

1. Elongate; black. Parameres as in Figs. 527: 33, 34. 4.5-5.2. – S Khab., Amur., Prim.; Siberia, Caucasus. – Europe, NW Africa. – In forests on *Rosa myriacantha*, *R. acicularis*. Late June to mid-July **E. planicornis** H.-S.

68. **Heterocordylus** Fieb. – 1 species (in USSR 5).

1. Black; only base of 2nd antennal segment in females sometimes yellow. Hemelytra with very short, adpressed, black setae and white scales. Parameres as in Figs. 527: 35, 36. 4.5-5.2. – S Khab., Prim. – On *Malus* and *Pyrus*. Mid-June to late July **H. alutaceus** Kulik

69. **Blepharidopterus** Fieb. Green. – 3 species (in USSR 4).

1. Posterior corners of pronotum, longitudinal stripe on ventral side of 1st antennal segment, base of 2nd (sometimes also 1st) antennal segments, spot on base of tibia (on knee) black. Male genital segment as in Figs. 528: 1-3. 4.5-5.5. – Mag., Khab., N Sakh. – Forest zone of Palearctic. – On deciduous trees, especially *Betula*, *Salix*, *Alnus*. Late July to late August **B. angulatus** Fall.
- Body, antennae and legs without black spots 2 [p. 832]
2. Process of sensory lobe of left paramere shorter and with 4-6 lobules at apex (Fig. 528: 5). Apex of right paramere with row of 3-4 denticles (Fig. 528: 4). Aedeagus smaller and with very short spicula (Fig. 528: 6). 3.1-4.5. – S Khab., Amur., Prim., S Sakh., S Kur. – E Mongolia. – On *Ulmus* spp. Late June to early September **B. ulmicola** Kerzh.
- Process of sensory lobe of left paramere longer and almost always with 3 lobules at apex (Fig. 528: 8). Apex of right paramere beak-shaped, with 2-3 superposed denticles (Fig. 528: 7). Aedeagus with long spicula (Fig. 528: 9). 4-4.8. – Amur., Prim. – Transpalearctic, mainly in forest zone. – On *Salix* and *Populus*. Early July to early August **B. diaphanus** Kbm.

70. *Zanchius* Dist. In USSR 1 species.

1. Pale green; geniculate spot on 1st antennal segment ventrally and part of 2nd segment red; apex of cuneus, inner corner of corium, sides of head behind eyes, and scutellum with orange or red spot each. Parameres and aedeagus as in Figs. 528: 10-12. 4.3-5. – S Prim. – On *Juglans*, *Quercus*, and other deciduous trees. Late July to late August *Z. tarasovi* Kerzh.

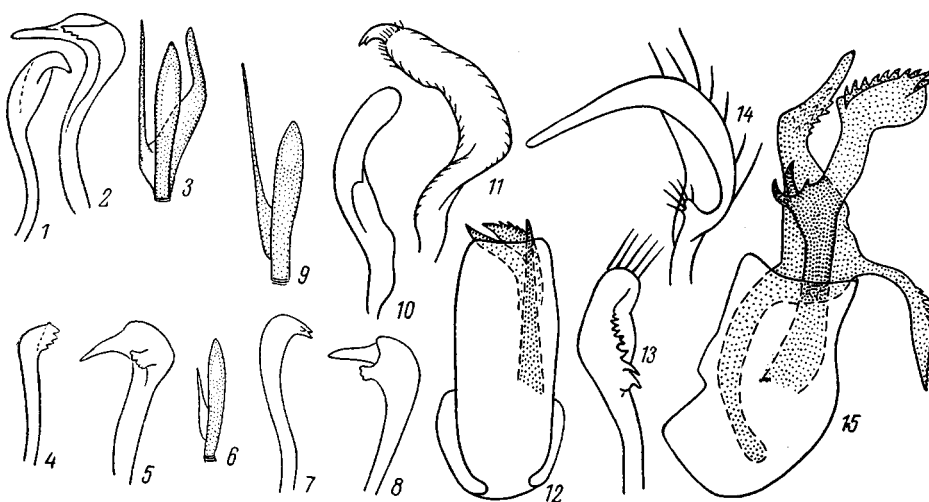


Fig. 528. Heteroptera. Family Miridae (after Kerzhner).

1-3, *Blepharidopterus angulatus*; 4-6, *B. ulmicola*; 7-9, *B. diaphanus*; 10-12, *Zanchius tarasovi*; 13-15, *Ulmica baicalica*.
1, 4, 7, 10, 13, right paramere; 2, 5, 8, 11, 14, left paramere; 3, 6, 9, 12, 15, aedeagus.

71. *Ulmica* Kerzh. Monotypic genus.

1. Green with the following black markings: 2 arch-shaped bands on ventral side of 1st antennal segment, a ring near base and another one at apex of 2nd antennal segment, 3rd (except base) and 4th antennal segments, stripe on anterior margin of femur, base and outer margin of tibia, 3rd tarsal segment. Parameres and aedeagus as in Figs. 528: 13-15. 4.6-5.4. – Amur.; Transbaikal. – NE China, E Mongolia. – On *Ulmus pumila*. Late June to mid-July
..... *U. baicalica* Kulik (*Malacocoris baicalicus*)

72. *Orthotylus* Fieb. Usually elongate-oval and green, less commonly with marked brown pattern or brown in major part. – 14-15 species (in USSR about 35). [p. 833]

1. Pronotum with only pale semierect setae 2
- Pronotum with erect black and brown setae with admixture of more or less dense white setae or scales (easily rubbed off) 8
2. Scutellum pale with black or brown median stripe or triangle. Vertex in males as wide as an eye, in females 1.4 times as wide as an eye. (Subgenus *Neomecomma* Southw.). Green; usually head or clypeus mesally, sometimes calli of pronotum and hemelytra along commissure brown. Parameres as in Figs. 529: 1, 2. 4.8-5.1. – S Prim., S Sakh. – Transpalearctic. – On *Populus tremula*, *P. laurifolia*. Early to late August *O. (N.) bilineatus* Fall.
- Scutellum unicolorous, pale or dark, or dark laterally and pale mesally. Vertex in

- males not less than 1.1 times, in females not less than 1.6 times as wide as an eye. (Subgenus *Orthotylus* Fieb.) 3
3. Dorsum with prevalence of black or brown color; if dorsum pale (part of females), pronotum with 2 longitudinal brown stripes 4
- Dorsum entirely or almost entirely green 5
4. Males: head black, narrowly yellow near eyes; pronotum in anterior part entirely black, in posterior part with yellow median stripe or also yellow laterally; scutellum entirely black. Females: head yellow with black median spot on frons, vertex, clypeus and adjacent to it parts of genae and lora. Parameres as in Figs. 529: 9, 10. 4.6-5.5. – Chuk., Mag., Kamch., N Khab. – N Eurasia. – On *Salix*. Late July to mid-September **O. boreellus** Zett.
- Males: only the whole clypeus and dorsal part of head mesally black; pronotum yellow at anterior and lateral margins and mesally; scutellum with longitudinal yellow stripe. Females: head entirely pale or only base of clypeus brown. Parameres as in Figs. 529: 7, 8. 4.8-5.7. – S Sakh., S Kur. – Japan. – On *Salix udensis* (*sachalinensis*). Mid-July to mid-August **O. pallens** Mats. (*emiliae* Kerzh.)
5. 1st antennal segment pale with black longitudinal stripe ventrally. Hemelytra light green, translucent, strongly shining. Parameres as in Figs. 529: 3, 4. 4-5. – S Prim. – Transpalearctic. – On deciduous trees. Late July to early August **O. nassatus** F.
- 1st antennal segment from yellow to black (in males), but without well-defined black stripe ventrally. Hemelytra more or less dark green, sometimes with yellow margin, not translucent, dull shining. On *Salix* 6
6. Larger: 5.3-6.7. Veins of membrane bright yellow. Parameres as in Figs. 529: 5, 6. – S Khab., Amur., Prim., Sakh., S Kur. (Iturup I.). {Record from S Kur. refers to *O. kurilensis* Kerzh.} – Forest zone of Palearctic. – Late June to mid-August. Records of *O. marginalis* Reut. from Far East refer to this species **O. interpositus** Schmidt
- Not longer than 5.3; in case that veins of membrane bright green, not longer than 4.8 7
7. Veins of membrane yellow, brown, or greenish yellow. Parameres as in Figs. 529: 11-13. 4.7-5.3. – Khab., Amur., Prim.; E Siberia. – Mid-July to late August **O. salicis** Jak.
- Veins of membrane bright green. Parameres as in Figs. 529: 14-16. 3.9-4.8. – S Khab., Amur., Prim. – Early July to early August **O. riparius** Kulik
8. Spines on tibiae yellowish or light brown. (Subgenus *Melanotrichus* Reut.) 9
- Spines on tibiae black or dark brown 10
9. Cells of membrane green or with green spots. Hemelytra and pronotum with spots of easily rubbed off silvery scales. Green. Parameres as in Figs. 529: 19-21. 3-4. – S Khab., Amur., Prim., Sakh., S Kur. – Major part of Holarctic. – On chenopodiaceous weeds (*Chenopodium*, *Atriplex*). Mid-June to early September .. **O. (M.) flavosparsus** C. Sahlb. (*parallelus* Lindb.)
- Membrane entirely gray. Easily rubbed off silvery setae on pronotum and hemelytra distributed uniformly. Green. Parameres as in Figs. 529: 22-26. 2.7-3.1. – S Prim. – From Korea to Bulgaria. – In Prim. [p. 834] on seaboard salt-marshes on *Salicornia europaea*. Late May to mid-September **O. (M.) parvulus** Reut. (*namphoensis* Jos.)
10. Length of black setae on dorsal side of body greater than width of 1st antennal segment. (Subgenus ?*Neopachylops* E. Wagn.). Green, with thick black spines on tibiae. Parameres as in Figs. 529: 17, 18. 3.8-4.8. – Amur.; USSR, mainly in steppes, to Ukraine. – Mongolia. – On *Spiraea* (in Amur. on *S. media*). Mid-July to mid-August **O. (?N.) oschanini** Reut. [p. 835]

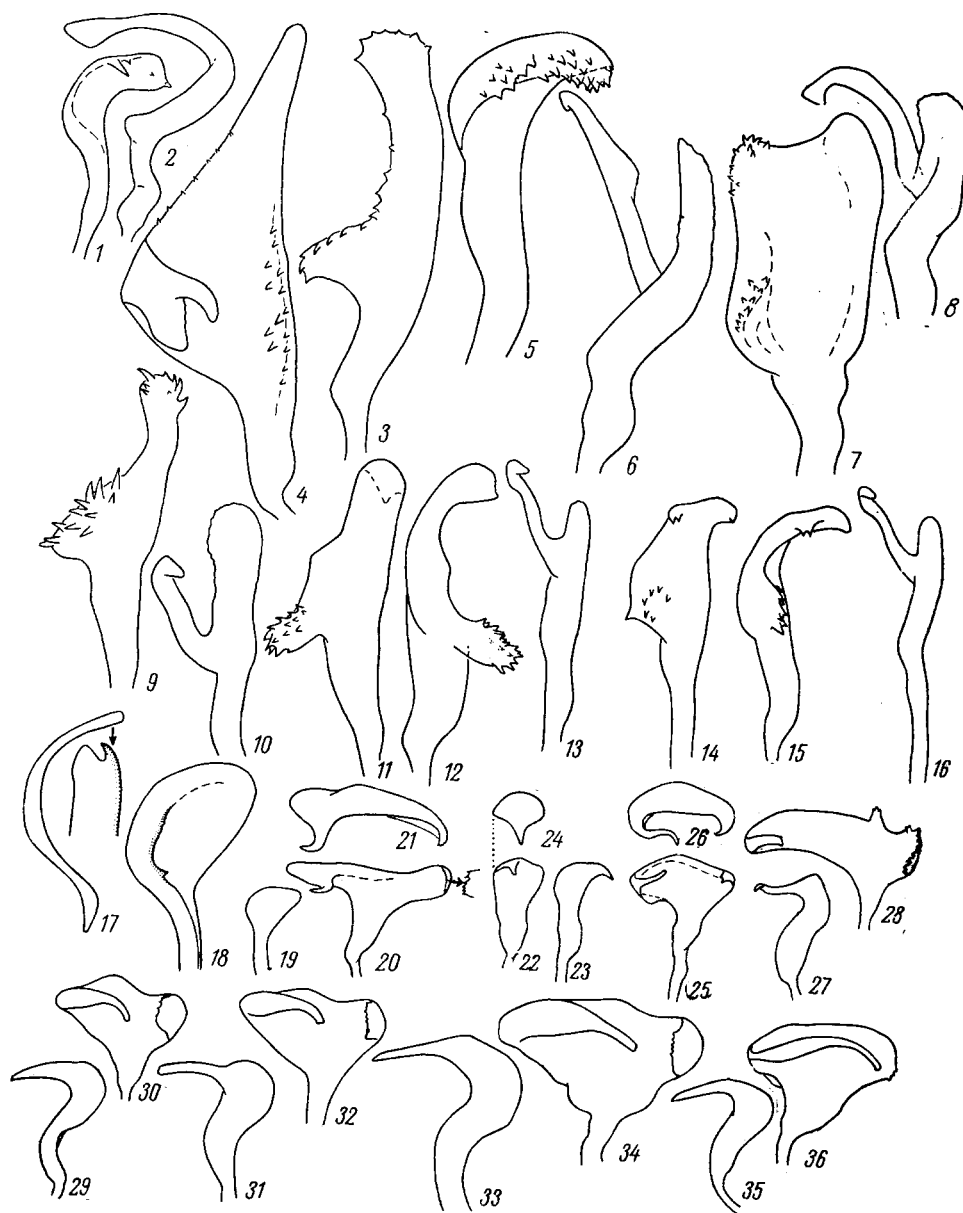


Fig. 529. Heteroptera. Family Miridae (original).

1, 2, *Orthotylus bilineatus*; 3, 4, *O. nassatus*; 5, 6, *O. interpositus*; 7, 8, *O. pallens*; 9, 10, *O. boreellus*; 11-13, *O. salicis*; 14-16, *O. riparius*; 17, 18, *O. oschanini*; 19-21, *O. flavosparsus*; 22-26, *O. parvulus*; 27, 28, *O. lenensis*; 29, 30, *O. algens*; 31, 32, *O. bermani*; 33, 34, *O. artemisiae*; 35, 36, *O. discolor*. 1, 3, 5, 7, 9, 11, 12, 14, 15, 17, 19, 22-24, 27, 29, 31, 33, 35, right paramere; 2, 4, 6, 8, 10, 13, 16, 18, 20, 21, 25, 26, 28, 30, 32, 34, 36, left paramere.

- Length of black setae on dorsal side of body less than or rarely equal to width of 1st antennal segment. (Subgenus *Labopidea* Uhl.= *Lindbergocapsus* E. Wagn.= *Labopidicola* Kelton) 11
- 11. Rostrum hardly reaching beyond fore coxae. Vertex in males 3 times, in females 4 times as wide as an eye. In brachypterous females, membrane vestigial, with-

- out cells. Green. Parameres as in Figs. 529: 27, 28. 2.9-4.3. – Chuk., Kamch.; Yakutia, south of Siberia, C and SE Kazakhstan, Polar Urals, extreme NE of European USSR. – N America. – On *Allium*, for instance *A. ochotense*. Mid-June to late August **O. (L.) lenensis** Lindb. (*lenaensis* E. Wagn., *L. idahoensis* Knight)
- Rostrum reaching or almost reaching middle or even hind coxae. Vertex in males not more than 2.2 times, in females not more than 2.8 times as wide as an eye. In females, hemelytra sometimes not covering apex of abdomen, but membranes developed, each with 2 cells (except for *O. bermani*) 12
12. Setae on head and anterior lobe of pronotum only pale; hemelytra and posterior lobe of pronotum with well visible pale setae mixed with dark brown or black ones. In females, hemelytra always markedly reaching beyond apex of abdomen; 2nd antennal segment longer than width of pronotum. Green. Parameres as in Figs. 529: 29, 30. 3-4.7. – Chuk. (SW), Mag.; E Yakutia. – Early June to mid-July **O. (L.) algens** Vin.
- Entire dorsum with black setae, without pale setae or with hardly visible ones on hemelytra only. In females, hemelytra usually not reaching beyond apex of abdomen; 2nd antennal segment not longer than width of pronotum 13
13. Males dark olive-green; parameres as in Figs. 529: 31, 32. In females, membranes vestigial, not overlapping, without cells; color green. Males 4.3-5; females 3-3.7. – Chuk. (including Wrangel I.), Kamch. – In tundra on *Oxytropis*. Mid-July to late July **O. (L.) bermani** Kerzh.
- Males either light green or not green. In females, membranes overlapping, with cells 14
14. Both sexes green. In females, length of hind tibia 2.1-2.3. Parameres as in Figs. 529: 33, 34. Males 4.5-5; females 3.3-4.5. – Chuk.? – Verified records only from the north, from the Polar Urals to mouth of Yana, records from estuary of Kolyma erroneous. {Records from Chuk. and Kolyma estuary now confirmed}. On *Artemisia tilesii*. Mid-July to mid-August **O. (L.) artemisiae** J. Sahlb.
- In males, head (sometimes except posterior margin), pronotum, scutellum (except for 2 spots at base and sometimes median stripe), abdomen, thorax ventrally, antennae, and legs dark brown to black; hemelytra dirty gray or light brown. Females dirty green or green, with hind tibia not longer than 1.8. Parameres as in Figs. 529: 35, 36. 3-3.9. – Chuk. – Extreme NE of Europe, north of Asia and America. – In tundra on herbs. Mid-July to early August **O. (L.) discolor** J. Sahlb.

Subfamily PHYLINAE

Small, rarely medium-sized. Characteristic structure of male genitalia as follows: right paramere flat, usually leaf-like, its hypophysis as a small hard process; left paramere with more or less parallel sensory lobe and hypophysis; sensory lobe often with tooth or projection which is more or less parallel to the apical process of the hypophysis; aedeagus usually strongly sclerotized, C- or S-shaped; theca fused with wall of genital segment. Usually phytophagous, often with narrow food specialization; less commonly zoophytophagous or predacious. Hibernating as eggs (with very rare exception). – The largest subfamily.

Tribe PILOPHORINI

Elongate or almost rounded; dorsum with scattered or forming bands silvery setae. Aedeagus with characteristic «beard» [p. 836] in apical part (Figs. 530: 3, 6, 9, 12, 16). On trees and bushes. Predacious. In USSR 2 genera.

73. *Hypseloecus* Reut. (*Pherolepis* Kulik). Black or brown-black; legs and antennae usually at least partly yellow or red. – 4 species (in USSR 5). {Now *Pherolepis* treated as a separate genus to which all the Far East species belong}

1. The whole surface of hemelytra, except membranes, covered with long pale setae and silvery scales. Pronotum with setae, at least very short ones. 2nd antennal segment shorter than width of head. Recurrent branch of aedeagus with 2 lateral processes or small denticles (Figs. 530: 3, 6). On *Salix*, particularly on *S. rorida* 2



Fig. 530. Heteroptera. Family Miridae (after Wagner and Kerzhner).

1-3, *Hypseloecus amplus*; 4-6, *H. kiritshenkoi*; 7-9, *H. aenescens*; 10-12, *H. fasciatus*; 13, *Pilophorus clavatus*; 14-16, *P. pseudoperplexus*. 1, 4, 7, 10, right paramere; 2, 5, 8, 11, left paramere; 3, 6, 9, 12, 16, aedeagus; 13, position of bands of silvery hairs on corium and clavus; 14, male, dorsal; 15, male antenna.

- Cuneus and posterior part of corium sharply differing in pubescence from remainder of hemelytra: they are bare or only with extremely short setae. Pronotum bare. Length of 2nd antennal segment greater than or equal to width of head. Recurrent branch of aedeagus with 1 lateral process (Figs. 530: 9, 12). On *Ulmus* 3
- 2. Setae on pronotum (to examine in anterior dorsal view) hardly visible, shorter than width of 2nd antennal segment at base. Legs, 1st antennal segment, and base of 2nd segment dirty yellow-brown. Membrane projecting beyond apex of cuneus by less than half its length. Scutellum mesally and basally with distinctly more sparse pubescence than on lateral margins. Male genitalia as in Figs. 530: 1-3. 3.3-4.2. – Amur., S Prim. – Korea. – Late July to early August

- **H. amplius** Kulik [p. 837]
 – Setae on pronotum longer than width of 2nd antennal segment. Legs, 1st and base of 2nd antennal segments red. Membrane projecting beyond apex of cuneus by half its length. Scutellum with almost uniform pubescence. Male genitalia as in Figs. 530: 4-6. 4-4.3. – S Prim. – Early August to mid-August
 **H. kiritshenkoi** Kerzh.
 3. Head pilose (setae easily rubbed off!). Scales on hemelytra almost uniformly scattered over area from base of hemelytra almost to level of apex of clavus. Hemelytra with very short simple setae in addition to scales. Male genitalia as in Figs. 530: 7-9. 3-3.7. – S Prim.; Transbaikal. – NE China, Mongolia. – On *Ulmus pumila*. Early August **H. aenescens** Reut. (*atrans* Kulik)
 – Head bare. Scales on hemelytra assembled into spots forming a band; anterior margin of the band slightly protruding anteriorly beyond apex of scutellum and its posterior margin level with middle of commissure; base of hemelytra bare. Hemelytra without simple setae. Male genitalia as in Figs. 530: 10-12. 3.2-3.8. – S Prim. – On *Ulmus japonica*. Early August to mid-August **H. fasciatus** Kerzh.

74. **Pilophorus** Hahn. Head, pronotum, and scutellum usually black; hemelytra usually brown. On trees and bushes (but *P. okamotoi* on herbs), often together with ants. Zoophytophagous. – 12 species (in USSR 17), records of *P. perplexus* Douglas et Scott from Prim. erroneous.

1. Corium distal to posterior band of silvery setae entirely shining 2
- Corium distal to posterior band of silvery setae shining only in outer half 3
2. Sides of pronotum straight. Posterior band of silvery setae continuous; hemelytra proximal to the band rufescent. Cuneus with small spot of silvery setae. 4-5. – Possibly will be found in Amur. and N Khab. – From Yakutia and Transbaikal to W Europe. – On *Pinus sylvestris*. Late July to late August .. **P. cinnamopterus** Kbm.
- Sides of pronotum notched. Posterior band of silvery setae widely interrupted on endocorium; hemelytra proximal to the band dark brown. Cuneus without silvery setae. 3-3.5. – S Prim. – Japan. – Early to late August **P. lucidus** Lnv.
3. Band of silvery setae on clavus situated distinctly more anteriorly than posterior band on corium (Fig. 530: 13). 4.2-5.7. – Kamch., Khab., Amur., Prim., S Sakh. – Forest and partly steppe zones of Palearctic. – On deciduous trees and bushes, especially on *Salix*. Early July to mid-September **P. clavatus** L.
- Bands of silvery setae on clavus and corium more or less on one line (Fig. 530: 14) 4
4. Pronotum twice as wide as long; its sides straight (*P. validicornis*) or almost straight (*P. miyamotoi*). 4th antennal segment black only in apical part; 3rd segment often entirely white 5
- Pronotum less than twice as wide as long; its sides usually notched at least slightly. 4th antennal segment black more than in half its length; 3rd segment almost always darkened apically 6
5. 2nd antennal segment in the thickest place twice as thick as hind tibia, only 6-8 times as long as thick (with setae). Scutellum with converging at apex lateral stripes of silvery setae. 3.5-3.75. – S Sakh., S Kur. (Kunashir I.). – On *Picea glehnii*. Mid-August to late August **P. validicornis** Kerzh.
- 2nd antennal segment not thicker or at most 1.3 times as thick as hind tibia, 10-12 times as long as thick. Scutellum with 3 spots of silvery setae. 3.8-4.5. – S Prim. (Khasan District). – Japan. – On *Pinus densiflora*. Early August to mid-August **P. miyamotoi** Lnv.

6. The whole surface of head, pronotum, scutellum, and also coriaceous surface of hemelytra entirely or in large part (*P. niger*) with erect, long or short setae (to examine in lateral view at high [p. 838] magnification). Anterior margin of hind femora with erect, brown, short setae 7
 - Dorsum with short adpressed setae, and only with a few erect setae on posterior margin of head, sometimes on anterior margin of pronotum and on hemelytra distal to posterior band of silvery setae. Anterior margin of hind femora without erect setae 9
7. Body 2.3-2.45 times as long as wide. Hemelytra usually not reaching or hardly reaching beyond apex of abdomen, strongly widened to posterior third. Pronotum strongly shining; 2nd antennal segment as in *P. setulosus*. 3.3-4.3. – Amur. – From E Siberia to W Europe. – On deciduous trees. Early July (in other regions, late June to early September) **P. confusus** Kbm.
 - Body 2.7-3 times as long as wide. Hemelytra reaching well beyond apex of abdomen, less widened 8
8. 2nd antennal segment slightly clavate, its thickened part black, rather sharply differing from pale basal part. Cuneus at base with spot of silvery setae in the form of elongate band prolonged on corium. Pronotum moderately shining. 4.4-5. – S Sakh., S Kur. – Japan. – On deciduous trees, especially on *Salix*. Late July to early September **P. setulosus** Horv.
 - 2nd antennal segment not thickened or almost not thickened apically, its color from yellowish or reddish brown in basal part grades to dark brown or black in apical part. Cuneus in inner corner with small rounded spot of silvery setae not prolonged on corium. Pronotum smooth, strongly shining. 3.9-4.9. – S Prim. – Japan, E Mongolia. – On deciduous trees. Late July to late August **P. niger** Popp.
9. Cuneus with a band of silvery setae only in inner half of its base. 1st antennal segment whitish yellow ventrally, usually dirty red or brown dorsally. 3.5-4.2. – S Prim. (Khasan District). – Korea. – On *Quercus dentata*. Late July to late August ... **P. choui** Jos.
 - Cuneus with a band of silvery setae from outer margin to inner corner. 1st antennal segment light yellow ventrally and dorsally 10
10. 2nd antennal segment slightly clavate. Hind tibiae more or less curved. Vertex in males 1.7-1.8 times, in females twice as wide as an eye. 2nd antennal segment 3 times as long as 3rd one. 3.7-5. – S Prim. – Japan. – On deciduous trees, more commonly on *Alnus*. Late July to late August **P. erraticus** Lnv.
 - 2nd antennal segment not clavate (Fig. 530: 15). Hind tibiae straight 11
11. Vertex in males 1.25-1.45 times, in females 1.5-1.7 times as wide as an eye. 2nd antennal segment 2.6-3 times as long as 3rd one; 3rd segment narrowly darkened at apex; 4th segment narrowly pale at base (Fig. 530: 15). Aedeagus as in Fig. 530: 16. 3.8-4.6. – S Prim. – Japan. – On deciduous trees. Early to late August. (Fig. 530: 14) **P. pseudoperplexus** Jos. (*oculatus* Kerzh., syn. n.)
 - Vertex in males slightly less than twice, in females 2.1-2.3 times as wide as an eye. 2nd antennal segment twice as long as 3rd one; 3rd segment black approximately in half its length; 4th segment entirely black. 3.5-4.2. – S Prim. – Korea. – In moderately humid meadows under herbs. Late August to mid-September (in Korea, early July to early October) **P. okamotoi** Miy. et Lee

Tribe *HALLODAPINI*

Small, with elongate body and often bright coloration. In most species females, in some species also males usually brachypterous. Many species, especially their females, antlike. Aedeagus slender, long, strongly curved and twisted. – 3 genera, 6 species (in USSR 11 genera, 23 species).

75. *Acrorrhinium* Noualh. (*Cinnamus* Dist.). In USSR 1 species.

1. Body elongate; antennae very long. Dark brown; most of scutellum, oblique stripe on each hemelytron, and cuneus black; apex of scutellum (or longitudinal [p. 839] stripe on scutellum), area of hemelytra adjacent to apex of scutellum, diffuse subapical spot on corium, middle and hind coxae and trochanters, a small spot on posterior margin of each middle and hind femur more or less whitish. Male genitalia as in Figs. 531: 1-4. 5.4-5.6. – S Prim. (Khasan District). – Korea. – On bark and branches of *Quercus* and other deciduous trees. Early August to early September **A. inexpectatum** Jos.

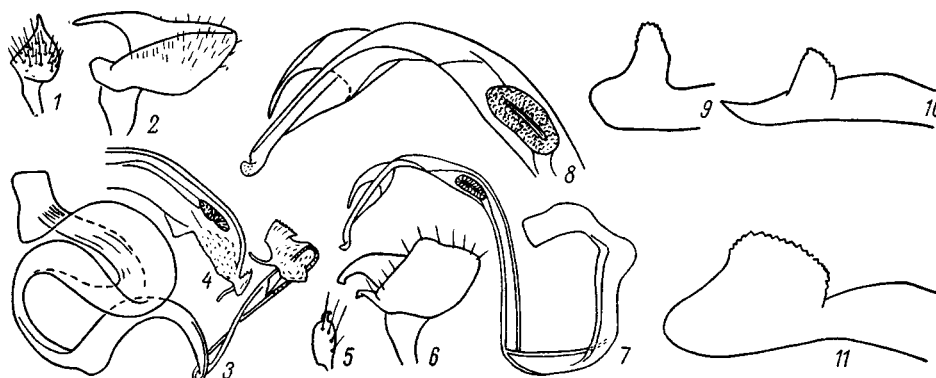


Fig. 531. Heteroptera. Family Miridae (after Josifov, Kerzhner, and original).

1-4, *Acrorrhinium inexpectatum*; 5-8, *Hallodapus linnavuorii*; 9, *H. pumilus*; 10, *H. rufescens*; 11, *H. sibiricus*. 1, 5, right paramere; 2, 6, left paramere; 3, 7, aedeagus; 4, 8-11, its apex.

76. *Hallodapus* Fieb. (*Allodapus* Fieb.). In brachypterous specimens, hemelytra without membrane, covering 2/3 of abdominal length. In dry habitats, mostly on the ground under plants. Living on grasses. – 4 species (in USSR 7).

1. Pronotum entirely smooth. Legs orange-yellow. 1st antennal segment with white, red-bordered, longitudinal stripe on inner side. Ventral margin of frons bordered with white band. Males, rarely females macropterous, their hemelytra brown or red-brown, with 2 white bands: anterior one intersecting hemelytra and posterior one not reaching inner margin of hemelytra; head and thorax from yellow to brown. Females usually brachypterous, with entire anterior part of body and hemelytra light yellow. Dorsum entirely shining. Male genitalia as in Figs. 531: 5-8. 3.3-3.6 (in Japan 2.7-2.8). – S Kur. (Kunashir I.). – Japan. – Early August to mid-September **H. linnavuorii** Miy.
- Pronotum with irregular wrinkles at least posteriorly. Femora and dorsum brown-red or partly black. Hemelytra in both sexes shortened, less often complete, with 2 white bands, both not reaching inner margin of hemelytra 2
2. Hemelytra in anterior half entirely or in major part dull. Anterior pale spot usually prolonged beyond middle of clavus in the form of narrow stripe. Apex of aedeagus as in Fig. 531: 9. Brachypterous 2.6-3.5; macropterous females 3.8-4. – S Prim.; south of E Siberia (up to Yenisei). – Mongolia. – On dry slopes and seaboard sands under grasses, in particular *Leymus mollis*. Early July to mid-September **H. pumilus** Horv.
- Hemelytra shining almost entirely. Anterior pale spot on hemelytra hardly prolonged on outer margin of clavus 3

3. Apex of aedeagus with narrow lateral process (Fig. 531: 10). Brachypterous 2.7-3.6; macropterous 4-4.6. – Mag. – Forest zone of Palearctic (chiefly its northern part), in Amur basin replaced by *H. sibiricus*. – In meadows. Early July to late August. (Fig. 525: 11) **H. rufescens** Burm.
- Apex of aedeagus with wide lateral process (Fig. 531: 11). Brachypterous 3.4-3.7; macropterous 4.5-5.2. – Amur., S Prim.; Transbaikal. – Mid-July to late August ..
..... **H. sibiricus** Popp. [p. 840]

77. **Systellonotus** Fieb. Males macropterous; females brachypterous, closely resembling ants. – 1 species (in USSR 5).

1. Body brown. In males, hemelytra yellow-brown, each with 2 white spots; anterior spots of hemelytra almost fusing in the middle of commissure; cuneus reddish black. In females, abbreviated hemelytra only twice as long as scutellum, brown or yellow-brown, with contiguous to outer margin white spot in the middle. 3.7-4.5. – S Khab., Amur., Prim., S Sakh., S Kur. – Japan. – In meadows on the ground. Mid-June to early August **S. malaisei** Lindb.

Tribe *PHYLINI*

Small, more rarely medium-sized; elongate or rounded. Coloration varying. Aedeagus C- or S-shaped, usually with well marked secondary gonopore. Living on herbs, grasses, and trees; phytophagous or zoophytophagous. – 26 genera. 79 species (in USSR about 70 genera, more than 300 species).

78. **Tytthus** Fieb. Pale yellow; head (except for 2 small spots close to eyes), pronotum in great part, scutellum, antennae (except for apex of 1st segment), and sides of thorax and abdomen ventrally black or dark brown. Femora sometimes orange. In humid habitats under grasses and sedges; feeding on eggs of leafhoppers. 2 species (in USSR 3).

1. Pronotum with more or less triangular yellow spot or band on anterior margin, so that its anterior margin entirely pale. Bases of tibiae pale. 2.5-2.9. – Mag., Kamch., N Khab., Amur., S Sakh. – Forest zone of Palearctic. – Late June to early September **T. pygmaeus** Zett.
- Pronotum close to anterior margin with 2 transverse yellow spots contiguous to the margin or slightly distant from it, so that anterior margin black at least in the middle. Base of tibia with dark spot on the knee. 2.6-3.2. – S Prim. – Korea. – Late August to late September **T. koreanus** Jos. et Kerzh.

79. **Eurycolpus** Reut. In USSR 1 species.

1. Orange-yellow or lemon-yellow; membrane dark smoky; apices of rostrum and tarsi and sometimes hemelytra along commissure brownish. Hemelytra with short black setae. Male genitalia as in Figs. 532: 1-4. 3.5-4.3. – Amur.; south of E Siberia, Tien Shan, Caucasus. – Europe, Mongolia. – On *Bupleurum* (Apiaceae). Mid-July to mid-August **E. flaveolus** Stål (*kuliki* E. Wagn.)

80. **Megalocoleus** Fieb. – 1 species (in USSR 6).

1. Whitish green or yellowish green; hemelytra sometimes, especially in males, with smoky brownish pattern. Legs and antennae yellowish. Dorsum with pale and brownish setae. 4-5.2. – S Prim. (Ussuriysk, collected by S. A. Kulik in mid-July on *Matricaria perforata*, possibly imported). – From Irkutsk to W Europe. – On *Achillea millefolium* **M. molliculus** Fall.

81. *Acrotelus* Reut. – 1 species (in USSR 2).

1. Pale green; dorsum with semierect black setae; hemelytra sometimes with small brown dots at bases of setae and pale brown pattern. Tarsi black, at least at apex. Antennae pale. Male genitalia as in Figs. 532: 5-10 (right paramere minute, aedeagus small, membranous). 4.4-5.8 (rarely smaller, to 3.5). – Amur., N Prim. – [p. 841] In steppe and mountain meadows west to Tien Shan. – On *Artemisia*, particularly on *A. dracunculus*. Possibly only subspecies of the western *A. caspicus* Reut. Late June to late August **A. pilosicornis** Reut.

82. *Macrotylus* Fieb. Dorsum with short black setae. Spines on tibiae usually very short, badly visible. – 4 species (in USSR 15).

1. All veins paler than membrane, whitish. Dirty brownish green or bluish; specimens from Far East usually blackish green, with black head, calli of pronotum, and legs. Membrane unicolorous, dark gray to black. Larger: 5-6.2. – S Prim.; E Siberia, Altai, N and SE Kazakhstan, Tien Shan, Caucasus, Urals, Karelia. – Mongolia, Finland. – On *Geranium*, particularly on *G. sylvaticum*. Late June (in Siberia, early June to mid-August) **M. cruciatus** R. Sahlb.
- Veins of membrane partly gray or black, concolorous with adjacent areas of membrane. Not longer than 3. On Rosaceae 2
2. Membrane black, unicolorous, except for part of veins and small whitish spot adjacent to apex of cuneus. Setae on hemelytra distributed uniformly. Head and pronotum green; hemelytra and scutellum sometimes dirty green, but more often black, only base and apex of cuneus whitish. Thorax ventrally green, venter of abdomen mostly black. Antennae, femora (except apices), tarsi, and at least bases of tibiae (hind ones usually entirely) black. 1.7-2.4. – Amur.; E Siberia, Altai. – Mongolia. – On *Chamaerhodos erecta*. Early August (in Siberia, late June to mid-August) **M. dimidiatus** Jak.
- Membrane gray with black band running from cells to apex of cuneus and 2 pale spots, one before and another behind the band. Setae on hemelytra forming more or less distinct stripes separated by bare stripes. Dorsum entirely green. Middle of 2nd antennal segment and part of 1st one pale. Femora green, black only on anterior or anterior and posterior margins 3
3. Vein of clavus with dense setae, black. Femora with black stripe at each anterior and posterior margins. Fore and middle tibiae black at base; hind tibiae black along the whole length. 1st antennal segment with longitudinal black stripe forming incomplete ring near apex. Spots before and behind black stripe on membrane uniformly pale, whitish. 2.3-2.8. – Mag., Amur., S Prim.; E Siberia, Altai. – Korea, Mongolia. – On *Potentilla*, particularly on *P. tanacetifolia*. Late June to late July **M. mundulus** Stål
- Vein of clavus pale. Femora with black stripe only on anterior margin. All tibiae black only at base. 1st antennal segment pale or with 2 brown rings proximal and distal to the middle. Spot behind black stripe on membrane grayish, less distinct. 2-2.6. – Amur.; Chita Prov. – Mongolia. – On *Potentilla* spp. in steppes. Early June to late July **M. zinovievi** Kerzh.

83. *Harpocera* Curt. On male inflorescences of *Quercus*; in Far East on *Quercus mongolica*. – 2 species (in USSR 3).

1. In females, all antennal segments black; head yellow with black genae, lora, and bands on frons and vertex lateral to the middle; pronotum brownish yellow, paler on margins and mesally; scutellum brown or black with yellow median

line; hemelytra dark brown, paler at bases of cuneus and corium; venter black, with a few yellow spots; legs dirty yellow; apices of femora, especially of hind ones, darkened. Males unknown. 6.4-6.6. – S Prim. – Korea. – Early June to mid-June **H. choui** Jos.

- In females, 2nd antennal segment yellow, with black apex and brown spots; dorsum orange-yellow; in dark specimens, head, pronotum, and scutellum reddish brown, with pale median stripe; venter and legs mostly pale; hind femora in apical half usually reddish. In males, head, pronotum [p. 842] and scutellum black with yellow median stripe, sometimes interrupted; pronotum with yellow lateral and posterior margins; hemelytra whitish yellow; apex of cuneus black; usually also clavus and corium partly blackish; antennae black; legs pale with small dark spots; hind femora black in apical half. Male genitalia as in Figs. 532: 11-15. 5.9-6.8. – S Kur. (Kunashir I.). – Mid-June to mid-July **H. orientalis** Kerzh.

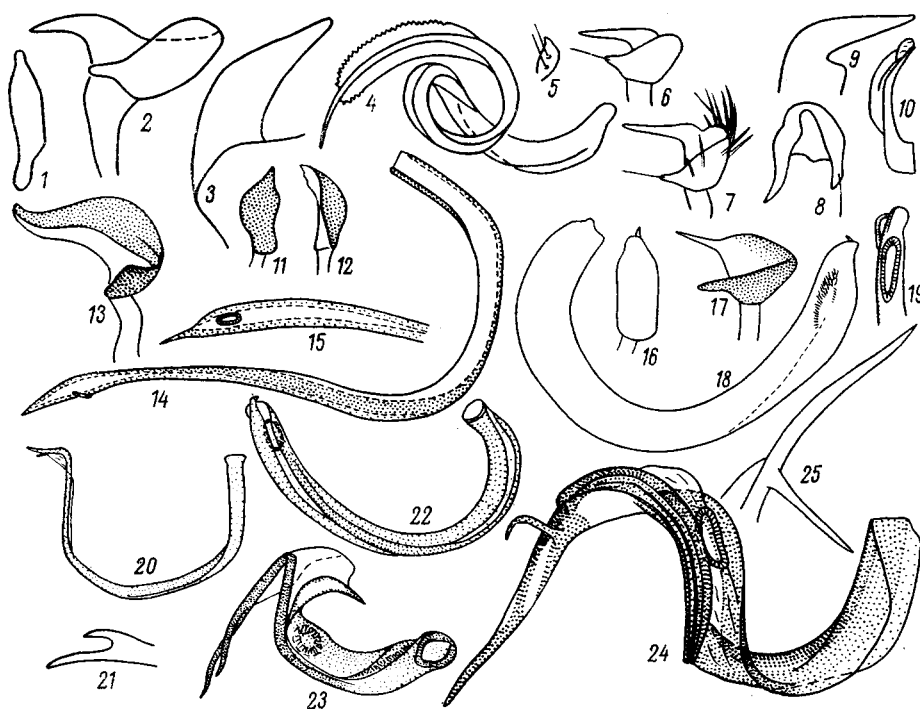


Fig. 532. Heteroptera. Family Miridae (after Kerzhner and original).

1-4, *Eurycolpus flaveolus*; 5-10, *Acrotelus pilosicornis*; 11-15, *Harpocera orientalis*; 16-19, *Plesiodema stlaniki*; 20, 21, *Brachyarthrum limitatum*; 22, *Phylus stundjuki*; 23, *Ph. coryloides*; 24, 25, *Ph. nigriscapus*. 1, 5, 11, 12, 16, right paramere; 2, 6-8, 13, 17, left paramere; 3, 9, theca; 4, 10, 14, 18, 20, 22-24, aedeagus; 15, 19, 21, 25, its apex.

84. **Plesiodema** Reut. Head, pronotum and scutellum black or dark brown; hemelytra in males black, in females from light yellow (mostly with slightly darker cuneus) to almost black (in southern populations of *P. stlaniki*). On *Pinus*. In USSR 2 species.

- 1. Smaller: males 3-3.5; females 2.6-2.9. – Amur. – Forest zone to W Europe. – On *Pinus sylvestris*. Late June **P. pinetella** Zett.
- Larger: males 4-4.6; females 3.7-4. Male genitalia as in Figs. 532: 16-19. – Mag., Kamch., N Khab., Sakh., S Kur.; E Yakutia. – On *Pinus pumila*. Mid-June to mid-August **P. stlaniki** Kerzh.

85. **Brachyarthrum** Fieb. Monotypic genus. The species very variable, coloration and sizes given below concern specimens from Far East.

1. Head, antennae, and venter of body black; in females, sometimes posterior margin of head and base of 2nd antennal segment yellow. In males, pronotum (with exception of anterior margin), scutellum, and hemelytra blackish; in females, these parts yellow or slightly orange. Legs bright yellow. Aedeagus as in Figs. 532: 20, 21. Males 3.9-4; females 4-5.2. – S Prim., S Sakh. – Forest zone of Palearctic. – In Prim. on *Chosenia arbutifolia*, outside of Far East on *Populus tremula* and *P. laurifolia*. Early July to early August **B. limitatum** Fieb. [p. 843]

86. **Phylus** Fieb. Body in species from Far East black; legs, 3rd and 4th antennal segments yellow. On trees and bushes. – 3 species (in USSR 8).

1. All femora or only hind ones light red at least partly. 1st antennal segment and sometimes also base of 2nd one yellow. Aedeagus as in Fig. 532: 22. 3.1-3.8. – S Khab., Prim. – On *Pyrus ussuriensis*. Late June to early July. {Recently placed in *Pseudophylus* Yas., with the valid species name *flavipes* Nitobe} **Ph. stundjuki** Kulik
- Femora yellow. 1st antennal segment black or yellowish brown; 2nd segment entirely black 2
2. Pronotum not wider than 1.2. 1st antennal segment usually brown or yellowish brown. Aedeagus as in Fig. 532: 23. 4-4.8. – S Khab., Amur., Prim. – Korea, NE China. – On *Corylus*. Late June to late August **Ph. coryloides** Jos. et Kerzh.
- Pronotum not narrower than 1.3. 1st antennal segment black. On the average wider and larger. Aedeagus as in Figs. 532: 24, 25. 4.5-5.4. – S Prim. (Khasan District). – On *Quercus dentata*. Early July to early August **Ph. nigriscapus** Kerzh.

87. **Psallus** Fieb. Oval, more rarely elongate-oval, usually black, brown-red, red, or yellow. On trees and bushes, zoophytophagous. – 23 species (in USSR about 35); some additional species described from Korea possibly will be found in Prim. Records of *P. variabilis* Fall., *P. diminutus* Kbm., and *P. lapponicus* Reut. from Far East erroneous.

LITERATURE. Josifov, M. 1983. Psallus-Arten aus Nord-Korea (KVDR) (Heteroptera, Miridae). Reichenbachia 21(35): 197-211.

1. 3rd segment of hind tarsi shorter or slightly longer than 2nd one, distinctly shorter than 1st and 2nd segments combined. On deciduous trees and bushes 2
- 3rd segment of hind tarsi longer than 2nd one, equal or subequal to 1st and 2nd segments combined. On conifers. (Subgenus *Pityopsallus* E. Wagn.) 20
2. In species from Far East, 1st antennal segment yellow with 2 brown spots at bases of spines in medial part. (Subgenus *Psallus* Fieb.). Dorsum in anterior part dirty yellow or whitish yellow, usually more or less red posteriorly; base of cuneus white; venter pale or abdomen partly brown. Femora and tibiae yellow, whitish or slightly reddish, with more or less large black spots 3
- 1st antennal segment yellow, brown, or black, but without distinct brown spots at bases of spines in medial part 7
3. Cuneus entirely white, without any red spots. Coloration from pale yellowish with few reddish spots to dominantly light red. Aedeagus as in Figs. 533: 1, 2. 3-3.8. – S Sakh. – Forest zone from Baikal to W Europe. – On broad-leaved willows (*Salix caprea*, etc.). Mid-August (in other regions, mid-July to early September) .. **P. haematodes** Gmel. (*roseus* E., *alni* E.)

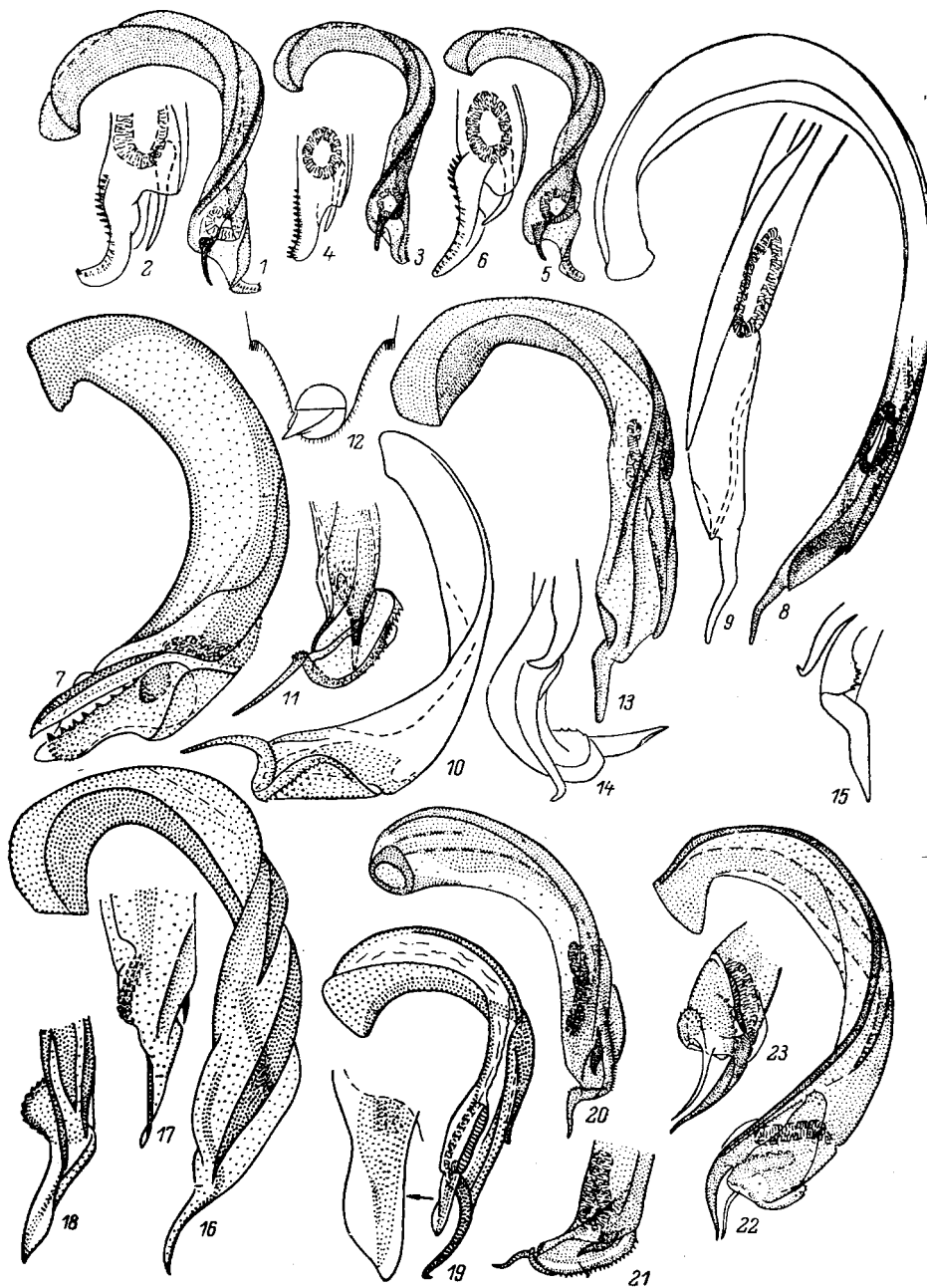


Fig. 533. Heteroptera. Family Miridae (after Kerzhner and original).

1, 2, *Psallus haematodes*; 3, 4, *P. salicis*; 5, 6, *P. falleni*; 7, *P. clarus*; 8, 9, *P. amoenus*; 10, 11, *P. ussuriensis*; 12-15, *P. tonnaichanus tonnaichanus*; 16-18, *P. loginovae*; 19, *P. flavescens*; 20, 21, *P. cinnabarinus*; 22, 23, *P. ulmi*. 1, 3, 5, 7, 8, 10, 13, 16, 19, 20, 22, aedeagus; 2, 4, 6, 9, 11, 14, 15, 17, 18, 21, 23, its apex; 12, apex of male genital segment.

- Cuneus partly red or with at least few red spots 4
- 4. Pronotum or at least major part of its posterior lobe without brown speckles. Aedeagus with flat, denticulate on one margin apical process (Figs. 533: 3-6). On Betulaceae 5

- Entire pronotum and sometimes also entire scutellum with brown speckles. Aedeagus different (Figs. 533: 7-9). On *Quercus dentata* 6
- 5. Apical process of aedeagus 2-2.5 times as long as wide (Figs. 533: 3, 4). Red color usually not reaching anteriorly beyond the middle of hemelytra or reaching beyond it with single spots. Vertex and pronotum usually with brown speckles. Sides of prothorax usually with 2 narrow, longitudinal, orange or red stripes each. 3.6-4.2. – S Prim., S Sakh., S Kur. – Forest zone of Palearctic. – On *Alnus*. Early to late August **P. salicis** Kbm. (*scholtzi* Fieb.)
- Apical process of aedeagus 3-3.5 times as long as wide (Figs. 533: 5, 6). Continuous red color usually reaching anterior third or even base of hemelytra. Vertex and pronotum usually without brown speckles. Sides of prothorax mostly each with a wide [p. 845] red stripe not divided or hardly divided in two. 3.7-4.3. – Kamch., S Prim., ?S Kur. – Forest zone of Palearctic. – On *Betula*. Late August **P. falleni** Reut.
- 6. Scutellum with brown speckles. Pronotum and scutellum with distinct, white, median stripe. Ventral side of hind femora without red hue, with not fused spots. Aedeagus as in Fig. 533: 7. 4.2-4.5. – S Prim. (Khasan District). – Mid-July **P. clarus** Kerzh.
- Scutellum with reddish speckles. Pronotum and scutellum without median white stripe. Ventral side of hind femora at least partly reddish, with denser and partly fused spots. Aedeagus as in Figs. 533: 8, 9. 4.2-4.4. – S Prim. (Khasan District). – Korea. – Mid-July (in Korea, late May) **P. amoenus** Jos.
- 7. Aedeagus with one not denticulate apical process and with subapical lobe finely denticulate on margin (Figs. 534: 3, etc.). 1st antennal segment and often 2nd segment entirely black; if the segments pale (*P. crataegi*, *P. cognatus*, sometimes pale females of other species), either body longer than 4 or (*P. cognatus*) the species from the northern part of Far East living on *Spiraea*. (Subgenus *Apocreminus* Fieb.) 8
- Aedeagus different. 1st and 2nd antennal segments pale. Body not longer than 4 (in females of *P. cinnabarinus* to 4.2). Species from southern part of Far East, living not on *Spiraea*. (Subgenus *Phylidea* Reut.= *Asthenarius* Kerzh.) 14
- 8. Cuneus unicolorous: black, red, or yellow. Evaporatoria of scent glands on metathorax black (in females of *P. stackelbergi* sometimes white) 9
- Cuneus at base or at least in middle part of base paler: white or reddish. Evaporatoria of scent glands on metathorax white (in *P. graminicola* sometimes black) 12
- 9. 4.9-5.4. Black, only spot at posterior margin of head yellow and tibiae usually yellow or reddish yellow with black spots. Left paramere and aedeagus as in Figs. 534: 1-3. – Prim. – Mid-June to mid-July **P. (A.) stackelbergi** Kerzh.
- Not longer than 4.6 10
- 10. Head, pronotum, and scutellum black or (in some females) bright red; hemelytra, legs, and antennae bright red; apex of 2nd antennal segment usually black; tibiae reddish yellow with brown small spots. Males sometimes with corium, clavus, and femora (except for their apices) black. Left paramere and aedeagus as in Figs. 534: 4-7. 4-4.3. – S Khab., Amur., Prim. – Mongolia. – On *Crataegus dahurica*. Mid-June to mid-August **P. (A.) crataegi** Kulik
- Dorsum black (rarely in females yellow) 11
- 11. Apical process of aedeagus with small denticulate projection at base (Figs. 534: 10, 11). Black; only tibiae red-yellow with black spots, bases of tarsi pale, and in females 2nd antennal segment red in basal 2/3. Left paramere as in Figs. 534: 8, 9. 3.8-4.4. – S Prim. – Korea. – On *Pyrus ussuriensis*, in Korea on *Crataegus*. Early June

- June to mid-August **P. (A.) atratus** Jos.
- Apical process of aedeagus without projection (Fig. 534: 12). Coloration as in *P. atratus*, but tibiae without red hue and 2nd antennal segment in females entirely black (outside Far East not rare pale females with entire or almost entire dorsum and usually part of 2nd antennal segment orange-yellow or yellow). 3.6-4.6. – Chuk., Mag., Kamch., N Khab., Amur. – Forest zone of Palearctic, mainly its northern part. – On undersized willows (*Salix brachypoda*, etc.). Mid-June to mid-August **P. (A.) aethiops** Zett.



Fig. 534. Heteroptera. Family Miridae (after Kerzhner and original).

1-3, *Psallus stackelbergi*; 4-7, *P. crataegi*; 8-11, *P. atratus*; 12, *P. aethiops*; 13, 14, *P. cognatus*; 15, *P. betuleti*. 1, 4, 8, left paramere, lateral; 2, 5, 9, same, dorsal; 3, 6, 10, 12, 13, 15, aedeagus; 7, 11, 14, its apex.

12. Smaller: 3.1-3.8. Antennae yellow; rarely 1st segment brown or black. Specimens from Far East (and from Yakutia) reddish brown to almost black (in other regions, light red or partly yellow). Femora black (only in some specimens from

- Far East and Yakutia) or yellow with brown spots; tibiae yellow with large black spots. Aedeagus as in Figs. 534: 13, 14. – Mag., Kamch. (previously recorded as *P. vaiabilis* Fall.); Yakutia, steppes from Tuva and Mongolia to Ukraine. – [p. 846] On *Spiraea* (in Yakutia and Far East, on *S. salicifolia*; in more western regions, on *S. hypericifolia*). Early to late July **P. (A.) cognatus** Jak.
- Larger: 3.7-5.5. Antennae black; if 1st and 2nd segment partly or entirely yellow (in some specimens of *P. betuleti*), body length more than 4. Femora black; if femora red (in some specimens of *P. betuleti*), then without brown spots; black spots on tibiae smaller 13
13. On average smaller: 3.7-4.7. Body, antennae and femora always black. Aedeagus as in *P. betuleti*, but smaller. – Mag., Kamch.; Tuva (in mountains), north of USSR. – Scandinavia. – In tundra and in marshes on bushy birches (*Betula exilis*, etc.). Late July to mid-August **P. (A.) graminicola** Zett.
- On average larger: 4-5.5. Body and femora black or partly or entirely red; antennae black; more rarely 2nd antennal segment medially or even almost entire 1st and 2nd segments dirty yellow. Aedeagus as in Fig. 534: 15. – Chuk., Mag., Kamch., Khab. (south to lower Amur), S Sakh. – Forest zone of Palearctic. – [p. 847] On *Betula* (trees) and *Alnus*. Early July to mid-August **P. (A.) betuleti** Fall.
14. Femora black at least in basal half. Tibiae with large dark spots. Evaporatoria of scent glands on metathorax black (except for pale specimens of *P. tonnaichanus dolerus*). Dorsum black, but in *P. t. dolerus* males with more or less brown hemelytra and females rather commonly with dorsum entirely red or yellow-red 15
- Femora entirely red or yellow, usually with brown spots. Tibiae without dark spots or with small spots, but in *P. loginovae* and *P. koreanus* with large ones. Evaporatoria of scent glands usually pale. Dorsum red, brown-red, or yellow-red; pronotum sometimes partly (in *P. loginovae*, *P. ulmi*) or entirely (males of *P. koreanus*) brown or black 16
15. 2nd antennal segment black in apical third. Bases of tibiae reddish. 3rd tarsal segment brown, at apex black. Aedeagus as in Figs. 533: 10, 11. 3.5. – S Prim. – Early July **P. (Ph.) ussuriensis** Kerzh.
- 2nd antennal segment entirely pale. Bases of tibiae yellow, not differing from remainder of tibiae in color. 3rd tarsal segment yellow with brown apex. Male genital segment on each side with a projection bearing a dense brush of setae (Fig. 533: 12). Aedeagus as in Figs. 533: 13-15. 2.9-3.6. – S Khab., Prim. (ssp. *dolerus* Kerzh., on average smaller and paler), S Kur. – Japan. – On *Quercus* (*Q. mongolica*, *Q. dentata*). Late June to late August **P. (Ph.) tonnaichanus** Muramoto (*dryos* Kerzh.)
16. Tibiae with large (about half of tibia width) dark spots 17
- Tibiae without dark spots or with small ones 18
17. Clypeus pale; if black or brown, genae and lora also black or brown. 1st rostral segment entirely black or brown. In males, anterior part of pronotum brown or black; in females, calli of pronotum sometimes darkened. Dark red; inner corner of corium often with large brown spot. Aedeagus as in Figs. 533: 16-18. 3.5-3.8. – S Prim. – On *Acer ginnala*. Late June to early July **P. (Ph.) loginovae** Kerzh.
- Clypeus black or brown; genae and lora yellow. 1st rostral segment, except base, yellow or red. In males, pronotum entirely black or dark brown; in females, pronotum entirely red. Hemelytra in males dark red-brown, in females red; corium without dark spot in inner corner. Aedeagus as in Fig. 535: 5. 3.3-4.2. – S Prim. – Korea. – In Korea on Rosaceae (*Crataegus*, *Prunus*, *Sorbus*). Late June to early July (in Korea, late May and mid-July). {The new synonymy was later re-

- futed by Josifov} **P. (Ph.) koreanus** Jos. (*sanguinolentus* Jos., syn. n.)
18. All femora yellow. Coloration of dorsum yellow or orange-yellow grading to red at cuneus and apex of corium; base of cuneus white. Aedeagus as in Fig. 533: 19. 3.8-4.3. – S Prim. – Late June to early July **P. (Ph.) flavescens** Kerzh.
- At least hind femora red, reddish yellow, or reddish brown 19
19. Aedeagus as in Figs. 533: 20, 21. Cinnabarine; fore and middle femora yellow; hind femora ventrally without dark dots or with 1 row of dots. 3.3-4.2. – S Prim., S Kur. (Kunashir I.). – On *Ulmus propinqua*. Mid-July to mid-August **P. (Ph.) cinnabarinus** Kerzh.

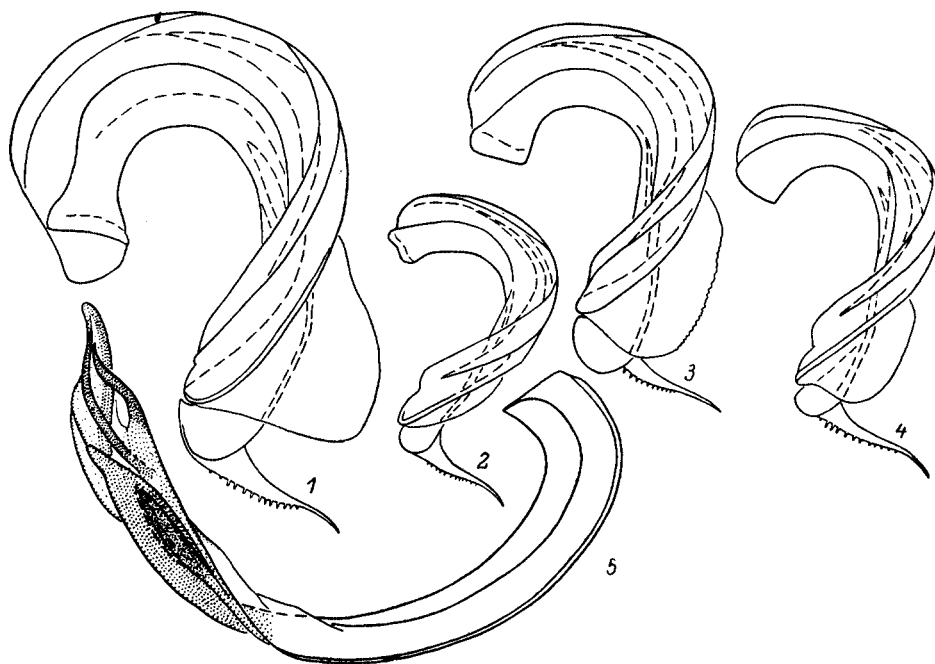


Fig. 535. Heteroptera. Family Miridae, aedeagus (original).

1, *Psallus ermolenkoi sichotensis*; 2, *P. vittatus*; 3, *P. luridus*; 4, *P. laricinus*; 5, *P. koreanus*.

- Aedeagus as in Figs. 533: 22, 23. Usually all femora red, hind femora with numerous dark dots dorsally and ventrally, anterior part of body dirty yellow, and base of cuneus white (but some specimens not differing in coloration from previous species!). 3.5-4. – S Khab., Amur., Prim.; Transbaikal. – NE China, Mongolia. – On *Ulmus pumila*. Late June to early August **P. (Ph.) ulmi** Kerzh. et Jos.
20. Dark red to dark reddish brown. Vertex in males 2-2.1 times, in females 2.3 times as wide as an eye. Rostrum reaching beyond the middle of abdomen. Legs yellow; femora and [p. 848] tibiae with small brown spots. Aedeagus as in Fig. 535: 1. 4-5. – Mag., S Prim. (ssp. *sichotensis* Kerzh.), S Sakh. – On *Pinus pumila*. Late June to mid-August **P. (P.) ermolenkoi** Kerzh.
- Color not red; if at least partly red (sometimes in *P. laricinus*), vertex of males 1.3-1.7 times as wide as an eye. Rostrum not reaching the middle of abdomen. On *Larix* 21
21. Rostrum not reaching beyond hind coxae. Spines on tibiae black. Scutellum, pronotum (at least in anterior half), and usually head black; hemelytra from

dirty yellow to black; base of cuneus whitish. Femora yellow with brown spots, rarely brown; tibiae yellow, without dark spots or with hardly marked ones. Aedeagus as in Fig. 535: 2. 3.3-4; width not more than 1.3. – Mag., N Khab., Amur., S Kur. – Forest zone of Palearctic. – Late June to mid-August

- **P. (P.) vittatus** Fieb.
- Rostrum reaching well beyond hind coxae. Tibiae with yellow or brown spines, with more or less distinct dark spots. Body width not less than 1.4 22
 - 22. Vertex in males 2-2.5 times, in females approximately 3 times as wide as an eye. Length of 2nd antennal segment in male 1.3-1.5 times the width of head. Dirty yellow; males yellowish brown. Aedeagus as in Fig. 535: 3. 3.5-4.3. – Mag., Khab., Amur., Prim., S Sakh. – Forest zone of Palearctic. – Late June to mid-August
..... **P. (P.) luridus** Reut.
 - Vertex in males 1.3-1.7 times, in females 2-2.5 times as wide as an eye. Length of 2nd antennal segment in male 1.5-1.6 times the width of head. Dirty yellow or brownish yellow; scutellum sometimes brown; sometimes cuneus, very rarely entire dorsum light red. Aedeagus as in Fig. 535: 4. 3.8-5.3. – Mag., N Khab., N Sakh.; Yakutia, Altai. – Mongolia. – Late June to late August
..... **P. (P.) laricinus** Vin.

88. Atractotomus Fieb. On trees. – 1 species (in USSR 4). [p. 849]

1. Black, shining; 3rd and 4th antennal segments yellow; posterior margin of head, fore and middle tibiae, usually also bases of tarsi dirty yellow or yellow-brown. Silvery scales on hemelytra very small; simple setae black. Aedeagus as in Fig. 536: 1. 3.8-4.5. – S Prim. – From Finland to Baikal, Korea. – On *Picea*, less commonly on other conifers. July **A. morio** J. Sahlb.

89. Dacota Uhl. (*Nyctidea* Reut.). 1 species (in USSR 3); record of *D. (Leguminola) nigratarsis* Jak. from Prim. erroneous.

1. Black, shining; only tibiae, except apices, usually brown-yellow; rarely femora and tibiae dark red. In females, 2nd antennal segment slightly thickened apically. Male genitalia as in Figs. 536: 2-5. 4.5-6.8. – Mag., Kamch., Amur.; E Siberia, Altai, E Kazakhstan (Saur), extreme NE of European USSR. – N Mongolia, N America. – In humid habitats on *Pentaphylloides fruticosa* and *Betula divaricata*. Late June to mid-July **D. hesperia** Uhl. (*nigra* Jak., *moesta* Reut.)

90. Excentricoris Carvalho. – 1 species (in USSR 2-3).

1. Black, shining; apices of femora narrowly white; tibiae white with black spots; 3rd and 4th antennal segments and spot on vertex often yellowish. Male genitalia as in Figs. 536: 6-9. 3.5-4.2. – Mag., N Khab.; E Siberia, Altai, Dzhungarian Alatau. – N China (Great Khingan), Mongolia. – In Yakutia on *Potentilla longifolia*, in Mongolia on *Lophanthus chinensis*. July **E. pictipes** Reut.

91. Orthonotus Steph. (*Ectenellus* Reut., *Homolaner* Kir., *Ferganocoris* Jos.). On herbs; possibly polyphagous. – 1 species (in USSR 8).

1. Macropterous, shining, with simple, brown and pale, partly scalelike (especially in females) setae. Black; the following areas are yellow: apical 2/3 of fore and middle tibiae, 4/5 of hind tibiae, apices of hind femora, bases of hind tibiae, tarsi, apical part of rostrum, 3rd and 4th antennal segments, in females also medial half of 2nd antennal segments. Aedeagus as in Fig. 536: 10. 3.6-4. – S

Khab., S Prim. – Korea. – On herbs under canopy of shady forest. Late June to mid-August **O. bicoloripes** Kerzh.

92. **Criocoris** Fieb. In species from Far East, femora black, their apices (in anterior femora wider than in other) and tibiae yellow; 1st and 2nd antennal segments in males black, slightly thickened, 3rd and 4th segments yellow or brownish (in *C. quadrimaculatus*); in females, antennae slender, yellow. On *Galium*. – 2 species (in USSR 8).

1. Dorsum black; females with a pale spot at vertex. Length of 2nd antennal segment in males twice, in females 1.6 times the width of head. 3.3-3.6. – Prim. (in mountains). – Transpalearctic, mainly in forest regions. – Early to late June **C. crassicornis** Hahn

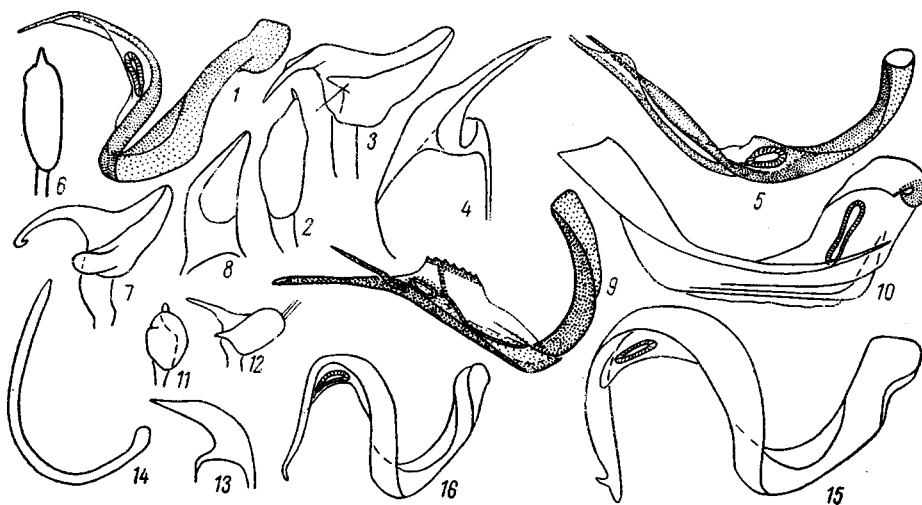


Fig. 536. Heteroptera. Family Miridae (after Kerzhner and original).

1, *Atractotomus morio*; 2-5, *Dacota hesperia*; 6-9, *Excentricoris pictipes*; 10, *Orthonotus bicoloripes*; 11-14, *Criocoris quadrimaculatus*; 15, *Compsidolon salicellus*; 16, *C. kerzhneri*. 1, 5, 9, 10, 14-16, aedeagus; 2, 6, 11, right paramere; 3, 7, 12, left paramere; 4, 8, 13, theca.

- The following areas are pale, yellowish or whitish: hemelytra along border between corium and clavus, outer margin of corium (except for some males), cuneus entirely or largely; in females, also posterior corners or posterior margin of pronotum and spot on vertex. Length of 2nd antennal segment in males not more than 1.5 times, in females not more than 1.3 times the width of head. Male genitalia as in Figs. 536: 11-14. 2.9-3.2. – Mag., Kamch., N Khab. – Forest zone west to Scandinavia. – On *Galium boreale*. July **C. quadrimaculatus** Fall.

93. **Compsidolon** Reut. (*Co niortodes* E. Wagn.). Usually pale with dark speckles. Tibiae pale, with dark spots, always pale at base. – 2 species (in USSR about 15). [p. 850].

1. Whitish; hemelytra (except cuneus), pronotum laterally and scutellum mesally with fine brown speckles; femora with brown spots; hind femora pale brownish; antennae pale; 1st segment with brown spot at inner side. Aedeagus as in Fig. 536: 15. 3.5-4.2. – S Khab., Prim.; Baikal. – Korea, Europe. – On *Corylus*. Mid-August **C. salicellus** M.-D.
- Brownish red; head and pronotum sometimes reddish yellow; dorsum without

dark speckles or with badly visible ones; base of cuneus narrowly pale; hind femora dark, without brown spots; fore and middle femora paler; 1st antennal segment and base of 2nd segment black. Aedeagus as in Fig. 536: 16. 2.5-2.9. – S Khab., Amur., Prim. – On stony slopes on *Artemisia gmelinii*. Mid-July to early August **C. kerzhneri** Kulik

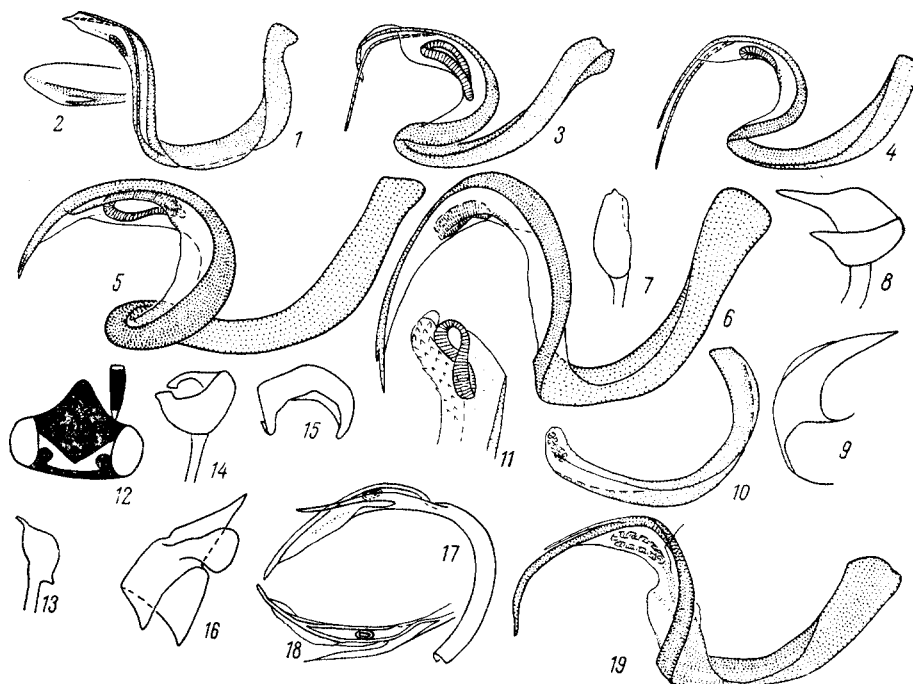


Fig. 537. Heteroptera. Family Miridae (after Kerzhner and original).

1, 2, *Phoenicocoris kyushuensis*; 3, *Ph. modestus*; 4, *Ph. obscurellus*; 5, *Salicarus roseri*; 6, *Monosynammia bohemani*; 7-11, *Sejanus potanini*; 12-18, *Sacculifer picticeps*; 19, *Parapsallus vitellinus*. 1, 3-6, 10, 17, 19, aedeagus; 2, 11, 18, its apex; 7, 13, right paramere; 8, 14, 15, left paramere; 9, 16, theca; 12, head and 1st antennal segment, dorsal.

94. **Phoenicocoris** Fieb. On *Pinus*. In USSR 3 species.

1. Head, pronotum, and femora (at least hind ones) dark brown; hemelytra and scutellum pale brown; cuneus usually reddish. Tibiae with dark small spots and brownish spines. Antennae yellow; 3rd and 4th segments brown. Aedeagus without apical processes (Figs. 537: 1, 2). 3-3.5. – S Prim. – Japan, Korea. – On *Pinus koraiensis*, *P. densiflora*. Late July to mid-August **Ph. kyushuensis** Lnv.
- Dorsum unicolorous, black, less commonly brown or dirty yellow. Femora usually concolorous with dorsum. Tibiae without dark spots and with black spines. Antennae yellow. Aedeagus with 2 apical processes (Figs. 537: 3, 4). On *Pinus sylvestris* 2
2. 2nd antennal segment not longer than width of head. Pronotum without pale scales. Aedeagus as in Fig. 537: 3. 2.3-2.8. – Amur. – Forest zone to W Europe. – Mid-July **Ph. modestus** M.-D.
- 2nd antennal segment by 1/4-1/3 longer than width of head. Pronotum with pale scales or setae. Aedeagus as in Fig. 537: 4. 2.6-3.5. – Amur. – Forest zone to W Europe. – Mid-July to late July **Ph. obscurellus** Fall.

95. *Salicarus* Kerzh. – 1 species (in USSR 3).

1. Wide, shining, black (in Far East, specimens with partly pale hemelytra not found); tibiae yellow, with small black [p. 851] spots at bases of spines; apices of femora yellow; membranes of hemelytra gray. Aedeagus as in Fig. 537: 5. 3.5-4. – Mag., Kamch., Khab., Amur., Prim. – Forest zone of Palearctic. – On *Salix*. Late June to late July *S. roseri* H.-S.

96. *Monosynamma* Scott. In USSR 1 species.

1. Slightly elongate; coloration very variable, more often whitish gray with brown or black pattern, rarely body entirely black, but head along inner margins of eyes always whitish yellow. Femora usually black with yellow apices; tibiae yellow with black dots; antennae black. Dorsum with pale setae. Aedeagus as in Fig. 537: 6. 3-4.3. – Mag., Kamch., Khab., Amur., Prim., Sakh. – Forest zone of Palearctic. – On *Salix*. Mid-June to early August. (Fig. 525: 12) {Correct spelling: *bohemanii*} *M. bohemani* Fall.

97. *Sejanus* Dist. In USSR 1 species.

1. Black, shining; tibiae, antennae, and apices of femora yellow; 2nd antennal segment in apical 1/2-2/3 black and slightly thickened. Male genitalia as in Figs. 537: 7-11. 2.8-3. – S Prim. – SE China. – On *Salix*. Mid-July to early August *S. potanini* Reut.

98. *Sacculifer* Kerzh. – 1 species (in USSR 2).

1. Oblong; brownish red or brownish yellow; cuneus with whitish base; legs yellow; femora with brown spots; head black with characteristic yellow spot at posterior margin (Fig. 537: 12); antennae black. Male genitalia as in Figs. 537: 13-18. 3.5-4. – Amur.; chiefly in steppe [p. 852] zone from Yakutia to European USSR. – In Far East, on *Spiraea salicifolia*. Mid-June to mid-July *S. picticeps* Kerzh.

99. *Parapsallus* E. Wagn. In USSR 1 species.

1. Yellow or orange, with pale pubescence; femora and tibiae with black dots. Aedeagus as in Fig. 537: 19. 2.8-3.3. – Amur., Prim. – Forest zone westwards up to Europe. – On *Larix*, in Europe also on *Abies*. Mid-June to late July *P. vitellinus* Scholtz

100. *Plagiognathus* Fieb. Oblong-oval; aedeagus with 2, more rarely 3 apical processes. – 14 species (in USSR about 20). {Both species of the subgenus *Poliopterus*, also *P. leucopus*, *P. lividus*, *P. gilvus*, *P. miyamotoi*, *P. lividellus*, and *P. kiritshenkoi* are now placed in *Europiella* Reut.}

1. Not green; if slightly greenish (*P. laeae*), not longer than 3.1 and all setae on body silvery-white. 1st antennal segment entirely and not less than half of 2nd segment brown or black 2
- Green, sometimes with some pale brown areas. 2nd antennal segment entirely pale or only in basal third dark. (Subgenus *Plagiognathus*, part) 8
2. Dorsum only with silvery-white setae; some of the setae slightly flattened (pubescence easily rubbed off). One of the aedeagus processes much longer than the other and strongly curved (Figs. 538: 2, 4). (Subgenus *Poliopterus* E. Wagn.). Color from grayish or gray greenish to black [p. 853] (in some males of *P.*

- albipennis*). 1st antennal segment and base of 2nd segment black; tibiae, including bases, with black dots. On *Artemisia* 3
- Dorsum with slender (not flattened), not dense, black or pale setae. Processes of aedeagus not differing sharply in length, the smaller one straight or weakly curved (Figs. 538: 7, 10, 13, 16, 19). (Subgenus *Plagiognathus*, part) 4

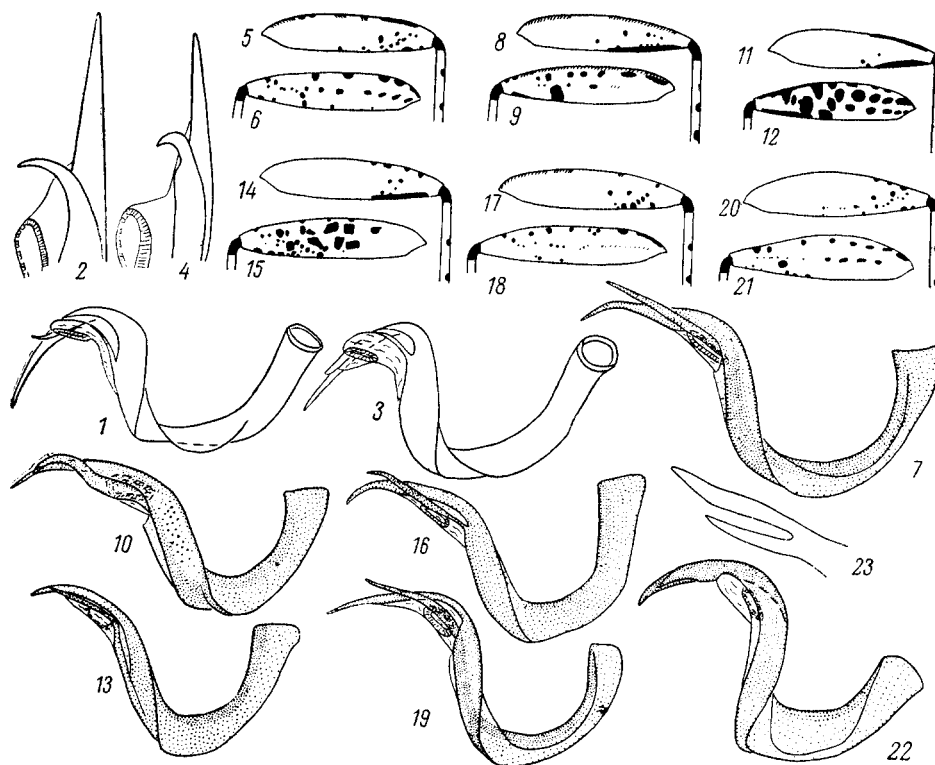


Fig. 538. Heteroptera. Family Miridae (original).

1, 2, *Plagiognathus albipennis*; 3, 4, *P. laeae*; 5-7, *P. obscuriceps*; 8-10, *P. collaris*; 11-13, *P. yomogi*; 14-16, *P. amurensis*; 17-19, *P. pini*; 20-23, *P. chrysanthemi*. 1, 3, 7, 10, 13, 16, 19, 22, aedeagus; 2, 4, 23, its apex, dorsal; 5, 8, 11, 14, 17, 20, hind femur, dorsal; 6, 9, 12, 15, 18, 21, same, ventral.

3. Usually pronotum and scutellum (except for spots in anterior corners) black; head usually black with 2 rounded pale spots near eyes. Aedeagus as in Figs. 538: 1, 2. 2.8-3.3. – Everywhere. – Almost all Palearctic. – On various species of *Artemisia* (*A. rubripes*, *A. stellerana*, *A. gmelinii*, *A. scoparia*, *A. integrifolia*, etc.). Mid-June to mid-September. {Correct name of the discussed species: *Europiella artemisiae* Becker} **P. (P.) albipennis** Fall. (*solani* Mats.)
- Pronotum and scutellum always pale; in dark specimens, head black with median pale spot close to posterior margin. Aedeagus as in Figs. 538: 3, 4. 2.5-3.1. – S Kur. (Iturup I.). – On seaboard rocks on *Artemisia schmidtiana*. August. {Junior synonym of *Europiella decolor* Uhl.} **P. (P.) laeae** Kerzh.
4. Anterior and usually also posterior margins of femora with longitudinal black or dark brown stripe in apical part (Fig. 538: 5, 8, 11) 5
- Anterior and usually (except for some specimens of *P. amurensis*) also posterior margins of femora without black stripes (Figs. 538: 14, 17). Dorsum from yellow to black; in the last case border between corium and cuneus pale 7
5. Posterior margins of femora without black stripe, only with spots close together

- (Figs. 538: 5, 6). Dorsum dirty yellow, reddish, or dark brown; head black with pale spot on vertex. Aedeagus as in Fig. 538: 7. 3.6-4. – Mag., Kamch., N Khab.; E Siberia. – On herbs and willows. Early July to mid-August ... **P. obscuriceps** Stål
- Posterior margin of femora with black stripe (Figs. 538: 8, 9, 11, 12) 6
6. Ventral side of hind femora with large black spot in apical third close to posterior margin and usually with 1 or 2 longitudinal rows of small spots close to anterior margin or in anterior half (Fig. 538: 9); anterior margin of hind femora usually with black or brown stripe along the whole length. Dorsum black, dark brown, or brownish yellow with black head and pronotum. Aedeagus as in Fig. 538: 10. 3.7-4.5. – Mag., Khab., Amur., Prim., Sakh., S and C Kur.; E Siberia. – Japan, E China. – On herbs and bushes. Early July to late August. To this species refer records of *P. arbustorum* F. from Far East **P. collaris** Mats.
- Ventral side of hind femora with numerous large black spots (Fig. 538: 12); anterior margin of hind femora with black stripe in apical 1/2-1/3. Dorsum black, strongly shining. Aedeagus as in Fig. 538: 13. 2.9-3.5. – S Prim. – Japan. – On *Artemisia rubripes*. Mid-July to late August **P. yomogi** Miy.
7. Posterior margin of hind femora with longitudinal black stripe (Fig. 538: 14); anterior margin with a row of large dark dots; ventral side with irregular large dark spots (Fig. 538: 15). Usually dorsum whitish yellow; apex of head, median stripe on scutellum, and pattern in apical part of hemelytra black or brown; sometimes dorsum entirely pale or entirely black. Aedeagus as in Fig. 538: 16. 3.2-4.2. – S Khab., Amur., Prim. – Korea, NE China. – On *Artemisia vulgaris* s. l. Mid-July to mid-September **P. amurensis** Reut.
- Posterior margin of hind femora without black stripe; anterior margin with 1-2 dark spots (Fig. 538: 17); ventral side with 2 rows of dark spots (Fig. 538: 18). Dorsum yellowish brown or reddish brown to black; head black with yellow vertex. Aedeagus as in Fig. 538: 19. 3.9-4.6. – S Prim., S Sakh.; Yakutia. – On *Pinus pumila*. Mid-July to mid-August **P. pini** Vin.
8. Dorsum only with black setae. Base of tibia with black spot. 1st antennal segment partly and ring near base of 2nd segment, spots on femora and tibiae (Figs. 538: 20, 21), sometimes apex of head, and pattern on frons black. Aedeagus as in Figs. 538: 22, 23. 3.2-4. – S Khab., Amur., Sakh., S Kur. – Major part of Palearctic. – [p. 854] In meadows and long fallows on various herbs. Late June to early September **P. chrysanthemi** Wolff
- Dorsum with pale and dark or with only pale setae. Bases of tibiae pale (except for *P. lividus*) 9
9. Femora and tibiae without dark spots, at most with small brown spots on hind femora (Figs. 539: 1, 2). Antennae pale. Setae on body brown and pale, of equal length. Parameres as in Figs. 539: 3-5. Aedeagus with serrate plate (Figs. 539: 6-8). 4.2-4.8. – S Prim. – Early July to late August **P. leucopus** Kerzh.
- Femora (especially hind ones) and tibiae with distinct black spots 10
10. Spots on femora (Figs. 539: 9, 10, 17, 18, 24, 25) numerous, dense (especially on ventral side), usually small (if spots are few, bases of tibiae darkened) 11
- Spots on femora (Figs. 539: 27-29, 35-37) few in number, mostly large. Bases of tibiae pale 13 [p. 855]
11. Bases of tibiae with a black ring or spot; femora with fewer dark spots (Figs. 539: 17, 18). Cuneus in males usually grayish, darker than corium. Male genitalia as in Figs. 539: 19-23. Smaller: males 3.9-4.5; females 3.5-3.7. – Amur., S Prim. – Korea, E China (Sichuan). – On *Artemisia gmelinii*. Late July to mid-September **P. lividus** Reut.
- Bases of tibiae pale or (in some specimens of *P. miyamotoi*) pale brown; femora

- with more dark spots (Figs. 539: 9, 10, 24, 25). Cuneus not daker than corium.
Larger 12
12. Dorsum in both sexes light green. Male genitalia as in Figs. 539: 11-16. Males 4.7-5; females 4.3-4.7. – S Prim. – In forests on *Radbosia excisa*. Early July to mid-August **P. gilvus** Kulik (*pilosus* E. Wagn.)



Fig. 539. Heteroptera. Family Miridae (after Kerzhner).

1-8, *Plagiognathus leucopus*; 9-16, *P. gilvus*; 17-23, *P. lividus*; 24-26, *P. miyamotoi*; 27-34, *P. lividellus*; 35-42, *P. kiritshenkoi*. 1, 9, 17, 24, 27, 35, hind femur, dorsal; 2, 10, 18, 25, 28, 36, same, ventral; 29, 37, same, anterior view; 3, 11, 19, 30, 38, left paramere, ventral; 4, 12, 20, 31, 39, same, lateral; 5, 13, 21, 32, 40, right paramere; 6-8, 14-16, 22, 23, 26, 33, 34, 41, 42, aedeagus and its apex.

- In males, scutellum or even almost entire dorsum often brownish green. Male genitalia as in *P. lividus*, but apical processes of aedeagus of different form (Fig. 539: 26). Males 4.6-5; females 3.8-4.4. – S Sakh., S Kur. – N Japan. – On *Artemisia montana*. Late July to early September **P. miyamotoi** Kerzh.
13. Dorsum with silvery and black setae. Anterior margin of hind femur with only 2 subapical black spots (Figs. 539: 27-29). Antennae without black spots. Male genitalia as in Figs. 539: 30-34. 3.1-3.8. – S Khab., Amur., Prim., S Kur. – On *Artemi-*

sia rubripes, *A. vulgaris*, *A. montana*. Late July to early September **P. lividellus** Kerzh.

- Dorsum with only silvery setae. Anterior margin of hind femur with numerous black spots (Figs. 539: 35-37). 1st antennal segment with 2 black spot near the middle (one on inner side, the other on ventral side); 2nd segment black at base. Male genitalia as in Figs. 539: 38-42. 4-4.4. – S Prim. – On *Artemisia*. Mid-July to early August **P. kiritshenkoi** Kulik

101. **Chlamydatus** Curt. – 8 species (in USSR 12).

1. Tibiae light yellow, with distinct black spots. (Subgenus *Euattus* Kerzh.). Body black; only femora and antennae pale, at least apically. Hemelytra entirely covering abdomen, in females usually shorter than in males, but always with membrane bearing at least 1 cell 2
- Tibiae without distinct black spots, often partly or entirely black. Hemelytra usually strongly shortened, not covering apex of abdomen; membrane strongly reduced, without cells; rarely hemelytra complete or short, but covering abdomen 4
2. All femora bright yellow or orange, very rarely in males dark brown in major part. Head entirely black. Male genitalia as in Figs. 540: 9-12. 1.9-2.9. – Mag., Kamch., N Khab., S Prim. (Mt. Oblachnaya); Yakutia. – In mountain tundra, also in humid larch forests on *Vaccinium* and *Ledum*. Early July to early August **Ch. (E.) drymophilus** Vin.
- Femora black with yellow apices; if femora yellow (sometimes in *Ch. pulicarius*), posterior margin of head narrowly brownish or whitish 3
3. Dark spots on hind tibiae narrower than width of tibia. Posterior margin of head more or less lightened. Aedeagus with long whiplike apical process (Fig. 540: 4); parameres and theca as in Figs. 540: 1-3. 2.6-3.2. – Mag., Kamch., Khab., Amur., Prim., Sakh. – Forest zone of Palearctic. – In meadows on herbs, in particular on Fabaceae. Mid-June to late August **Ch. (E.) pulicarius** Fall.
- Dark spots on hind tibiae not narrower than width of tibia. Posterior margin of head usually black. Aedeagus with shorter apical process (Fig. 540: 8); parameres and theca as in Figs. 540: 5-7. 2-2.7. – Chuk., Mag., Kamch., Khab., Amur., Prim. – Most part of Palearctic. – In meadows, in particular dry ones. Mid-June to late August **Ch. (E.) pullus** Reut.
4. Posterior margin of head pale. Hemelytra usually pale at bases or with pale longitudinal stripes. (Subgenus *Chlamydatus* Curt.) 5
- Head and hemelytra entirely black 6 [p. 856]
5. Pronotum and hemelytra shining. Hemelytra pale at base; in brachypterous specimens, hemelytra usually also pale apically or even entirely; sometimes also pronotum and scutellum partly pale. 1.8-2.3; macropterous up to 3.2. – S Khab. (lower Amur). – Transpalearctic, mainly in forest zone. – On *Polygonum aviculare* and other plants. Early to late August **Ch. saltitans** Fall.
- Pronotum and hemelytra dull. Hemelytra in brachypterous specimens with longitudinal pale stripes, in macropterous black almost entirely. Pronotum and scutellum usually with median pale stripe. 1.9-2.8; macropterous up to 3.4. – Chuk. – Extreme north of Holarctic. Late July (in other regions, late June to mid-August) **Ch. opacus** Zett.
6. Hind femora less than twice as wide as middle ones. In brachypterous specimens, hemelytra truncate posteriorly, their posterior margins perpendicular to commissure; commissure as long as scutellum. Abdomen roundly widened.

(Subgenus *Platypsallus* J. Sahlb.). 1.6-2; macropterous up to 2.8. – Mag. – Extreme north of Eurasia. – In riverside meadows and marshes. Mid-July to mid-August

- **Ch. (P.) acanthioides** J. Sahlb.
- Hind femora more than twice as wide as middle ones. In brachypterous specimens, hemelytra more or less rounded posteriorly, their commissure longer than scutellum. (Subgenus *Eurymerocoris* Kbm.) 7
7. Vertex 1.8-2 times as wide as an eye. Tibiae, tarsi, and 2nd-4th antennal segments yellow. 1.8-2.4; macropterous up to 2.7. – Chuk. (including Wrangel I.), Mag. – North of Holarctic, mountains of Siberia. – Early July to late August **Ch. (E.) wilkinsoni** Douglas et Scott

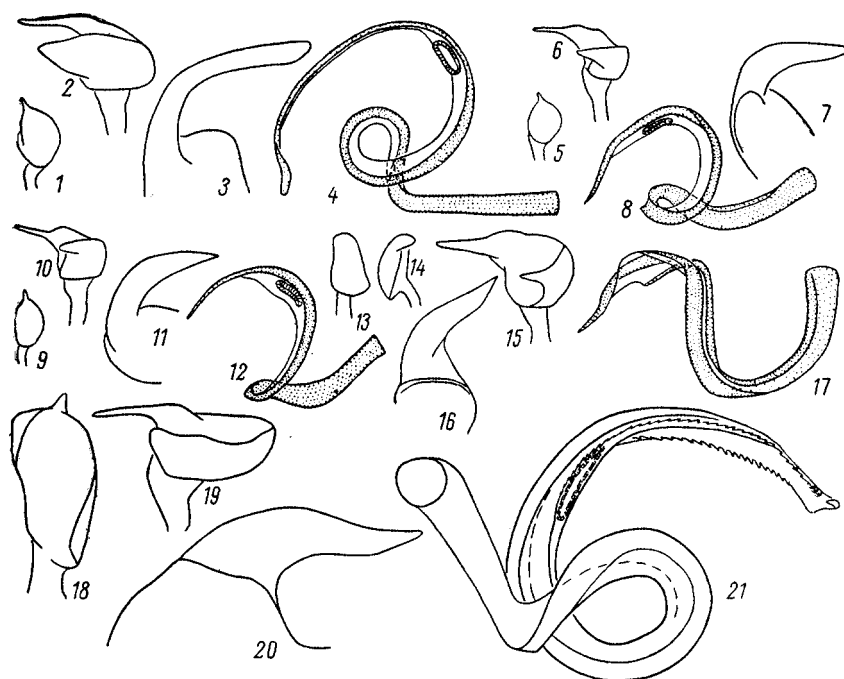


Fig. 540. Heteroptera. Family Miridae (original).

1-4, *Chlamydatus pulicarius*; 5-8, *Ch. pullus*; 9-12, *Ch. drymophilus*; 13-17, *Campylomma annulicorne*; 18-21, *Rubrocuneocoris quercicola*. 1, 5, 9, 13, 14, 18, right paramere; 2, 6, 10, 15, 19, left paramere; 3, 7, 11, 16, 20, theca; 4, 8, 12, 17, 21, aedeagus.

- Vertex 2.2-2.5 times as wide as an eye. Legs and antennae entirely black. 1.7-2; macropterous 2.1-2.5. – Amur, S Prim.; west to N Caucasus and Voronezh Prov. – On wild onions (*Allium* spp.). Mid-July to early August (outside Far East, April to September) **Ch. (E.) allii** V. Putshkov

102. **Campylomma** Reut. Predacious or zoophytophagous. – 1 species (in USSR 7-8).

1. Greenish white, with black setae. 1st antennal segment in males with black ring, in females with black dot; 2nd antennal segment in males entirely, in females basally black or brown. Femora and tibiae with small black spots. Male genitalia as in Figs. 540: 13-17. 2.7-3.1. – S Khab., Prim. – Transpalearctic. – On *Salix*. June and July **C. annulicorne** Sign.

103. **Rubrocuneocoris** Schuh. In USSR 1 species.

1. Dorsum yellow; venter brownish; head more or less brown with pale posterior margin and reddish apex; apex of cuneus, a small spot in outer posterior corner of corium, veins of membrane in outer part, spots on ventral side of hind femora red. Pubescence, antennae, and legs light yellow. Male genitalia as in Figs. 540: 18-21. 2.7-3.3. – S Prim. (Khasan District). – Korea. – On *Quercus dentata*. Mid-July to late August..... **R. quercicola** Jos.

104. **Atomoscelis** Reut. (*Kerzhneriola* Jos., syn. n.). Pale green; membrane with smoky pattern; a spot on each apex of scutellum and apex of clavus, a spot in the middle of 1st antennal segment, base of 1st antennal segment and sometimes base of 2nd segment, spots on femora and tibiae black or brown. – 1 species (in USSR 2).

1. Anterior margin of hind femora with 1 dark spot. Spines on tibiae light brown. 2.2-2.7. – Possibly will be found in Amur; from Yakutia and Chita Prov. to W Europe. – On *Atriplex*. May-September **A. onustus** Fieb.
- Anterior margin of hind femora with 3-5 dark spots. Spines on tibiae black. 2.5-3 (ssp. *hissarensis* Jos. 2.1-2.6). – S Prim. (near lake Khanka); S Kazakhstan, Soviet Central Asia, Caucasus. – Korea. In E Kazakhstan, Soviet Central Asia and Caucasus [p. 857] – ssp. *hissarensis*. – According to literary data, on halophilous *Artemisia*. Late May to early August **A. asiaticus** Jos., comb. n. (*Kerzhneriola*)

22. Family TINGIDAE

V.B. Golub

Small, not longer than 5; oval or oblong, often flattened. Head with long or small (tuberculiform) spines on frons or on frons and vertex (Figs. 541: 1-3). Rostrum lying in groove formed by areolate bucculae (Fig. 541: 2). Pronotum with 1-3 longitudinal carinae (Fig. 541: 1). Anterior margin of pronotum with areolate, often rather high, vesicular or prolonged anteriorly formation – hood (Fig. 541: 1). Pronotum posteriorly produced into triangular posterior process (Fig. 541: 1). Lateral margins of pronotum (paranota) usually flattened, areolate, and either expanded laterally, or bent up and adpressed to disc of pronotum, or turned up onto disc sometimes forming areolate inflations above the disc. Hemelytra areolate, either thick and leathery or hyaline, transparent. Each hemelytron (Fig. 541: 1) usually divided by prominent veins into flattened lateral margin (costal area), lateral field (subcostal area), medial field (discoidal area), and inner field (sutural area); membrane areolate and not differentiated. Some species show wing dimorphism. In brachypterous specimens, hemelytra only slightly longer than abdomen, sutural areas narrow, weakly overlapping or contiguous along commissure, membrane not developed. Macropterous specimens larger; hemelytra reaching well beyond apex of abdomen; their sutural areas broader and passing posteriorly into membranes without visible border; membranes widely overlapping. Phytophagous; living on leaves of trees, bushes and herbs, and also on mosses, sometimes form large colonies. Most species have narrow food [p. 858] specialization. Hibernating usually as adults, less commonly part of population hibernating also as larvae; one species, *Stephanitis oberti*, hibernating as eggs. In world fauna more than 2000 species. – 18 genera, 47 species (in USSR 26 genera, more than 180 species).

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KEY TO GENERA

1. At least discoidal and sutural areas of hemelytra not separated. Head without occipital spines 18. **Agramma**
 - Hemelytra distinctly divided by carinae or prominent veins into subcostal, discoidal and sutural areas (Fig. 541: 1); very rarely subcostal and discoidal areas separated more or less indistinctly (some specimens of *Leptoypha capitata*), but in that case head with occipital spines 2
2. Bucculae generally converging anteriorly and forming closed groove, so that attachment of rostrum not visible in anterior view (Fig. 541: 2); rarely (*Tingis pilosa*) bucculae not fully closed anteriorly, in that case openings of scent glands with canal 3
 - Bucculae not converging anteriorly, so that the groove formed by them is not closed and the attachment of rostrum is visible in anterior view (Fig. 541: 3). Openings of scent glands without canal 13
3. Openings of scent glands without canal 4
 - Openings of scent glands with distinct canal (Fig. 541: 4) 5
4. Areolate paranota in the form of very large blackish shells, highly raised above pronotal disc, and their marginal vein not approaching the surface of disc 17. **Cochlochila**
 - Areolate paranota turned up onto pronotal disc (Fig. 541: 10), flattened or inflated, but their marginal vein always touching the disc 16. **Dictyla**
5. Hemelytra not transparent, or only their largest areolae semitransparent 6
 - Hemelytra hyaline, transparent or semitransparent 11
6. Pronotum without paranota (Fig. 543: 8) 15. **Leptoypha**
 - Pronotum with paranota either expanded laterally, or bent up and adpressed to pronotal disc, or entirely turned up onto the disc 7
7. Areolate paranota bent up and turned onto pronotal disc 8
 - Areolate paranota expanded laterally or bent up, but not turned onto pronotal disc 10
8. Paranota reaching or almost reaching median carina. Lateral pronotal carinae converging anteriorly and touching or almost touching median carina 14. **Oncochila**
 - Paranota far from reaching median carina. Lateral pronotal carinae not touching median carina 9
9. Paranota strongly inflated; their marginal vein not touching disc and lateral pronotal carinae along most of its length 13. **Cysteocheila**
 - Paranota adpressed to pronotal disc with their entire surface or comparatively weakly inflated; their marginal vein touching surface of disc, or also touching lateral pronotal carinae 12. **Physatocheila**
10. Lateral margins of pronotum and hemelytra without denticles 11. **Tingis** [p. 859]
 - Lateral margins of pronotum and hemelytra or only of hemelytra with denticles ending in bristles 10. **Lasiacantha**
11. Discoidal and subcostal areas of each hemelytron forming a vesicular or rooflike elevation. Median pronotal carina very high, with large areolae 9. **Stephanitis**
 - Hemelytra without vesicular elevations. Median pronotal carina very low, without distinct areolae or with very small ones in posterior half 12
12. Hood hardly protruding cephalad, reaching only posterior margin of eyes, and almost not covering the head dorsally. Paranota very narrow, weakly widening

- anteriorly, without protruding anterior angles. Lateral pronotal carinae prominent, running along the whole pronotum 8. **Metasalis**
- Hood strongly protruding cephalad, reaching or almost reaching anterior margin of eyes, and covering dorsally much of the head. Paranota markedly widening anteriorly, their anterior angles strongly protruding cephalad. Lateral pronotal carinae present only in posterior half of pronotum, hardly visible 7. **Uhlerites**
13. Discoidal and subcostal areas of each hemelytron raised, forming vesicular or rooflike elevation. Hemelytra hyaline, transparent, with large areolae 14
- Hemelytra without vesicular or rooflike formations, not transparent, except for costal areas 15
14. Paranota with 1 row of areolae. Head with 5 long spines: 3 frontal and 2 occipital ones 6. **Galeatus**
- Paranota with 2-3 rows of areolae. Head with only 2 frontal spines 5. **Derephysia**
15. Hood in the form of large, shining, and not transparent sphere, without areolae, only with large and deep punctures (Fig. 541: 12) 2. **Sphaerista**
- Hood areolate, not spherical, sometimes almost not marked 16
16. Head with well visible in dorsal view, elongate, occipital spines reaching with their apices beyond anterior margin of eyes (Fig. 541: 13) 4. **Dictyonota**
- Head without occipital spines or (*Kalama koreana*) with minute, hardly visible tubercles situated far beyond posterior margins of eyes and concealed under hood 17
17. Antennae thick, with thickened, rigid, rather long bristles originating from large tubercles 3. **Kalama**
- Antennae comparatively slender, bare or with very slender, gentle, short setae, without large tubercles at their bases 1. **Acalypta**

KEYS TO SPECIES OF FAMILY TINGIDAE

1. **Acalypta** Westw. Small. Color from dirty yellow to black. Living on mosses in forests and in open habitats. – 6 species (in USSR 14).

1. Paranota strongly protruding cephalad in the form of angles (Figs. 541: 5, 6) 2
- Paranota not protruding or slightly protruding cephalad (Figs. 541: 7, 11) 3
2. Paranota protruding cephalad in the form of right or obtuse angles often rounded at the very apex (Fig. 541: 5). Body broad-oval. 2.3-3. – S Khab., Amur., S Sakh. – Forest and forest-steppe zones of Palearctic **A. carinata** Panz. (*sordida* Jak., *sibirica* Jak.)
- Paranota protruding cephalad in the form of acute angles with pointed apices (Fig. 541: 6). Body oblong. 1.9-2.5. – Mag., Amur.; Siberia, N Kazakhstan. – Mongolia, N America **A. cooleyi** Drake [p. 860]
3. 3rd antennal segment strongly thickened at base (Fig. 541: 8). 2.3-3.6. – Mag., Kamch., S Khab., Amur., Prim., S Kur (Kunashir I.). – Transpalearctic **A. gracilis** Fieb.
- 3rd antennal segment without large bulge at base (Fig. 541: 9) 4
4. Lateral pronotal carinae very low, with minute, hardly visible areolae. Lateral margins of pronotum straight or very weakly rounded; paranota with small areolae; costal areas with small areolae. 1st-3rd antennal segments yellow, or only apex of 3rd segment black. 1.9-2.4. – Chuk., Mag., N Khab.; Yakutia, Irkutsk Prov. – Mongolia, N America. (Fig. 541: 11) **A. elegans** Horv. (*nyctalis* Drake)

- Lateral pronotal carinae rather high, with distinct areolae. Lateral [p. 861] margins of pronotum distinctly rounded; paranota with rather large areolae (Fig. 541: 7); costal areas with large areolae. 1st-3rd antennal segments black 5

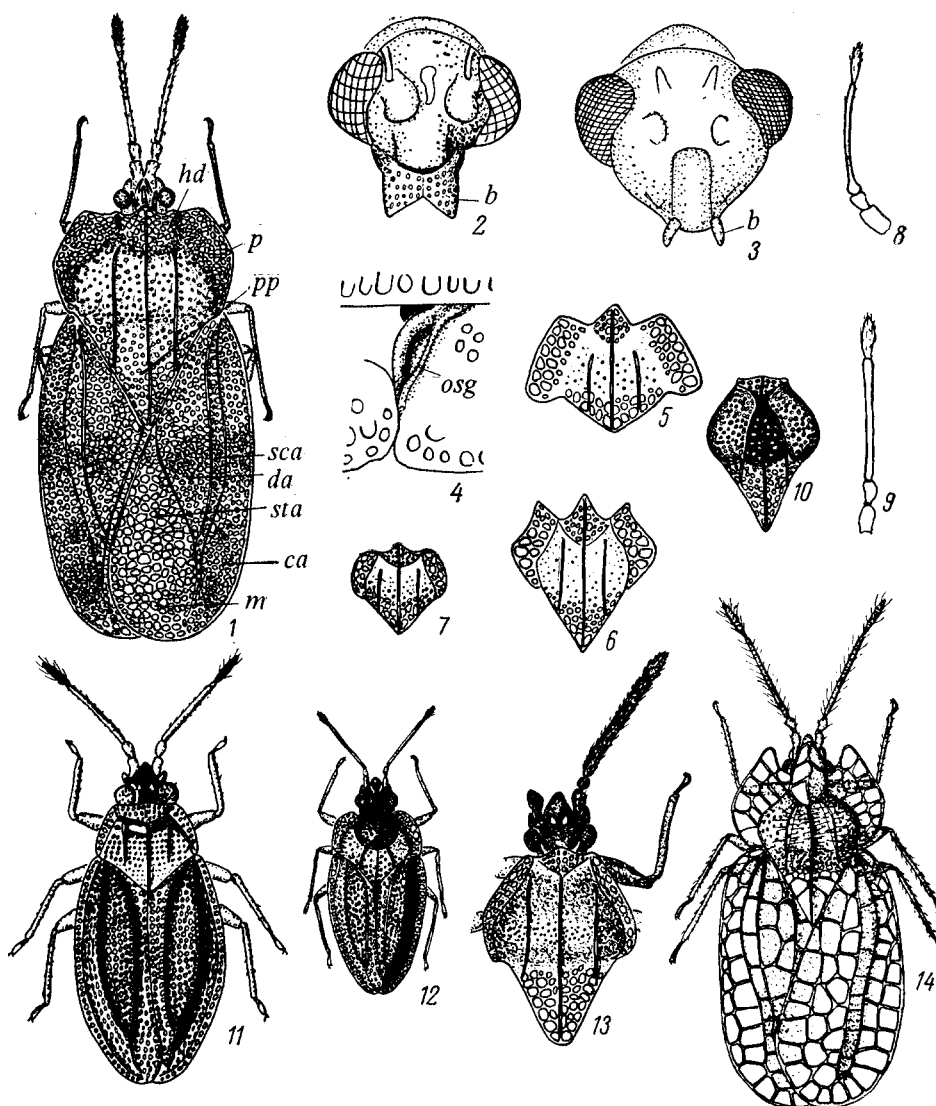


Fig. 541. Heteroptera. Family Tingidae (after Péricart and original).

1, *Tingis miyamotoi*; 2, 3, head, anterior view: 2, *Metasalis populi*; 3, *Acalypta gracilis*; 4, *Metasalis populi*, left half of mesothorax and metathorax, lateral; 5-7, pronotum, dorsal: 5, *Acalypta carinata*; 6, *A. cooley*; 7, *A. marginata*; 8, 9, antenna: 8, *A. gracilis*; 9, *A. marginata*; 10, *Dictyla orientalis*, pronotum, dorsal; 11, *Acalypta elegans*; 12, *Sphaerista paradoxa*; 13, *Dictyonota dlabolai*, anterior part of body, dorsal; 14, *Derephysia foliacea*. *ca*, costal area; *p*, paranotum; *sca*, subcostal area; *hd*, hood; *sta*, sutural area; *pp*, posterior process; *osg*, opening of scent gland; *m*, membrane; *da*, discoidal area; *b*, buccula.

5. Discoidal area of hemelytra in brachypterous specimens (especially in males) comparatively not wide. In males, discoidal area usually with 3 rows of areolae and with a few areolae of 4th row; in females, more commonly discoidal area with incomplete 4th row; in both sexes, medial row of the area with 12-13 ar-

- eolae. On average smaller: brachypterous specimens 1.85-2.4; macropterous specimens 2.75-3. – Mag., Amur., S Prim. – Transpalearctic. The record of *A. nigrina* from Amur. is to be referred to this species **A. marginata** Wolff
- Discoidal area of hemelytra in brachypterous specimens wide. In males, discoidal area with 4 complete rows of areolae; in females, the area with 5 complete or almost complete rows; in both sexes, medial row of the area with not less than 15 areolae. On average larger: brachypterous specimens 2.15-2.6; macropterous specimens 2.8-3.4. – Kamch.; forest zone of European USSR. – W Europe **A. nigrina** Fall.
2. **Sphaerista** Kir. Dirty yellow or brown dorsally; head darker or black, with 4 spines: paired frontal and occipital ones. Spherical hood dark brown or black, shining. On *Artemisia* spp. – 1 species (in USSR 2).
1. Pronotum with 3 carinae; lateral carinae low, converging anteriorly. Brachypterous specimens 1.9-2.4; macropterous specimens (rare) 3. – Amur.; S Siberia, SE of European USSR, Voronezh Prov. – Mongolia. (Fig. 541: 12) **S. paradoxa** Jak.
3. **Kalama** Put. Brown or dark brown; all veins of discoidal area concolorous. – 1 species (in USSR 9).
1. Antennae rather thick; 3rd segment with rigid bristles originating from rather large tubercles arranged in regular rows. 2.2-2.5. – Amur. – Korea, E Mongolia. – Probably on steppe mosses **K. koreana** Lee
4. **Dictyonota** Curt. (*Biskria* Put.). Dark brown or black; discoidal area with paler, usually dirty yellow or light yellow veins at base. Head somewhat protruded anterior to eyes. – 2 species (in USSR about 10).
1. Antennae brown, with pale setae; 3rd segment not wider than tibia. 3.5-3.7. – S Prim.; Tuva. – Mongolia. – On *Caragana*, *Maackia amurensis* (Fabaceae) **D. pulchricornis** Kerzh. et Jos.
- Antennae black, with black setae; 3rd segment wider than tibia. 2.9-3.4. – S Prim.; E Siberia. – Mongolia. – On *Caragana* **D. dlabolai** Hob.
5. **Derephysia** Spin. Body oval, brownish yellow or brown; head and thorax sometimes black. Head with 2 short frontal spines, without occipital spines. Openings of scent glands without canal. – 1 species (in USSR 7).
1. Pronotum with 3 carinae. Costal area with 2 rows of areolae along their whole length or along most of their length; more rarely 2 rows of areolae present only at base and apex of costal area. 2.9-4.1. – S Khab., Amur., Prim., S Sakh., S Kur. (Kunashir I.). – Transpalearctic. – On and under various herbs. (Fig. 541: 14). *Note.* Attribution of specimens from Mag., Kamch., and E. Yakutia needs refinement. They are similar to *D. foliacea*, but smaller (males 2.5; females 3) and with 1 row of areolae or only with a few areolae of 2nd row in costal area; previously they were erroneously identified as *D. kiritshenkoi* Jos. {This form was later described as *D. abbreviata* Golub} **D. foliacea** Fall. [p. 862]
6. **Galeatus** Curt. Body dorsally brown or black. Areolae of reticulate structures pale, often with more or less marked brown or black spots. Strongly widened paranota with 1 row of areolae. Head with 5 long slender spines. – 4 species (in USSR 11).

1. Hood long, reaching beyond anterior margin of head (with exception of frontal spines!) 2
- Hood short, not reaching anterior margin of head 3
2. Areolae of lateral pronotal carinae absolutely smooth, generally paler than apex of 4th antennal segment. Apical inflation of posterior process of pronotum generally not wider than vertex. Hood usually not even approaching apices of paranota. Length of 3rd antennal segment in macropterous specimens 2.2-4.2 times, in brachypterous specimens 1.7-2.6 times the width of head. Macropterous specimens 2.6-3.8; brachypterous specimens 2.3-3.4. – Khab. (north and mouth of Amur). – Forest zone of Palearctic, N America (possibly imported). – On *Aster*, *Artemisia*, and possibly on other Asteraceae **G. spinifrons** Fall. (*angusticollis* Reut.)
- Areolae of lateral pronotal carinae with minute, uniform, dense tubercles, generally darker than apex of 4th antennal segment. Apical inflation of posterior process of pronotum generally wider than vertex. Hood often almost reaching apices of paranota. Length of 3rd antennal segment in macropterous specimens 1.8-2.9 times, in brachypterous specimens 1.4-2 times the width of head. Macropterous specimens 2.6-3.8; brachypterous specimens 2.3-3.4. – Amur., S Prim. – Westwards to W Europe, from south of forest zone to deserts. – On *Helichrysum arenarium*, *Artemisia* spp. and other Asteraceae. (Fig. 542: 1) **G. affinis** H.-S.
3. Costal areas with spots along the whole length. All spots of areolate structures very distinct, blackish brown or black, not transparent, large. Smaller: 2.7-3.4. – Amur. – On *Leontopodium leontopodioides*. (Fig. 543: 5) **G. pardus** Golub
- Costal areas with spots only in posterior half. All spots of areolate structures indistinct, transparent, rather small. Larger: 3.4-3.6. – S Prim.; Buryatia. – Japan (Kyushu I.) **G. armatus** Takeya

7. **Uhlerites** Drake. In USSR 1 species.

1. Yellow dorsally; hemelytra with large, diffuse brown or blackish spots. Costal areas with 3-4, paranota with 4 rows of areolae in the widest place. Lateral margins of pronotum slightly notched. 2.9-3. – S Khab., S Prim. – Japan, Korea, E China. – On *Quercus*. (Fig. 543: 2) **U. debilis** Uhl. (*Stephanitis x-nigrum* Lindb.)

8. **Metasalis** Lee (*Ixia* Kerzh.). Body oblong, bare, dorsally dirtish yellow with brown or blackish spots. Macropterous. Areolae of hemelytra hyaline, semitransparent, without vesicular formations. Monotypic genus.

1. Head with 3 reclining spines. Paranota narrow, anteriorly with 2-3 rows of areolae, posteriorly with 1 row. 3.1-3.5. – S Khab., Amur., S Prim. – Japan, Korea, E China. – On *Salix* (e. g. *S. rorida*, *S. pierotii*) and *Populus*. (Fig. 543: 1) **M. populi** Takeya

9. **Stephanitis** Stål. Reticulate structures (pronotal carinae, paranota, hemelytra) hyaline, with rather large areolae, with brown or black pattern. Paranota wide, with 3-4 rows of areolae. Head, pronotum, and abdomen visible through hemelytra, brown or blackish. Head with 5 small spines. – 3 species (in USSR 5). [p. 863]

1. Bucculae of uniform height along their full length, reaching anteriorly beyond apex of clypeus (Fig. 542: 2). 3rd antennal segment about 3 times as long as 4th segment. 3-3.4. – S Prim. – Japan, Korea, E China. – On *Crataegus*, *Malus*, *Prunus*, *Pyrus*, and other rosaceous trees **S. nashi** Esaki et Takeya
- Bucculae lowering anteriorly and not reaching beyond apex of clypeus (Fig. 542:

- 3). 3rd antennal segment approximately twice as long as 4th segment 2
2. Hood and median pronotal carina with sparse, pale setae; median carina slightly longer than hood and usually markedly lower, with 1 row of areolae or only with 1-2 areolae of second row. 3.5-4. – Khab., S Sakh. – Forest zone of Palearctic. – In marshes on Ericaceae (*Vaccinium*, etc.). (Fig. 542: 4) **S. oberti** Kol.

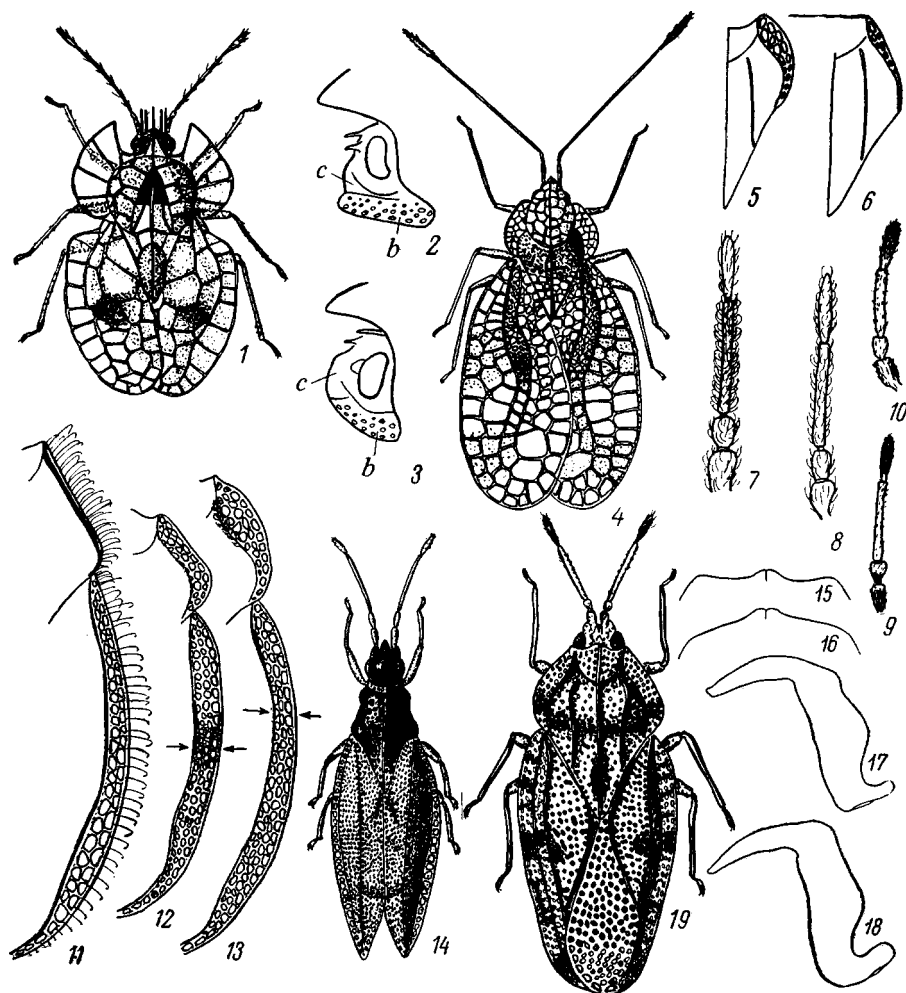


Fig. 542. Heteroptera. Family Tingidae (after Péricart and original).

1, *Galeatus affinis*; 2, 3, head, lateral: 2, *Stephanitis nashi*; 3, *S. oberti*; 4, *S. oberti*; 5, 6, right part of pronotum, dorsal: 5, *Tingis crispata*; 6, *T. helvina*; 7-10, antenna: 7, *T. crispata*; 8, *T. helvina*; 9, *T. cardui*; 10, *T. synuri*; 11-13, paranota and costal area, dorsal: 11, *T. pilosa*; 12, *T. cardui* (arrows show the narrowest place of costal area); 13, *T. synuri*; 14, *Agramma tropidopterum*; 15, 16, apex of female abdomen, ventral: 15, *A. ruficorne*; 16, *A. japonicum*; 17, 18, paramere: 17, *A. ruficorne*; 18, *A. japonicum*; 19, *Tingis cardui*. c, clypeus; b, buccula.

- Hood and median pronotal carina bare; median carina not longer than hood and almost equal to it in height, with 3-5 areolae of second row. 3.4-4. – S Prim. – Japan, Korea, E China, imported to W Europe and other continents. – On *Rhododendron mucronulatum* **S. pyrioides** Scott

10. *Lasiacantha* Stål. Body oval, grayish, yellowish or dark brown, in places with pale tomentum. Pronotum and hemelytra with pale, erect, rather long setae. Head with 5 spines. – 1 species (in USSR 4).

1. Hood not high, rounded. Discoidal area with 4-5 rows of areolae in the middle. 1st antennal segment approximately twice as long as lateral frontal spines; occipital spines not reaching or hardly reaching beyond middle of eyes. 1.9-2.8. – Amur.; south of E Siberia. – China (Inner Mongolia), Mongolia. – On *Thymus*.....
..... **L. kaszabi** Hob. (*mongolica* Nonnaizab, syn. n.)

11. **Tingis** F Usually more or less flattened, without high vesicular formations. Gray, brown, or blackish dorsally. Areolae of pronotum generally small, not transparent (except for apical areolae of membrane). Usually covered with curved or erect (or both), very short or more or less long, recumbent or erect setae; often in places also with pale tomentum. – 10 species (in USSR about 30).

1. Pronotum and hemelytra, including paranota and costal areas, with straight, erect, long setae. Paranota widest near the middle, narrowing anteriorly and posteriorly. (Subgenus *Tropidocheila* Fieb.). 3.95-4.1. – Amur., S Prim. – On *Ajuga multiflora* (Lamiaceae). (Fig. 543: 4) **T. (T.) triseriata** Golub
- Pronotum and hemelytra with strongly curved setae (Fig. 542: 11); if in addition with straight setae (*T. heterotricha*), paranota widening cephalad along their full length 2
2. Anterior margin of hood concave. Bucculae not closed anteriorly; attachment of rostrum visible in anterior view. (Subgenus *Neolasiotropis* E. Wagn.). 3.95-4.1. – S Prim. – Transpalearctic. – On Lamiaceae (*Phlomis*, *Leonurus*, etc.)
..... **T. (N.) pilosa** Hummel
- Anterior margin of hood protruding cephalad as an angle. Bucculae closed anteriorly, so that attachment of rostrum not visible in anterior view. On Asteraceae. (Subgenus *Tingis* E) 3
3. Dorsum with short, curved, recumbent setae; marginal veins of paranota, pronotal carinae, hood, and some veins of costal areas in addition with long, straight, erect setae. 3-3.4. – S Prim. (Fig. 543: 3) **T. heterotricha** Golub
- Pronotum and hemelytra without straight, long setae, covered only with strongly curved or twisted setae 4 [p. 864]
4. Costal area with 1-2 rows of areolae along its full length; if with incomplete 3rd row (*T. lasiocera*), antennae with long, erect setae curved at apex 5
- Costal area with not less than 3 rows of areolae along its full length or at least in posterior half (Fig. 542: 12), and antennae with very short, recumbent or slightly raised setae (Figs. 541: 1, 542: 9, 10) 7
5. Lateral margins of pronotum markedly rounded; paranota with 3 or 4 rows of areolae in the widest place. Costal area more commonly with 3 incomplete rows of areolae. 3-3.25. – S Kur. (Kunashir I., Shikotan I.). – N Japan (Hokkaido, N Honshu). – On *Artemisia vulgaris* s. l. Possibly a mere subspecies of *T. crispata*
..... **T. lasiocera** Mats. (*Copium artemisifolium* Shinji)
- Lateral margins of pronotum weakly rounded, straight, or slightly concave in the middle; paranota with 2-3 rows of areolae in the widest place. Costal area with 2 rows of areolae 6 [p. 865]
6. Paranota bent up and more or less raising above the level of pronotal disc in its lateral corners, usually anteriorly with 2, sometimes 3 rows of areolae well visible in dorsal view, their anterior angles usually reaching well beyond anterior margin of hood (Fig. 542: 5). Setae on 3rd antennal segment usually denser, thicker, more strongly raised and curved than those on the 4th segment (Fig. 542: 7). 2.7-3.35. – Amur., Prim. – Transpalearctic. – Mesophilous. On *Artemisia vulgaris*, possibly on other *Artemisia* **T. crispata** H.-S. (*comosa* Takeya)

- Paranota not raising above the level of pronotal disc in its lateral corners, anteriorly with only 1 row of areolae visible in dorsal view, not reaching or hardly reaching anterior margin of hood (Fig. 542: 6). Setae on 3rd and 4th antennal segments similar (Fig. 542: 8). 2.95-3.3. – Amur., Prim. – NE China, Mongolia. – On *Artemisia vulgaris*, *A. rubripes*, and possibly on other species of *Artemisia* **T. helvina** Jak.
- 7. Occipital spines short, 0.5-0.33 times as long as 2nd antennal segment, or vestigial, badly visible. Paranota with 3 rows of areolae in the widest place (sometimes partly hidden under pubescence) 8
- Occipital spines rather long, not shorter than 2nd antennal segment, their apices reaching or almost reaching anterior margin of an eye. Paranota with not less than 4 rows of areolae in the widest place 9
- 8. 3rd antennal segment 1.7-2 times as long as 4th segment (Fig. 542: 9). Costal area in the narrowest place 1.9-2.2 times as wide as 4th antennal segment. Paranota strongly bent up, along most of their length straight or weakly rounded externally (Fig. 542: 12). 3.1-4. – S Prim. – Transpalearctic. – Mesophilous. On *Carduus*, *Cirsium*. (Fig. 542: 19) **T. cardui** L.
- 3rd antennal segment 1.2-1.3 times as long as 4th segment (Fig. 542: 10). Costal area in the narrowest place 1.5 times as wide as 4th antennal segment. Paranota expanded laterally, markedly rounded externally (Fig. 542: 13). 3.2-3.5. – S Prim. – Korea. – On *Synurus deltoides* **T. synuri** Takeya
- 9. Paranota with 6-7 rows of areolae in the widest part. Costal area with 5 rows of areolae along most of its length. 3.95-4.1. – Prim. – Korea. – On *Saussurea japonica*. (Fig. 541: 1) **T. miyamotoi** Lee
- Paranota with 4-5 rows of areolae in the widest part. Costal area with 4 rows of areolae. 3.45-4.25. – S Khab., Prim. – Transpalearctic. – On *Cirsium*, recorded also from *Carduus* **T. ampliata** H.-S.

12. **Physatocheila** Fieb. Oblong or oval; bare dorsally; reddish brown, yellowish brown, sometimes dark brown, usually with rust-colored hue. Macropterous. Living on trees and bushes. – 4 species (in USSR 8).

1. Lateral pronotal carinae distinctly and usually markedly converging anteriorly; distance between them in the highest place of disc equal to or less than width of vertex; carinae contiguous with bent up paranota at a long distance. Costal area in medial part with not more than 8 small areolae (0.5-0.33 times as large as areolae at its base). 3.1-3.8. – Amur., S Prim.; SE Kazakhstan, Kirgizia, south of European USSR. – Japan, Korea, N China, Mongolia. – On *Salix* (*S. alba*, *S. bebbiana*, *S. rosmarinifolia*, *S. purpurea*) **Ph. distinguenda** Jak.
- Lateral pronotal carinae parallel or weakly converging anteriorly, distance between them in the highest place of disc greater than width of vertex; carinae usually not contiguous with bent up paranota or [p. 867] contiguous with them at a short distance. Costal area in medial part with 10-30 small areolae (0.5-0.25 times as large as areolae at its base) 2
2. Distance between median and lateral pronotal carinae in the highest place of disc twice the width of costal area in its medial part; areolae of costal area (except areolae at base) rather small. 3.65. – S Prim. (Lazovskyi Nature Reserve) ... **Ph. marginulata** Golub
- Distance between median and lateral pronotal carinae in the highest place of disc not more than 1.5 times the width of costal area in its medial part, often subequal to it; areolae of costal area large along most of its length 3

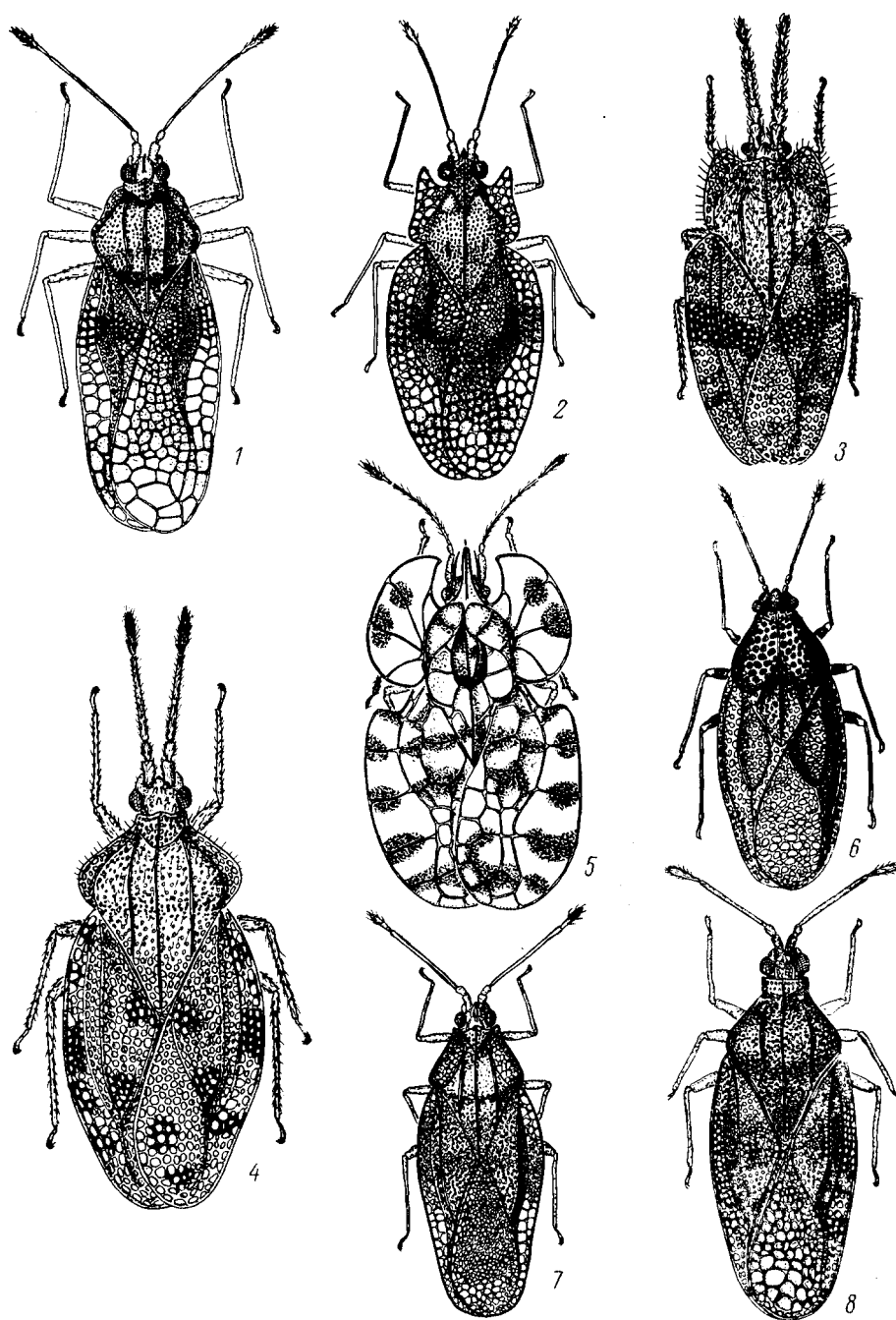


Fig. 543. Heteroptera. Family Tingidae (original).

1, *Metasalis populi*; 2, *Uhlerites debilis*; 3, *Tingis heterotricha*; 4, *T. triseriata*; 5, *Galeatus pardus*; 6, *Dictyla nigra*; 7, *Physatocheila orientis*; 8, *Leptoypha wuorentausi*.

3. Bent up paranota with 35-45 areolae; the latter much larger than (sometimes twice as large as) areolae of costal area in its medial part, usually arranged in 4-5, rarely 6 rows in the widest place. Inner margins of bent up paranota in their medial part usually straight or weakly convex, not touching or hardly touching

anteriorly the lateral pronotal carinae. Length of 3rd antennal segment in males 1.8-2 (rarely 2.1) times, in females 1.6-1.85 (rarely 1.9) times the width of head. On average smaller: 3.2-3.6. – S Khab., Amur., Prim. – Forest-steppes and south of forest zone of Palearctic. – On *Padus*, *Sorbus*, *Malus*, *Pyrus*, *Crataegus*, *Prunus domestica*, *P. spinosa* **Ph. smreczynskii** China (*forsteri* V. Putshkov)

- Bent up paranota with 50-60 areolae; the latter usually not larger or slightly larger than areolae of costal area in its medial part, usually arranged in 7-8, rarely 6 rows in the widest place. Inner margins of paranota distinctly convex along the whole length, almost always touching anteriorly, often at some distance, the lateral pronotal carinae and often covering them dorsally. Length of 3rd antennal segment in males 2.2-2.4 (rarely 2.1) times, in females 1.75-1.9 (very rarely 1.7) times the width of head. On average larger: 3.5-4.5. – S Khab., Amur., Prim., S Sakh., S Kur.; SW Yakutia, Chita Prov. – Japan (Hokkaido), Korea, NE China. – On *Padus*, *Aronia* (in Sakh. sometimes injurious to them), also on *Sorbaria*. (Fig. 543: 7) ***Ph. orientis** Drake

13. *Cysteochoila* Stål. In USSR 1 species.

1. Yellowish brown, with blackish spots. Areolae of pronotum and hemelytra large, separated from each other by thick veins, except for membrane with slender veins. Head with 5 long pale spines. 3-3.1. – S Prim. – Japan, E China **C. monstrosa** Scott

14. *Oncochila* Stål. – 2 species (in USSR 3).

1. Pronotum strongly convex, raised above hemelytra by more than half of head height (in lateral view). Blackish brown; anterior 1/4 of pronotum, margins of its apical process and carinae on the process, bases of hemelytra and apices of their discoidal and subcostal areas dirty white to brownish. Femora black. Hemelytra flat; costal area wider than hind tibia, with distinct areolae arranged in 1, in posterior third in places in 2 rows. 3. – S Prim. (Spassk District) **O. loginovae** Golub
- Pronotum flatter, almost not raised above hemelytra. Dorsum reddish to brown, with paler whitish areas almost as in the previous species. Femora red-yellow. Hemelytra weakly convex; costal area not wider than hind tibia, with only 1 row of areolae. 2.5-3.7. – Khab. (Okhotsk District and Nikolaevsk-on-Amur). – Transpalearctic. – On *Euphorbia* **O. simplex** H.-S.

15. *Leptoypha* Stål (*Birgitta* Lindb.). Dorsally brown, usually with reddish or rust-colored hue; head or in places also pronotum and hemelytra black. Anterior margin of hood straight. Macropterous. In USSR 2 species. [p. 868]

1. Head with 4 spines; occipital spines very short, not reaching the middle of eye. Costal area extremely narrow, with 1 row of minute or indistinct areolae. Vein separating subcostal and discoidal areas smoothed. 3.1-3.5. – S Khab., Prim. – Japan (Hokkaido, Honshu), Korea, E China. – On *Syringa* **L. capitata** Jak. (*tenuimarginata* Lindb.)
- Head with 5 spines; occipital spines long, reaching or almost reaching anterior margin of eye. Costal area rather wide, with 2-3 rows of distinct, not very small areolae. Vein separating subcostal and discoidal areas sharply prominent. 3.4-3.5. – S Khab., Prim. – Korea. – On *Fraxinus* (*F. mandshurica*, *F. rhynchophylla*). (Fig. 543: 8) **L. wuorentausi** Lindb.

16. **Dictyla** Stål. Usually dirty yellow or brown dorsally, with a few black spots, more rarely almost entirely black. Head (with exception of a spot behind eyes), usually also venter of body, disc of pronotum, and 4th antennal segment black. Frons with 2-3 short spines. On Boraginaceae. – 3 species (in USSR about 20). Record of the European *D. convergens* H.-S. from the Far East erroneous.

1. Areolate paranota turned up onto pronotum keeping uncovered posteriorly large part of disc (Fig. 541: 10). Discoidal and subcostal areas together forming small, humped, blackened inflation; discoidal area 2.7-2.8 times as long as wide, with 6-7 rows of areolae; costal area distinctly widened near apex where it is as wide as vertex and with 2 rows of areolae. Body oval, yellow dorsally, with small black spots. 2.85. – S Khab., S Prim. **D. orientalis** Golub
- Turned up paranota covering almost entire disc, keeping uncovered posteriorly only its small part (Fig. 543: 6). Hemelytra without humped inflation; discoidal area 3.4-3.8 times as long as wide, usually with 4-5 rows of areolae; if rarely with 6 rows (some specimens of *D. nigra*), body dorsally almost entirely black; costal area rather narrow along its whole length, in every place 0.66-0.5 times as wide as vertex, even when with small areolae of 2nd row near apex. Elongate 2
2. Body dorsally yellow or brown, with a few small black areas. Sides of pronotum straight or weakly convex anteriorly. {Costal area with 1 row of areolae along its whole length}. 2.6-3.4. – Mag., Amur. – Steppes of Palearctic. – Mainly on *Lappula* **D. platyoma** Fieb.
- Body {often} almost entirely black dorsally, except for whitish hood, yellowish lateral carinae of pronotum and apex of its posterior process, and some small brownish spots on hemelytra. Sides of pronotum {usually} weakly concave in anterior half. {Costal area with 2 rows of areolae in the widest place}. 2.5-3.05. – Amur.; south of Irkutsk Prov. (Fig. 543: 6) **D. nigra** Golub

17. **Cochlochila** Stål. In USSR 1 species.

1. Brown. Hemelytra with large areolae (except for subcostal area), hyaline, with large black spots; each hemelytron with 2 humped inflations. Head black, with brownish yellow spots behind eyes, with 5 long, slender, pale spines. Antennae pale, slender, and long. 3.7-4.5. – S Khab., Amur., Prim. – Japan, Korea, NE China. – In Amur, on *Corylus* wound by liana **C. conchata** Mats.

18. **Agramma** Steph. Head, disc of pronotum, base of pronotal posterior process, and venter of body black; antennae, hood, major part of pronotal posterior process, hemelytra and legs yellow. Hood very low and short, ring-shaped, its anterior margin [p. 869] concave; pronotum without paranota, with 1 very low longitudinal carina. On Cyperaceae and Juncaceae. – 3 species (in USSR 14). Record of *A. laetum* Fall. from the Far East erroneous.

1. Hemelytron along full length with 1 distinct carina separating subcostal area from fused discoidal and sutural areas, pointed at apex. 2.2-2.6. – S Prim. – Forest zone of Palearctic. – In marshes on *Carex*, *Eriophorum*, and *Juncus*. (Fig. 542: 14) ..
..... **A. tropidopterum** Fl.
- Hemelytron without longitudinal carina or with hardly visible one, not divided into areas, rounded at apex. On *Carex* 2
2. Apex of abdomen in females (examine in ventral view) almost directly truncate and usually slightly notched lateral to the median, weakly convex part (Fig. 542: 15). Stalk of paramere (Fig. 542: 17) with well marked, rather sharp incision near

- apex of its external margin. Median carina of pronotum not marked on its posterior process. Brachypterous and subbrachypterous specimens 1.81-2, pseudomacropterous specimens 2.3-2.55. – Amur, S Prim. – Japan, Korea, China, Mongolia, W Europe **A. ruficorne** Germ. (*nexile* Drake)
- Apex of abdomen in females in the form of obtuse angle (Fig. 542: 16). Stalk of paramere (Fig. 542: 18) with straight or indistinctly and smoothly notched external margin. Median carina of pronotum marked along its full length, including posterior process. Brachypterous and subbrachypterous specimens 1.71-2.05, pseudomacropterous specimens 2.1-2.35. – S Prim. (Khasan District), S Kur. (Kunashir I.). – Japan (Hokkaido). *Note.* Takeya (1962) synonymized *A. japonicum* with *A. nexile*, but judging from the descriptions they have distinctions. In case of confirmation of this synonymy, material tentatively referred here to *A. japonicum* should be considered a separate, probably new species. {The identification of *A. japonicum* was subsequently confirmed, but *A. nexile* is a separate species, not synonymous with *A. ruficorne*} **A. japonicum** Drake

23. Family REDUVIIDAE

E.V. Kanyukova

Large, rarely small. Head markedly elongate. Rostrum short, thick, strongly curved. Ocelli usually present. Pronotum usually with well-developed calli. Most species macropterous, some species more or less frequently or always occur as brachypterous or apterous forms. Apices of fore and middle tibiae in some species with velvety fossa spongiosa (Fig. 544: 11) on inner side. Predacious, feeding on various insects; bites of large species are painful. On trees, herbs and the ground, some species live in nests, burrows, buildings, under stones. Attracted to light in the south. A large family well represented in the tropics. – 9 genera, 15 species (in USSR 20 genera, about 90 species).

LITERATURE. Putshkov, P.V. 1981. Keys to the larvae of assassin bugs of the Soviet Far East and description of the preimaginal stages of *Epidaus tuberosus* Yang (Heteroptera, Reduviidae). In: *Novye svedeniya o nasekomykh Dal'nego Vostoka* [New data on the insects of the Far East]: 24-31. Vladivostok. [In Russian]. – Putshkov, P.V. 1982. New and little known species of the genus *Coranus* Curt. (Heteroptera, Reduviidae) in the fauna of the USSR and Mongolia. *Nasekomye Mongolii* 8: 190-199. Leningrad. [In Russian].

KEY TO GENERA

1. Fore femora strongly thickened and widened; fore tibiae saber-shaped, half as long as femora and closely apposed to them; fore tarsi very small, displaced to inner side of tibiae (Fig. 545: 2). Rostrum short, almost completely covered laterally. Abdomen widened, its lateral margins more or less raised. (Subfamily Phymatinae) **9. Phymata** [p. 870]
- Fore legs of different structure, often thicker than middle and hind legs, but not differing from them so sharply. Rostrum longer, well visible laterally 2
2. Fore coxae very long, cylindrical, more than 3 times as long as thick, attached to anterior margin of prothorax, reaching beyond apex of head (Fig. 544: 1). Antennae, middle and hind legs very long and slender. Ocelli absent. (Subfamily Emesinae) 3
- Fore coxae more or less short, usually conical, attached far from anterior margin of prothorax, not reaching beyond apex of head. Ocelli present 4
3. Scutellum usually with spine, there is also a spine on both metanotum and base of abdomen dorsally. Anterior part of pronotum not elongate. Smaller than 8 ..

- 1. **Empicoris**
- Scutellum, metanotum, and base of abdomen without spines. Anterior part of pronotum cylindrical, strongly elongate (Fig. 544: 2). Larger than 12 2. **Gardena**
- 4. 1st antennal segment longer than 2nd segment. Claw of tarsi with a tooth (Fig. 544: 5). (Subfamily Harpactorinae) 5
- 1st antennal segment shorter than 2nd segment. Claw without tooth, simple 7
- 5. Head dorsally with 2 short cornicles posterior to antennal sockets (Fig. 544: 3). Lateral angles of pronotum with 2 black spines 3. **Epidaus**
- Head dorsally without cornicles posterior to antennal sockets. Lateral angles of pronotum rounded, without spines 6
- 6. Scutellum without a longitudinal carina. Posterior lobe of pronotum smooth 4. **Rhynocoris**
- Scutellum with longitudinal carina raising toward the apex. Hind lobe of pronotum with coarse sculpture 5. **Coranus**
- 7. Head smooth between bases of antennae. Pronotum with constriction in posterior third. Fore femora most thick in basal third. (Subfamily Peiratinae) 6. **Peirates**
- Head medially, between bases of antennae with 1 or 2 short processes. Pronotum without constriction. Fore femora most thick in the middle or not thickened. (Subfamily Stenopodainae) 8
- 8. Head with long ventral processes on the sides behind eyes and on the margin (Fig. 544: 12). Apex of scutellum not produced into spine. Fore femora without teeth, not thickened 7. **Pygolampis**
- Head without long processes behind eyes and on the margin. Apex of scutellum produced into long spine. Fore femora toothed, strongly thickened in the middle 8. **Onccephalus**

KEY TO SPECIES OF FAMILY REDUVIIDAE

Note. Keys to species of the genera *Empicoris* and *Coranus* were compiled with the participation of P. V. Putshkov.

1. **Empicoris** Wolff. Resembling mosquitoes because of their long, slender legs and antennae. On trees, in houses and nests. – 4 species (in USSR 7).

- 1. Pronotum before posterior margin with large protuberance directed upwards (Fig. 544: 1). Head and pronotum brown, with exception of 2 pale, smoothed carinae on posterior lobe of pronotum. Posterior margin of pronotum narrowly white; protuberance of pronotum dark brown. Female 6.5. – S Prim. – Rare **E. ussuriensis** Kanyukova
- Pronotum before posterior margin with small tubercle (lower than thickness of 1st rostral segment) or without a tubercle 2
- 2. Fore femora longer than head and pronotum combined. Pterostigma (apical thickening of the vein on anterior margin of hemelytron) entirely pale, without spots. The spine on scutellum not longer than scutellum, slightly arched. Sides of pronotum with indistinct white carina. 5.7-7.5. – Amur., Prim., S Kur. – Forest zone of Holarctic. – On trees **E. vagabunda** L.
- Fore femora shorter than head and pronotum combined. Pterostigma with brown spots 3 [p. 871]
- 3. 1st antennal segment 1.2-1.35 times as long as 2nd segment. Vertex 1.8-3 times as wide as an eye. Pronotum without tubercle near posterior margin. 4-5.3. –

- Amur.; Soviet Central Asia, Caucasus, Ukraine. – Hungary **E. gracilentus** Jak.
 – 1st antennal segment as long as 2nd segment. Vertex not more than 1.5 times as wide as an eye (in dorsal view). Pronotum with distinct tubercle near posterior margin. Female 4.7. – S Prim. – Holotype: female, Prim., Khasan District, Vityaz', 2.VIII.1982 (Kerzhner), kept in Zoological Institute, USSR Academy of Sciences, Leningrad **E. culicimimus** P. Putshkov, sp. n.

2. **Gardena** Dohrn. In USSR 1 species.

1. Brown. Anterior part of body as in Fig. 544: 2. Rings at apices of middle and hind femora black. 12-19. – S Prim. – SE Asia, Australia. – In meadows **G. brevicollis** Stål (*fusca* Fukui)

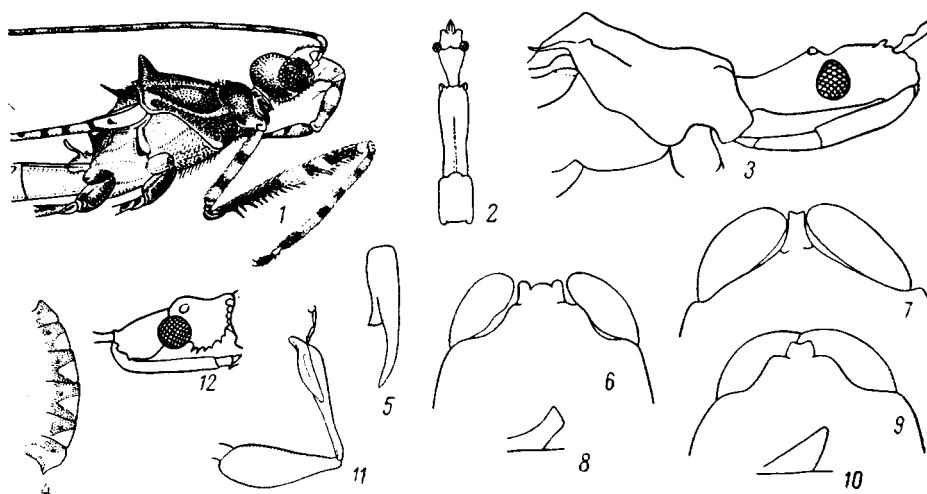


Fig. 544. Heteroptera. Family Reduviidae (after Kerzhner, Putshkov, Hsiao, and original).

1, *Empicoris ussuriensis*, anterior part of body, lateral; 2, *Gardena brevicollis*, same, dorsal; 3, *Epidaurus tuberosus*, same, lateral; 4, *Rhynocoris leucospilus*, connexivum; 5, *Coranus* sp., claw; 6, *C. aethiops*, apex of male genital segment; 7, 8, *C. stenopygus*: 7, apex of male genital segment; 8, apex of scutellum, lateral; 9, 10, *C. hammarstroemi*: 9, apex of male genital segment; 10, apex of scutellum, lateral; 11, *Peirates brachypterus*, fore leg; 12, *Pygolampis bidentata*, head, lateral.

3. **Epidaurus** Stål. In USSR 1 species.

1. Color brownish rufescent. Head behind eyes black. Pronotum with 4 short, obtuse, black spines (Fig. 544: 3). 19-22.5. – S Khab., Prim. – E China. – On deciduous trees **E. tuberosus** Yang (*Nagusta czerckii* Mamajeva)

4. **Rhynocoris** Hahn. On trees, bushes, and herbs; diurnal. – 1 species (in USSR to 20).

1. Black; connexivum with large yellow or red spots. Legs black dorsally; femur ventrally with 2 yellow-brown spots. Always macropterous. 11.5-15. – Mag., Kamch., Khab., Amur., Prim., Sakh., S Kur.; E Siberia north to Yakutsk and Kolyma. – Japan, Korea, China, Mongolia. (Fig. 544: 4) **Rh. leucospilus** Stål

5. **Coranus** Curt. Black; covered with erect setae. On the ground in dry open habitats and in litter of light deciduous forests. – 4 species (in USSR to 20). [p. 872]

1. Larger: 13-18. Usually apterous; in macropterous specimens, hemelytra entirely black. Connexivum with small yellow spots in posterior corners of segments.

- Legs entirely black. – Amur., Prim., S Kur. (Kunashir I.); Transbaik. – Japan, Korea, E China, Mongolia **C. dilatatus** Mats.
- Smaller: 8.5-14.3. Usually brachypterous; in macropterous specimens, hemelytra reddish brown, with gray pubescence, rarely black. Connexivum with yellow longitudinal spots, length of the spots not less than one-third of segment. Legs black, with yellow spots 2
2. Venter of abdomen entirely pitch-black, less commonly with a row of small yellow spots on lateral parts of sternite. Process of male genital segment relatively wide (Fig. 544: 6); genital segment 4.2-5.5 times as wide as the process near apex. 9-14.3. – Mag., Kamch., Khab., Prim.; Siberia, E Kazakhstan, Urals, Caucasus, NW of European USSR. – Mongolia, Finland **C. aethiops** Jak.

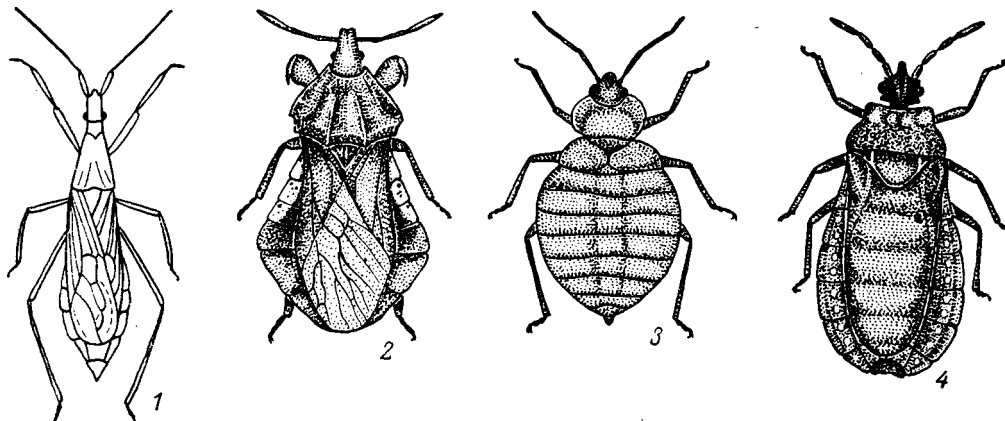


Fig. 545. Heteroptera. Families Reduviidae, Cimicidae, and Aradidae (after Esaki and Kerzhner).

1, *Pygolampis bidentata*; 2, *Phymata crassipes*; 3, *Cimex lectularius*; 4, *Aneururus macrotylus*.

- Venter of abdomen in males always, in females often yellowish, rufescent or brownish, with black median stripe (in males often, in females sometimes indistinct). Process of male genital segment narrow (Fig. 544: 7, 9) 3
3. Process of male genital segment very narrow (Fig. 544: 7); the genital segment 11-24 times as wide as the process near apex. Black median stripe on abdominal venter in light-colored females usually reaching genital plates, 2-5 times as wide as hind femora; in dark-colored males, continuous pale stripe usually present along lateral part of sternite, rarely entire venter of abdomen black. Apex of scutellum usually blunted (Fig. 544: 8). 9.8-13.5. – S Khab., Amur., S Sakh.; south of E Siberia. – E China, Mongolia **C. stenopygus** P. Putshkov
- Process of male genital segment less narrow (Fig. 544: 9); the genital segment 5.5-8.3 times as wide as the process near apex. Black median stripe on abdominal venter in females not reaching genital plates, not more than 1.5 times (rarely twice) as wide as hind femora. Apex of scutellum usually more acute (Fig. 544: 10). 8.5-12. – Amur., S Prim.; E Siberia to Altai. – China, Mongolia **C. hammarstroemi** Reut.
6. **Peirates** Serv. (*Pirates* Burm.). Fore and middle tibiae apically with fossa spongiosa (Fig. 544: 11). – 1 species (in USSR 2).
1. Black; hemelytra brownish. Brachy- and macropterous. 14-16. – Prim. – Korea, E China. {Valid name: *P. turpis* Walk.} **P. brachypterus** Horv. [p. 873]

7. **Pygolampis** Germ. Body flattened. Apex of abdomen in females pointed, in males with produced lateral corners between which the apex of genital segment is visible. In USSR 1 species.

1. Brownish. Macropterous. 12-14. – Khab., Amur., Prim., Sakh., S Kur. – Transpalearctic. (Fig. 545: 1) **P. bidentata** Gz. (*cognata* Horv.)

8. **Oncocephalus** Klug. Apex of abdomen in females pointed, in males rounded. n litter, under stones, etc.; attracted to light. – 1 species (in USSR 9). {In addition, *O. assimilis* Reut. and *O. femoratus* Reut. are found in Prim.}.

1. Brownish yellow; hemelytra with brown spots. Brachy- and macropterous. 20-21.5. – S Khab., Prim. – Korea, NE China **O. simillimus** Reut.

9. **Phymata** Latr. Apex of head with triangular notch. Abdomen rhomboidal, its sides not covered by hemelytra. – 1 species (in USSR 2).

1. Dorsum dark brown; antennae, legs, and venter brownish yellow; sides of abdomen whitish anteriorly. 7-8. – Amur., Prim., Sakh. – Transpalearctic; rare in the north. – In meadows and forest glades, often on flowers. (Fig. 545: 2) **Ph. crassipes** F

Infraorder PENTATOMOMORPHA

24. Family ARADIDAE

E.V. Kanyukova

Medium-sized or small, strongly flattened, brown or black. Head between antennae prolonged into a more or less long process; pointed tubercles originating external to antennal sockets. Eyes small; ocelli absent. Hemelytra mostly complete, but always slightly shorter than abdomen; membrane very large, beginning immediately behind scutellum and occupying large part of hemelytra or almost the whole hemelytra. Feeding mostly on fungi, living on polypori, on and under bark of trees, especially on burnt or felled trees, on stumps, rarely in galleries of bark beetles or in litter under trees. In USSR 7 genera. – 50 species (in USSR more than 70).

LITERATURE. Josifov, M. and I.M. Kerzhner. 1974. Zur Systematik der ostpaläarktischen Mezira-Arten (Heteroptera, Aradidae). Reichenbachia 15 (7): 49-59. – Kiritshenko, A.N. 1913. Dysodiidae and Aradidae. Fauna Rossii 6 (1): 1-301. St.Petersburg. [In Russian; with Latin diagnoses]. – Usinger, R.L. and R. Matsuda. 1959. Classification of the Aradidae (Hemiptera – Heteroptera). 410 p. London.

KEY TO GENERA

1. Scutellum triangular, with more or less straight lateral margins and pointed apex. 4th antennal segment shorter than or equal to 3rd segment 2
- Scutellum semicircular; if somewhat triangular, then with broadly rounded apex (Fig. 545: 4). 4th antennal segment markedly longer than 3rd segment. (Subfamily Aneurinae) 2. **Aneurus**
2. Rostrum reaching beyond base of head. Trochanters of fore and middle legs fused with femora. Genae not prolonged anteriorly on each side of clypeus (Figs. 548: 1-3). (Subfamily Aradinae) 1. **Aradus**
- Rostrum very short, lying completely in groove on ventral side of head. Trochanters not fused with femora. Genae prolonged anteriorly beyond clypeus

- (Figs. 548: 4, 5). (Subfamily Mezirinae) 3
3. Head behind eyes without pointed lateral processes. Membrane transparent, colorless (Fig. 549: 3). Small: not more than 3.6 3. **Acoryphocoris** [p. 874]
- Head behind eyes with pointed lateral processes. Membrane not transparent, smoky brown or black. Larger: more than 6 4
4. Pronotum with angulate projection on lateral margin anterior to each humeral angle (Fig. 546: 7). Membrane wrinkled, but without veins 5. **Usingerida**
- Pronotum without angulate projections on lateral margin. Membrane with distinct veins 5

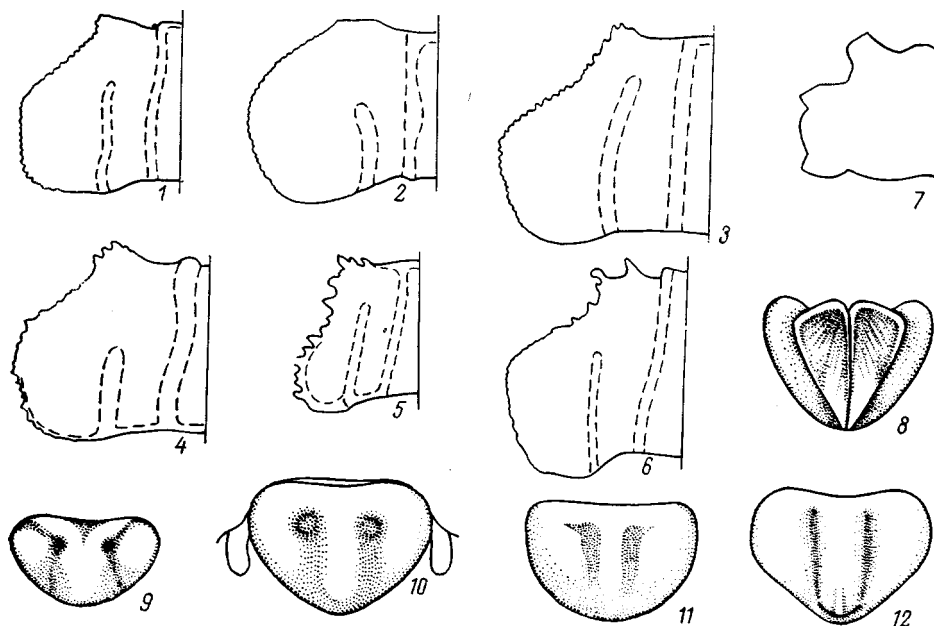


Fig. 546. Heteroptera. Family Aradidae (after Josifov and Kerzhner and original).

1-7, lateral margin of pronotum (its left half is shown): 1, *Aradus lugubris*; 2, *A. frigidus*; 3, *A. dissors*; 4, *A. depressus*; 5, *A. czerskii*; 6, *A. nemtshinowae*; 7, *Usingerida verrucigera*; 8-12, genital segment of male: 8, *Mezira verruculata*; 9, *M. subtilis*; 10, *M. setosa*; 11, *M. subsetosa*; 12, *M. ludviki*.

5. Abdominal segments IV-VI with basal transverse carina. Lateral margin of pronotum without angulate notches in anterior half (Fig. 548: 4) 4. **Neuroctenus**
- Abdominal segments without basal transverse carina. Anterior corners of pronotum usually prolonged anteriorly in the form of small blades; if the blades weakly marked, lateral margin of pronotum with angulate notch on each side in anterior half (Fig. 548: 5) 6. **Mezira**

KEYS TO SPECIES OF FAMILY ARADIDAE

1. **Aradus** Stål. {E} – 33 species (in USSR about 60).
1. Lateral margins of pronotum smooth or finely serrate, but without long teeth (Figs. 546: 1-3) 2
- Lateral margins of pronotum entirely or at least at anterior angles with long teeth (Figs. 546: 4-6; 547: 2, 4, 7, 14, 15) 15

2. Hemelytra longer than scutellum 3
- Hemelytra shorter than scutellum {rarely macropterous}. 6.2.– Amur. {Valid name: *Quilnus brevirostris* Horv.} **A. amurensis** Kir.
3. Anterior corners of pronotum whitish. Legs yellowish or light brown, with brown spots 4
- Pronotum entirely black or dark brown. Femora black or dark brown 5
4. Scutellum yellow or light brown with black apical margin. Antennae thin, thinner than fore femora. Rostrum reaching middle of mesothorax. Brachy- and macropterous. 7-9. – S Khab., Prim. – Korea. On deciduous trees **A. ussuriensis** Jak. [p. 875]
- Scutellum black with yellow apex. Antennae thick, thicker than fore femora. Rostrum reaching fore coxae. Macropterous. 6.2-8. – Amur., Prim., Sakh., S Kur. **A. transiens** Kir.
5. Rostrum reaching fore coxae but not beyond them 6
- Rostrum reaching beyond fore coxae 9
6. 3rd antennal segment entirely white. Lateral margin of pronotum anteriorly straight, not notched (Fig 548: 3). 5-6.8. – Mag., Khab.; Siberia, north of European USSR. – Europe, Canada. (Fig. 548: 3) **A. signaticornis** R. Sahlb.
- Antennae entirely black. Lateral margin of pronotum notched anteriorly (Figs. 546: 1, 3) 7
7. Lateral margin of pronotum with angulate notch anteriorly; lateral angles of pronotum not rounded. Lateral margins of scutellum highly elevated upwards. Apical corners of connexival segments not yellow-bordered. 5.8-6.6. – Amur., Prim. **A. semilacer** Kir.
- Lateral margin of pronotum with rounded notch anteriorly; lateral angles of pronotum rounded. Lateral margins of scutellum elevated upwards but not highly. Apical corners of connexival segments usually yellow-bordered 8
8. Lateral margins of pronotum behind the middle markedly converging to the base, as in Fig. 546: 2. Dark brown or, more often, black. 5.5-7. – S Khab., Amur., Prim. – Forest zone of Palearctic **A. aterrimus** Fieb. (*morio* Jak.)
- Lateral margins of pronotum behind the middle almost parallel, weakly converging to the base, as in Fig. 546: 1. Brown. 5.3-6. – Amur., Prim. – Forest zone of Palearctic, north. – On conifers **A. laeviusculus** Reut.
9. 3rd antennal segment entirely yellow, half as long as 2nd segment. Black; a spot near base of corium whitish yellow. Apices of femora and tibiae (except their apices) light brown, almost yellow. 4-5.5. – Prim.; E Siberia **A. pulchellus** J. Sahlb.
- 2nd and 3rd antennal segments whitish at apex or entirely dark 10
10. 2nd and 3rd antennal segments whitish at apex (Fig. 549: 2). Lateral margins of pronotum slightly notched anteriorly, almost parallel behind the middle (Fig. 546: 1). 4.5-6. – Chuk., Mag., Kamch., Khab., Amur., Prim., Sakh. – Holarctic. – On conifers **A. lugubris** Fall.
- 2nd and 3rd antennal segments dark at apex. Lateral margins of pronotum behind the middle not parallel, converging to base 11
11. Outer margin of corium forming bladelike widening in basal half 12
- Outer margin of corium not forming widening in basal half 14
12. Lateral margin of pronotum notched before the middle (Figs. 548: 1, 2). Bladelike widening of corium usually with whitish spot. 2nd antennal segment almost twice as long as 3rd segment 13
- Lateral margin of pronotum straight, not notched anteriorly (Figs. 546: 2). Bladelike widening of corium without white spot. 2nd antennal segment almost

- as long as 3rd segment or slightly longer (Fig. 549: 1). 5.2-6.4. Brachy- and macropterous. – Mag.; Yakutia, Transbaikal. – Mountains of W Europe **A. frigidus** Kir
13. Smaller: 5.8-6.5. Lateral margin of pronotum black. 2nd antennal segment shorter than head. – S Khab.; E Siberia **A. vitiosus** Jak.
- Larger: 6-8.5. Lateral margin of pronotum {sometimes} white in posterior half anterior to base. 2nd antennal segment as long as head. – Mag., Khab., Amur., Prim., Sakh., S Kur. – Forest zone of Palearctic. – On conifers. (Fig. 548: 1) **A. crenaticollis** R. Sahlb.
14. Lateral margin of pronotum as in Fig. 548: 2. Abdominal segment VIII in both sexes as in Figs. 547: 10, 11. 4.5-5.5. – Chuk., Mag., Kamch., Khab., Amur.; north of European USSR. – Mongolia, Finland. – On conifers. (Fig. 548: 2) **A. angularis** J. Sahlb.
- Lateral margin of pronotum as in Fig. 546: 3. Abdominal segment VIII in both sexes as in Figs. 547: 12, 13. 5.2-6.2. – S Khab., Amur., Prim. – NE China **A. dissors** Kir. [p. 876]
15. Sides of pronotum projecting laterally in the form of winglike lobes markedly protruding beyond lateral margins of hemelytra (Fig. 547: 14). Margins of scutellum in posterior half white-bordered at a short distance. Apices of connexival segments protruding posteriad and forming large teeth 16
- Lateral margins of pronotum not forming winglike lobes; if the margins projecting laterally, pronotum only slightly wider than hemelytra. Margins of scutellum not white-bordered. Apices of connexival segments not forming large teeth. 17
16. 3rd antennal segment black. Lateral margins of pronotum with large denticles (Fig. 547: 14). 6.3-9.5. – Prim., S Kur. (Kunashir I.). – Korea, NE China **A. bergrothianus** Kir.
- 3rd antennal segment white, only base brown. Lateral margins of pronotum with small denticles. 8.8-10. – S Prim. **A. compar** Kir.
17. Anterior corners of pronotum white; the rest of pronotum dark brown or black. Two depressed smooth spots on vertex almost rounded, sharply standing out because of dark color 18
- Anterior corners of pronotum dark; if pale, lateral margins of pronotum entirely pale. Two depressed spots on vertex narrow, less distinct 20
18. 2nd antennal segment as long as or longer than 3rd segment. Connexivum pale, with brown spots on lateral margins of each segment 19
- 2nd antennal segment slightly shorter than 3rd segment. Connexivum brown, only apical corners of segments sometimes pale. 5.4-7.8. – Prim. **A. spinicollis** Jak.
19. 2nd-4th antennal segments brown, with darker apices. Angles of connexival segments acute, protruding posteriad. 5.2-7. – S Khab., Amur., Prim., S Sakh., S Kur. – Japan **A. consentaneus** Horv.
- 2nd-4th antennal segments black. Angles of connexival segments right, not protruding posteriad. Pronotum as in Fig. 546: 4. 5-6.5. – Prim.; Siberia, European USSR, Caucasus. – Forest zone of Europe. – Under bark of deciduous trees **A. depressus** F.
20. Rostrum short, not reaching fore coxae 21
- Rostrum long, reaching or reaching beyond posterior margin of prothorax .. 22
21. 2nd and 3rd antennal segments brown, with pale apices. Pronotum not widened laterally, with straight lateral margins (Fig. 546: 5). Yellow-brown, without white longitudinal stripes. 4.2-5.5. – Prim. – In galleries of *Ips sexdentatus* on *Pinus koraiensis* **A. czerskii** Kir.
- 2nd and 3rd antennal segments yellow. Pronotum widened laterally, with

- rounded lateral angles. Head, median pronotal carinae, spots and stripes on scutellum and on corium whitish. 9.9. – S Prim. **A. gretae** Kir.
22. Scutellum narrow, 1.6-1.7 times as long as wide at base, its lateral margins straight, apical fourth whitish. 6.7-9. – S Khab., Prim. – Forest zone of Palearctic – On *Picea* **A. betulinus** Fall.
- Scutellum broad-triangular, unicolorous, only sometimes at very apex narrowly whitish 23
23. Antennae entirely black or dark brown 24
- 3rd antennal segment, sometimes also 2nd segment whitish at apex 26
24. Antennae slender. 2nd antennal segment almost twice as long as 3rd segment. Anterior angles of pronotum with long teeth (Fig. 546: 6). Body narrow; abdomen slightly widened. 4.6-6.4. – S Khab., Amur., Prim., Sakh.; Siberia, Urals. – Japan **A. nemtschinowae** Jak.
- Antennae thick. 2nd antennal segment as long as or hardly longer than 3rd segment. Anterior angles of pronotum without long teeth (Fig. 547: 15). Body markedly widened at the level of abdomen 25
25. Pronotum slightly widened in medial part, not wider than base of hemelytra; its lateral margins posterior to middle almost parallel, with denticles as in anterior part of pronotum (Fig. 547: 15). Entirely black. 6.5-8.5. – S Khab., Amur., Prim. – Forest zone of Palearctic. – On old trees of *Picea* **A. erosus** Fall.
- Pronotum strongly widened in medial part, wider than base of hemelytra; its lateral margins markedly converging posterior to [p. 877] middle, with only small denticles in this part. Brown-black; tibiae usually whitish basally and apically. 8-10. – Mag., Kamch., Amur., Prim. – Forest zone of Palearctic **A. brevicollis** Fall.
26. 2nd antennal segment and legs with a few whitish tubercles. Middle of scutellum generally with transverse elevation 27
- 2nd antennal segment and legs without whitish tubercles. Middle of scutellum without a transverse elevation 30
27. 2nd antennal segment at apex almost twice as wide as at base. Connexivum and abdominal segments along hemelytra unicolorous, brown, only apical corners of segments [p. 878] pale. Male genital segment as in Fig. 547: 3. 8.5-9. – Mag., Khab., Amur., Prim. – Forest zone of Palearctic **A. anisotomus** Put.
- 2nd antennal segment at apex only slightly wider than at base. Connexivum and abdominal segments along hemelytra either brown, or black with yellow spots and dots, or yellow with brown spots 28
28. In females, the last 2 abdominal segments strongly elongate, the width of segment VII at base not more than 1.2-1.3 times the length of segments VII and VIII combined. Male genital segment as in Figs. 547: 5, 6 29
- In females, the last 2 abdominal segments not elongate, the width of segment VII at base more than 1.5-1.7 times the length of segments VII and VIII combined. Male genital segment as in Fig. 547: 1. Pronotum as in Fig. 547: 2. 7.7-9.6. – Mag., Khab., Amur., Prim.; Siberia, SE Kazakhstan, E Kirgizia. – Japan, NE China. – On *Populus*, *Salix*, etc. **A. hieroglyphicus** J. Sahlb.
29. Lateral margin of pronotum angulate (Fig. 547: 4). 3rd antennal segment entirely white; 2nd segment longer than head. Male genital segment as in Fig. 547: 5. 9-11.2. – Prim. – On deciduous trees **A. herculeanus** Kir.
- Lateral margin of pronotum rounded. 3rd antennal segment brown at base or entirely; 2nd segment slightly shorter than head. Male genital segment as in Fig. 547: 6. 6.6-10.5. – Kamch., Khab., Amur., Prim. – Forest zone of Palearctic. – On deciduous trees **A. betulae** L.

30. Rostrum not reaching beyond posterior margin of prothorax. 2nd antennal segment, head, and entire anterior part of pronotum black, sometimes body entirely black. Lateral margin of pronotum as in Fig. 547: 7. 5.6-9. – Khab., Amur., Prim., Sakh., S Kur. – Forest zone of Palearctic. – On conifers and deciduous trees
 *A. corticalis* L. (*annulicornis* F., *melas* Jak., *kiritshenkoi* Korm.)



Fig. 547. Heteroptera. Family Aradidae (original).

1, 2, *Aradus hieroglyphicus*; 3, *A. anisotomus*; 4, 5, *A. herculeanus*; 6, *A. betulae*; 7, *A. corticalis*; 8, *A. pictellus*; 9, *A. pictus*; 10, 11, *A. angularis*; 12, 13, *A. dissors*; 14, *A. bergrothianus*; 15, *A. erosus*; 16, *Aneurus glaberrimus*. 1, 3, 5, 6, 8, 9, apex of abdomen and genital segment of male, dorsal (left half); 2, 4, 7, 14, 15, lateral margin of pronotum (its left half is shown); 10-13, apex of abdomen (its left half), dorsal (10, 12, male; 11, 13, female); 16, apex of female abdomen. at, anal tube; pm, paramere; pn, parandrium.

- Rostrum reaching beyond posterior margin of prothorax or reaching the middle of mesothorax. 2nd antennal segment, head, and pronotum brown 31
 31. Uniformly brown; apical corners of connexival segments pale. 7-8. – Prim. – Ja-

- pan. – Under bark of *Pinus koraiensis* **A. unicolor** Kir.
- Sides of pronotum, hemelytra whitish; abdomen yellow with brown and red spots 32
32. 2nd antennal segments shorter than head, its length 0.9-1. Male genital segment as in Fig. 547: 8. 5.5-7.8. – Prim., S Kur. – On polypori of coniferous trees **A. pictellus** Kerzh.
- 2nd antennal segment as long as head, its length 1.1-1.3. Male genital segment as in Fig. 547: 9. 6.5-9. – S Khab., Prim. – Forest zone of Palearctic. – On polypori of coniferous trees **A. pictus** Bär.

2. **Aneurus** Curt. Under coming off bark of stubs and logs, in splits of bark on branches and thin trunks of various trees. – 6 species (in USSR 7). {*A. galiae* and *A. nipponicus* are now placed in *Paraneurus* Jacobs, and *A. glaberrimus*, in *Aneurillodes* Heiss}.

1. Body entirely smooth, strongly shining, without tubercles. Scutellum with groove along lateral margins. Connexival segments II (1st visible) and III fused. An additional sclerite, so called paratergite (Fig. 547: 16), present between tergite VII and laterotergite VII (segment of connexivum). (Subgenus *Aneurillus* Korm. {now upgraded to genus}). 3.9-4.2. – S Kur. (Kunashir I., Shikotan I., Iturup I.) **A. (A.) glaberrimus** Kerzh.
- At least head and part of pronotum with small tubercles. Scutellum with carina along lateral margins. Connexival segments II and III separated by a suture. Additional sclerite between tergite VII and laterotergite VII absent. (Subgenus *Aneurus* Curt.) 2
2. Spiracle of segment V situated laterally (on margin of abdomen) 3
- Spiracle of segment V situated ventrally 4
3. Anterior outer angles of antenniferous tubercles not pointed. Scutellum with median smooth stripe and longitudinal furrows lateral to it, only apical [p. 879] third of scutellum with tubercles. Base of scutellum raised in the form of narrow carina. 4-4.8. – S Kur. (Kunashir I.). – SE China **A. nitidulus** Korm.
- Angles of antenniferous tubercles pointed. Entire scutellum with uniformly scattered tubercles. Base of scutellum not raised in the form of carina. 4.2-6.5. – S Khab., Prim., Sakh., S Kur. – Japan, Korea. (Fig. 545: 4) **A. macrotylus** Jak.
4. Spiracle of segment VI situated laterally. Base of membrane dull at a long distance. 4.5-5.2. – S Kur. (Kunashir I.) **A. galiae** Kerzh.
- Spiracle of segment VI situated ventrally. Entire membrane more or less shining 5
5. Head slightly wider than long; postocular angles acute. Posterior margin of connexival segment VII truncate. Projections of segment VIII in males rodlike. Male genital segment in basal half with converging, in distal half with parallel lateral margins. In females, posterior angles of tergite VII not reaching the margin of abdomen. 4.5-6. – S Khab., Prim., Sakh. – Transpalearctic **A. avenius** Duf.
- Head of subequal width and length; postocular angles rounded. Posterior margin of connexival segment VII not truncate. Projections of segment VIII in males triangular. Male genital segment from the base with parallel lateral margins. In females, posterior corners of tergite VII in the form of triangular projection reaching the margin of abdomen. 4.3-5.5. – Sakh., S Kur. (Kunashir I., Iturup I.). – Japan **A. nipponicus** Korm. et Heiss

3. **Acoryphocoris** Us. et Matsuda. In USSR 1 species.

1. Dark brown; apex of head, collar, abdomen (with exception of rounded carina behind membrane), antennae, and legs paler. Female 3.6. – S Prim. – Under bark of *Fraxinus*. Rare. (Fig. 549: 3) **A. kerzhneri** Kanyukova

4. **Neuroctenus** Fieb. In USSR 3 species.

1. 3rd antennal segment the longest. Spiracles separated from lateral margins of each abdominal segment with distinct, wavy, yellow, longitudinal carinae. Abdomen broadly rounded; apex of each connexival segment yellow-bordered. 6.5-7.5. – S Khab., Prim. – E China **N. castaneus** Jak.
- 3rd antennal segment not longer than 1st or 2nd segment. Spiracles not separated from lateral margins of abdominal segments with distinct, pale carinae. Abdomen elongate-oval; apices of connexival segments without yellow border 2
2. Membrane dirty white with veins and outer margins brown. Lateral margins of abdomen almost parallel. Smaller: 6-6.6. – S Prim. **N. macer** Kir.
- Membrane dark brown or black, only base pale. Abdomen widened posteriad. Larger: 8-10.5. – Prim. (Fig. 548: 4) **N. ater** Jak.

5. **Usingerida** Korm. Postocular processes of head needle-shaped. Anterior corners of scutellum with yellow spots. 3rd antennal segment shorter than 2nd segment. In USSR 1 species.

1. Head, pronotum, scutellum, apices of corium and pregenital segment dark brown. Anterior corners of pronotum with right-angled incision (Fig. 546: 7). 6.5-7.5. – Prim. – SE Asia **U. verrucigera** Bergr.

6. **Mezira** Am. et Serv. In USSR 6 species.

1. Postocular process of head with sharp, bladelike posterior margin. Lateral margins of pronotum straight anteriorly. Connexivum unicolorous. 7.5-9. – Prim. (ssp. *ussuriensis* Vásárhelyi); European USSR, Caucasus. – W Europe **M. tremulae** Germ. [p. 880]
- Postocular process of head conical, its posterior margin not sharp. Lateral margins of pronotum concave anteriorly (Fig. 548: 5). Connexivum bicolorous, with yellow spots either at apex, or at apex and base of each segment (Figs. 548: 5-8) 2
2. Corium dark brown. Connexival segments in male with not protruding apical angles (Figs. 548: 5-7). Male genital segment without median suture (Figs. 546: 9-12) 3
- Corium pale brown or yellow-brown, its apical margin dark brown. Connexival segments in male with protruding apical angles (Fig. 548: 8). Male genital segment with median suture (Figs. 546: 8). 7.5-8.5. – Prim. **M. verruculata** Kir.
3. Smaller. Connexival segments III and IV always yellow-bordered at apex (Fig. 548: 6). Male genital segment very small (Fig. 546: 9). 6.3-7.2. – Prim. **M. subtilis** Jos. et Kerzh.
- Larger. Usually connexival segments III and IV with only outer apical corner or outer and inner [p. 881] corners with yellow spots (Figs. 548: 5, 7); if these segments yellow-bordered at apex, body length not less than 7.8 4
4. Connexival segments VI and VII yellow only at apex. Outer margins of hemelytra notched at base. Male genital segment as in Fig. 546: 10. 7-8.7. – Prim. **M. setosa** Jak.
- Connexival segments VI and VII or at least segment VII yellow at base and apex

- (Figs. 548: 5, 7). Outer margins of hemelytra straight and parallel at base (Fig. 548: 5) 5
5. Connexival segments VI and VII yellow at base and apex (Fig. 548: 5). Male genital segment uniformly rounded posteriorly (Fig. 546: 11). 6.7-8.4. – Prim., S Kur. (Kunashir I.). (Fig. 548: 5) *M. subsetosa* Jos. et Kerzh.

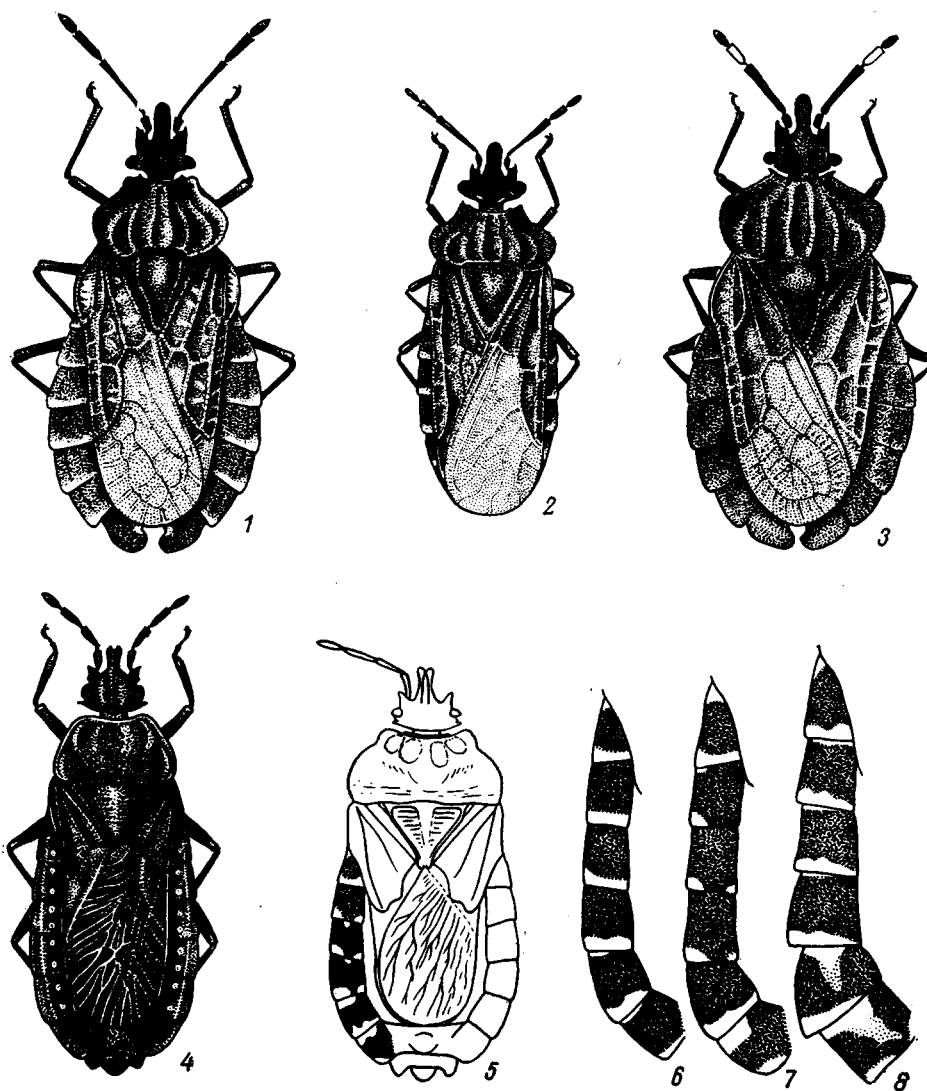


Fig. 548. Heteroptera. Family Aradidae (after Josifov and Kerzhner and Kiritshenko).

1, *Aradus crenaticollis*; 2, *A. angularis*; 3, *A. signaticornis*; 4, *Neuroctenus ater*; 5, *Mezira subsetosa*; 6-8, connexivum: 6, *M. subtilis*; 7, *M. ludviki*; 8, *M. verruculata*.

- Only connexival segment VII yellow at base (Fig. 548: 7). Male genital segment protruded caudad, with short, yellowish carina in the middle close to apex (Fig. 546: 12). 6.8-8.2. – Prim. – Korea
 *M. ludviki* Jos. et Kerzh. (*hoberlandti* Jos. et Kerzh.)

25. Family PIESMATIDAE

E.V. Kanyukova

Mandibular plates of head prolonged anteriorly as 2 small processes. Ocelli present. Rostrum and antennae 4-segmented. Hemelytra with a dense network of cells; macropterous specimens with almost entirely transparent membrane; in brachypterous specimens hemelytra covering entire abdomen but not overlapping posteriorly. Phytophagous; adults hibernating. In USSR 1 genus, 10 species.

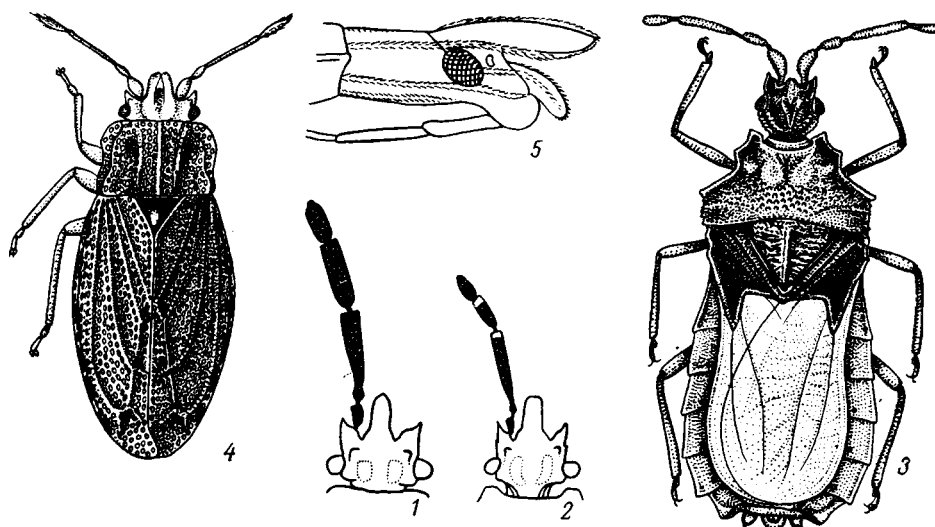


Fig. 549. Heteroptera. Families Aradidae, Piesmatidae, and Berytidae (after Vinokurov, Heiss and Péricart, and original).

1, 2, head with antenna: 1, *Aradus frigidus*; 2, *A. lugubris*; 3, *Acoryphocoris kerzhneri*; 4, *Piesma josifovi*; 5, *Neides propinquus*, head, lateral.

LITERATURE. Heiss, E. and J. Péricart. 1983. Revision of Palearctic Piesmatidae (Heteroptera). Mitt. Münch. Entomol. Ges. 73: 61-171.

KEY TO SPECIES OF FAMILY PIESMATIDAE

1. **Piesma** Lap. Small, usually pale, elongate-oval, markedly flattened. Mainly on Chenopodiaceae and Caryophyllaceae. – 2 species (in USSR 10). [p. 882] {Subsequently added *P. capitatum* Wolff, S Prim. *P. josifovi* is now placed in *Parapiesma* Pér.}.

1. Pronotum with 3 longitudinal carinae. 3rd antennal segment markedly longer than 1st and 2nd segments combined. Usually brachypterous, membrane absent. 2.4-2.9. – S Prim. – Korea, E China, Mongolia. – On *Chenopodium*. (Fig. 549: 4) ...
..... **P. josifovi** Pér.
- Pronotum with 2 longitudinal carinae. 3rd antennal segment subequal in length to 1st and 2nd segments combined. Usually macropterous. 2.3-3. – S Khab., Amur., Prim. – Transpalearctic. – On *Chenopodium* and *Atriplex*
..... **P. maculatum** Lap.

26. Family BERYTIDAE

E.V. Kanyukova

Narrow and elongate, resembling midges. Antennae and legs long, slender; antennae at rest folded in two. Apices of 1st antennal segment and femora more or less clavate. Head often with median process anteriorly. Phytophagous. – 3 genera, 3 species (in USSR 6 genera, about 20 species).

KEY TO GENERA

1. Frons produced above clypeus into a laterally compressed crest or cone (Fig. 549: 5). Scutellum triangular, without spine at apex. Abdomen ventrally with dense punctation 2
- Frons rounded anteriorly, without crest or cone. Scutellum with blunt horizontal spine at apex. Abdomen ventrally smooth 3. **Metatropis**
2. Rostrum reaching middle coxae; its 1st segment almost half as long as head. Antennae hardly shorter than body; 2nd antennal segment much longer than clava of 1st segment. Hind femora reaching apex of abdomen 1. **Neides**
- Rostrum reaching fore coxae; its 1st segment 0.25-0.33 times as long as head. Antennae markedly shorter than body; 2nd antennal segment shorter than clava of 1st segment. Hind femora far not reaching apex of abdomen 2. **Berytinus**

KEY TO SPECIES OF FAMILY BERYTIDAE

1. **Neides** Latr. – 1 species (in USSR 2).
1. Grayish brown. Inflation on apices of femora and 1st antennal segment, 4th antennal segment entirely, apices of tibiae, tarsi, apex of corium, and spots on membrane usually black. 8.5.-11. – S Khab., Amur., Prim.; E Siberia. – Mongolia. – Steppes **N. propinquus** Horv.
2. **Berytinus** Kirk. – 1 species (in USSR about 10).
1. Clava of 1st antennal segment pale; 4th antennal segment black. Apices of femora pale brown; 2nd tarsal segment black. 6.4-8.4. – Mag., Kamch., Amur., Prim. – Forest zone of Palearctic. – On herbaceous Fabaceae **B. clavipes** F.
3. **Metatropis** Fieb. In USSR 1 species.
1. Reddish brown. Antennae and legs yellow. Venter of head, thorax, spots on legs, and almost entire 4th antennal segment black. 7.5-10. – S Khab., Prim., Sakh., S Kur. – Forest zone of Palearctic. – In shady forests on *Circaea* and *Linnaea* **M. rufescens** H.-S. [p. 883]

27. Family LYGAEIDAE

N.N. Vinokurov

Body elongate, flat dorsally, strongly convex ventrally, sometimes strongly compressed dorsoventrally; usually punctate dorsally, but sometimes hemelytra without punctation (Figs. 550-552). Small to medium-sized (species from the Far East from 1.5 to 13). Head more or less triangular, not flattened, usually wider than long; in species from the Far East, ocelli present. Antennae and rostrum 4-segmented. Pronotum frequently with converging cephalad lateral margins, in the middle often

[p. 884] with constriction dividing it into anterior and posterior lobe differing in coloration and punctuation; lateral margins sometimes widened as a plate. Hemelytra divided into clavus, corium, and membrane with few (5-8) indistinct veins; in brachypterous specimens, venation of membrane strongly reduced or absent.

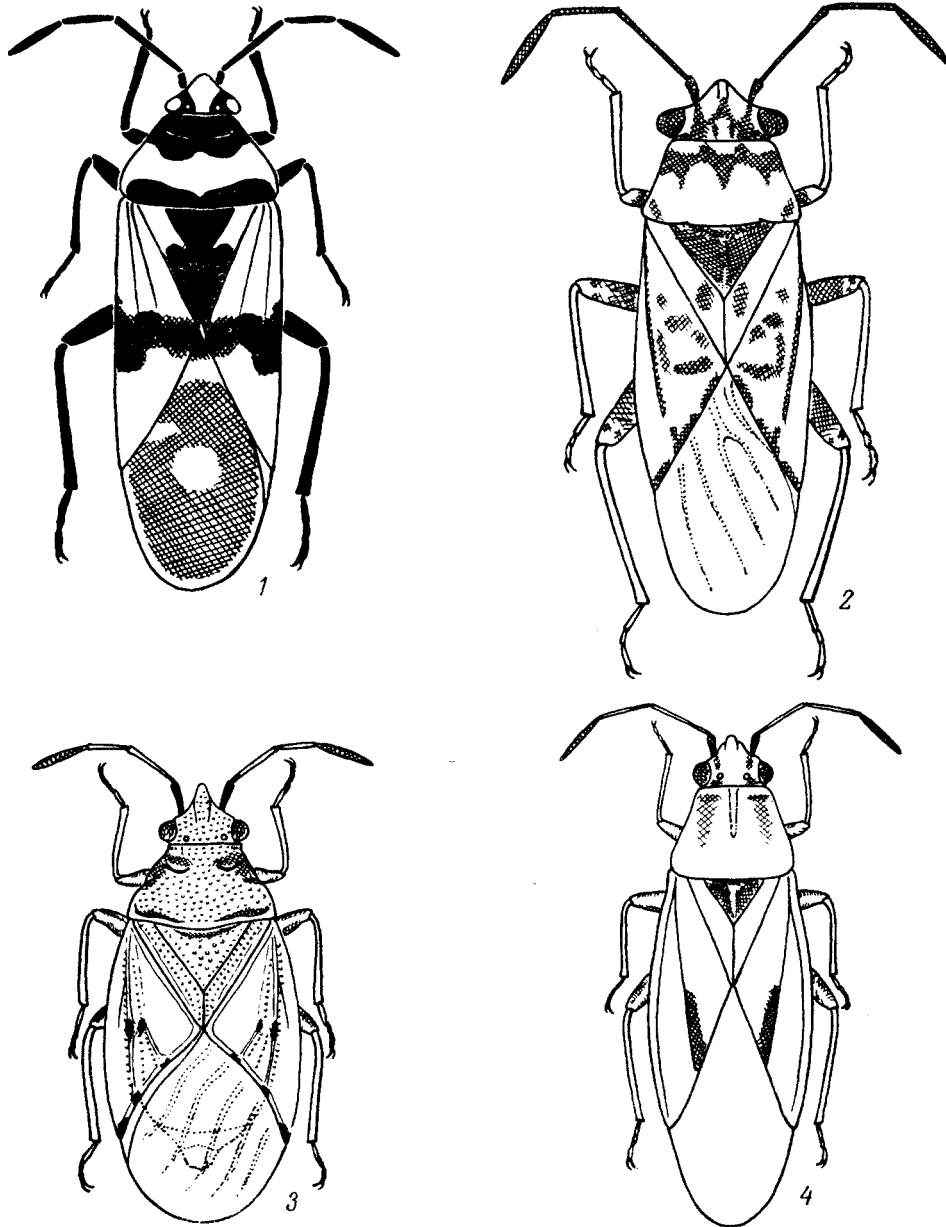


Fig. 550. Heteroptera. Family Lygaeidae (original).

1, *Lygaeus equestris*; 2, *Nysius groenlandicus*; 3, *Kleidocerys resedae*; 4, *Cymus glandicolor*.

Legs cursorial; fore femora often thickened, sometimes with large teeth, denticles, or spines; fore tibiae straight or curved. Tarsi of all legs 3-segmented. Abdomen usually with trichobotria on segments III-VII, spiracles situated on segments II-VII dorsally or ventrally (often some of them dorsally and some

ventrally). In females, last two abdominal segments divided by longitudinal slit, in which lies the ovipositor. In males, genital segment more or less spherical, drawn into abdomen; parameres symmetrical. Representatives of the family mainly living on the ground under various plants, lumps of soil, stones, in forest litter, in debris; some species living on herbs, bushes, and trees. Phytophagous, most of them polyphagous, usually feeding on seeds; rarely predacious. About 3000 species in the world fauna. – 42 genera, 85 species (in USSR to 100 genera, more than 330 species).

LITERATURE. Putshkov, V.G. 1969. Lygaeidae. Fauna Ukrainy 21 (3): 1-387. Kyiv. [In Ukrainian].

KEY TO GENERA

1. 3rd abdominal suture (between abdominal sternites IV and V) reaching lateral margins of abdomen, straight (Fig. 553: 1) 2
- 3rd abdominal suture (Fig. 553: 3) not reaching lateral margins of abdomen, but curving forward, then turning backward forming a depressed line along the lateral margin; rarely (*Plinthisus*) 3rd abdominal suture more or less distinctly reaching lateral margins of abdomen, slightly curved before reaching them (Fig. 553: 2). (Subfamily Rhyparochrominae) 18
2. Hemelytra not punctate, or very indistinctly punctate, or (*Philomyrmex* and *Blissinae*) with only several rows of punctures on clavus and 1 row of punctures along outer margin of corium. Hemelytra often shortened 3
- Hemelytra distinctly punctate, corium at least with some punctures in addition to the row along its outer margin; hemelytra usually complete, rarely (*Geocoris*) with strongly shortened membrane and not covering apex of abdomen 13
3. Lateral margins of pronotum almost parallel in posterior half, sharply converging beginning from the middle. Dorsal part of head, pronotum, and scutellum more or less strongly flattened. Head transverse, with convex posterior margin. Body more or less strongly elongate, with almost parallel lateral margins. Hemelytra usually strongly shortened. Spiracles of abdominal segment VII situated on ventral side of connexivum, the remaining spiracles on its dorsal side. (Subfamily Blissinae) 4
- Lateral margins of pronotum converging beginning from posterior corners; sometimes weakly concave medially 5
4. Fore coxal cavities closed posteriorly (Fig. 553: 5). Head and pronotum dull, not punctate (only calli with fine punctation). If head and pronotum shining (*I. aleocharoides*), scutellum large and rounded at apex 12. **Ischnodemus**
- Fore coxal cavities open posteriorly (Fig. 553: 6). Head and pronotum roughly punctate, shining 13. **Dimorphopterus**
5. Head with more or less distinct and shallow groove along inner margin of eyes. Openings of scent glands at most forming small tubercle on outer margin. All abdominal spiracles (not to be confused with foveae and tubercles on ventral side!) situated on dorsal side of connexivum 7
- Head raising to the middle immediately from inner margin of eye. Openings [p. 885] of scent glands on outer margin protruded into long white process. All spiracles situated on ventral side of abdomen. (Subfamily Oxycareninae) 6
6. Hemelytra black or dark brown. Head and pronotum densely, clavus sparsely punctate (Fig. 551: 4). Head with short, sparse setae 16. **Philomyrmex**
- Hemelytra pale, with dark veins. Head and clavus not punctate. Dorsum with dense, flattened scales 17. **Camptotelus**
7. Apical margin of corium posterior to apex of clavus straight (Fig. 553: 7). Outer angles of antenniferous tubercles obtuse, rounded. (Subfamily Lygaeinae) 8

- Apical margin of corium posterior to apex of clavus notched (Fig. 553: 8).
Antenniferous tubercles with pointed outer angles. (Subfamily Orsillinae) 11
- 8. Head behind eyes with small protuberance separating eyes from anterior angles
of pronotum 9
- Head behind eyes narrowing without protuberance; eyes touching or almost
touching anterior angles of pronotum 10
- 9. Pronotum shorter, about 1.7-2 times as wide as long, flat or weakly convex pos-
terior to the middle. Scutellum with low carina near apex. Coloration black with
red or almost unicolorous, black or yellowish 3. **Arocatus**
- Pronotum longer, less than 1.6 times as wide as long, strongly convex posterior
to the middle. Scutellum with high carina near apex. Color from grayish brown
to blackish brown 4. **Emphanisis**
- 10. Head entirely black, except only a small, longitudinal, pale spot posteriorly be-
tween eyes. Bucculae and openings of scent glands red 1. **Tropidothorax**
- Head between eyes red. Bucculae and openings of scent glands black
..... 2. **Lygaeus**
- 11. Apex of scutellum rounded. Hemelytra often shortened 5. **Nithecus**
- Apex of scutellum pointed. Hemelytra always complete 12
- 12. Head, pronotum, and corium with short, recumbent setae or without setae. Buc-
culae long, reaching beyond the middle of head. Lateral margins of corium usu-
ally more or less rounded 6. **Nysius**
- Head, pronotum, and corium with dense, erect setae. Bucculae short, not reach-
ing the middle of head. Lateral margins of corium straight
..... 7. **Ortholomus**
- 13. Head strongly transverse, wider than posterior margin of pronotum; eyes very
large, strongly elongate, about 2-3 times as long as wide (see in profile), strongly
prominent, reaching beyond anterior angles of pronotum (Fig. 553: 9). (Subfam-
ily Geocorinae). Scutellum of subequal length and width, with pointed apex
..... 14. **Geocoris**
- Head not transverse or moderately transverse, narrower than or (*Ninomimus*) as
long as posterior margin of pronotum; eyes not large, rounded or slightly elon-
gate, at most 1.5 times as long as wide (see in profile), not reaching beyond an-
terior angles of pronotum 14
- 14. Scutellum distinctly shorter than commissure (Subfamily Cyminae) 15
- Scutellum longer than commissure 16
- 15. Head transverse, with small protuberances posterior to eyes separating eyes
from anterior margin of pronotum; 4th antennal segment almost as long as 3rd
segment. Pronotum depressed medially, without carina. Hemelytra widening
posteriad, with lateral margin notched near base 10. **Ninomimus**
- Head not transverse, somewhat wider than long; eyes almost touching anterior
margin of pronotum. 4th antennal segment shorter than 3rd segment. Pronotum
not depressed medially, with short carina. Lateral margin of hemelytra without
notch near base 11. **Cymus** [p. 886]
- 16. Body approximately 4 times as long as wide. Fore femora with teeth, inflated.
(Subfamily Pachygronthinae). 1st antennal segment long, clavate at apex. Genae
with laminate border along lateral margin (Fig. 551: 3) 15. **Pachygrontha**
- Body only 2-2.5 times as long as wide. Fore femora without teeth, not thickened.
1st antennal segment short, simple. (Subfamily Ischnorhynchinae) 17
- 17. Pronotum and scutellum smooth, with shallow punctation. Corium near claval
suture with 2 rows of punctures: a short one and a long one 8. **Kleidocerys**
- Pronotum and scutellum with median longitudinal carina, roughly punctate.

- Corium near claval suture with 1 rows of punctures 9. *Pylorgus* [p. 887]
18. Pronotum near middle with transverse depression prolonged on its sides and forming more or less distinct constriction. Sides of pronotum rounded, without laminate carina 19
- Pronotum without transverse depression, or the latter is not prolonged on sides of pronotum. Sides of pronotum with laminate carina or costiform 22

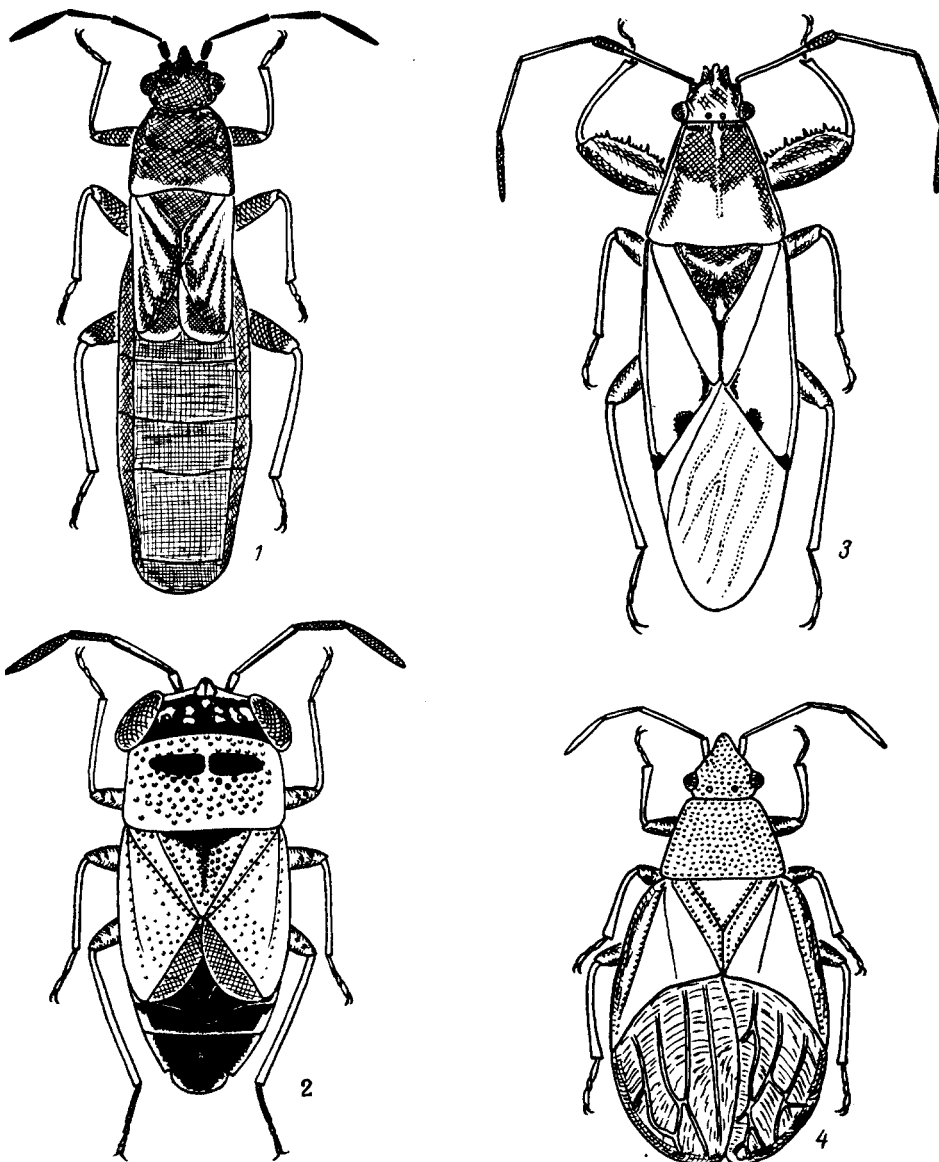


Fig. 551. Heteroptera. Family Lygaeidae (original).

1, *Ischnodemus orientalis*; 2, *Geocoris lapponicus mongolicus* {actually, *G. mongolicus*}, male; 3, *Pachygrontha antennata*; 4, *Philomyrmex insignis*.

19. Transverse depression of pronotum weak. Fore femur with 1 small tooth 29. *Stigmatonotum*
- Transverse depression of pronotum deep. Fore femur with many teeth 20

20. Pronotum longer than its width between posterior corners. Collar as long as width of 1st antennal segment..... 31. **Paraparomius**
- Pronotum shorter than or as long as its width between posterior corner. Collar shorter than width of 1st antennal segment 21
21. 1st segment of hind tarsi 1.25-1.35 times as long as 2nd and 3rd segments combined. Hemelytra often reaching beyond apex of abdomen. Head almost half as wide as pronotum on its hind margin 30. **Pachybrachius**
- 1st segment of hind tarsi more than twice as long as 2nd and 3rd segments combined. Hemelytra usually not covering apex of abdomen. Head at least 0.75 times as wide as pronotum on its hind margin 32. **Ligyrocoris**
22. Abdominal sternite V with 2-3 trichobothria (dull spots usually with erect long seta each, situated on lateral part of abdomen interior to the depressed line), posterior trichobothrium closer to posterior margin of sternite than to anterior trichobothrium (Fig. 553: 3) 23
- Posterior trichobothrium on abdominal sternite V closer to anterior trichobothrium than to posterior margin of sternite (Fig. 553: 4) 36
23. Lateral margin of pronotum either with more or less developed rib or without rib, but not expanded into more or less wide lamina..... 24
- Lateral margins of pronotum expanded into a more or less wide lamina. Hemelytra bare or with hardly visible setae 31
24. Commissure longer or slightly shorter than scutellum. 3rd abdominal suture (between abdominal sternites IV and V) reaching lateral margin of abdomen (Fig. 553: 2) 18. **Plinthisus**
- Commissure distinctly shorter than scutellum. 3rd abdominal suture not reaching lateral margin of abdomen (Fig. 553: 3) 25
25. Anterior and posterior parts of pronotum with similar punctation. Pronotum without transverse depression or with very indistinct one. Fore femora without teeth, slightly thickened 26
- Anterior part of pronotum markedly less punctate than posterior part; punctures on pronotum usually fine and widely spaced; if the pronotum is rather coarsely punctate (*Megalonotus*), it has a distinct transverse depression and the fore femora are markedly inflated, with one large tooth and several minute denticles 28
26. Surfaces of eyes and hemelytra with short, head and pronotum with long setae (to examine in lateral view) 21. **Stygnocoris**
- Eyes bare. Hemelytra bare or only their outer part with very short pubescence 27
27. Larger: 3.5-4.5. Head and pronotum with coarse punctation 20. **Acompus**
- Smaller: less than 3. Head and pronotum with fine punctation 19. **Iodinus**
28. Apex of scutellum (Fig. 553: 10) with more or less distinct V-shaped yellow or brownish yellow spot 36. **Peritrechus**
- Apex of scutellum black or yellowish, without V-shaped pale spot 29
29. Shorter: 2.5-3. Fore femora without denticles. Pronotum without transverse depression, its anterior part black, posterior part yellow-brown 40. **Pionosomus**
- Longer: 3.5-6.6. Fore femora with well visible denticles. Pronotum entirely black, with distinct or weakly marked transverse depression 30
30. Body elongate, slender, with almost parallel lateral margins. Head across eyes as wide as pronotum in medial part. Body strongly shining..... 39. **Pterotmetus** [p. 889]
- Body elongate-oval, wider. Head across eyes markedly narrower than pronotum in medial part. Body dull or shining 38. **Megalonotus**

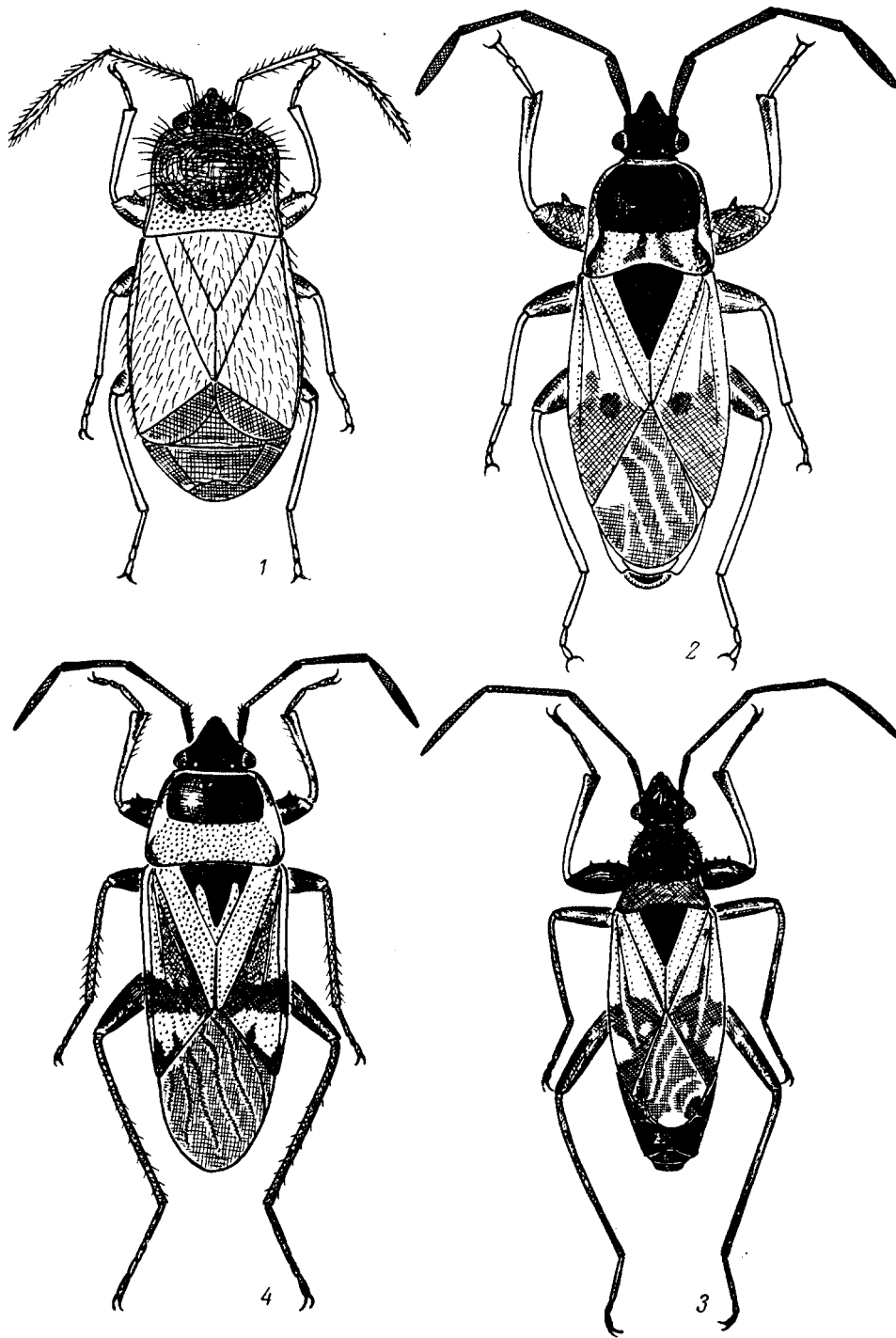


Fig. 552. Heteroptera. Family Lygaeidae (original).

1, *Plinthisus kanyukovae*; 2, *Eremocoris abietis*; 3, *Ligyrocoris sylvestris*; 4, *Panaorus csikii*.

31. 2nd and 3rd antennal segments bare or with extremely fine recumbent pubescence only, and with several short semierect setae just at apex (Fig. 553: 11) 32
 – 2nd and 3rd antennal segments with more or less long, semierect or erect setae 33

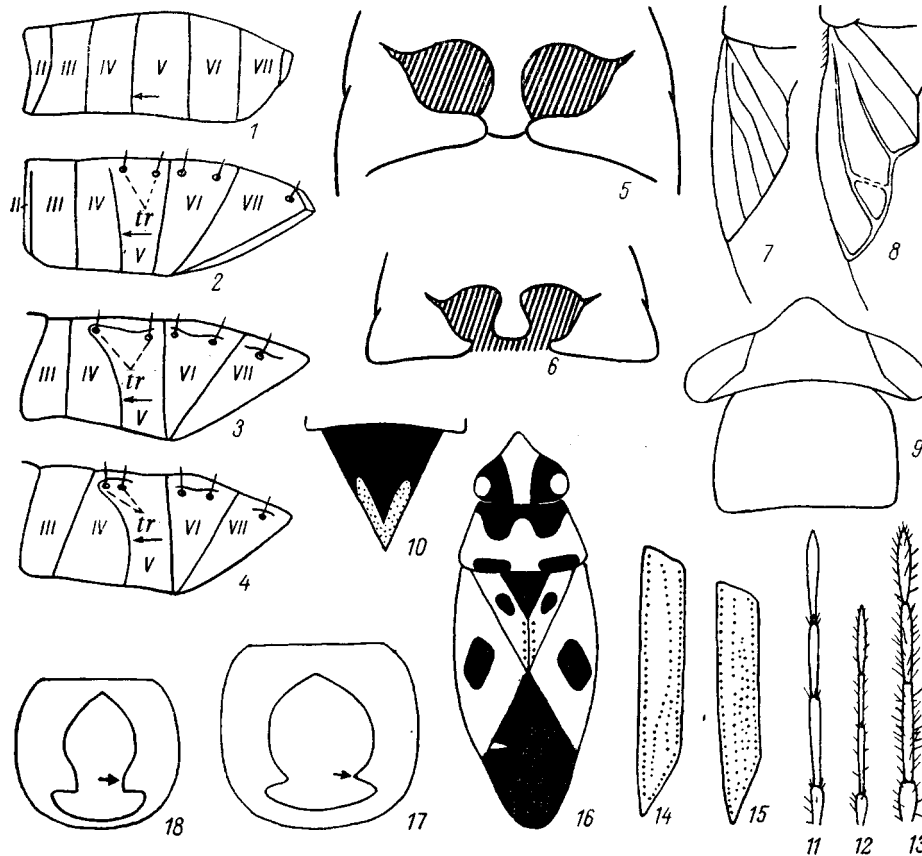


Fig. 553. Heteroptera. Family Lygaeidae (after Wagner, Kerzhner and original).

1-4, abdomen, lateral (arrow shows 3rd abdominal suture): 1, *Lygaeus equestris*; 2, *Plinthisus* sp.; 3, *Megalonotus chiragra* E.; 4, *Drymus sylvaticus* E.; 5, 6, coxal cavities: 5, *Ischnodemus* sp.; 6, *Dimorphopterus* sp.; 7, 8, hemelytron without membrane: 7, Lygaeinae; 8, Orsillinae; 9, *Geocoris lynceus*, head and pronotum; 10, *Peritrechus convivus*, scutellum; 11-13, antenna: 11, *Rhyparochromus pini*; 12, *Sphragisticus nebulosus*; 13, *Emblethis brachynotus*; 14, 15, clavus: 14, *Rhyparochromus pini*; 15, *Panaorus adspersus*; 16, *Lygaeus sjostedti*, body coloration; 17, 18, genital segment of male, dorsal (arrow shows projection of the lateral margin of the opening): 17, *Emphanisis kiritshenkoi*; 18, *E. cuprea*. tr, trichobothria.

32. The 2 outer rows of punctures on clavus almost parallel; distance between them in the middle shorter than distance between the inner row and the row of punctures along the scutellum (Fig. 553: 15). Scutellum with 2 oblique apical yellow stripes which are often fused into a V-shaped spot, or apex of scutellum narrowly yellow (*P. albomaculatus*). Inner corner of corium without black spot 33. **Panaorus**
 – The 2nd from outer margin row of punctures on clavus more or less curved, diverging from outer margin in the middle, here equally distant from inner and outer rows of punctures (Fig. 553: 14). Scutellum entirely black. Inner corner of corium with black spot 35. **Rhyparochromus**

33. 2nd and 3rd antennal segments with sparse setae (Fig. 553: 12) 34
 – 2nd and 3rd antennal segments with rather dense, erect or semierect setae
 35 [p. 890]
34. Lateral margins of pronotum with several erect, long, black bristles originating from brown dots. Scutellum with apical V-shaped yellow spot
 37. **Sphragisticus**
 – Lateral margins of pronotum without long bristles and brown dots. Scutellum entirely black 41. **Trapezonotus**
35. 2nd and 3rd antennal segments with erect setae more than twice as long as width of antennae (Fig. 553: 13). Pronotum entirely yellow-brown or brown
 42. **Emblethis**
 – 2nd and 3rd antennal segments with semierect setae slightly longer than width of antennae. Anterior lobe of pronotum black 34. **Naphiellus**
36. Body strongly flattened dorsoventrally. Posterior margin of pronotum 3 times as long as anterior margin. 3rd abdominal suture weakly arched 28. **Gastrodes**
 – Body not flattened ventrally. Posterior margin of pronotum not more than 2-2.5 times as long as anterior margin. 3rd abdominal suture strongly curved forward near lateral margins of abdomen 37
37. Fore femora without denticles or spines. Clavus with 2 rows of punctures 38
 – Fore femora with 1 or several denticles or spines on inner side. Clavus with 3 or more rows of punctures 39
38. Shorter: 2.3-3. Dorsum bare; pronotum almost square 22. **Ischnocoris**
 – Longer: 5.9-6.9. Dorsum with long, dark brown setae. Pronotum trapezoidal
 27. **Trichodrymus**
39. Laminate border of lateral margin of pronotum narrow, uniformly broad, not widened near middle 40
 – Laminate border of lateral margin of pronotum forming at least a small, inwardly-directed triangular corner in front of notch near middle of lateral margin 41
40. Head and entire pronotum densely and distinctly punctate. Fore femur with a small denticle or with 1 small tooth and several minute denticles 25. **Drymus**
 – Head only very finely punctulate; anterior lobe of pronotum almost entirely impunctate or with a few punctures. Fore femur with 1-2 acute spines
 26. **Lamproplax**
41. 3-4.4. 1st antennal segment projecting beyond apex of head by only half its length. Hemelytra with strongly shortened membrane generally not reaching beyond apex of corium. Pronotum always without median depression
 23. **Scolopostethus**
 – 4.2-6.5. 1st antennal segment projecting beyond apex of head by more than half its length. Hemelytra complete, rarely with slightly shortened membrane. If shorter than 4.5 (*E. insularis*), pronotum with rather deep median depression
 24. **Eremocoris**

KEYS TO SPECIES OF FAMILY LYGAEIDAE

Subfamily LYGAEINAE

1. **Tropidothorax** Bergr. – 1 species (in USSR 3).

1. Red; head, antennae, 2 large isolated spots on pronotum on each side of median line, scutellum, most of clavus, large spot on corium not reaching its outer margin, membrane, spots on ventral side of body, and legs, all black. 8.6-11.5. – S Khab., Prim. – Japan, Korea, China, Taiwan **T. cruciger** Motsch.

2. *Lygaeus* L. – 3 species (in USSR 6).

1. Membrane without medial white spot, only with 1 long transverse white streak near apex of corium. Corium with a large [p. 891] isolated black spot in the middle (Fig. 553: 16). 8.6-12. – Prim. – Korea *L. sjostedti* Lindb.
- Membrane with 1 white spot in the middle 2
2. A transverse black band on corium with 2 bare spots which seem more black and velvety; one of them at the anterior margin of the band, the other on its posterior margin; rarely the posterior spot absent. 9.5-13. – Prim., S Kur. – Transpalearctic. – In open habitats on herbs. (Fig. 550: 1) *L. equestris* L.
- Corium without transverse black band, with black spot usually lying on longitudinal, pale blackish stripe. 8-10.5. – S Prim. – Mainly in steppe zone from Kazakhstan to Korea and NE China *L. hanseni* Jak.

3. *Arocatus* Spin. On trees. – 2 species (in USSR 5).

1. Red; dorsum with contrasting pattern consisting of black spots. Connexivum unicolorous, red. Antennae and legs black or black-brown. 6.5-9.2. – Amur., Prim. – China *A. melanostoma* Scott
- Yellow-brown to reddish brown; dorsum with pattern consisting of indistinct black and brown spots. Connexival segments yellow, with large black spot in the middle. Antennae yellow-brown or red-brown. Legs either entirely yellow-brown or femora dorsally and bases of tibiae black and 3rd segment of hind tarsi black-brown. 6-7.4. – Amur., Prim., S Kur.; Transbaikial. – Japan, Mongolia. – On *Ulmus* *A. rufipes* Stål (*fasciatus* Jak.)

4. *Emphanis* China. In USSR 2 species.

1. Ventral side of head except bucculae entirely black. Pronotum with 2-4 more or less distinct, longitudinal, pale stripes. 2st and 3rd antennal segments black at apex (except for apical truncation). Genital segment larger (width 1.2), with triangular process on lateral margin of opening (Fig. 553: 17). Male 6.5-6.7; female 6.7-7.8. – S Prim. – China *E. kiritshenkoi* Kerzh.
- Ventral side of head basally pale in the middle. Pronotum without pale stripes. 2nd and 3rd antennal segments narrowly yellowish at apex. Genital segment smaller (width 0.8), with trapezoidal process on lateral margin of opening (Fig. 553: 18). Smaller: male 5.5-6; female 6.5-6.7. – S Prim. – Corea, China *E. cuprea* China

Subfamily ORSILLINAE

5. *Nithecus* Horv. – 1 species (in USSR 2).

1. Brownish; stripes on head, transverse depressed lines in anterior half of pronotum, often scutellum (except for carina and apical margin), and spots on abdomen dark brown to black. In brachypterous specimens, membrane reduced, apex of corium rounded. Macropterous specimens very rare. 4.8-5.7. – N Khab. – Transpalearctic. – On and under herbs and grasses *N. jacobaeae* Schill.

6. *Nysius* Dall. Elongate. Head shorter than wide; eyes rather large. Coloration from gray and brown to blackish with dark stripes on head and pronotum; hemelytra often with scattered dark spots. On herbs and under herbs in litter. – 5 species (in USSR about 10).

1. Scutellum with small, strongly smoothed, longitudinal apical carina (Subgenus *Nysius* Dall.) 2 [p. 892]
- Scutellum with high, well marked carina posterior to the middle. (Subgenus *Macroparius* Stål) 5

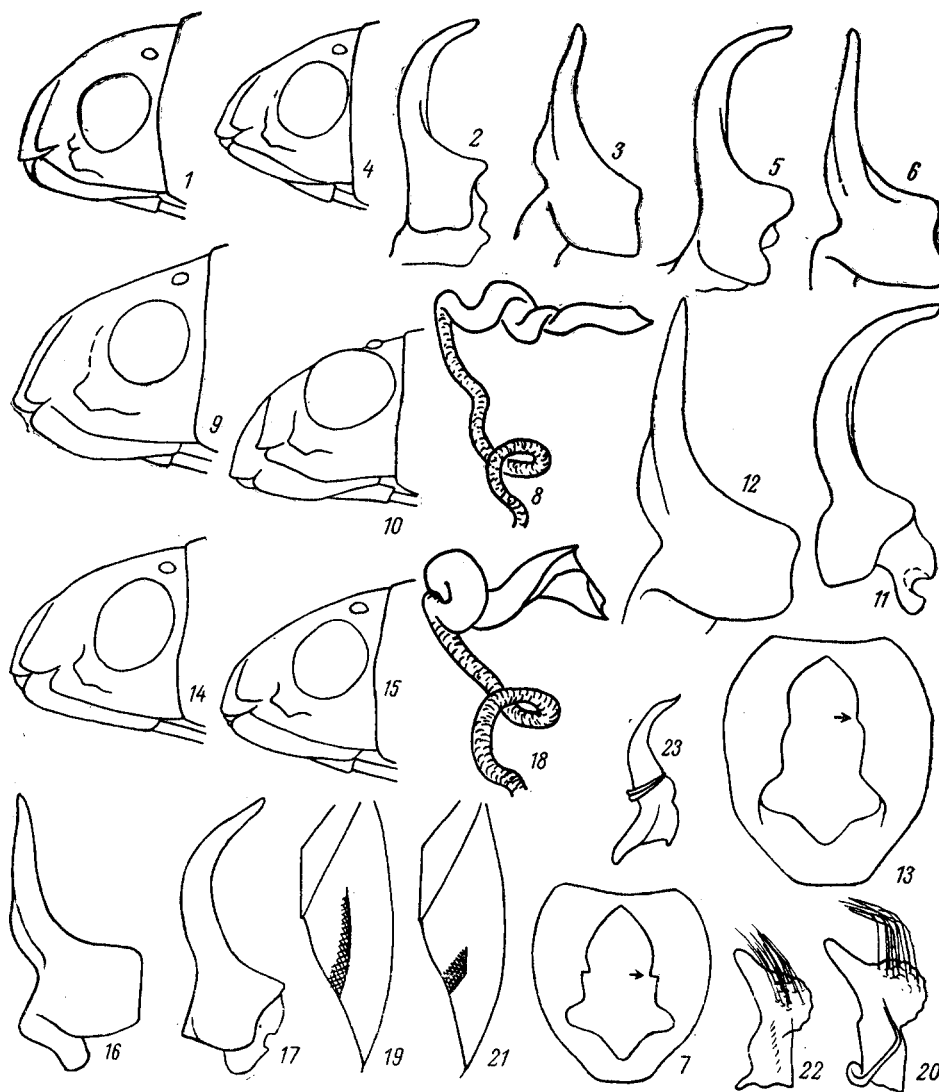


Fig. 554. Heteroptera. Family Lygaeidae (after Wagner, Kerzhner and original).

1-3, *Nysius ericae*: 1, head of female; 2, 3, paramere (2, lateral; 3, dorsal); 4-8, *N. groenlandicus*: 4, head of female; 5, 6, paramere (5, lateral; 6, dorsal); 7, male genital segment; 8, gonoporal process; 9-13, *N. expressus*: 9, 10, head (9, female; 10, male); 11, 12, paramere (11, lateral; 12, dorsal); 13, male genital segment; 14-18, *N. thymi*: 14, 15, head (14, female; 15, male); 16, 17, paramere (16, lateral; 17, dorsal); 18, gonoporal process; 19, 20, *Cymus glandicolor*: 19, hemelytron without membrane; 20, paramere; 21, 22, *C. aurescens*: 21, hemelytron; 22, paramere; 23, *Trapezonotus desertus*, paramere.

2. Bucculae sharply lowering posteriorly and not ending with a ledge; if they end with a small ledge (Fig. 554: 1), pronotum basally 1.82-2 times as wide as long. Hemelytra usually transparent, with distinct spots on veins fused in dark specimens. In females, scutellum with yellow, sometimes disappearing spots on each

- side of median line. Male genital segment entirely black; lateral margins of its opening with a large tooth in anterior half (Fig. 554: 7); hypophysis of paramere (to examine in lateral view) straight at base and evenly curved at apex (Figs. 554: 2, 5). Gonoporal process as in Fig. 554: 8 3 [p. 893]
- Bucculae weakly lowering posteriad and ending with a marked ledge (Figs. 554: 9, 10, 14, 15); in questionable cases (females), pronotum basally 1.5-1.81 times as wide as long. Hemelytra grayish brown, with rare exception not transparent, with indistinct dark spots on veins. In females, scutellum often entirely black. Male genital segment usually with yellow border around bases of parameres or along entire posterior margin; lateral margins of its opening with a small obtuse or acute tubercle in anterior half (Fig. 554: 13); hypophysis of paramere (to examine in lateral view) evenly arched along its whole length (Figs. 554: 11, 17). Gonoporal process as in Fig. 554: 18 4
 - 3. Males (very rare): lateral margin of paramere body (to examine in dorsal view) straight or slightly notched (Fig. 554: 3). Females: frons more convex; bucculae ending posteriorly with small ledge, less often without a ledge; 1st segment of rostrum as long as bucculae or slightly reaching beyond bucculae (Fig. 554: 1); head 1.65-1.87 (very rarely to 1.6) times as wide as length of 2nd antennal segment. 3.5-4.5. – S Khab., Amur., Prim., S Kur. – Transpalearctic **N. ericae** Schill.
 - Males (common): lateral margin of paramere body deeply notched (Fig. 554: 6). Females: frons less convex; bucculae always ending without a ledge; 1st segment of rostrum markedly longer than bucculae (Fig. 554: 4); head 1.48-1.66 times (in specimens from N Yakutia, sometimes to 1.87 times) as wide as length of 2nd antennal segment. 3.6-4.7. – Chuk., Mag., Kamch., N Khab., Prim., N Kur. – Arctalpine holarctic. (Fig. 550: 2) **N. groenlandicus** Zett.
 - 4. Larger: females 4.3-6, rarely only 4.1; males 4-4.6, rarely only 3.6. Antennae long; head in females 1.23-1.43 (rarely to 1.5), in males 1.13-1.36 times as wide as length of 2nd antennal segment. Vertex in females weakly convex, in males almost flat (Figs. 554: 9, 10). Paramere as in Figs. 554: 11, 12. – Mag., S Khab., Prim., Sakh., S Kur.; E Yakutia. – Japan **N. expressus** Dist.
 - Smaller: females 4.1-4.7; males 3.7-4.1, rarely to 4.3. Antennae short; head in females 1.53-1.86, in males 1.4-1.52 times as wide as length of 2nd antennal segment. Vertex in both sexes more convex (Figs. 554: 14, 15). Paramere as in Figs. 554: 16, 17. – Kamch., S Khab., Amur., Prim. – Holarctic **N. thymi** Wolff
 - 5. Body rust-brown or brown. Carina on scutellum dark. Corium not transparent, with convex lateral margins and dark spots over the entire surface. 5-6. – From Tuva to Chita Prov. and C Yakutia. – Mongolia, Korea **N. (M.) eximius** Stål
 - Body yellow-brown to brown. Carina on scutellum white. Corium semitransparent, with straight lateral margins. 4.5-5.5. – Amur. Palearctic **N. (M.) helveticus** H.-S.

7. *Ortholomus* Stål. In USSR 1 species.

- 1. Usually grayish, somewhat elongate, with parallel sides. 4.5-6. – Amur., Prim. – Transpalearctic. – In open habitats on grasses **O. punctipennis** H.-S.

Subfamily ISCHNORHYNCHINAE

8. *Kleidocerys* Steph. In USSR 1 species.

- 1. Reddish brown; hemelytra paler; membrane hyaline; almost entire venter and

several spots on dorsum black. 4.3-5.5. – Mag., Kamch., Khab., Amur., Prim., Sakh., S Kur. – Holarctic. – On *Betula*, *Alnus*, and other deciduous trees and shrubs. (Fig. 550: 3) **K. resedae** Panz. [p. 894]

9. **Pylorgus** Stål. In USSR 1 species.

1. Yellow-brown, shining; posterior lobe of pronotum convex; corium medially and membrane hyaline. 1st and 4th antennal segments, triangular spot on vertex, ventral side of head, transverse depressed lines on pronotum, mesothorax and metathorax, narrow stripe of clavus along scutellum, all black. 2nd and 3rd antennal segment reddish. Apex of scutellum white. Posterior corners of pronotum, spots on veins of corium and its apical part, last tarsal segment, and sometimes femora dark brown. 5-6. – S Prim. (Khasan District). – Japan. – On *Philadelphus tenuifolius* **P. yasumatsui** Hidaka et Izzard

Subfamily CYMINAE

10. **Ninomimus** Lindb. In USSR 1 species.

1. Head, calli of pronotum, wide stripes on ventral side of body black. 1st-3rd antennal segments, pronotum (except calli), scutellum, hemelytra, all yellow; 4th antennal segment, posterior lateral corners of pronotum, and apex of corium brown. 3.1-3.8. – S Prim. – Japan, Korea **N. flavipes** Mats. (*lundbladi* Lindb.)

11. **Cymus** Hahn. Body dorsally densely punctate, yellowish gray to blackish brown; hemelytra paler. In humid habitats on *Carex*. – 2 species (in USSR 6).

1. Larger: 4-5.1. Corium with long, parallel to median line brown stripe, or its internal part dark brown and outer part pale yellow (Fig. 554: 19). Paramere with longer hypophysis (Fig. 554: 20). – S Khab., Amur., Prim., S Kur. – Transpalearctic. (Fig. 550: 4) **C. glandicolor** Hahn
- Smaller: 3.7-4. Corium with short, oblique to median line, brown stripe, or with longer, but curved at obtuse angle stripe (Fig. 554: 21). Paramere with shorter hypophysis (Fig. 554: 22). – Amur., Prim., S Sakh., S Kur. – Transpalearctic **C. aurescens** Dist. (*obliquus* Horv.)

Subfamily BLISSINAE

12. **Ischnodemus** Fieb. – 2 species (in USSR 6).

1. Rostrum short, hardly reaching beyond fore coxae. Head, pronotum, and scutellum dull. Antennae and femora black. Hemelytra brown, with yellowish stripes. If hemelytra shortened, membrane is always present. 4.1-5. – S Khab., Prim. – NE China. (Fig. 551: 1) **I. orientalis** Vin. et Slater
- Rostrum reaching well beyond fore coxae. Head, pronotum, and scutellum shining. 1st and 4th antennal segments brown to black, 2nd and 3rd antennal segments and legs yellow-brown to brown. Hemelytra strongly shortened, without membrane, yellow to brown, often with large black spot in the middle. 3.5-5.4. – Amur., S Prim. – Beneath leaf-sheaths of *Carex* in marshes **I. aleocharoides** Jak.

13. **Dimorphopterus** Stål. Body strongly elongate; hemelytra often strongly shortened. – 2 species (in USSR 3).

1. Head 2-2.2 times as wide as length of 2nd antennal segment. 1st-3rd antennal segments, legs, and posterior margin of pronotum from yellow to brown. In brachypterous specimens, clavi posterior to scutellum contiguous or slightly not meeting. In macropterous specimens, clavus anterior to the middle and apical part of corium dark brown. 3.5-4.6. [p. 895] –S Prim., S Kur. – Japan, China. – On *Miscanthus* **D. japonicus** Hidaka
- Head 2.2-2.5 times as wide as length of 2nd antennal segment. 1st-3rd antennal segments, legs, and posterior margin of pronotum yellow-brown or brown; sometimes antennae, fore femora, and entire pronotum black. In brachypterous specimens, hemelytra widely spaced. In macropterous specimens, base of clavus and apical part of corium pale to dark brown. 3-4.1. – Amur., Prim. – Transpalearctic. – Beneath leaf-sheaths of grasses (*Leymus*, *Arundinella*, *Calamagrostis*, etc.) **D. spinolae** Sign. (*thoracicus* Jak.)

Subfamily GEOCORINAE

14. **Geocoris** Fall. Body broad-oval; pronotum and hemelytra coarsely punctate. Hemelytra shortened or complete. On ground in litter. – 7 species (in USSR 25).

1. Pronotum black with yellow median line. Hemelytra black. 3-3.5. – Amur. – From Transbaikal to W Europe and N Africa **G. ater** F
- Pronotum without yellow median line 2
2. Dorsum of head with longitudinal furrow along its full length. 3rd and 4th antennal segment subequal in length 3
- The furrow on dorsal part of head distinctly marked only on clypeus. 3rd antennal segment shorter than 4th segment 4
3. In males, posterior margin of pronotum black in the middle, pale only at corners. Inner margin of hemelytra black in females, yellow in males. 4th antennal segment white or yellow-brown. 1st-3rd antennal segments black. 4.3-5.8. – S Khab., Amur., Prim.; S Siberia west to Zaisan. – Korea, Mongolia. – In meadows **G. lynceus** Lindb.
- In males, posterior margin of pronotum yellow-bordered along its full length. Inner margin of hemelytra in both sexes always yellow. Antennae black or dark brown; in pale specimens, 4th antennal segment sometimes brown. 3.7-5. – Amur. – West to W Europe. – In dry meadows and steppes **G. grylloides** L.
4. Pronotum, scutellum, and hemelytra entirely black; sometimes posterior corners of pronotum and entire hemelytra or their outer margins brownish. 3-3.5. – S Kur. – Japan. – In seaboard sands under plants and debris cast ashore **G. proteus** Dist.
- Pronotum partly pale, rarely entirely black. Hemelytra pale, sometimes darkened interiorly 5
5. Head between eyes smooth, shining. Pronotum with sparse punctation not reaching posterior margin. 1st antennal segment always pale dorsally; 2nd-4th segments black. 3.5-4.3. – Mag. – Mainly in steppe regions from Yakutia and Transbaikal to Hungary **G. arenarius** Jak.
- Head between eyes dull, shagreened. Pronotum with dense punctation reaching posterior margin 6
6. Corium with concolorous or brown punctation, near inner corner with a brown spot and several black dots on this spot. Pronotum black, with pale posterior corners and a small pale spot in the middle of anterior and posterior margins. Scutellum entirely black. 1st antennal segment in both sexes black dorsally. 2.9-

- 3.5. – S Prim. (Khasan District). – South of Palearctic from Korea to S Europe, N and C Africa **G. pallidipennis** Costa
- Corium with black punctation, entirely pale, sometimes with diffuse dark spot near inner corner. Coloration of pronotum and scutellum different, very variable. 1st antennal segment in males white dorsally. 3.2-3.8. – Mag., Kamch.; NW and E Siberia. – Mongolia, N and mountains of Europe (in Far East, Siberia and Mongolia – ssp. *mongolicus* Horv.) {*G. mongolicus* is a separate species; records from Far East refer to the true *G. lapponicus*}. – In meadows. (Fig. 551: 2) **G. lapponicus** Zett. [p. 896]

Subfamily PACHYGRONTHINAE

15. **Pachygrontha** Germ. In USSR 1 species.

1. Pale brownish, with dark punctation in places fusing into spots. 6.7-8.2. – S Khab., Amur., Prim., S Kur. – Japan, Korea, China. – In humid meadows and bogs; probably, on grasses and *Carex*. (Fig. 551: 3) **P. antennata** Uhl. (*nigriventris* Reut.)

Subfamily OXYCARENINAE

16. **Philomyrmex** R. Sahlb. On conifers and in forest litter. Monotypic genus.

1. Brown-black, only openings of scent glands white. 3.8-4.5. – Mag., Kamch., N Khab. – European-Siberian. (Fig. 551: 4) **Ph. insignis** R. Sahlb.

17. **Camptotelus** Fieb. – 1 species (in USSR to 5).

1. Head, calli of pronotum, abdomen, and femora black or black-brown. Antennae and stripes on pronotum brown. Hemelytra and middle of tibiae whitish. 3-3.5. – Mag. – Palearctic. In steppe habitats on *Thymus* **C. lineolatus** Schill.

Subfamily RHYPAROCHROMINAE

{Subsequently added: *Prosomoëus* Scott with *P. brunneus* Scott, S Prim., representative of the tribe Ozophorini}.

Tribe PLINTHISINI

18. **Plinthisus** Steph. Oblong-oval, more or less shining; anterior part of pronotum in brachypterous specimens usually markedly convex. – 5 species (in USSR 15).

1. Smaller than 2.2. Pronotum and hemelytra coarsely punctate. If hemelytra shortened, they are convex, covering 3/4 of length of abdomen, their commissure slightly longer than scutellum. (Subgenus *Plinthisomus* Fieb.). Black or black-brown; if hemelytra not shortened, they are often light brown. 1.5-2.2. – Amur. – Palearctic. – In dry habitats under herbs, in litter **P. (P.) pusillus** Scholtz
- Larger than 2.2. Anterior lobe of pronotum smooth or weakly punctate; the posterior third of pronotum with large punctures. (Subgenus *Dasythisus* E. Wagn.) ... 2
2. Membrane in brachypterous specimens in the form of narrow fringe; its apical margin straight. Pronotum in males always with pointed apical corners. Hemelytra in females with long, dense, erect setae. 2.9-3.6. – Mag., Kamch., Amur.,

- Prim.; E Siberia, N Kazakhstan. – Mongolia. – In light forests in litter **P. (D.) lativentris** Horv.
- Membrane in brachypterous specimens with convex apical margin. Pronotum in males very rarely with pointed apical corners 3
3. Smaller: 2.3-3.3. Anterior and posterior parts of genital opening in males almost equal in width. Hemelytra in females with short setae. – Amur.; Transbaikal, Irkutsk Prov. – Mongolia. – On dry, stony slopes. {The valid name is *P. vestitus*} .
..... **P. (D.) sibiricus** Jak. (*vestitus* Jak.)
- Larger: 3.2-4.7 4
4. Male genital segment posteriorly (to examine in lateral view) straight; posterior margin of genital opening evenly rounded. Hemelytra in females with short setae. 3.2-4. – S Prim. – Japan, Korea, Mongolia **P. (D.) japonicus** Hidaka
- Male genital segment posteriorly (to examine in lateral view) with shallow notch; posterior margin of genital [p. 897] opening forming an obtuse angle in the middle. Hemelytra in females with long setae. 3.8-4.7 – Amur., Prim.; Irkutsk Prov. – In forest litter. (Fig. 552: 1) **P. (D.) kanyukovae** Vin.

Tribe *ANTILLOCORINI*

19. **Iodinus** Lindb. In USSR 1 species.

1. Dark brown or reddish brown; hemelytra and legs brownish yellow. 2.3-2.7. – S Khab., S Prim., S Kur. – Japan, Korea. – In litter under *Artemisia*
..... **I. ferrugineus** Lindb.

Tribe *STYGNOCORINI*

20. **Acompus** Fieb. Hemelytra often shortened. – 1 species (in USSR 2).

1. Head, pronotum, scutellum (except for apex), and venter black. 4th antennal segment (except for base) and the pattern along posterior margin of corium dark brown. Legs, 1st-3rd antennal segments, and corium (except for posterior margin) yellow. 3.5-4.5. – Mag., S Khab., Amur., Prim. – Transpalearctic. – On *Valeriana* **A. rufipes** Fieb.

21. **Stygnocoris** Douglas et Scott. – 1 species (in USSR 5).

1. Head, 4th antennal segment, pronotum (sometimes except posterior part), scutellum, and venter of body dark brown to black. Hemelytra brown. 1st-3rd antennal segments and legs yellow. Strongly shining. 2.2-3.1. – S Khab., S Prim., S Sakh., S Kur. – Holarctic. – In litter in meadows and forest glades
..... **S. sabulosus** Schill. (*pedestris* Fall.)

Tribe *DRYMINI*

22. **Ischnocoris** Fieb. – 1 species (in USSR 4).

1. Head, base of 1st antennal segment, anterior part of pronotum, and abdomen black. Posterior part, lateral margins, and middle of anterior margin of pronotum, clavus, corium (except for apical corner), and legs, all yellow to brownish orange. 2nd-4th antennal segments, apical corner of corium, sometimes middle of femora from brown to almost black. Macropterous. 2.3-2.8. – S Prim. – From mountains of Soviet Central Asia to W Europe and N Africa. – In steppe under stones and in litter **I. punctulatus** Fieb.

23. *Scolopostethus* Fieb. – 1 species (in USSR to 7).

1. Head, 3rd and 4th antennal segments, anterior lobe and posterior corners of pronotum, scutellum (except apex), pattern in posterior part of corium, abdomen, and fore femora black. 1st and 2nd antennal segments yellow-brown, often with proximal part of the 1st segment and distal part of the 2nd segment dark brown; collar, posterior lobe of pronotum, apex of scutellum, anterior part of hemelytra, and legs (except for fore femora), all yellowish brown. Lamine lateral borders of pronotum yellow. 3.5-4. – Kamch., S Sakh., S Kur. – Holarctic. – In forest litter, on humid ground in glades **S. thomsoni** Reut.

24. *Eremocoris* Fieb. Body oblong-oval, from brown to black. In forest litter. – 4 species (in USSR 9). [p. 898]

1. Fore femur with 2 large teeth (sometimes proximal tooth markedly smaller than distal one). Hind tibiae with long (longer than width of tibia), erect setae. Scutellum flat. Abdomen ventrally with short and long setae. 5.3-6.5. – S Khab., Prim., Sakh., S Kur. – Transpalearctic **E. plebejus** Fall. (*Drymus guttatus* Mats.)
- Fore femur with 1 large tooth (rarely in *E. abietis* with 2 large teeth). Setae on hind tibia approximately as long as width of tibia (*E. angusticollis*), or much shorter ... 2
2. Venter of abdomen with short recumbent and numerous oblique, longer setae. Clavus with 3 rows of punctures. Setae on hind tibiae approximately as long as width of tibia. At least in females, 4th antennal segment whitish-yellowish. Scutellum with well marked Y-shaped elevation. 4.9-5.1. – S Khab., S Prim. – Japan **E. angusticollis** Jak. (*planus* Uhl.)
- Venter of abdomen with short, recumbent setae; longer setae, if present, only on posterior margins of segments. Clavus with 4 rows of punctures. Setae on hind tibiae much shorter than width of tibia. 4th antennal segment brown or yellow ... 3
3. Femora reddish yellow; rarely fore or all femora brown. Corium without pale spot in the posterior third. 1st segment of hind tarsus more than twice as long as 2nd and 3rd segments combined. 4.5-6.5. – Mag., Kamch., S Khab. – Transpalearctic. (Fig. 552: 2) **E. abietis** L.
- Femora dark brown or black. Corium with a rounded white spot in the posterior third near lateral margin. 1st segment of hind tarsus less than twice as long as 2nd and 3rd segments combined. 4.2-4.5. – S Sakh., S Kur. **E. insularis** Kerzh.

25. *Drymus* Fieb. Oval, moderately shining, black or dark brown. Posterior lobe of pronotum, hemelytra, antennae, and legs often paler, brown or dirty yellow. In forest litter. – 7 species (in USSR 11).

1. Setae on tibiae long, almost erect, slightly longer than width of tibia. All antennal segments with erect, long setae. Evaporatorium of scent glands not punctate or with 2-3 punctures. (Subgenus *Drymus* Fieb.) 2
- Setae on tibiae short, adpressed or almost adpressed. At least 1st antennal segment without erect setae (not to be confused with bristles on inner side of segment). Evaporatorium of scent glands punctate. (Subgenus *Sylvadrymus* Le Quesne) 3
2. Entire abdomen covered ventrally with long, sparse, slender setae. 3.5-4.2. – Amur., S Prim. – Japan, NE China, widely distributed in Europe **D. pilicornis** M. R.

- Abdomen bare, only posterior margin of segment VI with setae. 5.2-6.2. – S Prim., S Kur. – Korea, Europe. In Far East ssp. *obscurior* Kerzh. **D. latus** Douglas et Scott
- 3. Abdomen ventrally bare (at high magnification, very sparse and short setae are visible!), only connexivum and apical sternites densely pilose. 4-5.9. – Amur., Prim. – Korea **D. (S.) laeviventris** Kerzh.
- Entire abdomen ventrally covered with dense, short setae 4
- 4. Very small: male 2.7-3.1; female 2.8-3.5. Fore tibiae of males straight. – S Khab., Amur., Prim.; E Siberia. – Korea **D. (S.) parvulus** Jak.
- Larger: male not less than 3.6; female not less than 3.9. Fore tibiae of males curved (except *D. brunneus*) 5
- 5. 2nd antennal segment with erect setae. Inner vein of corium without white spot. Posterior lobe of pronotum brown, distinctly wider than anterior lobe. Fore tibiae of males curved. 4-6. – S Khab., S Prim., Sakh., S Kur. **D. (S.) orientalis** Kerzh. [p. 899]
- 2nd antennal segment without erect setae, or with 1-2 such setae at apex. Inner vein of corium usually with white spot near the middle 6
- 6. Corium near inner corner with an area differing in sparse, shallow punctation. Entire pronotum (except for sides), venter of body, femora, and tibiae black. 3.6-4.9. – S Khab., Prim., S Sakh. – Japan, Korea **D. (S.) marginatus** Dist.
- Entire corium, including area near inner corner, with uniform, deep punctation. Posterior lobe of pronotum, venter of abdomen, femora, and tibiae brown. 3.7-5.5. – S Khab., Prim. (in mountains), Sakh. – From Baikal to W Europe **D. (S.) brunneus** R. Sahlb.

26. **Lamproplax** Douglas et Scott. Living in forest litter. – 3 species (in USSR 4).

- 1. Fore femora with 1 spinule. 2nd antennal segment as long as width of head or shorter. 3.4-3.8. – S Kur. – ?Japan **L. unispina** Kerzh.
- Fore femora with 2 (sometimes 3) spinules. 2nd antennal segment longer than width of head. Not shorter than 4 2
- 2. Middle and hind femora without dark spinules or sometimes hind femora with 1-2 spinules in the apical third. Usually less than 5, rarely females to 5.3-5.4. – Amur., Prim., S Kur.; E Siberia. – Japan, N Korea **L. membranea** Dist.
- Middle femora with 2-4, hind femora with 4-5 widely spaced black spinules. Male 4.9-5.3; female 5.2-5.9. – S Prim., S Kur. – Japan **L. majuscula** Kerzh.

27. **Trichodrymus** Lindb. Black; posterior lobe of pronotum, corium, and clavus dark brown with some black spots. In forest litter. In USSR 2 species.

- 1. Femora and tibiae black. 2 pale spots near anterior margin of pronotum scarcely larger than ocelli. Scutellum with yellow longitudinal stripe at apex. Entire posterior margin of corium with a black band. Membrane blackish. 5.7-6.7. – S Khab., Prim., S Sakh., S Kur. – Korea, NE China **T. pameroides** Lindb.
- Femora yellow with black apices; tibiae yellow with brownish bases. 2 pale spots near anterior margin of pronotum almost as large as eye. Scutellum with yellow apex and 2 yellow spots close to lateral margins. In the corium, only apical corner and a spot near middle of posterior margin black. Membrane colorless. 5-5.5. – S Prim. (Khasan District). – Korea **T. pallipes** Jos. et Kezh.

28. **Gastrodes** Westw. Body oblong ovoid, flat; hemelyta finely punctate and widened posteriorly. On trees. – 2 species (in USSR 3).

1. Shorter: 4.5. 1st and 2nd antennal segments reddish brown; 3rd and 4th segments black. – S Prim. **G. parvulus** Kerzh.
- Longer: 5.5-8.2. Antennae unicolorous, reddish brown to dark brown. – Amur., S Khab., Sakh., S Kur. – Transpalearctic. – In cones of *Picea* **G. grossipes** De Geer

Tribe *MYODOCHINI*

29. *Stigmatonotum* Lindb. In USSR 1 species.

1. Head, anterior lobe of pronotum, base of scutellum, venter of body, and 4th antennal segment black. Collar, posterior lobe of pronotum, and apex of scutellum rufescent brown. Hemelytra brownish yellow, with dark punctation and a few brown speckles. Legs and 1st-3rd antennal segments rufescent yellow; femora and 1st antennal segment [p. 900] sometimes blackened medially. 3.7-5. – Kamch., S Khab., Prim., S Sakh., S Kur. – Japan, Korea. – In meadows and marshes **S. rufipes** Motsch. (*sparsum* Lindb.)

30. *Pachybrachius* Hahn. – 1 species (in USSR 3).

1. Venter of body, head, pronotum often almost entirely, scutellum, 1st and 4th antennal segments black. Posterior margin or posterior lobe of pronotum usually with rufous spots. Hemelytra brownish yellow, with brown pattern in posterior part and inner corner of corium. Legs and usually 2nd and 3rd antennal segments rufescent yellow; fore femora in apical half dark brown. 4.8-5.8. – Amur., Prim., S Sakh., S Kur. – Japan, Korea, Europe, imported in N America. – In swamp meadows **P. luridus** Hahn

31. *Paraparomius* Harrington. – 1 species (in USSR 2).

1. Venter of body, head, pronotum, scutellum, apex of 3rd antennal segment and 4th segment almost entirely, fore femora (except for bases and apices), all black. Hemelytra dark brown; their veins, lateral margin, and a spot near inner corner of corium reddish yellow; posterior corners of pronotum narrowly yellow; legs (except fore femora) and often antennae yellow. 5.8-6.1. – S Prim. (Khasan District), S Kur. – Japan, E China. – On *Miscanthus* **P. lateralis** Scott

32. *Ligyrocoris* Stål. In USSR 1 species.

1. Black; hemelytra yellowish, usually with 1-2 brown spots in posterior half or brown with 2 yellowish spots along outer margin; rarely tibiae and 1st-2nd antennal segments and very rarely posterior lobe of pronotum yellowish brown. 4.6-6.5. – Mag., Kamch., Khab., Amur. – Holarctic. – In forb meadows and forest glades. (Fig. 552: 3) **L. sylvestris** L.

Tribe *RHYPAROCHROMINI*

33. *Panaorus* Kir. In USSR 4 species.

1. 4th antennal segment entirely black. Corium unicolorous or only with a black spot in inner corner 2
- 4th antennal segment with pale ring in basal half (very rarely indistinct). Apical part of corium with distinct, sometimes interrupted, black band and with yellowish white spot beyond the band. Apical margin and apical corner of corium narrowly black 3

2. Middle and hind femora with 2 rows of erect spinules. Lateral margins of both pronotum and corium usually with numerous dark dots. 6.3-7.2. – Amur., Prim., S Sakh., S Kur. – Japan, Korea, E China. – In open habitats **P. japonicus** Stål (*angustatus* Mont.)
- Middle and hind femora without spinules. Lateral margins of both pronotum and corium without dots (rarely with a few dots). 6.3-7.3. – S Khab., Amur., Prim. – Palearctic **P. adspersus** M. R.
3. Apical part of scutellum with V-shaped pale spot. Clavus without basal black spot. Posterior margin of hind femora ventrally with 1-3 erect bristles, dorsally without bristles. Hind tibiae usually brown, with narrowly black apices. 6.2-8.3. – Prim. – Korea, E China. (Fig. 552: 4) **P. csikii** Horv. (*amurensis* Lindb.)
- Apical part of scutellum narrowly pale only at apex, rarely with 2 additional yellowish stripes. Clavus with quadrangular basal black spot. Posterior margin of hind femora ventrally with 4-6, dorsally with 1-2 strong, black bristles. Hind tibiae usually black. 6.5-8. – S Prim. [p. 901] – Japan, Korea, E China. – In forb meadows **P. albomaculatus** Scott

34. **Naphiellus** Scudd. In USSR 1 species.

1. Head, large isolated spots on anterior lobe of pronotum, scutellum (except for V-shaped pattern in apical half and sometimes longitudinal median stripe), legs, and venter of body (except for posterior margins of thoracic sternites) black. Hemelytra and anterior lobe of pronotum with dark brown and black dots. 7.1-8.8. – S Khab., Amur., Prim.; S Siberia, E Kazakhstan. – In dry, open habitats **N. irroratus** Jak.

35. **Rhyparochromus** Hahn. – 1 species (in USSR 3).

1. Head, antennae, anterior lobe of pronotum, inner margin of clavus, a spot near inner corner of corium, venter of body, and legs (except for outer margin of fore tibiae), all black. Posterior lobe of pronotum and narrow stripe along each its lateral margin, hemelytra, outer margins of fore tibiae basally, all brown-yellow. 6.5-8.5. – Khab., Amur., Prim. – Transpalearctic. – In meadows, forest glades and edges. On herbs **Rh. pini** L.

36. **Peritrechus** Fieb. – Body oblong-oval, dull black, except for pale posterior lobe of pronotum, V-shaped spot on scutellum, and hemelytra. Head flat, eyes small or large. – 3 species (in USSR 17).

1. 2nd-4th antennal segments thick, terete, strongly thickening to apex. 4-5.2. – S Khab., Amur., N Prim. – Palearctic **P. angusticollis** R. Sahlb.
- 2nd and 3rd antennal segments slender 2
2. Eyes very large, almost spherical, protruding beyond anterior angles of pronotum. Antennae unicolorous, black. 4.5-5.5. – Amur., Prim., S Kur. – NE China. – In sandy habitats **P. femoralis** Kerzh.
- Eyes smaller, not spherical, not protruding beyond anterior angles of pronotum. 1st and 4th antennal segments entirely black; 2nd and 3rd segments medially yellow. 4-5. – Mag., Kamch.; Siberia. – Europe **P. convivus** Stål

37. **Sphragisticus** Stål. Monotypic genus.

1. Oval, black; posterior lobe of pronotum and hemelytra yellow-brown, with dense, dark punctation; inner corner of corium often with a black spot. 4.5-5. –

Mag., Khab., Amur., Prim., S Kur. – Transpalearctic. – In meadows
 **S. nebulosus** Fall.

38. **Megalonotus** Fieb. Elongate, black, with pale hemelytra; head transverse, eyes small. In litter and on ground under plants. – 2 species (in USSR 11).

1. Body covered with short, slender, recumbent setae. Pronotum and hemelytra shining; all femora yellow or rufescent, sometimes fore femora dark brown. 3.5-4.5. – S Khab., Amur., S Prim. – Transpalearctic **M. antennatus** Schill.
- Body covered with short, recumbent and long, erect setae. Pronotum and hemelytra dull; all femora black; tibiae yellow-brown. Male 4.4-4.8; female 5.2-5.7. – Amur., S Prim. – Holarctic. – In dry habitats **M. sabulicola** Thomson [p. 902]

Tribe *GONIANOTINI*

39. **Pterotmetus** Am. et Serv. Monotypic genus.

1. Head, antennae, thorax, abdomen, and legs black. Brachypterous, more rarely macropterous. Clavus and corium pale rufescent; sometimes corium with black basal band, or its outer margin blackened in apical part; membrane dark brown, with white spot at base. 4.5-6. – S Khab., Amur. – Palearctic. – In meadows
 **P. staphyliniformis** Schill.

40. **Pionosomus** Fieb. Body black, with dense, long, erect setae; hemelytra brown-yellow, with 1 or 2 dark brown bands, often shortened. – 2 species (in USSR 7).

1. Anterior lobe of pronotum black, mat or dull shining, with bronze hue, without median furrow, with dense punctation. Hemelytra usually with 2 bands (at base and in the middle of corium). Femora rufous to dark brown. 2-2.8. – Amur., S Prim.; C Yakutia, S Siberia. – Mongolia **P. monochrous** Jak.
- Anterior lobe of pronotum pitch-black, strongly shining, without bronze hue, with narrow median furrow, with sparse punctation. Hemelytra usually with only 1 band in the middle of corium. Femora black-brown, less often black or dark brown. 2.2-2.8. – Mag. – Palearctic (in Mag. and E Yakutia – ssp. *frigidus* Vin.). – In steppe habitats **P. trichopterus** Thomson

41. **Trapezonotus** Fieb. Broad-oval, not pilose, black, except for pale hemelytra and posterior margin of pronotum. Inner margin of corium often with black spot. Hemelytra complete or shortened. On ground under plants and in litter. – 3 species (in USSR 6).

1. Fore femora with a tooth; fore tibiae distinctly curved. At least fore tibiae, apices of femora, in males also 1st antennal segment yellow. (Subgenus *Trapezonotus* Fieb.). Hypophysis of paramere curved at an obtuse angle, wide at base, tapering apically (Fig. 554: 23). 3.8-4.5. – Mag., Kamch., Khab., Amur., Prim. – Forest zone of Palearctic **T. desertus** Seid.
- Fore femora without teeth; fore tibiae almost straight; antennae and legs black. (Subgenus *Gnopherus* Stål) 2
2. Larger: 4.3-5.6. Hemelytra with shortened membrane, covering 2/3 of abdomen. – S Khab., Amur. – Transpalearctic **T. (G.) anorus** Fl.
- Smaller: 3.6-4.2. Hemelytra complete, covering entire abdomen. – Amur., Prim.; Transbaikal, Irkutsk Prov. – Mongolia **T. (G.) subtilis** Jak.

42. **Emblethis** Fieb. – 1 species (in USSR 23).

1. Yellow to yellow-brown; dorsum with dense black punctures; membrane with small, white spots between veins. 1st segment of hind tarsi 1.9-2.1 times as long as 2nd and 3rd segments combined. Flattened lateral margins of pronotum almost twice as wide as clypeus. 1st antennal segment short-oval. 4.6-6.1. – Mag., Khab., Amur., Prim., S Sakh.; Siberia. – Europe. – In dry meadows *E. brachynotus* Horv.

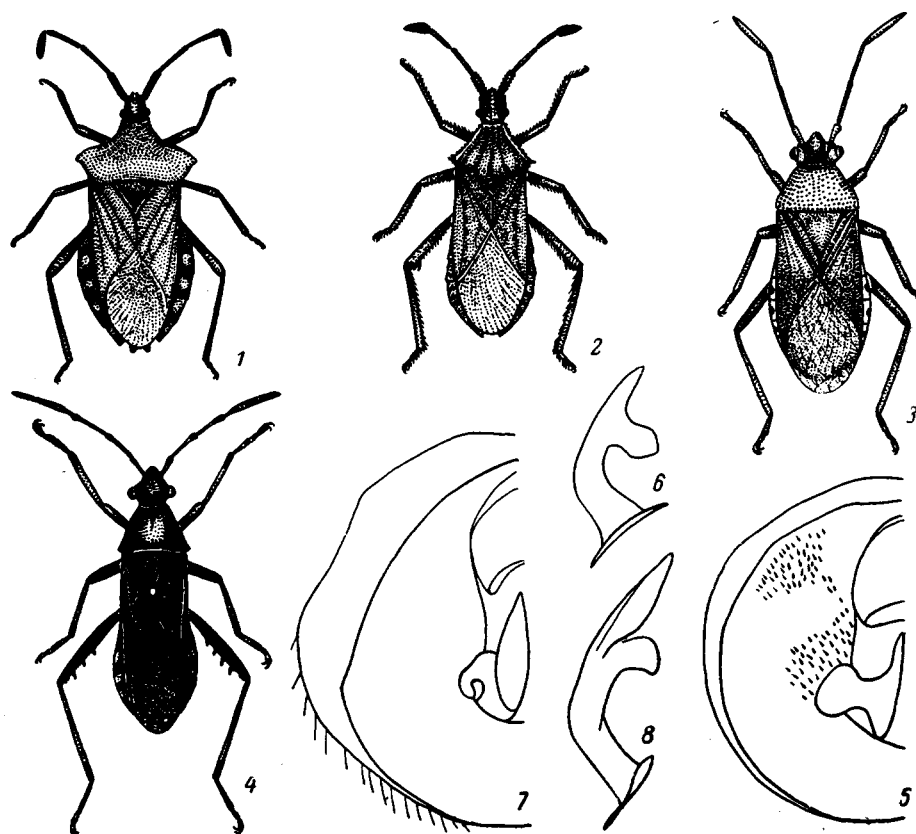


Fig. 555. Heteroptera. Families Pyrrhocoridae, Coreidae, and Rhopalidae (after Esaki, Putshkov and original).

1, *Coreus marginatus*; 2, *Coriomeris scabricornis*; 3, *Rhopalus parumpunctatus*; 4, *Alydus calcaratus*; 5, 6, *Pyrrhocoris sinuaticollis*: 5, left half of male genital segment; 6, paramere; 7, 8, *P. sibiricus*: 7, left half of male genital segment; 8, paramere.

28. Family PYRRHOCORIDAE

E.V. Kanyukova

Medium-sized or large. Feeding on seeds, dead insects, eggs of insects, etc. Adults hibernating. – 1 genus (in USSR 2 genera, 6 species). [p. 903]

KEY TO SPECIES OF FAMILY PYRRHOCORIDAE

1. *Pyrrhocoris* Fall. Pronotum and hemelytra in species from Far East yellowish brown or reddish brown, with black punctation; their lateral margins red or light brown. Venter of body generally black. In litter. – 2 species (in USSR 5).

1. Thorax around all coxal cavities and posterior margin of metathorax white or reddish. Male genital segment and paramere as in Figs. 555: 7, 8. 8.5-9.5. – Khab. (to Shantar Islands), Amur., Prim., S Kur. (Kunashir I.); Transbaik. – Japan, Korea, China, Mongolia. – On dry slopes **P. sibiricus** Kuschakewitsch (*fieberi* Kuschakewitsch)
- Entire thorax black ventrally. Male genital segment and paramere as in Figs. 555: 5, 6. 7.6-9.5. – S Khab., Amur., Prim. – Japan, Korea, E China. – In light forests .. **P. sinuaticollis** Reut., sp. dist., sec. typ. (*stehliki* Kanyukova, syn. n.)

29. Family STENOCEPHALIDAE

G.P. Tshernova

Body elongate, with almost parallel lateral margins. Head long, with strongly produced conical genae (Fig. 556: 1). Eyes shifted far from pronotum. Ocelli present. Antennae 4-segmented, slender, with dark and [p. 904] pale rings. Rostrum 4-segmented. Hemelytra always complete. Sternite VII in females completely split, ovipositor visible externally. Male genital segment not concealed within abdomen; parameres symmetrical. Phytophagous. Adults hibernating. – 1 genus, 2 species (in USSR 7 species).

KEY TO SPECIES OF FAMILY STENOCEPHALIDAE

1. **Dicranocephalus** Hahn. Dark brown or almost black; apex of scutellum usually with a small, white spot; connexivum with wide, black and white bands; antennae with black and white rings; bases of femora, tibiae (except both ends), bucculae, and first two rostral segments, all white. On *Euphorbia*. – 2 species (in USSR 7).
1. Hind femora pale basally for not more than 1/3 of their length. 2nd antennal segment with 2 brown rings. 11-13. – Prim.; Transbaik. – China, Mongolia **D. femoralis** Reut.
- Hind femora pale basally for not less than half of their length. 2nd antennal segment with 3 brown rings. 9.5-11.5. – Prim.– Transpalearctic **D. medius** M. R. (*sibiricus* Jak., *japonicus* Lansb.)

30. Family COREIDAE

G.P. Tshernova

Body shape variable; coloration brownish, more rarely yellowish or black. Ocelli present. Antennae and rostrum 4-segmented. Hemelytra usually complete. Openings of thoracic scent glands always distinct, with callose rib. Posterior margins of tergites IV and V with tongue-shaped, median projections directed posteriad. Male genital segment not concealed within abdomen; parameres symmetrical. Phytophagous. Adults hibernating. Some authors regard Alydinae as a separate family. – 9 genera, 9 species (in USSR 26 genera, 67 species).

KEY TO GENERA

1. Head much narrower than pronotum. Body moderately wide 2
- Head approximately as wide as pronotum. Body strongly elongate. (Subfamily Alydinae) 7
2. Hind femur without teeth or (*Coreus*) with 2 rows of small denticles. Head dor-

- sally with short median groove. (Subfamily Coreinae) 3
- Hind femur with 1 or several subapical teeth. Head dorsally without median groove. (Subfamily Pseudophloeinae) 5
- 3. Apex of head with 2 converging acute spines (Fig. 556: 2). 2nd antennal segment cylindrical. Femora with 2 rows of small denticles 2. **Coreus**
- Apex of head without spines (Fig. 556: 4). 2nd antennal segment in Far East species flattened laterally. Femora without denticles 4.
- 4. Outer margin of antenniferous tubercle with pointed tooth directed forward (Fig. 556: 4). In Far East species, 3rd antennal segment widened and blackened at apex 3. **Enoplops**
- Antenniferous tubercle without teeth. 3rd antennal segment moderately widened apically, not black 1. **Homoeocerus**
- 5. Hind femora near apex with a group of several teeth of various sizes and with 1 tooth basal to this group (Fig. 556: 3). Lateral margin of pronotum with bristles originating from teeth; its posterior margin with pointed spine on each side lateral to scutellum 6. **Coriomeris**
- Hind femora near apex with 1 tooth, rarely (*Nemocoris*) with additional, very fine denticles. Lateral margin of pronotum without teeth, its posterior margin without spines 6 [p. 905]
- 6. 2nd antennal segment half as long as 3rd segment, both of them red. Hind femora unicolorous, brown 4. **Ulmicola**
- 2nd antennal segment as long as 3rd segment; all antennal segments black. Hind femora yellowish, with black apices 5. **Nemocoris**
- 7. Hind femora without teeth. Genae as long as clypeus or longer. Color light yellow 7. **Paraplesius**
- Hind femora with teeth. Genae shorter than clypeus. Color black or dark brown 8
- 8. Pronotum without a spine before posterior angles. 1st-3rd antennal segments pale at least at base. Hemelytra unicolorous 8. **Alydus**
- Pronotum with a small, externally directed spine before posterior angles. In Far East species, antennae entirely black, corium usually with pale outer margin 9. **Megalotomus**

KEY TO SPECIES OF FAMILY COREIDAE

Subfamily COREINAE

- 1. **Homoeocerus** Burm. In USSR 1 species.
- 1. Dirty yellow, less often brownish or reddish; antennae usually red. 11.5-15. – S Khab., Prim. – Japan, Korea, E China. – On deciduous trees and bushes **H. dilatatus** Horv.
- 2. **Coreus** F In USSR 1 species.
- 1. Dark brown; 2nd and 3rd antennal segments red, 4th segment black. 12-15. – S Khab., Amur., Prim., Sakh. – Transpalearctic. In the Far East, ssp. *orientalis* Kir. – On Polygonaceae, especially on *Rumex*. (Fig. 555: 1) **C. marginatus** L.
- 3. **Enoplops** Am. et Serv. – 1 species (in USSR 5).
- 1. Brown or brownish-yellow; lateral margins of pronotum narrowly yellow. Apex of 3rd antennal segment, 4th and sometimes 1st segments black. 10-12. – Amur.; from Yakutia to E Kazakhstan. – China, Mongolia. – On *Atriplex*.... **E. sibiricus** Jak.

Subfamily PSEUDOPHLOEINAE

4. *Ulmicola* Kirk. Monotypic genus.

1. Brown; 2nd and 3rd antennal segment red. 8.8-9.5. – Amur. – Forest zone to W Europe. On *Trifolium* in forest meadows **U. spinipes** Fall.

5. *Nemocoris* R. Sahlb. Monotypic genus.

1. Dorsum dark brown or black; venter dirty yellow; lateral margins of pronotum and bases of hemelytra whitish. 8.5-10.5. – S Prim. – Transpalearctic. – On Fabaceae, rare **N. fallenii** R. Sahlb.

6. *Coriomeris* Westw. – 1 species (in USSR 9).

1. Flattish, color from dirty yellow to almost black. 7.5-9.5. – Mag., Kamch., Khab., Amur., Prim., Sakh. – Transpalearctic. – On Fabaceae. (Fig. 555: 2) **C. scabricornis** Panz. [p. 906]

Subfamily ALYDINAE

7. *Paraplesius* Scott. Monotypic genus.

1. Grayish yellow or greenish yellow, with fine, dark punctation. Pronotum with a small black spot in each posterior corner. 4th antennal segment brown, with pale ring in basal half. 12-14. – S Kur. – Japan. – On *Sasa* **P. unicolor** Scott

8. *Alydus* F. – 1 species (in USSR 2).

1. Black; sometimes hemelytra or also pronotum brown. Scutellum with a small white spot at apex. Tibiae and antennae partly pale. 9.5-12. – Mag., Kamch., Khab., Amur., Prim., Sakh. – Transpalearctic. – On Fabaceae. (Fig. 555: 4) **A. calcaratus** L.

9. *Megalotomus* Fieb. – 1 species (in USSR 3).

1. Black; hemelytra usually brown; outer margin of corium generally yellowish. Scutellum entirely black. Tibiae pale, darkened basally and apically. 12.5-15. – S Khab., Amur., Prim. – Transpalearctic. – On Fabaceae **M. juncus** Scop.

31. Family RHOPALIDAE

G.P. Tshernova

Body oblong-oval or strongly elongate, with parallel lateral margins. Coloration variable. Ocelli present. Antennae and rostrum 4-segmented. Openings of thoracic scent glands indistinct. Male genital segment concealed within abdomen; parameres symmetrical. Phytophagous. – 6 genera, 15 species (in USSR 11 genera, 40 species).

LITERATURE. Putshkov, V.G. 1986. Rhopalidae (Heteroptera) in the fauna of the USSR. 1986. 132 pp. Leningrad. (Opredeliteli po faune SSSR, vol. 146). [In Russian].

KEY TO GENERA

1. Antenniferous tubercles projecting outward in form of a tubercle or pointed tooth directed forward. 1st antennal segment not reaching or reaching little be-

- yond apex of head; 4th antennal segment usually longer than 3rd segment. Body oblong-oval. (Tribe Rhopalini) 2
- Antenniferous tubercles rounded externally. 1st antennal segment reaching markedly beyond apex of head; 4th antennal segment shorter than 3rd segment. Body strongly elongate, narrow. (Tribe Chorosomatini) 5
2. Dorsum red with contrasting pattern of black spots. Corium and clavus not transparent, with weakly prominent veins 1. **Corizus**
- Coloration different, if red then without black spots dorsally. Corium and clavus more or less hyaline, transparent, with rather prominent veins 3
3. Metapleura with rounded corners, uniformly punctate (Fig. 556: 5) 4. **Stictopleurus**
- Metapleura with produced caudad and laterad posterior corners; metepisterna punctate, metepimera almost not punctate (Fig. 556: 6) 4
4. Anterior margin of pronotum with smooth, not punctate ridge. Transverse groove in anterior part of pronotum black. Membrane usually reaching well beyond apex of abdomen 2. **Liorhyssus** [p. 907]
- Anterior margin of pronotum either without ridge, or with 1-3 rows of punctures anterior to the ridge. Transverse groove on pronotum generally pale. Membrane usually only slightly reaching beyond apex of abdomen 3. **Rhopalus**
5. 1st antennal segment half as long as head and projecting beyond apex of head by 1/3 of its length. Often brachypterous 5. **Myrmus**
- 1st antennal segment as long as head and projecting beyond apex of head by 3/4 of its length. Hemelytra always complete, with well developed membrane, but not covering a large part of the abdomen 6. **Chorosoma**

KEYS TO SPECIES OF FAMILY RHOPALIDAE

1. **Corizus** Fall. – 2 species (in USSR 4).
1. Ultimate abdominal tergite black, the other tergites pale. In posterior corner of pronotum, 1 square, rarely notched, black spot. Male genital segment black or brown; its posterior margin weakly notched (Fig. 556: 7). 8-10. – Mag., Khab., Amur., Prim. – Transpalearctic. – On various herbs, developing mainly on *Hyoscyamus niger* **C. hyoscyami** L.
- Ultimate and penultimate abdominal tergites black; the rest tergites pale. In posterior corner of pronotum, generally 2 parallel, longitudinal, black spots. Male genital segment red or yellow-red; its posterior margin deeply notched (Fig. 556: 8). 8-9.6. – S Prim.; S Siberia, mountains of Soviet Central Asia. – Korea, China, Mongolia **C. tetraspilus** Horv.
2. **Liorhyssus** Stål. In USSR 1 species.
1. In specimens from Far East, coloration dirty yellow; scutellum usually black medially; abdomen under hemelytra black. In female, apex of abdomen almost truncate; in male, apex of abdomen as in Fig. 556: 9. 5.3-7.5. – S Khab., Amur., Prim. – Distributed almost worldwide. – Polyphagous, but prefers *Lactuca*. Rare **L. hyalinus** F.
3. **Rhopalus** Schill. Coloration dirty yellow or reddish brown. On herbs. – 5 species (in USSR 9).
1. Coriaceous, punctate, outer part of corium at least slightly reaching beyond outer vein of corium. Male not shorter than 7, female not shorter than 7.5. Veins

- of hemelytra with well marked black spots. (Subgenus *Aeschyntelus* Stål) 2
- Coriaceous, punctate, outer part of corium not reaching beyond outer vein of corium. Male not longer than 7.5. (Subgenus *Rhopalus* Schill.) 4
2. Venter of abdomen with 2-3 longitudinal rows of black dots. Dorsum of abdomen medially pale entirely or almost entirely. Connexivum usually without black bands dorsally, only with a dot or a line on each segment. Male genital segment as in Fig. 556: 10. 7-9. – S Khab., Amur., Prim., S Sakh., S Kur. – Transpalearctic. – In marshes and humid meadows **Rh. (Ae.) maculatus** Fieb.

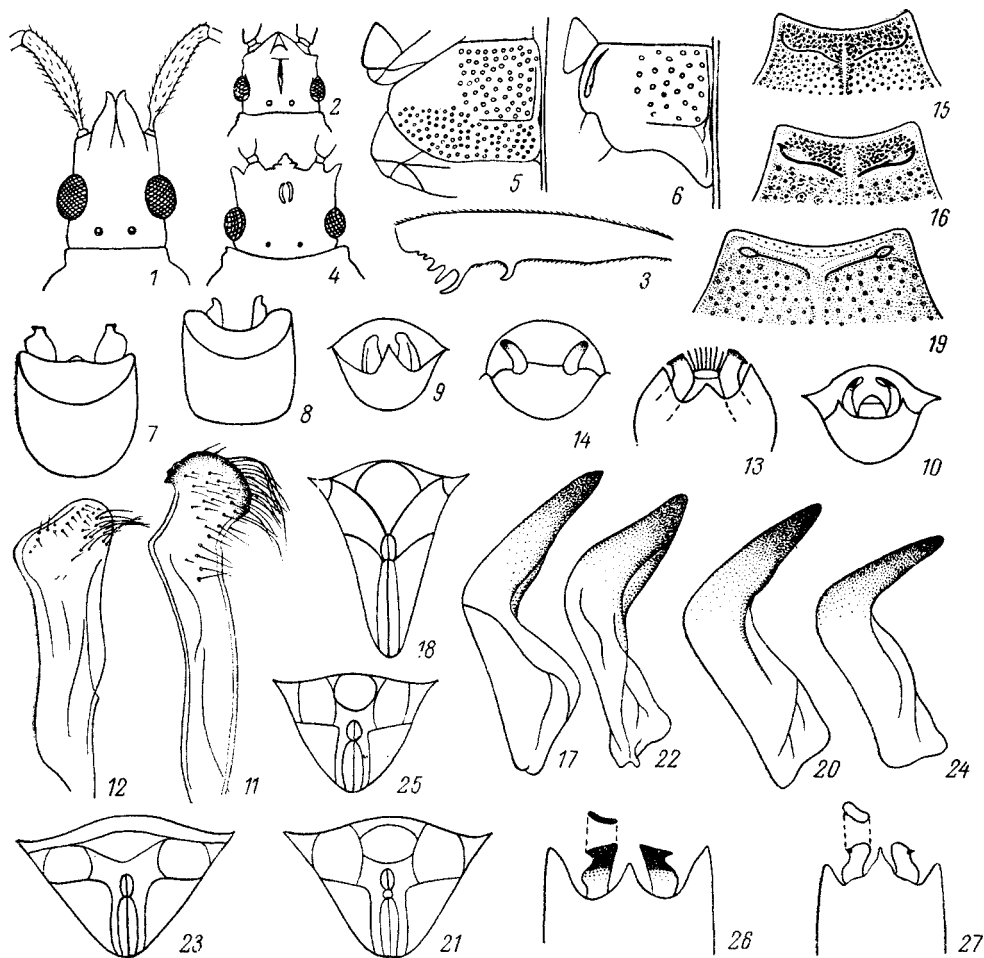


Fig. 556. Heteroptera. Families Stenocephalidae, Coreidae, and Rhopalidae (after Josifov, Kerzhner, Kiritshenko, and Putshkov).

1, *Dicranocephalus agilis* Scop., head; 2, *Coreus marginatus*, head; 3, *Coriomeris scabricornis*, hind femur; 4, *Enoplops scapha* F., head; 5, *Stictopleurus punctatonervosus*, metathorax, lateral; 6, *Rhopalus parumpunctatus*, metathorax, lateral; 7-10, male genital segment: 7, *Corizus hyoscyami*; 8, *C. tetraspilus*; 9, *Liorhyssus hyalinus*; 10, *Rhopalus maculatus*; 11, *Rh. latus*, paramere; 12, *Rh. sapporensis*, paramere; 13, *Rh. distinctus*, male genital segment; 14, *Rh. parumpunctatus*, male genital segment; 15-18, *Stictopleurus punctatonervosus*: 15, 16, anterior part of pronotum; 17, paramere; 18, apex of female abdomen, posterior view; 19, *S. viridicatus*, anterior part of pronotum; 20, 21, *S. sericeus*: 20, paramere; 21, apex of female abdomen, posterior view; 22, 23, *S. crassicornis*: 22, paramere; 23, apex of female abdomen, posterior view; 24, 25, *S. viridicatus*: 24, paramere; 25, apex of female abdomen, posterior view; 26, *Myrmus lateralis*, apex of male genital segment, ventral; 27, *M. miriformis*, same.

- Venter of abdomen without black dots or with single dots not forming rows. Dorsum of abdomen black almost entirely. Connexivum always with wide black bands 3
- 3. Lateral corners of pronotum distinctly projecting beyond bases of hemelytra and usually slightly elevated. Coloration usually reddish brown. Paramere as in Fig. 556: 11. Male 8.2-9.6; female 9.5-10.7. – S Khab., Amur., Prim.; south of E Siberia, Altai. – Korea, E China **Rh. (Ae.) latus** Jak.
- Lateral corners of pronotum almost not projecting beyond bases of hemelytra. Coloration yellowish brown. Paramere as in Fig. 556: 12. On average shorter and narrower. Males 7-8; females 7.5-9. – S Khab., Prim. – Japan, Korea, E China **Rh. (Ae.) sapporensis** Mats. (*maculatus* var. *umbratilis* Horv.) [p. 908]
- 4. Connexivum with wide, brown bands. Pronotum with distinct, white median carina. Rust-reddish. Male genital segment as in Fig. 556: 13. 5.5-6.5. – Mag. (to border with Chuk.), Amur. – Transpalearctic. – On *Thymus* **Rh. distinctus** Sign.
- Connexivum entirely pale or with small black spot on each segment. Pronotum without distinct, white median carina. Dirty yellow or greenish. Male genital segment as in Fig. 556: 14. 5.5-7.5. – S Khab., Amur., Prim. – Transpalearctic. – On various herbs. (Fig. 555: 3) **Rh. parumpunctatus** Schill.
- 4. **Stictopleurus** Stål. Coloration variable, usually grayish, brownish, or greenish. Mainly on Asteraceae. – 4 species (in USSR 10). [p. 909]
- 1. Transverse groove in anterior part of pronotum not bounded anteriorly by smooth ridge and forming an open (Fig. 556: 15), rarely indistinctly closed (Fig. 556: 16) loop on each side. Pronotum from the groove to anterior margin with uniform punctures similar to those posterior to groove. Apex of female abdomen and paramere as in Figs. 556: 17, 18. 6.2-8.6. – Mag., Kamch., Khab., Amur., Prim., Sakh., S Kur. – Transpalearctic. – Mainly in forest meadows and outskirts **S. punctatonervosus** Gz.
- Transverse groove on anterior part of pronotum bounded anteriorly by smooth ridge and forming closed (Fig. 556: 19) loop on each side. Punctuation anterior to groove different to that posterior to it 2
- 2. Body densely pilose; setae on tibiae and antennae erect, twice as long as the thickness of tibia and antenna respectively. Apex of female abdomen and paramere as in Figs. 556: 20, 21. 6.4-8.4. – Mag.; Yakutia, from Transbaikal to Bashkiria. – Mongolia. – Mainly in steppes **S. sericeus** Horv.
- Setae on body less dense, short; setae on tibia and antenna approximately as long as the thickness of tibiae and antennae respectively 3
- 3. Paramere and apex of female abdomen in posterior view as in Figs. 556: 22, 23. Larger: 6.5-8.3. – Mag., Kamch., Khab., Amur., Prim., N Sakh. – Transpalearctic. – Mainly in forest meadows and outskirts **S. crassicornis** L.
- Paramere and apex of female abdomen in posterior view as in Figs. 556: 24, 25. Smaller: 5-6.5. – Mag., Amur., Prim. – Palearctic west to Ukraine, N America. – Mainly in steppes **S. viridicatus** Uhl. (*nysioides* Reut.)
- 5. **Myrmus** Hahn. On wild grasses. – 2 species (in USSR 4).
- 1. Always macropterous. Setae on head and pronotum recumbent. Coloration greenish or yellowish, with abundant black pattern mesally. Male genital segment as in Fig. 556: 26. 8.3-10.7. – Amur., S Prim. – Korea, E China. – On dry slopes on *Arundinella hirta* **M. lateralis** Hsiao

- Often brachypterous. Setae on head and pronotum very short, erect, or pronotum bare. Coloration green, rarely yellowish, sometimes, especially in males, with longitudinal black stripes. Male genital segment as in Fig. 556: 27. 6.5-11. – Mag., Kamch., Khab., Amur., Prim., Sakh. – Transpalearctic. In the south of the Far East (Amur., Khab. south to delta of Amur, Prim., S Sakh.), ssp. *gracilis* Lindb. differing in the long 2nd antennal segment (1.5-1.8 times as long as width of head across eyes), very short pubescence of antennae and legs, and large sizes: male 8.5-9.7; female 10-11 **M. miriformis** Fall.

6. **Chorosoma** Curt. – 1 species (in USSR 4).

1. Light green. 14-18. – Amur.; S Siberia. – China, Mongolia. – On wild grasses **Ch. macilentum** Stål

32. Family UROSTYLIDAE

E.V. Kanyukova

One of the most primitive families of Pentatomoidea. Representatives of the family distributed in the Indo-Malayan Region and SE part of Palearctic. Species from the Russian Far East living on deciduous trees, hibernating as adults. In USSR 2 genera, 7 species.

LITERATURE. Kerzhner, I.M. 1966. Pentatomoidea of family Urostylidae (Heteroptera) in the USSR fauna. Trudy Zool. Inst. Akad. Nauk SSSR 37: 45-50. [In Russian]. [p. 910]

KEY TO GENERA

1. In the Far East species, body dull; hemelytra not pilose; setae on legs and antennae very short, recumbent. Paramere flattened to apex. Posterior genital plates in female not separated from tergite, slightly projecting posteriad and not covering the outer margin of middle plates 1. **Urochela** Dall.
- Body shining, dorsally and ventrally with pale setae approximately as long as width of eye; antennae and legs with rather long, erect setae. Paramere almost rodlike, tapering to apex. Posterior genital plates in female separated from tergite by a groove, markedly projecting posteriad and slightly overlying the outer margin of middle plates 2. **Urostylis** Westw.

KEYS TO SPECIES OF FAMILY UROSTYLIDAE

1. **Urochela** Dall. In USSR 2 species.

1. Body brownish red; each hemelytron with 2 small, rounded black spots; connexivum with black and white bands. (Subgenus *Urochela* Dall.). Male genital segment with opening on dorsal side, without processes (Fig. 557: 1). 13.5-17. – S Khab., Prim. – Japan, Korea, China. – On *Ulmus scabra*. Hibernating in rocks, caves. (Fig. 561: 2) **U. quadrinotata** Reut.
- Body green, sometimes turning yellow after death; only antennae with black rings and sides of prothorax with a fine black stripe each. (Subgenus *Chlorochela* Kerzh.). Male genital segment with opening situated dorsocaudally, with protruded lateral angles and a short, bifurcated apically process (Fig. 557: 2) in the middle of posterior margin. 7.7-11.3. – S Khab., Amur., Prim.; Chita Prov., Buryatia. – Korea, China, E Mongolia. – On *Padus, Malus* **U. (Ch.) flavoannulata** Stål

2. *Urostylis* Westw. Green; partly reddening before hibernation, sometimes turning yellow after death; antennae often with black or brown rings; sometimes sides of prothorax with a black stripe. In USSR 5 species, all on *Quercus*.

1. Process on posterior margin of male genital segment in the form of rhomboidal, notched at apex plate on a short stalk, with an outgrowth on inner side (Fig. 557: 3). Female genital segments as in Fig. 557: 4. Pronotum, scutellum, and hemelytra with dark punctation; anterior half of pronotum usually with pale punctation. 11.5-14.5. – S Prim. (Khasan District). – S China (Yunnan). – On *Quercus dentata* ***U. linguiformis* Ren**

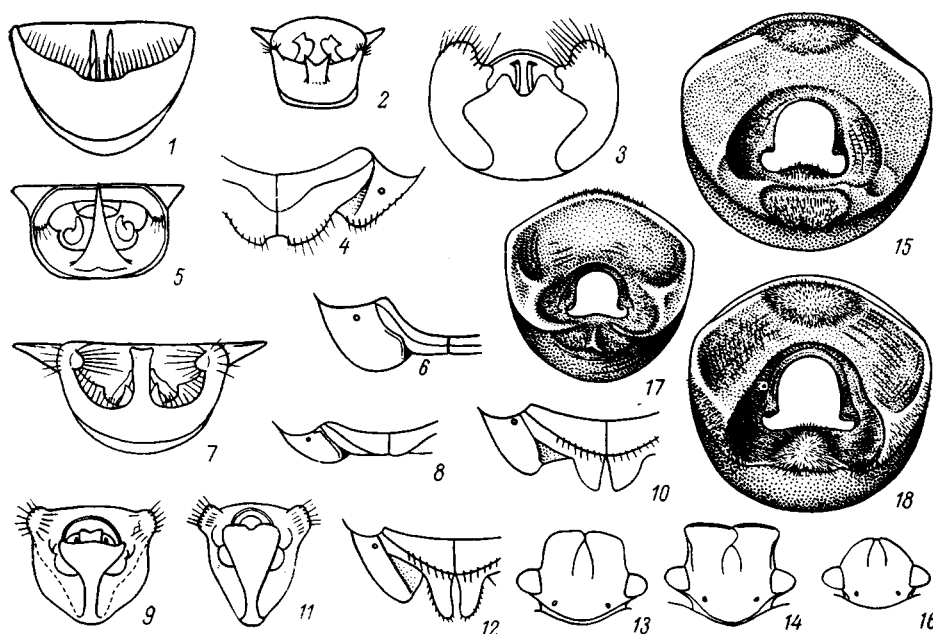


Fig. 557. Heteroptera. Families Urostylidae and Plataspididae (after Josifov and Kerzhner).

1, *Urochela quadrinotata*; 2, *U. flavoannulata*; 3, 4, *Urostylis linguiformis*; 5, 6, *U. lateralis*; 7, 8, *U. annulicornis*; 9, 10, *U. trullata*; 11, 12, *U. striicornis*; 13-15, *Coptosoma capitatum*; 16, 17, *C. biguttulum*; 18, *C. chinense*. 1-3, 5, 7, 9, 11, 15, 17, 18, male genital segment, posterior view; 4, 6, 8, 10, 12, apex of female abdomen; 13, 14, 16, head (13, female; 14, male).

- Process on posterior margin of male genital segment different 2
- 2. Process on posterior margin of male genital segment not widening to apex, without outgrowth on inner side (Figs. 557: 5, 7). Middle genital plates of female without projection posteriorly (Figs. 557: 6, 8) 3
- Process on posterior margin of male genital segment widening to apex, with ribbon-like outgrowth on inner side (Figs. 557: 9, 11). Middle genital plates of female with long projection (Figs. 557: 10, 12) on posterior margin 4
- 3. Process on posterior margin of male genital segment gradually tapering, pointed at apex (Fig. 557: 5). Posterior genital plates of female protruding far beyond posterior margin of the middle plates (Fig. 557: 6). Pale punctation prevails on pronotum, scutellum, and inner parts of hemelytra. Setae on hemelytra distinctly shorter than those on pronotum. 10-13. – Prim. – Korea, China. – On *Quercus mongolica* and *Q. dentata* ***U. lateralis* Walk.**
- Process on posterior margin of male genital segment not tapering, truncate or weakly notched at apex (Fig. 557: 7). Posterior genital plates of female almost not

- protruding beyond posterior margin of the middle plates (Fig. 557: 8). All punctation on pronotum, scutellum, and hemelytra black. Setae on hemelytra almost as long as [p. 911] on pronotum. 9.5-12.5. – S Khab., Prim., S Kur. – Japan, China. – On *Quercus mongolica* **U. annulicornis** Scott
4. Apex of process on posterior margin of male genital segment broad-triangular, without median incision; ribbon-like outgrowth on inner side protruding above the process (Fig. 557: 9). Posterior genital plates of female and processes of middle plates shorter and wider, as in Fig. 557: 10. Bases of tibiae on outer side not blackened or with narrow black band, interrupted medially. Punctuation on pronotum and scutellum pale. 10.5-14. – S Khab., Prim., Sakh. – On *Quercus mongolica* **U. trullata** Kerzh.
- Apex of process on posterior margin of male genital segment narrowly triangular, with median incision; ribbon-like outgrowth on inner side shorter, not protruding above the process (Fig. 557: 11). Posterior genital plates of female and processes of middle plates longer and narrower, as in Fig. 557: 12. Bases of tibiae widely blackened on outer side. Punctuation on pronotum and scutellum black or brown. 12-14. – Prim. – Japan, Korea, China. – On *Quercus mongolica* and *Q. dentata* **U. stricornis** Scott

33. Family PLATASPIDIDAE

E.V. Kanyukova

Body strongly convex, hemispherical. Phytophagous. In USSR 1 genus.

KEY TO SPECIES OF FAMILY PLATASPIDIDAE

1. **Coptosoma** Lap. Black, shining; thorax ventrally gray, dull; 1st and 2nd antennal segments, knees, apices of tibiae, tarsi, and small spots on connexival segments yellowish. On Fabaceae. – 4 species (in USSR 5). [p. 912]

1. Scutellum without yellow spots at base. Lateral margins of pronotum black or dark brown. 3.4-4.5. – S Khab., Amur., Prim. – Transpalearctic **C. scutellatum** Geoffr.
- Scutellum with 2 or more yellow spots at base. Lateral margins of pronotum narrowly yellow 2
2. Mandibular plates longer than clypeus and converging anterior to it (Figs. 557: 13, 14). Male genital segment as in Fig. 557: 15. 4-5. – S Khab., Amur., Prim. – Korea **C. capitatum** Jak.
- Mandibular plates not longer than clypeus and not converging anterior to it (Fig. 557: 16). Male genital segment different 3
3. Upper margin of male genital segment with a narrow stripe of short, pale setae (Fig. 557: 17). 3-4.5. – S Khab., Amur., Prim. – Japan, Korea, NE China. – Common on *Lespedeza*. (Fig. 561: 3) **C. biguttulum** Motsch.
- Upper margin of male genital segment with a rounded area covered with fine setae (Fig. 557: 18). 3.5-4.5. – S Prim. – Korea, NE China **C. chinense** Sign.

34. Family ACANTHOSOMATIDAE

E.V. Kanyukova

Body somewhat elongate, widest in the area of lateral corners of pronotum and gradually tapering posteriad, shining, bare. Mesothorax with laminate process; base

of abdomen with directed forward spine. On trees and bushes, mostly sucking fruits and flower buds. Adults hibernating. One generation per year. In some species, maternal care of eggs present. – 3 genera, 17 species (in USSR 4 genera, 20 species).

KEY TO GENERA

1. Laminate process of mesothorax not reaching middle coxae. Larger 1. **Acanthosoma**
- Laminate process of mesothorax reaching middle coxae or beyond them 2
2. Connexivum unicolorous, pale 2. **Elasmotethus**
- Connexivum dorsally with alternating black and pale transverse bands 3. **Elasmucha**

KEYS TO SPECIES OF FAMILY ACANTHOSOMATIDAE

1. **Acanthosoma** Curt. – 7 species (in USSR 8).

1. Laminate process of mesothorax low, not protruding or hardly protruding above rostrum. Posterior margin of male genital segment medially with 2 tufts of dense setae sometimes clustered in 1 row; lateral processes of the segment with small black denticles at apices. In females, posterior margin of pregenital sternite narrowly blackened in the middle. 12-17. – Amur., S Prim., Sakh., S Kur.; Tien Shan, SE Kazakhstan. – Japan, Korea, China, Mongolia. – On deciduous trees ..
..... **A. spinicolle** Jak. (*axillare* Jak., *frater* Reut.)
- Laminate process of mesothorax high, markedly protruding above rostrum 2
2. Male genital segment without long, lobiform, lateral processes, with 2 blackened at apex denticles on each side of the middle of posterior margin (Fig. 558: 1). In females, posterior margin of pregenital sternite with 2 black spots on each side of the middle. 12-15. – S Kur. – Japan, China **A. expansum** Horv. [p. 913]
- Male genital segment with long, lobiform, lateral processes protruding beyond apex of abdomen. In females, posterior margin of pregenital sternite sometimes narrowly blackened, but not with 2 black spots on each side of the middle 3
3. Lateral corners of pronotum produced into spines, blackened at ends (in specimens from Siberia and Far East, ssp. *angulatum* Jak.). Lateral processes of male genital segment in the form of wide lobes, without teeth (Fig. 558: 2). In females, apex of abdomen as in Fig. 558: 3. 12-17. – S Khab., Prim., Sakh. – Transpalearctic. – On deciduous trees **A. haemorrhoidale** L.
- Lateral corners of pronotum not produced into spines 4
4. Boundaries of tergites on connexivum narrowly blackened, black bands not wider than tibia. Lateral corners of pronotum reddish at apices. Lateral processes of male genital segment in the form of long, narrow lobes, protruding far beyond apices of hemelytra (Figs. 558: 4, 6) 5
- Boundaries of tergites on connexivum widely blackened, black bands wider than tibia. Lateral corners of pronotum not reddish at apices. Lateral processes of male genital segment in the form of wide lobes, only slightly protruding beyond apices of hemelytra (Figs. 558: 8, 9) 6
5. Femur in male with basal spine. Lateral processes of male genital segment without spine at base, diverging posteriad (Fig. 558: 4). Posterior margins of female genital plates almost truncate (Fig. 558: 5). 14-17. – Prim. – Japan, Korea **A. forficula** Jak. (*virens* Reut.)
- Femur in male without spines. Lateral processes of male genital segment with spinelike process at base, almost parallel (Fig. 558: 6). Posterior margins of fe-

- male genital plates uniformly rounded (Fig. 558: 7). 14-19. – S Khab., [p. 914] Prim., S Kur. – Japan, Korea, E China. – On *Swida alba* **A. labiduiroides** Jak.
6. Each lateral process of male genital segment with 1 black projection anterior to apex (Fig. 558: 8). Posterior margins of female genital plates uniformly rounded. 17-18. – Prim. – Japan, Korea **A. crassicaudum** Jak.

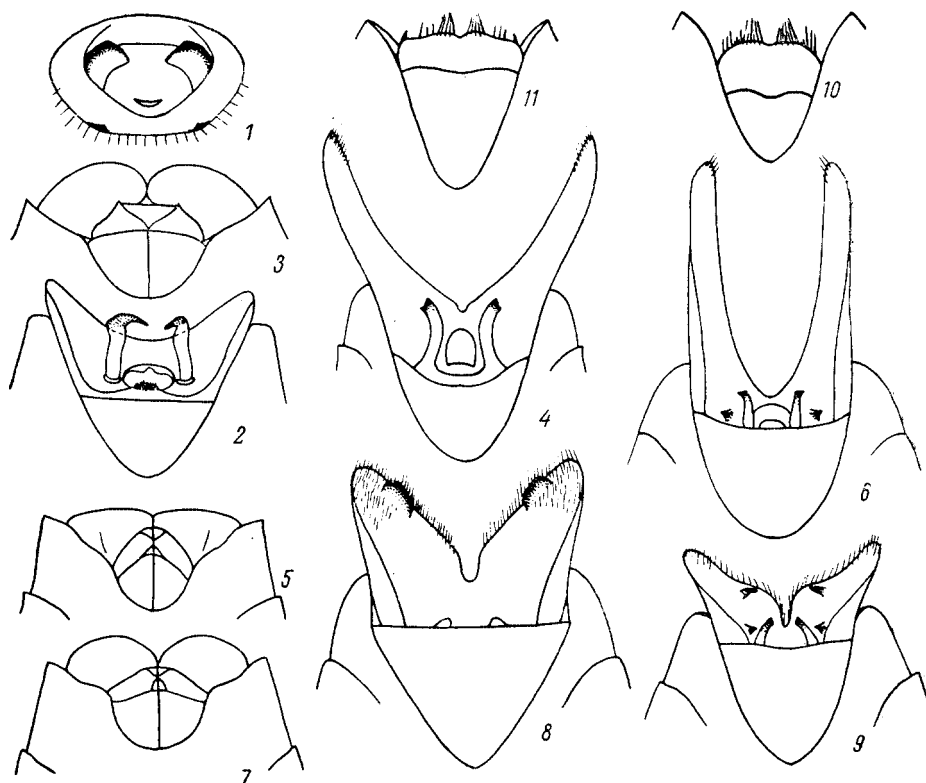


Fig. 558. Heteroptera. Family Acanthosomatidae (after Kerzhner and original).

1, *Acanthosoma expansum*; 2, 3, *A. haemorrhoidale*; 4, 5, *A. forficula*; 6, 7, *A. labiduiroides*; 8, *A. crassicaudum*; 9, *A. denticaudum*; 10, *Elasmostethus interstinctus*; 11, *E. brevis*. 1, 2, 4, 6, 8-11, male genital segment, ventral (1) and posterior view (the other); 3, 5, 7, apex of female abdomen, ventral.

- Each lateral process of male genital segment with 2 small, black spinules (Fig. 558: 9). Posterior margins of female genital plates less rounded. 13-18. – S Khab., Prim., S Kur.; south of Siberia. – Japan, Korea, N China **A. denticaudum** Jak.

2. *Elasmostethus* Fieb. – 3 species (in USSR 4).

1. Abdomen dorsally almost entirely pale. Posterior margin of male genital segment only with 2 tufts of setae. Posterior angles of abdominal segment VII in females slightly protruding beyond posterior margin of genital segments. Rostrum reaching only middle coxae. 8.5-12. – S Khab., Prim., Sakh., Kur. – Japan, Korea, E China. – On large Apiaceae, feeding on seeds **E. humeralis** Jak.
- Abdomen dorsally black. Posterior margin of male genital segment in addition to 2 tufts of setae with 2 black denticles lateral to them. Posterior angles of abdominal segment VII in females markedly protruding beyond posterior margin of genital segments 2
2. Denticles on male genital segment small, strongly approached to tufts of setae

and lying on ventral margin of genital segment (Fig. 558: 10). 8.5-11.5. – Mag., Kamch., Khab., Amur., Prim., Sakh., Kur.; forest and forest-steppe zones of the USSR. – From Japan to W Europe. – On *Betula*, *Alnus*; adults also on other trees and bushes **E. interstinctus** L.

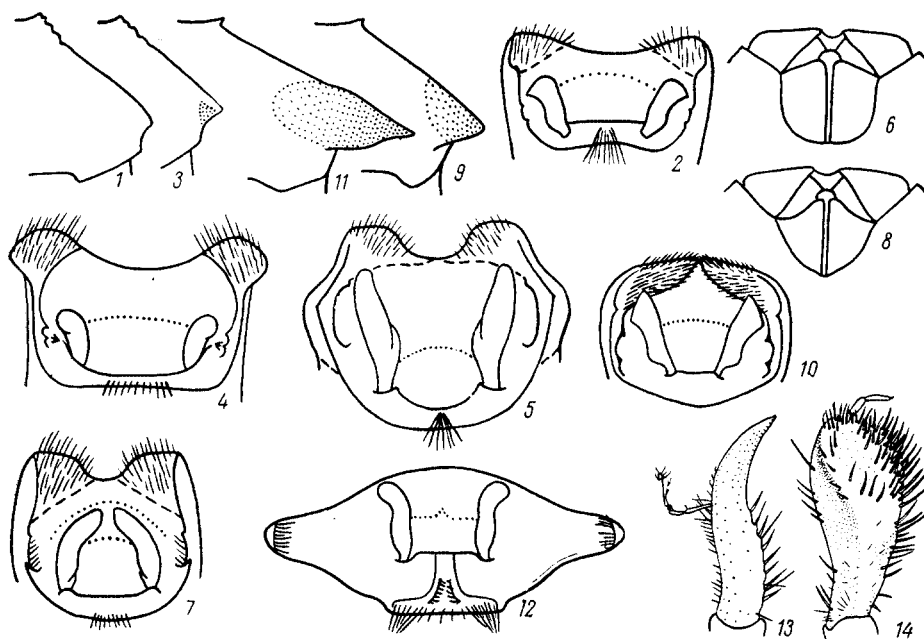


Fig. 559. Heteroptera. Families Acanthosomatidae and Cydnidae (after Kerzhner).

1, 2, *Elasmucha grisea*; 3, 4, *E. putoni*; 5, 6, *E. fieberi*; 7, 8, *E. amurensis*; 9, 10, *E. dorsalis*; 11, 12, *E. ferrugata*; 13, 14, *Stibaropus* sp. 1, 3, 9, 11, lateral margin of pronotum; 2, 4, 5, 7, 10, 12, male genital segment; 6, 8, apex of female abdomen, ventral; 13, 14, fore and hind tibiae.

- Denticles on male genital segment larger, far distant from tufts of setae and lying almost in the middle of lateral margins of the segment (Fig. 558: 11). 8.5-11.5. – Mag., Kamch., Khab., Amur., Prim., Sakh.; forest zone of the USSR from Sakh. to Leningrad Prov. – Korea, NE China, Mongolia, Scandinavia. – On *Salix* and *Chosenia* **E. brevis** Lindb. [p. 915]

3. *Elasmucha* Stål. In USSR 7 species.

LITERATURE. Kerzhner, I.M. 1972. Shieldbugs of the genus *Elasmucha* Stål (Heteroptera, Acanthosomatidae) in the fauna of the USSR. Zool. Zhurn. 51: 214-219. [In Russian].

1. Humeral angles of pronotum not produced into spines (Figs. 559: 1, 3) 2
- Humeral angles of pronotum produced into more or less long spines (Figs. 559: 9, 11) 5
2. Abdomen ventrally without black punctation or with single black punctures. At least 1st-3rd antennal segments yellow 3
- Abdomen ventrally with numerous black punctures. All antennal segments in males and usually 1st, 4th, and 5th segments in females black or brown 4
3. Apex of paramere with a tooth on outer margin (Fig. 559: 2). Humeral corner of pronotum usually not blackened (Fig. 559: 1). 6.5-8.5. – S Khab., Amur., Prim., Sakh. – Forest zone of Palearctic. – On *Betula*, *Alnus* **E. grisea** L. (*betulae* De Geer)

- Apex of paramere rounded, without a tooth (Fig. 559: 4); surface of paramere facing genital segment with longitudinal triangular carina. Humeral corner of pronotum always blackened (Fig. 559: 3). 8-9. – S Khab., Prim. – Japan, Korea..
..... **E. putoni** Scott
- 4. Parameres straight, with diverging apices (Fig. 559: 5). Anterior genital plates of female with almost angulate outer margins and right-angled basal corners (Fig. 559: 6). 7.5-9. – Mag., Kamch., Khab., Amur., Prim., Sakh., S Kur. – Forest zone of Palearctic. – On *Betula*, *Alnus* **E. fieberi** Jak. (*grisea* auct.)
- Parameres arched, with converging apices (Fig. 559: 7). Anterior genital plates of female with uniformly rounded outer margins and acute basal corner (Fig. 559: 8). 7.5-10. – S Khab., Amur., Prim., Sakh., S Kur. – Japan, Korea. – On *Betula*, *Alnus* **E. amurensis** Kerzh.
- 5. Scutellum with black spot. Humeral angles strongly elongate (Fig. 559: 11); lateral margins of pronotum anterior to the angles more or less concave. Larger: 8-10, rarely smaller. In males, abdominal sternites IV-VI forming smooth brownish area 6
- Scutellum without black spot. Humeral angles shorter (Fig. 559: 9); lateral margins of pronotum anterior to the angles usually straight. Relatively small: 6-7.5. In males, abdominal sternites IV-VI without smooth brownish area. Male genital segment as in Fig. 559: 10. – S Khab., Amur., Prim., Sakh., S and C Kur.; south of Siberia. – Japan, Korea, E China, N Mongolia. – On *Aruncus* and *Spiraea* **E. dorsalis** Jak. (*signoreti* auct.)
- 6. 1st antennal segment usually black. Base of scutellum with small longitudinal black spot. Male genital segment as in Fig. 559: 12. – S Khab., Amur., Prim. – Forest zone of Palearctic. – On *Ribes* and other berry bushes **E. ferrugata** F.
- 1st antennal segment yellowish. Base of scutellum with wide transverse black spot. – S Sakh., S Kur. – Japan. – On *Ribes* **E. signoreti** Scott

35. Family CYDNIDAE

E.V. Kanyukova

Medium-sized and small, generally dark-colored and shining, more rarely yellow or brown; usually rounded, more rarely slightly oblong. Phytophagous, living usually on the ground under plants or in the ground. Hibernating as adults. – 8 genera, 12 species (in USSR 16 genera, more than 40 species).

KEY TO GENERA

1. Lateral margins of head and pronotum with pores bearing bristles (bristles sometimes rubbed off). Lateral margins of pronotum not pale. (Subfamily Cydninae) 2 [**p. 916**]
- Lateral margins of head and pronotum not pilose. Lateral margins of pronotum or at least its anterior corners pale. (Subfamily Sehirinae) 6
2. Hind tibiae very thick, at apex obliquely truncate and rounded (Fig. 559: 14); hind tarsi hardly visible. Fore tarsi attached almost in the middle of the saber-shaped tibiae (Fig. 559: 13) 1. **Stibaropus**
- Hind and fore tibiae of common shape; fore tarsi attached near apex of tibiae .
..... 3
3. Anterior margin of head with small spinules in addition to setae (Fig. 560: 1) 4
- Anterior margin of head without spinules 5
4. 2nd antennal segment shorter than other segments. Lateral margins of hem-

- elytra not pilose 2. **Chilocoris**
- 2nd antennal segment not shorter than other segments. Lateral margins of hemelytra pilose 3. **Aethus**
- 5. Lateral fringe of pronotum concealed dorsally in posterior corners (Fig. 560: 3). Dull evaporatorium of scent gland bilobate (Fig. 560: 4). Species from the Far East larger than 7.5 4. **Macroscytus**
- Lateral fringe of pronotum not concealed in posterior corners, visible dorsally (Fig. 560: 6). Dull evaporatorium of scent gland not bilobate (Fig. 560: 7). Species from the Far East smaller: 4-5 5. **Geotomus**
- 6. Hemelytron with distinct, white, L-shaped spot at base and white spot at apex (Fig. 560: 10). Anterior corners of pronotum pale 6. **Tritomegas**
- Only a narrow stripe along lateral margin of hemelytron and sometimes also a small spot in the middle of corium white. Lateral margins of pronotum pale along their full length 7
- 7. Body with metallic, dark blue or violet shine (Fig. 561: 1) 7. **Canthophorus**
- Body without metallic shine, brown or black 8. **Adomerus**

KEYS TO SPECIES OF FAMILY CYDNIDAE

1. **Stibaropus** Dall. – 1 species (in USSR 3).
 1. Light brown, convex dorsally and ventrally. 4.5-5.5. – S Prim. (Khasan District). – China. – In sand. {Misidentification, actually *S. secundus* Lis} **S. formosanus** Takano et Yanagihara
2. **Chilocoris** Mayr. In USSR 2 species.
 1. Yellow-brown; pronotum, with exception of small areas in anterior half, punctate. 3-3.5. – S Prim. **Ch. alienus** Horv.
 - Reddish brown, almost black; anterior half of pronotum smooth, not punctate, only with lateral and median rows of pores. 3.9-5.3. – S Prim. – Korea **Ch. nigricans** Jos. et Kerzh.
3. **Aethus** Dall. – 1 species (in USSR 7).
 1. Dark brown. Clypeus with 2 spinules at apex. Abdomen ventrally bare. Distance between eye and ocellus equals to 3 diametres of ocellus. Paramere as in Fig. 560: 2. 4.5-5.5. – Amur., Prim., S Kur. – Central belt and south of Palearctic {Now placed in *Microporus* Uhl.} **Ae. nigrita** F.
4. **Macroscytus** Fieb. – 1 species (in USSR 2).
 1. Dark brown. Margins of head, pronotum, and hemelytra with long bristles. Paramere as in Fig. 560: 5. 7.5-10.5. – Prim., S Kur. – Japan, Korea, China **M. japonensis** Scott
5. **Geotomus** M. R. – 1 species (in USSR 4).
 1. Dark brown to black. Paramere and male genital segment dorsally as in Figs. 560: 8, 9. 4-5. – S Khab., Amur., Prim., S Kur. – Japan, Korea, NE China {Misidentification, actually *G. convexus* Hsiao} **G. palliditarsis** Scott [p. 917]
6. **Tritomegas** Am. et Serv. – 1 species (in USSR 3).
 1. Pronotum black, with white spots in anterior corners; scutellum entirely black (Fig. 560: 10). 5.5-9. – Amur., Prim. – Transpalearctic. On Lamiaceae **T. bicolor** L.

7. *Canthophorus* Am. et Serv. – 1 species (in USSR 8).

1. Metallic shining; lateral margins of pronotum and hemelytra and connexivum white. 6-8. – Amur., Prim.; Chita Prov. – Japan, Korea, China, Mongolia. – On *Thesium*. (Fig. 561: 1) *C. niveimarginatus* Scott

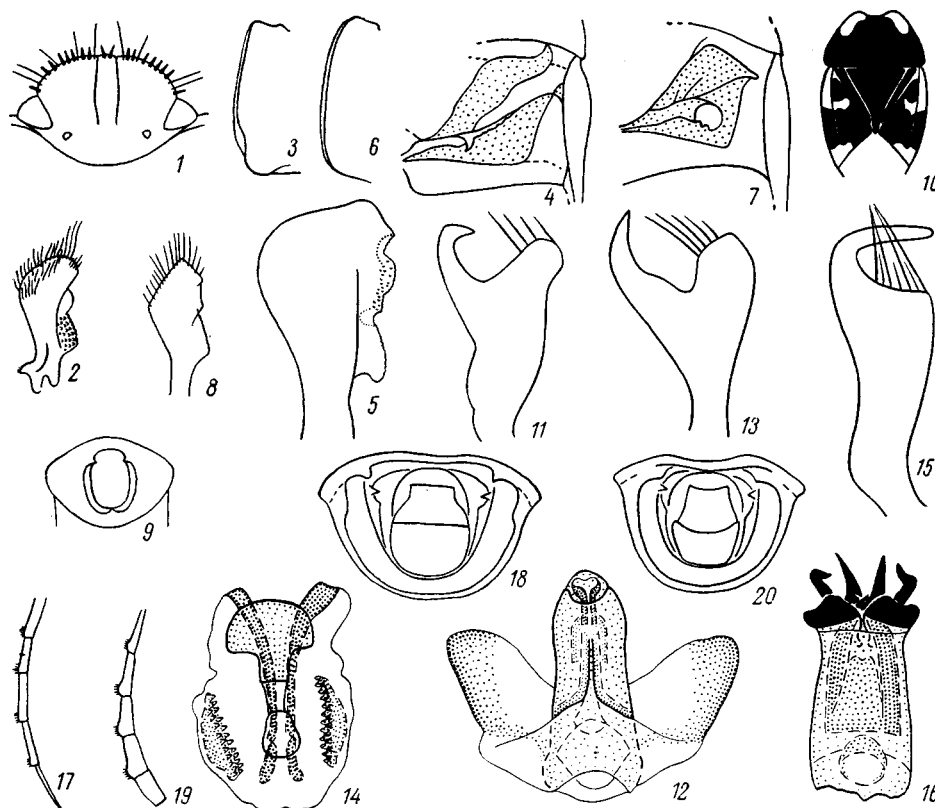


Fig. 560. Heteroptera. Families Cydnidae and Scutelleridae (after Vinokurov, Josifov, Kerzhner, Hsiao, and original).

1, 2, *Aethus nigrita*: 1, head; 2, paramere; 3-5, *Macroscytus japonensis*: 3, lateral margin of pronotum; 4, evaporatorium of scent gland; 5, paramere; 6-9, *Geotomus palliditarsis*: 6, lateral margin of pronotum; 7, evaporatorium of scent gland; 8, paramere; 9, male genital segment; 10, *Tritomegas bicolor*, coloration of pronotum and hemelytra; 11, 12, *Adomerus notatus*: 11, paramere; 12, aedeagus; 13, 14, *A. rotundus*: 13, paramere; 14, aedeagus; 15, 16, *A. triguttulus*: 15, paramere; 16, aedeagus; 17, 18, *Phimodera laevilinea*: 17, connexivum; 18, male genital segment; 19, 20, *Ph. fumosa*: 19, connexivum; 20, male genital segment.

8. *Adomerus* M. R. – 4 species (in USSR 6). *Note*. The key was compiled with the participation of I.M. Kerzhner.

1. White limbus of lateral margin of pronotum produced along its posterior margin up to the level of suture between corium and clavus. Venter of abdomen laterally not entirely white. Corium and clavus in anterior half usually dirty yellowish, in posterior half usually brown. 5.7-7.5. – S Khab., Prim., S Kur. – Japan *A. variegatus* Sign. [p. 918]
- White limbus of lateral margin of pronotum not produced along its posterior margin. Venter of abdomen laterally narrowly white along its whole length. Corium and clavus black or dark brown; narrow limbus of lateral margin of corium

- and usually a spot close to its inner margin white 2
2. Apex of scutellum white. Canal of scent glands very long and narrow. Inner margin of hind tibiae white medially. Paramere and aedeagus as in Figs. 560: 15, 16. 4.7-6.5. – S Prim. – Japan, E China **A. triguttulus** Motsch.
- Apex of scutellum black or brown. Canal of scent glands shorter and wider. Inner margin of hind tibiae usually entirely brown or black 3
3. Prothorax with deep longitudinal groove ventrally under rostrum, markedly elevated on each side of the groove. White spot on corium usually 3-4 times as long as wide. Paramere and aedeagus as in Figs. 560: 11, 12. 4-5.9. – S Khab., Amur., Prim.; south of Siberia. – NE China., Mongolia. – On *Leonurus* **A. notatus** Jak. (*Legnotus longiguttulus* Hsiao, syn. n.)
- Prothorax ventrally without groove or with hardly marked one. White spot on corium usually not more than twice as long as wide, sometimes absent. Paramere and aedeagus as in Figs. 560: 13, 14. 3.5-6.3. – S Khab., Prim. – NE China. – As *A. rotundus* were described males, and as *L. breviguttulus* females of the same species **A. rotundus** Hsiao, comb. n. (*Legnotus rotundus*, *L. breviguttulus* Hsiao, syn. n.)

36. Family SCUTELLERIDAE

E.V. Kanyukova

Body oval; coloration dirty yellow, brown or black, more rarely bright. All species phytophagous, living on herbs, more rarely on trees, mostly polyphagous. – 5 genera, 7 species (in USSR 13 genera, about 35 species).

KEY TO GENERA

1. Body pilose. Head wider than long, semicircular anteriorly 2
- Body bare or (in *Phimodera*) with hardly visible pubescence. Head usually not wider than long, more often triangular or right-angled 3
2. Setae on body short. Pronotum with small angulate incision in posterior part of lateral margin 1. **Odontoscelis**
- Setae on body very long and slender. Pronotum with small notch slightly posterior to the middle of lateral margin 2. **Irochrotus**
3. Coloration bright, with metallic shine, with green or dark blue hue and red spots on pronotum and hemelytra 3. **Poecilocoris**
- Coloration not bright, without metallic shine, brown or almost black 4
4. Head almost right-angled. Eyes convex, almost pedunculate. Connexivum hardly visible from under scutellum 4. **Phimodera**
- Head triangular. Eyes not pedunculate. Connexivum wide, flat, markedly protruding from under scutellum 5. **Eurygaster**

KEYS TO SPECIES OF FAMILY SCUTELLERIDAE

1. **Odontoscelis** Lap. – 1 species (in USSR 7).
1. Dark brown with yellow longitudinal lines on pronotum and scutellum or almost black. Dorsum with short brown setae. 5.5-7.5. – Amur.; south of Siberia, Kazakhstan, east of European USSR. – Mongolia, Turkey. – Dry meadows, steppes. Polyphagous **O. byrrhus** Seid. [p. 919]
2. **Irochrotus** Am. et Serv. – 1 species (in USSR 6).

1. Dark brown. 5.5-7.7. – Mag., Kamch., N Khab., Amur., Prim.; Siberia west to Altai. – China, Mongolia. – In steppes and steppized areas, on grasses **I. sibiricus** Kerzh.
3. **Poecilocoris** Dall. In USSR 1 species.
 1. 15-19. – Prim. – Japan, Korea. – Larvae hibernating, developing on *Pinus* **P. lewisi** Dist.
4. **Phimodera** Germ. – 2 species (in USSR 18). Under plants. {Additionally, *Ph. kiborti* Jak. was found in Mag.}
 1. Setae on scutellum (to examine at magnification 30-50 times), especially in its posterior half, gradually tapering and hooked at apex. Femora and entire venter of abdomen black. Tubercles on margin of abdomen weakly prominent (Fig. 560: 17). Male genital segment with straight posterior margin (Fig. 560: 18). 5.7-7. – Mag., Amur., Prim.; Siberia west to Altai. – China, Mongolia. – In steppes and steppized areas **Ph. laevilinea** Stål
 - Setae on scutellum moderately long, straight, flattened, truncate at apex. Femora and venter of abdomen pale, with black spots and punctation. Tubercles on margin of abdomen markedly prominent (Fig. 560: 19). Male genital segment with concave posterior margin (Fig. 560: 20). 5.3-7.9. – Amur. – Steppe and semi-desert regions of Palearctic **Ph. fumosa** Fieb.
5. **Eurygaster** Lap. Yellowish, reddish, or brown, often with darker pattern, sometimes black. On grasses and sedges. – 2 species (in USSR 6).
 1. Mandibular plates longer than clypeus and converging anterior to it. Lateral angles of pronotum not protruding beyond bases of hemelytra; lateral margins of pronotum convex, rounded. 8-10. – S Khab., Prim.; Irkutsk Prov. – Korea, Mongolia. – Rare **E. laeviuscula** Jak.
 - Mandibular plates shorter than or as long as clypeus and not converging anterior to it. Lateral angles of pronotum protruding beyond bases of hemelytra; lateral margins of pronotum straight or slightly concave. 8-10.5. – S Khab., Amur., Prim. – Transpalearctic **E. testudinaria** Geoffr.

37. Family PENTATOMIDAE

E.V. Kanyukova

Body with tough integument; bare dorsally, rarely pubescent. Large or medium-sized; usually moderately flattened, rarely markedly flattened or, on the contrary, almost spherical. Head forming dorsally a flat or more or less convex shield consisting anteriorly of clypeus and mandibular plates; bases of antennae not visible in dorsal view. Hemelytra usually normal. Species of subfamily Asopinae predacious, the others are phytophagous. Hibernating as adults, more rarely as larvae (*Pentatoma*) or eggs (*Picromerus*). – 30 genera, 58 species (in USSR more than 70 genera, about 200 species).

KEY TO GENERA

1. Rostrum not very thick, attached at some distance from base of labrum (Fig. 562: 1). 1st rostral segment flanked with bucculae which are not fused posteriorly 2 [p. 920]

- Rostrum, especially its first segments, very thick; base of rostrum close to base of labrum and surrounded posteriorly by the fused bucculae (Fig. 562: 2). (Subfamily Asopinae) 23
- 2. Scutellum reaching apex of abdomen. (Subfamily Podopinae) 3

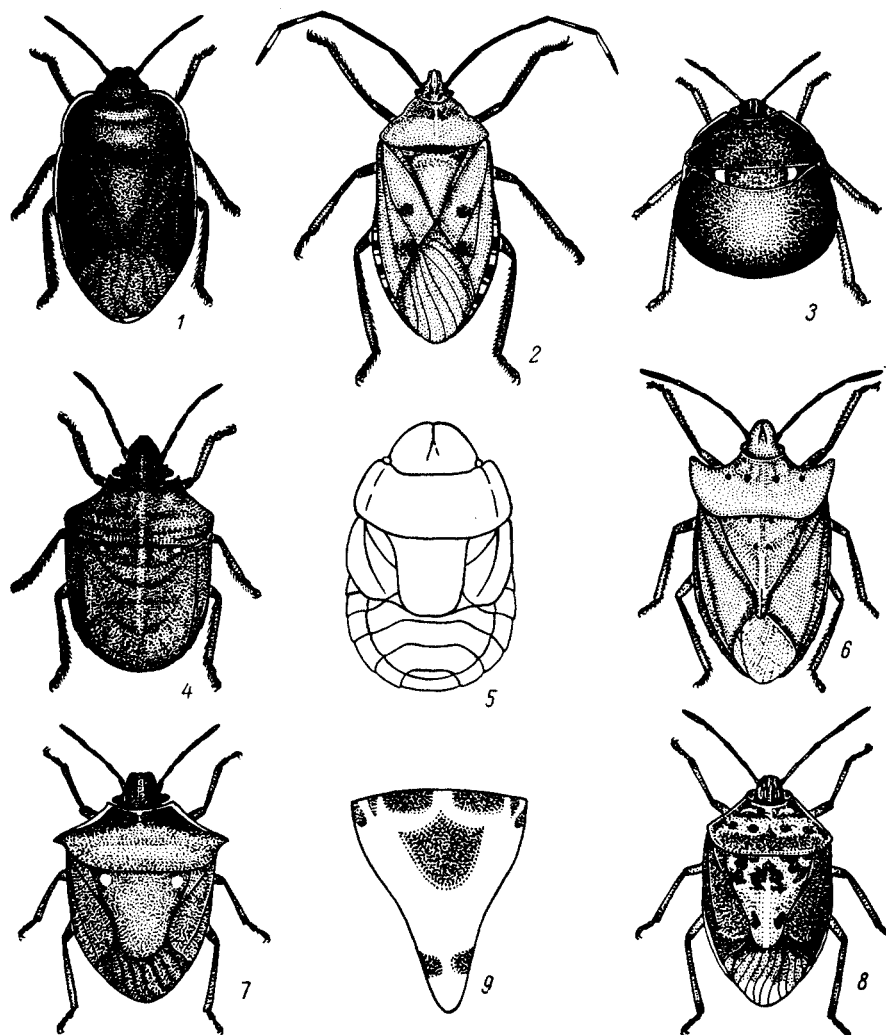


Fig. 561. Heteroptera. Families Urostylidae, Plataspididae, Cydnidae, and Pentatomidae (after Hsiao and Esaki).

1, *Canthophorus niveimarginatus*; 2, *Urochela quadrinotata*; 3, *Coptosoma biguttulum*; 4, *Dybowskia reticulata*; 5, *Sciocoris abbreviatus*; 6, *Lelia decempunctata*; 7, *Eysarcoris lewisi*; 8, *Menida musiva*; 9, *M. scotti*, scutellum.

- Scutellum covering not more than 2/3 of length of abdomen. (Subfamily Pentatiminae) 4
- 3. From light brown to almost black (Fig. 561: 4). Smaller: less than 6 1. **Dybowskyia**
- Red or yellow; head, pronotum, and scutellum with longitudinal black stripes. Larger: more than 9 2. **Graphosoma**
- 4. Sides of pronotum expanded into a broad thin plate. Head wider than or as wide

- as base of scutellum. Body strongly flattened (Fig. 561: 5) 3. **Sciocoris**
- Sides of pronotum blunt or sharp, but not expanded into plate. Head narrower than base of scutellum. Body more or less convex 5 [p. 921]
5. Mesothorax with deep longitudinal groove between coxae. Anterior margin of prothorax at each side (to examine in lateral and ventral view) prolonged anteriorly into a narrow plate. Head triangular, strongly convex, strongly curved from base to apex (except for *Neottiglossa metallica*) 6
- Mesothorax more or less flat medially, with longitudinal carina. Prothorax not prolonged into a plate. Head more or less horizontal 7
6. Head longer or hardly shorter than wide. Head, pronotum, and scutellum with continuous, wide, longitudinal stripes of pale and black punctures. Scutellum near anterior corners without smooth, ivory white tubercles 4. **Aelia**
- Head distinctly shorter than wide. Entire dorsum with more or less uniform, black punctation, without wide, longitudinal pale stripes. Scutellum near each anterior corner with smooth, ivory white tubercle 5. **Neottiglossa**
7. Openings of scent glands distinct; surface around them dull and scabrous 8
- Openings of scent glands very small, close to coxae, indistinct or invisible, without scabrous area around them. Mandibular plates longer than clypeus and converging anterior to its apex. Anterior margin of pronotum with slender, smooth ridge bounded posteriorly by a row of punctures 16. **Eurydema**
8. Base of abdomen medially without directed forward tubercle or spine 9
- Base of abdomen medially between hind coxae with directed forward 1-2 tubercles or spine; if tubercle weakly developed (*Pentatoma semiannulata*), body length more than 15 18
9. Head and spots near anterior corners of pronotum entirely or largely bronze-black. Anterior corner of scutellum with white, callose, sometimes very small spot 10
- Head and anterior corners of pronotum not bronze-black. Anterior corner of scutellum without white, callose spot 12
10. Mandibular plates longer than clypeus, converging anterior to it, but not contiguous, with a split remaining between them. Openings of scent glands prolonged into long ridge almost reaching lateral margins of thorax 9. **Rubiconia**
- Mandibular plates as long as clypeus or slightly longer. Openings of scent glands with short ridge 11
11. Not longer than 6. Lateral margins of pronotum white throughout their full length 6. **Eysarcoris**
- Longer than 8. Lateral margins of pronotum white only in anterior part 8. **Carbula**
12. Mandibular plates shorter than clypeus. Not longer than 6 7. **Hermolaus**
- Mandibular plates longer than or as long as clypeus. Larger: longer than 7 .. 13
13. Color intense green (very rarely reddish brown). Prothorax, mesothorax, and metathorax without a black dot external to each coxa 14
- Color not green, rarely yellowish green. Prothorax, mesothorax, and metathorax with a black dot external to each coxa 15
14. Apex of clypeus pointed, covered or almost covered anteriorly by mandibular plates. Dorsum with minute black punctation, unicolorous. Venter often yellowish 11. **Palomena**
- Apex of clypeus blunt, free. Dorsum usually with pale punctures. Apex of scutellum, lateral margins of pronotum, bases of hemelytra and connexivum white, not punctate. Venter green 12. **Chlorochroa**

15. 2nd antennal segment not longer or hardly longer than 3rd segment 10. **Holcostethus**
- 2nd antennal segment much longer than 3rd segment, usually almost twice as long 16
16. Openings of scent glands prolonged into long groove 13. **Carpocoris**
- Openings of scent glands with very short groove 17
17. 3rd-5th antennal segments black with white rings at bases and apices. Head, pronotum, and scutellum with semierect pale setae 15. **Dolycoris** [p. 922]
- 3rd-5th antennal segments unicolorous, black or pale, more rarely black with brownish red bases. Body dorsally bare, less commonly (only in *A. varicornis*) pilose 14. **Anthemina**
18. Base of abdomen with 1-2 tubercles not reaching anteriorly beyond hind coxae 19
- Base of abdomen with a pointed spine reaching anteriorly beyond hind coxae 21
19. Lateral angles of pronotum rounded, not flattened, weakly protruding beyond bases of hemelytra. Head, pronotum, scutellum, margins of hemelytra, and connexivum green; clavus and corium reddish brown 17. **Plautia**
- Lateral angles of pronotum in the form of flattened lobes protruding beyond bases of hemelytra. Coloration different; if green, then with metallic shine 20
20. Lateral angles of pronotum large, strongly protruding, bent upwards. Base of abdomen with 1 tubercle 19. **Pentatoma**
- Lateral angles of pronotum small, not bent upwards. Base of abdomen with 2 tubercles 21. **Homalogonia**
21. Smaller: not longer than 11.5. Lateral corners of pronotum rounded, not flattened in the form of lobes 18. **Menida**
- Larger: longer than 15. Lateral corners of pronotum flattened in the form of large lobes 22
22. Lateral corners of pronotum bent caudad and upwards. Dorsum with metallic green shine 20. **Acrocorisellus**
- Lateral corners of pronotum bent forward. Dorsum brownish yellow, without metallic shine 22. **Lelia**
23. Lateral margins of pronotum scabrous or finely serrate; lateral corners of pronotum protruding beyond bases of hemelytra 24
- Lateral margins of pronotum smooth, not serrate; lateral corners of pronotum rounded, not protruding beyond bases of hemelytra 29
24. Base of abdomen ventrally with directed forward tubercle 25
- Base of abdomen without tubercle 28
25. Fore femur with a subapical tooth 26
- Fore femur without a tooth 27
26. Fore tibiae expanded outwards in the form of plates. Apex of clypeus covered by mandibular plates anteriorly. Lateral corners of pronotum pointed-rounded..... 24. **Pinthaeus**
- Fore tibiae simple. Apex of clypeus free. Lateral corners of pronotum long, pointed 23. **Picromerus**
27. Lateral corners of pronotum flattened, ear-shaped, rounded. Mandibular plates hardly longer than clypeus, not converging anterior to it..... 26. **Troilus**
- Lateral corners of pronotum long, pointed. Mandibular plates 1.5 times as long as clypeus, converging anterior to it 25. **Dinorhynchus**
28. 2nd antennal segment almost 3 times as long as 3rd segment. Body moderately flat. Tibiae entirely yellow 27. **Arma**

- 2nd antennal segment almost as long as 3rd segment. Body convex. Tibiae yellow medially, black at both ends 28. **Rhacognathus**
- 29. Fore femur with a tooth; tibia with deep furrow on ventral surface. Base of pronotum wider than that of scutellum. Without metallic shine 29. **Jalla**
- Fore femur without a tooth; tibia without furrow. Base of pronotum not wider than that of scutellum. With metallic shine, dark blue 30. **Zicrona**

KEYS TO SPECIES OF FAMILY PENTATOMIDAE

Subfamily PODOPINAE

1. **Dybowskyia** Jak. On Apiaceae. Monotypic genus. [p. 923]

1. Appearance as in Fig. 561: 4. 4.5-5.5. – S Khab., Amur., Prim. – Forest zone west to Czechoslovakia; in Siberia and Europe rare; Japan, China **D. reticulata** Dall.

2. **Graphosoma** Lap. On Apiaceae. – 1 species (in USSR 5).

1. 9.5-11. – S Khab., Amur., Prim., S Kur. – Japan, Korea, China ***G. rubrolineatum** Westw.

Subfamily PENTATOMINAE

{Subsequently added: *Okeanos* Dist. with *O. quelpartensis* Dist., S Prim., a genus closely related to *Pentatoma*}.

3. **Sciocoris** Fall. (*Masthletinus* Reut.). Brownish yellow, with dense black punctation. – 4 species (in USSR to 15-20).

1. Scutellum semicircular, slightly wider than long. Hemelytra almost always shortened, with vestigial membrane, not longer than scutellum. Male genital segment with elongate median process. 4.8-7. – Amur.; Siberia, N Kazakhstan. – China, Mongolia. – Steppe areas and stony slopes. (Fig. 561: 5) **S. abbreviatus** Reut.
- Scutellum almost triangular, with rounded apex, longer than or as long as wide. Hemelytra always with complete membrane, longer than scutellum 2
2. Lateral margin of head with shallow incision anterior to eyes. Eyes not pedunculate; their inner margins not protruding beyond lateral margins of head (Fig. 562: 3). Posterior margin of male genital segment without notches anterior to apical corners, with more or less long median process (Fig. 562: 4) 3
- Lateral margin of head with deep incision anterior to eyes. Eyes pedunculate, almost entirely protruding beyond lateral margins of head (Fig. 562: 5). Posterior margin of male genital segment with rounded notches anterior to apical corners, without long median process (Fig. 562: 6) 4
3. Venter of abdomen with V-shaped black spot (rarely only with black spot on segment VII). 5.5-7. – Khab., Prim. – West to Hungary. – On grasses **S. distinctus** Fieb.
- Venter of body unicolorous. 4.5-6.5. – From Irkutsk Prov. to W Europe. Record from N Khab. erroneous **S. umbrinus** Wolff
4. 3rd antennal segment by 1/3 shorter than 2nd segment. Scutellum longer than wide, with smoothed, pale, median carina. Posterior margin of male genital segment (in lateral view) as in Fig. 562: 7. 4.5-6.3. – Mag., Kamch., Khab. – Forest

zone of Palearctic. – Mesophilous, in meadows and forest edges

..... **S. microphthalmus** Fl.

- 3rd antennal segment long, only by 1/5 shorter than 2nd segment. Scutellum as long as wide, without smoothed, pale, median carina. Posterior margin of male genital segment as in Fig. 562: 8. 5.4-7.3. – Amur., Prim.; Transbaikal. – Korea, Mongolia. – Xerophilous, in steppized stations **S. placidus** Jak.

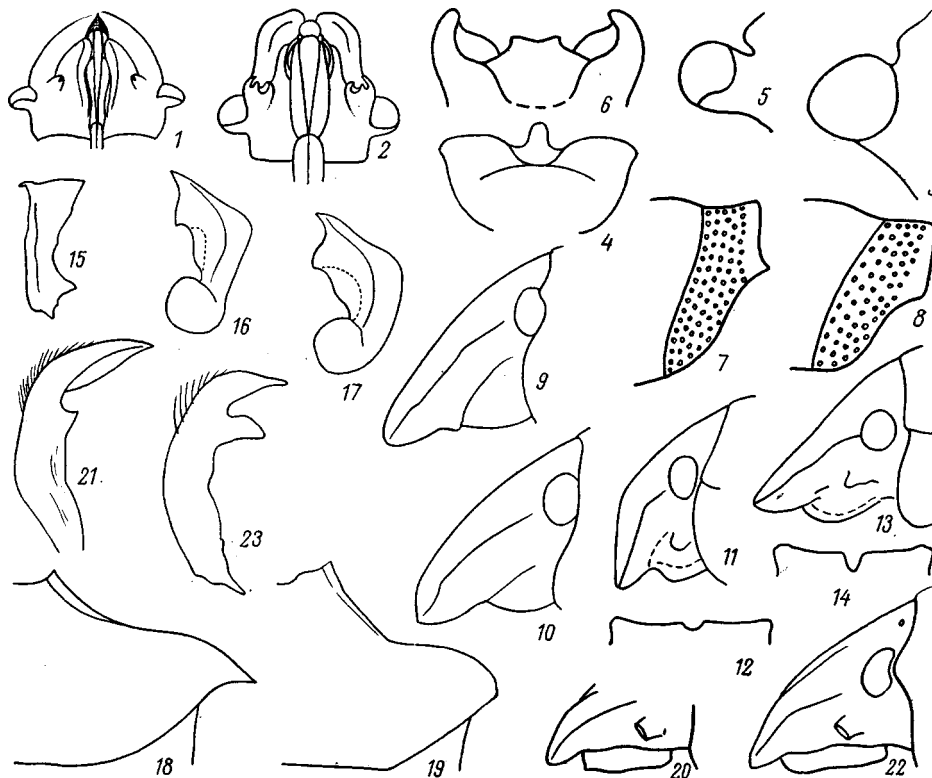


Fig. 562. Heteroptera. Family Pentatomidae (after Vinokurov, Josifov and Kerzhner, Putshkov, and original).

1, 2, head, ventral: 1, *Neottiglossa pusilla*; 2, *Arma custos*; 3, 4, *Sciocoris umbrinus*: 3, lateral margin of head near eye; 4, posterior margin of male genital segment, dorsal; 5-7, *S. microphthalmus*: 5, lateral margin of head near eye; 6, posterior margin of male genital segment, dorsal; 7, posterior margin of male genital segment, lateral; 8, *S. placidus*, posterior margin of male genital segment, lateral; 9, *Aelia fieberi*, head, lateral; 10, *Ae. klugii*, same; 11, 12, *Neottiglossa pusilla*: 11, head, lateral; 12, posterior margin of male genital segment, posterior view; 13, 14, *N. metallica*: 13, head, lateral; 14, posterior margin of male genital segment, posterior view; 15, *Eysarcoris gibbosus*, paramere; 16, *E. aeneus*, same; 17, *E. lewisi*, same; 18, *Carbula humerigera*, lateral margin of pronotum; 19, *C. putoni*, same; 20, 21, *Rubiconia intermedia*: 20, ventral part of head, lateral; 21, paramere; 22, 23, *R. peltata*: 22, head, lateral; 23, paramere.

4. **Aelia** F – Elongate, tapering anteriorly. Whitish yellow, with longitudinal grayish or black stripes of punctures. On grasses. – 3 species (in USSR to 15).

1. Bucculae with angulate projection medially posterior to notch (Fig. 562: 9). Hind femur with 2 more or less large black spots in medial part. 8-10. – S Khab., Amur., Prim., S Kur. – Japan, Korea, NE China. – Injurious to cereals
..... ***Ae. fieberi** Scott (*nasuta* E. Wagn.)
- Bucculae without angulate projection medially posterior to notch (Fig. 562: 10). Hind femur in medial part without black spots 2

2. 4th and 5th antennal segments black. Venter of abdomen with 4-6 stripes of black punctures. Body tapering posteriorly. 6.5-8.5. – Mag., Khab., Amur. – Transpalearctic. – Dry meadows of forest zone, steppes **Ae. klugii** Hahn [p. 924]
- 4th and 5th antennal segments red. Venter of abdomen more or less uniformly punctate. Body broadly rounded posteriorly. 6.4-7.2. – Mag.; Yakutia, Altai **Ae. frigida** Kir.

5. **Neottiglossa** Kby. Short-oval, usually dirty yellowish or brownish dorsally. – 3 species (in USSR 4).

1. Corium distinctly shorter than scutellum. Abdomen ventrally pale, with black punctation, without bronze hue. 5-6. – S Khab., Amur., Prim. – Transpalearctic. – Dry meadows and steppes. On grasses, especially on *Poa* **N. leporina** H.-S.
- Corium as long as scutellum. Abdomen ventrally black, with bronze hue 2
2. Head (in lateral view) moderately oblique up to the middle of its length, then sharply bent downwards (Fig. 562: 11). Incision on posterior margin of male genital segment rounded, not deep (Fig. 562: 12). 4.8-6. – Mag., Kamch., Khab., Amur., Prim., Sakh. – Transpalearctic. – Humid meadows and marshes. On grasses (*Festuca*, *Agrostis*) **N. pusilla** Gmel.
- Head moderately oblique, with flat dorsal surface (Fig. 562: 13). Incision on posterior margin of male genital segment deep, more or less triangular [p. 925] (Fig. 562: 14). 5-6.5. – S Khab., Amur., Prim.; E Siberia. – Mongolia. – Swampy habitats in forest zone and in high mountains. On sedges and grasses **N. metallica** Jak.

6. **Eysarcoris** Hahn. Dorsum yellowish gray, with black punctation. Anterior corners of scutellum with small, pale, smooth tubercle. – 3 species (in USSR 5).

1. Base of scutellum with large, metallic shining, semicircular or triangular, black spot. Abdomen ventrally almost entirely bronze-black. Paramere as in Fig. 562: 15. 4.5-5.5. – S Khab., Amur., Prim., S Kur. – Japan, Korea, China, N Vietnam. – On Lamiaceae. Records of *E. fabricii* Kirk. from the Far East refer to this species **E. gibbosus** Jak.
- Scutellum entirely pale 2
2. Abdomen ventrally with black median spot, laterally more or less widely pale. Paramere as in Fig. 562: 16. 4.5-6. – S Khab., Amur., Prim. – Transpalearctic. – In meadows and marshes. Mainly on Lamiaceae **E. aeneus** Scop.
- Abdomen ventrally entirely black. Paramere as in Fig. 562: 17. 4.5-6. – S Khab., Sakh., S Kur. – Japan. – In meadows and marshes, probably on sedges. (Fig. 561: 7) **E. lewisi** Dist. {Scott}

7. **Hermolaus** Dist. In USSR 1 species.

1. Reddish brown, with black punctation. Anterior half of pronotum with 2 black elongate spots. 5-6. – Prim. – Korea. Rare **H. amurensis** Horv.

8. **Carbula** Stål. Dorsum brown, with dense, black punctation. In USSR 2 species.

1. Lateral angle of pronotum produced in the form of thin spine (Fig. 562: 18). 8.5-10.5. – Sakh., S Kur. – Japan, China. – In tall herbaceous vegetation on various herbs **C. humerigera** Uhl.
- Lateral angle of pronotum not produced in the form of thin spine (Fig. 562: 19). 8.5-10.5. – Prim. – Korea, China **C. putoni** Jak.

9. **Rubiconia** Dohrn. Brownish yellow, with black punctation; head, anterior corners of pronotum, and dorsum of abdomen black. In USSR 2 species.

1. Bucculae rectangular anteriorly (Fig. 562: 20). Anterior margins of femora unicolorous, without black punctation. Spiracles usually with yellow or brown rim. Parameres as in Fig. 562: 21. 6.1-8.5. – Khab., Amur., Prim. – Forest zone of Palearctic. – Mainly on grasses **R. intermedia** Wolff
- Bucculae rounded anteriorly (Fig. 562: 22). Anterior margins of femora with black punctation. Spiracles with black rim. Parameres as in Fig. 562: 23. 6.9-9.3. – S Khab., Amur., Prim.; Transbaik. – Korea, N China **R. peltata** Jak.

10. **Holcostethus** Fieb. More or less rounded. Coloration very variable: dorsally grayish, brownish, or yellowish gray, with black punctation. Venter and legs yellowish. Polyphagous. – 2 species (in USSR 10).

1. Clypeus covered by mandibular plates anteriorly. Ventral part of head without lateral black stripes. Bucculae anteriorly raising and forming distinct angle. Male genital segment as in Fig. 563: 1. 7-8. – Mag., Sakh.; E Siberia, Altai. – E China, Mongolia. – In steppe areas **H. ovatus** Jak.
- Clypeus free anteriorly. Ventral part of head with black lateral stripes. [p. 926] Bucculae everywhere uniformly high. Male genital segment as in Fig. 563: 2. 7-8. – S Khab., Prim. – NE China. – In marshes **H. breviceps** Horv.

11. **Palomena** M. R. More often in forests, polyphagous. – 2 species (in USSR 3).

1. 2nd antennal segment by 1/3-1/5 longer than 3rd segment. Posterior margin of male genital segment (in lateral view) notched (Fig. 563: 3). 12-16. – S Khab., Amur., Prim. – Forest zone and forest-steppe of Palearctic **P. viridissima** Poda
- 2nd and 3rd antennal segments subequal in length. Posterior margin of male genital segment (in lateral view) rounded (Fig. 563: 4). 12-16. – S Khab., Prim., Sakh., S Kur. – Japan, Korea, NE China **P. angulosa** Motsch.

12. **Chlorochroa** Stål (*Pitedia* Reut.). On conifers. – 1 species (in USSR 2). *Note.* The name *Chlorochroa* Stål, 1872, widely used by American and till 1943 also by European authors, is not preoccupied by *Chlorochroa* Sclater, 1862 (nomen nudum) and must be restored instead of *Pitedia* Reuter, 1888.

1. 10.7-13.5. – Mag., Kamch., Khab., Amur., Prim., Sakh. – Forest zone of Palearctic. – On *Juniperus*, more rarely on other conifers **Ch. juniperina** L.

13. **Carpocoris** Kol. Large, with very variable yellowish, reddish, or brownish coloration. On herbs and bushes. Polyphagous. 1-2 generation per year. – 2 species (in USSR 7).

1. Lateral corners of pronotum blackened, acute, markedly projecting beyond margin of corium. Paramere as in Fig. 563: 5. 11.8-14. – Khab., Amur., Prim., Sakh., S Kur. – In forest and steppe zones of Palearctic. – In meadows. Injurious ***C. purpureipennis** De Geer
- Lateral corners of pronotum not blackened, rounded, weakly projecting. Paramere as in Fig. 563: 6. 11.5-13. – Amur., Prim.; Transbaik. – NE China, Mongolia. – In steppe habitats **C. seidenstueckeri** Tam.

14. **Anthemina** M. R. – 4 species (in USSR 6).

1. Head, pronotum, and scutellum with dense, short, sometimes rubbed off setae. Each abdominal sternite usually with a black spot mesally close to posterior margin. Reddish or yellow-brown; head, pronotum, and scutellum generally with longitudinal dark and yellowish stripes; connexivum dorsally with transverse black bands. 8.5-10.5. – S Khab., Amur., Prim. – Transpalearctic. – On banks of rivers and lakes. On Cyperaceae **A. varicornis** Jak.
- Body dorsally bare or only with a few setae. Abdominal sternites without black spots mesally. Dorsum usually greenish or greenish yellow, sometimes reddish 2
2. Corium, especially its lateral margin, with pale punctation. 7.5-9.5. – S Khab., Amur.; steppes of S Siberia, Kazakhstan, Soviet Central Asia, Transcaucasus, SE of European USSR. – Turkey, Greece. – On herbs and subshrubs. In the Far East and E Siberia ssp. *longiceps* Reut. **A. pusio** Kol.
- Corium with black punctation 3
3. Connexivum pale or entirely with black punctation, which is more dense near anterior and posterior margins of segments. Paramere as in Fig. 563: 7. 7.3-10. – Mag.; Yakutia, mountains of Soviet Central Asia and E Kazakhstan, Altai. – Mongolia. – In the Far East ssp. *tamaninii* Kerzh. **A. eurynota** Horv.
- Connexivum with wide black bands on each segment, punctation between them pale. Paramere as in Fig. 563: 8. 9-11. – Mag., Khab., Amur., Prim.; E Siberia, locally in forest zone of W Siberia and European USSR. [p. 927] – In taiga zone in marshes on dwarfish *Betula*, *Salix*, and other bushes **A. aliena** Reut.

15. **Dolycoris** M. R. – 1 species (in USSR 2). Polyphagous. 1-2 generation per year.

1. Dorsum from grayish red to brownish red; apex of scutellum and venter whitish. 9.5-12. – Khab., Amur., Prim., Sakh., S Kur. – Transpalearctic. – In forest and forest-steppe zones ***D. baccarum** L.

16. **Eurydema** Lap. More or less rounded, with variegated, moderately variable pattern consisting of dark (black, bluish black, or greenish black) and pale (yellow, red, or whitish) spots. On wild and cultivated Brassicaceae. – 3 species (in USSR to 14).

1. Apex of corium pale, with rounded dark spot in the middle (Fig. 563: 9). Exocorium (outer part of corium) entirely pale. 5.5-8. – Mag., Kamch., Khab., Amur., Prim., Sakh. – Transpalearctic ***E. dominulus** Scop.
- Apex of corium dark, with transverse pale spot at the level of apex of scutellum. Exocorium anteriorly pale, in posterior part entirely dark or with dark stripe along inner margin 2
2. Exocorium dark in posterior part. Legs black. Abdominal sternites with large, black spots in the middle. Pronotum with 2 dark spots. 6.5-8.5. – Sakh., S Kur. – Japan, Korea, NE China **E. rugosa** Motsch.
- Exocorium in posterior part with dark stripe along inner margin and pale externally. Legs pale, with black spots at bases and apices of femora and tibiae and on tarsi. Abdominal sternites with 2 rows of spots mesally. Pronotum with 4-6 spots. 6.8-8. – Mag., Kamch., Khab., Amur., Prim.; Siberia, Kazakhstan. – China, Mongolia, E Europe ***E. gebleri** Kol.

17. **Plautia** Stål. In USSR 1 species.

1. Head, pronotum, and scutellum green; hemelytra reddish brown (with exception of lateral margin); dorsum with black punctation; venter greenish yellow. 9-12. – S Khab., Prim. – Japan, Korea, E China. – On deciduous trees **P. stali** Scott (*amurensis* Reut.)

18. **Menida** Motsch. In USSR 3 species. On deciduous trees.

1. The spine at base of abdomen reaching anteriorly beyond middle coxae. Dorsum with metallic shine, with green or blue hue. Posterior margin of pronotum mostly with wide, pale band. Scutellum, except for apex, entirely dark. 7.5-9. – S Khab., Prim. – Japan, Korea, China **M. violacea** Motsch.

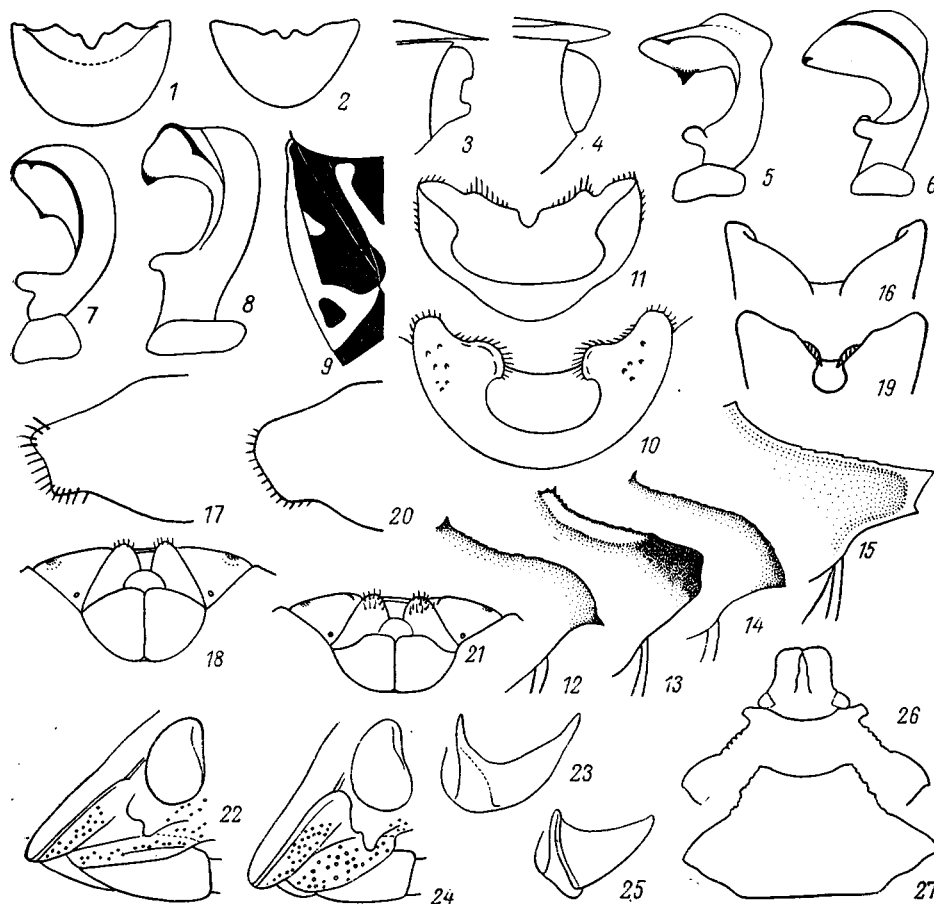


Fig. 563. Heteroptera. Family Pentatomidae (after Vinokurov, Josifov, Kerzhner, Petrova, and Hsiao).

1, 2, male genital segment, posterior view: 1, *Holcostethus ovatus*; 2, *H. breviceps*; 3, 4, male genital segment, lateral: 3, *Palomena viridissima*; 4, *P. angulosa*; 5-8, paramere: 5, *Carpocoris purpureipennis*; 6, *C. seidenstueckeri*; 7, *Antheminia eurynota*; 8, *A. aliena*; 9, *Eurydema dominulus*, coloration of hemelytron; 10, 11, male genital segment, posterior view: 10, *Menida musiva*; 11, *M. scotti*; 12-15, lateral margin of pronotum: 12, *Pentatoma rufipes*; 13, *P. semiannulata*; 14, *P. metallifera*; 15, *P. japonica*; 16-18, *Homalogonia confusa*: 16, 17, male genital segment, ventral and lateral; 18, apex of female abdomen, ventral; 19-21, *H. obtusa*: 19, 20, male genital segment, ventral and lateral; 21, apex of female abdomen, ventral; 22, 23, *Picromerus bidens*: 22, head, lateral; 23, paramere; 24, 25, *P. lewisi*: 24, head, lateral; 25, paramere; 26, *Rhacognathus corniger*, head and pronotum; 27, *Rh. punctatus*, pronotum.

- The spine at base of abdomen not reaching beyond middle coxae. Anterior corners and apex of scutellum pale 2
- 2. Scutellum more rounded in posterior half (Fig 561: 8). Hemelytra and posterior half of pronotum often reddish, more rarely greenish gray. Male genital segment as in Fig. 563: 10. 6.5-9. – S Khab., Amur., Prim. – Japan, Korea. (Fig. 561: 8) **M. musiva** Jak.

- Scutellum narrower and more elongate in posterior half (Fig 561: 9). Hemelytra and posterior half of pronotum always greenish gray. Male genital segment as in Fig. 563: 11. 8.5-11.5. – S Khab., Amur., Prim. – Korea **M. scotti** Put.

19. **Pentatoma** Ol. On deciduous trees. In USSR 4 species. {Additionally, *P. parametallifera* Zheng et Li is found in Prim.}

1. Clypeus covered by mandibular plates anteriorly. Lateral angles of pronotum with a spine at apex (Fig. 563: 12). Dorsum dark brown, sometimes with greenish [p. 928] hue; venter, legs, and antennae reddish; apex of scutellum usually pale. 11-16. – S Khab., Amur., Prim., Sakh., S Kur. – Forest zone of Palearctic **P. rufipes** L.
- Clypeus free anteriorly. Coloration different 2
2. Dorsum reddish yellow, without metallic shine. Lateral angles of pronotum obtuse, with small notch at apex (Fig. 563: 13). 17-22. – S Khab., Amur., Prim., Sakh. – Japan, Korea, NE China **P. semiannulata** Motsch.
- Dorsum green, with metallic shine. Lateral angles of pronotum pointed 3
3. Lateral corners of pronotum rounded anteriorly, with one apex, which is slightly produced caudad (Fig. 563: 14). Apex of scutellum without reddish limbus, sometimes with yellow spot. 17-22. – S Khab., Amur., Prim., Sakh.; Transbaikal. – Japan, Korea, China, Mongolia **P. metallifera** Motsch.
- Lateral corners of pronotum with two pointed apices directed laterally (Fig. 563: 15). Apex of scutellum with narrow, reddish yellow limbus. [p. 929] 17-22. – S Khab., Prim. – Japan, Korea, China. – Rare **P. japonica** Dist.

20. **Acrocorisellus** Put. Monotypic genus.

1. Pronotum, scutellum, and most part of corium yellowish-greenish; dorsum green, with metallic shine. 15-18. – S Khab., Prim. – Korea, China. – On *Fraxinus* **A. serraticollis** Jak.

21. **Homalogonia** Jak. On deciduous trees. In USSR 2 species.

1. Dorsum with dense punctation, therefore seeming darker. Male and female genital segments as in Figs. 563: 16-18. 12-15. – S Khab., Prim. – Korea, NE China ... **H. confusa** Kerzh.
- Punctation more sparse, paler. Male and female genital segments as in Figs. 563: 19-21. 12-15. – S Khab., Prim. – Japan, Korea, E China, Vietnam ... **H. obtusa** Walk.

22. **Lelia** Walk. In USSR 1 species.

1. Pronotum with 4 small black spots arranged longitudinally; scutellum with 4 small spots on anterior margin and another 2 spots closer to posterior part. 15-23. – S Khab., Prim. – Japan, Korea, China. – On *Acer*. (Fig. 561: 6) **L. decempunctata** Motsch.

Subfamily ASOPINAE

All species of this subfamily are predacious.

23. **Picromerus** Am. et Serv. – 2 species (in USSR 3).

1. Bucculae narrower and longer (Fig. 563: 22), their ventral margins almost straight. Venter of abdomen and femora with scattered, not fused into spots and

rows pale and dark punctation. Paramere as in Fig. 563: 23. 9.7-15. – S Khab., Amur., Prim., Sakh., S Kur. – Transpalearctic. In the Far East ssp. *fuscoannulatus* Stål

- **P. bidens** L.
 – Bucculae wider and shorter (Fig. 563: 24), their ventral margins curved. Venter of abdomen and femora with fused into spots or rows black punctation. Paramere as in Fig. 563: 25. 9.7-14. – S Khab., Amur., Prim., ?Sakh.; Siberia. – Japan, Korea, E China **P. lewisi** Scott (*angusticeps* Jak.)

24. **Pinthaeus** Stål. Monotypic genus.

1. Dorsum dark brown; venter, apex and anterior corners of scutellum, bands on connexivum pale; antennae black; legs reddish. 12-17. – S Khab., Prim.; Caucasus. – Korea, China, Europe. – On trees and bushes **P. sanguinipes** F

25. **Dinorhynchus** Jak. In USSR 1 species.

1. Metallic green or blue. Connexivum, venter, and legs reddish yellow. 16-24. – S Khab., Prim., Sakh., S Kur. – Japan, Korea, NE China **D. dybowskyi** Jak.

26. **Troilus** Stål. Monotypic genus. [p. 930]

1. Grayish or brownish, with black punctation; head and anterior part of pronotum often with metallic green shine; venter and legs yellowish. 10.2-13.5. – S Khab., Amur., Prim. – Forest zone of Palearctic. – On trees **T. luridus** F

27. **Arma** Stål. In USSR 1 species.

1. Brown or yellowish, ventrally paler; antennae yellow; 3rd and 4th antennal segments often with black spots. 12-14.5. – S Khab., Amur., Prim., Sakh., S Kur. – Forest zone of Palearctic **A. custos** F

28. **Rhacognathus** Fieb. In USSR 3 species.

1. Anterior corners of pronotum with tongue-shaped projections (Fig 563: 26). 2nd and 3rd antennal segments red. 7-9. – S Khab. – Korea, NE China **Rh. corniger** Hsiao et Cheng (*lamellifer* Jos. et Kerzh.)
 – Anterior corners of pronotum without projections (Fig. 563: 27). 2nd and 3rd antennal segments black 2
 2. Head wider than long. Clypeus free at apex. 7.5-10. – Mag. – Forest zone of Palearctic **Rh. punctatus** L.
 – Head slightly longer than wide. Clypeus covered at apex. 7.5-9. – S Khab., Amur., Prim. – E Mongolia **Rh. callosus** Horv.

29. **Jalla** Hahn. – 1 species (in USSR 2).

1. Dorsum dark brown; venter, legs, antennae, and head black; median stripe on head, pronotum, and scutellum, a spot in each anterior corner of scutellum, lateral margins of pronotum, and medial part of tibiae, all yellowish or reddish. 10.5-14.5. – Amur., Prim. – Whole Palearctic, except north. – On bushes, herbs, and in litter **J. dumosa** L.

30. **Zicrona** Am. et Serv. Monotypic genus.

1. 4.5-8. – Mag., Khab., Amur., Prim., Sakh. – Holarctic, except north. – On trees and herbs, feeding on beetles of the genus *Haltica* **Z. caerulea** L.

INDEX: HETEROPTERA

Note. All page references correspond to the original Russian text, not to the translation. Junior synonyms are in italics and the names of families and taxa above family in bold-face type. Asterisked page numbers refer to pages with figures and the boldfaced ones, to first pages of the main texts on genera and suprageneric taxa.

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