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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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## 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, Aghanistan, 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.	– Bärensprung	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. 540] 3. Suborder ALEYRODINEA – WHITEFLIES

**E.M. Danzig**

Very small insects (Palearctic species less than 2); resembling minute moth; wings and body covered with white mealy dust.

Body (Fig. 426: 1) yellow, sometimes with dark pattern. Antennae 7-segmented; first 2 segments spherical; other segments long and slender, last segment ending in a spinelike seta (Fig. 425: 2). Rhinaria rounded, small, surrounded by a crown of hair, singly or in groups, usually on the 3rd, 5th and 7th antennal segments. Compound eyes with a transverse constriction or completely divided into a dorsal and ventral part; ocelli 2, at the anterior margin of each compound eye. Legs long and slender; tarsi bisegmented; 2nd tarsal segment with 2 claws and an unpaired process (paronychium) (Fig. 425: 3). Two pairs of wings, white, sometimes with 1 or 2 dark spots, at rest flatly folded over abdomen (Fig. 426: 1); both pairs of wings almost equally long and with similar, much reduced venation (Fig. 425: 1). Anus of adults and nymphs dorsal, situated at end of abdomen in a cup-shaped depression which is covered by a special vasiform orifice consisting of an operculum and a lingula (Fig. 427: 5). [p.541] Last abdominal sternite of male with 2 processes (valves) between which originates the penis. Ovipositor of females as in Psyllinea, consisting of 3 pairs of valves. 4 pairs of spiracles: 2 thoracic pairs and 2 abdominal pairs.

The classification of Aleyrodinea is exclusively based on characters of 4th instar larva – puparium (see below); only higher categories (families) are differentiated by the characters of the adults (wing venation and legs). Puparium oval, dark or pale, surrounded by a waxy band which separates its dorsal and ventral sides (Fig. 426: 3), or without such band (Fig. 426: 2); dorsal side of puparium sometimes with waxy lamellar formations (Fig. 426: 2); in other forms dorsum of puparium bare or covered with waxy powder. 1.2-1.8. Microscopic preparations have to be made for identification of the puparia by the method described for Coccinea (p. 690); light puparia are stained with fuchsin. Puparia show the following sutures (Fig. 427: 3): a submarginal suture separating the marginal region from the dorsal disk; a transverse suture separating thorax from abdomen; a longitudinal suture dividing the thoracic part into a left and right half. Most important characters are the structure of the vasiform orifice and the form of the anus. A caudal furrow passes in some forms from the anus to the posterior margin of the puparium (Fig. 427: 3). The dorsal disk shows oval, rounded or branched depressions recognized by their light color in preparations; there are also several pairs of setae (Fig. 427: 1). The puparia of some forms bear siphons or submarginal papillae (Fig. 427: 11). The ventral side of the puparium bears the reduced mouthparts, antennae, legs and spiracles (Fig. 427: 3). Antennae usually single-segmented, with a long or short seta. Legs short, thick, curved, forming stumps. 2 thoracic tracheal furrows (right and left) are present in some species; margin of puparium at end of furrow sometimes with sclerotized denticles (tracheal comb, – Fig. 427: 1) or with a semicircular notch (Fig. 427: 4).

The eggs have a pedicel by means of which they are attached to the substrate. They are laid in circles, in clusters, or singly. Oval, flat active larvae hatch from the eggs. They possess 3 pairs of legs, antennae, eyespots and hairs at the margin of the body; these larvae crawl about for several hours; then they attach themselves by suction. Later instars (2nd to 4th) are inactive, with rudimentary antennae and legs. In the 4th instar the body of the larva becomes convex, attaches itself closely to the substrate and waxy formations appear on its dorsal side; under this cover (the so-called puparium) the larva ceases to feed and undergoes important changes. As a result the larva becomes a winged imago. Most species have 1 generation in the Far East.

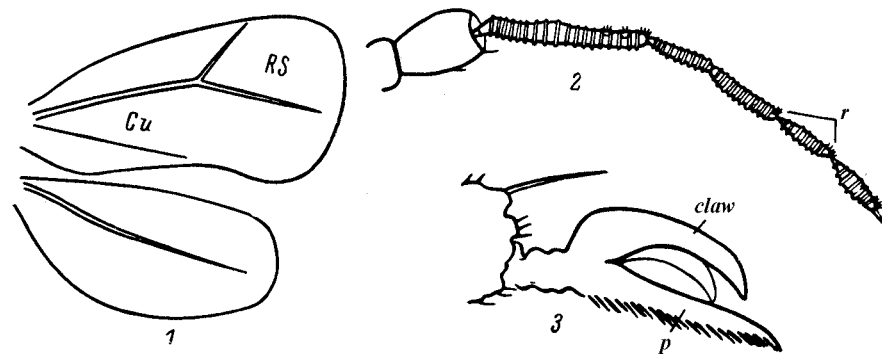


Fig. 425. Homoptera, Aleyrodinea. Fam. Aleyrodidae. Imago of *Aleurochiton aceris* Modeer. (After Grasse).

1, wings; 2, antennae; 3, tarsus. *P*, paronychium; *r*, rhinaria.

The larvae and imagines live on the lower surface of leaves of various plants, preferring humid and shaded habitats. The puparia hibernate on old and fallen leaves; in some species the imagines hibernate together with the puparia. The best period to collect specimens is the second half of summer and fall, as well as spring. The method [p. 542] of collecting is as follows: some puparia found on leaves are kept dry in envelopes or boxes to preserve the waxy integument; it is desirable to place the leaves for a while in killing bottle to prevent hatching of imagines and damaging of puparia; other part of puparia, imagines and larvae are kept in 70% alcohol.

Some species are serious pests of plants. They feed on plant juices, causing yellow leaf discolouration. Their sugar excretions become infested with sooty moulds, which block the stomata, reducing assimilation of leaves. The greenhouse whitefly (*Trialeurodes vaporariorum*) is injurious to cucumbers, tomatoes and various greenhouse flowers; the citrus whitefly (*Dialeurodes citri* Ashmead) has caused severe damage to citrus on the Black Sea coast of the Caucasus; in USSR, it is now subjected to quarantine.

The suborder includes two families: Aleyrodidae and Aleurodicidae. Only the family Aleyrodidae is represented in Palearctic; the other family is distributed in South America.

LITERATURE. Danzig, E.M. 1964. Suborder Aleyrodinea – Whiteflies. In: Bei-Bienko, G.Ya. (ed.). *Opredelitel' nasekomykh evropeiskoi chasti SSSR* [Keys to the Insects of the European USSR] 1: 482-489, Leningrad. [In Russian; English translation: 1967, Israel Program for Scientific Translation, Jerusalem, pp. 608-616]. – Danzig, E.M. 1966. Contributions to the knowledge of the whiteflies (Homoptera, Aleyrodoidea) of the Primorye. *Entomol. Obozr.* 45: 364-386. [In Russian]. – Mound, L. A. & Halsey, S. H. 1978. Whitefly of the world. A systematic catalogue of the Aleyrodidae (Homoptera) with host plant and natural enemy data. Chichester etc., 340 pp.

1. Family ALEYRODIDAE

10 genera, 22 species (in USSR 20 genera, 49 species).

KEY TO GENERA

1. Dorsal disk separated from marginal region of puparium by a suture (Fig. 427: 1) or weakly sclerotized band; puparium black, with white transparent waxy plates (Fig. 426: 2) ..... 2

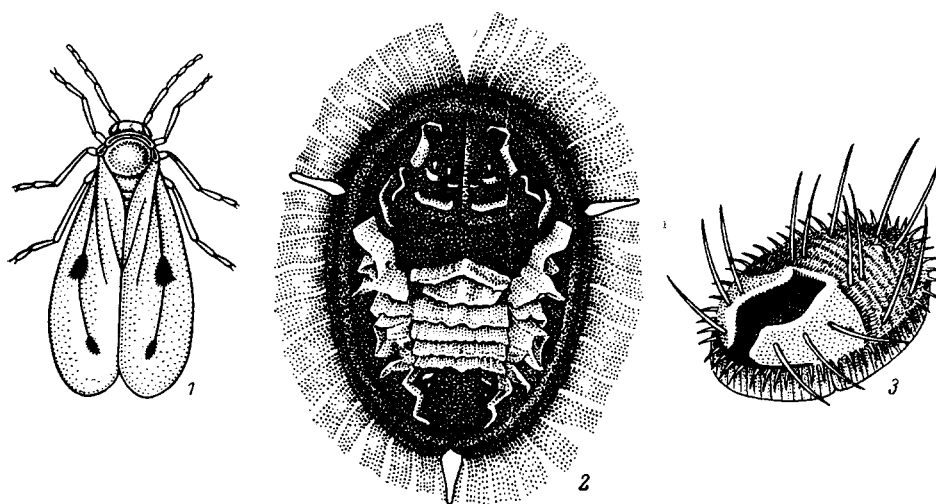


Fig. 426. Homoptera, Aleyrodinea. Fam. Aleyrodidae. (After Weber, Haupt, and original).

1, *Aleyrodes proletella*, imago; 2, *Aleurolobus wuenni*, puparium; 3, *Trialeurodes vaporariorum*, puparium.

- Dorsal disk not separated from marginal region of puparium (Fig. 427: 2); puparium pale or brown ..... 3
- 2. Dorsal disk separated from marginal region of puparium by a suture, sometimes weakly developed. Margin of puparium without submarginal papillae ..... 1. **Aleurolobus** [p. 543]
- Dorsal disk separated from marginal region of puparium by weakly sclerotized band; ventral side of puparium with submarginal skin fold. Margin of puparium with a row of submarginal papillae (Fig. 427: 9) ..... 2. **Aleyrodiella**
- 3. Anus triangular (Fig. 427: 6) ..... 4
- Anus round or heart-shaped (Fig. 427: 7) ..... 7
- 4. Transverse suture reaching margin of puparium. Part of lingula not covered by operculum rounded (Fig. 427: 6) ..... 3. **Neopealius**
- Transverse suture not reaching margin of puparium. Lingula elongate (Fig. 427: 7) ..... 5
- 5. Transverse suture curved, directed anteriorly, forming a closed figure (Fig. 427: 2) ..... 6
- Transverse suture interrupted, at least on sides, not forming a closed figure (Fig. 427: 10) ..... 6. **Bemisia**

6. On base of marginal denticles specific disk glands present; tracheal combs and furrows absent (Fig. 427: 12) ..... 4. **Bemisiella**  
 – Marginal denticles without specific disk glands; tracheal combs and often also furrows present (Fig. 427: 2) ..... 5. **Asterobemisia**  
 7. Margin of puparium with a row of submarginal papillae (Fig. 427: 11). Anus heart-shaped ..... 7. **Trialeurodes**  
 – Margin of puparium without submarginal papillae ..... 8

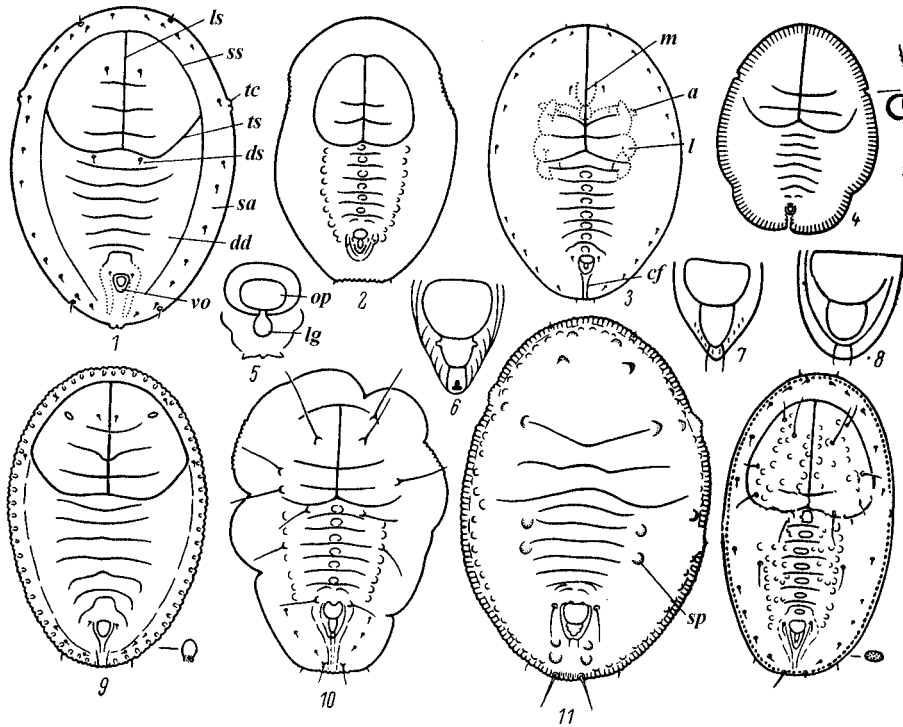


Fig. 427. Homoptera, Aleyrodinea. Fam. Aleyrodidae. Puparium (1-4, 9-12) and anus (5-8). (After Zahradnik, Dobreanu, and original).

1, *Aleurolobus wuenni*; 2, *Asterobemisia carpini*; 3, 7, *Aleyrodes lonicerae*; 4, *Aleurotuberculatus similis*; 5, *Aleurochiton orientalis*; 6, *Neopealius rubi*; 8, *Aleyrodes proletella*; 9, *Aleyrodiella lamellifera*; 10, *Bemisia shinanoensis*; 11, *Trialeurodes vaporariorum*; 12, *Bemisiella artemisiae*. a, antenna; an, anus; cf, caudal furrow; dd, dorsal disk; ds, dorsal setae; l, legs; lg, lingual; ls, longitudinal suture; m, mouthparts; op, operculum; sa, submarginal area; sp, submarginal papillae; ss, submarginal suture; tc, tracheal comb; ts, transverse suture.

8. Vasiform orifice (Fig. 427: 5) situated in a rugose anal depression with sclerotized sides. Transverse suture reaching [p. 544] margin of puparium. Puparia broadly oval, of two types: hibernating puparia brown, flat; summer puparia white, convex ..... 8. **Aleurochiton**  
 – Vasiform orifice on surface of puparium. Transverse suture not reaching margin of puparium ..... 9  
 9. Margin of puparium with 3 semicircular spiracular pits (2 on thorax and one at posterior end of abdomen). Anus rounded, passing into caudal furrow (Fig. 427: 4) ..... 9. **Aleurotuberculatus**

- Margin of puparium without semicircular spiracular pits. Anus heart-shaped, broadly rounded posteriorly (Figs. 427: 3, 7, 8) ..... 10. **Aleyrodes**

*KEYS TO SPECIES OF FAMILY ALEYRODIDAE*

1. **Aleurolobus** Quaintance et Baker. In USSR 2 species.
  1. Puparium oval; submarginal suture distinct. Tracheal combs formed by 2 separate denticles (Fig. 426: 2). 1.2. – S Prim., S Kur. (Kunashir); Irkutsk Prov. – Europe. – On various shrubs and grasses ..... **A. wuenni** Ryberg (*asari* auct.)
  - Puparium broad oval; submarginal suture indistinct, hardly noticeable. Tracheal combs formed by 2 fused denticles. 1.8. – S Prim. – On *Vitis amurensis* ..... **A. vitis** Danzig
2. **Aleyrodiella** Danzig. Monotypic genus.
  1. Tracheal furrows and combs absent (Fig. 427: 9). – S Prim. – On *Ulmus* ..... **A. lamellifera** Danzig
3. **Neopealius** Takah. Monotypic genus.
  1. Puparium light, without waxy covering. Transverse suture passes near margin of puparia. Tracheal furrows not developed; tracheal combs formed by 5-7 denticles, which continue deep into body by sclerotized lingulae. – S Prim. – Japan. – On *Agastache rugosa* and *Phlomis* in open areas ..... **N. rubi** Takah.
4. **Bemisiella** Danzig. Puparium white, with tubercles in medial part and row of waxy ciliae along margin. 2 species in the genus.
  1. Puparium not transparent. Anus elongated; lingula oval (Fig. 427: 12). Imago yellow, wings without maculae. – S Prim. – On *Artemisia* . **B. artemisiae** Danzig
  - Puparium transparent. Anus triangular; lingula triangular. – S Prim. – On *Lespedeza bicolor* ..... **B. lespedezae** Danzig
5. **Asterobemisia** Trehan (*Neobemisia* Visnia). Puparium broadly oval; in species from the Far East yellow or white, with black maculae. 1.5.– 4 species (in USSR 7 species).
  1. Caudal furrow distinct. – S Prim. – On *Trifolium* ..... **A. trifolii** Danzig
  - Caudal furrow not developed ..... 2
  2. Denticles along margin of puparia sclerotized. – S Prim. – On *Quercus* ..... **A. takahashii** Danzig
  - Denticles along margin of puparia not sclerotized ..... 3 [p.545]
  3. Puparia almost rounded, of subequal length and width; unsegmented (marginal) part of puparium twice as broad as the segmented (medial) one. Tracheal combs narrow; caudal comb narrower than maximum width of frame around vasiform orifice. – S Prim. – On *Carpinus*, *Tilia*, *Malus*.... **A. lata** Danzig
  - Puparia considerably longer than wide; segmented part of puparium as wide as its unsegmented part (Fig. 427: 2). Tracheal combs wide; caudal comb broader than maximum width of frame around vasiform orifice. Imago yellow, wings without maculae. – S Prim.; Tomsk, Krasnoyarsk. – Europe. – On trees and shrubs; in Prim., on *Bergenia pacifica* ..... **A. carpini** Koch (*avellanae* Sign.)

6. **Bemisia** Quaintance et Baker. Puparium yellow or white. – 1 species (in USSR 8 species).

1. Strong variability of the most important characters of puparia was the reason for the synonymy stated below. Dorsal setae long or badly noticeable; tracheal combs with 8-26 denticles (Fig. 427: 10). – S Prim. – In Japan, polyphagous species; in Prim., on *Ulmus*, *Corylus*, *Lonicera*, *Sorbaria sorbifolia* and *Aster tataricus* .....  
**B. shinanoensis** Kuwana (*eo*a Danzig, syn. n.; *iol*e Danzig, syn. n.; *tabaci* sensu Danzig, 1966)

7. **Trialeurodes** Ckll. Mainly tropical species. – 1 species, only on various greenhouse and indoor plants (in USSR 2 species).

1. Puparium greenish white, with surrounding waxy band, with 5-8 long waxy filaments (Fig. 426: 8) and several pairs of large tubercles dorsally (Fig. 427: 11). – On various greenhouse and indoor plants; very injurious .....  
..... \***T. vaporariorum** Westw.

8. **Aleurochiton** Tullgr. On *Acer*; most species monophagous, developing on one species of plant. Two generations per year; puparia with seasonal dimorphism. – 1 species (in USSR 4 species).

1. Puparium of both generations bearing exuviae of three younger larval instars on the dorsum; exuviae closely attached one under another. Dorsal surface of thorax with strong setae; margin of puparium without setae. – S Prim. – On *Acer mono* ..... **A. orientalis** Danzig

9. **Aleurotuberculatus** Takah. (*Japaneyrodes* Zahradnik). In USSR 1 species.

1. Puparium pale yellow, slightly convex, with constriction at posterior part (Fig. 427: 4), sometimes with longitudinal dark band and waxy cover. – S Prim., Sakh., S Kur. (Kunashir); Irkutsk Prov. – Japan, Europe. – On *Vaccinium vitis-idaea*; on islands also on *Ilex crenata*. The species is characterized by individual and geographical variability; its subdivision into three subspecies is inexpedient ...  
..... **A. similis** Takah.

10. **Aleyrodes** Latr. Puparia yellow or white. – 5 species (in USSR 8 species).

1. Puparium elongated oval; bases of marginal denticles prolonged on the disk of puparium, forming a transverse striation. – S Prim. – On *Urtica* and *Chelidonium majus* ..... **A. borchsenii** Danzig
- Puparium oval; bases of marginal denticles only for a short distance prolonged on the disk of puparium ..... 2 [p. 546]
2. Marginal area of puparium sclerotized. Puparium with longitudinal brown band. – S Prim. – On *Euphorbia* ..... **A. zygia** Danzig
- Marginal area of puparium not sclerotized ..... 3
3. Puparium up to 1.8, with longitudinal uninterrupted dark band. Imago with 1 dark macula on wings. – S Prim. – Oligophagous on Saxifragaceae, common on *Philadelphus tenuifolius*; also infesting *Bergenia pacifica* and *Ribes*; forming large colonies ..... **A. philadelphi** Danzig

- Puparium up to 1.2, without longitudinal dark band ..... 4
- 4. Puparium yellow, caramel-like, not transparent, in some specimens becoming dark brown in fall; dorsum of puparium without tubercles; dorsal setae very short; lateral margin of anus thickened, smooth without folds (Fig. 427: 8). Imago with 2 dark spots on wings. (Fig. 426: 1). – S Prim.; Tomsk, Kazakhstan – Europe. – On *Chelidonium majus*, *Euphorbia* and *Brassica*, to which sometimes it causes damage; forming dense colonies; in Prim. on *Euphorbia*. Several generations per year; eggs laid in circles ..... **A. proletella** L.
- Puparium white, transparent, in some specimens becoming greenish yellow in fall; a row of round tubercles in midline of abdomen (Fig. 427: 3); these tubercles are sometimes faintly marked, but sometimes brown; 4-7 pairs of dorsal setae, their length very variable; lateral margin of anus plicated (Fig. 427: 7). Imago with 1 dark macula on wings. – S Prim.; Tomsk, Tien Shan. – Europe. – On various shrubs and grasses in forests, parks and near roads; not forming dense colonies. Several generations per year; eggs irregularly scattered .....  
..... **A. lonicerae** Walk.

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*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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