Larvae of some species of the subfamily Eupelicinae (Homoptera: Cicadellidae)

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Five instar larvae of 6 species from the genera *Eupelix* Germ., *Dorycephalus* Kouch., *Paradorydium* Kirk. are described. Keys to genera and to species are given. Basing on larval characters, Eupelicinae are considered a separate subfamily including three tribes (Eupelicini, Dorycephalini, and Paradorydiini).

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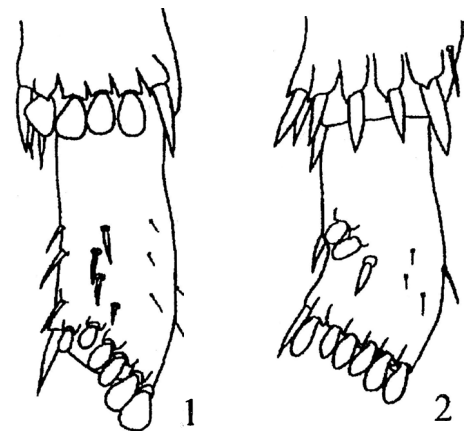
Though Cicadina is a well studied group, study of their larvae has not received sufficient attention. This concerns especially the leafhopper larvae, because they are rather uniform and their identification is difficult. At present, there are only a few works with descriptions of larvae of Cicadellidae, keys for their identification, and comparative morphological data (Walter, 1975, 1978; Wilson, 1978, 1981, 1983; Vilbaste, 1982; Dmitriev, 1999, 2000). There are also some publications including brief descriptions of larvae from the subfamily Eupelicinae (genera *Eupelix*, *Dorycara*, *Attenuipyga* and *Neoslossonia)* (Oman, 1949, 1985; Ossiannilsson, 1981; Vilbaste, 1982).

The place of Eupelicinae in the leafhopper classification is variously treated by different authors. Hamilton (1975) placed them as three tribes in the subfamily Aphrodinae, and Emeljanov (1999) included them in Deltocephalinae. Undoubtedly, Eupelicini, Dorycephalini and Paradorydiini are closer related to each other than to the rest species of Aphrodinae and Deltocephalinae. They strongly differ in the chaetotaxy of legs (see also Hamilton, 1975; Rakitov, 1998; Dmitriev, 2000). Eupelicinae and Deltocephalinae are also distinguished by the chaetotaxy of larval abdomen. Therefore I think that Eupelicinae should be considered a separate subfamily with three tribes included. Descriptions of the subfamily, examined genera and species based on characters of five instar larvae are given below.

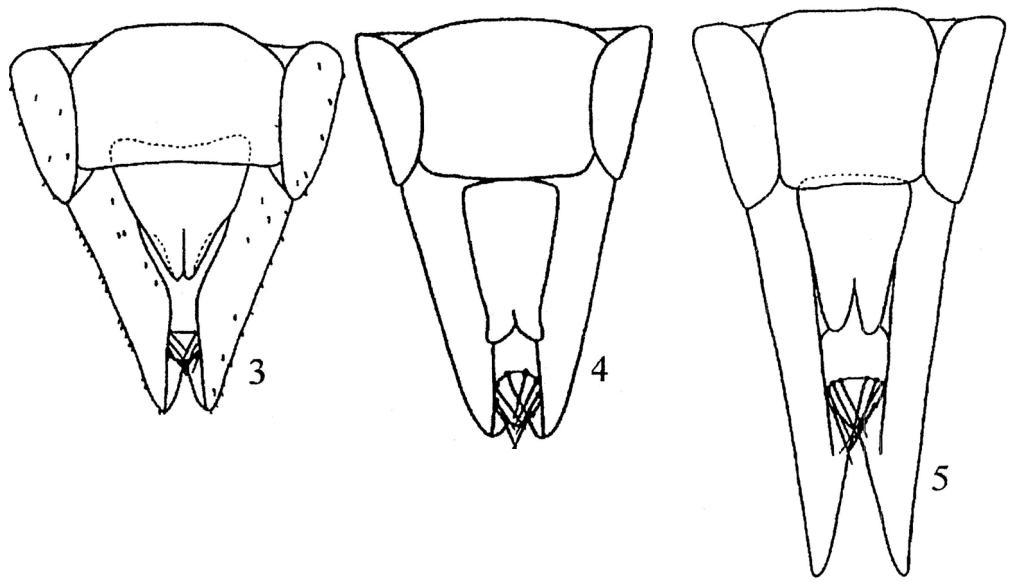
In the lists of the material examined, symbols ♂ and ♀ are used to designate male and female fifth instar larvae (not imagines!).

Subfamily EUPELICINAE Sahlberg, 1871

Description. Body slender, in *Paradorydium* and *Dorycephalus* strongly elongate, in *Eupelix* dorsoventrally flattened. Head usually strongly elongate and flattened. Vertex considerably longer than pronotum, with median carina; its anterior margin narrowly or widely rounded; posterior margin straight. Vertex-face transition sharp, carina-like, lateral margins of cephalic projection usually foliaceous; in *Eupelix*, lateral margin of head divides anterior part of eye in two parts. Face longer than wide; anteclypeus parallel-sided, nearly twice as long as wide; lorum as wide as anteclypeus or nar-



Figs 1-2. Fifth instar larva, apex of hind tibia and first segment of tarsus. **1**, *Eupelix cuspidata* F.; **2**, *Dorycephalus baeri* Kouch.



Figs 3-5. Fifth instar larva, apex of male abdomen from below. **3**, *Eupelix cuspidata* F.; **4**, *Paradorydium aristidae* Zachv.; **5**, *Dorycephalus baeri* Kouch.

rower, about 1/3 of its inner margin bordering on postclypeus; postclypeus longer than wide, in *Paradorydium* and *Eupelix* with median carina, in *Dorycephalus* with a pair of grooves running from antennal pits to apex of face; genae with obtusely angled lateral edge; antennae inserted in front of or at anterior margin of eyes. Pronotum 2-3 times as wide as long, laterally about as long as medially, with median carina and paired lateral carinae, upper of the latter often weaker. Wing pads 1.2-2.0 times as long as combined length of meso- and metanotum medially. Apex of metafemur with 2 setae; tibia with 4 longitudinal rows of setae; each row consists of 5-7 macrosetae and shorter setae between them; macrosetae somewhat displaced toward apex of tibia; apex of metafemur with 7 (in *Eupelix* usually 8) setae, all setae are usual or setae II-IV (V) are platellae (the term used after Howe (1930) for blunt setae) (Figs 1-2); first segment of hind tarsus with 5 platellae at apex (sometimes seta I not transformed into platella) and at some distance from them one more platella and one seta; in *Dorycephalus*, two apical setae in anteroventral row are platellae. Abdomen bald, without macrosetae, or disorderly covered with short setae; lateral margin with double carina (upper one often weak). Male gonapophyses triangular, as long as wide at the base or longer, with rounded apices (Figs 3-5).

Key to tribes of Eupelicinae

1(4). Vertex flat, with median carina. Face with median carina. Apex of metatibia with platellae. First segment of hind tarsus without platellae in ventral rows (Fig. 1).

2(3). Carina on lateral margin of head divides anterior part of eye in two parts. Apex of metatibia with 8 setae (of them setae II-V are platellae) (Fig. 6) . . . . . **Eupelicini**

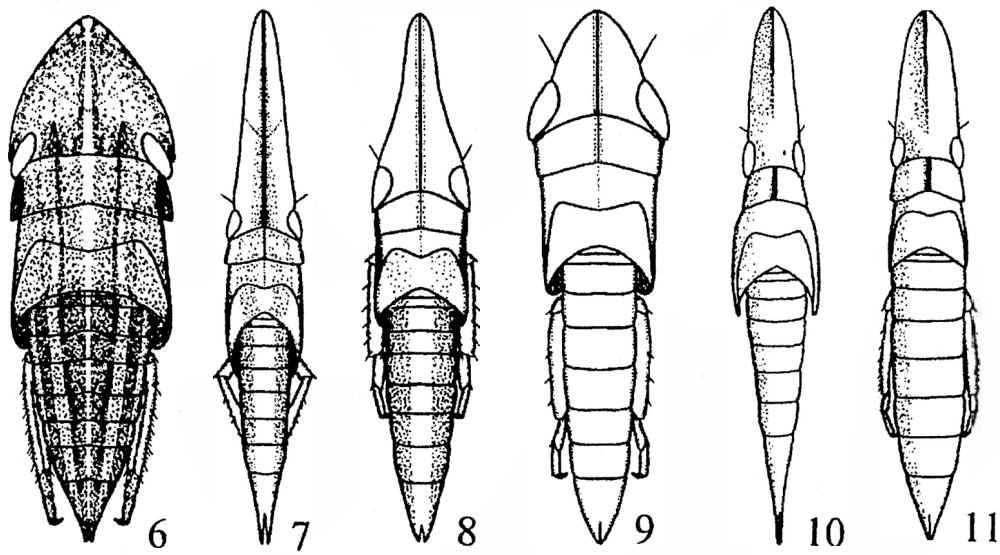
3(2). Carina on lateral margin of head not divides anterior part of eye in two parts. Apex of metatibia with 7 setae (setae II-IV are platellae) (Figs 7-9) . . . . . **Paradorydiini**

4(1). Vertex roof-like. Face without median carina, with a pair of longitudinal grooves. Apex of metatibia without platellae. First segment of hind tarsus with platellae in anteroventral row (Figs 2, 10-11) . . . . . **Dorycephalini**

Tribe **Eupelicini** Sahlberg, 1871

Eupelix Germar, 1821

Description. Body moderately slender, dorsoventrally flattened. Head elongated; its lateral margin foliaceous, divides anterior part of eye in two parts. Vertex 2.5-3.0 times as long as pronotum, longer then wide between eyes. Its anterior edge rounded or acute-angulately rounded, posterior margin straight. Vertex-face transition sharp, carina-like. Face considerabely longer than wide; antennae inserted in front of eyes; anteclypeus long, parallel-sided,



Figs 6-11. Larvae of species of Eupelicinae. **6**, *Eupelix cuspidata* F.; **7**, *Paradorydium paradoxum* H.-S.; **8**, *P. aristidae* Zachv.; **9**, *Paradorydium* sp.; **10**, *Dorycephalus baeri* Kouch.; **11**, *D. hunnorum* Em.

more than twice as long as wide; lorum nearly as wide as anteclypeus; genae with nearly rectangular lateral margins; postclypeus with median carina in upper part. Pronotum about 3 times as wide as long; its anterior margin almost straight; posterior margin somewhat concave; lateral margin long, about as long as pronotum in median part, with a pair of carinae. Apex of metatibia with 8 (rarely 7) setae; setae II-V are platellae. Abdomen with a pair of lateral carinae, with disorderly situated short setae; apices of setae blunt. Male gonapophyses triangular, nearly as long as wide; their apices rounded.

Eupelix cuspidata (Fabricius, 1775)
(Figs 1, 3, 6)

Material. **Russia**: ♂♂, ♀♀, *Voronezh Prov.* and *Krasnodar Terr.* (Dmitriev, Gnezdilov).

Description. Brownish with numerous brown dots; males usually darker than females; anterior margin of vertex with small black spots; face with darkened spots under antennae; abdomen with a pair of small dark spots at fore margin of each tergite and narrow pale median stripe; on each side of abdomen, also a pale stripe lateral to dark spots and one more along lateral carinae; legs with narrow black rings and dark spots around bases of setae.

Body length 5.3-6.5 mm; head width 1.3-1.8 mm.

Tribe **Paradorydiini** Evans, 1936

Paradorydium Kirkaldy, 1901

Description. Body slender or strongly elongate. Head stretched, dorsoventrally flattened. Vertex 2.2-7.0 times as long as pronotum, sometimes almost as long as rest of body, tapering and narrowly rounded at apex, with weak median carina. Vertex-face transition sharp, carina-like. Face longer than wide; anteclypeus parallel-sided, more than twice as long as wide; lorum somewhat narrower than anteclypeus, slightly bordering on postclypeus; gena with rectangularly rounded lateral margin; postclypeus with median carina in upper part. Pronotum 2-3 times as wide as long, with weak median carina; its anterior margin convex; posterior margin sinuous; sides with paired carinae, upper one usually weak or absent. Wing pads 1.5-2.0 times as long as pterothorax. Apex of metatibia with 7 setae (of them setae II-IV are platellae). Abdomen bald. Male gonapophyses longer than wide, with rounded apices directed laterocaudad.

Key to species of *Paradorydium*

1(4). Vertex more than 3 times as long as pronotum.
2(3). Vertex more than 6.5 times as long as pronotum. Wing pads about twice as long as pterotorax (Fig. 7) ..... **P. paradoxum** H.-S.

3(2). Vertex less than 6 times as long as pronotum. Wing pads about 1.5 times as long as pterotorax (Fig. 8) ..... **P. aristidae** Zachv.
4(1). Vertex less than 3 times as long as pronotum (Fig. 9). ..... **Paradorydium** sp.

Paradorydium paradoxum (Herrich-Schäffer, 1837)
(Fig. 7)

Material. **Kazakhstan**: 1 l_4, *Dzhezkazgan Prov.*, 40 km S of Zhana-Arka (Atasu), 28.VI.1959 (Loginova); 1 ♀, same locality, 19.VII.1960 (Emeljanov); **Bulgaria**: ♂♂, ♀♀, VII-VIII.2000 (Emeljanov, Gnezdilov).

Description. Grinish or brownish; abdomen with two darkened longitudinal stripes.

Body length 6.5-7.7 mm; head width 0.9-1.0 mm.

Paradorydium aristidae (Zachvatkin, 1953)
(Figs 4, 8)

Material. **Kazakhstan**, *Dzhambul Prov.*: 1 ♂, 1 ♀, Akyrtobe, 5.VII.1930 (Bianchi); 1 ♂, 2 ♀, 2 l_4, railway station Chu, 15.VII.1960 (Kerzhner, Emeljanov).

Description. Similar to *P. paradoxum* H.-S.

Body length 4.9-6.2 mm; head width 0.8-0.9 mm.

Paradorydium sp.
(Fig. 9)

Material. **Azerbadzhan**: 1 ♂, *Nakhichevan Rep.*, 23.VI.1977 (Logvinenko).

Description. Greenish.

Body length 4.0 mm; head width 0.8 mm.

Tribe **Dorycephalini** Oman, 1943

Dorycephalus Kouchakewitch, 1866

Description. Body slender. Head strongly stretched. Vertex 4.0-5.5 times as long as pronotum, roof-like, with median carina, rounded at apex; posterior margin straight. Vertex-face transition sharp, carina-like. Face longer than wide; anteclypeus parallel-sided, almost twice as long as wide; lorum narrower than anteclypeus, 1/3 of its inner margin bordering on postclypeus; postclypeus strongly elongate, with a pair of grooves running from antennal pits to apex of face; antennae inserted at fore margins of eyes. Pronotum about twice as wide as long, with median carina; its lateral margins long, about as long as median length of pronotum, with paired carinae, upper carina weaker than lower. Wing pads 1.2-1.5 times as long as combined length of meso- and metanotum. Apex of metatibia with 7 setae. First segment of hind tarsus with two platellae in anteroventral row. Abdomen bald, with weak lateral additional carina. Male gonapophyses triangular, longer than wide, with rounded apices.

Key to species of *Dorycephalus*

1(2). Vertex more than 4.5 times as long as pronotum. Wing pads nearly 1.5 times as long as pterotorax. Pale brownish with darker dots (Fig. 10) ..... **D. baeri** Kouch.
2(1). Vertex less than 4.5 times as long as pronotum. Wing pads about 1.2 times as long as pterotorax. Greenish or rarely pinkish (Fig. 11). . . . . **D. hunnorum** Em.

Dorycephalus baeri Kouchakewitch, 1866
(Figs 2, 5, 10)

Material. **Kazakhstan**: 1 ♂, 1 ♀, Koksengir, 40 km S of Zhana-Arka (Atasu), 12-14.V.1959 (Emeljanov); 4 ♀, same locality, 29.V.1960 (Emeljanov).

Description. Pale brownish with numerous dark dots; two small spots at the base of vertex.

Body length 7.6-7.8 mm; head width 1.0-1.1 mm.

Dorycephalus hunnorum Emeljanov, 1964
(Fig. 11)

Material. **Mongolia**, 3 ♂, 5 ♀, Khubsugul, Central, and East aimaks, 24.VI-21.VII.1967-1968 (Emeljanov).

Description. Greenish, rarely pinkish.

Body length 6.5-7.4 mm; head width 1.0 mm.

It is worth noting that *Paradorydium* is closer related to *Eupelix* than to *Dorycephalus*. Their synapomorphy is the presence of platellae at apex of hind tibia, which remain also in imago (in *Eupelix*) or turn into usual setae (in *Paradorydium*). *Dorycephalus* has its autapomorphies: longitudinal grooves on postclypeus and platellae in anteroventral row on first segment of the hind tarsus.

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