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A REVIEW OF THE TRIBE DELOMERISTINI (HYMENOPTERA, ICHNEUMONIDAE, PIMPLINAE) IN THE UKRAINIAN CARPATHIANS

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A Review of the Tribe Delomeristini (Hymenoptera, Ichneumonidae, Pimplinae) in the Ukrainian Carpathians. Varga, O. — A list of the Ukrainian Carpathian species of the tribe Delomeristini is reviewed. All ten recorded species are new for the studied region. The genus *Atractogaster* Kriechbaumer, 1872 with a single European species, *A. semisculptus* Kriechbaumer, 1872, *Delomerista borealis* Walkley, 1960, *D. novita* (Cresson, 1870), *D. pfankuchi* Brauns, 1905, and *Perithous speculator* Haupt, 1954 are recorded for Ukraine for the first time. Diagnostic features and illustrations of some species, seasonal dynamics and high-altitude zone distribution in the Ukrainian Carpathians are provided.
Key words: parasitoids, Ukraine, new records.

Introduction

Delomeristini is a small tribe of the subfamily Pimplinae, represented by 3 genera and 37 species worldwide and only 3 genera and 19 species in the Western Palaearctic (Yu et al., 2012). Five species of Delomeristini have so far been recorded from Ukraine by Kasparyan (1981): *Delomerista mandibularis* (Gravenhorst, 1829), *Perithous albicinctus* (Gravenhorst, 1829), *P. divinator* (Rossi, 1790), *P. scurra* (Panzer, 1804), and *P. septemcinctorius* (Thunberg, 1822). In this study, ten aditional species of tribe Delomeristini were found for the first time in the Ukrainian Carpathians, and five of them are new records for Ukraine.

Delomeristini are parasitoids of Hymenoptera and Coleoptera: *Delomerista* attack hosts in thick cocoons (the sawflies and Braconidae), species from other two genera oviposit through plant tissue into somewhat concealed hosts, stem nesting-aculeates (*Perithous*) or wood-boring Coleoptera (*Atractogaster*) (Gauld et al., 2002).

Material and methods

This study is mainly based on specimens collected by sweep netting, Malaise (MT) and Tereshkin (TT) traps by the author in various locations of the Ukrainian Carpathians in 2009–2017. The material deposited in the collection of the Vasyl Stefanyk Precarpathian National University, the Schmalhausen Institute of Zoology and the Bavarian State Collection of Zoology (ZSSM) was also studied.

The most common collecting sites and respective abbreviations are provided below:

Ivano-Frankivsk Region (IF): Mochary — Mochary, 5 km NE of Bogorodchany, 315 m, mixed forest (48.837078 N, 24.581379 E); Dibrova — Dibrova, 5 km SW of Bogorodchany, 310 m, oak forest (48.772054 N, 24.511657 E); Zhbyr — Zhbyr, 8 km SW of Bogorodchany, 405 m, mixed forest (48.777922 N, 24.456837 E); Igrovets — Gorgany, 4 km SW of Stara Guta, 1050 m, coniferous forest (48.614163 N, 24.157944 E).

Transcarpathian Region (ZAK): Kvasy — Svydovets, 750 m, beech forest, 2–3 km NW of Kvasy (48.144694 N, 24.270809 E); Sheshul — Chornogora, Sheshul, 6–7 km NE of Kvasy, 1450 m, subalpine zone (48.157193 N, 24.363658 E); Chornogora — Chornogora, 900–1200 m, forest; Rakhiv — Rakhiv, 800–900 m, beech forest; Chorna Gora — Chorna Gora, 280 m, oak forest (48.138338 N, 23.073689 E); Ugolka — Tyachiv District, 6.5 km N of Mala Ugolka, 600 m, beech forest (48.259464 N, 23.619672 E).

Specimens were identified with the use of keys provided by Kasparyan (1981), Gupta (1982), and Fitton et al. (1988). Additionally, specimens were compared with material from Zoological Institute (ZISP), and Schmalhausen Institute of Zoology identified by D. R. Kasparyan. Some *Delomerista* specimens were sent for identification to G. Broad (Natural History Museum, London). Type of *P. speculator* deposited in Senckenberg Deutsches Entomologisches Institute (SDEI) was examined from photographs (Taeger & Haupt, 2013.). New Ukrainian records marked with asterisk.

Photographs of specimens were taken with a Leica stereomicroscope 205A with DFC 500 camera, combined with Zerene® software (Alexandru Ioan Cuza University of Iasi).

Taxonomy

Atractogaster semisculptus Kriechbaumer, 1872*

Material. **Switzerland:** holotype female, Chur, 4.06.1851 (Kriechbaumer) (ZSSM). **Ukraine: IF:** Mochary, sweeping, 9.05.2011, 1 ♂, 12.05.2011 2 ♂, 31.05.2012, 2 ♀, TT, 11–26.05.2014, 1 ♀; Dibrova, sweeping, 5.06.2011, 1 ♀, 26.05.2012, 1 ♀, 2.06.2012, 1 ♀, 14.06.2012, 1 ♀; Igrovets, sweeping, 8–9.06.2012, 1 ♀ (Varga) (ZISK).

Diagnosis. This species is characterized by the clypeus with apical tubercle, the yellow malar space and inner orbits, the simple fore tarsal claw (without basal lobe), the propodeum with a more-or-less well defined area superomedia and area apicalis (as on fig. 1, *3*); the impunctate and somewhat aciculate and granulate (female) or smooth (male) metasoma, the middle tergites with deep basolateral grooves, and the ovipositor with undulate apex.

Flight period in Carpathians. May to June (9.05–14.06).

Delomerista borealis Walkley, 1960* (fig. 1, *11*)

Material. **Ukraine: IF:** Mochary, sweeping, 26.05.2014, 1 ♀ (Varga) (ZISK).

Diagnosis. This species is characterized by the irregularly granulate metasoma (as on fig. 1, *5*); the two basal antennal segments with numerous rows of sensillae (fig. 1, *11*); the malar space which is about 0.5 × length of basal width of mandible; the black face and upper hind corner of pronotum; the brownish tegulae; the ovipositor which is about 1.8 × length of hind tibia, with simply tapered at apex upper valve (fig. 1, *7*). Male is distinguisheble by the entirely yellow face and clypeus, the narrow and black malar space (as on fig. 1, *2*), the black tegulae and alongate area superomedia.

Remarks. *Delomerista* species look rather like *Scambus* (Ephialtini), but have simple fore tarsal claws (without basal lobe); propodeum with a more-or-less well defined area superomedia; more finely sculptured, matt metasoma; yellow malar space and mandibles (at least basally).

Flight period in Carpathians. May.

Delomerista cf. *japonica* Cushman, 1937 (figs 1, *1*, *9*, *10*)

Material. **Ukraine: IF:** Dibrova, sweeping, 2.06.2013, 1 ♀, 6.06.2013, 1 ♀, 12.06.2013, 1 ♀ (Varga) (ZISK).

Diagnosis. This species is characterized by the irregularly granulate metasoma (as on fig. 1, *5*); the malar space which is about 0.5 × length of basal width of mandible; the yellow upper hind corner of pronotum and tegulae; the short and sloping down propodeum with area superomedia wider than long; the ovipositor which is about 1.4–1.6 × length of hind tibia, with rounded at apex upper valve (fig. 1, *9*). Male is distinguisheble by the yellow malar space and tegulae and the small and broadly triangular area superomedia.

Flight period in Carpathians. June.

Remarks. This species is close to non-Carpathian examined *D. japonica* specimens and to *D. mandibularis* (Gravenhorst, 1829), but differs by the smaller body compared to most other *Delomerista* species, the antenna with only 20–21 segments (23 in *D. japonica* and 27–29 in *D. mandibularis*); the wider area superomedia which is about 1.2–1.3 × as wide as long (1.0–1.1 in *D. japonica* and 0.7–0.8 in *D. mandibularis*); the ovipositor

which is about 1.4–1.5 × the length of the hind tibia (1.1–1.2 in *D. japonica* and 1.8–2.2 in *D. mandibularis*. Additionally, *D.* cf. *japonica* has two basal antennal segments with numerous rows of sensillae (as on fig. 1, *11*) (less abundant in *D. mandibularis* (fig. 1, *12*)).

Thus, we discussed these Carpathian specimens with Gavin Broad and after examination he stated to leave these species with a queston mark.

Delomerista novita (Cresson, 1870)* (figs 1, *2*, *3*, *5*)

Material. **Ukraine: IF:** Mochary, sweeping, 1.05.2011, 1 ♂, 21.05.2011, 1 ♀, 31.05.2011, 2 ♀, 19.07.2011, 1 ♀; Dibrova, sweeping, 23.06.2011, 1 ♀, 6.06.2013, 3 ♀; Zhbyr, sweeping, 23.05.2012, 2 ♀, TT, 14.08–16.09.2013, 1 ♀; **ZAK:** Sheshul, sweeping, 16–18.06.2012, 5 ♂, 15.06.2013, 6 ♂, 6.06.2014, 1 ♂, 1 ♀ (Varga); Rakhiv, sweeping, 15.07.1995, 1 ♀; Chornogora, sweeping, 5.08.1994, 1 ♀ (Kotenko) (ZISK).

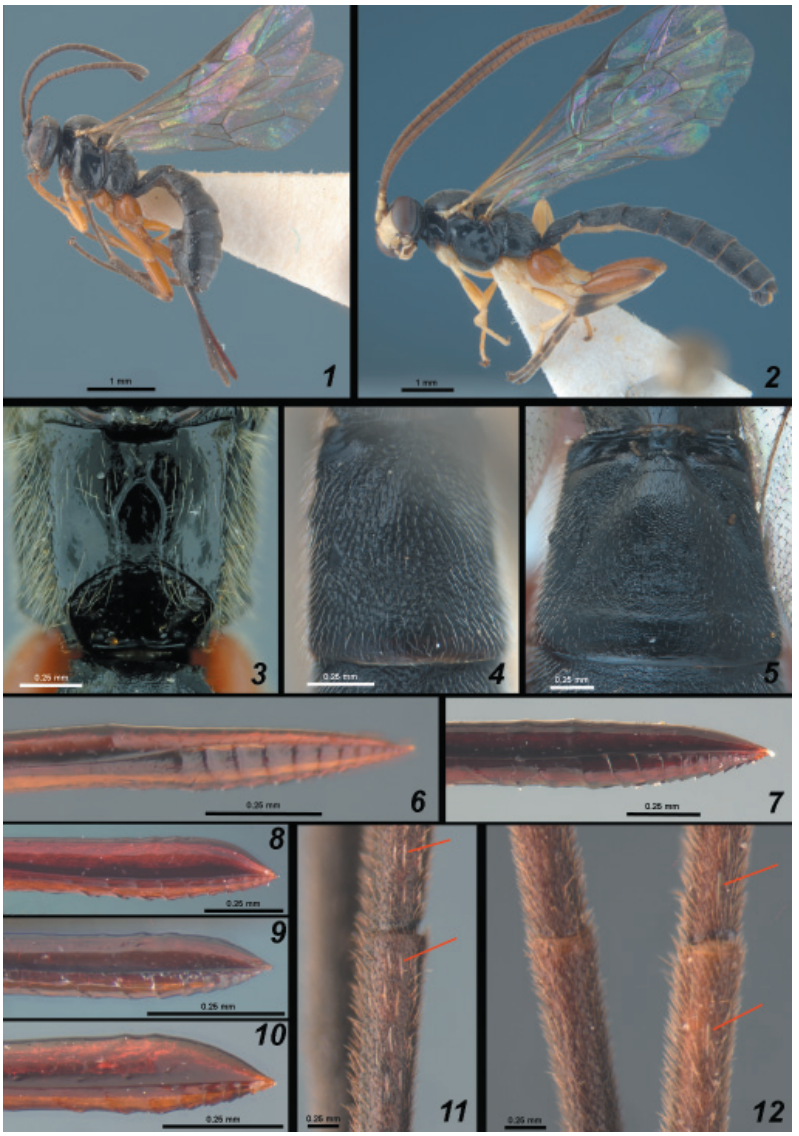

Fig. 1. *Delomerista* spp. *1–2* —habitus, lateral view: 1 — *D.* cf. *japonica*, female; *2* — *D. novita*, male; *3* — *D. novita*, female, dorsal view of propodeum; *4, 5* — dorsal view of the second metasomal tergite: *4* — *D. pfankuchi*, male; *5* — *D. novita*, female; *6–10* — lateral view of ovipositor tip: *6* — *D. pfankuchi*; *7* — *D. borealis*; *8* — *D. mandibularis*; *9* — *D.* cf. *japonica*; *10* — *D. japonica* (non-Carpathian material); *11–12* — lateral view of two basal antennal segments: *11* — *D. borealis; 12* — *D. mandibularis.*

Diagnosis. This species is similar to *D. borealis*, but has shorter malar space (about 0.25 × length of basal width of mandible), yellow upper hind corner of pronotum and tegulae, and shorter ovipositor (about 1.5–1.6 × length of hind tibia). Male has yellow tegulae (fig. 1, *2*).

Flight period in Carpathians. May to September (1.05–16.09).

Delomerista pfankuchi Brauns, 1905* (figs 1, *4*, *6*)

Material. **Ukraine: IF:** Mochary, sweeping, 21.05.2011, 1 ♀, 31.05.2011 2 ♀, 19.07.2011, 1 ♀, 1.05.2012, 1 ♂, 29.05.2012, 1 ♀, 10.06.2012, 1 ♀, 24.07.2012, 1 ♀, 4.06.2013, 1 ♀, 18.08.2013, 1 ♀, TT, 15–31.08.2014, 1 ♂, MT, 8–30.06.2015, 1 ♀; Dibrova, sweeping, 23.06.2011, 1 ♀, 2.06.2012, 1 ♀, 6.06.2013, 3 ♀, 18.06.2013, 2 ♀; Zhbyr, TT, 14.08–16.09.2013, 1 ♀; Gorgany, m. Syvulya, 12–13 km SW of Stara Guta, 48.531433 N, 24.132609 E, 1425 m, subalpine zone, sweeping, 14.07.2012, 1 ♀; **ZAK:** Kvasy, MT, 24.06–14.07.2013, 1 ♀, TT, 11–26.05.2014, 1 ♀, TT, 26.05–9.06.2014, 1 ♀, TT, 27.06–13.07.2014, 2 ♀, TT, 13–29.07.2014, 3 ♀, TT, 29.07–15.08.2014, 1 ♀, TT, 15–31.08.2014, 1 ♂ (Varga); Chornogora, sweeping, 5.08.1994, 1 ♀ (Kotenko) (ZISK).

Diagnosis. This species is similar to *D. novita*, but both sexes have distinctly and closely punctate-reticulate metasoma (fig. 1, *4*).

Flight period in Carpathians. May to September (1.05–16.09).

Remarks. The presence of two yellow spots below antennal sockets in females is variable.

Perithous albicinctus (Gravenhorst, 1829)

Material. **Ukraine: IF:** Mochary, ex dead *Picea abies* L. trunk, 19.08.2013, 1 ♀, ex dead *Pyrus communis* L. trunk, 23.03.2014, 1 ♂, 1 ♀; Gorgany, Elmy, 15 km SW of Yaremche, 950 m, coniferous forest, 48.415462 N, 24.418878 E, sweeping, 20.07.2009, 1 ♂; **ZAK:** Ugolka, MT, 13.06–8.07.2015, 1 ♀ (Varga); Rakhiv District: Dilove, 450–500 m, beech forest, sweeping, 7.2008, 1 ♂ (Bidychak) (ZISK).

Diagnosis. This species is characterized by the absence of red coloration of mesosoma; the mostly reddish with hind tibia and tarsus darker legs and the ovipositor which is about 4.5 × length of hind tibia.

Flight period in Carpathians. June to August (13.06–19.08).

Perithous divinator (Rossi, 1790) (fig. 2, *3*)

Material. **Ukraine: ZAK:** Rakhiv, sweeping, 1.08.1994, 1 ♀ (Kotenko); Chorna Gora, MT, 2–22.07.2017, 1 ♂, sweeping, 22.07.2017, 1 ♀ (Varga) (ZISK).

Diagnosis. This species is characterized by the red mesoscutum, mesopleuron, and partly pronotum (as on figs 2, *1*, *5*); the yellow laterally scutellum; the smooth, black propodeum with narrow yellow arch along apical transverse carina (fig. 2, *3*); the red hing coxa; the smooth first metasomal tergite; the second tergite without a distinct median longitudinal keel anteriorly (fig. 2, *3*); the ovipositor which is about 2.5–3.2 × length of hind tibia.

Flight period in Carpathians. July to August (2.07–1.08).

Perithous scurra (Panzer, 1804) (figs 2, *2*, *5*)

Material. **Ukraine: IF:** Mochary, sweeping, 31.05.2011, 1 ♂, 19.05.2012, 1 ♂, MT, 21.07–10.08.2015, 1 ♀; Igrovets, sweeping, 20.06.2013, 1 ♀; **ZAK:** Kvasy, MT, 24.06–14.07.2013, 1 ♀, TT, 5–29.06.2014, 3 ♀; (Varga); Ugolka, 1.07.2008, 1 ♀ (Bidychak) (ZISK).

Diagnosis. This species is similar to *P. divinator*, but has the second tergite with a distinct median longitudinal keel anteriorly (fig. 2, *2*) and longer ovipositor (about 4.5–5.0 × length of hind tibia).

Flight period in Carpathians. May to August (19.05–10.08).

Perithous septemcinctorius (Thunberg, 1822) (fig. 2, *4*)

Material. **Ukraine: IF:** Mochary, sweeping, 19.07.2012, 1 ♀, 24.07.2012, 1 ♀, 17.08.2013, 1 ♀, 18.08.2013, 1 ♀, 19.08.2013, 1 ♀, MT, 21.07–10.08.2015, 1 ♀; **ZAK:** Chorna Gora, MT, 2–22.07.2017, 1 ♂ (Varga); Chornogora, sweeping, 5.08.1994, 1 ♀ (Kotenko) (ZISK).

Diagnosis. This species is characterized by the abundant red and yellow coloration of body; the granulate propodeum and first metasomal tergite (fig. 2, *4*); the ovipositor which is about 5.9–7.2 × length of hind tibia.

Flight period in Carpathians. July to August (2.07–19.08).

Perithous speculator Haupt, 1954* (fig. 2, *1*)

Material. **Ukraine: IF:** Dibrova, sweeping, 8.10.2013, 1 ♀ (Varga) (ZISK).

Diagnosis. This species is similar to *P. divinator*, but has more abundant yellow coloration of mesosoma: stripes on mesoscutum, scutellum apically, wide arch on propodeum, large spot on hind coxa; and a longer ovipositor (about 4 × length of hind tibia) (fig. 2, *1*).

Flight period in Carpathians. October.

Remarks. Coloration of metasomal tergites varies from entirely black (with yellowish band posteriorly) to tricolor (holotype) (see Taeger & Haupt, 2013).

High-altitude zone distribution of Delomeristini species

Delomeristini species have been recorded in various high-altitude zones of the Ukrainian Carpathians (table 1). Delomeristini were most abundant in the **Foothill oak forest zone**, reaching up to 150–400 m a. s. l. in Precarpathia and Transcarpathian lowland with mixed forests, where the main tree species are *Quercus robur*, *Q. rubra*, *Caprinus*, *Fraxinus*, *Picea abies*,

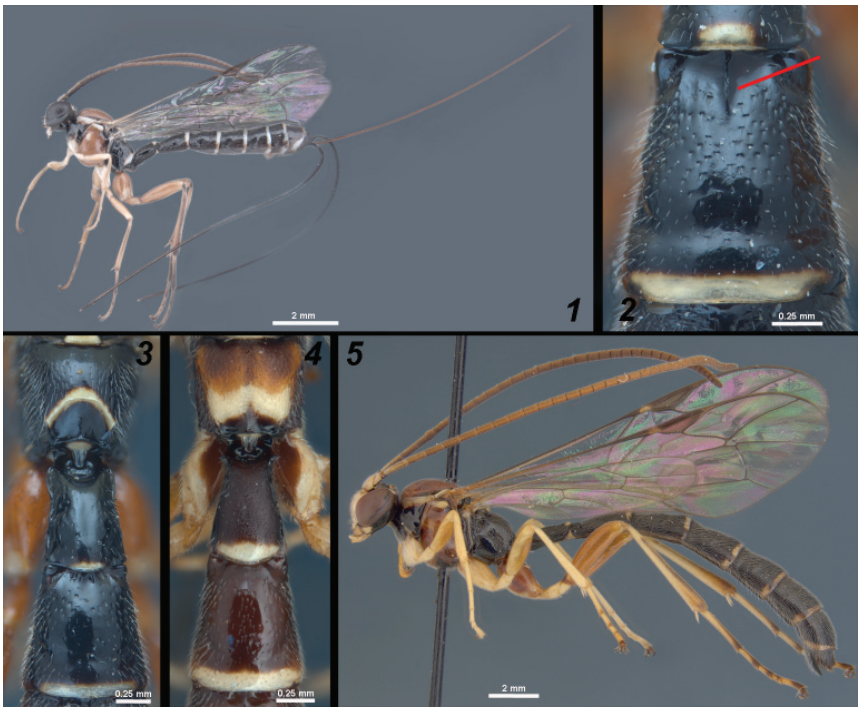

Fig. 2. *Perithous* spp.: *1* — *P. speculator*, female, habitus, lateral view; *2* — *P. scurra,* female, dorsal view of the second metasomal tergite; *3–4* — dorsal view of propodeum and metasomal tergites I–II, female: *3* — *P. divinator*; *4* — *P. septemcinctorius*; *5* — *P. scurra*, male, habitus, lateral view.

Table 1. High-altitude zone distribution of Delomeristini species in Ukrainian Carpathians

Species	High-altitude zone			
	Foothill oak forest zone	Beech forest zone	Coniferous boreal forest zone	Subalpine zone
Atractogaster semisculptus	+		+	
Delomerista borealis	+			
D. cf. *japonica*	+			
Delomerista novita	+	+	+	+
D. pfankuchi	+	+	+	+
Perithous albicinctus	+	+	+	
Perithous divinator	+	+		
P. scurra	+	+	+	
P. septencintricosus	+		+	
P. speculator	+			

Abies alba, and *Pinus sylvestris*, where all ten species were collected. *D. novita*, *D. pfankuchi*, *P. albicinctus, P. divinator*, and *P. scurra* were found in monocultural stands of *Fagus sylvatica* in the **Beech forest zone** (400–1300 m a. s. l.) in Transcarpathia. Six species, *A. semisculptus*, *D. novita*, *D. pfankuchi*, *P. albicinctus*, *P. scurra*, and *P. septencintricosus* were collected in the **Coniferous boreal forest zone**, situated at 900–1600 m a. s. l. in the mountainous part of the Carpathians, where the *Picea abies* community predominates. And only two species, *D. novita* and *D. pfankuchi* were found in the **Subalpine zone**, at 1400–2061 m a. s. l., known as polonynys, which are high altitude open grasslands, partly taken over by bush, mainly by *Pinus mugo*, *Dushekia viridis*, *Juniperus sibirica* and only single small *Picea abies* trees.

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