

## A REVIEW OF THE GENUS *COLEOPTEROPHAGUS* BERLESE, 1882 (ACARI: ASTIGMATA: CANESTRINIIDAE) OF UKRAINE

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**ABSTRACT:** Four species of the genus *Coleopterophagus* Berlese, 1882 known from Europe — *C. megnini* (Berlese, 1881), *C. albini* Haitlinger, 1990, *C. donaldi* Haitlinger 1990 and *C. maroni* Haitlinger, 1990 are recorded in Ukraine. *Coleopterophagus albini* and *C. maroni* are recorded in Ukraine for the first time. Adults of the four species are redescribed and illustrated. The male of *C. donaldi* and immature stages of the genus *Coleopterophagus* are described and illustrated for the first time. Keys to the four species (adults and tritonymphs) are provided. The host-parasite relationships of *Coleopterophagus* are discussed.

**KEY WORDS:** Acari, Canestriniidae, *Coleopterophagus*, Cetoninae, juvenile stages, morphology, hosts, key, Ukraine

### INTRODUCTION

Mites of the family Canestriniidae (Acari, Astigmatina) are obligate external or subelytral paraphages of adult beetles of several families (Coleoptera: Carabidae, Lucanidae, Passalidae, Scarabaeidae, Elateridae, Colydiidae, Tenebrionidae, Chrysomelidae) (OConnor 2009). The genus *Coleopterophagus* Berlese, 1882 includes nine species (Haitlinger 1990) associated with flower beetles of the genera *Protaetia* Burmeister, 1842 and, probably, *Cetonia* Fabricius, 1775 (Scarabaeidae, Cetoninae). Of them, four species are known from Europe and only two species were previously recorded from Ukraine (Haitlinger 1990; Khaustov and Eidelberg 2001; Trach 2006). Available descriptions of these four species are incomplete, without detailed drawings of the idiosoma and legs (Berlese 1882; Canestrini and Kramer 1899; Cooreman 1954; Haitlinger 1988, 1990). The morphology of juvenile stages of the genus *Coleopterophagus* has never been described. Furthermore, a key to males is lacking. The purpose of the present work is to describe and illustrate the morphology of adults and juvenile stages and observe the host-parasite associations of the genus *Coleopterophagus* of Ukraine.

### MATERIALS AND METHODS

Flower beetles were collected during 2000–2010 in different regions and natural zones of Ukraine. Studied material also received from a number of colleagues. Twelve species of Cetoninae known from Ukraine (Medvedev 1964; Vasko and Gerasimov 2005 (2006)). Ten of them belonging to all four known genera represented in Ukraine were studied, species names are listed according to the Catalogue of Palaearctic Coleoptera (2006):

*Tropinota (Epicometis) hirta* (Poda von Neuhaus, 1761), *Oxythyrea funesta* (Poda von Neuhaus, 1761), *Cetonia* (s. str.) *aurata* (Linnaeus, 1761), *Protaetia (Cetonischema) aeruginosa* (Drury, 1770), *Protaetia (Eupotosia) affinis* (Andersch, 1797), *Protaetia (Liocola) marmorata* (Fabricius, 1792), *Protaetia (Netocia) hungarica* (Herbst, 1790), *Protaetia (Potosia) cuprina* (Motschulsky, 1849), *Protaetia (Potosia) fieberi* (Kraatz, 1880), *Protaetia (Potosia) metallica* (Herbst, 1782). More than 500 specimens of beetles were studied.

Mites collected from beetles were mounted on slides in Hoyer's medium. Mites were studied with aid of a stereomicroscope Mikmed-1 Lomo with binocular head AU-12, ocular micrometer AM9-2 and camera lucida RA-7U 4,2. The idiosomal chaetotaxy nomenclature follows Griffiths et al. (1990) as modified by Norton (1998); leg chaetotaxy follows Grandjean (1939). Measurements are given in micrometers (µm). In the descriptions of leg chaetotaxy the number of solenidia is given parentheses. All slides are deposited in the collection of the Department of Zoology, I. I. Mechnikov Odessa National University. Most of the host beetles are in the author's collection.

### RESULTS

Canestriniid mites were found only on six *Protaetia* species. Mites were not found on numerous specimens of *Tropinota hirta*, *Oxythyrea funesta*, *Cetonia aurata* and *Protaetia (Netocia) hungarica*. Two species of flower beetles, *Protaetia (Cetonischema) speciosa* (Adams, 1817) and *Oxythyrea cinctella* (Schaum, 1841), known in Ukraine only from the Crimean peninsula, were

not studied. A list of the *Coleopterophagus* mites of Ukraine and their *Protaetia* hosts is given in table 1.

Table 1.  
List of Ukrainian species of the genus *Protaetia*  
and their canestriniid associates

Host	Mite
<i>Protaetia (Cetonischema):</i>	<i>C. maroni</i>
<i>P. (C.) aeruginosa</i> (Drury, 1770)	Haitlinger, 1990*
<i>P. (C.) speciosa</i> (Adams, 1817)	? **
<i>Protaetia (Eupotosia):</i>	<i>C. donaldi</i>
<i>P. (E.) affinis</i> (Andersch, 1797)	Haitlinger, 1990
<i>Protaetia (Liocola):</i>	<i>C. albini</i>
<i>P. (L.) marmorata</i> (Fabricius, 1792)***	Haitlinger, 1990*
<i>Protaetia (Netocia):</i>	– ****
<i>P. (N.) hungarica</i> (Herbst, 1790)	
<i>Protaetia (Potosia):</i>	
<i>P. (P.) fieberi</i> (Kraatz, 1880)**	<i>C. megnini</i>
<i>P. (P.) metallica</i> (Herbst, 1782)	(Berlese, 1881)
<i>P. (P.) cuprina</i> (Motschulsky, 1849)***	

\* species recorded in Ukraine for the first time;

\*\* coleopteran host not studied;

\*\*\* new host;

\*\*\*\* mites not found.

### COLEOPTEROPHAGUS BERLESE, 1882

**Type species:** *Dermoglyphus megnini* Berlese, 1881, by original designation.

**Diagnosis.** According to Khaustov and Eidelberg (2001) with modifications.

**Female.** Gnathosoma typical for the family, about 1,5 times longer than its width. Dorsal surface of idiosoma reticulated. Sejugal furrow usually well-developed. A sickle-, U- or W-shaped dorsal structure absent. Propodosoma with sclerotized lateral areas. Propodosomal plate weakly developed. Setae *ve* absent. Supracoxal setae *sI* rather short and finely barbed basally. Other setae smooth. Seta *vi* thickened near the base, stiff, blunt-ended. Setae *se*, *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub>, *e*<sub>1</sub>, *e*<sub>2</sub> strong, blunt-ended, not flagellate. Seta *cp* stiff, not flagellate. Setae *h*<sub>1</sub> and *h*<sub>2</sub> thick, long and flagellate. Coxal apodemes I fused to form Y-shaped structure. Posterior apodemes II usually developed, small. Ventral chaetotaxy almost complete, but setae *ad*<sub>3</sub> absent. Some ventral setae flagellate. Leg chaetotaxy: trochanters 1–1–1–1, femora 1–1–0–0, genua 2(1)–2(1)–1–0, tibiae (1)–(1)–(1)–(1), tarsi 9(3)–6(1)–4–5. Solenidion of tibia IV short. Subunguinal setae on tarsi I–IV strongly developed, spine-like. All legs with well-developed ambulacral claws.

**Male.** Dorsal surface of the idiosoma reticulated weaker than in females. Propodosomal plate weakly developed. Some dorsal setae (*c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub>) much shorter than in female. The structure of ventral setae usually as in females. Adanal suckers absent. Legs chaetotaxy as in females. Solenidion of tibia IV of variable length.

**Tritonymph.** Dorsal surface of the idiosoma reticulated weaker than in adults. Propodosomal plate weakly developed. Setae of the idiosoma relatively thinner than in adults, usually pointed. Length of some dorsal setae sometimes shows sexual dimorphism. Posterior apodemes II usually weakly developed. The shape of ventral setae usually as in adults. Leg chaetotaxy: trochanters 1–1–1–0, femora 1–1–0–0, genua 2(1)–2(1)–1–0, tibiae (1)–(1)–(1)–(1), tarsi 9(3)–6(1)–4–5. Solenidion of tibia IV shorter than in females.

**Protonymph.** Dorsal surface of the idiosoma almost without reticulation. Propodosomal plate weakly developed. Idiosomal setae thinner than in tritonymph. The shape of ventral setae usually as in tritonymph. Leg chaetotaxy: trochanters 0–0–0–0, femora 1–1–0–0, genua 2(1)–2(1)–1–0, tibiae (1)–(1)–(1)–0, tarsi 9(2)–6(1)–4–4.

**Larva.** Dorsal surface of the idiosoma smooth. Propodosomal plate very weakly developed. Idiosomal setae thin, except thick and long *se*, *cp* and *h*<sub>1</sub>. Shape of ventral setae usually as in protonymph. Leg chaetotaxy: trochanters 0–0–0, femora 1–1–0, genua 2(1)–2(1)–1, tibiae (1)–(1)–(1), tarsi 9(1)–6(1)–4.

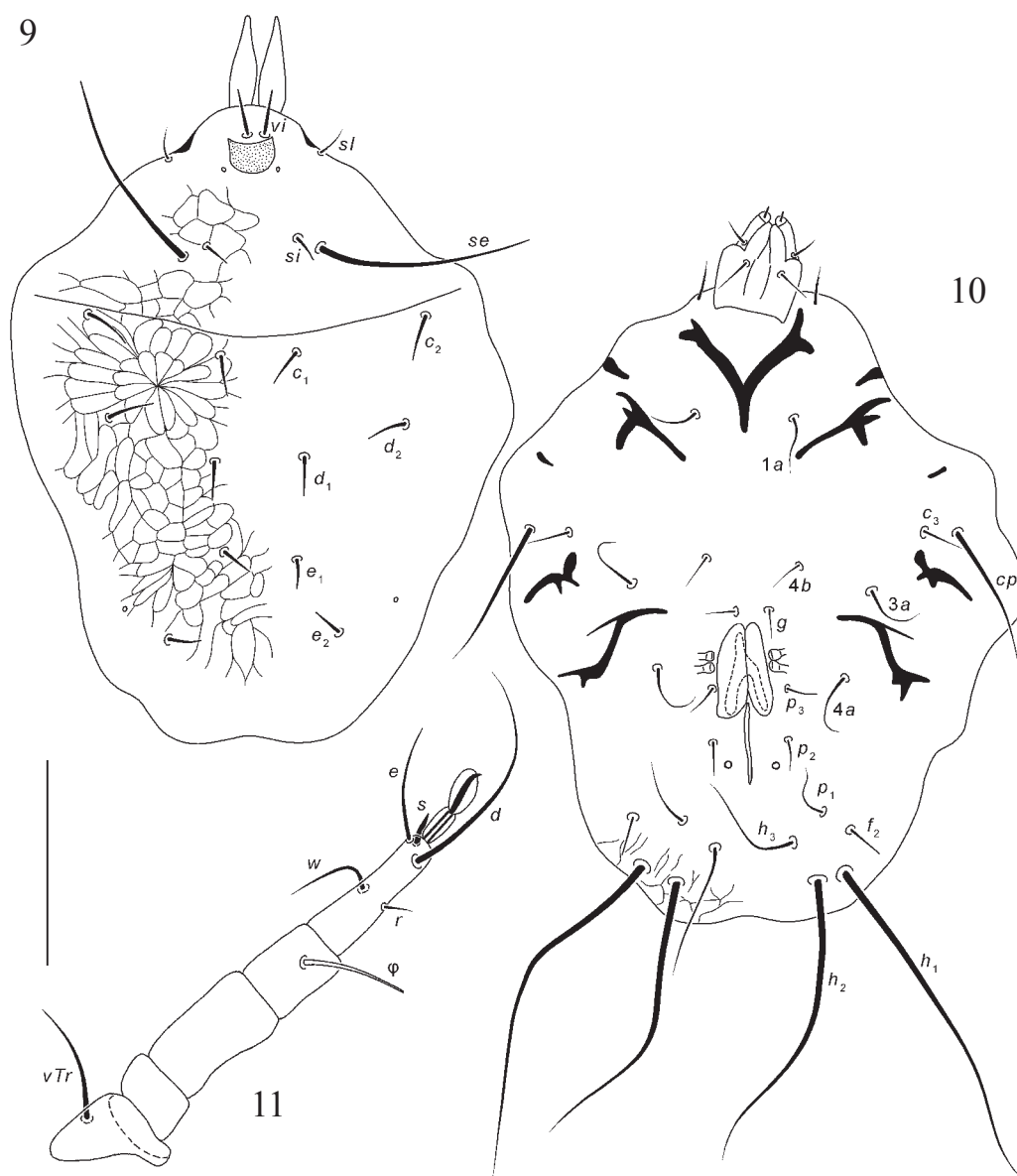
### *Coleopterophagus megnini* (Berlese, 1881)

Figs. 1–30

**Distribution and hosts.** Italy, Holland, England, Poland, on *P. metallica* and, rarely on *C. aurata*; Czech, former Yugoslavia (Syrmia), on *P. cuprea obscura* (Andersch, 1797); Hungary, Croatia, on *P. affinis*; Italy, on *P. cuprea cuprea* (Fabricius, 1775); Turkey, on *P. cuprea ignicollis* (Gory et Percheron, 1833); Ukraine, on *P. metallica*, *P.* sp. (Haitlinger 1990, 2002; Khaustov and Eidelberg 2001; Trach 2006).

**Material examined.** 8 females, 3 males, 11 TNs, UKRAINE, Crimea, Karadag, on *Protaetia cuprina*, 21 May 1925, coll. Kistjakovsky; 10 females, 10 males, 8 TNs, 2 PNs, 3 larvae, UKRAINE, Donetsk province, Volodarsky distr., vic. of Bogorodichnoe, on *P. metallica*, 13 July 2000, coll. M.E. Sergeev; 6 females, 1 male, UKRAINE, Lugansk province, Melovskoj distr., vic. of Krinichnoe, on *P. metallica*, 26 June 2001,





Figs. 9–11. *Coleopterophagus megnini*, male: 9 — dorsum of the body; 10 — venter of the body; 11 — leg IV. Scale bar 100  $\mu\text{m}$  (9, 10), 50  $\mu\text{m}$  (11).

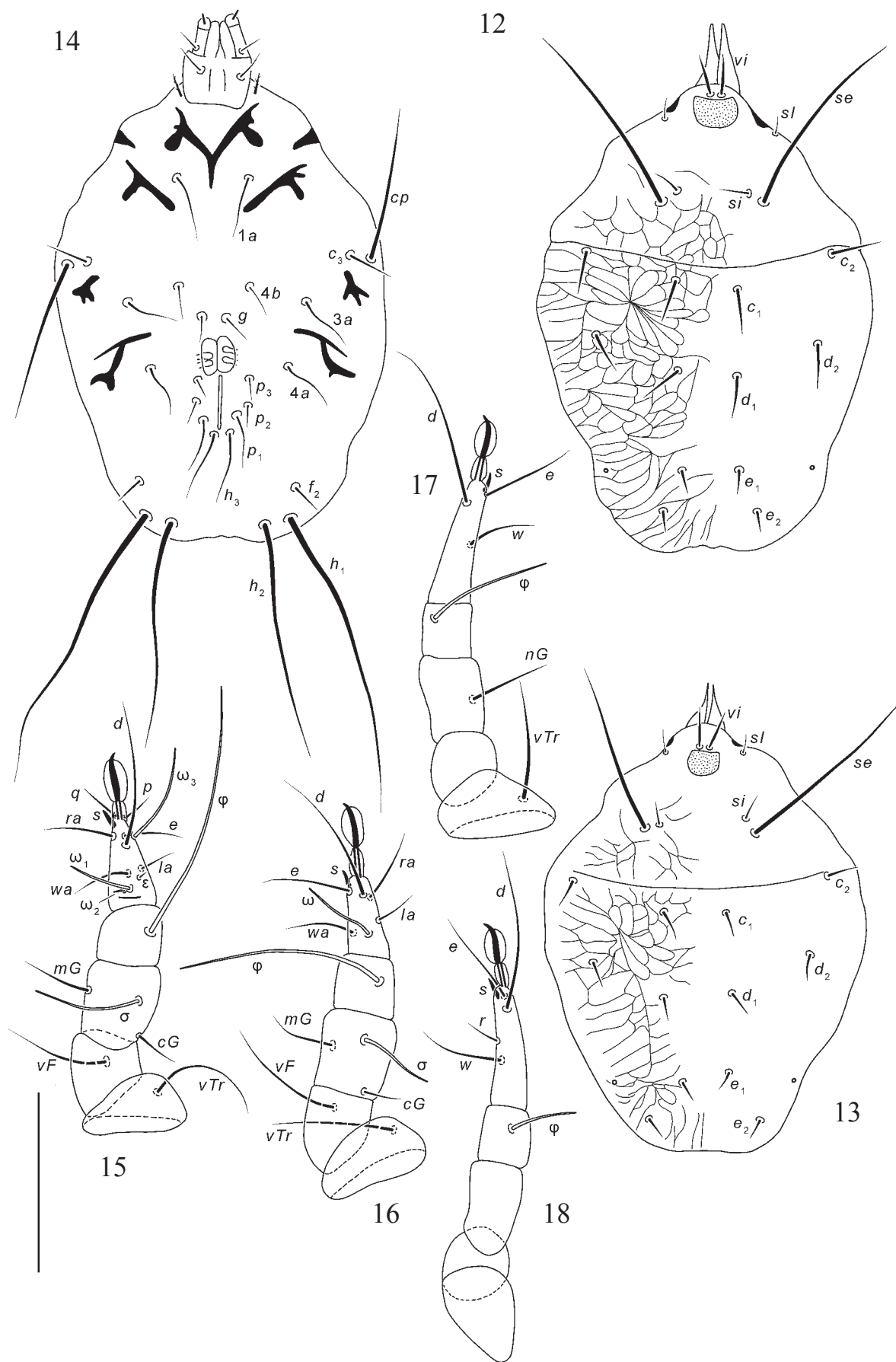
coll. T.A. Pisarenko; 4 females, 9 males, 1 TN, UKRAINE, Odessa province, Savransky distr., vic. of Polyanetzkie, on *P. fieberi*, 13 July 2001, coll. V.A. Trach; 12 TNs, UKRAINE, Chernigov province, Borznyansky distr., vic. of Yaduty, on *P. metallica*, 14 May 2003, coll. V.A. Trach; 4 females, 5 males, UKRAINE, Donetsk province, Krasnolimansky distr., vic. of Yampol', on *P. fieberi*, 27 July 2003, coll. M.E. Sergeev; 3 females, 3 males, UKRAINE, Lviv province, Yavorivsky distr., vic. of Ivano-Frankovo, on *P. metallica*, 18 May 2004, coll. V.A. Trach; 8 females, 10 males, 18 TNs, 3 PNs, UKRAINE, Crimea, vic. of Karadag, vic. of Schchelkino, on *P. cuprina*, 9 Yuny 2008, coll. V.A. Trach; 15 females, 21 males, 29 TNs, 8 PNs, 1 larva, UKRAINE, Odessa province,

vic. of Kotovsk, on *P. metallica*, 30 April 2010, coll. Ye.V. Khalaim.

**Description. Female.** Idiosomal length 279–344, maximal width 214–288.

Gnathosoma typical for the family. Subcapitulum, palps and chelicera as on figs. 1–2.

Idiosomal dorsum. Idiosoma ornamented as on fig. 3. Sejugal furrow well-developed. Seta *vi* thickened basally, stiff, blunt-ended. Seta *si* simple, blunt-ended. Seta *se* long, stiff and blunt-ended. Setae *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub> stiff and blunt-ended. Setae *e*<sub>1</sub> and *e*<sub>2</sub> much shorter, stiff, blunt-ended. Setae *h*<sub>1</sub> and *h*<sub>2</sub> thick, flagellate, very long. Length of dorsal setae: *vi* 25–34, *si* 25–27, *se* 92–122, *c*<sub>1</sub> 46–59, *c*<sub>2</sub> 46–57, *d*<sub>1</sub> 46–59, *d*<sub>2</sub> 46–59, *e*<sub>1</sub> 11–15, *e*<sub>2</sub> 11–15, *h*<sub>1</sub> 166–200, *h*<sub>2</sub> 137–179.



Figs. 12–18. *Coleopterophagus megnini*, tritonymph: 12 — female tritonymph, dorsum of the body; 13 — male tritonymph, dorsum of the body; 14 — venter of the body; 15–18 — legs I–IV, respectively. Scale bar 100  $\mu$ m (12–14), 50  $\mu$ m (15–18).



Idiosomal venter (Fig. 4). Posterior apodemes II usually developed. Seta *cp* long and stiff. Setae *1a*, *3a*, *4a*, *p*<sub>1</sub> flagellate. Setae *4b* and *g* slightly flagellate. Setae *c*<sub>3</sub>, *ad*<sub>1</sub>, *ad*<sub>2</sub>, *p*<sub>2</sub>, *p*<sub>3</sub> simple. Seta *f*<sub>2</sub> simple, blunt-ended. Seta *p*<sub>1</sub> longer than *p*<sub>2</sub> and *p*<sub>3</sub>, setae *p*<sub>2</sub> and *p*<sub>3</sub> longer than *ad*<sub>1</sub> and *ad*<sub>2</sub>. Seta *h*<sub>3</sub> long and flagellate. Length of ventral setae: *1a* 27–34, *cp* 76–97, *c*<sub>3</sub> 23–27, *4b* 25–29, *g* 17–25, *3a* 25–34, *4a* 25–34, *ad*<sub>1</sub> 11–15, *ad*<sub>2</sub> 11–15, *p*<sub>1</sub> 19–25, *p*<sub>2</sub> 13–17, *p*<sub>3</sub> 13–17, *f*<sub>2</sub> 17–21, *h*<sub>3</sub> 55–67. Bursa copulatrix horseshoe-shaped, spermatheca poorly visible.

Legs (Figs. 5–8). Length: I 105–130, II 109–128, III 116–147, IV 122–143. Length of solenidia: leg I:  $\omega_1$  19–23,  $\omega_2$  4–5,  $\omega_3$  27–32,  $\phi$  63–74,  $\sigma$  27–40; leg II:  $\omega$  25–27,  $\phi$  61–67,  $\sigma$  17–25; leg III:  $\phi$  44–53; leg IV:  $\phi$  27–29.

**Male.** Idiosomal length 242–326, maximal width 167–242.

Idiosomal dorsum. Idiosoma ornamented as on fig. 9. Sejugal furrow well-developed. Seta *vi* thickened near the base, stiff, blunt-ended. Seta *se* long, stiff and blunt-ended. Setae *si*, *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub>, *e*<sub>1</sub>, *e*<sub>2</sub> simple, blunt-ended. Setae *h*<sub>1</sub> and *h*<sub>2</sub> thick, very long, flagellate. Length of dorsal setae: *vi* 21–25, *si* 13–17, *se* 95–116, *c*<sub>1</sub> 15–21, *c*<sub>2</sub> 18–23, *d*<sub>1</sub> 15–19, *d*<sub>2</sub> 18–23, *e*<sub>1</sub> 13–16, *e*<sub>2</sub> 13–16, *h*<sub>1</sub> 147–179, *h*<sub>2</sub> 126–158.

Idiosomal venter (Fig. 10). Posterior apodemes II weakly developed or absent. Seta *cp* long and stiff. Setae *1a*, *3a*, *4a*, *p*<sub>1</sub> flagellate. Setae *4b* and *g* slightly flagellate. Setae *c*<sub>3</sub>, *p*<sub>2</sub>, *p*<sub>3</sub> simple. Seta *f*<sub>2</sub> simple, blunt-ended. Seta *p*<sub>1</sub> longer than *p*<sub>2</sub> and *p*<sub>3</sub>. Seta *h*<sub>3</sub> long and flagellate. Length of ventral setae: *1a* 19–23, *cp* 57–67, *c*<sub>3</sub> 15–17, *4b* 19–25, *g* 11–15, *3a* 17–27, *4a* 19–29, *p*<sub>1</sub> 17–25, *p*<sub>2</sub> 13–15, *p*<sub>3</sub> 11–13, *f*<sub>2</sub> 13–16, *h*<sub>3</sub> 38–57. Penis 36–40 long.

Legs. Length: I 97–109, II 101–113, III 105–122, IV 105–113. Solenidion of tibia IV short as in females (Fig. 11). Length of solenidia: leg I:  $\omega_1$  15–21,  $\omega_2$  3–5,  $\omega_3$  25–29,  $\phi$  57–61,  $\sigma$  32–34; leg II:  $\omega$  16–23,  $\phi$  55–59,  $\sigma$  17–19; leg III:  $\phi$  38–48; leg IV:  $\phi$  27–38.

**Tritonymph.** Idiosomal length 242–298, maximal width 177–214.

Idiosomal dorsum. Idiosoma ornamented as on figs. 12–13. Sejugal furrow well-developed. Seta *vi* thickened near the base, stiff. Seta *se* long and stiff. Setae *si*, *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub>, *e*<sub>1</sub>, *e*<sub>2</sub> simple. Thickness and length of some dorsal setae (*c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub>) is sex-dependent (Figs. 10–11). Setae *h*<sub>1</sub> and *h*<sub>2</sub> thick, very long, flagellate. Length of dorsal setae: *vi* 22–25, *si* 12–16, *se* 101–126, *c*<sub>1</sub> 15–17 in male tritonymph (21–25 in female tritonymph), *c*<sub>2</sub> 15–

17 in male tritonymph (19–24 in female tritonymph), *d*<sub>1</sub> 17–19 in male tritonymph (20–23 in female tritonymph), *d*<sub>2</sub> 17–19 in male tritonymph (20–23 in female tritonymph), *e*<sub>1</sub> 12–13, *e*<sub>2</sub> 11–15, *h*<sub>1</sub> 168–210, *h*<sub>2</sub> 137–158.

Idiosomal venter (Fig. 14). Posterior apodemes II weakly developed or absent. Seta *cp* long and stiff. Setae *1a*, *3a*, *4a*, *p*<sub>3</sub> and *h*<sub>3</sub> flagellate. Setae *4b* and *g* slightly flagellate. Setae *c*<sub>3</sub>, *p*<sub>1</sub>, *p*<sub>2</sub> and *f*<sub>2</sub> simple. Seta *p*<sub>1</sub> longer than *p*<sub>2</sub> and *p*<sub>3</sub>. Length of ventral setae: *1a* 27–32, *cp* 71–84, *c*<sub>3</sub> 15–21, *4b* 14–17, *g* 11–15, *3a* 29–38, *4a* 29–36, *p*<sub>1</sub> 25–34, *p*<sub>2</sub> 11–15, *p*<sub>3</sub> 11–15, *f*<sub>2</sub> 13–17, *h*<sub>3</sub> 32–42.

Legs (Figs. 15–18). Length: I 84–92, II 84–92, III 95–105, IV 97–109. Length of solenidia: leg I:  $\omega_1$  20–23,  $\omega_2$  3–4,  $\omega_3$  23–25,  $\phi$  53–63,  $\sigma$  25–34; leg II:  $\omega$  21–25,  $\phi$  53–59,  $\sigma$  25–34; leg III:  $\phi$  32–38; leg IV:  $\phi$  16–19.

**Protonymph.** Idiosomal length 167–214, maximal width 112–149.

Idiosomal dorsum (Fig. 19). Sejugal furrow well-developed. Seta *vi* slightly thickened near base. Seta *se* long and thick. Setae *si*, *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub>, *e*<sub>1</sub>, *e*<sub>2</sub> simple. Setae *h*<sub>1</sub> and *h*<sub>2</sub> thick, long, flagellate. Length of dorsal setae: *vi* 15–19, *si* 7–8, *se* 76–86, *c*<sub>1</sub> 8–9, *c*<sub>2</sub> 8–9, *d*<sub>1</sub> 8–9, *d*<sub>2</sub> 8–9, *e*<sub>1</sub> 7–8, *e*<sub>2</sub> 7–8, *h*<sub>1</sub> 84–116, *h*<sub>2</sub> 63–84.

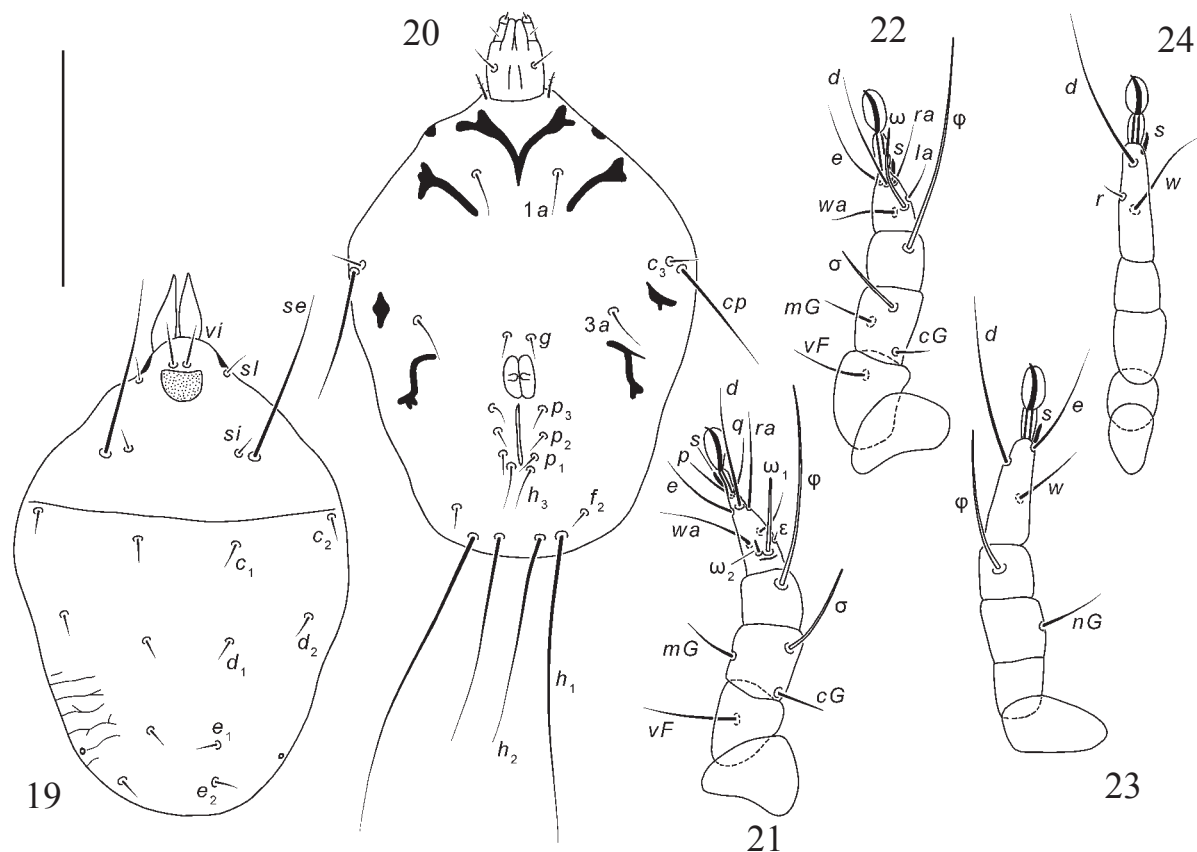
Idiosomal venter (Fig. 20). Posterior apodemes II not developed. Seta *cp* long and thick. Setae *1a*, *3a* and *h*<sub>3</sub> flagellate. Seta *p*<sub>1</sub> slightly flagellate. Setae *c*<sub>3</sub>, *g*, *p*<sub>1</sub>, *p*<sub>2</sub> and *f*<sub>2</sub> simple. Seta *p*<sub>1</sub> slightly longer than *p*<sub>2</sub> and *p*<sub>3</sub>. Length of ventral setae: *1a* 13–17, *cp* 38–53, *c*<sub>3</sub> 11–13, *g* 7–8, *3a* 13–15, *p*<sub>1</sub> 8–12, *p*<sub>2</sub> 7–8, *p*<sub>3</sub> 7–9, *f*<sub>2</sub> 8, *h*<sub>3</sub> 21–25.

Legs (Figs. 21–24). Length: I 69–80, II 67–76, III 74–88, IV 74–88. Length of solenidia: leg I:  $\omega_1$  14–17,  $\omega_2$  3,  $\phi$  38–50,  $\sigma$  17–19; leg II:  $\omega$  15–19,  $\phi$  36–42,  $\sigma$  14–15; leg III:  $\phi$  23–36.

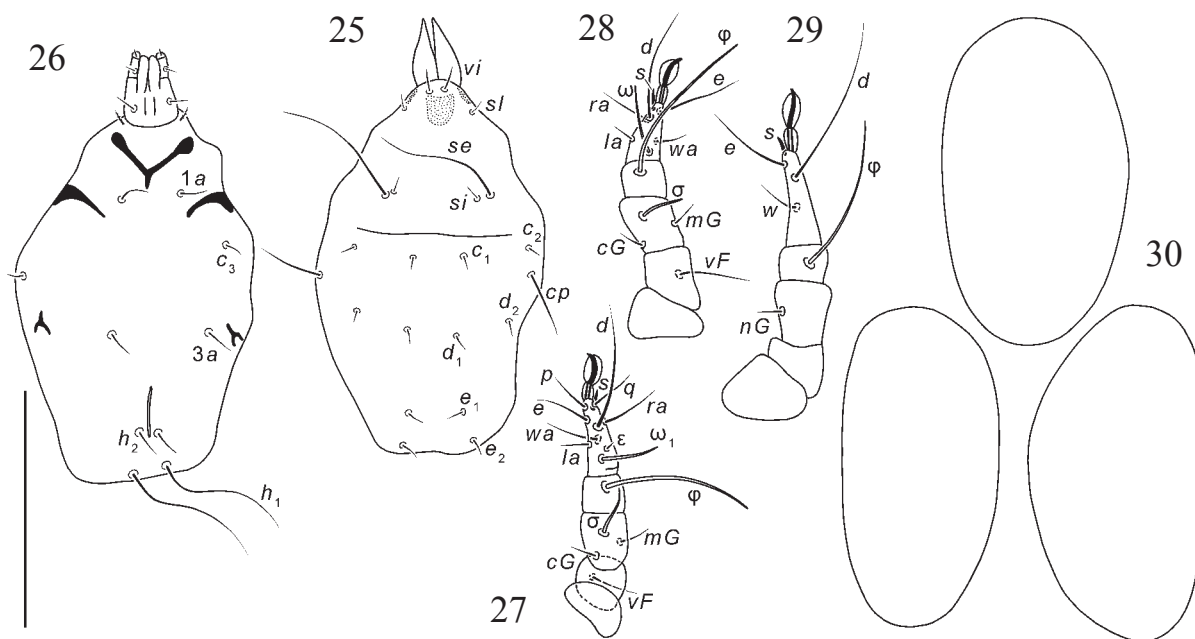
**Larva.** Idiosomal length 140–186, maximal width 93–126.

Idiosomal dorsum (Fig. 25). Sejugal furrow developed. Setae *se*, *cp*, *h*<sub>1</sub> long and slightly thickened. Setae *vi*, *si*, *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub>, *e*<sub>1</sub>, *e*<sub>2</sub> simple. Length of dorsal setae: *vi* 14–15, *si* 5–6, *se* 50–59, *c*<sub>1</sub> 4–5, *c*<sub>2</sub> 4–5, *cp* 21–25, *d*<sub>1</sub> 5–6, *d*<sub>2</sub> 4–6, *e*<sub>1</sub> 5–6, *e*<sub>2</sub> 5–6, *h*<sub>1</sub> 63–74.

Idiosomal venter (Fig. 26). Claparede's organs not visible (but in many genera of Canestriniidae it well developed). Apodemes slender. Posterior apodemes II not developed. Setae *1a*, *3a* and *h*<sub>2</sub> slightly flagellate. Setae *c*<sub>3</sub> and *e*<sub>2</sub> simple. Length of ventral setae: *1a* 14–16, *c*<sub>3</sub> 6–7, *3a* 13–15, *h*<sub>2</sub> 15–21.



Figs. 19–24. *Coleopterophagus megnini*, protonymph: 19 — dorsum of the body; 20 — venter of the body; 21–24 — legs I–IV, respectively. Scale bar 100  $\mu$ m (19, 20), 50  $\mu$ m (21–24).

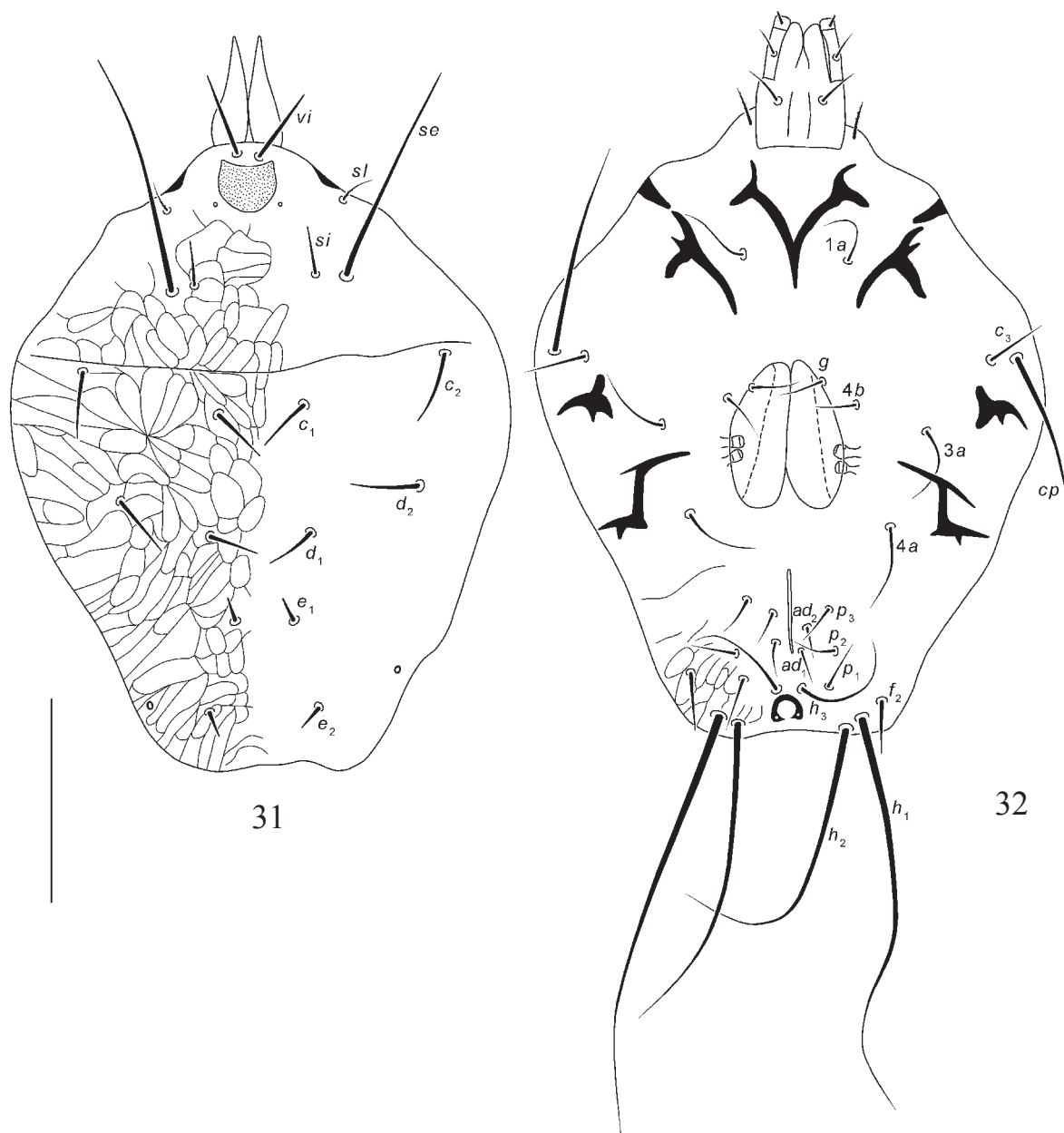


Figs. 25–30. *Coleopterophagus megnini*: 25 — larva, dorsum of the body; 26 — larva, venter of the body; 27–29 — larva, legs I–III, respectively; 30 — eggs. Scale bar 100  $\mu$ m (25, 26, 30), 50  $\mu$ m (27–29).

Legs (Figs. 27–29). Length: I 53–57, II 50–55, III 65–74. Length of solenidia: leg I:  $\omega_1$  12–14,  $\phi$  36–42,  $\sigma$  8–12; leg II:  $\omega$  15–17,  $\phi$  36–38,  $\sigma$  11–13; leg III:  $\phi$  25–32.

**Egg.** Ovoid or bean-shaped, smooth (Figs. 30), length 134–173, width 64–83.

**Remarks.** We recorded *C. megnini* in Ukraine only on *P. (Potosia)* spp. (*P. metallica*, *P. fieberi*,



Figs. 31–32. *Coleopterophagus maroni*, female: 31 — dorsum of the body; 32 — venter of the body. Scale bar 100  $\mu$ m.

*P. cuprina*). Probably *C. megnini* associated mainly with flower beetles of the subgenus *Potosia* (including *P. (Potosia) cuprea* (Fabricius, 1775)). The records of *C. megnini* on other species of flower beetles are probably accidental.

***Coleopterophagus maroni* Haitlinger, 1990**

Figs. 31–37

**Distribution and hosts.** Syria, on *P. speciosa jousseleini* (Gory et Percheron, 1833); Romania, on *P. aeruginosa* (Haitlinger 1990).

**Material examined.** 3 females, 1 male, 5 TNs, UKRAINE, Donetsk province, Artemovsky distr., vic. of Dronovka, on *P. aeruginosa*, 4 July 2003, coll. M.E. Sergeev; 6 females, 3 males, 1 TN, UKRAINE, Odessa province, Kodymsky dis-

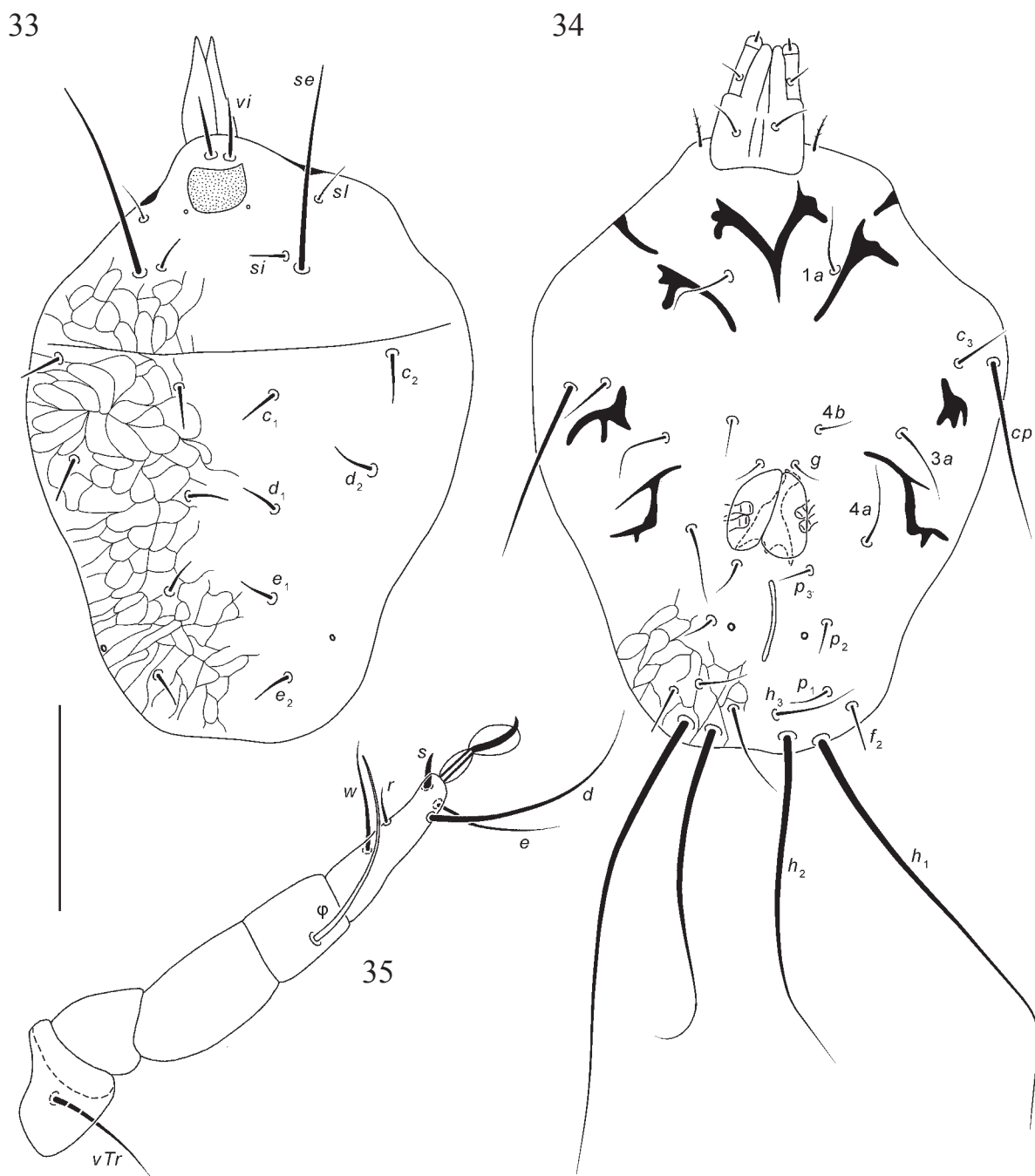
tr., vic. of Alexandrovka, on *P. aeruginosa*, 24 May 2008, coll. V.A. Trach.

**Description. Female.** Idiosomal length 326–372, maximal width 233–316.

**Idiosomal dorsum.** Idiosoma ornamented as on fig. 31. Sejugal furrow well-developed. Seta *vi* thickened basally, stiff, blunt-ended. Seta *se* long, stiff and blunt-ended. Seta *si* simple, blunt-ended. Setae *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub> stiff and blunt-ended. Setae *e*<sub>1</sub> and *e*<sub>2</sub> shorter, stiff, blunt-ended. Setae *h*<sub>1</sub> and *h*<sub>2</sub> thick, very long, flagellate. Length of dorsal setae: *vi* 32–42, *si* 23–25, *se* 116–126, *c*<sub>1</sub> 25–34, *c*<sub>2</sub> 36–40, *d*<sub>1</sub> 25–34, *d*<sub>2</sub> 34–42, *e*<sub>1</sub> 11–15, *e*<sub>2</sub> 11–13, *h*<sub>1</sub> 189–221, *h*<sub>2</sub> 147–179.

**Idiosomal venter** (Fig. 32). Posterior apodemes II weakly developed or absent. Seta *cp* long





Figs. 33–35. *Coleopterophagus maroni*, male: 33 — dorsum of the body; 34 — venter of the body; 35 — leg IV. Scale bar 100  $\mu\text{m}$  (33, 34), 50  $\mu\text{m}$  (35).

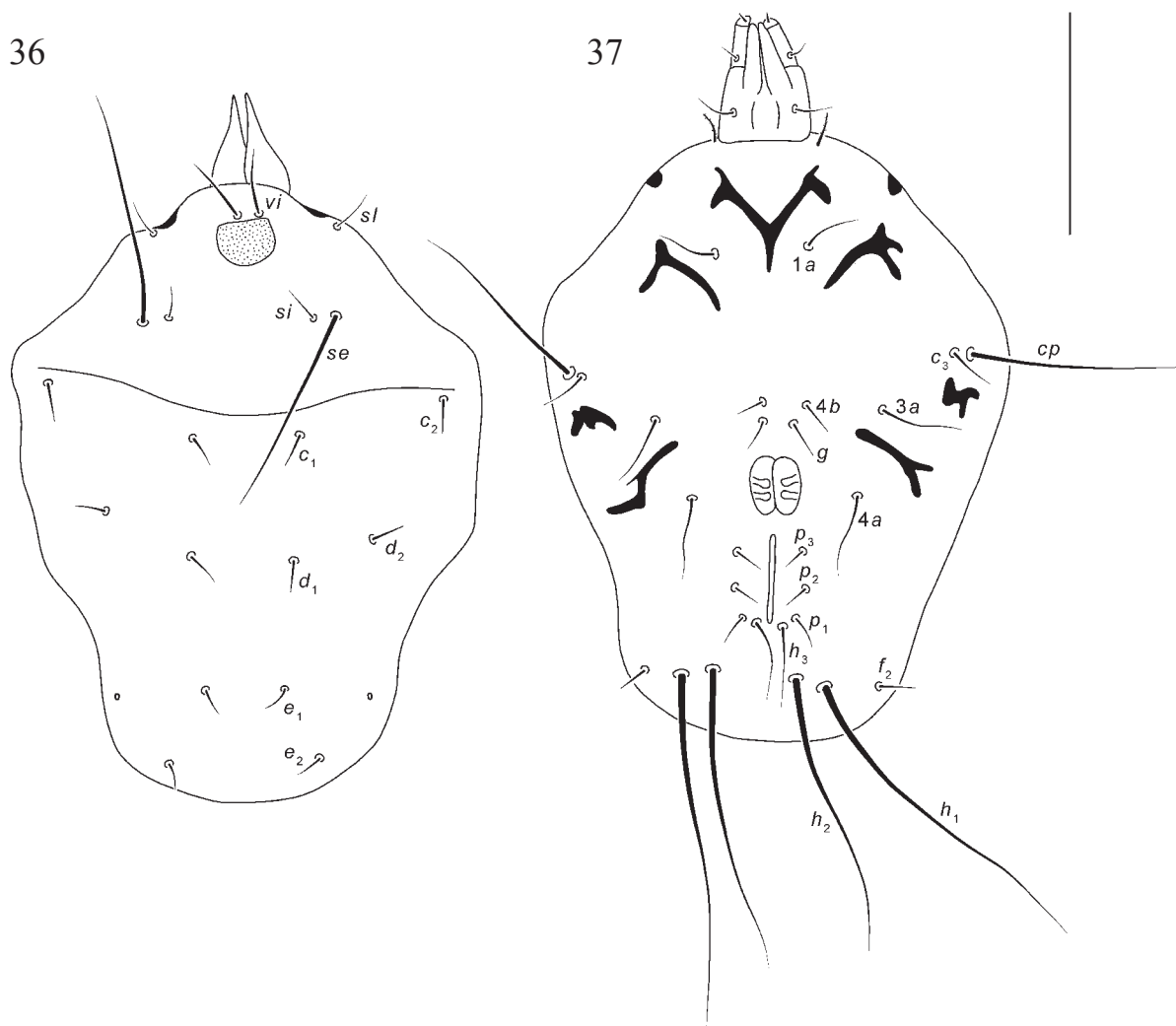
and stiff. Setae 1a, 3a, 4a flagellate. Setae 4b and g slightly flagellate. Setae  $c_3$ ,  $ad_1$ ,  $ad_2$ ,  $p_1$ ,  $p_2$  and  $p_3$  simple. Seta  $f_2$  simple, blunt-ended. Seta  $p_1$  slightly longer than  $p_2$  and  $p_3$ , setae  $p_2$  and  $p_3$  slightly longer than  $ad_1$  and  $ad_2$ . Seta  $h_3$  long and flagellate. Length of ventral setae: 1a 34–42, cp 95–120,  $c_3$  27–32, 4b 21–29, g 21–29, 3a 34–46, 4a 34–42,  $ad_1$  11–15,  $ad_2$  13–17,  $p_1$  21–23,  $p_2$  17–21,  $p_3$  17–19,  $f_2$  21–25,  $h_3$  38–50.

Legs. Length: I 126–143, II 130–139, III 155–164, IV 158–164. Length of solenidia: leg I:

$\omega_1$  22–25,  $\omega_2$  4–5,  $\omega_3$  34–36,  $\phi$  74–86,  $\sigma$  36–42; leg II:  $\omega$  25–27,  $\phi$  76–82,  $\sigma$  26–28; leg III:  $\phi$  50–55; leg IV:  $\phi$  34–38.

**Male.** Idiosomal length 298–353, maximal width 233–279.

Idiosomal dorsum. Idiosoma ornamented as on fig. 33. Sejugal furrow well-developed. Seta  $vi$  thickened basally, stiff, blunt-ended. Seta  $se$  long, stiff and blunt-ended. Setae  $si$ ,  $c_1$ ,  $c_2$ ,  $d_1$ ,  $d_2$ ,  $e_1$ ,  $e_2$  simple, blunt-ended. Setae  $h_1$  and  $h_2$  thick, very long, flagellate. Length of dorsal setae:  $vi$  21–25,  $si$



Figs. 36–37. *Coleopterophagus maroni*, tritonymph: 36 — dorsum of the body; 37 — venter of the body. Scale bar 100  $\mu$ m.

13–17, *se* 95–116, *c*<sub>1</sub> 15–21, *c*<sub>2</sub> 18–23, *d*<sub>1</sub> 15–19, *d*<sub>2</sub> 18–23, *e*<sub>1</sub> 13–16, *e*<sub>2</sub> 13–16, *h*<sub>1</sub> 147–179, *h*<sub>2</sub> 126–158.

Idiosomal venter (Fig. 34). Posterior apodemes II weakly developed or absent. Seta *cp* long and stiff. Setae *1a*, *3a* and *4a* flagellate. Setae *4b* and *g* slightly flagellate. Setae *c*<sub>3</sub>, *p*<sub>1</sub>, *p*<sub>2</sub> and *p*<sub>3</sub> simple. Seta *f*<sub>2</sub> simple, blunt-ended. Seta *p*<sub>1</sub> slightly longer than *p*<sub>2</sub> and *p*<sub>3</sub>. Seta *h*<sub>3</sub> long and flagellate. Length of ventral setae: *1a* 32–38, *cp* 92–105, *c*<sub>3</sub> 23–27, *4b* 17–19, *g* 14–17, *3a* 34–38, *4a* 32–37, *p*<sub>1</sub> 15–17, *p*<sub>2</sub> 13–14, *p*<sub>3</sub> 11–13, *f*<sub>2</sub> 14–16, *h*<sub>3</sub> 34–48. Length of penis 44–50.

Legs. Length: I 107–126, II 122–132, III 139–155, IV 137–155. Solenidion of tibia IV long (Fig. 35). Length of solenidia: leg I:  $\omega$ <sub>1</sub> 21–23,  $\omega$ <sub>2</sub> 4–5,  $\omega$ <sub>3</sub> 32–36,  $\phi$  69–80,  $\sigma$  36–40; leg II:  $\omega$  26–29,  $\phi$  69–76,  $\sigma$  25–29; leg III:  $\phi$  43–53; leg IV:  $\phi$  45–50.

**Tritonymph.** Idiosomal length 260–307, maximal width 177–242.

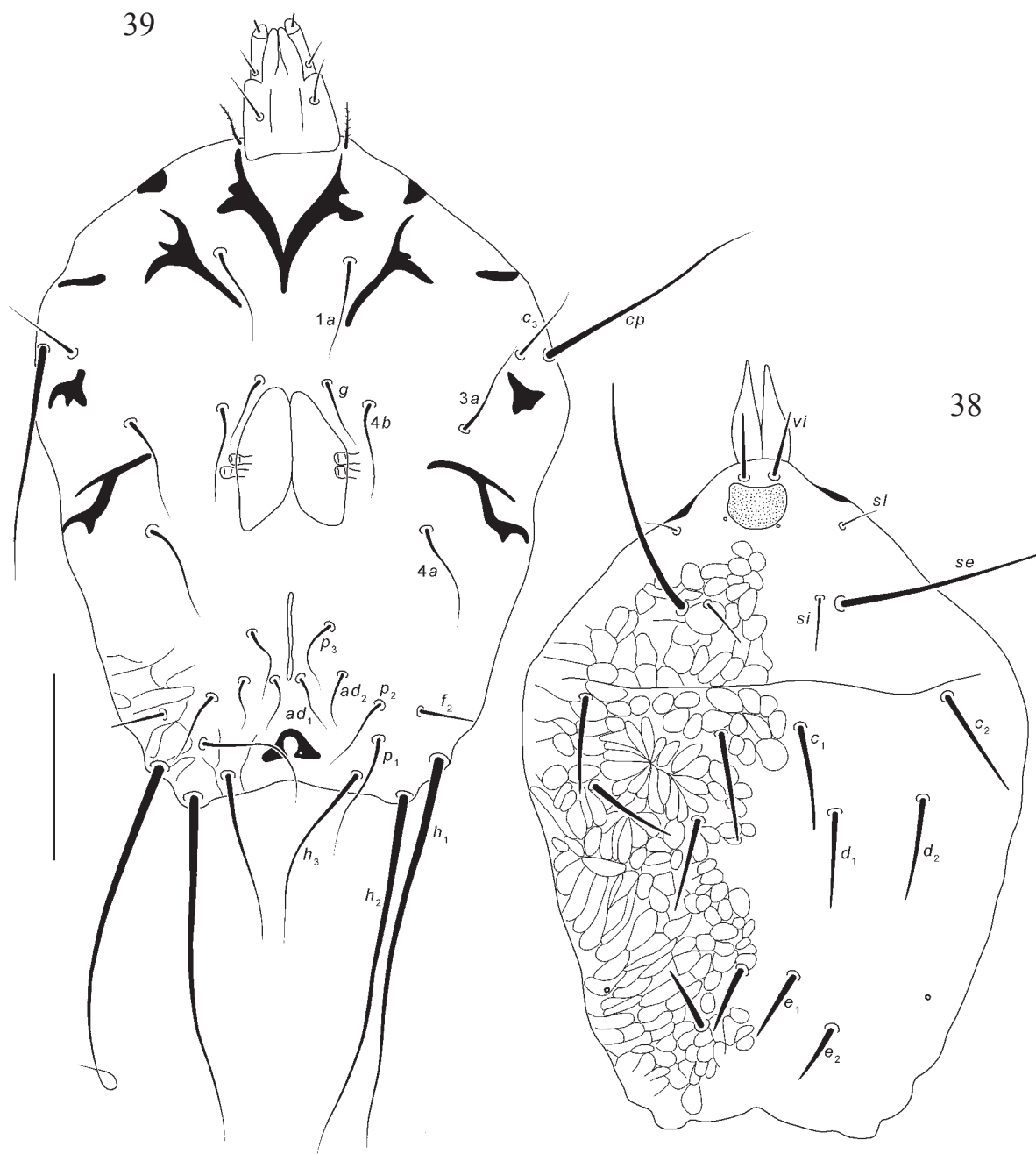
Idiosomal dorsum (Fig. 36). Dorsal surface of the idiosoma reticulated, but in examined specimens the sculpture poorly visible. Sejugal furrow

well-developed. Seta *vi* thickened basally, stiff. Seta *se* long and stiff. Setae *si*, *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub>, *e*<sub>1</sub>, *e*<sub>2</sub> simple. Setae *h*<sub>1</sub> and *h*<sub>2</sub> thick, flagellate, very long. Length of dorsal setae: *vi* 27–34, *si* 14–16, *se* 105–126, *c*<sub>1</sub> 14–17, *c*<sub>2</sub> 15–17, *d*<sub>1</sub> 14–17, *d*<sub>2</sub> 15–17, *e*<sub>1</sub> 12–16, *e*<sub>2</sub> 12–16, *h*<sub>1</sub> 179–200, *h*<sub>2</sub> 116–137.

Idiosomal venter (Fig. 37). Posterior apodemes II not developed. Seta *cp* long and stiff. Setae *1a*, *3a*, *4a* and *h*<sub>3</sub> flagellate. Setae *4b* and *g* slightly flagellate. Setae *c*<sub>3</sub>, *p*<sub>1</sub>, *p*<sub>2</sub>, *p*<sub>3</sub> and *f*<sub>2</sub> simple. Seta *p*<sub>1</sub> slightly longer than *p*<sub>2</sub> and *p*<sub>3</sub>. Length of ventral setae: *1a* 25–32, *cp* 78–95, *c*<sub>3</sub> 15–19, *4b* 8–13, *g* 11–13, *3a* 25–32, *4a* 25–32, *p*<sub>1</sub> 11–15, *p*<sub>2</sub> 11–13, *p*<sub>3</sub> 11–13, *f*<sub>2</sub> 11–13, *h*<sub>3</sub> 21–32.

Legs. Length: I 97–109, II 97–107, III 113–130, IV 113–126. Length of solenidia: leg I:  $\omega$ <sub>1</sub> 19–23,  $\omega$ <sub>2</sub> 3–4,  $\omega$ <sub>3</sub> 25–27,  $\phi$  63–74,  $\sigma$  29–34; leg II:  $\omega$  23–25,  $\phi$  57–63,  $\sigma$  23–27; leg III:  $\phi$  40–46; leg IV:  $\phi$  13–21.

**Remarks.** *Coleopterophagus maroni* associated only with beetles of the subgenus *Cetonischema* of the genus *Protaetia*.



Figs. 38–39. *Coleopterophagus albini*, female: 38 — dorsum of the body; 39 — venter of the body. Scale bar 100  $\mu$ m.

***Coleopterophagus albini* Haitlinger, 1990**

Figs. 38–44

**Distribution and hosts.** Romania, Austria, former Czechoslovakia, Germany, Poland, on *P. aeruginosa* (Haitlinger 1990, 2002).

**Material examined.** 3 females, 4 males, 2 TNs, 1 PN, UKRAINE, Kiev, Lysaya gora, on *P. marmorata*, Yuny 1998; coll. G. Uspensky.

**Description.** Idiosomal length 344–419, maximal width 260–326.

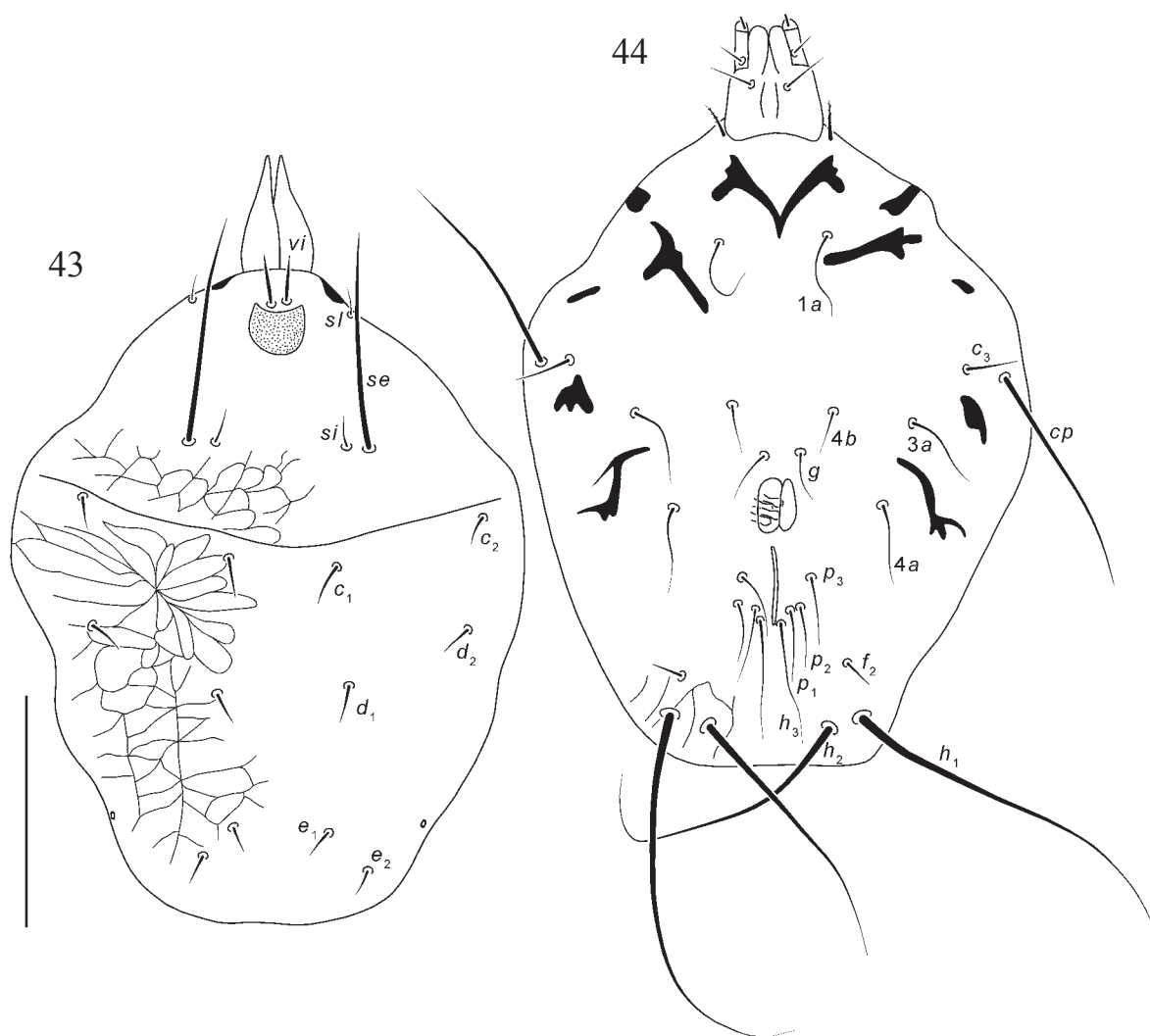
Idiosomal dorsum. Idiosoma ornamented as on fig. 38. Sejugal furrow well-developed. Seta *vi* thickened basally, stiff, blunt-ended. Seta *se* long,

stiff and blunt-ended. Seta *si* simple, blunt-ended. Setae *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub> stiff and blunt-ended. Setae *e*<sub>1</sub> and *e*<sub>2</sub> shorter and thicker, stiff, blunt-ended. Setae *h*<sub>1</sub> and *h*<sub>2</sub> thick, very long, flagellate. Length of dorsal setae: *vi* 34–38, *si* 27–34, *se* 122–139, *c*<sub>1</sub> 53–59, *c*<sub>2</sub> 57–69, *d*<sub>1</sub> 53–61, *d*<sub>2</sub> 57–65, *e*<sub>1</sub> 38–48, *e*<sub>2</sub> 34–40, *h*<sub>1</sub> 210–252, *h*<sub>2</sub> 189–231.

Idiosomal venter (Fig. 39). Posterior apodemes II developed. Seta *cp* long and stiff. Seta *h*<sub>3</sub> long and flagellate. Seta *f*<sub>2</sub> simple, blunt-ended. Other ventral setae flagellate. Seta *p*<sub>1</sub> longer than *p*<sub>2</sub> and *p*<sub>3</sub>, setae *p*<sub>2</sub> and *p*<sub>3</sub> slightly longer than *ad*<sub>1</sub> and *ad*<sub>2</sub>. Length of ventral setae: *1a* 34–44, *cp* 122–128, *c*<sub>3</sub> 32–46, *4b* 29–38, *g* 23–27, *3a* 34–46,



Figs. 40–42. *Coleopterophagus albini*, male: 40 — dorsum of the body; 41 — venter of the body; 42 — leg IV. Scale bar 100  $\mu\text{m}$  (40, 41), 50  $\mu\text{m}$  (42).



Figs. 43–44. *Coleopterophagus albini*, tritonymph: 43 — dorsum of the body; 44 — venter of the body. Scale bar 100  $\mu$ m.

4a 34–42, *ad*<sub>1</sub> 21–34, *ad*<sub>2</sub> 21–29, *p*<sub>1</sub> 46–65, *p*<sub>2</sub> 27–38, *p*<sub>3</sub> 25–38, *f*<sub>2</sub> 21–29, *h*<sub>3</sub> 80–107.

Legs. Length: I 139–162, II 143–169, III 166–193, IV 160–181. Length of leg solenidia: leg I:  $\omega$ <sub>1</sub> 25–29,  $\omega$ <sub>2</sub> 4–5,  $\omega$ <sub>3</sub> 36–40,  $\phi$  80–86,  $\sigma$  40–57; leg II:  $\omega$  27–32,  $\phi$  76–101,  $\sigma$  25–34; leg III:  $\phi$  53–63; leg IV:  $\phi$  34–40.

**Male.** Idiosomal length 344–372, maximal width 251–298.

Idiosomal dorsum. Idiosoma ornamented as on fig. 40. Sejugal furrow well-developed. Seta *vi* thickened basally, stiff, blunt-ended. Seta *se* long, stiff and blunt-ended. Setae *si*, *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub>, *e*<sub>1</sub>, *e*<sub>2</sub> simple, blunt-ended. Setae *h*<sub>1</sub> and *h*<sub>2</sub> thick, very long, flagellate. Length of dorsal setae: *vi* 29–36, *si* 23–27, *se* 111–137, *c*<sub>1</sub> 25–34, *c*<sub>2</sub> 32–46, *d*<sub>1</sub> 27–38, *d*<sub>2</sub> 32–42, *e*<sub>1</sub> 23–32, *e*<sub>2</sub> 21–27, *h*<sub>1</sub> 189–231, *h*<sub>2</sub> 179–221.

Idiosomal venter (Fig. 41). Posterior apodemes II developed. Seta *cp* long and stiff. Seta *h*<sub>3</sub> long and flagellate. Seta *f*<sub>2</sub> simple, blunt-ended.

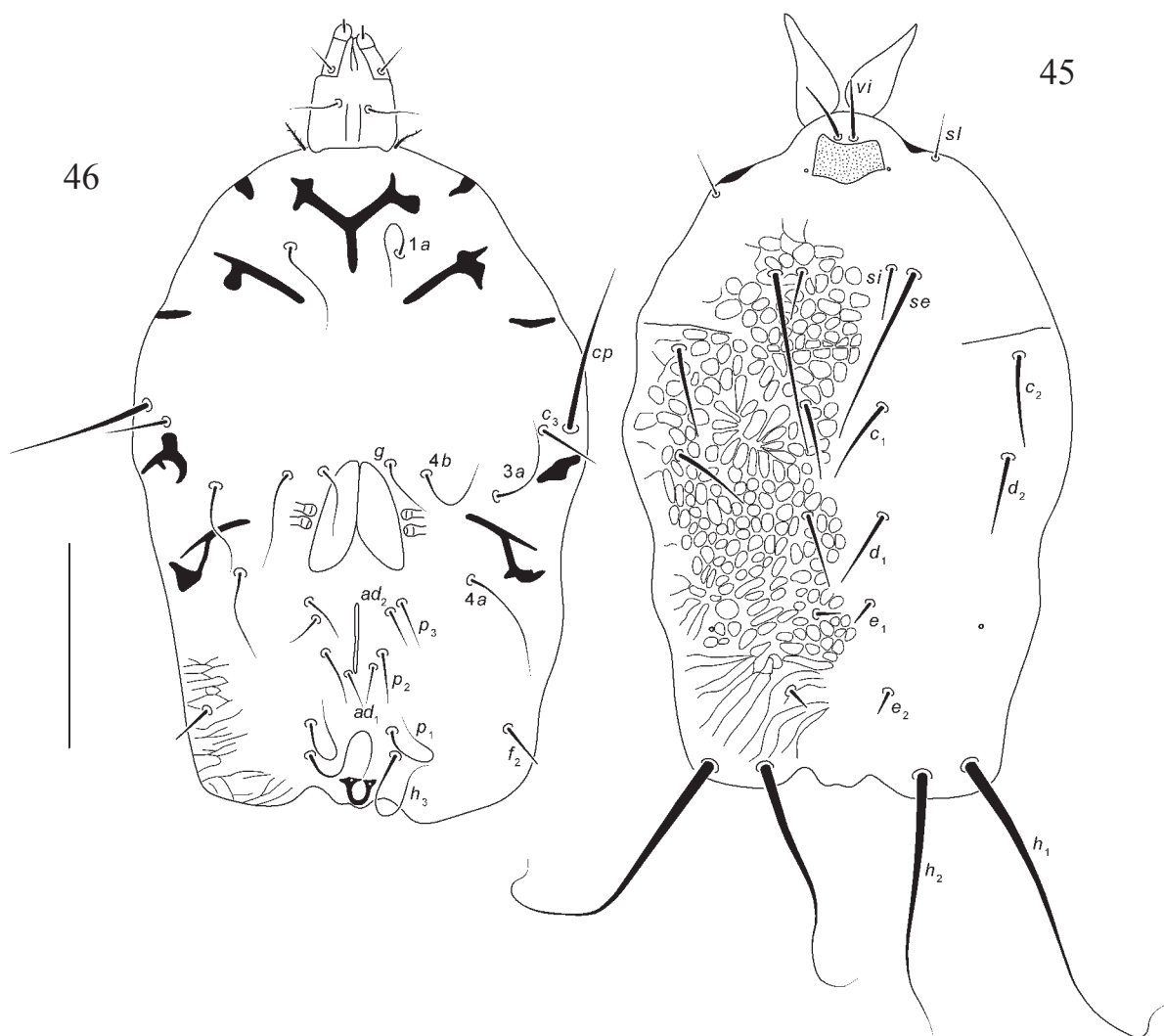
Other ventral setae flagellate. Seta *p*<sub>1</sub> slightly longer than *p*<sub>2</sub> and *p*<sub>3</sub>. Length of ventral setae: *1a* 32–40, *cp* 101–130, *c*<sub>3</sub> 34–44, *4b* 27–38, *g* 19–25, *3a* 36–44, *4a* 36–44, *p*<sub>1</sub> 38–55, *p*<sub>2</sub> 25–38, *p*<sub>3</sub> 25–34, *f*<sub>2</sub> 17–25, *h*<sub>3</sub> 74–90. Length of penis 44–53.

Legs. Length: I 126–158, II 128–151, III 147–179, IV 153–179. Solenidion of tibia IV short, as in females (Fig. 42). Length of solenidia: leg I:  $\omega$ <sub>1</sub> 19–25,  $\omega$ <sub>2</sub> 4–5,  $\omega$ <sub>3</sub> 25–36,  $\phi$  63–82,  $\sigma$  38–46; leg II:  $\omega$  25–32,  $\phi$  63–84,  $\sigma$  25–27; leg III:  $\phi$  46–57; leg IV:  $\phi$  32–38.

**Tritonymph.** Idiosomal length 326–349, maximal width 233–256.

Idiosomal dorsum. Idiosoma ornamented as on fig. 43. Sejugal furrow well-developed. Seta *vi* thickened near the base, stiff. Seta *se* long and stiff. Setae *si*, *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub>, *e*<sub>1</sub>, *e*<sub>2</sub> simple. Setae *h*<sub>1</sub> and *h*<sub>2</sub> thick, flagellate, very long. Length of dorsal setae: *vi* 21–25, *si* 13–15, *se* 105–120, *c*<sub>1</sub> 16–18, *c*<sub>2</sub> 16–20, *d*<sub>1</sub> 16–18, *d*<sub>2</sub> 16–21, *e*<sub>1</sub> 16, *e*<sub>2</sub> 13–15, *h*<sub>1</sub> 168–189, *h*<sub>2</sub> 137–158.





Figs. 45–46. *Coleopterophagus donaldi*, female: 45 — dorsum of the body; 46 — venter of the body. Scale bar 100  $\mu$ m.

Idiosomal venter (Fig. 44). Posterior apodemes II weakly developed. Seta *cp* long, and stiff. Seta *f*<sub>2</sub> simple. Other ventral setae flagellate. Seta *p*<sub>1</sub> slightly longer than *p*<sub>2</sub> and *p*<sub>3</sub>. Length of ventral setae: 1a 29–38, *cp* 88–95, *c*<sub>3</sub> 19–22, 4b 21–25, *g* 17–23, 3a 29–38, 4a 29–34, *p*<sub>1</sub> 25–34, *p*<sub>2</sub> 21–25, *p*<sub>3</sub> 19–25, *f*<sub>2</sub> 12–14, *h*<sub>3</sub> 46–55.

Legs. Length: I 105–122, II 109–116, III 130–134, IV 120–130. Length of solenidia: leg I:  $\omega$ <sub>1</sub> 19–21,  $\omega$ <sub>2</sub> 3–4,  $\omega$ <sub>3</sub> 29–32,  $\phi$  59–63,  $\sigma$  34–40; leg II:  $\omega$  23–25,  $\phi$  61–67,  $\sigma$  21–23; leg III:  $\phi$  38–46; leg IV:  $\phi$  21–23.

**Remarks.** *Coleopterophagus albini* is known only from *P. (Cetonischema) aeruginosa* and *P. (Liocola) marmorata*, however, we did not find it on *P. aeruginosa* in Ukraine.

#### ***Coleopterophagus donaldi* Haitlinger, 1990**

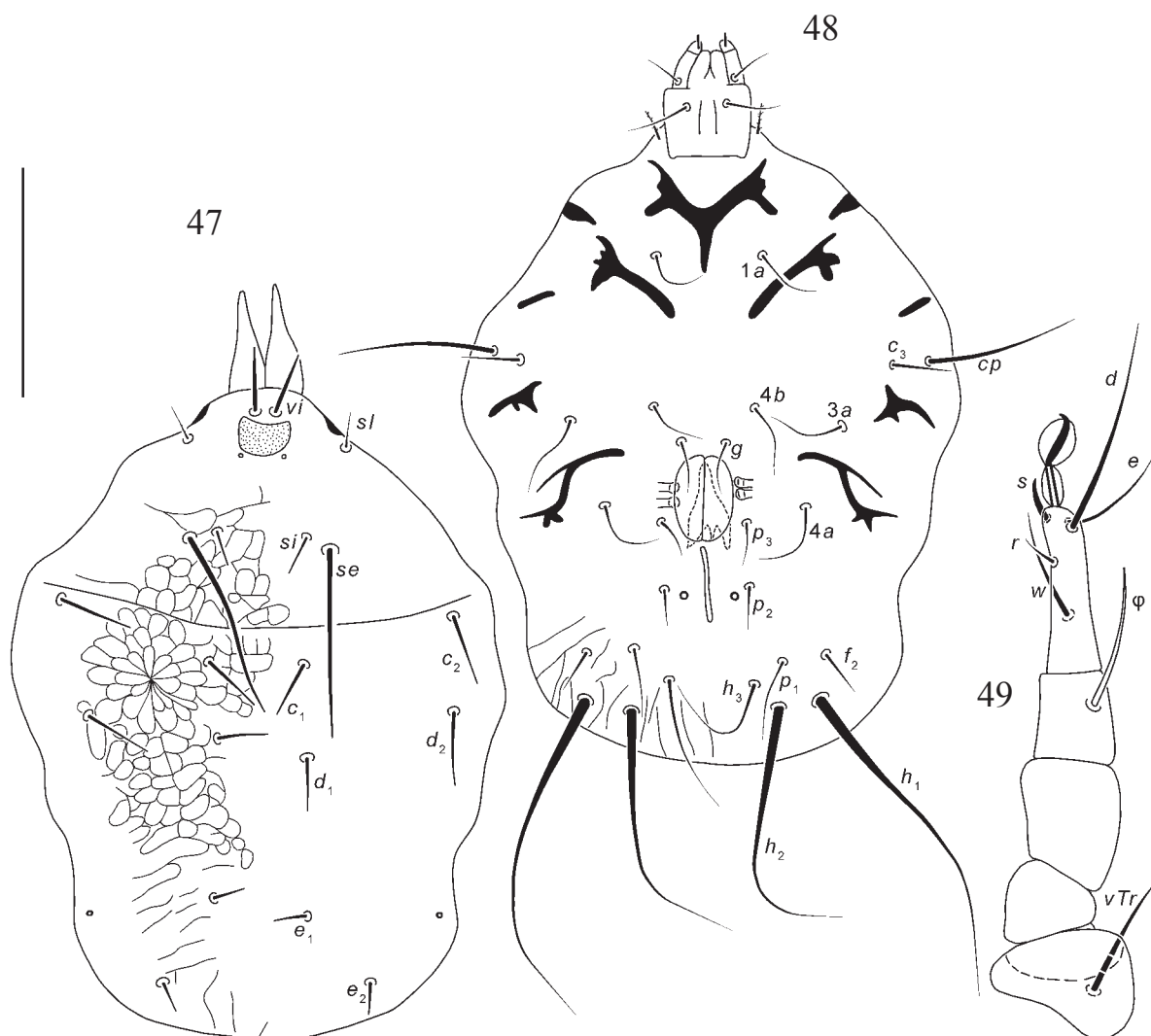
Figs. 45–51

**Distribution and hosts.** Italy, Ukraine, on *P. affinis* (Haitlinger 1990; Trach 2006).

**Material examined.** 4 females, 1 male, 1 larva, UKRAINE, Donetsk province, Volodarsky distr., vic. of Volodarskoe, on *P. affinis*, 27 May 1999, coll. M.E. Sergeev; 1 female, UKRAINE, Odessa province, Savransky distr., vic. of Polyantzkoe, on *P. affinis*, 13 July 2001, coll. V.A. Trach; 1 female, 6 males, 1 TN, UKRAINE, Donetsk province, Artemovsky distr., vic. of Dronovka, on *P. affinis*, 4 July 2003, coll. M.E. Sergeev; 2 females, 2 males, 2 TNs, UKRAINE, Vinnitza province, Chechel'nitzsky distr., vic. of Kurenivka, on *P. affinis*, 9 Yuny 2009, coll. N.P. Tarantetz.

**Description.** Idiosomal length 288–363, maximal width 195–251.

Idiosomal dorsum. Idiosoma with cellular sculpture (Fig. 45). Sejugal furrow not completely developed. Seta *vi* thickened basally, stiff, blunt-ended. Seta *se* long, stiff and blunt-ended. Seta *si* simple, blunt-ended. Setae *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub> stiff and blunt-ended. Setae *e*<sub>1</sub> and *e*<sub>2</sub> shorter, stiff, blunt-



Figs. 47–49. *Coleopterophagus donaldi*, male: 47 — dorsum of the body; 48 — venter of the body; 49 — leg IV. Scale bar 100  $\mu\text{m}$  (47, 48), 50  $\mu\text{m}$  (49).

ended. Setae  $h_1$  and  $h_2$  strongly thickened basally, very long, flagellate. Length of dorsal setae:  $vi$  29–34,  $si$  21–27,  $se$  86–97,  $c_1$  40–44,  $c_2$  45–50,  $d_1$  38–42,  $d_2$  45–50,  $e_1$  11–14,  $e_2$  11–14,  $h_1$  147–189,  $h_2$  126–168.

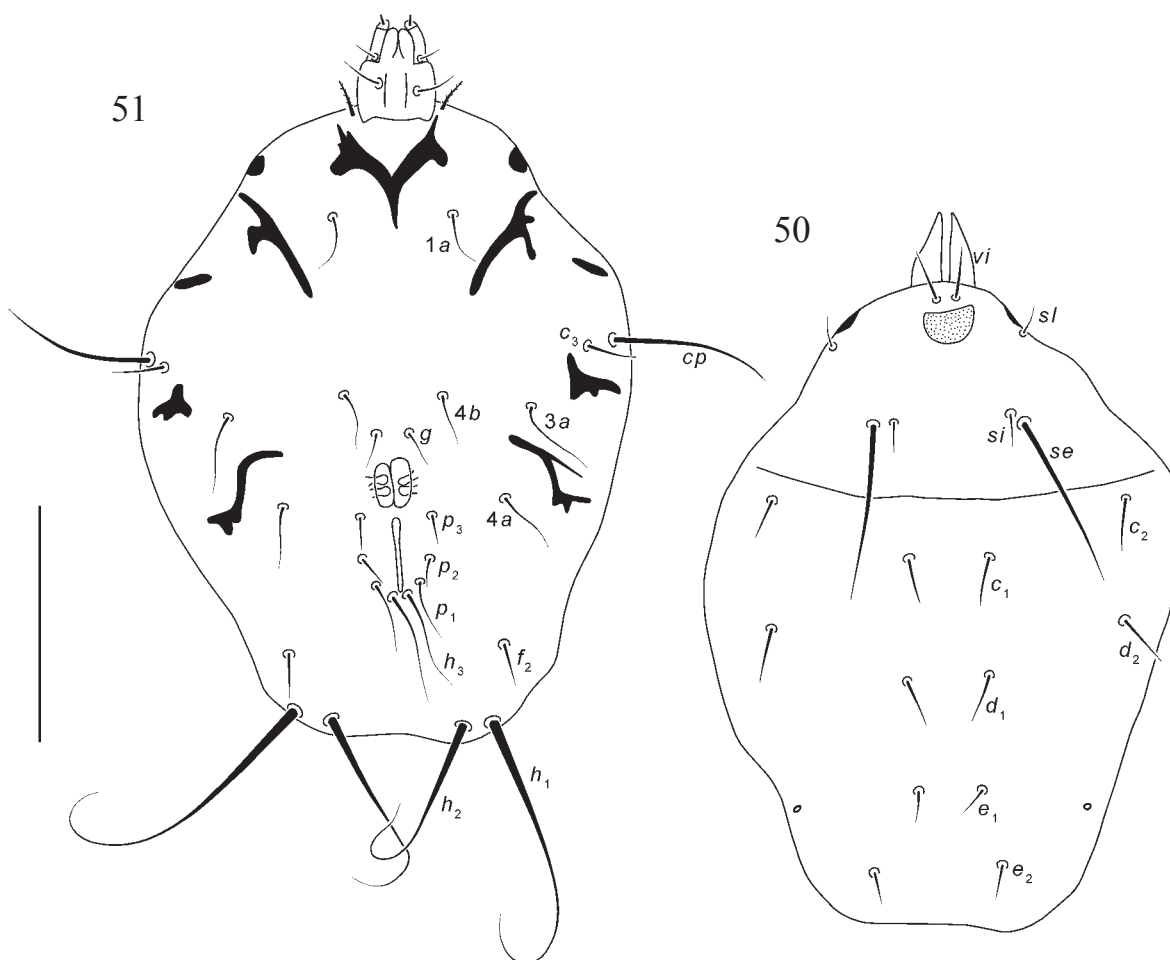
Idiosomal venter (Fig. 46). Posterior apodemes II developed. Seta  $cp$  long and stiff. Setae  $1a$ ,  $3a$ ,  $4a$  and  $p_1$  flagellate. Setae  $4b$  and  $g$  slightly flagellate. Setae  $c_3$ ,  $ad_1$ ,  $ad_2$ ,  $p_2$  and  $p_3$  simple. Seta  $f_2$  simple, blunt-ended. Seta  $p_1$  longer than  $p_2$  and  $p_3$ , setae  $p_2$  and  $p_3$  slightly longer than  $ad_1$  and  $ad_2$ . Seta  $h_3$  long and flagellate. Length of ventral setae:  $1a$  25–34,  $cp$  78–99,  $c_3$  32–38,  $4b$  25–29,  $g$  19–25,  $3a$  29–38,  $4a$  29–38,  $ad_1$  13–17,  $ad_2$  15–23,  $p_1$  25–34,  $p_2$  21–27,  $p_3$  21–25,  $f_2$  17–23,  $h_3$  55–67.

Legs. Length: I 116–122, II 109–122, III 128–141, IV 130–143. Length of solenidia: leg I:  $\omega_1$  22–25,  $\omega_2$  3–5,  $\omega_3$  29–36,  $\phi$  63–78,  $\sigma$  34–40; leg II:  $\omega$  25–27,  $\phi$  67–74,  $\sigma$  23–25; leg III:  $\phi$  44–48; leg IV:  $\phi$  27–32.

**Male.** Idiosomal length 251–316, maximal width 167–242.

Idiosomal dorsum. Idiosoma ornamented as on fig. 47. Sejugal furrow well-developed. Seta  $vi$  thickened near the base, stiff, blunt-ended. Seta  $se$  long, stiff and blunt-ended. Setae  $si$ ,  $c_1$ ,  $c_2$ ,  $d_1$ ,  $d_2$ ,  $e_1$ ,  $e_2$  simple, blunt-ended. Setae  $h_1$  and  $h_2$  strongly thickened basally, very long, flagellate. Length of dorsal setae:  $vi$  27–29,  $si$  15–17,  $se$  86–95,  $c_1$  22–29,  $c_2$  29–37,  $d_1$  22–25,  $d_2$  32–38,  $e_1$  13–17,  $e_2$  13–17,  $h_1$  137–179,  $h_2$  116–158.

Idiosomal venter (Fig. 48). Posterior apodemes II weakly developed. Seta  $cp$  long and stiff. Setae  $1a$ ,  $3a$ ,  $4a$  and  $p_1$  flagellate. Setae  $4b$  and  $g$  slightly flagellate. Setae  $c_3$ ,  $p_2$  and  $p_3$  simple. Seta  $f_2$  simple, blunt-ended. Seta  $p_1$  longer than  $p_2$  and  $p_3$ . Seta  $h_3$  long and flagellate. Length of ventral setae:  $1a$  25–34,  $cp$  74–82,  $c_3$  23–27,  $4b$  25–29,  $g$  19–25,  $3a$  29–38,  $4a$  29–38,  $p_1$  17–29,  $p_2$  15–19,  $p_3$  15–17,  $f_2$  16–21,  $h_3$  53–67. Length of penis 40–44.



Figs. 50–51. *Coleopterophagus donaldi*, tritonymph: 50 — dorsum of the body; 51 — venter of the body. Scale bar 100  $\mu$ m.

Legs. Length: I 105–120, II 105–116, III 116–139, IV 137–155. Solenidion of tibia IV short as in females (Fig. 49). Length of solenidia: leg I:  $\omega_1$  19–23,  $\omega_2$  3–4,  $\omega_3$  29–34,  $\phi$  59–67,  $\sigma$  34–36; leg II:  $\omega$  24–25,  $\phi$  59–67,  $\sigma$  19–25; leg III:  $\phi$  38–44; leg IV:  $\phi$  27–34.

**Tritonymph.** Idiosomal length 233–307, maximal width 186–233.

Idiosomal dorsum (Fig. 50). Dorsal surface of the idiosoma reticulated, but in examined specimens the sculpture poorly visible. Sejugal furrow well-developed. Seta *vi* thickened basally, stiff. Seta *se* long and stiff. Setae *si*, *c*<sub>1</sub>, *c*<sub>2</sub>, *d*<sub>1</sub>, *d*<sub>2</sub>, *e*<sub>1</sub>, *e*<sub>2</sub> simple. Setae *h*<sub>1</sub> and *h*<sub>2</sub> stiffly thickened basally, very long, flagellate. Length of dorsal setae: *vi* 25–27, *si* 15–17, *se* 78–90, *c*<sub>1</sub> 17–23, *c*<sub>2</sub> 23–27, *d*<sub>1</sub> 20–23, *d*<sub>2</sub> 22–28, *e*<sub>1</sub> 12–14, *e*<sub>2</sub> 13–15, *h*<sub>1</sub> 137–168, *h*<sub>2</sub> 95–126.

Idiosomal venter (Fig. 51). Posterior apodemes II weakly developed or absent. Seta *cp* long and stiff. Setae *1a*, *3a*, *4a* and *p*<sub>1</sub> flagellate. Setae *4b* and *g* slightly flagellate. Setae *c*<sub>3</sub>, *p*<sub>2</sub>, *p*<sub>3</sub> and *f*<sub>2</sub> simple. Seta *p*<sub>1</sub> longer than *p*<sub>2</sub> and *p*<sub>3</sub>. Seta *h*<sub>3</sub>

long and flagellate. Length of ventral setae: *1a* 21–29, *cp* 59–75, *c*<sub>3</sub> 21–25, *4b* 17–25, *g* 11–13, *3a* 21–34, *4a* 19–34, *p*<sub>1</sub> 17–29, *p*<sub>2</sub> 12–17, *p*<sub>3</sub> 12–15, *f*<sub>2</sub> 15–19, *h*<sub>3</sub> 29–46.

Legs. Length: I 90–99, II 90–101, III 101–116, IV 101–122. Length of solenidia: leg I:  $\omega_1$  19–21,  $\omega_2$  3–4,  $\omega_3$  25–32,  $\phi$  57–67,  $\sigma$  27–34; leg II:  $\omega$  23–25,  $\phi$  57–67,  $\sigma$  17–23; leg III:  $\phi$  34–44; leg IV:  $\phi$  17–23.

**Remarks.** *Coleopterophagus donaldi* is known only from *P. (Eupotosia) affinis*.

**Key to species of the genus  
*Coleopterophagus* of Ukraine (females)**

1. Setae *ad*<sub>1</sub>, *ad*<sub>2</sub>, *p*<sub>2</sub>, *p*<sub>3</sub> and *c*<sub>3</sub> not flagellate; setae *e*<sub>1</sub> and *e*<sub>2</sub> not exceeding 30  $\mu$ m, shorter than half of setae *c*<sub>2</sub> and *d*<sub>2</sub> ..... 2
- Setae *ad*<sub>1</sub>, *ad*<sub>2</sub>, *p*<sub>2</sub>, *p*<sub>3</sub> and *c*<sub>3</sub> flagellate; setae *e*<sub>1</sub> and *e*<sub>2</sub> exceeding 30  $\mu$ m, longer than half of setae *c*<sub>2</sub> and *d*<sub>2</sub> ..... *C. albini* Haitlinger, 1990
2. Dorsal integument with reticulated sculpture; setae *h*<sub>1</sub> and *h*<sub>2</sub> moderately thickened basally (Figs. 3, 32) ..... 3

- Dorsal integument with cellular sculpture; setae  $h_1$  and  $h_2$  strongly thickened basally (Fig. 45) ..... *C. donaldi* Haitlinger, 1990
3. Seta  $p_1$  flagellate; setae  $c_1$  and  $d_2$  longer than 45  $\mu\text{m}$  ..... *C. megnini* (Berlese, 1881)
- Seta  $p_1$  not flagellate; setae  $c_1$  and  $d_2$  shorter than 35  $\mu\text{m}$ ) ..... *C. maroni* Haitlinger, 1990

**Key to species of the genus  
*Coleopterophagus* of Ukraine (males)**

1. Seta  $p_1$  flagellate; solenidion on tibia IV short shorter than 40  $\mu\text{m}$  (as in females) ..... 2
- Seta  $p_1$  not flagellate; solenidion on tibia IV longer than 50  $\mu\text{m}$  ..... *C. maroni* Haitlinger, 1990
2. Setae  $p_2$  and  $p_3$  not flagellate; idiosoma shorter than 330  $\mu\text{m}$ ; setae  $e_1$  and  $e_2$  shorter than 20  $\mu\text{m}$ ; seta  $c_3$  shorter than 30  $\mu\text{m}$  ..... 3
- Setae  $p_2$  and  $p_3$  flagellate; idiosoma longer than 340  $\mu\text{m}$ ; setae  $e_1$  and  $e_2$  longer than 20  $\mu\text{m}$ ; seta  $c_3$  longer than 30  $\mu\text{m}$  ..... *C. albini* Haitlinger, 1990
3. Setae  $c_2$  and  $d_2$  shorter than 25  $\mu\text{m}$ , setae  $e_1$  and  $e_2$  longer than half of setae  $c_2$  and  $d_2$ ; setae  $h_1$  and  $h_2$  moderately thickened basally ..... *C. megnini* (Berlese, 1881)
- Setae  $c_2$  and  $d_2$  longer than 25  $\mu\text{m}$ , setae  $e_1$  and  $e_2$  shorter than half of setae  $c_2$  and  $d_2$ ; setae  $h_1$  and  $h_2$  clearly thickened basally ..... *C. donaldi* Haitlinger, 1990

**Key to species of the genus  
*Coleopterophagus* of Ukraine (tritonymphs)**

1. Setae  $p_2$  and  $p_3$  not flagellate; idiosoma shorter than 310  $\mu\text{m}$  ..... 2
- Setae  $p_2$  and  $p_3$  flagellate; idiosoma longer than 320  $\mu\text{m}$  ..... *C. albini* Haitlinger, 1990
2. Seta  $p_1$  long and flagellate, longer than  $p_2$  and  $p_3$  ..... 3
- Seta  $p_1$  short and not flagellate, subequal with  $p_2$  and  $p_3$  ..... *C. maroni* Haitlinger, 1990
3. Setae  $h_1$  and  $h_2$  moderately thickened basally; seta  $se$  longer than 100  $\mu\text{m}$ ; seta  $cp$  longer than 70  $\mu\text{m}$  ..... *C. megnini* (Berlese, 1881)
- Setae  $h_1$  and  $h_2$  strongly thickened basally; seta  $se$  shorter than 90  $\mu\text{m}$ ; seta  $cp$  shorter than 75  $\mu\text{m}$  ..... *C. donaldi* Haitlinger, 1990

**ACKNOWLEDGEMENT**

The authors are grateful to Dr. V.V. Martynov (Donetsk national university, Ukraine), Dr. M.Ye. Sergeev (Donetsk Botanical Garden, NAS of Ukraine), B.N. Vasko (I.I. Schmalhausen Institute of Zoology, NAS of Ukraine), Ye.V. Khalaim (I.I. Mechnikov Odessa National University, Ukraine) for loan of host beetles.

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