

UDC 595.771

## NEW RECORDS OF SCIARID SPECIES (DIPTERA, SCIARIDAE) FROM UKRAINE. III

A. I. Babytskiy<sup>1,2\*</sup>, O. O. Bezsmertna<sup>3,4</sup>

<sup>1</sup>Schmalhausen Institute of Zoology NAS of Ukraine,  
vul. B. Khmelnytskogo, 15, Kyiv, 01030 Ukraine

<sup>2</sup>National University of Life and Environmental Sciences of Ukraine,  
vul. Heroiv Oborony, 13, Kyiv, 03041 Ukraine

<sup>3</sup>Taras Shevchenko National University of Kyiv,  
vul. Volodymyrska, 60, Kyiv, 01033 Ukraine

<sup>4</sup>Tsumanska Puscha National Nature Park,  
vul. Nezalezhnosti, 18, Kivertsi town, Volyn Region, 45200 Ukraine

\*Corresponding author

E-mail: andriybabytskiy@gmail.com

A. I. Babytskiy (<https://orcid.org/0000-0003-2758-0319>)

**New Records of Sciarid Species (Diptera, Sciaridae) from Ukraine. III. Babytskiy, A. I., Bezsmertna, O. O.** — Five species of black fungus gnats *Corynoptera furcifera* Mohrig & Mamaev, 1987, *Cratyna (Cratyna) fulvicauda* (Felt, 1898), *Lycoriella lundstromi* (Frey, 1948), *Pseudolycoriella paludum* (Frey, 1948) and *Xylosciara (Xylosciara) heptacantha* Tuomikoski, 1957 are recorded from Ukraine for the first time. Distributions of these species are summarized and diagnoses of the species are provided.  
K e y w o r d s : biodiversity, black fungus gnats, distribution, Europe, morphology, Sciaroidea.

### Introduction

Black fungus gnats are small (imago up to 8 mm in length), mainly dark coloured flies (Diptera) of the family Sciaridae Billberg, 1820. Sciarid larvae usually develop in rotting plant material permeated by fungal hyphae and play an important role as detritivores, facilitating the decay of wood and decaying leaf-litter, but larvae of some sciarid species also develop in fungal fruiting bodies or living plant tissues and cause significant damage to cultivated fungi and crops in greenhouses (Babytskiy et al., 2019 a).

The sciarid fauna of Ukraine remains poorly studied. Our knowledge of the species that occur in Ukraine is mainly derived from three collections: Wierzejski's from Podolia (the second half of the 19th century) (Winnertz, 1868), Bukowski's from Crimea (the beginning of 20th century) (Bukowski & Lengersdorf, 1936), Krivosheina and Mamaev's from Transcarpathia (the second half of the 20th century) (Mohrig et al., 1985; 1989 a, b; 1990). According to the literature, 67 sciarid species from 17 genera have been recorded from Ukraine.

This paper is the latest in a series to present new records of sciarids from Ukraine, based upon our collections which started in 2012 (see Babytskiy et al., 2019 b; 2020). Here we report five new records of sciarid species, belonging to five genera: *Corynoptera* Winnertz, 1867, *Cratyna* Winnertz, 1867, *Lycoriella* Frey, 1942, *Pseudolycoriella* Menzel & Mohrig, 1998 and *Xylosciara* Tuomikoski, 1957.

## Material and methods

Material was collected during expeditions and excursions between 2013 and 2018. Adult males were collected with a Malaise trap, by sweep-netting, or directly from the substrate with an aspirator. Collected gnats were stored in 5 ml vials containing 70 % ethanol. During preparation in the laboratory, the specimens were dehydrated in absolute ethanol and then mounted on slides in Euparal.

The specimens were studied with MBS-9 and Biolam D11 microscopes equipped with Nikon D90 cameras; images were processed using NKRemote Version 2.2.1, AxioVision Version 4.6.3 and Photoshop CC 2018 programs; and stacked using Helicon Focus 6.7.1 open-source software.

All of the material that was examined as part of this study is kept in Andriy Babytskiy's private collection, Kyiv (PABK) and publicly available data is on the Ukrainian Biodiversity Information Network, UkrBIN (Babytskiy, 2018). Individual catalogue numbers of the vouchers in the UkrBIN are given (e. g., UkrBIN-795906). PABK collection numbers are also provided for all of the specimens (e. g., No. 210). The names of the morphological structures follow the handbook of Palaearctic sciarids by Menzel & Mohrig (1997). The nomenclature and systematics follow the revision of Palaearctic Sciaridae (Menzel & Mohrig, 2000). Diagnoses of the discussed species are generally based on examined specimens from Ukraine, in consideration of the keys, original descriptions, and re-descriptions by Frey (1948), Tuomikoski (1957, 1960), Mohrig et al. (1987; 2013), Rudzinski (2000) and Menzel & Mohrig (2000).

## Results

### *Corynoptera* Winnertz, 1867

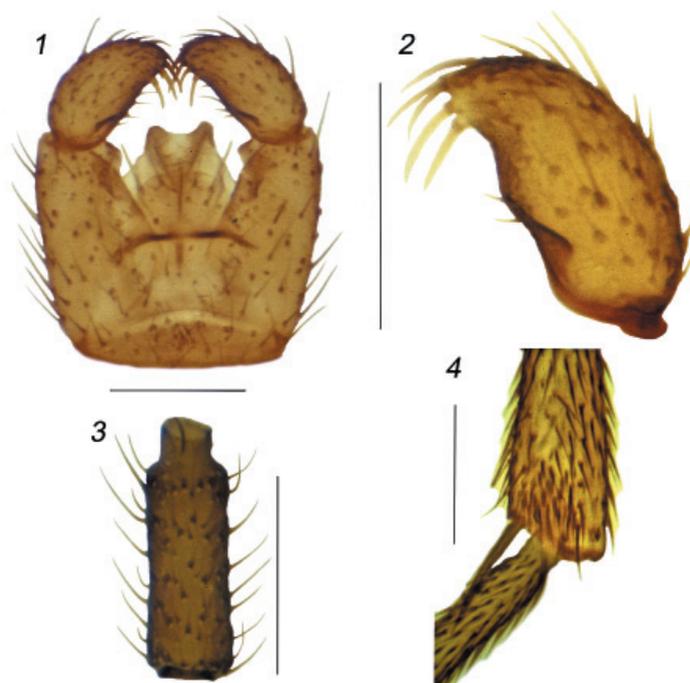
#### *Corynoptera furcifera* Mohrig & Mamaev, 1987 (figs 1–4)

Synonym: *vitella* Rudzinski & Drissner, 1992

Material examined. Ukraine, Volyn Region: outskirts of Klubochyn, Tsumanska Puscha National Nature Park, 50.96230° N, 025.83071° E, ca. 205 m a. s. l., hornbeam-oak forest, sweeping, 27.06.2017, 1 ♂ (A. Babytskiy) (No. 210, UkrBIN-795906); Ukraine, Volyn Region: outskirts of Sokyrychi, Tsumanska Puscha National Nature Park, 50.87516° N, 25.51393° E, ca. 210 m a. s. l., hornbeam forest with an admixture of pine and old larches, sweeping, 28.06.2017, 1 ♂ (A. Babytskiy) (No. 224A, UkrBIN-795921); Ukraine, Volyn Region: outskirts of Zhabka, Tsumanska Puscha National Nature Park, 50.81919° N, 25.43038° E, ca. 210 m a. s. l., old arboretum with domination of oak, hornbeam and pine, sweeping, 29.06.2017, 1 ♂ (A. Babytskiy) (No. 232, UkrBIN-795929).

Distribution: Austria, Bulgaria, Czech Republic, Finland, Germany, Greece (mainland), Russia (Central European part; Southern Siberia), Slovakia, Sweden, Switzerland, Ukraine (**new record**), United Kingdom (Heller et al., 2009; Hippa et al., 2010; Vilkamaa, 2014; Heller & Menzel, 2017; this study).

Diagnosis. Males reach 2.0–2.3 mm in length. **Head.** Eye bridge consists of 3 rows of ommatidia (facets). Face fine, long with light vestiture. Maxillary palp relatively short, bright, consists of 3 palpomeres. Basal palpomere ( $p_1$ ) thickened and slightly raised, with an outer bristle and a flat-edged sensory area. Sensilla long and curved. Terminal palpomere ( $p_3$ ) about as long as  $p_1$ ;  $p_2$  short and ovoid, about  $2/3$  as long as  $p_3$ . Flagellum long, slightly roughened and brownish. Scape, pedicel and the base of the first flagellomere whitish-yellow, clearly lighter than the remaining flagellomeres; the 4<sup>th</sup> flagellomere is 2.2–3.0 times as long as wide (the flagellomeres that follow are a bit longer), with coarse and protruding vestiture, setae about as long as the flagellomere width (fig. 3). Neck part of flagellomeres short, brown and sharply separated. **Body** with sparse, long and dark brown vestiture. **Thorax** and abdomen yellowish-brown, gonocoxae and legs light yellow. Postpronotum bare. Mesonotum yellow, with some coarse and brownish setae, long lateral and central bristles. Scutellum with 2 conspicuously long and robust bristles. Katepisternum high and triangular. Fore tibia with spines among basal bristles. Wing wide, membrane brownish, with well-developed anal lobe; posterior wing veins indistinct and like the wing membrane without macrotrichia; stM a little longer than M-fork; M-fork broad, short-arched and wide open;  $c/w = 0.6–0.8$ ;  $y$  longer than  $x$  or  $x = 1.0–1.4 y$ , both naked, stCuA very short, makes  $1/3–1/2 x$ ,  $R_1 = R$  or  $R_1$  shorter, makes  $2/3 R$  and falls into C in front of the base of M-fork;  $R_5$  long, with dorsal and ventral macrotrichia. Haltere short and brownish. **Legs** long and slim, light-coloured. Femur of forelegs ( $f_1$ ) not



Figs 1–4. *Corynoptera furcifera*, male: 1 — hypopygium, ventral view; 2 — gonostylus, ventral view; 3 — fourth flagellomere, lateral view; 4 — anterior apex of fore tibia ( $t_1$ ) with tibial organ, lateral view. Scale bars: 0.10 mm.

noticeably thickened. Fore tibial organ ( $t_1$ ) with fine and dense irregular bristle spot with no curved border (fig. 4). Tibial end of  $t_2$  and  $t_3$  both with 2 slim and equally long spurs. Tarsal claws without teeth. **Abdomen** with sparse light brown vestiture. **Hypopygium** about as long as wide, light brown to yellowish (fig. 1). Gonocoxites strong and compact, inside with short and fine setae; ventral genital base without basal lobe or basal group of bristles. Gonostylus long and ovoid (about 2.0 times as long as wide), without cavities or deep margins inside. The tip of the gonostylus narrowed, broadly rounded on the outside and without an apical tooth, upper quarter of gonostylus with 3 or 4 subapical, hyaline finger-shaped megasetae and light bristles; all megasetae about equal in length and turn inwards and downwards (fig. 2). Hippa, Vilkamaa & Heller indicated the presence of a little beak-like apical tooth on the gonostylus, but it is very hard to find it among the megasetae in ventral view (Hippa et al., 2010). Tegmen clearly wider than long, membranous, and broadly rounded apically. The field of teeth about as long as wide, with each tooth short and terminating in a single-point. Aedeagus short and fine (Mohrig et al., 1987; Menzel & Mohrig, 2000).

*Corynoptera* Winnertz, 1867 is one of the most speciose genera in the family Sciaridae, containing approximately 250 species (Pape & Thompson, 2019). However, the systematic position of species within the genus is not yet resolved. In this paper, we follow Menzel & Mohrig's (2000) concept of *Corynoptera* s. l., which includes 16 species groups. *Corynoptera furcifera* belongs to the *C. boletiphaga* group with 14 species, which differ from other *Corynoptera* by having tibial organ  $t_1$  without a comb-like row of bristles and a curved margin, but instead with a patch of bristles at the apex; gonostylus without an apical tooth; ventral base of hypopygium with a wide emargination, and a membranous tegmen (Menzel & Mohrig, 2000). Also *C. furcifera* is similar to *C. arboris* Fritz, 1982 and *C. saccata* Tuomikoski, 1960, but differs by having a yellow antennal scapus and pedicellus, paler than the flagellum (Hippa et al., 2010).

Morphological note. Males reach 1.5 mm in length; the wing is 1.7–1.8 mm long and 0.6–0.7 mm wide; x and y both bare. Biometric indexes of studied specimens: width/length of wing = 0.38–0.40; stM/M-fork = 1.05–1.19;  $R_1/R$  = 0.69–0.84; x/y = 0.61–1.42; stCuA/x = 0.28–0.48; c/w = 0.71–0.72. Length of spur/width of tibia: leg 1 = 1.21–1.46, leg

2 = 1.48–1.99; leg 3 = 1.28–2.03. Length of metatarsus/length of tibia: leg 1 = 0.47–0.50, leg 2 = 0.42–0.44, leg 3 = 0.43–0.45. Length of tibia 3/length of thorax is 1.25–1.31.

In the previous *C. furcifera* descriptions there are some discrepancies in relation to wing venation measurements. On one hand, Mohrig et al., 1987 stated that y is longer than x, but Menzel & Mohrig (2000) indicated  $x = 1.0\text{--}1.4 y$ . In the studied specimens we have found both variants: the specimens No. 210 and 224A has x shorter than y and  $x/y = 0.61\text{--}0.71$ , but in the specimen No. 232 x is longer than y and  $x/y = 1.25\text{--}1.42$ . On the other hand,  $R_1$  is specified as equal to R (Mohrig et al., 1987) or shorter, at  $2/3 R$  (Menzel & Mohrig, 2000). In the studied specimens  $R_1$  is shorter than R and  $R_1/R = 0.69\text{--}0.84$ . The number of gonostylar megasetae differs in previous descriptions too: 3 (Menzel & Mohrig, 2000) or 4 (Mohrig et al., 1987). In the studied specimens we found 3 megasetae—the upper one is a bit thinner than the 2 lowers (fig. 2).

Genus *Cratyna* Winnertz, 1867

Subgenus *Cratyna* Winnertz, 1867 s. str.

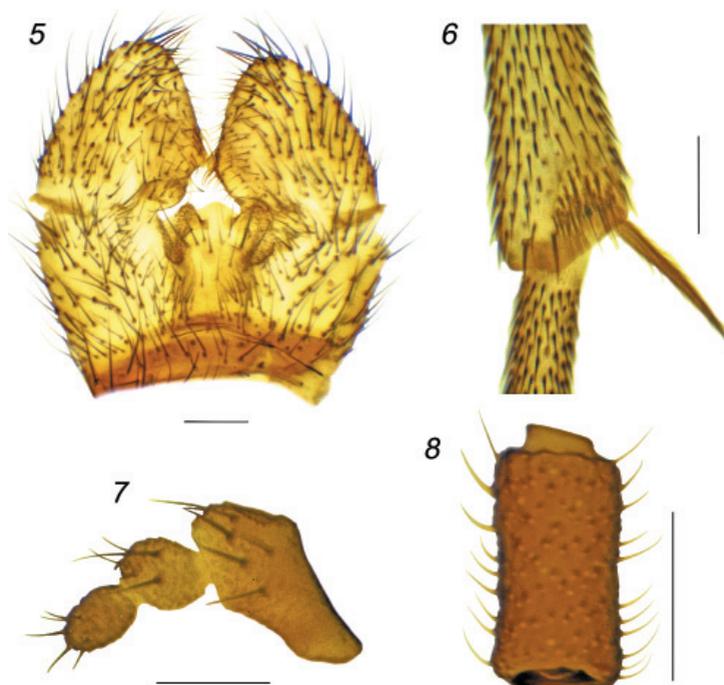
*Cratyna (Cratyna) fulvicauda* (Felt, 1897) (figs 5–8)

Synonym: *gilva* Rudzinski, 2000

Material examined. Ukraine, Cherkasy Region: Kaniv Nature Reserve, 49.72672° N, 31.51717° E, ca. 180 m a. s. l., maple-hornbeam forest, mass development, collected with aspirator from rotten wood, 01.07.2016, 24 ♂, 4 ♀ (A. Babytskiy) (No.148-9, UkrBIN-795849-50); Ukraine, Cherkasy Region: Yablunivka and Samoridnia, 49.43762° N, 31.18949° E, ca. 160 m a. s. l., oak-hornbeam forest, mass development, collected with aspirator from the trunk of Khmelnytskii's Oak, 02.07.2016, 15 ♂, 9 ♀ (A. Babytskiy) (No. 61, 150, UkrBIN-795786, 795851); Ukraine, Kyiv Region: outskirts of Bilohorodka, 50.42609° N, 30.23636° E, ca. 150 m a. s. l., maple-linden-oak forest, collected with aspirator from dead fruit body of *Fomes fomentarius* (L.) J. J. Kickx, 1867 which laid on the forest road, 16.07.2016, 1 ♂ (A. Babytskiy) (No. 99, UkrBIN-795814); Ukraine, Ternopil Region: outskirts of Kasperivtsi, Dniester Canyon National Nature Park, the left bank of Kasperivtsi Reservoir on Seret River, 48.67661° N, 25.85291° E, ca. 200 m a. s. l., coastal hornbeam forest on the steep slope, near the spring, sweeping, 22.06.2018, 1 ♂ (A. Babytskiy) (No. 658); Ukraine, Ternopil Region: outskirts of Kasperivtsi, Dniester Canyon National Nature Park, the left bank of Kasperivtsi Reservoir on Seret River, 48.68012° N, 25.85049° E, ca. 190 m a. s. l., coastal hornbeam forest on the steep slope, outcrop of siliceous rocks, sweeping, 22.06.2018, 1 ♂ (A. Babytskiy) (No. 660); Ukraine, Ternopil Region: outskirts of Kasperivtsi, Dniester Canyon National Nature Park, the left bank of Kasperivtsi Reservoir on Seret River, 48.67120° N, 25.85270° E, ca. 170 m a. s. l., meadowy wood glade on the edge of forest tract, collected with aspirator in the car, 23.06.2018, 1 ♂ (A. Babytskiy) (No. 664).

Distribution: Czech Republic, Germany, Greece (mainland), Ukraine (**new record**), USA (New Jersey) (Mohrig et al., 2013; Heller & Menzel, 2017; this study).

Diagnosis. Males reach 2.5–3.5 mm in length. **Head.** Compound eyes very sparsely haired. Eye bridge wide, consisting of 5 rows of ommatidia. Prefrons with 8 short bristles. Clypeus bare. Maxillary palps light, white-brownish, consisting of 3 palpomeres (fig. 7);  $p_1$  thickened, ca. 120  $\mu\text{m}$  in length, dorsally with extensive sensory area, 1 long and 46 short bristles;  $p_2$  small and rounded, ca. 60  $\mu\text{m}$  in length, with 12 long and 45 short bristles;  $p_3$  short oval, ca. 40  $\mu\text{m}$  in length. Scapus and pedicel light yellow, sharply contrasting with colour of flagellomeres. Flagellomeres dark brown with light, dense and protruding setae. Length/width of the 4<sup>th</sup> flagellomere 1.7 (fig. 8). The neck of flagellomere dark brown, relatively short — 0.3 of flagellomere width. **Thorax** primarily brown, with yellow sides and katapisternum. Mesonotum with strong dark brown bristles. Dorsocentral and acrostichal bristles strong; 6–8 long lateral bristles. Scutellum with 6–8 long apical and several short distal bristles. Postpronotum bare. **Wing** 2.0 mm in length, with brownish membrane; anal lobe well developed;  $c/w = 0.80$ ; R and  $R_1$  with macrotrichia (14–16 in total),  $R_1/R = 1.10$ ,  $R_1$  falls into C before the base of M-fork; x and y about equal in length, x with 2–3 macrotrichia, y bare; stCuA short, makes half of x. Haltere brown. Coxae and **legs** light, yellow-brownish; bristles on coxae dark brown. Tibial organ  $t_1$  with 1 spur and dense, multi-row bristle patch, proximally pyramid shaped, which is different from the tibial vestiture with stronger and darker bristles on the edge of the patch (fig. 6);  $t_2$  and  $t_3$  both with 2 spurs;  $t_3$  with well-developed dorsal row of spines. **Abdomen** brown with dense dark brown bristles.



Figs 5–8. *Cratyna fulvicauda*, male: 5 — hypopygium, ventral view; 6 — anterior apex of fore tibia ( $t_1$ ) with tibial organ, lateral view; 7 — maxillary palp, lateral view; 8 — fourth flagellomere, lateral view. Scale bars: 0.10 mm.

IX tergite narrow pyramidal shaped. **Hypopygium** very bright, brownish-yellow, clearly brighter than abdomen (fig. 5). Gonocoxae almost twice as wide as long, with thick bristles on the ventral base. Tegmen relatively small, trapezoidal. Aedeagus very short. Gonostylus bloated, apically slightly tapered with long bristles. There are 4 bright pairs of megasetae on the inner side of the gonostylus (Rudzinski, 2000; Mohrig et al., 2013).

*Cratyna* Winnertz, 1867 s. l. separates from other Sciaridae by having short palps with a strong tendency to reduction of the palpomeres, especially  $p_2$ , which is sometimes wartlike in form. According to Menzel & Mohrig (2000), *Cratyna* is divided into 4 subgenera — *Cratyna* Winnertz, 1867 s. str., *Spathobdella* Frey, 1948, *Peyerimhoffia* Kieffer, 1903 and *Diversicratyna* Menzel & Mohrig, 1998, but some authors consider *Peyerimhoffia* to be a separate genus (Vilkamaa & Hippa, 2005; Babytskiy et al., 2018). *Cratyna fulvicauda* belongs to the subgenus *Cratyna* s. str., which includes about 30 species in the Palaearctic and differs from other subgenera by the absence of an apical tooth on the gonostylus. *Cratyna fulvicauda* is similar to *Cr. ambigua* (Lengersdorf, 1934), *Cr. subalpina* (Mohrig & Mamaev, 1990) and *Cr. alpina* (Mohrig & Menzel, 1992), but can be easily separated by the structure of the gonostylus, yellow sides of the thorax and bright gonocoxae (Rudzinski, 2000; Mohrig et al., 2013).

According to Mohrig et al. (2013), *Cr. fulvicauda* was not collected in Central Europe before 1989 and they suggested that the species may have been introduced from North America, where it has been known for at least a century. In Ukraine we have found *Cr. fulvicauda* inhabiting natural biotopes such as the broadleaf forests of the Kaniv Nature Reserve and Dniester Canyon National Nature Park (see material examined). In early July 2016, we recorded the mass development and swarming of *Cr. fulvicauda* imagoes in Cherkasy Region. In the 1<sup>st</sup> of July we observed the mass flight of imagoes above a rotten hornbeam trunk in the maple-hornbeam forest in Kaniv Nature Reserve and in the 2<sup>nd</sup> of July we recorded the same phenomenon in the oak-hornbeam forest above an ancient (ca. 800 years old) very rotten oak tree, the so-called “Khmelnyskii’s Oak” (now completely lost). In both cases male and female imagoes copulated immediately after eclosion, when they were still in a teneral state and completely white in color.

Morphological note. Males reach 4.0 mm in length, with a wing measuring 2.5–2.7 mm long and 1.0–1.1 mm wide; x bare, y with 5–7 macrotrichia. Biometric indexes of studied specimens: width/length of wing = 0.39–0.44; stM/M-fork = 0.83–1.05;  $R_1/R = 1.20$ –1.44;  $x/y = 0.74$ –1.10; stCuA/x = 0.36–0.63; c/w = 0.76–0.83. Length of spur/width of tibia: leg 1 = 1.05–1.36, leg 2 = 1.61–2.17; leg 3 = 1.63–2.00. Length of metatarsus/length of tibia: leg 1 = 0.54–0.58, leg 2 = 0.47–0.49, leg 3 = 0.43–0.49. Length of tibia 3/length of thorax is 1.21–1.36.

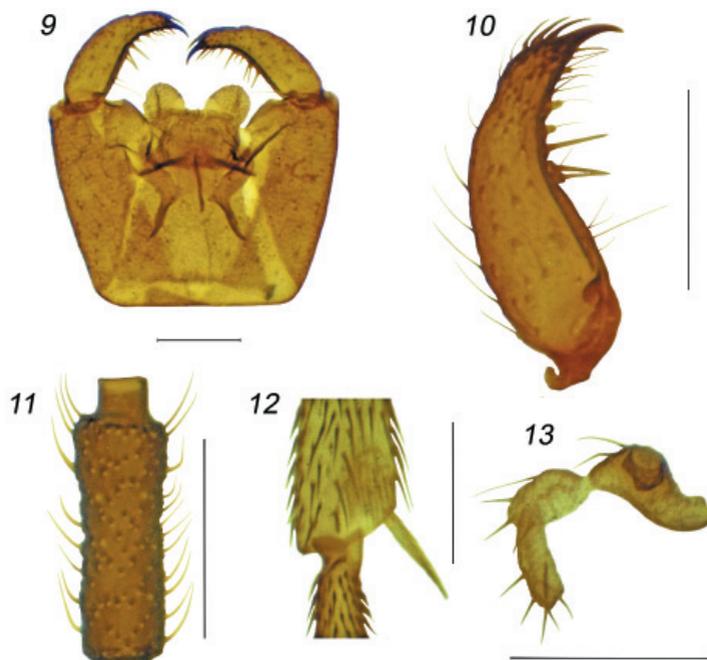
Genus *Lycoriella* Frey, 1942

*Lycoriella lundstromi* (Frey, 1948) (figs 9–13)

Material examined. Ukraine, Volyn Region: outskirts of Klubochyn, Tsumanska Puscha National Nature Park, 50.96447° N, 25.77727° E, ca. 215 m a. s. l., hornbeam forest with admixture of *Betula pendula* Roth. and three trees of *Betula obscura* A. Kotula, sweeping, 27.06.2017, 2 ♂ (A. Babytskiy) (No. 201-2, UkrBIN-795898-9); Ukraine, Volyn Region: outskirts of Klubochyn, Tsumanska Puscha National Nature Park, 50.96230° N, 25.83071° E, ca. 205 m a. s. l., hornbeam-oak forest, sweeping, 27.06.2017, 3 ♂ (A. Babytskiy) (No. 209, 211, 213, UkrBIN-795905, 795907, 795909); Ukraine, Ternopil Region: Nastasiv, 49.41884° N, 25.51873° E, ca. 325 m a. s. l., bank of artificial pond near the vegetable gardens, sweeping above coastal shrubs and weeds, 19.06.2018, 1 ♂ (A. Babytskiy) (No. 632); Ukraine, Ternopil Region: outskirts of Luchka, “Myshkovytska Dacha” tract, 49.40665° N, 25.61123° E, ca. 340 m a. s. l., oak-hornbeam forest near the country side, sweeping, 20.06.2018, 1 ♂ (A. Babytskiy) (No. 634).

Distribution: Czech Republic, Estonia, Finland, France (mainland), Germany, Hungary, Italy (mainland), Luxembourg, Romania, Russia (Southern and Western Siberia), Slovakia, Spain (mainland), Sweden, Switzerland, Ukraine (**new record**), United Kingdom (Gerbachevskaja-Pavluchenko, 1986; Mohrig et al., 2001 [as *L. subterranea*]; Menzel, 1998; Komarov, 2011; Heller & Weber, 2013; Heller & Menzel, 2017; Kolcsár & Heller, 2019; Menzel et al., 2020; this study).

Diagnosis. Males reach 1.5–1.7 mm in length. **Head.** Compound eyes sparsely haired or almost bare. Eye bridge consists of 2–4 (2 in Menzel & Mohrig, 2000, 3 in Tuomikoski, 1960 and 4 in Frey, 1948) rows of ommatidia. Maxillary palps yellowish, 3 segmented, basal palpomere with brown sensory pit (fig. 13). Flagellum of male imago is slim, 1.45 mm in length,



Figs 9–13. *Lycoriella lundstromi*, male: 9 — hypopygium, ventral view; 10 — gonostylus, ventral view; 11 — fourth flagellomere, lateral view; 12 — anterior apex of fore tibia ( $t_1$ ) with tibial organ, lateral view; 13 — maxillary palp, lateral view. Scale bars: 0.10 mm.

middle flagellomeres about three times as long as wide. The base of the first flagellomere is yellow. Flagellomeres with protruding hairy setae, also the clearly recognizable blunt-tipped sensilla present, they are not much shorter than the ordinary setae. The 4<sup>th</sup> flagellomere is 2.5 times as long as wide, the neck  $\frac{1}{6}$  of flagellomere body length (fig. 11). **Body** dark with light bristles. Notum with short yellow bristles. **Wing** wide, 2.5–2.6 times as long as wide, wing length = 1.5–1.9 mm, wing width = 0.7 mm; c slightly longer than  $\frac{2}{3}$  w; Sc makes a half of R length; R/R<sub>1</sub> = 1.3; R<sub>1</sub> falls into C well before the base of M-fork; x = 1.3–2.0 y, both bare; M-fork as long as the stM; stCuA is about  $\frac{1}{2}$  x; CuA<sub>1</sub> and CuA<sub>2</sub> clearly bent down apically. Haltere with a light stem and dark knob. **Legs** yellow. Tarsus from the distal half of the metatarsus is dark. Tibial organ of t<sub>1</sub> with patch of bristles and indistinct arcuate emargination (fig. 12). Spurs in t<sub>2</sub> and t<sub>3</sub> short. Hindleg = 0.6 mm; hindtibia = 0.8 mm; hindmetatarsus = 0.3 mm; hindtarsus = 0.7 mm. **Hypopygium** without basal lobe (fig. 9). The ventral base of gonocoxae with only scattered setae. Gonostylus long and narrow, almost awl-shaped (fig. 10); inner side of the gonostylus with a pair of megasetae in the middle, near the ventral margin and whiplash seta on the basal part (Frey, 1948; Tuomikoski, 1960).

*Lycoriella* Frey, 1942 s. l. according to Menzel & Mohrig (2000) included 3 subgenera: *Lycoriella* Frey, 1942 s. str., *Hemineurina* Frey, 1942 and *Coelostylina* Tuomikoski, 1960. Later, the preoccupied name *Coelostylina* Tuomikoski was replaced by *Stenacanthella* Vilkamaa & Menzel, the former subgenera *Hemineurina* and *Stenacanthella* (= *Coelostylina*) were elevated to genera, and the genus *Trichocoelina* Vilkamaa & Menzel was established for the members of the *Hemineurina* species group of *L. vitticollis* (Vilkamaa & Menzel, 2019). *Lycoriella* s. str. includes 34 species in the Palaearctic which differ from related genera and subgenera by the presence of a dark, deep sensory area on the basal palpomere, absence of spines on t<sub>1</sub>, narrow and strongly tapered at apex gonostyles, and the presence of an ascending whiplash seta on the basal part of the gonostyles (Menzel & Mohrig, 2000). *Lycoriella lundstromi* differs from related species by lacking a basal lobe on the ventral base of the gonocoxae, and having shorter flagellomeres with a combination of long, curved sensilla and long hairs that stick out clearly. *Lycoriella lundstromi* is similar to *L. subterranea* (Märkel, 1844), but *L. lundstromi* can be distinguished by the position of lower megasetae on the gonostylus, which are close together and cross over each other, as in figure 9 (Menzel & Mohrig, 2000).

Morphological note. Males reach 1.5–2.0 mm in length, wing is 1.5–1.9 mm long and 0.6–0.8 mm wide; x and y both bare. Biometric indexes of studied specimens: width/length of wing = 0.39–0.43; stM/M-fork = 0.92–1.03; R<sub>1</sub>/R = 0.59–0.72; x/y = 0.94–1.74; stCuA/x = 0.31–0.81; c/w = 0.65–0.72. Length of spur/width of tibia: leg 1 = 0.87–1.13, leg 2 = 0.88–1.40; leg 3 = 1.05–1.32. Length of metatarsus/length of tibia: leg 1 = 0.47–0.54, leg 2 = 0.41–0.45, leg 3 = 0.41–0.45. Length of tibia 3/length of thorax is 1.06–1.26.

The eye bridge of our specimens consists of three rows of ommatidia. The ommatidia of the upper row are not as close to each other as the ommatidia of the two lower rows, giving the impression that there are only two rows.

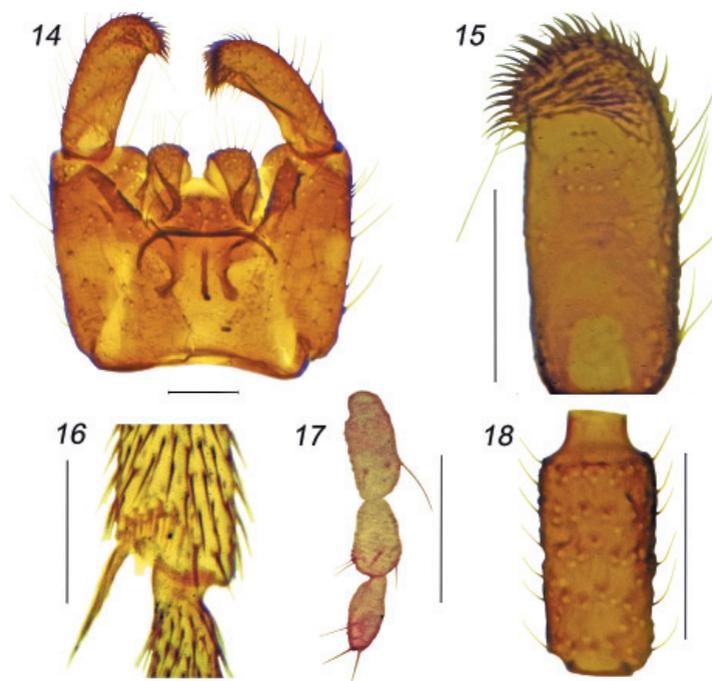
### Genus *Pseudolycoriella* Menzel & Mohrig, 1998

#### *Pseudolycoriella paludum* (Frey, 1948) (figs 14–18)

Synonyms: *leucocera* (Mohrig & Menzel, 1990); *polliciformis* (Freeman, 1990)

Material examined. Ukraine, Ternopil Region: between Luchka and Volia, “Zapust” tract, 49.40572° N, 25.61362° E, ca. 340 m a. s. l., oak-hornbeam forest, wet ravine overgrown by hornbeam, sweeping on the edge of ravine, 03.07.2015, 1 ♂ (A. Babytskiy) (No. 50); Ukraine, Volyn Region: outskirts of Klubochyn, Tsumanska Puscha National Nature Park, 50.96483° N, 25.77776° E, ca. 215 m a. s. l., hornbeam forest with admixture of birch, sweeping, 27.06.2017, 1 ♂ (A. Babytskiy) (No. 196, UkrBIN-795893); Ukraine, Volyn Region: outskirts of Klubochyn, Tsumanska Puscha National Nature Park, 50.96447° N, 25.77727° E, ca. 215 m a. s. l., hornbeam forest with admixture of *Betula pendula* Roth. and three trees of *Betula obscura* A. Kotula, sweeping, 27.06.2017, 5 ♂ (A. Babytskiy) (No. 197, 199, 203-4, UkrBIN-795894, 795896, 795900-01); Ukraine, Volyn Region: outskirts of Klubochyn, Tsumanska Puscha National Nature Park, 50.96522° N, 25.77657° E, ca. 215 m a. s. l., hornbeam-birch forest with overgrowth of *Vinca minor* L., sweeping, 27.06.2017, 2 ♂ (A. Babytskiy) (No. 205,

UkrBIN-795902); Ukraine, Volyn Region: outskirts of Klubochyn, Tsumanska Puscha National Nature Park, 50.96230° N, 25.83071° E, ca. 205 m a. s. l., hornbeam-oak forest, sweeping, 27.06.2017, 2 ♂ (A. Babytskiy) (No. 208, 214, UkrBIN-795904, 795910); Ukraine, Volyn Region: outskirts of Sokyrychi, Tsumanska Puscha National Nature Park, 50.87516° N, 25.51393° E, ca. 210 m a. s. l., hornbeam forest with admixture of pines and old larches, sweeping, 28.06.2017, 5 ♂ (A. Babytskiy) (No. 221-2, 226, UkrBIN-795917-8, 795923); Ukraine, Volyn Region: between Berestiane and Kholonevychi, Tsumanska Puscha National Nature Park, "Piilo" tract, 50.99890° N, 25.93088° E, ca. 175 m a. s. l., hornbeam forest with admixture of aspen, sweeping, 28.06.2017, 8 ♂ (A. Babytskiy) (No. 227-8, UkrBIN-795924-5); Ukraine, Volyn Region: outskirts of Turiisk, 51.06977° N, 24.54502° E, ca. 180 m a. s. l., broadleaved hornbeam forest with admixture of ash, larch and oak, sweeping, 05.07.2017, 2 ♂ (A. Babytskiy) (No. 301-2); Ukraine, Kyiv Region: Kyiv City, Holosiivskiy National Nature Park, 50.37381° N, 30.50764° E, ca. 160 m a. s. l., broadleaved maple-hornbeam forest, sweeping above the rotten trunk, 15.06.2017, 31 ♂ (A. Babytskiy) (No. 322-332, 334-344, 346-354); Ukraine, Kyiv Region: Kyiv City, Holosiivskiy National Nature Park, 50.37384° N, 30.50781° E, ca. 170 m a. s. l., broadleaved maple-hornbeam forest, sweeping above grass, 15.06.2017, 29 ♂ (A. Babytskiy) (No. 356-384); Ukraine, Kyiv Region: Kyiv City, Holosiivskiy National Nature Park, 50.37382° N, 30.50782° E, ca. 170 m a. s. l., broadleaved maple-hornbeam forest, sweeping above rotten birch trunk and nearest grass, 15.06.2017, 15 ♂ (A. Babytskiy) (No. 385-399); Ukraine, Ternopil Region: outskirts of Luchka, "Zapust" tract, 49.40420° N, 25.61105° E, ca. 325 m a. s. l., oak-hornbeam forest, western edge of the tract, sweeping above the litter and rotten woods, 18.06.2018, 3 ♂ (A. Babytskiy) (No. 566-7, 569); Ukraine, Ternopil Region: outskirts of Luchka, "Zapust" tract, 49.40447° N, 25.61140° E, ca. 330 m a. s. l., oak-hornbeam forest, sweeping above the litter, 18.06.2018, 1 ♂ (A. Babytskiy) (No. 571); Ukraine, Ternopil Region: outskirts of Luchka, "Zapust" tract, 49.40451° N, 25.61254° E, ca. 340 m a. s. l., oak-hornbeam forest, sweeping above the litter without grass, 18.06.2018, 5 ♂ (A. Babytskiy) (No. 581-2, 588, 592, 597); Ukraine, Ternopil Region: outskirts of Strusiv, near "Zorepad" camp, 49.33839° N, 25.63538° E, ca. 355 m a. s. l., hornbeam forest, sweeping, 19.06.2018, 3 ♂ (A. Babytskiy) (No. 612-3, 616); Ukraine, Ternopil Region: outskirts of Strusiv, near "Zorepad" camp, 49.33638° N, 25.63387° E, ca. 370 m a. s. l., hornbeam-oak forest, sweeping above litter and rotten trunks and stumps overgrown by mosses, 19.06.2018, 7 ♂ (A. Babytskiy) (No. 623, 625-6, 628-31); Ukraine, Ternopil Region: outskirts of Luchka, "Zapust" tract, 49.40443° N, 25.61215° E, ca. 335 m a. s. l., oak-hornbeam forest, sweeping, 27.06.2018, 1 ♂ (A. Babytskiy) (No. 688); Ukraine, Ternopil Region: outskirts of Luchka, "Zapust" tract, 49.40638° N, 25.61746° E, ca. 350 m a. s. l., oak-hornbeam forest, wet ravine-old channel of spring, sweeping above thick vegetation of *Aegopodium podagraria* L., 27.06.2018, 2 ♂ (A. Babytskiy) (No. 690-1); Ukraine, Ternopil Region: outskirts of Druzhba, 49.34654° N, 25.66220° E, ca. 370 m a. s. l., hornbeam forest with admixture of birch and merry, sweeping, 28.06.2018, 3 ♂ (A. Babytskiy) (No. 695, 697-8); Ukraine, Ternopil Region: outskirts of Strusiv, 49.34376° N, 25.62999° E, ca. 410 m a. s. l.,



Figs 14–18. *Pseudolycoriella paludum*, male: 14 — hypopygium, ventral view; 15 — gonostylus, medial view; 16 — anterior apex of fore tibia ( $t_1$ ) with tibial organ, lateral view; 17 — maxillary palp, lateral view; 18 — fourth flagellomere, lateral view. Scale bars: 0.10 mm.

hornbeam-oak forest, sweeping along forest road, 30.06.2018, 3 ♂ (A. Babytskiy) (No. 701, 710, 725); Ukraine, Ternopil Region: outskirts of Strusiv, 49.33495° N, 25.63931° E, ca. 380 m a. s. l., young birch-hornbeam-oak forest, sweeping, 30.06.2018, 2 ♂ (A. Babytskiy) (No. 741, 744); Ukraine, Ternopil Region: outskirts of Volia, "Hrabyna" tract, 49.38887° N, 25.62857° E, ca. 375 m a. s. l., oak-hornbeam forest, sweeping, 02.07.2018, 14 ♂ (A. Babytskiy) (No. 750-6, 758-61, 764, 767, 769); Ukraine, Ternopil Region: outskirts of Volia, "Hrabyna" tract, 49.38776° N, 25.62919° E, ca. 360 m a. s. l., oak-hornbeam forest, southern edge of the tract, sweeping on ecotone, 02.07.2018, 13 ♂ (A. Babytskiy) (No. 772-3, 776, 779-84, 786-90); Ukraine, Ternopil Region: outskirts of Volia, "Hrabyna" tract, 49.38776° N, 25.62919° E, ca. 360 m a. s. l., light and wet northern edge of the oak-hornbeam forest dominated by hornbeam and pine and admixture of *Acer platanoides* L., sweeping above thick vegetation, 02.07.2018, 1 ♂ (A. Babytskiy) (No. 792); Ukraine, Ternopil Region: outskirts of Volia, "Zapust" tract, 49.40038° N, 25.62152° E, ca. 350 m a. s. l., oak-hornbeam forest, sweeping along forest road on the edge of the tract, 02.07.2018, 6 ♂ (A. Babytskiy) (No. 794, 800, 803-4, 817, 820).

**Distribution:** Czech Republic, Finland, France (Corsica), Germany, Greece (mainland), Norway, Romania, Russia (North European part), Sweden, Switzerland, Ukraine (**new record**); United Kingdom (Heller & Menzel, 2017; Kolcsár & Heller, 2019; Menzel et al., 2020; this study).

**Diagnosis.** Dark brown species. **Head.** Compound eyes long haired. Eye bridge consists of 2–3 rows of ommatidia. Clypeus with 3–4 short setae. Maxillary palps darkened, consist of three palpomeres, all of them are about the same length, only  $p_2$  is slightly shorter — about twice as long as thick. Basal palpomere without sensory pit and with 2–3 setae (fig. 17). Scape and pedicel of antenna (also sometimes the basal part of the 1<sup>st</sup> flagellomere) yellow, contrasting in color with the remaining flagellomeres. Flagellum slim, 1.3 mm in length; the 4<sup>th</sup> flagellomere 2.5 times as long as wide, with a neck  $\frac{1}{5}$  of the body length (fig. 18). **Thorax** dark brown. Notum weakly sclerotized, covered with sparse short setae. Scutellum with 2 longer setae and 3 shorter setae on both sides. **Wing** brownish with dark veins, 1.8 mm in length, 0.7 mm in width, 2.6–2.8 times as long as wide;  $c = \frac{2}{3} w$ ;  $R/R_1 = 1.5$ ;  $R_1$  with 4–6 macrotrichia, falls into C opposite the end of  $CuA_2$  and well before the base of stM;  $R_5$  barely curved, ventrally bare, ends a little before the end of  $M_2$ ;  $x = y$ , both bare; stM longer than  $M_1$ , easily recognizable in the specimen; M-fork quite broad, 2.7 times as long as wide in the middle;  $M_1$  sharply bent, so the whole fork appears to be bent down and the cell above it is greatly expanded apically; st $CuA_1$  long — as long or almost as long as  $x$ ;  $CuA_1$  and  $CuA_2$  curved. Haltere dark with a light stem and about 8 dorsal short setae. **Legs** weak, brownish-yellow; coxae not shortened, brownish. Tibial organ  $t_1$  with irregular row of bristles with curved margin at apex (fig. 16). Hindleg = 0.63 mm; hindtibia = 0.86 mm; hindmetatarsus = 0.37 mm; hindtarsus = 0.75 mm. **Hypopigium.** Ventral base of genitalia without central basal lobe, only with scattered setae. Gonocoxae well developed, longer than gonostyles, covered with long and thin setae (fig. 14). Gonostyles narrow and attenuated, apex widely rounded with dense, fur-like setae and apical whiplash seta. Apex of gonostyles with only spines among dense bristles, without tooth (fig. 15). Apex of tegmen widely rounded, without finger-like central process (Tuomikoski, 1960; Menzel & Mohrig, 2000).

*Pseudolycoriella* Menzel & Mohrig, 1998 includes about 30 species in the Palaearctic, divided into 3 groups – the *P. bruckii* Group, the *P. morenae* Group and the *P. horribilis* Group (Menzel & Mohrig, 2000). A specific characteristic of the genus *Pseudolycoriella* is the presence of a whiplash seta on the gonostylus, but in contrast to *Lycoriella*, the whiplash seta of *Pseudolycoriella* is usually located apically and directed downward. *Pseudolycoriella paludum* belongs to the richest *P. bruckii* Group and differs from related species by having yellow basal antennal segments — scapus, pedicel and sometimes part of the 1<sup>st</sup> flagellomere.

**Morphological note.** The body length of studied male imagoes reach 2.2–2.3 mm, wing is 1.8–2.3 mm long and 0.8–0.9 mm wide;  $x$  and  $y$  both bare or  $y$  with 1–3 macrotrichia. Biometric indexes of studied specimens: width/length of wing = 0.39–0.45; stM/M-fork = 0.86–0.99;  $R_1/R = 0.45$ –0.72;  $x/y = 0.82$ –1.63; st $CuA/x = 0.63$ –1.03;  $c/w = 0.63$ –0.70. Length of spur/width of tibia: leg 1 = 1.02–1.43, leg 2 = 1.17–1.52; leg 3 = 0.90–1.44. Length of metatarsus/length of tibia: leg 1 = 0.45–0.58, leg 2 = 0.40–0.52, leg 3 = 0.40–0.51. Length of tibia 3/length of thorax is 1.08–1.43.

Genus *Xylosciara* Tuomikoski, 1957

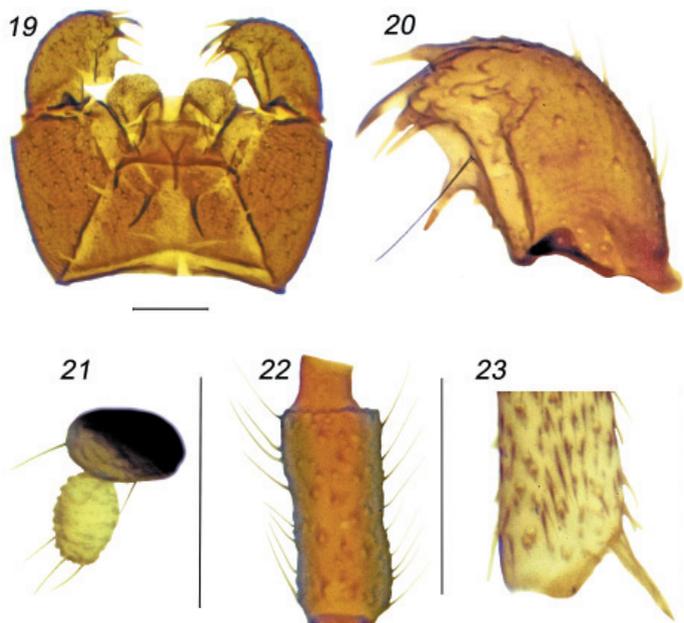
Subgenus *Xylosciara* Tuomikoski, 1957 s. str.

*Xylosciara (Xylosciara) heptacantha* Tuomikoski, 1957 (figs 19–23)

Material examined. Ukraine, Kyiv Region: Kyiv City, Holosiivskiy National Nature Park, 50.37199° N, 30.50525° E, ca. 180 m a. s. l., oak-hornbeam forest with admixture of maple, sweeping above rotten trunk, 10.06.2015, 1 ♂ (A. Babytskiy) (No. 40); Ukraine, Ternopil Region: outskirts of Stinka, Dniester Canyon National Nature Park, 48.91482° N, 25.23508° E, ca. 200 m a. s. l., left bank of Seret River, coastal beech-hornbeam forest, sweeping, 09.08.2016, 1 ♂ (A. Babytskiy) (No. 74); Ukraine, Ivano-Frankivsk Region: between Nezvysko and Luka, 48.78303° N, 25.25203° E, ca. 200 m a. s. l., right bank of Seret River, coastal beech forest, sweeping around spring, 10.08.2016, 1 ♂ (A. Babytskiy) (No. 57).

Distribution: Austria, Czech Republic, Estonia, Finland, Germany, Ireland, Luxembourg, Norway, Russia (Southern Siberia; Far East: Kuril Islands), Slovakia, Sweden, Switzerland, The Netherlands, Ukraine (**new record**), United Kingdom (Gerbachevskaja-Pavluchenko, 1986; Menzel et al., 2006; Heller, 2011 (in part); Komarov, 2011; Heller & Weber, 2013; Heller & Menzel, 2017; Menzel et al., 2020; this study).

Diagnosis. Dark brown species. **Head** capsule is rounded-ovoid. Maxillary palps short and swollen, yellow, consisting of two palpomeres. Basal palpomere short and club-like, with a field of sensilla and 3 setae (fig. 21). Antennae brown; flagellomeres with protruding bristles, as long as the flagellomere width; the 4<sup>th</sup> flagellomere 2 times as long as wide, neck  $\frac{1}{4}$  of the body length (fig. 22). **Thorax** brown. Katepisternum large, flat and wedge shaped, pointing backwards. Mesonotum and scutellum very flat and attenuated. **Abdomen** long and attenuated, accounting for most of the body length. **Wing** 2.3 mm long, with a large anal area. M-fork long and curved, approximately the same length as stM. R<sub>1</sub> clearly shorter than R, y in some specimens is very short, doesn't exceed half-length of x; stCuA sometimes indistinct. Haltere light brown, concolorous with abdomen; with long stem. **Legs** slender and attenuated, paler than body and thorax, brownish-yellow. Spurs short, shorter than tibial width. Tibial organ t<sub>1</sub> with sparse bristles, not arranged in a row or patch (fig. 23). **Hypopygium** wider than long, the base of gonocoxae without differentiation or bristle group (fig. 19). Gonostylus oval, with a whiplash seta and 5–7 strong spines on



Figs 19–23. *Xylosciara heptacantha*, male: 19 — hypopygium, ventral view; 20 — gonostylus, ventral view; 21 — maxillary palp, lateral view; 22 — fourth flagellomere, lateral view; 23 — anterior apex of fore tibia (t<sub>1</sub>) with tibial organ, lateral view. Scale bars: 0.10 mm.

raised sockets — 4–6 apical and 1 mesial, located clearly far from the other (fig. 20). Apex of tegmen with short central bridge, genital apodeme short (Tuomikoski, 1957, 1960; Gerbachevskaja, 1969; Menzel & Mohrig, 2000).

*Xylosciara* Tuomikoski, 1957 s. l. is divided into 2 subgenera — *Protoxylosciara* Tuomikoski, 1960 with only 2 species and *Xylosciara* Tuomikoski, 1957 s. str., which includes about 20 mainly xylophilic species in the Palaearctic. From related species, *X. heptacantha* can be distinguished by the large mesial megaseta lying isolated more basally than the other megasetae on the gonostylus. *Xylosciara heptacantha* is similar to *X. acanthaformis* Mohrig & Mamaev, 1983, but the latter species has a more attenuated gonostylus and a larger number of aedeagal teeth on the tegmen — ca. 50, compared with 30 in *X. heptacantha* (Hippa & Vilkkamaa, 2004).

**Morphological note.** The body length of studied male imagoes reach 1.8–2.0 mm, wing is 1.1–1.4 mm long and 0.5 mm wide; x and y both bare. Biometric indexes of studied specimens: width/length of wing = 0.37–0.44; stM/M-fork = 0.92–1.10; R<sub>1</sub>/R = 0.53–0.68; x/y = 1.12–2.81; stCuA/x = 0.32–0.46; c/w = 0.60–0.72. Length of spur/width of tibia: leg 1 = 0.75–0.99, leg 2 = 0.61–0.86; leg 3 = 0.56–0.90. Length of metatarsus/length of tibia: leg 1 = 0.43–0.48, leg 2 = 0.39–0.40, leg 3 = 0.33–0.37. Length of tibia 3/length of thorax is 0.77–0.97.

We consider it our pleasant obligation to express sincere gratitude to our colleagues and friends, who supported our work, among them, Valery Korneyev (I. I. Schmalhausen Institute of Zoology, NAS of Ukraine, Kyiv, Ukraine) for his ongoing help, scientific guidance and valuable advice, and Frank Menzel (Senckenberg Deutsches Entomologisches Institut, Müncheberg, Germany) for his kind help in identification of the specimens. Special thanks are due to Igor S. Kvach, ex-director of the Tsumanska Puscha National Nature Park (Kivertsy, Volyn Region), for his permission and assistance in carrying out expeditions in the park. We also thank two anonymous reviewers for their valuable comments.

## References

- Babytskiy, A. 2018. Sciaridae dataset. Dataset ID #3861. In: *UkrBIN: Ukrainian Biodiversity Information Network* [public project & web application]. UkrBIN, Database on Biodiversity Information. Available from: <http://www.ukrbn.com>.
- Babytskiy, A. I., Zuieva, O. A., Bezsmertna, O. O. 2018. *Peyerimhoffia vagabunda* — new sciarid species (Sciaridae, Diptera) for the entomofauna of Ukraine. *Biosystems Diversity*, **26** (3), 245–249. <https://doi.org/10.15421/011837>
- Babytskiy, A. I., Moroz, M. S., Kalashnyk, S. O., Bezsmertna, O. O., Dudiak, I. D., Voitsekhivska, O. V. 2019 a. New findings of pest sciarid species (Diptera, Sciaridae) in Ukraine, with the first record of *Bradysia difformis*. *Biosystems Diversity*, **27** (2), 131–141. <https://doi.org/10.15421/011918>
- Babytskiy, A. I., Zuieva, O. A., Bezsmertna, O. O., Dudiak, I. D. 2019 b. The First Records of *Corynoptera* species (Diptera, Sciaridae) from Ukraine. *Vestnik Zoologii*, **53** (3), 227–236. <https://doi.org/10.2478/vzoo-2019-0022>
- Babytskiy, A. I., Bezsmertna, O. O., Moroz, M. S., Pavliuk, S. D., Honcharenko, B. V. 2020. New Records of *Bradysia* Species (Diptera, Sciaridae) from Ukraine. *Zoodiversity*, **54** (4), 329–340. <https://doi.org/10.15407/zoo2020.04.329>
- Bukowski, W., Lengersdorf, F. 1936. Neue Lycoriiden-Arten aus der Krim. *Konowia*, **15** (1–2), 106–112.
- Frey, R. 1948. Entwurf einer neuen Klassifikation der Mückenfamilie Sciaridae (Lycoriidae). II Die nordeuropäischen Arten. *Notulae Entomologicae*, **27** (2–4), 33–112.
- Gerbachevskaja, A. A. 1969. Sciaridae (Lycoriidae) family. In: G. Y. Bei-Bienko, ed. *Keys to the insects of the European Territory of the USSR. Vol. V. Diptera, Siphonaptera. Part 1*. Nauka, Leningrad, 320–356 [In Russian].
- Gerbachevskaja-Pavluchenko, A. A. 1986. Family Sciaridae. In: Soós, Á. Papp, L., eds. *Catalogue of Palaearctic Diptera, Volume 4: Sciaridae–Anisopodidae*, Akadémiai Kiadó, Budapest, 11–72.
- Heller, K. 2011. Sciaridae (Diptera: Sciaroidea) aus dem Naturreservat “De Kaaistoep”, Niederlande. *Studia dipterologica*, **17** (1–2) (2010), 172–176.
- Heller, K., Menzel, F. 2017. Fauna Europaea: Sciaridae. In: P. L. T. Beuk, T. Pape, eds. *Fauna Europaea: Diptera, Nematocera. Fauna Europaea, database version 2017.06*, <https://fauna-eu.org>, Museum für Naturkunde, Leibniz-Institut für Evolutions- und Biodiversitätsforschung, Berlin (accessed 01.07.2021).
- Heller, K., Weber, D. 2013. Trauermücken (Diptera: Sciaridae) aus Höhlen des Großherzogtums Luxemburg. In: D. Weber, ed. *Die Höhlenfauna Luxemburgs. Ferrantia*, **69**, Musée national d'histoire naturelle du Luxembourg, Luxembourg, 320–336.
- Heller, K., Vilkkamaa, P., Hippa, H. 2009. An annotated check list of Swedish black fungus gnats (Diptera, Sciaridae). *Sahlbergia*, **15** (1), 23–51.

- Hippa, H., Vilkkamaa, P. 2004. The genus *Xylosciara* Tuomikoski (Diptera, Sciaridae): phylogeny and review of the species. *Acta Zoologica Fennica*, **214**, 1–38.
- Hippa, H., Vilkkamaa, P., Heller, K. 2010. Review of Holarctic *Corynoptera* Winnertz, 1867, s. str. (Diptera, Sciaridae). *Zootaxa*, **2695**, 1–197. <https://doi.org/10.11646/zootaxa.2695.1.1>
- Kolcsár, L.-P. & Heller, K. 2019. First DNA barcodes and records of Sciaridae (Insecta, Diptera) from Romania. *Turkish Journal of Zoology*, **43** (3), 290–296. <https://doi.org/10.3906/ZOO-1801-6>
- Komarov, S. S. 2011. Sciarids (Diptera, Sciaridae) of Horniy Altai. *Thesis*, Novosibirsk, 1–244 [In Russian].
- Menzel, F. 1998. 21. Sciaridae. In: Merz, B., Bächli, G., Haenni, J.-P., Gonthier, Y., eds. *Fauna Helvetica 1. Diptera – Checklist*. Centre suisse de cartographie de la Faune / Schweizerische Entomologische Gesellschaft, Neuchâtel, 126–130.
- Menzel, F., Gammelmo, Ø., Olsen, K. M. & Köhler, A. 2020. The Black Fungus Gnats (Diptera: Sciaridae) of Norway – Part I: species records published until December 2019, with an updated checklist. *ZooKeys*, **957**, 17–104. <https://doi.org/10.3897/zookeys.957.46528>
- Menzel, F., Mohrig, W. 1997: 2.6. Family Sciaridae. In: L. Papp, B. Darvas, eds. *Contributions to a Manual of Palaearctic Diptera (with special reference to flies of economic importance), Volume 2, Nematocera and Lower Brachycera*. Science Herald, Budapest, 51–69.
- Menzel, F., Mohrig, W. 2000. Revision der paläarktischen Trauermücken (Diptera: Sciaridae). *Studia dipterologica* Supplement 6 (1999), Ampyx-Verlag, Halle an der Saale, 1–761.
- Menzel, F., Salmela, J. & Vilkkamaa, P. 2020. New species and new records of black fungus gnats (Diptera: Sciaridae) from the Viidumäe Nature Reserve, Estonia. *European Journal of Taxonomy*, **720**, 62–76. <https://doi.org/10.5852/ejt.2020.720.1115>
- Mohrig, W., Heller, K., Hippa, H., Vilkkamaa, P. & Menzel, F. 2013. Revision of Black Fungus Gnats (Diptera: Sciaridae) of North America. *Studia dipterologica*, **19** (1–2) (2012), 141–286.
- Mohrig, W.; Krivosheina, N., Mamaev, B. 1985. Beiträge zur Kenntnis der Trauermücken (Diptera, Sciaridae) der Sowjetunion. Teil VIII: Neue Arten aus europäischen Gebieten. *Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie*, **112** (3), 299–310.
- Mohrig, W., Krivosheina, N., Mamaev, B. 1989 a. Beiträge zur Kenntnis der Trauermücken (Diptera, Sciaridae) der Sowjetunion. Teil XII: Gattung *Bradysia*, Serie 1. *Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie der Tiere*, **116** (4), 411–425.
- Mohrig, W., Krivosheina, N., Mamaev, B. 1989 b. Beiträge zur Kenntnis der Trauermücken (Diptera, Sciaridae) der Sowjetunion Teil XIII: Gattung *Bradysia*, Serie 2. *Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie der Tiere*, **116** (4), 427–445.
- Mohrig, W., Krivosheina, N., Mamaev, B. 1990. Beiträge zur Kenntnis der Trauermücken (Diptera, Sciaridae) der Sowjetunion. Teil XIV: Gattungen *Plastosciara*, *Lycoriella* und *Scatopsiara*. *Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie*, **117** (1), 11–21.
- Mohrig, W., Mamaev, B., Krivosheina, N. 1987. Beiträge zur Kenntnis der Trauermücken der Sowjetunion (Diptera, Sciaridae). Teil XI. Neue Arten aus der zentral-asiatischen autonomen Sowjetrepublik Tuwa. *Zoologische Jahrbücher, Abteilung für Systematik, Ökologie und Geographie*, **114** (1), 91–104.
- Mohrig, W., Rulik, B., Papp, L. 2001. Sciaridae. In: Papp, L., ed. *Checklist of the Diptera of Hungary*. Hungarian Natural History Museum, Budapest, 119–123.
- Pape, T., Thompson, F. C., eds. 2019. Systema Dipteroorum (version 2.0, Jan 2011). In: Roskov, Y., Abucay, L., Orrell, T., Nicolson, D., Bailly, N., Kirk, P. M., Bourgoin, T., DeWalt, R. E., Decock, W., De Wever, A., Nieukerken, E., Zarucchi, J., Penev, L. 2019. *Species 2000 & ITIS Catalogue of Life*, <http://www.catalogueoflife.org/> (accessed 01.07.2021).
- Rudzinski, H.-G. 2000. Neue Trauermücken aus der tschechischen und der slowakischen Republik. *Mitteilungen des Internationalen Entomologischen Vereins*, **25** (3–4), 167–184.
- Tuomikoski, R. 1957. Beobachtungen über einige Sciariden (Dipt.), deren Larven in faulem Holz oder unter der Rinde abgestorbener Bäume leben. *Annales Entomologici Fennici*, **23** (1), 3–35.
- Tuomikoski, R. 1960. Zur Kenntnis der Sciariden (Dipt.) Finnlands. *Annales Zoologici Societatis Zoologicae Botanicae Fennicae "Vanamo"*, **21** (4), 1–164.
- Vilkkamaa, P. 2014. Checklist of the family Sciaridae (Diptera) of Finland. In: Kahanpää, J., Salmela, J., eds. *Checklist of the Diptera of Finland*. *ZooKeys*, **441**, 151–164.
- Vilkkamaa, P., Hippa, H. 2005. Phylogeny of *Peyerimhoffia* Kieffer, with the revision of the species (Diptera: Sciaridae). *Insect Systematics & Evolution*, **35**(4), 457–480. <https://doi.org/10.1163/187631204788912445>
- Vilkkamaa, P., Menzel, M. 2019. Re-classification of *Lycoriella* Frey sensu lato (Diptera, Sciaridae), with description of *Trichocoelina* gen. n. and twenty new species. *Zootaxa*, **4665**, 1–67. <https://doi.org/10.11646/zootaxa.4665.1.1>
- Winnertz, J. 1868. Acht neue Arten der Gattung *Sciara*. *Verhandlungen der zoologisch-botanischen Gesellschaft in Wien*, **18**, 533–540.

Received 2 October 2021

Accepted 3 November 2021