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A new species of *Hellichiella* (Diptera: Simuliidae) with 11-segmented antenna from the Eocene

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ABSTRACT

We synonymize *Hellichiella pugach* Perkovsky & Sukhomlin, 2015 with *Greniera yankovskyi* Perkovsky & Sukhomlin, 2015 (Stegopterniini) based on the holotype and female paratype of *H. pugach* (Stegopterniini). *Hellichiella polessica* n. sp. differs from *Hellichiella oligocenica* (Rubtsov, 1936) (the only species of *Hellichiella* known in Baltic amber) by its smaller body, narrower head, 11-segmented antenna, greater number of upper corneal facets, cylindrical metabasitarsus, and narrowed gonostylus. Our findings show three species of blackflies in Rovno amber: *Greniera ukrainica* Perkovsky & Sukhomlin, 2015 and *G. yankovskyi* Perkovsky & Sukhomlin, 2015 (Stegopterniini) and *Hellichiella polessica* n. sp. (Nevermanniini).

KEYWORDS: Rovno amber, Eocene, Simuliidae, *Hellichiella*, blackflies.

INTRODUCTION

In the extant world blackfly fauna, there are three genera and 43 species belonging to the tribe Stegopterniini Enderlein, 1930 and 13 genera and 738 species in the Nevermanniini Enderlein, 1921. Most species of both tribes feed on birds, although they can also attack mammals, including humans (Yankovsky 2002; Adler & Crosskey 2015). Five fossil species of Stegopterniini are known; these are *Greniera ukrainica* Perkovsky & Sukhomlin, 2015 and *Greniera yankovskyi* Perkovsky & Sukhomlin, 2015 from the Rovno amber (Perkovsky & Sukhomlin 2015), and three species — *Greniera affinis* (Meunier, 1904), *Greniera importuna* (Meunier, 1904), *Greniera pulchella* (Meunier, 1904) — from the Baltic amber (Meunier 1904). A single fossil genus and species was previously known in the Nevermanniini, *Hellichiella oligocenicum* Rubtsov, 1936, from the Baltic amber (Rubtsov 1936). Recently Perkovsky and Sukhomlin (2015) described *Hellichiella pugach* from the Rovno amber. Further examination and comparison of the holotype and paratype of *H. pugach* with descriptions of fossil and modern species prompted their reassignment to the genus *Greniera* based on their 10-segmented antenna and the presence of the basal medial cell in their wings. Thus, members of the genus *Greniera* clearly dominate Rovno amber blackflies.

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Herein, we describe a new blackfly species from the Rovno amber. *Hellichiella polessica* n. sp. is assigned to this genus based on its 11-segmented antenna with the pedicel considerably longer than the third antennomere, non-pubescent anepisternal membrane and katepisternum, the wing without medial cell, well developed and large calcipala, and the absent pedisulcus.

MATERIALS AND METHODS

All Rovno amber blackflies discussed here save for the specimen UA-28008 (see Perkovsky & Sukhomlin, 2015) were undoubtedly excavated from the Pugach quarry, near the Klesov village in the Rovno Region. The specimen K-9812 was found in a clear piece of amber (65×36×18 mm, weight 16.3 g) from a representative collection. The material including types are housed in the amber collection of the Schmalhausen Institute of Zoology, National Academy of Sciences of Ukraine, Kiev (SIZK). The specimens were photographed using a Leica 165 M microscope with an Olympus SZX10 and Olympus CX41 camera.

TAXONOMY

Tribe Stegopterniini Enderlein, 1930
Genus *Greniera* Doby & David, 1959
Greniera yankovskyi Perkovsky & Sukhomlin, 2015

Greniera yankovskyi Perkovsky & Sukhomlin, 2015: 50, pl. VII, fig.1
Hellichiella pugach Perkovsky & Sukhomlin, 2015: 51, pl. VII, fig.2, **n. syn.**

Scrutiny of the holotype of *Hellichiella pugach* showed that it must be attributed to the genus *Greniera* based on the following characters: 10-segmented antenna, presence of the basal medial cell in the wing and developed albeit small calcipala. The specimen is assigned to species *Greniera yankovskyi* based on the following combination of features: short maxillary palp, large palpomere 2, palpomere 4 not longer than palpomeres 2 and 3 combined, basal radial cell short (0.25 wing length). The female paratype SIZK K-26804 of *H. pugach* also belongs to *G. yankovskyi*.

Tribe Nevermanniini Enderlein, 1921
Genus *Hellichiella* Rivosecchi & Cardinali, 1975
Hellichiella polessica Perkovsky & Sukhomlin, n. sp.
(Figs 1–25)

Hellichiella pugach [*partim*]: Perkovsky, Sukhomlin, 2015: 51, pl. VII, fig. 3.

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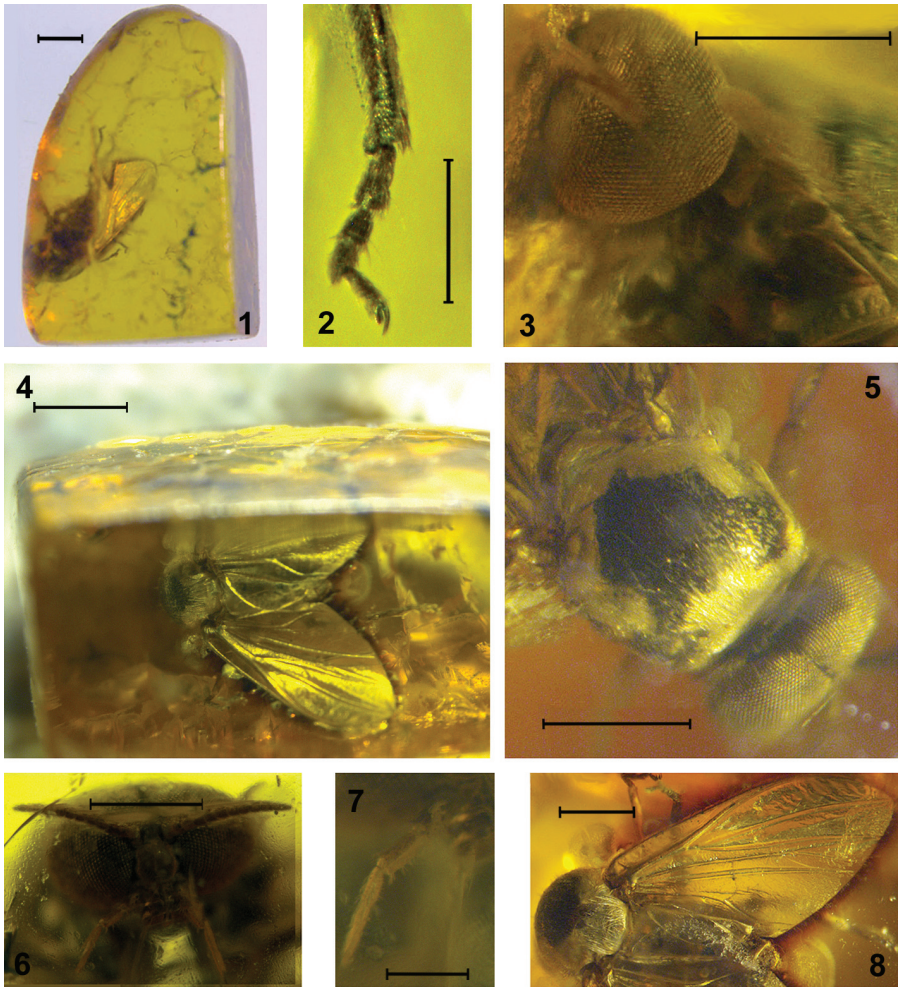
Etymology: From Polesie, the natural and historical region of Eastern Europe, where the holotype was found.

Description: Female (Figs 1–15). *Head* slightly smaller than thorax. Clypeus convex, rounded-square. Antenna 11-segmented, pedicel considerably longer than

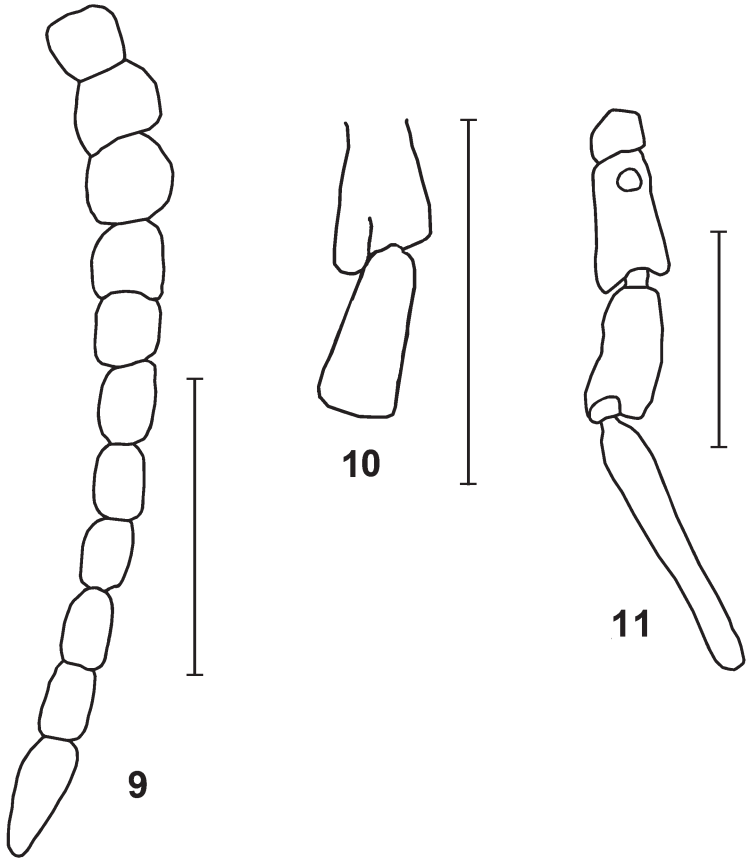


Figs 1–8. *Hellichiella polessica*, holotype: (1) general lateral view, (2) calcipala and pedisulcus, (3) thorax, (4) general dorsal view, (5) scutum, (6) antenna and clypeus, (7) maxillary palp, (8) wing. Scale bars (mm): Figs 1, 4 – 1, Figs 2, 7 – 0.2, Figs 3, 6 – 0.5, Figs 5, 8 – 0.6.

scape or antennomere 3. Maxillary palp long; palpomere 4 long, distinctly longer than palpomeres 2 and 3 together.

Thorax. Scutum evenly setose. Silvery spots visible on anterior scutum and along posterior margin. Anepisternal membrane non-pubescent. Katepisternum bare.

Wing. Radial sector not branched. Basal radial cell short, 0.2 wing length. Basal medial cell absent. Medial veins (M1, M2) merge at posterior margin of cell, form short stem.

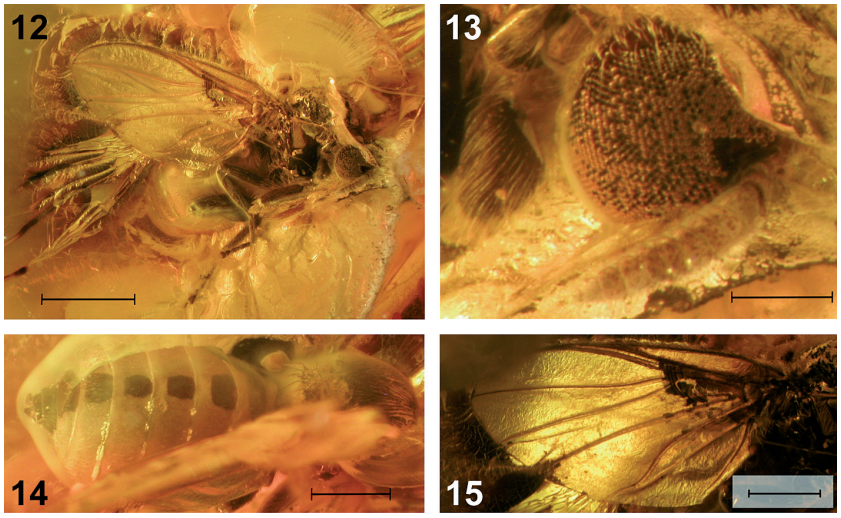


Figs 9–11. *Hellichiella polessica*, holotype: (9) antenna, (10) calcipala and pedisulcus, (11) maxillary palp. Scale bars 0.2 mm.

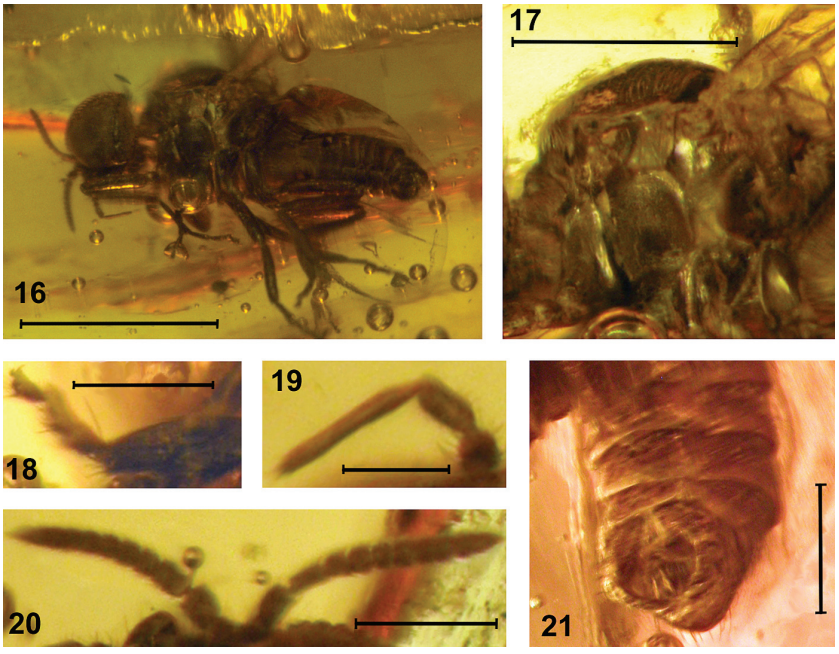
Legs in holotype spotted, hind tibia yellow, darkened apically (hind tibia dark in paratype). Basitarsi of all legs cylindrical. Calcipala well developed, large; pedisulcus invisible. Claw with large tooth basally.

Abdomen (in holotype invisible dorsally). In paratype tergites III–VI reduced, indicating possibility of bloodsucking habit. Morphology of abdominal sclerites in female paratype conforms those of extant species *Hellichiella rivi* (Ivashchenko, 1970) (Grjaznov 1984).

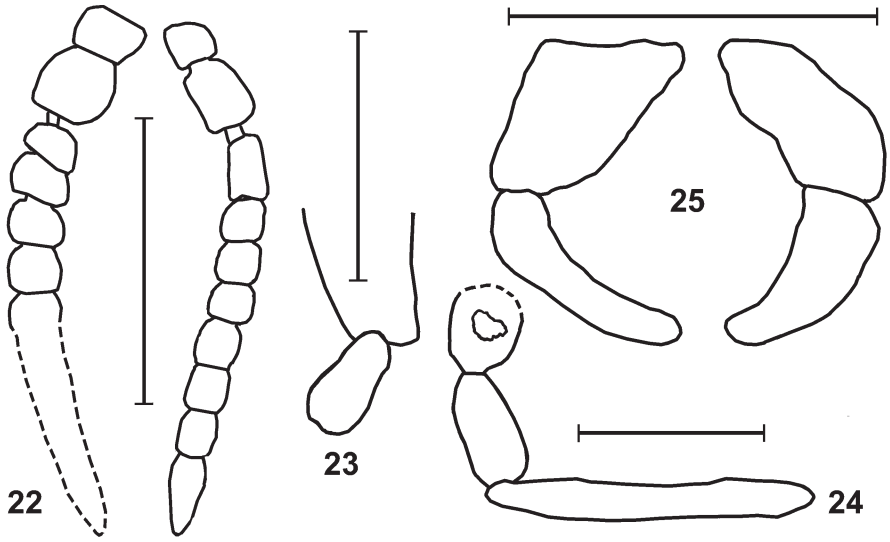
Male (Figs 16–25). *Head* slightly smaller than thorax, *ca* 5× as long as body. Antenna 11-segmented, pedicel considerably longer than scape and almost equal to antennomere 3. Maxillary palp long; palpomere 4 long, distinctly longer than palpomeres 2 and 3 together. Eyes with distinctly separated upper and lower corneal facets; facets numerous, forming more than 15 rows.



Figs 12–15. *Hellichiella polessica*, paratype SIZK K-9812: (12) general lateral view, (13) antenna, (14) abdomen and scutum, (15) wing. Scale bars (mm): Fig. 12 – 1, Fig. 13 – 0.2, Figs 14, 15 – 0.5.



Figs 16–21. *Hellichiella polessica*, paratype SIZK K-26871: (16) general view, (17) thorax, (18) calcipala and pedisulcus, (19) maxillary palp, (20) antennae, (21) male genitalia. Scale bars (mm): Fig. 16 – 1, Fig. 17 – 0.5, Figs 18, 20, 21 – 0.2, Fig. 19 – 0.1.



Figs 22–25. *Hellichiella polessica*, paratype SIZK K-26871: (22) antennae, (23) calcipala and pedisulcus, (24) maxillary palp, (25) gonocoxites and gonostyli. Scale bars (mm): Figs 22, 23, 25 – 0.2, Fig. 24 – 0.1.

Thorax. Scutum evenly setose, without pattern. Silvery spots visible on anterior, lateral scutum and along posterior margin. Anepisternal membrane nonpubescent. Katepisternum bare.

Wing. Both hair-like and spine-like seta clearly present on costa.

Legs mostly dark. Basitarsus of all legs cylindrical. Calcipala well developed, large; pedisulcus absent.

Abdomen. Silvery spots on abdominal sternites absent. Gonocoxite large, trapezoid, resembling those of recent species of *Hellichiella* and *Boreosimulium* Rubtzov & Yankovsky, 1982 (Yankovsky 2002). Gonostylus triangular, narrowed towards apex, slightly curved.

Measurements (mm). Holotype: wing length, 2.09; head width, 0.87; maxillary palp length, 0.48; antenna length, 0.59. Paratype female: body length 2.63; head length 0.48; wing length 2.20; wing width 0.175; antenna length 0.47. Paratype male: body length, 1.93; head length, 0.37; maxillary palp length 0.28; palpomere 4 0.17; antenna length 0.37.

Material examined: Ukraine: Holotype ♀ (SIZK UA-28008): Rovno amber, Late Eocene [well preserved, well visible in dorsal and lateral views, and partly ventrally]. Paratypes: 1♀ (SIZK K-9812) Klesov, Rovno amber, Late Eocene [satisfactorily preserved, partly visible in dorsal and ventral views; syninclusions: Sciaroidea, stellate hairs]; 1♂ (SIZK K-26871); Klesov, Rovno amber, Late Eocene [moderately well preserved, clearly visible in ventral view and poorly visible in dorsal view; syninclusion: Acari: Erythraeidae, Fig. 26].

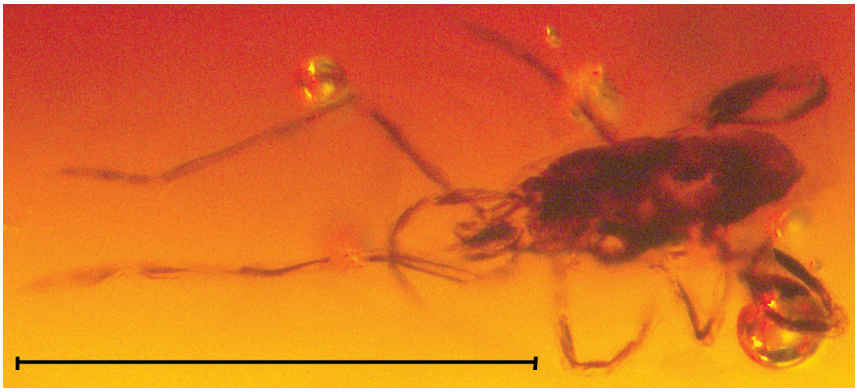


Fig. 26. A mite (Acari: Erythraeidae) found with *H. polessica* paratype SIZK K-26871. Scale bar, 0.6 mm.

Comparison: The new species differs from *H. oligocenica* (Rubtsov, 1936) (the only *Hellichiella* species known from the Baltic amber) in having a smaller body, narrower head, 11-segmented antenna, greater number of upper corneal facets, cylindrical metabasitarsus, and a narrowed gonostylus. The species differs from extant *Hellichiella* species by silvery spots on scutum and a slightly curved gonostylus. Most extant species have characteristic pattern—three lighter longitudinal bands—on the scutum in females, which we have not observed.

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