

Nasiternella regia, a redescription
of the adult and neotype designation (Diptera: Pediciidae)

Jaroslav STARÝ¹⁾ & Jozef OBOŇA²⁾

¹⁾Neklanova 7, CZ-779 00 Olomouc-Nedvězí & Silesian Museum, Tyršova 1, CZ-746 01 Opava, Czech Republic; e-mail: stary.cranefly@gmail.com

²⁾Department of Biology and General Ecology, Faculty of Ecology and Environmental Sciences, Technical University, T.G. Masaryka 24, SK-960 53 Zvolen, Slovakia; e-mail: xobonaj@tuzvo.sk

Abstract. *Nasiternella regia* Riedel, 1914 (Diptera: Pediciidae) is redescribed from new material collected in Slovakia, and the first illustrations of the male and female terminalia are provided. A neotype of the species is designated.

Key words. Diptera, Pediciidae, *Nasiternella regia*, redescription, male and female terminalia, neotype designation, Slovakia

Introduction

Nasiternella Wahlgren, 1904 (= *Nasiterna* Wallengren, 1881, preoccupied by *Nasiterna* Wagler, 1832 (Aves: Psittaciformes)) is a small pediciid genus comprising only six species worldwide, viz. *N. grallator* Alexander, 1962 (Oriental), *N. hyperborea* (Osten Sacken, 1861) (Nearctic), *N. ignara* (Alexander, 1950) (Oriental), *N. regia* Riedel, 1914 (Palearctic), *N. tjederi* Alexander, 1962 (Oriental), and *N. varinervis* (Zetterstedt, 1851) (syn. *N. hokkaidensis* Alexander, 1934) (Palearctic) (OOSTERBROEK 2012). From all other European pediciid genera *Nasiternella* clearly differs in a supernumerary cross-vein in cell M (Fig. 1). Outside Europe, however, there are other genus-group taxa with a supernumerary cross-vein in cell M, such as *Amalopinodes* Alexander, 1949, *Heterangaeus* Alexander, 1925, *Malaisemyia* Alexander, 1950, *Polyangaeus* Doane, 1900, and others, but these either have additional supernumerary cross-veins in other wing cells or/and r-m connected with R_{5+6} , and lacking R_{4+5} (so-called capture of R_4 by R_{2+3} by ALEXANDER 1927, 1930). In *Nasiternella*, cell R_4 is petiolate, with R_{4+5} developed (Fig. 1), as e.g. in *Tricyphona* Zetterstedt, 1837. The male terminalia of *Nasiternella* are distinctive by having the gonocoxite comparatively short and broad with a powerful apical lobe that projects beyond the gonostylus such that the latter arises from the medial wall of the gonocoxite at about its midlength or even closer towards its base.

Nasiternella regia was described by RIEDEL (1914) from a single female collected in Romania, then deposited in the Hungarian Natural History Museum, Budapest. Subsequently,

records from Albania and Austria were published by LACKSCHEWITZ (1940) based on additional material from the Naturhistorisches Museum, Wien. Altogether five specimens (1 ♂ 4 ♀♀) were recorded, including the holotype female; the record from Austria (Wien-Schönbrunn) suggested the occurrence of the species in Central Europe. However, despite its considerable size and conspicuousness, and despite efforts by the senior author, *N. regia* was not rediscovered and became a somewhat enigmatic species. It was only in 2010–2012 that the junior author found both larvae and pupae of this species, and later also the adults, in water-filled tree holes in deciduous forests in Slovakia. The larva and pupa of *N. regia* were described recently (OBOŇA & STARÝ 2013). As the original description of the species (RIEDEL 1914) was based on a female, and, moreover, the holotype was aberrant in the wing venation, we here give a redescription of the adult from new material and provide the first illustrations of the male and female terminalia. In addition, we designate a neotype of *N. regia*.

Material and methods

The morphological terminology adopted here essentially follows McALPINE (1981) except for terminology of the wing veins which is in accordance with HENNIG (1954) (Fig. 1).

The following acronyms for museums and collections are used in the text:

HNHM	Hungarian Natural History Museum, Budapest, Hungary;
JSOC	J. Starý collection, Olomouc, Czech Republic;
NHMW	Naturhistorisches Museum, Wien, Austria;
SNMC	Slovenské národné múzeum, Bratislava, Slovakia;
TUZS	Technical University, Zvolen, Slovakia.

Taxonomy

Nasiternella regia Riedel, 1914

(Figs 1–7)

Nasiternella regia Riedel, 1914: 150 (description), Fig. 5 (wings).

Nasiternella regia: LACKSCHEWITZ (1940): 109 (faun. records); SAVCHENKO (1986): 136 (redescription, based on RIEDEL 1914); SAVCHENKO (1989): 33 (references, distribution); SAVCHENKO et al. (1992): 196 (Palearctic catalogue); OOSTERBROEK (2012) (World catalogue).

New type locality. Slovakia, Diviacka Nová Ves (district Prievidza), oak forest northeast of the village, 320 m a.s.l., 48°45'25.1"N, 18°30'43.5"E.

Type material examined. NEOTYPE: ♂ (present designation), "Slovakia 1.10.2011 / Diviacka Nová Ves (distr. / Prievidza), oak forest [7277] / J. Oboňa leg.". Accordingly labelled as neotype ("NEOTYPE / *Nasiternella* / *regia* Riedel / J. Starý & J. Oboňa 2012") (SNMC). The specimen has been pinned and the terminalia have been dissected and placed in a plastic tube with glycerine, pinned with the specimen.

Additional material examined (12 ♂♂ 6 ♀♀): **SLOVAKIA:** the same locality as for neotype, 18.vi.2011 (ex larva, adult emerged 26.x.2011), 1 ♀ (pinned); 30.vii.2011 (ex larva, adult 26.x.2011), 1 ♀ (pinned); 27.ix.2011, 2 ♂♂ (pinned, dried from ethanol); 1.x.2011, 4 ♂♂ (pinned), 1 ♂ 1 ♀ (in ethanol); 2.x.2011, 1 ♂ (pinned); 9.iv.2012 (ex larva, adult 19.x.2012), 1 ♀ (pinned); 26.iv.2012 (ex larva, adult 14.x.2012), 1 ♂ (pinned); 22.v.2012 (ex larva, adult 20.x.2012), 1 ♀ (pinned); 16.ix.2012 (ex pupa, adult 22.ix.2012), 1 ♂ (pinned); 25.ix.2012, 1 ♂ 1 ♀ (pinned), all J. Oboňa leg. (in JSOC, TUZS). **ALBANIA:** Babia, 14.ix.1917, 1 ♂, Kary leg. (NHMW) [not "20.xi." as listed by LACKSCHEWITZ (1940)]. Years ago J. S. had examined the then single existing male of *N. regia* from the NHMW and made a sketch of the terminalia based on a (badly distorted) mount in Canada balsam between celluloid slides, probably prepared by Lackschewitz.

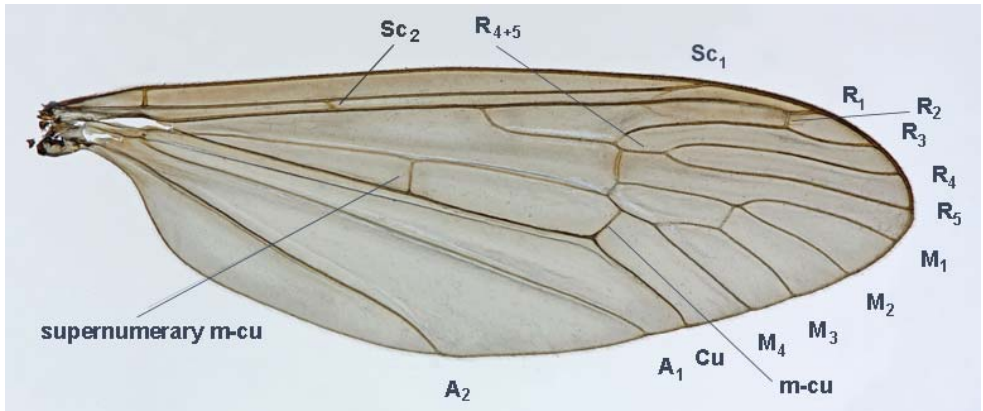
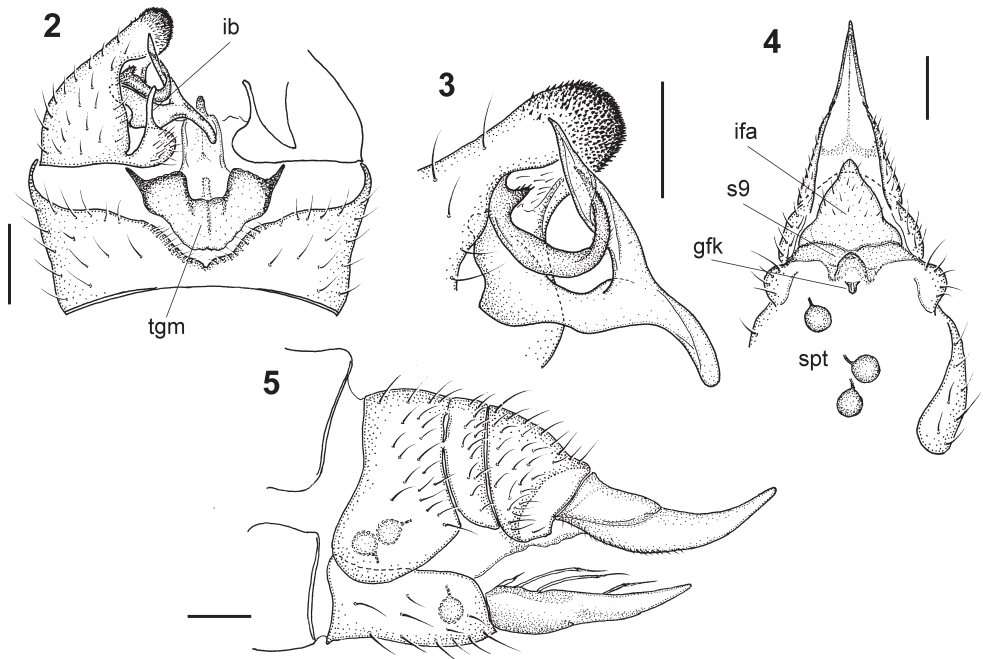
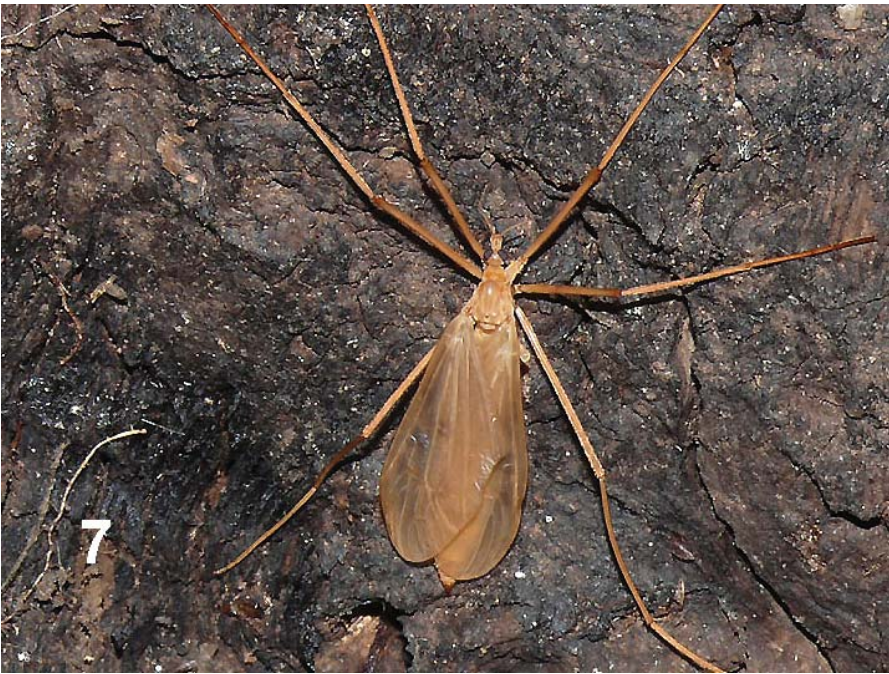
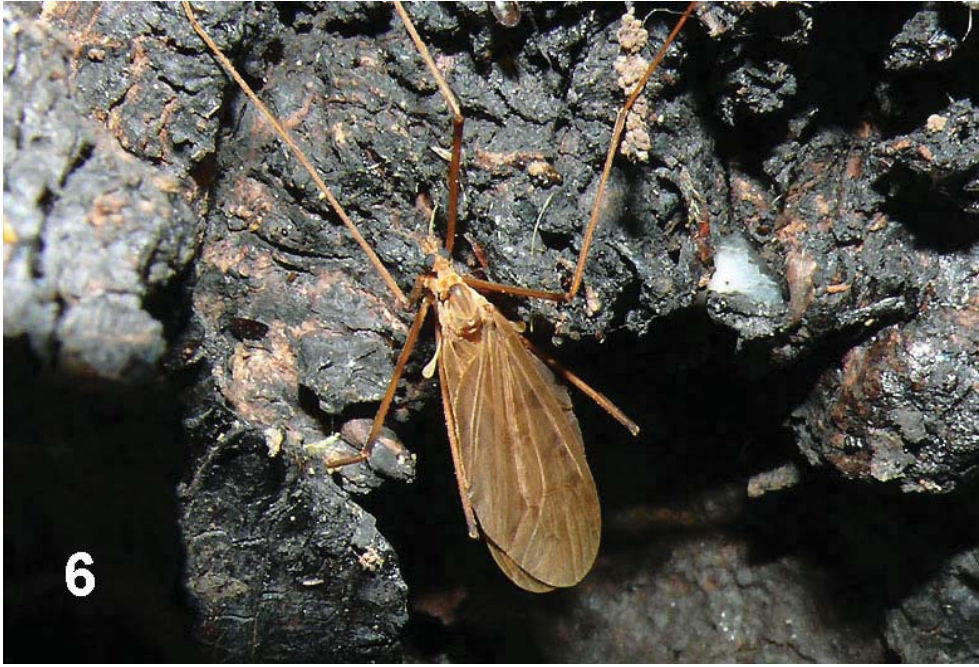


Fig. 1. *Nasiternella regia* Riedel, 1914 (Slovakia, Diviacka Nová Ves). Male wing (photo J. Roháček).



Figs 2–5. *Nasiternella regia* Riedel, 1914. 2–3 – male terminalia: 2 – general view, dorsal; 3 – detail of gonostylus, dorsal; 4–5 – female terminalia: 4 – internal structures, ventral; 5 – general view, lateral. Scale bars = 0.5 mm. Lettering: gfk – genital fork (vaginal apodeme); ib – interbase; ifa – infra-anal (supravaginal) plate; spt – spermathecae; s9 – sternum 9; tgm – tegmen.



Figs 6–7. *Nasiternella regia* Riedel, 1914 (Slovakia, Diviacka Nová Ves). 6 – male (photo J. Starý, 2 Oct., 2011); 7 – female (photo J. Starý, 25 Sept., 2012).

Diagnosis. Very large species. Body colouration yellowish brown. Prescutum with four dark brown stripes. Wing long, broad, intensively tinged with yellowish brown. Male terminalia with gonocoxite short, very broad at base, with powerful apical lobe; gonostylus bipartite, positioned at about midlength of gonocoxite. Female terminalia with cercus moderately upturned, obtuse at tip; spermathecae three, nearly spherical, small, and pale. Body length 15.3–22.6 mm, wing length 20.0–25.7 mm.

Redescription. Male. Head yellowish brown. Antenna short, 15-segmented, sometimes appearing 14-segmented, reaching slightly beyond anterior margin of prescutum. Basal segments yellowish brown, flagellomeres a little darkened distally. Flagellomere 1 subequal in length to scape, flagellomeres 2–10 shorter, short-ovoid, slightly decreasing in length and breadth towards apex of antenna, flagellomere 12 longer, cylindrical, terminal flagellomere somewhat conical, shorter than penultimate. Verticils on flagellomeres short, at most subequal in length to their respective segments, pubescence very short, barely evident. Palpus short, last palpomere about twice length of penultimate.

Thorax yellowish brown, with four dark brown prescutal stripes, inner ones incompletely separated from each other. Wing long, very broad, breadth about one-third its length, intensively tinged with yellowish brown, slightly more so along anterior margin. Veins pale, some cross-veins, especially r-m, slightly darker, with barely evident darkening on wing membrane. Wing generally delicate, veins weak, wing membrane distinctly wrinkled. Wing venation (Fig. 1): Sc_2 more or less oblique, positioned at about two-thirds length of R. Rs arcuated at origin, without any spur. R_4 and R_5 four times (or more) as long as R_{4+5} . Cross-vein r-m connecting R_{4+5} and M_{1+2} . Discal cell closed, distal section of M_{1+2} (beyond discal cell) very short, sometimes cell M_1 almost sessile. Cross-vein m-cu at about one-third length of M_{3+4} (lower side of discal cell). Supernumerary cross-vein in cell M distinctly before origin of Rs. Distance between of A_2 and A_1 at wing margin about six times or more that of A_1 and Cu. Halter yellowish brown. Legs yellowish brown, femora and tibiae with darker apices, distal tarsal segments darker. Metatarsus of fore leg subequal in length to tibia. Tarsal claws simple, lacking teeth along inner margin, slightly less than half length of last tarsal segment.

Abdomen yellowish brown, distal tergites incompletely dark brown medially, tracing out longitudinal stripe. All tergites very slightly darkened laterally. Male terminalia (Figs 2–3) yellowish brown. Segment 9 (basal ring) dorsally: short, broad, transverse, with median emargination at posterior margin; edge of emargination slightly darkened, with fringe of fine setae; ventrally: about twice as long as dorsally, thus gonocoxite connected to segment 9 at almost right angle. Gonocoxite generally short, very broad, inflated proximally, in distal third tapered into massive, broadly rounded apical lobe, at apex densely covered with black spinules. Gonostylus bipartite from base, arising roughly at midlength of gonocoxite. More proximal part of gonostylus, slightly more ventral in position, smooth, generally sinuous, obtuse at apex, with long, retrorse, somewhat twisted arm at about two-thirds its length, subacute at tip, extending back above inner margin of apical lobe of gonocoxite. More distal and dorsal part of gonostylus somewhat darker, covered with microscopic hairs distally, recurved at about midlength, with acute tip touching retrorse arm of proximal part of gonostylus, more or less rolled up in more proximal part. Small hump tipped with a few spinules present at outer base of distal part of gonostylus. Interbase pale, slender rod, obtuse at apex, arising from basal inner wall of gonocoxite. Aedeagal complex pale and comparatively inconspicuous, as

usual for Pediiciidae, except for large, transverse, median, darkly pigmented plate (tegmen of EDWARDS 1938 and DIENSKÉ 1987), situated dorsally slightly proximally of bases of gonocoxites, shaped as in Fig. 3 (tgm), and normally partly concealed by membranous proctiger (the latter removed in Fig. 3).

Female. In general appearance resembling male. Female terminalia (Figs 4–5) with cercus moderately long, gently upturned, obtuse at tip. Infra-anal plate triangular, rounded at apex, sparsely covered with setae. Sternite 9 as in Fig. 4 (s9), forming transverse blade with elevated crescent-shaped central structure. Presumed genital fork very small, close to sternite 9. Hypogynial valve with four slender processes at inner margin, each tipped with seta, their lengths and configuration as in Fig. 5. Spermathecae three, nearly spherical, small, and weakly sclerotized, with sclerotized parts of ducts about half diameter of spermatheca.

Larva and pupa. For descriptions see OBOŇA & STARÝ (2013).

Differential diagnosis. The family Pediiciidae contains some very large taxa such as *Pedicia* (s. str.) Latreille, 1809 and *Malaisemyia*. Within the genus *Nasiternella*, however, *N. regia* is quite unique in its size, being more than twice as large as its congeners. Beside its size, *N. regia* is distinctive by colouration of the wings. These are plain but intensively tinged with yellowish brown, whereas the wings in the other *Nasiternella* species are either conspicuously spotted (*N. hyperborea*, *N. ignara*, *N. varinervis*) or crossbanded (*N. tjederi*), or reduced to brachypterous condition in both sexes (*N. grallator*) (ALEXANDER 1916, 1919, 1934, 1950, 1962). The structure of the male terminalia in *N. regia* suggests a closer relationship only to *N. tjederi* (India: Sikkim) based on the shape of the gonostylus which is bipartite in both species (Figs 2–3, cf. ALEXANDER 1962: Fig. 47). *Nasiternella regia* seems not to be as closely related to its European congener, *N. varinervis*. It should be noted that none of the specimens examined here has any abnormalities in the wing venation, as had both wings as illustrated for the female holotype of *N. regia* (RIEDEL 1914: Fig. 5).

Comment on neotype designation. *Nasiternella regia* was described by RIEDEL (1914) from a single female collected at Brassó (= Braşov) in Romania in a paper titled “Neue und wenig bekannte Limnobiiden aus dem Ungarischen National-Museum” [= New and little-known Limnobiidae from the Hungarian National Museum]. In the description, the depository of the holotype was again indicated (“Ung. Nat.-Mus.”, RIEDEL 1914: 150). No type, or any other specimen of *N. regia* is preserved in the HNHM, where it was most probably destroyed by fire during the Soviet army invasion in 1956 (G. Lengyel, pers. comm.). To fix the identity of the species, a neotype is designated here.

Biology. The immatures of *N. regia* were found to develop in water-filled tree holes, dendrotelmata, mostly of oak trees (OBOŇA & STARÝ 2013). Of 18 specimens listed here from Slovakia (see above) 12 were captured in nature and 6 were reared from larvae/pupae. Of the adults collected from the field, all but one were taken from within tree holes during the day in sunny weather. To learn something about night activities of adults, on September 25, 2012, we adopted equipment used by collectors of moths, viz. a white vertical sheet illuminated with a mercury-vapour lamp. No specimen of *N. regia* was attracted to this light, although weather conditions seemed to be suitable. While searching with an electric torch during that same night a male was found on a tree trunk a short distance from his hollow. Adults appear to be negatively phototropic, leaving their shelters perhaps at twilight or by night, or maybe just on cloudy days, but their activity is likely to be mostly limited to crawling up and down

the trees, because, despite their large wings, they seem to be bad fliers. A specimen removed from the tree hole and released from the hand took a short descending flight and settled to rest on the trunk of a nearby tree. This behaviour as well as the late imaginal occurrence (late September to early October) may be reasons for the seeming rarity of *N. regia* (this paper).

Distribution. Albania, Austria (LACKSCHEWITZ 1940), Romania (RIEDEL 1914), Slovakia (OBOŇA & STARÝ 2013, this paper).

Discussion. The original description of *N. regia* (cf. RIEDEL 1914) gave mostly external characters; the female terminalia were only inadequately mentioned. Both wings were illustrated (RIEDEL 1914: Fig. 5), aberrant in the wing venation in a different manner, and the abnormalities were referred to in detail. Based on the external characters other than the wing venation, however, it is clear beyond any doubt that our examined specimens belong to *N. regia*.

Acknowledgements

We are indebted to Gábor Lengyel (HNHM) for information on the HNHM collection. Fenja Brodo (Ottawa, Canada) kindly checked and improved the English of this article. For making a picture of the wing of *N. regia* we are grateful to Jindřich Roháček (Slezské zemské museum, Opava, Czech Republic). The work of the senior author was supported by grant No. IGS201103 from the Silesian Museum, Opava, Czech Republic.

References

- ALEXANDER C. P. 1916: New or little-known crane-flies from the United States and Canada: Tipulidae, Ptychopteridae, Diptera. Part 3. *Proceedings of the Academy of Natural Sciences of Philadelphia* **68**: 486–549.
- ALEXANDER C. P. 1919: The crane-flies of New York. Part I. Distribution and taxonomy of the adult flies. *Cornell University Agricultural Experiment Station, Memoir* **25**: 767–993.
- ALEXANDER C. P. 1927: The interpretation of the radial field of the wing in the nematocerous Diptera, with special reference to the Tipulidae. *Proceedings of the Linnean Society of New South Wales* **52**: 42–72.
- ALEXANDER C. P. 1930: A comparison of the system of nomenclature that have been applied to the radial field of the wing in the Diptera. *Proceedings of the Fourth International Congress of Entomology* **2**: 700–707.
- ALEXANDER C. P. 1934: New or little-known Tipulidae from eastern Asia (Diptera), XVIII. *Philippine Journal of Science* **53**: 267–300.
- ALEXANDER C. P. 1950: Entomological results from the Swedish expedition 1934 to Burma and British India. Diptera: Tipulidae – Pediciini. Collected by René Malaise. *Arkiv för Zoologi* **42A**: 1–21.
- ALEXANDER C. P. 1962: New or little-known Tipulidae from eastern Asia (Diptera), XLIX. *Philippine Journal of Science* **90**: 155–214.
- DIENSKE J. W. 1987: An illustrated key to the genera and subgenera of the Western Palaearctic Limoniidae (Insecta: Diptera), including a description of the external morphology. *Stuttgarter Beiträge zur Naturkunde (A)* **409**: 1–52.
- EDWARDS F. W. 1938: British short-palped craneflies. Taxonomy of adults. *Transactions of the Society for British Entomology* **5**: 1–168.
- HENNIG W. 1954: Flügelgeäder und System der Dipteren unter Berücksichtigung der aus dem Mesozoikum beschriebenen Fossilien. *Beiträge zur Entomologie* **4**: 245–388.
- LACKSCHEWITZ P. 1940: Die paläarktischen Limnophilinen, Anisomerinen und Pediciinen (Diptera) des Wiener Naturhistorischen Museums. *Annalen des Naturhistorischen Museums in Wien* **50** (1939): 68–122.
- McALPINE J. F. 1981: Morphology and terminology – adults. Pp. 9–63. In: McALPINE J. F., PETERSON B. V., SHEWELL G. E., TESKEY H. J., VOCKEROTH J. R. & WOOD D. M. (eds.): *Manual of Nearctic Diptera I*. Monograph No. 27. Research Branch, Agriculture Canada, Ottawa, 674 pp.

- OBOŇA J. & STARÝ J. 2013: Description of the larva and pupa of *Nasiternella regia* (Diptera: Pediciidae) from Slovakia, with notes on ecology and behaviour. *Biologia* (Bratislava) **68**: 345–350.
- OOSTERBROEK P. 2012: *Catalogue of the craneflies of the World (Insecta, Diptera, Nematocera, Tipuloidea)*. Version 10 March 2012 [online]. Available from <http://ip30.eti.uva.nl/ccw/>
- RIEDEL M. P. 1914: Neue und wenig bekannte Limnobiiden aus dem Ungarischen National-Museum (Dipt.). *Annales Musei Nationalis Hungarici* **12**: 146–152.
- SAVCHENKO E. N. 1986: *Limoniidae (Introduction, Pediciinae, Hexatomiinae)*. Fauna Ukrainy 14(2). Naukova Dumka, Kiev, 380 pp. (in Russian).
- SAVCHENKO E. N. 1989: *Komary-limoniidy fauny SSSR. [Limoniid-flies of the fauna of the USSR]*. Akademia Nauk Ukrainskoi SSR, Naukova Dumka, Kiev, 377 pp. (in Russian).
- SAVCHENKO E. N., OOSTERBROEK P. & STARÝ J. 1992: Family Limoniidae. Pp. 183–369. In: SOÓS Á., PAPP L. & OOSTERBROEK P. (eds.): *Catalogue of Palaearctic Diptera, 1*. Hungarian Natural History Museum, Budapest, 520 pp.