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**A new species of *Empis* Linnaeus, 1758 (Diptera: Empididae)
from Morocco, with a key to *Coptophlebia*-like species
of the Mediterranean basin**

**Новый вид рода *Empis* Linnaeus, 1758 (Diptera: Empididae)
из Марокко, с определителем *Coptophlebia*-подобных видов
Средиземноморского бассейна**

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Key words: Diptera, Empididae, *Empis*, new species, Morocco.

Ключевые слова: Diptera, Empididae, *Empis*, новый вид, Марокко.

Abstract. *Empis* (*Empis*) *nikita* sp. n. is described from Morocco. The new species belongs to a group of species with incomplete vein M_1 that was placed earlier to the subgenus *Coptophlebia* Bezzi, 1909. The new species differs from all species of *Empis* s. str. by the structure of abdominal sternite 7 of the male which has long, horn-like projection curved anteriorly. A key to species of *Empis* s. str. with incomplete vein M_1 known from the Mediterranean basin is compiled for the first time.

Резюме. *Empis* (*Empis*) *nikita* sp. n. описывается из Марокко. Новый вид относится к группе видов с неполной жилкой M_1 , которая ранее помещалась в подрод *Coptophlebia* Bezzi, 1909. Новый вид отличается от всех видов *Empis* s. str. строением 7-го стернита брюшка самца, который имеет длинный роговидный вырост, направленный вперед. Впервые составлен определитель видов *Empis* s. str. с неполной жилкой M_1 , известных из Средиземноморского бассейна.

Introduction

The family Empididae (or dance flies) is a large group of Diptera with about 4000 species distributed worldwide and inhabiting very different biotopes. The Empididae are quite well represented in the Mediterranean basin [e.g., Chvála, 2008; Ivković, Plant, 2015; Ivković et al., 2017]. They are especially diverse in montane and submontane areas and often are a marked element of spring biota. The genus *Empis* Linnaeus, 1758 is one of the largest groups of Empididae, with about 800 species distributed worldwide [Yang et al., 2007], of which about 400 species are known from the Palaearctic [Shamshev, 2016]. The Mediterranean basin has a very specific fauna of *Empis*. Many subgenera of this genus exhibit a high level of the endemism and some of them are distributed almost exclusively within this area, e.g., *Kritempis* Collin, 1926 [Daugeron, 2009].

Our paper includes the description of a new species of *Empis* from Morocco. The wing of the new species has incomplete vein M_1 that is a character used for a long time as a feature of the subgenus *Coptophlebia* Bezzi, 1909 [see for discussion Chvála, 1994; Chvála, Pont, 2015]. Here, we follow a revised definition of this subgenus suggested by Daugeron et al. [2011] and place the new species to *Empis* s. str. A key to species of *Empis* s. str. with incomplete vein M_1 known from the Mediterranean basin is compiled.

Material and methods

This study is based on Empididae Collections housed in Zoological Museum of Moscow University (ZMUM, Moscow, Russia) and the Zoological Institute of the Russian Academy of Sciences (ZIN, St Petersburg, Russia). Pinned, dried specimens were studied. To facilitate observations, the terminalia were macerated in cold 10% KOH, then put for a short period in 85% lactic acid and immersed in glycerine. Terms used for adult structures primarily follow those summarised by Cumming and Wood [2009]. Drawings of morphological features were made with a camera lucida attached to a compound microscope. The photos were produced using a Canon EOS 11 40D digital camera with a Canon MP-E 65 mm objective and were combined using Zerene Stacker 1.04 software. Label data for the holotype are cited from the top downward, with the data from each label in quotation marks. Labels are cited in full, with original spelling, punctuation, and date. Additional information is included in square brackets. The repositories of the types are given in parentheses.

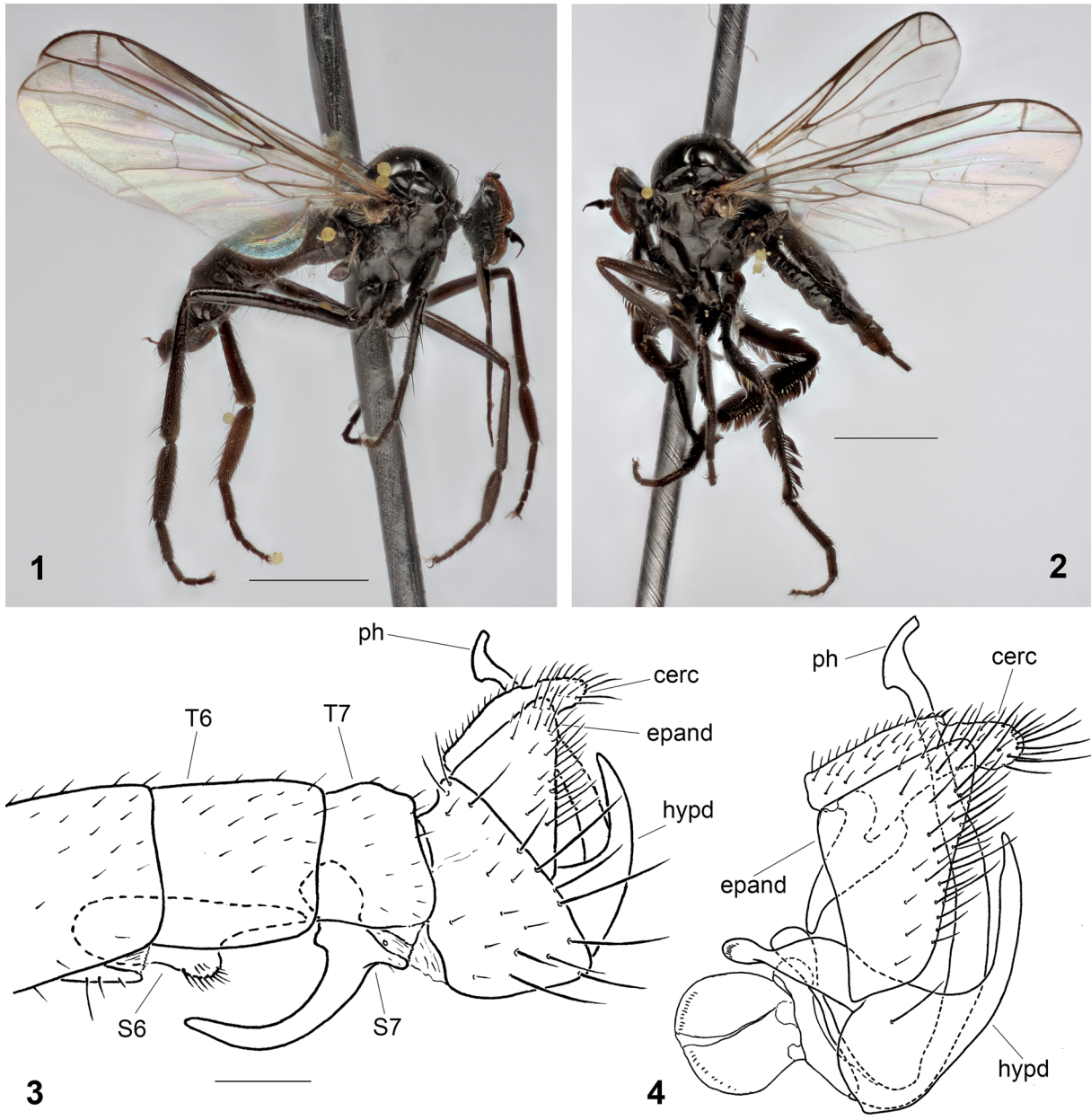
The main source of distributional data is Yang et al. [2007], with some later additions summarised by Shamshev [2016].

Order Diptera Linnaeus, 1758
 Family Empididae Latreille, 1804
 Subfamily Empidinae Schiner, 1862
 Genus *Empis* Linnaeus, 1758
Empis (Empis) nikita Shamshev, sp. n.
 (Figs 1–5)

Material. Holotype, ♂ (ZMUM): “Morocco, ≈ Essaouira dune [31°30'N / 9°46'W] 24Mar2009 N. Vikhrev”, “*Empis (Empis) nikita* Shamshev, sp. n.” (red label). Paratypes: 3♂, 1♀ (ZMUM), 2♂ (ZIN), same data as holotype.

Diagnosis. A small, shiny black species with incomplete vein M_1 and anal vein, proboscis only slightly longer head height, laterotergite with pale setae, wing membrane hyaline, halter black, abdomen pale setose. Male: fore and mid basitarsi slightly thickened; abdominal sternite 7 with long horn-like projection. Female: all legs broadly pennate, including fore and mid tarsi.

Description. Male (Fig. 1). Body length 3.2–3.4 (holotype 3.2) mm; wing length 3.3–3.5 (holotype 3.3) mm. Head black. Eyes holoptic, upper ommatidia enlarged. Frons reduced



Figs 1–4. *Empis (Empis) nikita* sp. n.

1 – male habitus, holotype, lateral view; 2 – female habitus, lateral view; 3 – male postabdomen, lateral view; 4 – male genitalia, lateral view. Abbreviations: cerc – cercus, epand – epandrium, hypd – hypandrium, ph – phallus, S6, S7 – sternites 6 and 7, respectively, T6, T7 – tergites 6 and 7, respectively. Scale bars: 1, 2 – 1 mm; 3, 4 – 0.1 mm.

Рис. 1–4. *Empis (Empis) nikita* sp. n.

1 – габитус самца, голотип, вид сбоку; 2 – габитус самки, вид сбоку; 3 – постабдомен самца, вид сбоку; 4 – гениталии самца, вид сбоку. Сокращения: cerc – церка, epand – эпандрий, hypd – гипандрий, ph – фаллус, S6, S7 – стерниты 6 и 7, T6, T7 – тергиты 6 и 7. Масштабные линейки: 1, 2 – 1 мм; 3, 4 – 0.1 мм.

to small greyish triangular space just above antennae. Face wide, greyish. Occiput faintly greyish pollinose; covered with short black thin setae on upper part and similar pale setae on lower part (longer laterally); ocellar tubercle concolorous with occiput; with 2 thin black moderately long setae and several setulae. Antenna black; scape and pedicel with minute black setulae; postpedicel short, nearly 2.5 times longer than wide, slightly concave on apical part ventrally; stylus about half as long as postpedicel. Proboscis short, labrum only slightly longer than head height; palpus black, with scattered black setulae.

Thorax black; postpronotal lobe and mesonotum very faintly greyish pollinose, almost shiny, remaining prothoracic sclerites and mesopleuron denser pollinose; stronger setae black, otherwise as noted. Prosternum bare. Proepisternum with 4–5 short hair-like pale setae on lower part and 2–3 longer setae on upper part. Antepronotum with 6–7 long pale setae on each side. Postpronotal lobe with 1 moderately long yellowish seta and several setulae. Mesonotal setation: 1 short, hardly prominent, yellowish presutural supra-alar (with additional pale setulae), 3 strong black notopleurals (anterior seta shortest and sometimes yellowish, middle seta longest), 1 short thin yellowish postsutural supra-alar, 1 long black postalar, 2 long black cruciate scutellars, some additional pale setulae present on supra-alar face and on notopleuron; acrostichals yellowish anteriorly and blackish posteriorly, arranged in 2 close irregular rows, very short, hair-like, laterocline, lacking on prescutellar depression; dorsocentrals similar to acrostichals, 1 prescutellar pair long. Laterotergite with numerous pale yellow setae. Anterior and posterior spiracles black.

Legs uniformly blackish brown. Coxae and trochanters with simple pale setae. Fore femur covered with minute setulae. Fore tibia slightly evenly thickened toward apex, pubescent ventrally, covered with short setulae, setae of subapical circler very short. Fore basitarsus thickened, slightly broader than fore tibia at apex, remaining tarsomeres simple; all tarsomeres covered with mostly short setulae, setae of subapical circler mostly very short, somewhat longer on basitarsus (1 anterodorsal seta longest), basitarsus pubescent ventrally. Mid femur with anteroventral and posteroventral rows of numerous brownish yellow to yellowish setae longer on middle portion (longest setae 2–2.5 longer than femur is deep). Mid tibia with 3–4 long anterodorsals (basalmost seta usually shortest), rows of anteroventral and posteroventral short strong setae; setae of subapical circler short. Mid tarsomeres simple, covered with short setae but basitarsus with 1 long subapical anterodorsal seta. Hind femur slender, mostly with pale setation; 4–5 long anterodorsals on basal half, complete row of short to moderately long anteroventrals (at most as long as femur is deep), similar posteroventral setae on about basal half and longer setae closer to base posteriorly, black spinules near apex posteriorly. Hind tibia evenly thickened toward apex; mostly covered with short setae slightly longer closer to apex dorsally, 1 anterodorsal subapical seta longest. Hind basitarsus thickened, nearly as broad as hind tibia at apex; with some stronger short setae dorsally and ventrally.

Wing membrane hyaline; veins mostly brownish, well-sclerotized, M_1 , M_2 and anal vein yellowish brown, thin. Pterostigma distinct, light brownish. Basal costal seta short, black. Radial fork very open, R_4 almost at right angle to R_5 . M_1 and anal vein incomplete. Axillary angle acute but closer to 90°. Calypter dirty yellow, pale fringed. Halter black.

Abdomen black, very faintly greyish pollinose, almost shiny, covered with pale hair-like setae. Sternite 6 (Fig. 3) with deep narrow excision posteriorly, cluster of black spinules in front of anterior margin of excision. Sternite 7 with long, horn-like projection curved forward. Segment 8 with fused tergite and sternite, tergite 8 narrow, broadly convex posteriorly, without projections, bearing 2 long setae laterally; sternite 8 broad, with long posteromarginal setae. Genitalia (Fig. 4) small, mostly black, only phallus reddish brown; cerci and epandrium with short blackish setae. Cerci

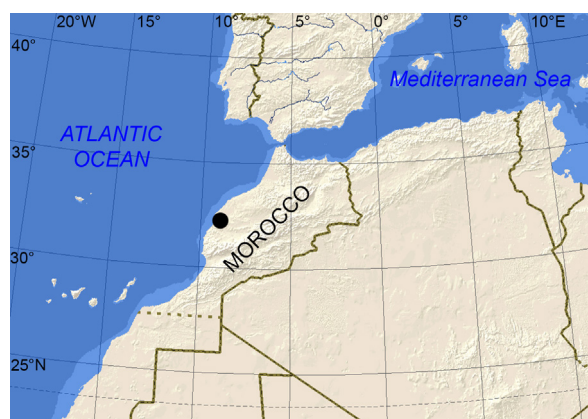


Fig. 5. Distribution of *Empis (Empis) nikita* sp. n.
Рис. 5. Распространение *Empis (Empis) nikita* sp. n.

narrowly fused anteriorly; in lateral view cercus rather elongate oval, produced beyond apex of epandrial lamella, rounded apically; in dorsal view its inner margin with angulate projection closer to middle; covered with mostly short setae longer apically, inner projection with marginal spinules posteriorly. Epandrial lamella subtriangular (lateral view), with moderately long setae along lower margin and apically; hypandrium large, shiny, triangular (ventral view), with elongate pointed apex, 1 short seta laterally; phallus moderately long, somewhat broader on basal part, otherwise thin, evenly curved, with hook-like apex.

Female (Fig. 2). Body length 3.5 mm; wing length 3.6 mm. Similar to male except as follows: eyes dichoptic, all ommatidia small; frons broad, parallel-sided, greyish pollinose, with minute marginal setulae; occiput with sparser and shorter setation, especially pale setae on lower part; ocellars slightly stronger; fore coxa with row of long pennate setae anteriorly, mid coxa with 3 similar setae on outer side; legs more robust; fore femur with anterodorsal row of long pennate setae on about basal 2/3 and anteroventral row of short pennate setae on about basal 1/3; fore tibia pennate posterodorsally on about apical half; mid femur without long setae but long pennate anterodorsally (except subapical part) and posteroventrally (except near base); mid tibia without long setae, with long anterodorsal pennation throughout and shorter posteroventral pennation near base; mid basitarsus covered with simple short setae; hind femur without pale setae, with long pennation dorsally and ventrally throughout; hind tibia with long pennation dorsally throughout and ventrally on about basal half; hind basitarsus rather slender, covered with short simple setae; abdomen with shorter setation, segments 6–8 densely pollinose; cercus slender, long, with dark setulae.

Differential diagnosis. The new species can be readily distinguished from all species of *Empis* s. str. by the structure of abdominal sternite 7 of the male which has long, horn-like projection curved anteriorly. *Empis nikita* sp. n. is close to *E. confluens* Becker, 1907 (known from Spain and Tunisia). However, *E. confluens* has, besides simple abdominal sternite 7 of the male, yellowish halteres.

Distribution. Palearctic: Morocco (Fig. 5).

Habitat and seasonal occurrence. According to label data the new species appears in flight around the end of May. The presence of pollen on the body of several specimens suggests that the new species is an active flower-visitor like other species of *Empis*.

Etymology. The new species is named in honour of the Russian dipterist Nikita Vikhrev (Moscow), who kindly provided his very interesting materials used in this study.

**Key to species of *Empis* s. str. with incomplete vein M₁
of Mediterranean basin**

1. Male 2
– Female (unknown in *E. hoffmannseggii*) 15
2. Prosternum setose. Scutellum with 6–8 setae. Larger, body 5.5 mm (Italy, Portugal)
..... *E. hoffmannseggii* Loew, 1869
– Prosternum bare. Scutellum with 2–4 setae. Smaller, body at most 3.5–4.5 mm 3
3. Halteres yellowish 4
(*E. gravis* Wiedemann, 1822 known from Portugal after the original description only belongs here).
– Halteres blackish to brownish 6
4. Abdominal tergite 7 with large rounded projection dorsally [Chvála, 1994: 139, fig. 243]. Europe
..... *E. albinervis* Meigen, 1822
– Abdominal tergite 7 simple 5
5. Main mesonotal setae black. Europe
..... *E. impennis* Strobl, 1902
– Mesonotum only with pale to yellowish setae. Spain, Tunisia *E. confluens* Becker, 1907
6. Abdominal sternite 7 with very long, horn-like, projection curved anteriorly. Laterotergite and abdomen with pale setae. Morocco *E. nikita* sp. n.
– Abdominal sternite 7 simple. Laterotergite and abdomen except *E. vitripennis* with black setae 7
7. Proepisternum with cluster of 5–8 short spine-like setae on lower part 8
– Proepisternum with hair-like setae 9
8. Fore basitarsus with long, dense, hair-like setae posterodorsally. Europe *E. pilimana* Loew, 1869
– Fore basitarsus covered with short setae. Europe
..... *E. abbreviata* Loew, 1869
9. Fore and mid tarsus with tarsomeres 1–3 greatly dilated (especially those of fore tarsus) and densely clothed with numerous very long setae dorsally. Jordan, Israel ..
..... *E. mirifica* (Collin, 1960)
– Fore tarsus with only tarsomere 1 sometimes slightly thickened, mid tarsus with slender tarsomeres; covered with short setae 10
10. Scutellum with 4 setae (lateral pair short, thin) 11
– Scutellum only with 2 setae 12
11. Anal vein incomplete. Mesonotum densely grey pollinose (dorsal view). Southern Europe
..... *E. pavesii* Bezzi, 1895
– Anal vein complete (faint at middle). Mesonotum subshiny (dorsal view), faintly greyish pollinose. Europe *E. volucris* Wiedemann, 1822
12. Wing membrane milk-white. Southern Europe
..... *E. corcyrica* Bezzi, 1909
– Wing membrane clear or faintly greyish infuscate 13
13. Anal vein complete (faint at middle). Mid tibia with 5–6 long setae dorsally (see also section 11)
..... *E. volucris* Wiedemann, 1822
– Anal vein incomplete. Mid tibia with 2–4 long setae dorsally 14
14. At least anterior abdominal tergites with pale setae. Europe *E. vitripennis* Meigen, 1822
– Abdomen only with black setae. Southern Europe
..... *E. coracina* Bezzi, 1909
15. Halteres yellowish 16
– Halteres blackish 18
16. Hind femur and tibia pennate
..... *E. albinervis* Meigen, 1822
– Legs covered with only simple setae 17
17. Main mesonotal setae black *E. impennis* Strobl, 1902
– Mesonotum only with pale to yellowish setae
..... *E. confluens* Becker, 1907
18. Laterotergite and abdomen with pale setae. Fore coxa with pennate setae *E. nikita* sp. n.
– Laterotergite and abdomen (except *E. vitripennis*) with black setae. Fore coxa with simple setae 19
19. Proepisternum with cluster of 5–8 short spine-like setae on lower part 20
– Proepisternum with hair-like setae 21
20. Mid and hind femora anterodorsally along entire length and anteroventrally on apical third to quarter with flattened hair-like setae (shorter than femur is deep) ...
..... *E. pilimana* Loew, 1869
– Mid and hind femora with simple setae
..... *E. abbreviata* Loew, 1869
21. Legs only with simple setae. Wing membrane milk-white 22
– Some podomeres pennate. Wing membrane clear or faintly brownish infuscate 23
22. Scutellum with 4 setae *E. mirifica* (Collin, 1960)
– Scutellum with 2 setae *E. corcyrica* Bezzi, 1909
23. Fore tibia and basitarsus pennate dorsally. Scutellum with 4 setae 24
– Fore tibia and basitarsus with simple setae. Scutellum with 2 setae 25
24. Anal vein complete (faint at middle)
..... *E. volucris* Wiedemann, 1822
– Anal vein incomplete *E. pavesii* Bezzi, 1895
25. At least anterior abdominal tergites with pale setae. Hind femur pennate ventrally along entire length
..... *E. vitripennis* Meigen, 1822
– Abdomen only with black setae. Hind femur pennate ventrally on about apical half
..... *E. coracina* Bezzi, 1909

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