



A New Species of *Chrysotus* Loew, 1857 (Diptera: Dolichopodidae) from Morocco

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Abstract: The new species *Chrysotus larachensis* sp. n. is described from northern Morocco. This species can be distinguished from the closest *C. collini* Parent, 1923 by the presence of only one broad band-like lateral subapical lobe on the phallus. The male of *C. collini* has a phallus with two rounded-ovate lateral subapical lobes of unequal size. A key to the 11 Mediterranean species of the *Chrysotus gramineus* group (only males) is provided.

Key words: Larache Province, morphology, taxonomy, identification key.

Introduction

The genus *Chrysotus* Loew, 1857 (Diaphorinae) is one of the largest dolichopodid genera with about 550 species worldwide (GRICHANOV 2017a). About 80 species are known from the Palaearctic, which have been keyed most recently by NEGROBOV et al. (2000). FREY (1945) published a key to 22 species of the West Mediterranean Region and adjacent islands of the Atlantic Ocean. GRICHANOV (2007) provided a key to 20 species of *Chrysotus* of the East Mediterranean Region. Later, two new Western-Palaearctic species have been described (NAGLIS 2010, NEGROBOV et al. 2016).

Most of the recently described Oriental and Palaearctic species of *Chrysotus* can be reliably identified and distinguished from the species described longer time ago, primarily by the shape of the male phallus. In contrast, many Neotropical and Nearctic species of the genus bear distinct male secondary sexual characters (MSSC) on legs, head and other parts of the body (see GRICHANOV 2017b and references therein). Recently, CAPELLARI & AMORIM

(2012) commented the status of the type species *Chrysotus nigripes* (Fabricius, 1794) and its possible relation to *C. gramineus* (Fallén, 1823) and *C. laesus* (Wiedemann, 1817).

The Moroccan fauna is largely understudied, with four previously recorded species of *Chrysotus* (see GRICHANOV 2009, EBEJER et al. 2019). An old record of *C. gramineus* from Tanger by PARENT (1924) may belong to the new species described here from El Hamma locality from northern Morocco. Furthermore, we provide an identification key to the Mediterranean species of the *Chrysotus gramineus* group (or subgroup of the *laesus* group).

Materials and Methods

The material cited in this work was deposited at the Zoological Institute of the Russian Academy of Sciences, St. Petersburg (ZIN). Part of the paratypes were deposited in the Institut Scientifique, Université Mohammed V – Agdal, Rabat, and Faculté des Sciences, Université Abdelmalek Essaâdi, Tétouan, Morocco. The specimens of the type series were studied and photographed with a ZEISS Discovery V-12 stereo-microscope and an AxioCam

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MRc5 camera in St. Petersburg. Genitalia preparations were photographed with a ZEISS AxioStar stereo-microscope and an AxioCam ICc3 camera. Morphological terminology and abbreviations followed CUMMING & WOOD (2017) and GRICHANOV & BROOKS (2017). The relative lengths of the antennomeres and podomeres should be regarded as representative ratios and not measurements. Body length was measured from the base of antenna to the tip of abdominal segment 6. Wing length was measured from the base to the wing apex.

The holotype and paratypes were collected with a Malaise trap at El Hamma, a small village in the Larache Province in northern Morocco, in the region of Tanger-Tétouan-Al Hoceïma. The habitat, where the Malaise trap was set up, represented matorral with diversified vegetation that consisted of *Quercus coccifera*, *Olea europaea*, *Fraxinus angustifolia*, *Phillyrea angustifolia*, *Ditrichia viscosa*, *Pistacia lentiscus* and *Erica arborea* (Figs. 1, 2). The region as a whole also contains other plant species endemic to the Spanish/Maghrebi biodiversity hotspot. The Rif Region of Morocco and some mountains in southern Andalusia show very similar environmental conditions, being united in the Intercontinental Biosphere Reserve of the Mediterranean. The Reserve was designated in 2006 by the Man and the Biosphere Programme (MAB) of UNESCO.

Results

Chrysotus gramineus species group

Diagnosis: Body size 1.9–3.2 mm. Eyes contiguous on face or nearly so; antenna with postpedicel about as long as high, without apical incision; lower postocular setae white; palpus small and dark; all coxae and femora black or brown, often shining green; hind trochanter dark, at palest never clear yellow; setae on fore coxa entirely or mainly black or brown; mid tibia with 2 strong anterodorsal bristles; posterodorsals poorly developed on mid tibia. The Mediterranean *Chrysotus monochaetus* Kowarz, 1874 and *C. nudus* Becker, 1918 with mid tibia bearing one anterodorsal bristle (Parent, 1938) may also belong to the *gramineus* group.

Description of the new species

Chrysotus larachensis sp. n. (Figs. 3–4)

Type material. Holotype: ♂, Morocco, Larache Province, El Hamma, 35°23'05"N, 5°30'46"W, 338 m a.s.l., 6–21 June 2016, Malaise trap, K. Kettani Coll. [ZIN]. Paratypes. 5♂, 9♀, same label [ZIN; Institut Scientifique, Université Mohammed V – Agdal, Rabat; Faculté des Sciences, Université Abdelmalek Essaâdi, Tétouan].



Fig. 1. Larache Province, El Hamma: Malaise trap at the type locality of *Chrysotus larachensis* sp. n. Photo K. Kettani, 6 June 2016



Fig. 2. Surrounding landscape at El Hamma. Photo K. Kettani, 6 June 2016.

Description

Male. Length (mm): body 2.0–2.3, wing 2.0/0.8.

Head (Fig. 3A). Distinctly wider than high; frons broad, black with metallic shine, pollinose, slightly wider than high; face linear (MSSC), grey pollinose under antennae; clypeus indistinct; palpus dark, small, with strong black seta; proboscis brownish; pair of strong divergent ocellars; pair of strong verticals; pair of short postvertical setae; row of white postoculars laterally, longest ventrally; about 7 dorsalmost postoculars black; occiput concave, lower head surface with few long scattered pale setae; antennae (Fig. 3B) black, positioned

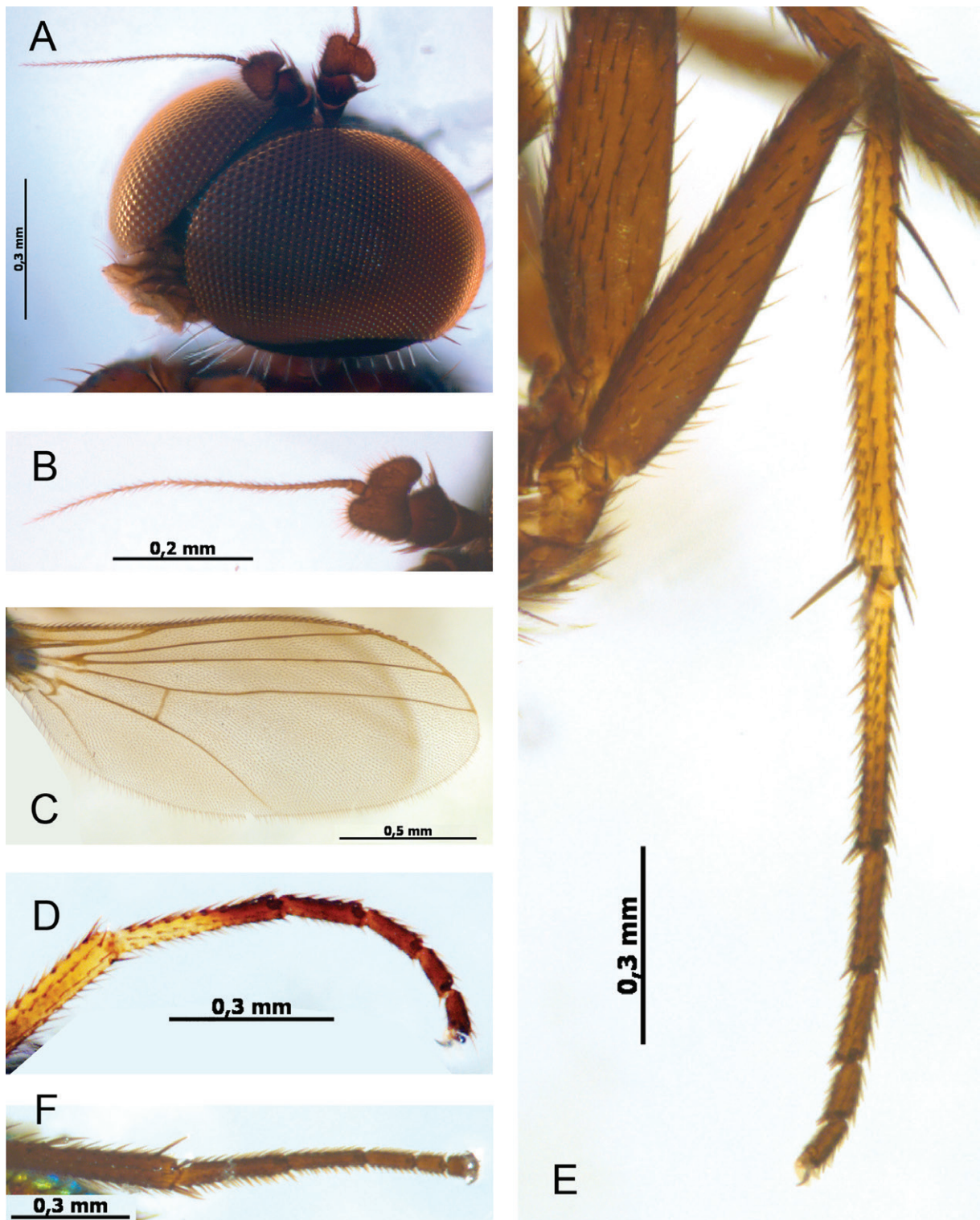


Fig. 3. *Chrysotus larachensis* sp. n., male. A. Head, anterolateral view. B. Antenna. C. Wing. D. Fore tarsus. E. Mid leg. F. Hind tarsus. Photo I. Grichanov.

above middle of head; scape conical, short; pedicel short, with crown of setulae at apex, dorsalmost longer; postpedicel ovate-triangular, higher than long (12/9), clearly pubescent; stylus black, in shallow dorsoapical excavation, bi-articulated at base, pubescent; length ratio of scape to pedicel to post-

pedicel to stylus (1st and 2nd segments), 7/6/9/3/45.

Thorax. Shining blackish-green; mesonotum with copper reflection, weakly pollinose; pleura grey pollinose; acrostichals biseriate, well developed; five pairs of strong dorsocentral bristles; lower surface of proepisternum with two black setae,

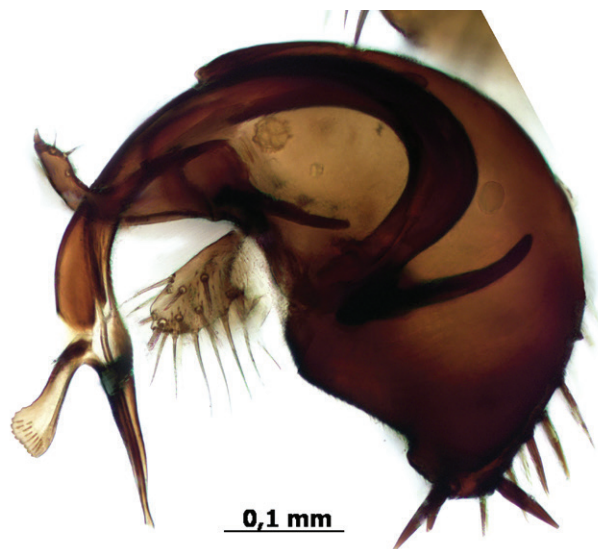


Fig. 4. *Chrysotus larachensis* sp. n., male hypopygium. Photo I. Grichanov.

ventralmost longer; upper surface of proepisternum in front of anterior spiracle bare; scutellum with one pair of strong medial scutellars and one pair of smaller ones.

Wing (Fig. 3C). Membrane hyaline. C ending at wing apex; R_1 ending on basal third of wing; R_{2+3} straight; R_{4+5} and M_{1+2} parallel, slightly bent anteriorly; costal section between R_{2+3} and R_{4+5} nearly twice that of costal section between R_{4+5} and M_{1+2} (31/17); ratio of cross-vein dm-m to distal part of M_4 , 13/57; CuA+CuP distinct; anal lobe small; lower calypter yellow, with brownish white setae; halter yellow.

Legs (Fig. 3D–F). Coxae, hind trochanter and hind tibia black; femora (except distal tips) black, shining green; knees, fore and mid tibiae and basitarsi (except apex) yellow; otherwise tarsi black; fore coxa covered with black hairs and setae; anterior surface of mid coxa with black setae; hind coxa with 1 long black lateral basal seta; fore femur with short setulae, 2–3 setae at apex posteroventrally; mid femur with 3–4 setae at apex anteroventrally; hind femur with conspicuous anteroventral setae at apex; fore tibia simple, with short black setulae and apical setae; mid tibia (Fig. 3E) with black setulae and setae, 1 longer anterodorsal at base, 1 shorter anterodorsal below, no posterodorsals, 4 apical setae including 2 strong ventral setae; hind tibia simple, covered with black cilia, shorter than diameter of tibia, with 2 pairs of antero- and posterodorsal setae, 2 apical setae; hind basitarsus (Fig. 3F) simple, with short black setulae; tarsomere 5 of all tarsi slightly flattened dorsoventrally, with poorly developed pulvilli and distinct claws; podomeres

(from femur to fifth tarsomere, mm) length: fore leg: 0.62/ 0.61/0.32/0.16/0.14/0.08/0.1, mid leg: 0.76/0.79/0.41/0.19/0.14/0.09/0.09, hind leg (Fig. 4): 0.92/0.88/0.28/0.21/ 0.14/0.08/0.09.

Abdomen. Shining dark-green, covered with mainly short black bristles, those of distal margins (including tergum 6) stronger; sterna 2–4 covered with black hairs; segment 8 with short simple black setae and 4 short spines. Hypopygium (Fig. 4). Epandrium black, semiglobular, with posterior angular projection; lateral epandrial lobe slightly projected, bearing 3 setae of different length, basiventral seta absent; surstylus with fused lobes, without subapical tubercle, bearing 1 thick apical spine, 2 subapical ventral setae and 2–3 microscopic subapical setulae; hypandrium short, simple; postgonite short, concealed; phallus thick, long, not serrate dorsally, pointed apically, with 1 broad band-like lateral subapical lobe; cercus elongate-triangular, yellow, covered with long black setae.

Female. Similar to male except lacking MSSC. Face wide, in middle slightly wider than postpedicel height. Length (mm): body 2.5–2.8, wing 2.3/0.9.

Etymology. The new species is named after the Larache Province, where the type material was collected.

Discussion

Differential diagnosis: Following published keys (PARENT 1938, D'ASSIS-FONSECA 1978, NEGROBOV 2000, GRICHANOV 2007), *C. larachensis* sp. n. is close to *C. collini* Parent, 1923, with the type locality Frinton-on-Sea in England [not “Printon”, as PARENT (1923) erroneously wrote]. The latter differs from the new species in the phallus with two rounded-ovate lateral subapical lobes of unequal size (Martin Drake, pers. comm. based on males collected in England). The new species differs from other species of the *gramineus* group in non-thickened hind tibia; one broad band-like lateral subapical lobe on phallus and other characters (see the following key). Females of species related to *C. gramineus* are probably indistinguishable without molecular analysis.

Chrysotus larachensis is remarkable in having the posterior angular projection of the epandrium, a major diagnostic character used by WEI & ZHANG (2010) for the definition of the *laesus*-group for 22 Chinese species of *Chrysotus* (see ZHOU & WEI 2017). In Europe, it seems that only *C. gramineus* and *C. laesus* have this apomorphic feature (CAPELLARI & AMORIM 2012, NAGLIS 2015), both well differing from *C. larachensis* in habitus and MSSC. However, the male genitalia of some European and

Macaronesian species are yet not studied. Therefore, the definition of a new group of *Chrysotus* spp. closely related to *C. gramineus* by their habitus but having no posterior angular projection on the epandrium, seems to be premature.

Key to the Mediterranean species of the *Chrysotus gramineus* group (males)

- 1. Hind femur ventrally with strong setae at least on apical 2/3 2
 – Hind femur ventrally with strong setae at most on apical 1/3 3
- 2. Hind tibia distinctly swollen (NAGLIS 2010: Fig. 6); phallus –?; 2.5 *C. alpicola* Strobl
 – Hind tibia not swollen; phallus with 1 rounded and 1 spicular lateral subapical lobes (NEGROBOV & MASLOVA 1995: Fig. 10); 1.9–2.2 *C. glebi* Negrobov & Maslova
- 3. Fore tibia rusty brown, ciliated above and below; some ventral cilia distinctly longer than diameter of tibia; mid tibia brownish black; phallus with 1 subquadrate and 1 fingerlike lateral subapical lobes (NEGROBOV et al. 2016: Fig. 6); 2.5–3.25 *C. blepharosceles* Kowarz
 – Fore tibia only shortly ciliated, or if cilia longer than normal, then fore and mid tibiae clearly yellow 4
- 4. Postpedicel rounded 5
 – Postpedicel triangular 9
- 5. Postpedicel distinctly reniform, large, at least twice as high as pedicel; all tibiae black or brown, sometimes light brown; phallus with 2 narrow lateral subapical lobes of unequal length (Grichanov, unpubl.); 2.5 *C. obscuripes* Zetterstedt
 – Postpedicel smaller; fore and mid tibiae usually yellow 6
- 6. Legs mostly black with fore trochanter, fore and mid knees brownish or reddish yellow, fore and mid tibiae brownish black; hind tibia not ciliated; 2.0 *C. melampodius* Loew
 – At least fore and mid tibiae entirely or mainly yellow to rusty yellow 7
- 7. Hind tibia densely ciliated, with 3–6 pairs of dorsal setae; phallus with 2 rounded and 1 long spicular lateral subapical lobes (NEGROBOV & CHANDLER 2006: Fig. 2, KAHANPÄÄ & GRICHANOV 2006: Fig. 1b); 2.0–2.75 *C. gramineus* (Fallén)
 – Hind tibia not densely ciliated, with 2 pairs of dorsal setae 8
- 8. Lower calypter with black setae; phallus with 2 rounded-ovate lateral subapical lobes of unequal size (M. Drake, pers. comm.); 2.0 *C. collini* Parent
 – Lower calypter with brownish white setae; phallus with 1 broad band-like lateral subapical lobe (Fig. 4);

- 2.0–2.3 *C. larachensis* sp. n.
- 9. Postpedicel less than 2 times larger than pedicel; phallus practically simple, with 1–2 minute subapical lobes (KAHANPÄÄ & GRICHANOV 2006: Fig. 1a, NEGROBOV & CHANDLER 2006: Figs. 3–4); 2.25 *C. angulicornis* Kowarz
 – Postpedicel more than 2.5 times larger than pedicel 10
- 10. Postpedicel higher than long; phallus with 2 rounded striated lateral subapical lobes (NEGROBOV et al. 2000: Fig. 21); 2.8 *C. peculiariter* Negrobov & Maslova
 – Postpedicel longer than high; phallus with 1 obdeltoid (subtriangular) and 1 fingerlike lateral subapical lobes (NEGROBOV et al. 2000: Fig. 6); 2.1 *C. defensus* Negrobov & Maslova

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