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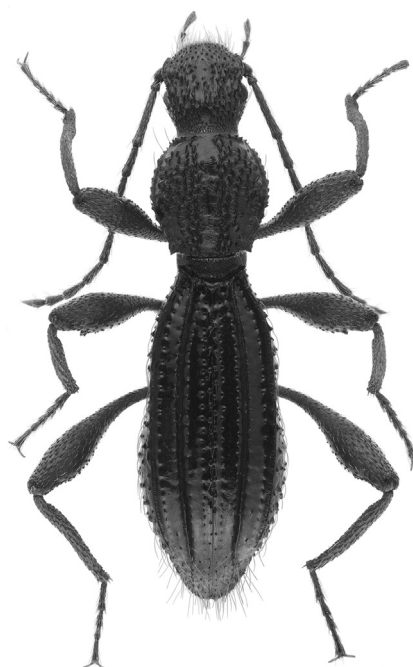


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A new species of *Neurigona* Rondani, 1856 (Diptera: Dolichopodidae) with a key to species from Iran and adjacent countries

© I.Ya. Grichanov¹, E. Gilasian²

¹All-Russian Institute of Plant Protection, Podbelskiy Roadway, 3, St Petersburg, Pushkin 196608 Russia. E-mail: grichanov@mail.ru

²Insect Taxonomy Research Department, Iranian Research Institute of Plant Protection, Agricultural Research, Education and Extension Organization, Yaman str., 1, Chamran Highway, Tehran 19857-13111 Iran

Abstract. A new long-legged fly species, *Neurigona parchamii* sp. n., from the southwestern Iranian province of Khuzestan is described and illustrated. The new species appears to be closely related to *N. euchroma* Negrobov, 1987 known from Uzbekistan, differing from this species by the following characters states: body somewhat longer; fore coxa with yellow bristles apically; mid femur with posteroventral row of mainly yellow bristles, mostly longer than femur height, and the shape of the hypopygium and its appendages. *Neurigona euchroma* has a fore coxa with black bristles at apex; mid femur with ventral row of mainly black bristles, shorter than femur height, and 1–2 light setae at base. A check list and key to 17 species of the genus *Neurigona* Rondani, 1856 of Iran and neighbouring countries are compiled.

Key words: Neurigoninae, *Neurigona*, new species, Palaearctic, Iran, Khuzestan, Karkheh National Park.

Новый вид рода *Neurigona* Rondani, 1856 (Diptera: Dolichopodidae) и определитель видов Ирана и сопредельных стран

© И.Я. Гричанов¹, Э. Гиласян²

¹Всероссийский институт защиты растений, шоссе Подбельского, 3, Санкт-Петербург, Пушкин 196608 Россия. E-mail: grichanov@mail.ru

²Отдел таксономии насекомых, Иранский институт защиты растений, Организация сельскохозяйственных исследований, образования и распространения знаний, ул. Яман, 1, шоссе Чамран, Тегеран 19857-13111 Иран

Резюме. Описан новый вид мух-зеленушек *Neurigona parchamii* sp. n. из иранской провинции Хузестан. Приведены фотографии ключевых признаков самца. Новый вид близок к узбекскому *N. euchroma* Negrobov, 1987, отличается от него несколько большей длиной тела, желтыми щетинками на вершине переднего таза, заднеventральным рядом длинных, в основном желтых щетинок на среднем бедре и морфологией гипопигия. *Neurigona euchroma* описан с черными щетинками на вершине переднего таза и ventральным рядом коротких черных щетинок на среднем бедре. Составлены список и определитель 17 видов рода *Neurigona* Rondani, 1856 Ирана и соседних стран.

Ключевые слова: Neurigoninae, *Neurigona*, новый вид, Палеарктика, Иран, Хузестан, национальный парк Кархе.

Introduction

The genus *Neurigona* Rondani, 1856 with 167 species worldwide comprises 41 species in the Palaearctic region [Grichanov, 2017]. The last key to the Palaearctic species of the genus was published by Negrobov and Fursov [1988]. Grichanov [2010] reviewed and compiled a key to the West-Palaearctic species of *Neurigona*, Yang et al. [2011] revised and keyed the Chinese fauna, and Kazerani et al. [2022] described a new species of the genus from Iran and provided a key to the males of the five species known from this country. Material of a new *Neurigona* species has been found in the collection of the Hayk Mirzayans Insect Museum (HMIM), Iranian Research Institute of Plant Protection (IRIPP, Tehran, Iran), which is considered close to *N. euchroma* Negrobov, 1987 from Uzbekistan, differing from the latter in peculiar characters of leg setation and male genitalia (see diagnosis below).

All specimens were collected in the Karkheh National Park (Fig. 1) situated in the southwestern province of Khuzestan (Irano-Turanian biogeographic zone). The Khuzestan Plain borders Iraq in the west and Persian Gulf in the south. This area has an annual precipitation of 200–300 mm, long, hot and dry summers, and high

atmospheric humidity. The natural vegetation consists mainly of ephemeral forb communities. There are also some permanent rivers, cultivated lands or damper natural habitats [Frey, Probst, 1986; Frey et al., 2001].

Material and methods

The paper is based on the material found in the HMIM collection that will be deposited in the Zoological Institute of the Russian Academy of Sciences (ZISP, St Petersburg, Russia) and in the Hayk Mirzayans Insect Museum. The specimens are mostly preserved in 75% ethanol with the exception of the male holotype and two paratypes mounted on pins.

Specimens have been studied and photographed by I.Ya. Grichanov with a ZEISS SteREO Discovery.V12 modular stereo microscope and an AxioCam MRc5 camera. Morphological terminology and abbreviations follow Cumming and Wood [2017] and Grichanov and Brooks [2017]. The lengths of the antennomeres and podomeres are given in millimetres. Body length is measured from the base of the antenna to the tip of abdominal segment 6. Wing length is measured from the base to the wing apex. Antenna length is measured from the base of the scape



Fig. 1. The type locality of *Neurigona parchamii* sp. n., Karkheh National Park, Khuzestan, Iran.

Рис. 1. Типовое местонахождение *Neurigona parchamii* sp. n., национальный парк Кархе, Хузестан, Иран.

to tip of the arista-like stylus. The figures showing the hypopygium in lateral view are oriented as it appears on the intact specimen, with the morphologically ventral surface of the genitalia facing upwards, dorsal surface downwards, anterior end facing right and posterior end facing left. Closely related *Neurigona* species are usually indistinguishable by females; therefore, they are left unidentified.

Genus *Neurigona* Rondani, 1856

Note. See diagnosis and discussion in Negrobov and Fursov [1988] and Naglis [2003]. The following species are known from Iran and adjacent countries:

Neurigona abdominalis (Fallén, 1823)

Type locality. Not given (Sweden).

Distribution. Russian Caucasus (Krasnodar), Asian Turkey; Europe.

Neurigona bullata Negrobov, 1987

Type locality. Tajikistan: Kurgan-Tyube.

Distribution. Tajikistan.

Neurigona erichsoni (Zetterstedt, 1843)

Type locality. Sweden: "Scania: Lund, Silfakra, Röstanga, Lindholmen, Esperöd, Ostrogothia ad Gusum, Gottenvik, Jonsberg, Gottlandia ad Nähr, insula Furillen".

Distribution. Iran (Gilan, Mazandaran), Russian Caucasus (Krasnodar, Adygea, North Ossetia), Asian Turkey; Europe.

Neurigona euchroma Negrobov, 1987

Type locality. Uzbekistan: Samarqand Region, Kattakurgan, Katta-ming.

Distribution. Uzbekistan.

Neurigona febrilata Negrobov et Fursov, 1988

Type locality. Russia: Krasnodar Region, Caucasian Reserve, Aishkha Pass.

Distribution. Russian Caucasus (Krasnodar).

Neurigona helva Negrobov et Tsurikov, 1990

Type locality. Russia: Krasnodar Region, Khosta environs.

Distribution. Iran (Golestan, Mazandaran), Russian Caucasus (Krasnodar).

Neurigona nubifera (Loew, 1869)

Type locality. "Griechenland".

Distribution. Bosnia and Herzegovina, Croatia, Greece, European Turkey.

Neurigona pallida (Fallén, 1823)

Type locality. Sweden: Scania (= Skåne).

Distribution. Iran (Gilan); West Palaearctic species.

Neurigona persiana Pollet et Kazerani, 2022

Type locality. Iran, Mazandaran Province, Kheirroud Forests, 7 km E of Nowshahr.

Distribution. Iran (Mazandaran).

Neurigona pseudolongipes Negrobov, 1987

Type locality. Russia: Krasnodar Region, Caucasian Reserve, Pshkish Mt.

Distribution. Abkhazia, Iran (Mazandaran), Russian Caucasus (Krasnodar, Adygea, Karachay-Cherkessia).

Neurigona semilata Negrobov et Fursov, 1988

Type locality. Russia: Krasnodar Region, Caucasian Reserve, Guzeripl.

Distribution. Russian Caucasus (Krasnodar, Adygea).

Neurigona sergii Negrobov et Fursov, 1988

Type locality. Tajikistan: Hissar Range, Kondara Gorge.

Distribution. Tajikistan.

Neurigona subcilipes Negrobov et Fursov, 1988

Type locality. Russia: Krasnodar, Caucasian Reserve, Tegenya cordon.

Distribution. Russian Caucasus (Adygea, Krasnodar).

Neurigona suturalis (Fallén, 1823)

Type locality. Sweden: "Esperöd".

Distribution. Russian Caucasus (Krasnodar), Georgia, Asian Turkey; Europe.

Neurigona unicalcarata Negrobov et Fursov, 1988

Type locality. Uzbekistan: Sirdaryo Region, Guliston (40°29'N / 68°47'E).

Distribution. Uzbekistan.

Neurigona uncinata Negrobov et Fursov, 1988

Type locality. Kyrgyzstan: Kyrk-Kichiktau Mts., Kugartsu River basin (41°25'N / 73°20'E).

Distribution. Kyrgyzstan.

Key to species of *Neurigona* of Iran and adjacent countries (males)

Species known from the following countries are included into the key below: Turkey, Russia (North Caucasus), Abkhazia, Georgia, Iran, Uzbekistan, Tajikistan, and Kyrgyzstan. Species of *Neurigona* have not been reported from Armenia, Azerbaijan, Iraq, countries of the Arabian Peninsula, Turkmenistan, Afghanistan or Pakistan [Grichanov, 2017].

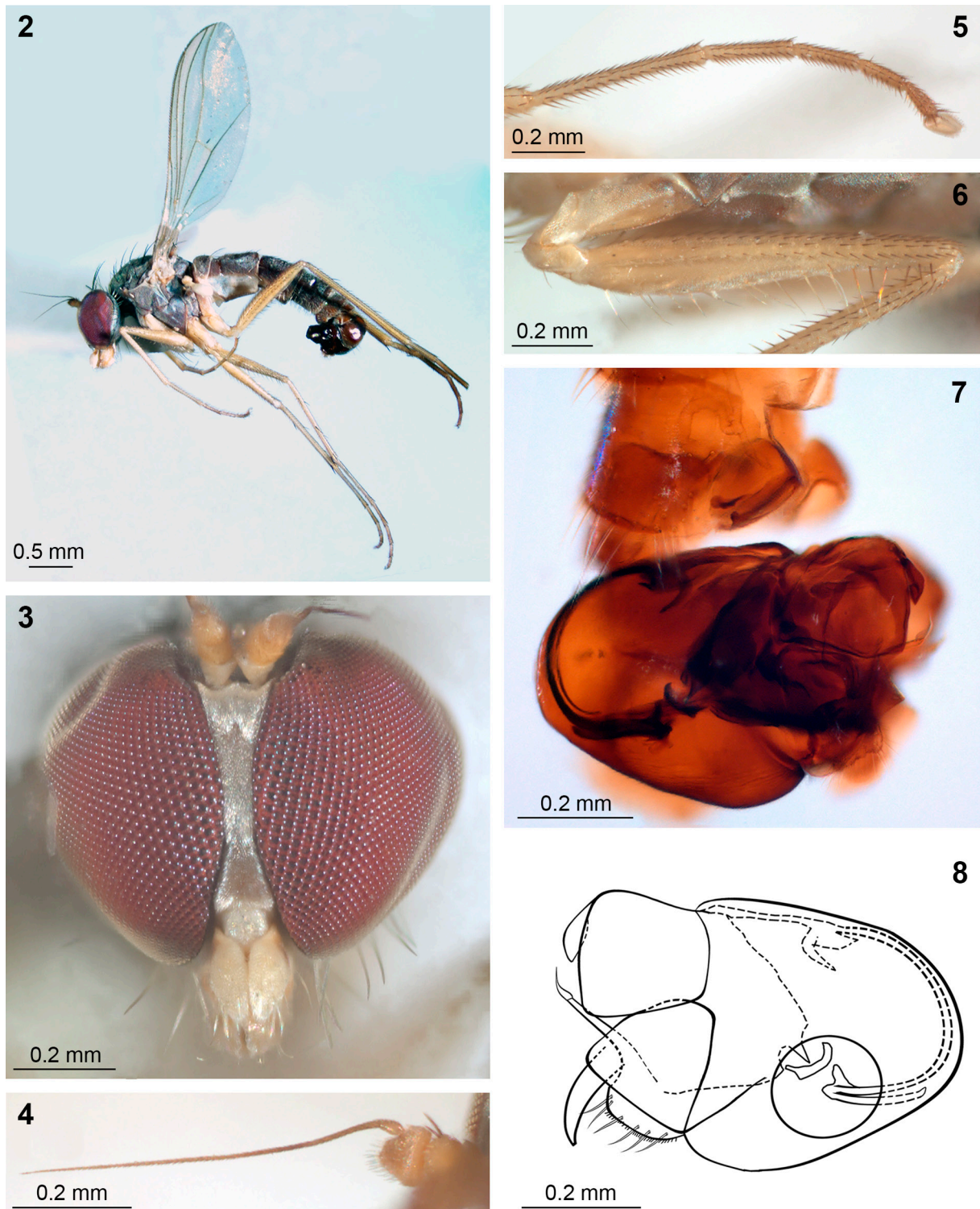
1. Segments 4–5 of fore tarsus long plumose at apex, with anterior setae more developed; mesonotum yellow, shining; body 5–5.4 mm *N. pseudolongipes*
– Apical segments of fore tarsus simple; sometimes segments 4–5 slightly enlarged, flattened or curved, with short erect setae 2
2. Mesonotum entirely yellow, usually slightly shining, without pollinosity 3
– Mesonotum mainly matt-dark, covered with yellowish grey or brownish grey pollinosity 6
3. Abdominal tergite 5 without lateroventral lobes; body 4–4.5 mm *N. erichsoni*
– Abdominal tergite 5 with distinct lateroventral lobes directed downward 4
4. Hypopygium distinctly pedunculate; abdominal tergites 3 and 4 with lateroventral lobes; lateroventral lobes of tergite 5 black at apex; mid femur with 3–5 black flat ventral setae at base; body 6 mm *N. pallida*
– Hypopygium sessile; abdominal tergites 3 and 4 without lateroventral lobes; lateroventral lobes of tergite 5 entirely brown or black; mid femur without black flat ventral setae at base 5
5. Wing anal lobe undeveloped; fore coxa with white spines at apex; body 4.9 mm *N. helva*
– Wing anal lobe well developed; anal angle obtuse; fore coxa with brown bristles at apex; body 2.6 mm
..... *N. sergii*
6. Abdominal tergites 2–4 entirely or almost entirely metallic green 7
– Abdominal tergites 2–4 entirely yellow, or mostly yellow, with dark bands or spots 11
7. Segment 5 of fore tarsus with anterior and posterior rows of strong setae, with very long anterior claw and short posterior claw; body 3.7 mm *N. unicalcarata*
– Segment 5 of fore tarsus without strong setae, with equally long claws 8
8. Hypopygium distinctly pedunculate; abdominal tergite 5 without lateroventral lobes; body 3.3 mm *N. bullata*

- Hypopygium sessile; abdominal tergite 5 with distinct lateroventral lobes 9
- 9. Segment 5 and apex of segment 4 of fore tarsus flattened; scutellum yellow, dark at extreme base; body 4.5 mm ...
..... *N. uncinata*
– Fore tarsus simple; scutellum entirely dark 10
- 10. Fore coxa with black bristles at apex; mid femur with ventral row of mainly black bristles, shorter than femur height, and 1–2 light setae at base; body 2.7–3.2 mm ...
..... *N. euchroma*
– Fore coxa with yellow bristles at apex; mid femur with posteroventral row of mainly yellow bristles, mostly longer than femur height, and few black preapical antero- and posteroventral setae; body 3.6 mm
..... *N. parchamii* **sp. n.**
- 11. Wing with large smoky spot at apex; body 3.5–4 mm ...
..... *N. nubifera*
– Wing without dark spot at apex, sometimes slightly darkened anteriorly 12
- 12. Abdominal tergites 2–4 entirely yellow 13
– At least some of abdominal tergites 2–4 with large brown or black spots 14
- 13. Wing vein M_{1+2} straight or nearly straight; R_{4+5} and M_{1+2} almost parallel; segment 5 of fore tarsus weakly modified; body 4–5 mm *N. suturalis*
– Wing vein M_{1+2} strongly curved at middle of distal part; R_{4+5} and M_{1+2} converging; segment 5 of fore tarsus with strong curved ventral setae; body 4–5 mm
..... *N. abdominalis*
- 14. Segment 5 of fore tarsus without ventral spines; abdominal tergites 2–4 yellow dorsally, with large dark lateral spots; body 5.2–5.5 mm *N. persiana*
– Segment 5 of fore tarsus with small but strong black ventral spines; abdominal tergites 2–4 with dark bands or dorsolateral spots 15
- 15. Wing vein dm-m about 4 times shorter than distal part of M_4 ; abdominal tergite 2 in basal 2/3 and tergites 3 and 4 in basal 1/2 each with large black dorsolateral triangular spots; body 4.4–4.5 mm
..... *N. subcilipes*
– Wing vein dm-m more than 5 times shorter than distal part of M_4 ; at least abdominal tergites 3 and 4 in basal 1/3 each with brown band having median emargination 16
- 16. Palpus yellow; abdominal tergite 2 in basal 1/3 with brown band having median emargination; last two segments of fore tarsus equal in length; body 4.6–4.9 mm *N. semilata*
– Palpus white; abdominal tergite 2 in basal 2/3 with brown triangular spot; segment 4 of fore tarsus about half as long as segment 5; body 4.9 mm *N. febrilata*

Neurigona parchamii **sp. n.** (Figs 2–8)

Material. Holotype, ♂ (ZISP, dried and mounted on pin): Iran, Khuzestan Prov., Shoush, Karkheh National Park, 32°04'14"N / 48°14'34"E, 63 m, Malaise trap, 6–8.05.2014 (M. Parchami-Araghi). Paratypes: 2♂ (ZISP, one male terminalia dissected and stored in glycerin in microvial pinned with the specimen), same data; 14♂ (HMIM, in 75% ethanol), same data.

Diagnosis. *Neurigona parchamii* **sp. n.** is very close to *N. euchroma* in habitus, differing from the latter in a



Figs 2–8. *Neurigona parchamii*, **sp. n.**, male, paratype.
 2 – habitus; 3 – head; 4 – antenna; 5 – fore tarsus; 6 – mid femur; 7 – hypopygium after maceration, right lateral view (reflected light); 8 – hypopygium schematically, left lateral view.

Рис. 2–8. *Neurigona parchamii*, **sp. n.**, самец, паратип.
 2 – внешний вид; 3 – голова; 4 – усик; 5 – передняя лапка; 6 – среднее бедро; 7 – гипопигий после размачивания, сбоку справа (отраженный свет); 8 – гипопигий схематично, сбоку слева.

somewhat longer body; fore coxa with yellow bristles at apex; mid femur with posteroventral row of mainly yellow bristles, mostly longer than femur height, and few black preapical antero- and posteroventral setae; ventral lobe of surstylus with large distoventral plate (Figs 7, 8). *Neurigona euchroma* has fore coxa with black bristles at apex; mid femur with ventral row of mainly black bristles, shorter than femur height, and 1–2 light setae at base; ventral lobe of surstylus with two thick bristles in middle of distal margin [Negrobov, 1987: fig. 4].

Description. Male (Fig. 2). Length (mm): body 3.6, wing 3/0.9, antenna 0.8. Head (Fig. 3) metallic greenish black with pale grey pollen; face silvery white pollinose. Face slightly narrowing towards clypeus, eyes narrowly separated at clypeus. One pair of black and strong ocellars, 1 pair of black and strong verticals, half as long as ocellars, 1 pair of postverticals white and strong, postverticals not longer than verticals; postocular bristles entirely pale. Antenna (Fig. 4) orange-yellow; postpedicel darker at apex, wider than long (10 : 8); stylus brown-black, middorsal, with short basal segment. Length ratio of scape, pedicel, postpedicel, stylomere 1, stylomere 2 – 6 : 6 : 8 : 4 : 60. Proboscis yellowish brown with pale hairs; palpus yellow with pale hairs.

Thorax: greenish black with pale grey pollen; metapleuron brown. Hairs and bristles on thorax mainly black. Six long strong dorsocentrals, 9–10 paired acrostichals between 1st–5th dorsocentrals, 1 long postpronotal bristle and 1 short pale adjacent hair, 1 sutural, 2 notopleural, 2 supraalar bristles. Propleuron with 2 yellow unequally-sized bristles on lower portion (proepisternum). Scutellum with 2 pairs of bristles, medial pair long and strong, but lateral pair short and hair-like.

Legs: including coxae yellow, with last tarsomeres brownish. Fore coxa with pale hairs and 3–4 yellow bristles on anteroapical portion; mid coxa with yellow hairs and 2–3 brownish anterior and apical bristles; hind coxa with 1 brownish outer bristle at base. Fore femur with posteroventral row of about 9 black setae in distal half, mostly shorter than femur height, longer at apex; mid femur (Fig. 6) with full posteroventral row of mostly yellow erect bristles, distinctly longer than femur height, brown at apex; hind femur with anteroventral row of about 6 black setae in distal half, shorter than femur height. Fore tibia devoid of bristles, with few short pale apical setae and 2 rows of black semi-erect setulae on ventral surface; mid tibia with 2 anterodorsal, 2 posterodorsal, and 3 apical bristles, all black; hind tibia with 2 anterodorsal, 1–2 posterodorsal, 1–2 ventral rather short setae, and apically with 3–5 setae, all black. Fore tarsus (Fig. 5) with posteroventral row of short semi-erect setae and pale short ventral cilia on segments 1–4; tarsomere 5 flattened dorsoventrally, without claws, with enlarged pulvilli (nearly as long as tarsomere 5) and 5 long apicodorsal setae (about as long as tarsomere 5). Mid and hind tarsomeres with rather short ordinary setae. Length ratio of fore femur to tibia to tarsus (segments from 1st to 5th), 0.86 : 0.82 : 0.45 : 0.25 : 0.19 : 0.14 : 0.11. Length ratio of mid femur to tibia to tarsus (segments from 1st to 5th), 0.99 : 1.01 : 0.68 : 0.27 : 0.21 : 0.17 : 0.13. Length ratio of hind femur to tibia to tarsus (segments from 1st to 5th), 1.19 : 1.53 : 0.34 : 0.48 : 0.27 : 0.17 : 0.17.

Wing: hyaline, unmodified, veins brown. Apical part of vein R_{4+5} convex anteriad, vein M_{1+2} weakly sinuate at middle of distal part, cell R_{4+5} at widest point 2 times as wide as distance between tips of R_{4+5} and M_{1+2} ; M_{1+2} joining costa before wing apex; ratio of part of costa between R_{2+3} and R_{4+5} to this between R_{4+5} and M_{1+2} , 40 : 11; ratio of cross-vein dm-m to distal part of M_4 , 23 : 71. Anal vein distinct, almost reaching to wing margin; anal lobe present; anal angle obtuse. Calypter yellow, with pale cilia. Halter yellow.

Abdomen: tergites entirely greenish black with grey pollen, with black hairs dorsally and white setae laterally; sternites brown; hypopygium black; tergite 1 with long white marginal bristles;

tergite 5 with small rounded lateroventral projections; segment 8 with pale setae. Genitalia (Figs 7, 8): epandrium as long as wide; 2 short unequal epandrial processes apicoventrally, each bearing one apical seta. Surstylus with wide dorsal and ventral lobes, subequal in size; ventral lobe with 2 long and thick flattened apical setae, 1 simple and 1 securiform. Postgonite bilobed; each lobe thin, swollen at base, with 1 long simple seta at middle and 1 short thick apical seta. Cercus somewhat rounded, white, bearing short white hairs.

Female unknown (probably indistinguishable from females of *N. euchroma*).

Etymology. This species is dedicated to Dr Mehrdadi Parchami-Araghi (IRIPP, Tehran, Iran, and Canadian National Collection of Insects, Ottawa, Ontario) who has collected the type series of this species.

Conclusion

As a result of this study, the number of *Neurigona* species in Iran has increased to six: four species have been reported from Mazandaran, two from Gilan, one from Golestan, and one species from Khuzestan (the southernmost finding of the genus in this country). Regarding neighbouring countries, eight species are known from the Russian North Caucasus, three from Turkey, two from Tajikistan and two from Uzbekistan. Abkhazia, Georgia and Kyrgyzstan each comprise only one species. Species of *Neurigona* have not been found thus far from Armenia, Azerbaijan, Iraq, countries of the Arabian Peninsula, Turkmenistan, Afghanistan, and Pakistan [Grichanov, 2017]. It is worth noting that Pakistan was in error included in the distribution list for *Neurigona angulata* De Meijere, 1916 and *N. denudata* Becker, 1922 by some catalogs [e.g., Yang et al., 2006]. These species were reported from East Pakistan, now Bangladesh [Dyte, 1975]. In total, 176 species belonging to 30 genera of the family Dolichopodidae are recorded now from Iran [Grichanov, Gilasian, 2023a, b, c].

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