J. Entomol. Res. Soc., 22(2): 211-218, 2020
Print ISSN:1302-0250

Research Article
Online ISSN:2651-3579

Three New Species of *Hilara* Meigen (Diptera: Empididae) from Central and Northeastern Turkey

Mustafa Cemal ÇİFTÇİ[1*] Derya ÇİFTÇİ[2] Şirin Bahar CAN[3]

[1]Siirt University, Faculty of Agriculture, Department of Plant Protection, Siirt, TURKEY
[2, 3]Gazi University, Faculty of Science, Department of Biology, Ankara, TURKEY
e-mails: [1*]empididae@gmail.com, [2]dcanpolat@gmail.com, [3]sirinbahhar@gmail.com
ORCID IDs: [1] 0000-0003-2386-6969, [2]0000-0002-7670-4392, [3] 0000-0001-5787-5228

ABSTRACT

Three new species, *Hilara elifae* Çiftçi & D. Çiftçi sp. nov. (*Hilara interstincta*-group), *Hilara ardahanensis* Çiftçi & Can sp. nov. (*Hilara abdominalis*-group) and *Hilara hasbenlii* Çiftçi sp. nov. (*Hilara maura*-group) are described from central (Sivas province) and northeastern (Ardahan province) Turkey. Male and female specimens of new species are described and male genitalia and forelegs are illustrated. The relationships between the new species and related species are compared.

Key words: Taxonomy, distribution, dance flies, new species, Turkey.

Çiftçi, M.C., Çiftçi, D., & Can, Ş.B. (2020). Three new species of *Hilara* Meigen (Diptera: Empididae) from central and northeastern Turkey. *Journal of the Entomological Research Society*, 22(2), 211-218.

INTRODUCTION

Hilara Meigen is a complex and the most difficult Palaearctic genus of Empididae to distinguish and identify species because of the large number of described species and the lack of distinctive differential characters and uniform appearance (Chvála, 2005; Chvála & Merz, 2009). By the absence of metapleural bristles, long and acute radial fork (R_{4+5}) and swollen fore basitarsus, the genus *Hilara* may easily be recognized (Chvála, 1994).

A few researchers have tried to make species groups for easier identification of this difficult genus (Strobl, 1892; Collin, 1961; Chvála, 2005). As a result, Chvála divided the genus *Hilara* into 14 species groups with his studies (Chvála, 2005, 2008; Chvála & Merz, 2009). In this study, three new species are described and are assigned to the following three species groups: *Hilara interstincta*-group, *Hilara abdominalis*-group and *Hilara maura*-group.

MATERIAL AND METHODS

This study is based on 23 male and 15 female dried and pinned specimens collected from central (Sivas province) and northeastern (Ardahan province) Turkey in 2013 and 2019. For illustration, the male genitalia and fore legs were dissected and cleared in 10% KOH for 24 h at 30 °C. All figures were drawn using a binocular microscope with an ocular grid. After drawing, all parts were stored in small capsules with glycerol and pinned beneath the specimens. In this study, the morphological nomenclature of McAlpine (1981), Stuckenberg (1999) and Sinclair (2000) were followed.

The specimens were collected by A. Hasbenli, D. Çiftçi, M.C. Çiftçi and Ş.B. Can during field studies within the scope of baseline data collection studies (2013) for the environmental impact assessment and post-construction monitoring (2019) for the Trans Anatolian Natural Gas Pipeline Project (TANAP) and are stored in the Zoological Museum of Gazi University (ZMGU).

RESULTS

Hilara ardahanensis Çiftçi and Can sp. nov.

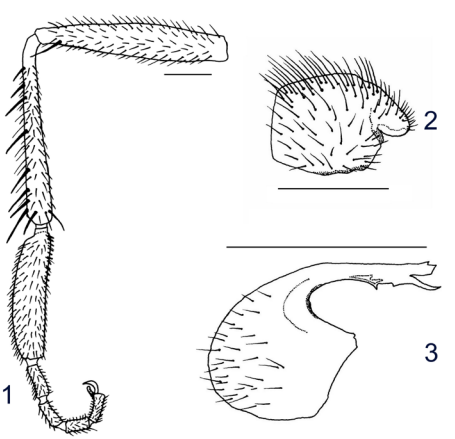
Diagnosis. Large, yellowish species of *H. abdominalis*-group with dense grey dusting. Body about 5.5-6.1 mm long, legs mostly yellow colored. Scape and pedicel yellow, postpedicel black. Palpus yellow with 1 long preapical bristle. Halter completely yellow. Male fore basitarsus slightly thickened, slightly broader than tip of the fore tibia. Basal segments of abdomen yellowish.

Description. *Male*. Face and frons black with grey dusting. Frons almost as wide as postpedicel, face slightly wider than frons. Ocellar bristles long, frontal bristles shorter than ocellar pair. Occiput densely grey dusted, occipital bristles black. Scape and pedicel yellow, postpedicel black. Stylus as long as postpedicel. Palpus yellow, ventrally with black hairs and 1 long preapical bristle. Labrum shiny black and longer than half length of head.

Thorax black with densely grey dusting. Humeral area lower part of postalar area and pleural stur yellow. Hairs and bristles on thorax black. Scutum with 2 black stripes between acrostichal and dorsocentral bristles in frontal view. Acrostichal and dorsocentral bristles short, hair-like, becoming longer and thicker posteriorly. Acrostichal bristles 4-serial, longer dorsocentral bristles uniserial and ending with 2 rather long prescutellar pairs. Large marginal bristles long: 1 fine humeral, 2 fine intrahumerals, 1 posthumeral anteriorly with 2-3 short hairs, 3 notopleurals, 3-4 fine supra-alars, 1 postalar and 3 pairs of scutellar bristles. Prothoracic collar with black bristle on each side, between them with row of small spine-like black hairs. Proepisternum and sides of prosternum with fine, very short black hairs.

Wing almost clear, slightly brownish, veins brownish lighter colored on basal half. Anal vein only distinct at base. Pterostigma long, slightly brownish, basal costal bristle long and strong. Squamae and margin yellow, fringes long and yellow, black on basal half. Halter completely yellow.

Legs long, yellow; apical half of tibiae and tarsal segments brownish. Coxae slightly grey dusted. All hairs and bristles on legs black, only fore coxa with pale hairs on basal half. All femora with short hairs, anterior row on mid femur and anteroventral row and dorsal hairs on hind femur slightly longer and thicker. All tibiae with short hairs and preapical circlet of bristles long and distinct. Fore tibia dorsally with 1 row of bristles. Mid tibia posterodorsally with 1 row of thin bristles. Hind tibia dorsally and anteroventrally with long bristle-like hairs. All tarsal segments with dense short hairs. All basitarsi ventrally with short spine-like bristles. Fore basitarsus (Fig. 1) clearly shorter than fore tibia, parallel-sided and slightly broader than tip of fore tibia.



Figs. 1-3. *Hilara ardahanensis* 1. Fore leg (scale: 0,3 mm); 2. Epandrial lamella (scale: 0,5 mm); 3. Hypandrium (scale: 1 mm).

Abdomen densely grey dusted; terga brownish yellow, first three sterna completely yellow, other sterna at margins yellow with middle parts blackish. Hairs on terga black, hairs on sterna short and yellow. Hind marginal bristles short but distinct. Hypandrium

(Fig. 3) small, shiny black and forked at tip. Epandrial lamella (Fig. 2) large apically with dense hairs and wide finger-like apical process.

Holotype male body length: 6 mm, wing length: 6.9 mm. Paratypes body length: male 5.8-6.1 mm; wing length: male 6.7-6.9 mm.

Female. Unknown.

Type material. Holotype: Turkey, ♂, Ardahan, Posof, SW of Yeniköy, 2075m, 41° 26' N / 42° 47' E, 24.07.2013, leg. A. Hasbenli and D. Çiftçi, det. M.C. Çiftçi (ZMGU). Paratypes: 2♂♂, same locality and date as holotype (ZMGU).

Derivatio nominis. This species is named after Ardahan Province, where the type material was collected.

Remarks. When Chvála's (2005, 2008) keys are used for the diagnosis of the species, *Hilara ardahanensis* leads to the species *Hilara comes* Collin and *Hilara cypriana* Chvála in the 2008 key and using the 2005 key, the species runs to *Hilara abdominalis* Zetterstedt and *Hilara allogastra* Chvála. The presence of a row of small spine-like black hairs between black bristles on each side of the prothoracic collar and the absence of long dorsal hairs or bristles of the male fore basitarsus clearly differentiate *H. ardahanensis* from *H. comes* and *H. cypriana*. When we look at the genitalia (epandrial lamella and the tip of hypandrium) and the above mentioned properties, *H. ardahanensis* is more similar to *H. abdominalis* and *H. allogastra*. *Hilara ardahanensis* is clearly differentiated from *H. abdominalis* with characters such as the male fore basitarsus clearly shorter than the fore tibia, tarsomere 2 of fore leg is not larger than the other tarsomeres and the scape and pedicel are yellow. *Hilara ardahanensis* is differentiated from *H. allogastra* by these characters: frontal bristles shorter than ocellar bristles, halteres completely yellow, male fore basitarsus shorter and less swollen, hind femur with row of anterodorsal bristles and differences in genitalia structure.

***Hilara elifae* Çiftçi and D. Çiftçi sp. nov.**

Diagnosis. Large species of *H. interstincta*-group, body about 4.8-5.9 mm long and completely dull black with slightly brownish dusting species. Antenna blackish brown with slightly grey dusting, stylus nearly as long as postpedicel. Palpus covered with dense black hairs and ventrally with 4-5 long black bristles. Halter, palpus and all legs completely black. Male fore basitarsus swollen, dorsally with 1-2 fine bristles.

Description. *Male*. Frons black with slightly greyish brown dusting, as wide as half-length of postpedicel. Face wider than frons and lower edge slightly shiny. Pair of ocellar bristles as long as postpedicel with stylus, frontal bristles slightly shorter than ocellar pair. Occiput dull black, occipital bristles black. Antenna black, stylus nearly as long as postpedicel, postpedicel slightly grey dusted. Palpus with dense black hairs and ventrally with 4-5 long bristles. Labrum shiny black, scarcely shorter than height of head.

Thorax black, slightly shiny, pleura with grey and scutum slightly brownish dusted. Hairs and bristles on thorax black. Scutum slightly brownish dusted in frontal view, dull black in dorsal view. Acrostichal bristles widely spaced, 4-serial, almost as long as stylus. Dorsocentral bristles uniserial, distinctly longer than acrostichal bristles

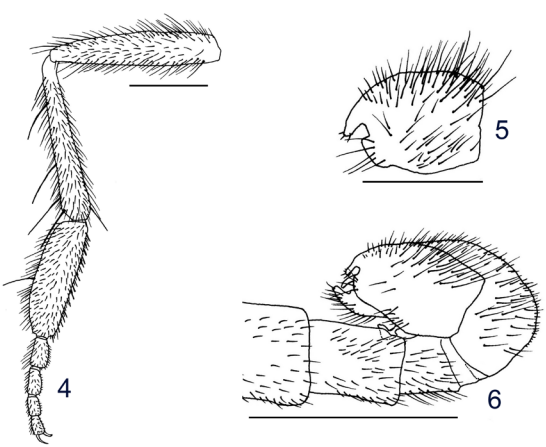
and ending with 2 long prescutellar pairs. Large marginal bristles long: 1 humeral, 1 intrahumeral, 3 posthumerals, 3 notopleurals, 2 supra-alars, 1 postalar and 2 pairs of scutellar bristles. Notopleural depression anteriorly with fine, short black hairs. Prothoracic collar with black bristle on each side between them with row of small black hairs. Proepisternum and prosternum with fine, short black hairs.

Wing brownish with distinct black veins. Pterostigma long and brownish black, basal costal bristle long and strong. Anal vein only distinct at base. Squamae brownish with dark blackish margin and fringes black. Halter completely black.

Legs long and black, slightly grey dusted, only base of tibiae brownish. All hairs and bristles black. Femora with short black hairs, fore and mid femora dorsally with slightly longer hairs, fore femur posteroventrally with 1 long, fine preapical hair. Mid femur with 5 long anterior bristles and 2 longer and fine anteroventral bristles on apical part. Hind femur anteroventrally and posteroventrally with 1 long and fine bristles. All tibiae with short hairs and distinct preapical circlet of bristles. Fore tibia dorsally with 4 long bristles, mid tibia ventrally with 2 bristles on basal half and dorsally on apical half with 3 long, strong bristles. Hind tibia with row of dorsal and anteroventral long bristles. Tarsal segments with dense short hairs. Fore basitarsus (Fig. 4) thickened, slightly broader than the apex of fore tibia and shorter than fore tibia, dorsally with 1-2 long bristles.

Abdomen brownish black. Abdominal hairs black, only marginal hairs on terga fine and brownish. Sterna with very short hair. Hind marginal bristles distinct but not very long. Genitalia (Figs. 5-6) large and densely covered with hairs. Hypandrium small but epandrial lamella very large and convex.

Holotype male body length: 5.8 mm, wing length: 6.1 mm. Paratypes body length: male 5-5.9 mm; female 4.8-5.5 mm, wing length: male 5.8-6.2 mm; female 5.3-5.8 mm.



Figs. 4-6. *Hilara elifae* 4. Fore leg (scale: 0,5 mm); 5. Epandrial lamella (scale: 0,5 mm); 6. Post abdomen (scale: 1 mm).

Female. General appearance as in male, only hairs and bristles on legs shorter than in male. Wings slightly shorter, squamae lighter colored with pale fringes. Acrostichal

and dorsocentral bristles equally long. Hind tibia slender and simple. Abdominal hairs shorter and lighter colored, hind marginal bristles shorter than in male.

Type material. Holotype: Turkey, ♂, Ardahan, Posof, SW of Yeniköy, 2075m, 41° 26' N / 42° 47' E, 24.07.2013, leg. A. Hasbenli and D. Çiftçi, det. M.C. Çiftçi (ZMGU). Paratypes: 9♂♂, 12 ♀♀, same locality and date as holotype (ZMGU). 2 ♂♂, 1♀, Ardahan, Posof, SW of Yeniköy, 2075m, 41° 26' N / 42° 47' E, 06.08.2019, leg. A. Hasbenli and Ş.B. Can, det. M.C. Çiftçi (ZMGU).

Derivatio nominis. This species named after Dr. Elif Manav (ÇINAR Engineering Consulting Inc., Ankara) who worked as the ecology coordinator in Trans Anatolian Natural Gas Pipeline Project (TANAP) Environmental Impact Assessment Study.

Remarks. Considering the completely black and large body, unstriped greyish dusted scutum, widely spaced and 4-serial acrostichals and male fore basitarsus shorter than fore tibia, *Hilara elifae* is very similar to *H. anglodanica* Lundbeck in *H. interstincta*-group. *Hilara elifae* leads to *H. anglodanica* in Chvála's (2008) identification key. *H. elifae* is clearly separated from *H. anglodanica* by the following characters: labrum longer (nearly as long as height of head), posterior four tibiae without spine-like anterior bristles, clearly shorter fore basitarsus in male and the shape of male genitalia.

***Hilara hasbenlii* Çiftçi sp. nov.**

Diagnosis. Medium-sized species of *H. maura*-group, body 3.5-3.9 mm long. Legs short and robust, brownish black. Body subglossy with slightly grey dusting, bristles on body very reduced. Halter black, antennal stylus short and stout. Scutum subglossy, slightly brownish dusted without stripes. Acrostichal and dorsocentral bristles rather short, acrostichals biserial, dorsocentrals uniserial. Abdominal hairs short and black.

Description. *Male*. Face and frons wide, dull black with grey dusting, except edges of frons shiny. Ocellar bristles almost as long as postpedicel with stylus, frontal bristles little shorter than ocellar bristles. Occiput dull black from any point of view, occipital hairs black, upper postocular bristles little shorter than frontal bristles, lower part of occiput below neck with shorter and finer pale hairs. Antenna black, postpedicel long, stylus stout and half length of postpedicel. Palpus black, slightly grey dusted with 2 preapical bristles as long as frontal bristles, palpus ventrally with yellowish hairs on basal half and black hairs on apical half. Labrum short, shorter than half-length of height of head.

Thorax black, pleura densely grey dusted, scutum slightly shiny with grey and brownish dusted, without stripes and slightly shinier in frontal and dorsal views. Acrostichal and dorsocentral bristles rather short and hair-like, acrostichal bristles narrowly spaced, biserial, dorsocentral bristles uniserial, and ending with pair of somewhat long prescutellar bristles. Large marginal bristles short and fine: 1 very fine humeral, intrahumeral and posthumeral bristles absent, 3 notopleural, 1 supra-alar, 1 postalar and 2 pairs of scutellar (inner pair longer) bristles. Notopleural depression with short fine yellowish hairs. Prothoracic collar, prosternum and prothoracic episterna with yellowish hairs, prothoracic collar without bristles at sides, sensory pit below prothoracic spiracle guarded by long white hairs.

Wing almost clear, slightly brownish, more brownish on costal area. Veins dark brown, anal vein only distinct at base, not reaching wing margin. Pterostigma long

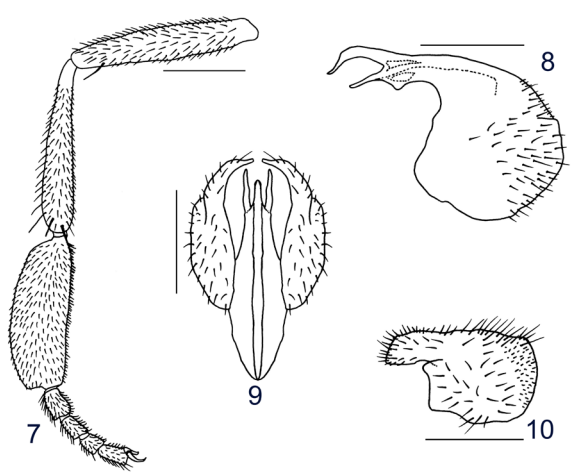
and brownish, basal costal bristle shorter than prescutellar pair. Squama brownish black with yellowish fringes. Halter completely black.

Legs stout and simple, brown to brownish black with lighter colored “knees”. Coxae greyish dusted, especially fore coxa lighter brown. Coxae with yellowish hairs and lower parts with longer hair. Legs with black and yellow rather short hairs. Bristles almost absent. Femora with short hairs, mid femur anteriorly with row of fine and short hairs, only 1 basal bristle distinct and bristle-like. Hind femur not thickened. Tibiae with short hairs, preapical circlet of bristles short and hair-like, only dorsal pair on fore tibia long and bristle-like. Hind tibia dorsally with row of bristle-like hairs slightly longer than depth of hind tibia. Tarsal segments with short pubescent-like hairs. Fore basitarsus (Fig. 7) swollen, twice as wide as tip of fore tibia and almost as long as fore tibia.

Abdomen blackish brown colored, slightly shiny and dusting considerably reduced. Abdominal hairs brown and black, very short, first two segments with longer hairs. Hairs on sterna yellow and quite reduced. Hind marginal bristles absent. Genitalia (Figs. 8-10) covered with thin black hairs. Tip of hypandrium (Figs. 8-9) at middle with two hooked shaped processes bent upwards, ventrally slightly enlarged and tip simple and pointed. Apical projection of epandrial lamella (Fig. 10) long and broad.

Female. General appearance as in male, hairs and bristles on head much shorter than in male, legs darker colored, anterior row of hairs on mid femur more distinct Hind tibia slender and simple. Abdominal hairs yellowish and shorter.

Holotype male body length: 3.8 mm, wing length: 3.9 mm. Paratypes body length: male 3.6-3.9 mm; female 3.6 mm, wing length: male 3.6-4 mm; female 3.7 mm.



Figs. 7-10. *Hilara hasbenlii* 7. Fore leg; 8. Hypandrium; 9. Hypandrium and Epandrial lamella in dorsal view; 10. Epandrial lamella. Scale: 0.3 mm.

Type material. Holotype: Turkey, ♂, Sivas, Yıldızeli, Belcik village, 1260 m, 39° 49’ N / 36° 15’ E, 17.06.2013, leg. A. Hasbenli and D. Çiftçi, det. M.C. Çiftçi (ZMGU). Paratypes: 4 ♂♂, 1♀, same locality and date as holotype (ZMGU). 3 ♂♂, 1♀, Sivas, Yıldızeli, Belcik village, 1260 m, 39° 49’ N / 36° 15’ E, 24.05.2019, leg. A. Hasbenli and M.C. Çiftçi, det. M.C. Çiftçi (ZMGU).

Derivatio nominis. The species is named after the collector of the type specimens, Turkish dipterist and the authors mentor, Prof. Dr. Abdullah Hasbenli.

Remarks. When Chvala's (2005) key is used for the diagnosis, *Hilara hasbenlii* leads to *H. discalis*. While it is similar to *H. discalis* with biserial acrostichal bristles, uniserial dorsocentral bristles, yellowish fore coxa and the hind tibia in females slender and simple, it differs from this species with its dull black, partly grey dusted frons, narrow spaced biserial acrostichals, a pair of prescutellar bristles more distinct, longer fore basitarsus and differences in genitalia structure. Tip of hypandrium of *H. hasbenlii* similarly shape with *H. brevistyle*, but this species is in the *Hilara chorica*-group of species and morphologically very different with *H. hasbenlii*.

ACKNOWLEDGEMENTS

These findings were obtained from field studies carried out within the TANAP Project. The authors wish to thank the TANAP Natural Gas Transmission Inc. for their financial support and ÇINAR Engineering Consulting Inc. for conducting Environmental Impact Assessment studies and ENVY Energy and Environmental Investments Inc. for conducting post-construction monitoring. Also we thank Prof. Dr. Abdullah Hasbenli for collecting specimens.

REFERENCES

Chvála, M. (1994). *The Empidoidea (Diptera) of Fennoscandia and Denmark. III Genus Empis*. Fauna Entomologica Scandinavica, 29. Brill, Leiden, New York.

Chvála, M. (2005). *The Empidoidea (Diptera) of Fennoscandia and Denmark. IV Genus Hilara*. Fauna Entomologica Scandinavica, 40. Brill, Leiden, New York.

Chvála, M. (2008). *Monograph of the Genus Hilara Meigen (Diptera: Empididae) of the Mediterranean Region*. Studia Dipterologica Supplement 15. Ampyx-Verlag, Halle.

Chvála, M. & Merz, B. (2009). The *Hilara* species (Diptera, Empididae) of Switzerland, with respect to the fauna of the Alps and other central European mountains. *Revue Suisse de Zoologie*, 116(3-4), 509-633.

Collin, J.E. (1961). *Empididae. British Flies, Volume 6*. Cambridge University Press, Cambridge.

McAlpine, J.F. (1981). Morphology and terminology - Adults. In J.F. McAlpine, B.V. Peterson, G.E. Shewell, H.J. Teskey, J.R. Vockeroth and D.M. Wood (Eds.). *Manual of Nearctic Diptera, Vol. 1. Monograph 27* (pp. 9-63). Research Branch, Agriculture Canada, Ottawa, Canada.

Sinclair, B.J. (2000). Morphology and terminology of Diptera male terminalia. In L. Papp and B. Darvas (Eds.). *Contributions to a Manual of Palaearctic Diptera, Vol. 1. General and Applied Dipterology* (pp. 53-74). Science Herald, Budapest.

Strobl, G. (1892). Die österreichischen Arten der Gattung *Hilara* Meigen (Mit Berücksichtigung der Arten Deutschlands und der Schweiz.). *Verhandlungen der zoologisch-botanischen Gesellschaft in Wien*, 42, 85-182.

Stuckenberg, B.R. (1999). Antennal evolution in the Brachycera (Diptera), with a reassessment of terminology relating to the flagellum. *Studia Dipterologica*, 61(1), 33-48.

Received: March 31, 2020 *Accepted: June 26, 2020*