Zeitschrift: Mitteilungen der Schweizerischen Entomologischen Gesellschaft = Bulletin de la Société Entomologique Suisse = Journal of the Swiss Entomological Society

Herausgeber: Schweizerische Entomologische Gesellschaft

Band: 87 (2014)

Heft: 1-2

Artikel: Palaearctic species of the Medetera betulae group (Diptera, Dolichopodidae), with the description of three new species from Switzerland

Autor: Naglis, Stefan / Negrobov, Oleg P.

DOI: https://doi.org/10.5169/seals-403082

MITTEILUNGEN DER SCHWEIZERISCHEN ENTOMOLOGISCHEN GESELLSCHAFT
BULLETIN DE LA SOCIETE ENTOMOLOGIQUE SUISSE
87: 85-93, 2014

Palaearctic species of the *Medetera betulae* group (Diptera, Dolichopodidae), with the description of three new species from Switzerland

STEFAN NAGLIS[1] & OLEG P. NEGROBOV[2]

[1] Institute of Evolutionary Biology and Environmental Studies, University of Zurich, Winterthurerstrasse 190, CH-8057 Zurich, Switzerland; s.naglis@bluewin.ch
[2] Voronezh State University, Universitetskaya pl. 1, Voronezh, 394006, Russia; negrobov@list.ru

The Palaearctic species of the *Medetera betulae* group are reviewed. It comprises six species including three new species from alpine regions in South and South-East Switzerland: *Medetera alpicola* sp. n., *Medetera helvetica* sp. n. and *Medetera ticinensis* sp. n. The distribution patterns are an indication of a boreal–montane distribution of members of the group. A species list and a key based on male genitalic characters to species of the group are provided.

Keywords: Dolichopodidae, *Medetera*, Palaearctic region, Switzerland, new species.

INTRODUCTION

The genus *Medetera* Fischer von Waldheim includes 172 Palaearctic species (Naglis unpubl.). The latest comprehensive taxonomic work on the Palaearctic species of *Medetera* is the revision of the subfamily Medeterinae by Negrobov & Stackelberg (1971–77). Since then 18 new Palaearctic species of *Medetera* have been described: 1 species from Great Britain (Allen 1976), 1 species from Poland (Negrobov & Capecki 1977), 5 species from Russia (Negrobov 1979, Negrobov & Golubtsov 1991), 1 species from Spain (Rampini & Canzoneri 1979), 4 species from Japan (Masunaga & Saigusa 1998), 1 species from China (Yang 1999), 1 species from Morocco (Grichanov & Vikhrev 2009), 1 species from Tunisia (Grichanov 2010), and 3 species from Turkey (Naglis 2013). From Switzerland 23 species have been recorded so far (Naglis 2009, 2012).

Adults of *Medetera* are often found on vertical surfaces as tree trunks, walls or rocks, and are predators on small, soft-bodied arthropods as mites, Collembola, Psocoptera, and small Diptera. The larvae live under bark of dead or dying trees and are known as predators of bark beetles. The genus is of considerable importance as an agent of biological control (Bickel 1985). Unlike many other dolichopodid genera, males of *Medetera* have few secondary sexual characters, and the examination of the male genitalia is usually necessary for reliable identification. During the study of a large number of *Medetera* specimens of the private collection of Gerhard Bächli, three new species of the *Medetera betulae* group from Switzerland were found.

MATERIAL AND METHODS

The present study is based on material of the private collection of Gerhard Bächli (Dietikon, Switzerland). Holotypes and paratypes will be desposited in the Entomological Collection of the ETH Zurich (ETHZ). Distribution data is mainly according to Pollet (2004) and Yang *et al.* (2006), but doubtful records are omitted.

Body length is measured from the base of the antennae to the tip of abdominal segment 6; wing length from wing base to wing apex. The positions of features on elongate structures such as leg segments are given as a fraction of the total length, starting from the base. The following ratios are used: relative podomere ratios: femur, tibia, tarsomere 1/2/3/4/5; length of crossvein dm–cu to distal section of CuA (= CuAx ratio); distance between veins R_{2+3} and R_{4+5} to distance between R_{4+5} and M at costal margin (= RMx ratio). In describing the hypopygium, dorsal and ventral refers to the position prior to rotation and flexion, i.e. in figures top is morphologically ventral and bottom is dorsal. If not otherwise indicated, the coloration of hairs and setae is black. Morphological terminology follows McAlpine (1981), except the terminology for thoracic chaetotaxy, wing veins and genitalia, which follows Bickel (1985).

Morphologic abbreviations: ac = acrostichal setae; ad = anterodorsal; av = anteroventral; dc = dorsocentral setae; pd = posterodorsal; ppls = proepisternal setae; pv = posteroventral; sa = postsutural supraalar setae.

Other abbreviations: GR = Canton Grisons; TI = Canton Ticino; VS = Canton Valais; ETHZ = Entomological Collection of the ETH Zurich.

SYSTEMATICS

The *Medetera betulae* group

Medetera betulae was described by Ringdahl (1949) from Sweden. He differentiated his new species from the similar *M. pallipes* Zetterstedt, 1843 by the presence of only 1 sa and by the dark colouration of setae and hairs. Becker (1917) synonymised *Medetera ruficornis* Strobl, 1898 with *M. insignis* Girschner, 1888. Morge & Negrobov (1981) examined the types of *Medetera ruficornis* and removed the species from synonymy. Gosseries (1988) provided the new name *Medetera negrobovi* for *Medetera ruficornis* Strobl, preoccupied by *Medetera ruficornis* Haliday, 1838 (now in the genus *Thinophilus*). When using the frequently used keys for Central Europe, such as Parent (1938) or d'Assis Fonseca (1978), members of this group will be identified as *Medetera pallipes* (Zetterstedt, 1843) or *Medetera flavipes* Meigen, 1824.

Definition. The *Medetera betulae* group is defined by the following combination of characters: 4–5 pairs of strong dc, all of almost the same length; ac well developed; only 1 strong sa; 4 scutellar setae; tibiae and tarsomeres usually yellow; mid tibia with a pair of ad/pd setae near base; hind tibia with 2 spine-like apical setae anteriorly; distal section of vein CuA at least twice as long as crossvein dm-cu; hypandrium with a hyaline membrane in distal part.

List of species:

Medetera alpicola sp. n.
Type locality: Switzerland, GR, Il Fuorn.
Distribution: Switzerland.

Medetera betulae Ringdahl, 1949
Type locality: Tännerdalen, Prov. Härjedalen, Sweden.
Distribution: Sweden, Finland, Norway, Estonia, Russia, ?Switzerland (see discussion).

Medetera helvetica sp. n.
Type locality: Switzerland, VS, Riederalp.
Distribution: Switzerland.

Medetera negrobovi Gosseries, 1988. (New name for *Medeterus ruficornis* Strobl, 1898, preoccupied by *Medeterus ruficornis* Haliday, 1838, now in genus *Thinophilus*).
Type locality: Grab near Sotiesca, former Yugoslavia, probably Bosnia-Herzegovina.
Distribution: Bosnia-Herzegovina.

Medetera relicta Negrobov, 1967
Type locality: Fisht, Russia.
Distribution: Russia, Czech Republic.

Medetera ticinensis sp. n.
Type locality: Switzerland, TI, Piotta.
Distribution: Switzerland.

KEY TO PALAEARCTIC SPECIES OF THE *MEDETERA BETULAE* GROUP BASED ON MALE GENITALIC CHARACTERS:

1. Hypandrium ventrally with 1 or 4 small spines 2
– Hypandrium without spines, sometimes with apical hook 4

2. Hypandrium symmetric, ventrally with 4 spines (Fig. 2B); ventral arm of surstylus with fringed ventroapical seta (Fig. 2A) ..... ***M. helvetica*** sp. n.
– Hypandrium asymmetric, ventrally with 1 spine; ventral arm of surstylus without fringed seta 3

3. Hypandrium with curved, acute apex (Fig. 1B); surstylus with deep incision (Fig. 1A) ..... ***M. alpicola*** sp. n.
– Hypandrium with rounded apex (*fig. 3); surstylus with short incision (*fig. 5) ..... ***M. negrobovi*** Gosseries

4. Hypandrium with rounded apex (**fig. 777); epandrial lobes of different length; ventral arm of surstylus with fringed ventroapical seta (**fig. 778) ..... ***M. relicta*** Negrobov

– Hypandrium with acute apex; epandrial lobes of the same length; ventral arm of surstylus without fringed seta 5

5. Hypandrium with apical hook (Fig. 3B); ventral arm of surstylus with tapered apex (Fig. 3A) ..... ***M. ticinensis*** sp. n.
– Hypandrium without apical hook (**fig. 415); ventral arm of surstylus with rectangular apex (**fig. 423) ..... ***M. betulae*** Ringdahl

* = Figure in Morge & Negrobov (1981)
** = Figure in Negrobov & Stackelberg (1971–77)

DESCRIPTIONS OF NEW SPECIES

Medetera alpicola sp. n.

(Figs. 1A–B)

Diagnosis (general characters are given in the definition of the *Medetera betulae* group). Antenna dark brown; face metallic green with grey pruinosity; 4 pairs of strong dc, 2nd pair slightly smaller; 4–5 pale ppls; hypandrium (ventral view) asymmetric, with curved and pointed apex, ventrally with 1 small spine.

Material examined. Holotype ♂ SWITZERLAND: GR, Il Fuorn, VII.–VIII. 1995, leg. C. Besuchet. To be deposited at ETHZ. — Paratypes: 2 ♂♂, same data as holotype. To be deposited at ETHZ. — Other material: SWITZERLAND: VS, Leuk, 3 ♂♂, 23.VIII.–2.IX.1977 and 1 ♂, 27.–29.VII.1993, leg. G. Bächli.

Description. Body length holotype: 2.2 mm, wing length 2.6 mm.

Head: Frons and face dark metallic green, with dense grey pruinosity, clypeus dark metallic green shining, with weak grey pruinosity along eye margins, narrowest distance between eyes 1.5 times the distance between ocellar setae; palpus dark brown, with brown hairs and 1 strong brown seta; proboscis dark brown; antenna dark brown; first flagellomere rounded, about as long as high; arista subapical, bare; postocular setae white.

Thorax: Mesonotum dark metallic green, with dense grey pruinosity; thoracic setae black; 4 pairs of strong dc, 2nd pair slightly smaller, in front of 1st pair an additional small seta; 4–5 pairs of ac, which are as long as distance between rows; 1 long and strong sa; 4 strong scutellars, laterals half as long as medians; 4–5 pale ppls, lower most seta distinctly longer; pleura dark metallic blue-green shining, with grey pruinosity.

Legs: Coxae and femora dark brown; knees, tibiae and tarsomeres yellow; setae dark, except as noted. Fore leg: Coxa with some anterior setae; femur, tibia and tarsomeres bare; relative podomere ratios: 55/52:27:17:10:7:6. Mid leg: Coxa with a strong anterolateral seta; femur bare; tibia with ad/pd pair at 1/3, and with 3–4 short apical setae; relative podomere ratios: 62/66:35:20:14:6:6. Hind leg: Coxa with a strong lateral yellowish-brown seta; femur with a row of short dorsal setae on basal half; tibia with a yellow dorsal seta at 4/5, with 2 black, spine-like apical setae anteriorly, and with a short apical tooth posteriorly; tarsomeres bare; relative podomere ratios: 65/78:21:31:18:10:7.

Wing: Hyaline, veins brownish yellow; basal section of M shorter than distal section; CuAx ratio: 0.3; RMx ratio: 3.5; lower calypter whitish, with white setae; halter pale yellow.

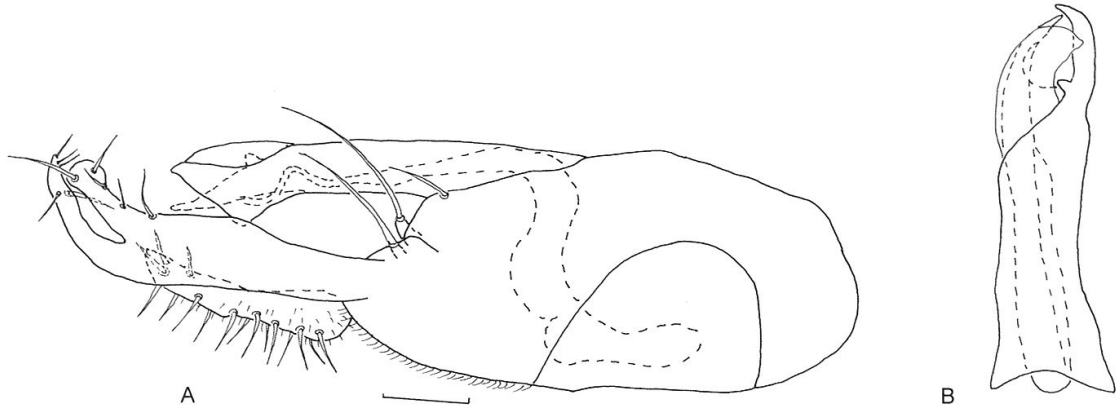

Fig. 1. *Medetera alpicola* sp. n. male. A) hypopygium, lateral. — B) hypandrium, ventral. (scale bar = 0.1 mm)

Abdomen: Dark metallic green shining, with brown hairs. Hypopygium (Figs. 1A–B): epandrium dark brown, cercus pale yellow, surstylus yellowish brown, hypandrium dark brown. Epandrium long and slender; hypandrium (ventral view) asymmetric, with curved and pointed apex, ventrally with 1 small spine; surstylus slightly broadened, with deep incision; ventral arm of surstylus with rounded apex, with 2 strong apical, 2 smaller subapical, and 1 curved ventral setae; dorsal arm of surstylus slender, with subapical seta and 3 apical setae; epandrial lobes basally separated and setae of almost the same length; cercus narrow, without apical projection.

Female: Unknown.

Etymology. The name refers to the alpine habitat where the species was found.

Comments. All specimens were collected using wine traps in the canopy of trees.

Medetera helvetica sp. n.

(Figs. 2A–B)

Diagnosis (general characters are given in the definition of the *Medetera betulae* group). Antenna ochreous brown; face bluish green with grey pruinosity; 4 pairs of strong dc, all of about the same length; 2 brown ppls; hypandrium (ventral view) symmetric, with 4 small spines.

Material examined. Holotype ♂ SWITZERLAND: VS, Riederalp, 31.VII.–8.VIII.1976, leg. G. Bächli. To be deposited at ETHZ.— Paratypes: 6 ♂♂ same data as holotype. To be deposited at ETHZ.— Other material: SWITZERLAND: GR: Alp Flix, 8 ♂♂ 4.–8.VIII.1975, leg. G. Bächli; Dischmatal, 2 ♂♂ 1.–15.VII.1991 and 16.–31.VII.1991, leg. Brodmann; Landquart, 1 ♂ 9.–12.VIII.1974, leg. G. Bächli; Zernez, 1 ♂ 4.–7.VIII.1996, leg. G. Bächli. TI: Angone/Anzonico, 8 ♂♂ 21.–31.VIII.1981, leg. G. Bächli; Piotta, 3 ♂♂ 19.–22.VIII.1981, leg. G. Bächli; Ravatoi/Calonico, 3 ♂♂ 27.–31.VIII.1981, leg. G. Bächli. VS: Bürchen, 3 ♂♂ 17.–19.VIII.1993, leg. G. Bächli; Guttet, 2 ♂♂ 4.–6.VIII. and 31.VII.–2.VIII.1993, leg. G. Bächli; Leuk, 2 ♂♂ 23.VIII.–2.IX.1977, leg. G. Bächli; Oberwald, 1 ♂ 13.–15.VIII.1975, leg. G. Bächli; Visp, 3 ♂♂ 13.–15.VIII.1993, leg. G. Bächli; Visperterminen, 1 ♂ 30.VII.1998, leg. Merz & Bächli.

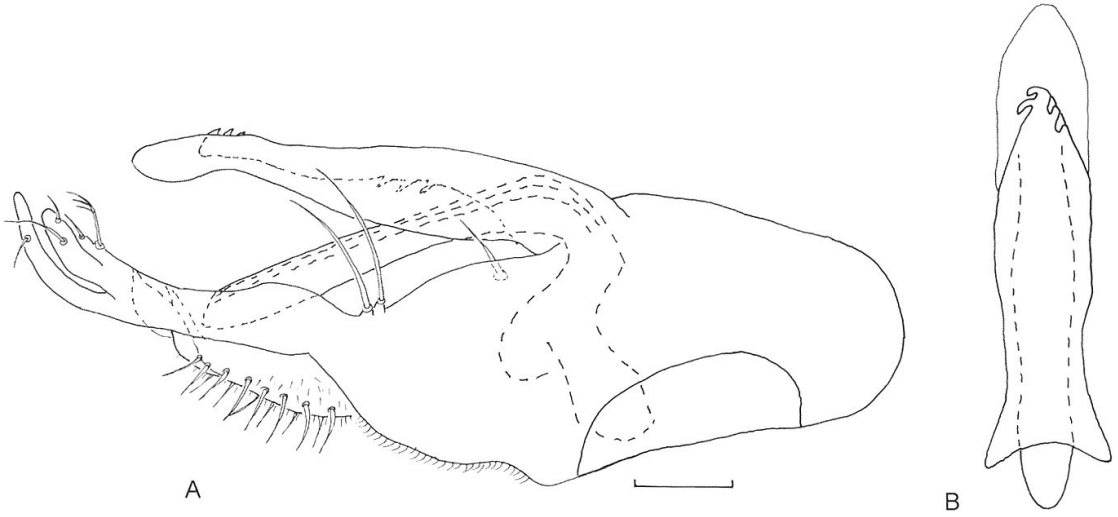

Fig. 2. *Medetera helvetica* sp. n. male. A) hypopygium, lateral. — B) hypandrium, ventral. (scale bar = 0.1 mm)

Description. Body length holotype: 2.2 mm, wing length 2.5 mm.

Head: Frons and face metallic blue-green, with dense grey pruinosity, clypeus metallic green, with grey pruinosity along eye margins, narrowest distance between eyes twice the distance between ocellar setae; palpus dark brown, with brown hairs and 1 strong brown seta; proboscis dark brown; antenna ochreous brown; first flagellomere rounded, about as long as high; arista subapical, bare; postocular setae pale yellow.

Thorax: Mesonotum metallic blue–green, with dense grey pruinosity; thoracic setae black; 4 pairs of strong dc, all of about same length; 5–6 pairs of ac, which are longer than distance between rows; 1 long and strong sa; 4 strong scutellars, laterals half as long as medians; 2 strong brown ppls, lower seta longer; pleura dark metallic blue-green, with grey pruinosity.

Legs: Coxae and femora dark brown; knees, tibiae and tarsomeres yellow; setae dark, except as noted. Fore leg: Coxa with some anterior setae; femur, tibia and tarsomeres bare; relative podomere ratios: 48/45:23:11:9:7:6. Mid leg: Coxa with a strong anterolateral seta; femur bare; tibia with ad/pd pair at 1/3, and with 3–4 apical setae; relative podomere ratios: 59/60:33:15:11:8:6. Hind leg: Coxa with a strong lateral seta; femur with a row of short dorsal setae on basal half; tibia with a yellow dorsal seta at 3/4, with 2 black, spine-like apical setae anteriorly, and with a short apical tooth posteriorly; tarsomeres bare; relative podomere ratios: 58/78:17:28:14:9:6.

Wing: Hyaline, veins pale yellow; basal section of M shorter than distal section; CuAx ratio: 0.4; RMx ratio: 5.0; lower calypter whitish, with white setae; halter pale yellow.

Abdomen: Dark metallic green shining, with brown hairs. Hypopygium (Figs. 2A–B): epandrium dark brown, cercus pale yellow, surstylus yellowish brown, hypandrium dark brown. Epandrium long and slender; hypandrium (ventral view) symmetric, with rounded apex, ventrally with 4 small spines; ventral arm of surstylus tapering, with a fringed ventroapical seta, with a long curved lateral seta, and with 2 smaller ventroapical setae; dorsal arm of surstylus slender, with subapical

seta; epandrial lobes very close, but basally separated and setae of the same length; cercus with a blade-like apical projection.

Female: Unknown.

Etymology. The name is derived from Helvetia, a historic name for Switzerland.

Medetera ticinensis sp. n.

(Figs. 3A–B)

Diagnosis (general characters are given in the definition of the *Medetera betulae* group). Antenna ochreous brown; face black shining, with dense grey pruinosity; 4 pairs of strong dc; 3 dark ppls; hypandrium (ventral view) symmetric, very slender, with hook-shaped apex, without ventral spines.

Material examined. Holotype ♂: SWITZERLAND: TI, Piotta, 19.–22.VIII. 1981, leg. G. Bächli. To be deposited at ETHZ.

Description. Body length: 2.3 mm, wing length 2.8 mm.

Head: Frons and face brownish black shining, with dense grey pruinosity, clypeus black shining, with grey pruinosity along eye margins, narrowest distance between eyes 1.5 times the distance between ocellar setae; palpus dark brown, with brown hairs and 1 strong brown seta; proboscis dark brown; antenna ochreous brown; first flagellomere ovate, slightly longer than high; arista apical, bare; postocular setae white.

Thorax: Mesonotum brownish black, with green and violet reflections, and with dense grey pruinosity; thoracic setae black; 4 pairs of strong dc (most setae broken off), in front of 1st pair an additional small seta; 4–5 pairs of ac, which are longer than distance between rows; 1 strong sa (broken off); 4 strong scutellars (medians broken off); 3 dark ppls, all of about the same length; pleura dark brownish black shining, with grey pruinosity.

Legs: Coxae and femora dark brown; knees, tibiae and tarsomeres yellow; setae dark, except as noted. Fore leg: Coxa with some brown anterior setae; femur, tibia and tarsomeres bare; relative podomere ratios: 42/44:22:11:7:5:5. Mid leg: Coxa with a strong anterolateral seta; femur bare; tibia with ad/pd pair at 1/4, and with 3–4 short apical setae; relative podomere ratios: 52/55:28:14:10:5:5. Hind leg: Coxa with a strong brown lateral seta; femur with a row of short dorsal setae on basal half; tibia with a yellow dorsal seta at 4/5, with 2 black, spine-like apical setae anteriorly, and with a short apical tooth posteriorly; tarsomeres bare; relative podomere ratios: 51/67:15:23:14:6:5.

Wing: Hyaline, veins brownish yellow; basal section of M shorter than distal section; CuAx ratio: 0.4; RMx ratio: 4.5; lower calypter whitish, with white setae; halter pale yellow.

Abdomen: Dark metallic green shining, with brown hairs. Hypopygium (Figs. 3A–B): epandrium dark brown, cercus pale yellow, surstylus yellowish brown, hypandrium dark brown. Epandrium long and slender; hypandrium (ventral view) symmetric, very slender, with hook-shaped apex, without ventral spines; surstylus subparallel; ventral arm of surstylus with finger-like apical projection bearing 3 setae, and with subovate ventroapical projection, bearing 4 setae; dorsal arm of surstylus slender, curved, with a subapical seta; epandrial lobes basally separated and setae of the same length; cercus narrow, without apical projection.

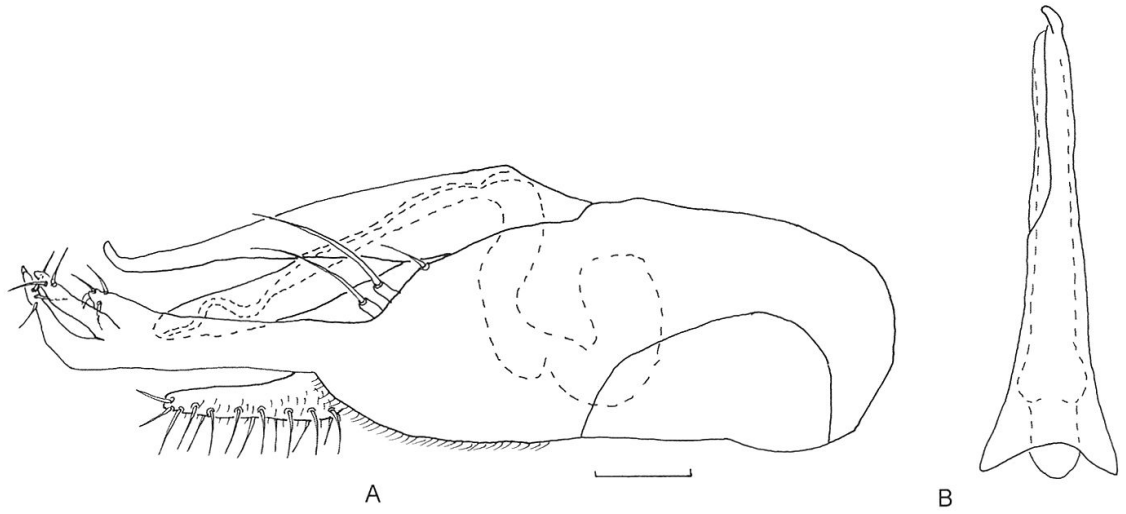

Fig. 3. *Medetera ticinensis* sp. n. male. A) hypopygium, lateral. — B) hypandrium, ventral. (scale bar = 0.1 mm)

Female: Unknown.

Etymology. The name is derived from the Canton Ticino, where the species was found.

DISCUSSION

The three here newly described species are very similar in external characters and for safe identification the examination of the male genitalia is necessary. The material was collected in the alpine region in South and South-East Switzerland, in the Cantons Valais, Ticino and Grisons, where most specimens were caught on an elevation between 1000 and 2000 m. The closely related *M. betulae* shows a boreal distribution in Northern Europe. These distribution patterns are an indication of a mainly boreal-montane distribution of most members of the group and some are possibly glacial relict species. The unique record of *M. betulae* from the Canton Neuchâtel (Basset 1985) should be verified.

ACKNOWLEDGEMENTS

The first author is grateful to Gerhard Bächli (Dietikon) for providing the material. Dan Bickel (Sydney) and an anonymous reviewer provided valuable comments on the manuscript.

LITERATURE

Allen, A.A. 1976. A new species of *Medetera* Fisch. (Dipt.: Dolichopodidae) in Britain. — Entomologist's Record 88(3): 77–79.

d'Assis Fonseca, E.C.M. 1978. Diptera Orthorrhapha Brachycera Dolichopodidae. — Handbooks for the identification of British insects 9(5): 1–90.

Basset, Y. 1985. Les peuplements d'Arthropodes sur *Pinus mugo* Turra dans les tourbières du Haut-Jura neuchâtelois. — Bulletin de la Société Neuchâteloise des Sciences Naturelles 108: 63–76.

Becker, T. 1917. Dipterologische Studien. Dolichopodidae. A. Paläarktische Region. — Nova Acta Academiae Caesareae Leopoldino Carolinae 102 (1917): 113–361.

Bickel, D.J. 1985. A Revision of the Nearctic *Medetera* — United States Department of Agriculture, Agricultural Research Service, Technical Bulletin Number 1692: 1–109.

Grichanov, I.Ya. 2010. Palearctic species of the *Medetera senicula* species group with description of a new species from Tunisia. — Russian Entomological Journal, 19(1): 71–75.
Grichanov, I.Ya. & Vikhrev, N.E. 2009. Mediterranean species of the *Medetera plumbella* species group with description of a new peculiar species from Morocco (Diptera: Dolichopodidae). — Zootaxa 2170: 46–52.
Gosseries, J. 1988. Some new names in the Dolichopodidae (Diptera). — Bulletin & Annales de la Société Royale Belge d'Entomologie, 124: 304–307.
Masunaga, K. & Saigusa, T. 1998. A taxonomic study of the genus *Medetera* Fischer von Waldheim of Japan (Diptera: Dolichopodidae). — Entomological Science 1(4): 611–621.
McAlpine, J.F. 1981: Morphology and terminology – Adults. *In*: McAlpine, J. F. *et al.* (eds): Manual of Nearctic Diptera. Vol. 1. — Research Branch, Agriculture Canada, Monograph 27: 9–63.
Morge, G. & Negrobov, O.P. 1981. Über die Typen von P. Gabriel Strobl aus der Familie Dolichopodidae (Diptera). — Beiträge zu Entomologie, 31: 13–15.
Naglis, S. 2009. Checkliste der Langbeinfliegen der Schweiz (Diptera, Dolichopodidae). — Entomo Helvetica, 2: 17–22.
Naglis, S. 2012. Nachtrag zur Checkliste der Langbeinfliegen der Schweiz (Diptera, Dolichopodidae). — Entomo Helvetica, 5: 169–171.
Naglis, S. 2013. New records of Medeterinae (Diptera, Dolichopodidae) from Turkey, with the description of three new species of *Medetera* Fischer von Waldheim. — Mitteilungen der Schweizerischen Entomologischen Gesellschaft, 86 (3–4): 165–173.
Negrobov, O.P. 1979. Family Dolichopodidae (Diptera) of the fauna of the USSR. I. subfamilies Dolichopodinae and Medeterinae. — Entomologicheskoe Obozrenie, 58(3): 646–659.
Negrobov, O.P. & Capecki, Z. 1977. A new species of *Medetera* Fischer genus (Dolichopodidae, Diptera) from Poland. — Polskie Pismo Entomologiczne, 47(2): 191–194.
Negrobov, O.P. & Golubtzov, D.N. 1991. New species of genus *Medetera* Fischer (Dolichopodidae, Diptera). — Nauchnye Doklady Vysshe Shkoly, Biologicheskie Nauki, 11: 50–53.
Negrobov, O.P. & Stackelberg, A.A. 1971–77. 29. Dolichopodidae. Medeterinae. — *In*: Lindner, E. (ed.): Die Fliegen der Palaearktischen Region. Lief. 284: 238–256, Lief. 289: 257–302, Lief. 302: 303–324, Lief. 303: 325–346, Lief. 316: 347–354.
Parent, O. 1938. Diptères Dolichopodidae. — Faune de France 35: 1–720.
Pollet, M. 2004. Dolichopodidae. *In*: Pape, T. (ed.). Fauna Europaea: Diptera Brachycera. — Fauna Europaea, http://www.faunaeur.org. (release date 27 September 2004, accessed January 2014).
Rampini, L. & Canzoneri, S. 1979. Una nuova specie di *Medetera* di Minorca (Diptera, Dolichopodidae). — Bollettino del Museo Civico di Storia Naturale di Venezia, 30: 265–269.
Ringdahl, O. 1949. Notizen zur Familie Dolichopodidae (Diptera). — Opuscula Entomologica, 14: 53–59.
Yang, D. 1999. Two new species of Dolichopodidae (Diptera) from North China. — Biologia Bratislava, 54(2): 165–167.
Yang, D., Zhu, Y., Wang, M. & Zhang, L. 2006. World Catalog of Dolichopodidae (Insecta: Diptera). — China Agricultural University Press, 1–704.

(received March 3, 2014; accepted May 12, 2014; published June 30, 2014)