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New records of predaceous midges from the Middle East, with the description of two new species (Diptera: Ceratopogonidae)

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Abstract

Two new distinctive species of predaceous biting midges of the tribe Ceratopogonini are described and illustrated from the Middle East. *Brachypogon freidbergi* sp. nov., with a unique Y-shaped gonostylus, is recorded from Israel. We also provide the first records of *Brachypogon vitiosus* (Winnertz) and *B. aethiopicus* (Clastrier, Rioux & Descous) from this country, and a key to the adult males of the genus *Brachypogon* Kieffer from the Middle East. *Ceratopogon azari* sp. nov., described from Lebanon, shows a distinctive structure of the male genital apparatus, and is the southernmost species of that genus in the Western Palaearctic.

Key words: Diptera, Ceratopogonidae, biting midges, *Brachypogon*, *Ceratopogon*, new species, new records, Middle East

Introduction

The predaceous midges of the genus *Brachypogon* Kieffer, 1899 and *Ceratopogon* Meigen, 1803 belong to the tribe Ceratopogonini, which includes over 1200 extant species (Borkent 2013). The generic status of *Brachypogon* and *Ceratopogon* remained problematic for many years, until Grogan (1982) and Wirth & Grogan (1988) redefined these two taxa as well as *Isohelea* Kieffer, 1917, which is currently regarded as a subgenus of *Brachypogon*. Debenham (1991) proposed the new subgenus, *Sarissohelea*, for several Australasian and Indomalayan species with females having a long costa and the radius joining the costa at an oblique angle. Species of *Brachypogon* are distributed throughout the world except in Antarctica (Spinelli & Grogan 1998), and nearly 200 extant species are currently recognized (Borkent 2013). The genus *Ceratopogon* is well represented in Baltic amber (Szadziewski 1988), but only 42 extant species are currently recognized (Borkent 2013). It is now apparent that *Ceratopogon* is a relict genus of Holarctic distribution, with cold-adapted boreal species; the adults are active during late winter or spring, or, during summer in high mountainous regions (Remm 1974, Borkent & Grogan 1995) and peat bogs (Szadziewski 1988).

This article is part of a survey of biting midges of the Middle East (Dominiak *et al.* 2007, Szadziewski *et al.* 2011, Alwin & Szadziewski 2012, Dominiak & Alwin 2013). Our examination of material collected in Lebanon and Israel revealed two distinctive, hitherto unknown species of *Brachypogon* and *Ceratopogon*, and provides new data on geographical distribution of these genera.

Material and methods

All specimens examined were cleared in a solution of phenol-ethanol, then dissected and slide-mounted in a mixture of phenol-Canada balsam by the techniques described by Wirth & Marston (1968). Morphological terms in the descriptions and methods of measurements follow Szadziewski *et al.* (1994) and Borkent & Grogan (1995). The microphotographs were taken using the LAS Montage multifocus with a Leica DM6000. Holotypes, paratypes

Both sexes of *C. azari* were co-associated as they were collected together from same site in the Anti-Lebanon Mountains, at a small stream and an adjacent helocrene spring. This is the first record of *Ceratopogon* from the Middle East and the southernmost site for this genus in the Western Palearctic (cf. Yu *et al.* 2005, Grogan & Wirth 1980).

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References

- Alwin, A. & Szadziewski, R. (2012) Description of a female of *Forcipomyia (Pedilohelea) eremita* (Diptera: Ceratopogonidae) from Yemen. *Polish Journal of Entomology*, 81, 207–210.
- Bernotienė, R. (2002) New data on the fauna of biting midges (Diptera, Ceratopogonidae) from Lithuania. *Acta Zoologica Lituonica*, 12, 288–293.
<http://dx.doi.org/10.1080/13921657.2002.10512516>
- Boorman, J. & van Harten, A. (2002) Some Ceratopogonidae (Insecta: Diptera) from the Arabian Peninsula, with particular reference to the Republic of Yemen. *Fauna of Arabia*, 19, 427–462.
- Borkent, A. (2013) *World species of biting midges (Diptera: Ceratopogonidae)*. Available from: <http://www.inhs.uiuc.edu/cee/FLYTREE/CeratopogonidaeCatalog.pdf> (accessed 20 February 2013)
- Borkent, A. & Grogan, W.L. (1995) A revision of the genus *Ceratopogon* Meigen with a discussion of phylogenetic relationships, zoogeography and bionomic divergence (Diptera: Ceratopogonidae). *Memoirs of the Entomological Society of Washington*, 15, 1–198.
- Borkent, A. & Wirth, W.W. (1997) World species of biting midges (Diptera: Ceratopogonidae). *Bulletin of the American Museum of Natural History*, 233, 257 pp.
- Brodskaya, N.K. (2001) Biting midges (Diptera: Ceratopogonidae). In: Fetisov, S.A. & Konechnaya, G.Yu. (Eds), *Bioraznoobrazie i redkie vidy Natsional'nogo Parka "Sebezshskiy"*. *Trudy St.-Peterburgskovo Obschestva Estestvoispytatelej*, Ser. 6, Vol. 4, 184–187.
- Clastrier, J., Rioux, J.A. & Descous, S. (1961) Notes sur les Cératopogonidés. XII. Cératopogonidés de Nord-Tchad. *Archives de l'Institut Pasteur Algérie*, 39, 49–98.
- Clastrier, J. & Wirth, W.W. (1961) Notes sur les Cératopogonidés. XIII. Cératopogonidés de la région Éthiopienne. *Archives de l'Institut Pasteur Algérie*, 39, 190–240.
- Debenham, M. (1991) Australian and New Guinea species of the biting midges genus *Brachypogon* (Diptera: Ceratopogonidae). *Invertebrate Taxonomy*, 5, 765–806.
<http://dx.doi.org/10.1071/it9910765>
- Delécolle, J.-C. & Rieb, J.-P. (1990) Liste faunistique complémentaire des Cératopogonidés d'Alsace (Dipt. Nematocera). *Bulletin de la Société Entomologique de France*, 95, 183–185.
- Delécolle, J.-C., Rieb, J.-P. & Brunhes, J. (1991) Note préliminaire sur les Diptères Cératopogonidés de la tourbière eutrophe du marais de Lavours (Vallée du Rhone, Ain). *Bulletin de la Société Entomologique de France*, 96, 255–256.
- Dominiak, P. (2009) Biting midges (Diptera: Ceratopogonidae). In: Herbich, J. & Ciechanowski, M. (Eds), *The nature of Kurze Grzędy and Staniszewskie Błoto reserves in the Kashubian Lakeland*. Fundacja Rozwoju Uniwersytetu Gdańskiego, Gdańsk, pp. 199–205.
- Dominiak, P. & Alwin, A. (2013) Five new species and new records of biting midges of the genus *Dasyhelea* Kieffer from the Near East (Diptera: Ceratopogonidae). *Zootaxa*, 3683 (2), 133–144.
<http://dx.doi.org/10.11646/zootaxa.3683.2.3>
- Dominiak, P., Braverman, Y. & Szadziewski, R. (2007) New records of biting midges of the genus *Dasyhelea* from Israel, with notes on synonymy in the genera *Culicoides* and *Forcipomyia* (Diptera: Ceratopogonidae). *Polish Journal of Entomology*, 76, 257–265.
- de Meillon, B. & Downes, J.A. (1986) Sub-Saharan Ceratopogonidae (Diptera). X. Report on species collected in the Drakensberg, South Africa. *Canadian Entomologist*, 118, 141–180.

- Glukhova, V.M. (1979) *Lichinki mokretsov podsemeistv Palpomyiinae i Ceratopogoninae fauny SSSR (Diptera, Ceratopogonidae=Heleidae). Opredeliteli po faune SSSR, izdavaemye Zoologicheskim Institutom AN SSSR. Vol. 121.* Nauka, Leningrad, 230 pp.
- Goetghebuer, M. (1920) Ceratopogoninae de Belgique. *Mémoires du Musée Royal d'Histoire Naturelle de Belgique*, 8 (3), 1–116.
<http://dx.doi.org/10.5962/bhl.title.10099>
- Goetghebuer, M. (1934) A. Die Imagines. Heleidae (Ceratopogonidae). 13a. In: Lindner, E. (Ed.), *Die Fliegen der palaearktischen Region*. E. Schweizerbart'sche verlagsbuchhandlung, Stuttgart, pp. 1–94.
- Grogan, W.L. (1982) The separation of *Ceratopogon*, *Brachypogon* and *Isohelea*. *Mosquito News*, 42, 521.
- Grogan, W.L. & de Meillon, B. (1993) New *Brachypogon*, mainly from Senegal, with a key to the Afrotropical species (Diptera: Ceratopogonidae). *Annales de la Société Entomologique de France (N.S.)*, 29, 387–409.
- Grogan, W.L. & Wirth, W.W. (1980) Two new species of *Macrurohelea* from Chile with a key to the Neotropical species (Diptera: Ceratopogonidae). *Pan-Pacific Entomologists*, 56, 137–143.
- Hagan, D.V., Hassold, E., Kynde, B., Szadziewski, R., Thunes, K.H., Skartveit, J. & Grogan, W.L. Jr. (2000) Biting midges (Diptera: Ceratopogonidae) from forest habitats in Norway. *Polish Journal of Entomology*, 69, 465–476.
- Havelka, P. (1976) Ceratopogoniden-Emergenz am Breitenbach und am Rohrwiesebach (1971–1972). *Archiv für Hydrobiologie*, 50, 54–95.
- Havelka, P. (1979) Situation der Ceratopogonidenforschung auf der Iberischen Halbinsel (Dipt. Ceratopogonidae). *Eos*, 53, 55–74.
- Kieffer, J.J. (1899) Description d'un nouveau genre et tableau des genres européens de la famille des Chironomides (Dipt.). *Bulletin de la Société Entomologique de France*, 1899, 66–70.
- Kieffer, J.J. (1913) Nouveaux chironomides (tendipédides) d'Allemagne. *Bulletin de la Société d'Histoire Naturelle de Metz*, 28, 7–35.
- Kieffer, J.J. (1917) Chironomides d'Amérique conservés au Musée National Hongrois de Budapest. *Annales Historico-Naturales Musei Nationalis Hungarici*, 15, 175–228.
- Kieffer, J.J. (1924) Quelques nouveaux chironomides piqueurs de l'Europe centrale. *Archives de l'Institut Pasteur Algérie*, 2, 391–408.
- Mayer, K. (1934) Ceratopogoniden aus der Neumark. (Dipt.). *Stettiner entomologische Zeitung*, 95, 290–294.
- Meigen, J.W. (1803) Versuch einer neuen Gattungseintheilung der europäischen zweiflügligen Insekten. *Magazin für Insektenkunde*, 2, 259–281.
- Meigen, J.W. (1818) *Systematische Beschreibung der bekannten europäischen zweiflügeligen Insekten. Vol. 1.* bei Friedrich Wilhelm Forstmann, Gedruckt bei Beaufort Sohn, Aachen, xxxvi + 333 pp., pls. 1–11.
<http://dx.doi.org/10.5962/bhl.title.12464>
- Meunier, F. (1904) Monographie des Cecidomyiidae, des Sciaridae, des Mycetophilidae et des Chironomidae de l'ambre de la Baltique (concl.). *Annales de la Société Scientifique de Bruxelles (Mem.)*, 28, 93–275.
- Navai, S. (1997) A new species of *Brachypogon* Kieffer from Afghanistan (Diptera: Ceratopogonidae). *Memoirs of the Entomological Society of Washington*, 18, 184–188.
- Országh, I. & Chalupský, J. (1987) Ceratopogonidae (Heleidae). In: Ježek, J. (Ed.), *Enumeratio insectorum Bohemoslovakiae. Check list of Czechoslovak insects 2 (Diptera)*. Acta faunistica entomologica Musei Nationalis Pragae, 18, pp. 48–52.
- Remm, H. (1966) On the Lithuanian biting midges (Diptera, Heleidae). *Tartu Riikliku Ülikooli Toimetised*, 180, 53–71.
- Remm, H. (1967) On the fauna of Ceratopogonidae (Diptera) in the Caucasus. *Tartu Riikliku Ülikooli Toimetised*, 194, 3–37.
- Remm, H. (1971) On the Fauna of Ceratopogonidae of South Primorye (Ussuri Land). In: *Živaja priroda Dal'nego Vostoka. Akademiia Nauk Estonkoi SSR*, pp. 182–220.
- Remm, H. (1974) A systematic review of species of the genus *Ceratopogon* Meigen from USSR. *Tartu Riikliku Ülikooli Toimetised*, 327, 23–58.
- Remm, H. (1979) A catalogue of the Ceratopogonidae (Diptera) of the Estonian S.S.R. *Eesti NSV Teaduste Akadeemia Tartu*, 40–60.
- Remm, H. (1988) Family Ceratopogonidae. In: Soos, Á. & Papp, L. (Eds), *Catalogue of Palaearctic Diptera. Vol. 3.* Akadémiai Kiadó, Budapest, pp. 11–110.
- Spinelli, G.R. & Grogan, W.L. (1994) Two new Neotropical species of the subgenus *Isohelea* of *Brachypogon*, with the description of the female of *B. (I.) misionensis* and a key to the Neotropical species (Diptera: Ceratopogonidae). *Revista de la Sociedad Entomologica Argentina*, 53, 1–8.
- Spinelli, G.R. & Grogan, W.L. (1998) A revision of the Neotropical predaceous midges of *Brachypogon* (*Brachypogon*) Kieffer (Diptera: Ceratopogonidae). *Insecta Mundi*, 12, 59–79.
- Szadziewski, R. (1988) Biting midges (Diptera, Ceratopogonidae) from Baltic amber. *Polish Journal of Entomology*, 58, 3–283.
- Szadziewski, R., Gwizdalska-Kentzer, M. & Gilka, W. (2011) Order Diptera, family Ceratopogonidae. In: Sheikh Tahnoon Bin Zayed Al Nahyan, H.H. (patron) & van Harten, A. (Eds), *Arthropod fauna of the United Arab Emirates. Vol. 4.* Dar Al Ummah Printing, Publishing, Distribution & Advertising, Abu Dhabi, UAE, pp. 636–653.
- Szadziewski, R. & Havelka, P. (1984) A review of the Palaearctic biting midges of the subgenus *Brachypogon* (s. str.) (Diptera, Ceratopogonidae). *Polish Journal of Entomology*, 54, 341–358.

- Szadziewski, R., Kaczorowska, E. & Krzywiński, J. (1994) The predaceous midges of the subgenus *Isohelea* of *Brachypogon* in Poland (Diptera, Ceratopogonidae). *Acta Zoologica Cracoviensia*, 37, 1–32.
- Winnertz, J. (1852) Beitrag zur Kenntnis der Gattung *Ceratopogon* Meigen. *Linnaea Entomologica*, 6, 1–80.
- Wirth, W.W. & Grogan, W.L. (1988) The predaceous midges of the world. (Diptera: Ceratopogonidae; tribe Ceratopogonini). *Flora & Fauna Handbook 4*, 1–160.
- Wirth, W.W. & Marston, N. (1968) A method for mounting small insects on microscope slides in Canada balsam. *Annals of the Entomological Society of America*, 61, 783–784.
- Yu, Y.-X., Liu, J.-H., Liu, G.-P., Liu, Z.-J., Hao, B.-S., Yan, G. & Zhao, T.-S. (2005) *Ceratopogonidae of China*, *Insecta, Diptera. Vol. 2*. Military Medical Science Press, Beijing [2005], 1699 pp.