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A new species of *Heterangaesus* Alexander, 1925 crane flies (Diptera: Pediciidae) from north-central Mongolia with first description of the larva for the genus

SIGITAS PODENAS^{1,2}, VIRGINIJA PODENIENE¹ & JON GELHAUS³

¹Department of Zoology of Vilnius University, Ciurlionio str. 21/27 and Research Associate, Academy of Natural Sciences of Drexel University, Philadelphia, PA, USA1910-1195. E-mail: sigitas.podenas@gf.vu.lt

²Nature Research Centre, Akademijos str. 2, LT-08412 Vilnius, Lithuania

³Department of Entomology, Academy of Natural Sciences of Drexel University, Philadelphia, PA, USA1910-1195.

E-mail: gelhaus@ansp.org

Abstract

A new species of Pediciidae, *Heterangaesus mongolicus* is described from specimens collected during the fieldwork of the Mongolian Aquatic Insect Survey Project in north-central Mongolia, Tov Aimag (district). Descriptions and illustrations of the distinguishing morphological features are provided. Habitat information is presented. Female ovipositor and larvae of *Heterangaesus* are described and illustrated for the first time. This discovery of *Heterangaesus* in Mongolia represents a 1700 kilometer extension of the known distribution for the genus.

Key words: *Heterangaesus mongolicus*, ovipositor, larval morphology, Japan, Mongolia

Introduction

The Mongolian Aquatic Insect Survey (MAIS) is a multi-national collaborative project between Mongolian, American and European scientists, funded primarily by grants from the U.S. National Science Foundation (Biotic Surveys and Inventories Program). Starting in 2002, this project has focused on documenting the species diversity of aquatic insects with particular sampling emphasis for Coleoptera (beetles), Ephemeroptera (mayflies), Plecoptera (stoneflies) Trichoptera (caddisflies), and Diptera (true flies). Fieldwork has included sampling for adult and immature stages, along with collecting physical and chemical measurements of the aquatic habitats (Gelhaus 2010; Philips-Iverson and Gelhaus 2010). Sampling in the first phase of MAIS (2003–2006) involved the Selenge River Basin watershed (Arctic drainage) (Gelhaus *et al.* 2008), building on earlier collaborative work in the Lake Hovsgol watershed (Goulden *et al.* 2006). The second phase of the project (2008–2011) has involved sampling the endorheic basins of western Mongolia (Gelhaus 2010). In total 423 aquatic sites have been sampled (75% streams and rivers, 25% lakes, ponds and other), with an estimated 500,000 specimens collected.

With nearly 300 species (Podenas *et al.* 2013), crane flies are a species-rich group of insects in Mongolia composed of a primarily Palaearctic fauna, with groups of species with Central Asian, endemic Mongolian and disjunct distributions (between Mongolia and western Palaearctic or Palaearctic Far East) (Gelhaus and Podenas 2006, Podenas, Gelhaus and Podeniene 2013). Earlier work by us focused on surveying in the Lake Hovsgol region, with scattered samples from elsewhere in northern Mongolia, and has resulted in the description of 13 new species of crane flies (Podenas and Gelhaus 2000, 2001; Gelhaus, Podenas and Brodo, 2000; Podenas and Gelhaus 2011). In this paper we describe a new species of Pediciidae discovered during sampling in the Selenge Basin during 2003–2011).

Heterangaesus Alexander, 1925 is a very small genus, that covers only six species worldwide (Oosterbroek, 2013). Two of them are composed of two subspecies each. All species and subspecies are described by Ch. P. Alexander alone (Alexander 1919, 1924a, b, 1925, 1931, 1933, 1954). All, but *H. gloriosus gloriosus* (Alexander, 1924), are endemic to islands of Japan. *H. gloriosus gloriosus* is found not only in Japan, but also on the continent

Heterangaeus and *Tricyphona* larvae develop in very similar habitats, and both of them can be found in organic rich mud. *Dicranota* usually develop in running water, *Pedicia* in the benthic zone of springs and *Nasiternella* can be found in rotten wood or water-filled tree holes.

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References

- Alexander, C.P. (1919) Undescribed species of Japanese crane-flies (Tipulidae, Diptera). *Annals of the Entomological Society of America*, 12, 327–348.
- Alexander, C.P. (1920) The crane flies of New York, Part 2. Biology and phylogeny. *Cornell University Agricultural Experimental Station Memoirs*, 38, 691–1133.
- Alexander, C.P. (1924a) New or little-known crane flies from northern Japan (Tipulidae, Diptera). *Philippine Journal of Science*, 24, 531–611.
- Alexander, C.P. (1925) New or little-known Tipulidae (Diptera). XXVI. Palaearctic species. *Annals and Magazine of Natural History*, 9 (15), 65–81.
<http://dx.doi.org/10.1080/00222932508633181>
- Alexander, C.P. (1931) New or little-known Tipulidae from eastern Asia (Diptera). IX. *Philippine Journal of Science*, 44, 339–368.
- Alexander, C.P. (1933) New or little-known Tipulidae from eastern Asia (Diptera). XIV. *Philippine Journal of Science*, 51, 507–544.
- Alexander, C.P. (1954) Records and descriptions of Japanese Tipulidae (Diptera). Part III. The crane-flies of Shikoku. III. *Philippine Journal of Science*, 82, 263–308.
- Alexander, C.P. (1958) Records and descriptions of Japanese Tipulidae (Diptera). Part VI. The crane-flies of Honshu. II. *Philippine Journal of Science*, 86, 281–330.
- Brindle, A. (1962) The larvae natural groups of the British Pediciini (Diptera, Tipulidae). *Entomologist's Monthly Magazine*, 98, 234–237.
- Brindle, A. (1967) The larvae and pupae of the British Cylindrotominae and Limoniinae (Diptera, Tipulidae). *Transactions of the Society of British Entomology*, 17, 151–216.
- Brinkmann, R. (1991) Zur Habitatpräferenz und Phanologie der Limoniidae, Tipulidae und Cylindrotomidae (Diptera) im Bereich eines norddeutschen Tieflandbaches. *Faunistische-Ökologische Mitteilungen*, Supplement 11, 156 pp.
- Crisp, G. & Lloyd, L. (1954) The community of insects in patch of woodland mud. *Transaction of the Royal Entomological Society of London*, 105 (13), 269–313.
<http://dx.doi.org/10.1111/j.1365-2311.1954.tb00766.x>
- Fahy, E. (1972) The larva and life history of *Dicranota guerini* Zett. (Diptera: Tipulidae). *Entomologist*, 105, 260–263.
- Gelhaus, J.K. (1986) Larvae of the Crane fly genus *Tipula* in North America (Diptera: Tipulidae). *University of Kansas Science Bulletin*, 53 (3), 121–182.
- Gelhaus, J. (2010) *The census of aquatic biodiversity in Mongolia: Results from the Mongolian Aquatic Insect Survey 2002–2010. Abstract. First International Conference "Survey of Mongolian aquatic ecosystems in a changing climate: Results, new approaches and future outlook. 7–10 April 2010. Ulaanbaatar, Mongolia"* Water Research Center, National University of Mongolia, Ulaanbaatar, 37 pp.
- Gelhaus, J. & Podenas, S. (2006) The diversity and distribution of crane flies (Diptera: Tipuloidea) in the watershed of Lake Hovsgol, Mongolia. In: Goulden, C.E., Sitnikova, T., Gelhaus, J. & Boldgiv, B. (Eds.), *The Geology, Biodiversity and Ecology of Hovsgol Nuur*. Backhuys Publishers, Leiden, pp. 279–303.
- Gelhaus, J., Podenas, S. & Brodo, F. (2000) New and poorly known species of long-palped crane flies (Diptera: Tipulidae) from Mongolia. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 150, 145–157.
- Gelhaus, J., Hayford, B., Morse, J., Nelson, C.R., Suvdtsetseg, Ch., Oyunchuluun, Y. & Sanaa, E. (2008) The Mongolian

- Aquatic Insect Survey (MAIS): Progress and future projects. In: Boldgiv, B. (Ed.), *Proceedings of the International Conference, Fundamental and Applied Issues of Ecology and Evolutionary Biology*. National University, Ulaanbaatar, Mongolia, pp. 53–60.
- Goulden, C.E., Sitnikova, T., Gelhaus, J. & Boldgiv, B. (Ed.) (2006) The Geology, Biodiversity and Ecology of Lake Hovsgol (Mongolia). Backhuys Publishers, Leiden, 525 pp.
- Haliday, A.H. (1833) Catalogue of the Diptera occurring about Holywood in Downshire. *Entomological Magazine*, 1, 147–180.
- Hennig, W. (1973) Diptera. *Handbuch der Zoologie*, 4 (2), 1–337.
- Krivosheina, M. G. (2009) On the morphology and ecology of the previously unknown larva of the short-palped crane fly *Nasiternella variinervis* (Zetterstedt, 1851) (Diptera, Pediciidae). *Entomological Review*, 89 (9), 1055–1058.
<http://dx.doi.org/10.1134/s001387380909005x>
- Krivosheina, N.P. & Krivosheina, M.G. (2011) *Key to the terrestrial crane-fly larvae (Diptera, Limoniidae, Pediciidae) of Russia*. KMK Scientific Press, 194 pp.
- Latreille, P.A. (1809) Genera crustaceorum et insectorum secundum ordinem naturalem in familias disposita, iconibus exemplisque plurimis explicata. *Paris and Strasbourg*, 4, 1–399.
<http://dx.doi.org/10.5962/bhl.title.11558>
- Lindner, Eb. (1959) Beiträge zur Kenntnis der Larven der Limoniidae. *Zeitschrift für Morphologie und Ökologie der Tiere*, 48, 209–319.
- McAlpine, J.F. (1981a) Morphology and terminology – adults. In: McAlpine, J.F., Peterson, B. V., Shewell, G.E., Teskey, H.J., Vockeroth, J.R. & Wood, D.M. (Eds.), *Manual of Nearctic Diptera. Vol. 1. Monograph 27*. Biosystematic Research Centre, Ottawa, Ontario, pp. 9–63.
- McAlpine, J.F. (1981b) Morphology and terminology – larvae. In: McAlpine, J.F., Peterson, B. V., Shewell, H.E., Teskey, H.J., Vockeroth, J.R. & Wood, D.M. (Eds.), *Manual of Nearctic Diptera. Vol. 1. Monograph 27*. Biosystematic Research Centre, Ottawa, Ontario, pp. 65–88.
- Obona, J. & Sary, J. (2013) Description of the larva and pupa of *Nasiternella regia* Riedel, 1914 (Diptera, Pediciidae) from Slovakia, with notes on ecology and behavior. *Biologia*, 68 (2), 345–350.
<http://dx.doi.org/10.2478/s11756-013-0149-7>
- Oosterbroek, P. (2013) Catalogue of the Craneflies of the World (CCW). Online version. Available from: <http://nlbif.eti.uva.nl/ccw/index.php> (accessed 14 April 2014)
- Oosterbroek, P. & Theowald, Br. (1991) Phylogeny of the Tipuloidea based on characters of larvae and pupae (Diptera, Nematocera) with an index to the literature except Tipulidae. *Tijdschrift voor Entomologie*, 134, 211–267.
- Phillips-Iverson, A. & Gelhaus, J. (2010) Mongolian Altai Survey Project, Mongolian Aquatic Insect Survey website. Available from: <http://clade.acnatsci.org/mongolia/> (accessed 14 April 2014)
- Podenas, S. & Gelhaus, J. (2000) A new species of longpalped crane fly in the subgenus *Tipula* (Odonatisca) (Diptera: Tipulidae) from Mongolia. *Transactions of the American Entomological Society*, 126, 109–115.
- Podenas, S. & Gelhaus, J. (2001) New species of shortpalped crane flies (Diptera: Limoniidae) from Mongolia. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 151, 41–59.
[http://dx.doi.org/10.1635/0097-3157\(2001\)151\[0041:nsospc\]2.0.co;2](http://dx.doi.org/10.1635/0097-3157(2001)151[0041:nsospc]2.0.co;2)
- Podenas, S. & Gelhaus, J. (2011) Three new species of Chioneinae crane flies (Diptera: Limoniidae) from north-central Mongolia. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 161, 73–86.
<http://dx.doi.org/10.1635/053.161.0105>
- Podenas, S., Gelhaus, J. & Podeniene, V. (2013) An overview of the Tipulomorpha and Ptychopteromorpha crane flies (Diptera) of Mongolia. *Proceedings of the Academy of Natural Sciences of Philadelphia*, 162, 111–123.
<http://dx.doi.org/10.1635/053.162.0107>
- Ribeiro, G. (2007) A review of the monotypic genus *Chilelimnophila* Alexander (Diptera: Tipulomorpha: Limoniidae). *Papéis Avulsos de Zoologia*, 47 (18), 203–211.
<http://dx.doi.org/10.1590/s0031-10492007001800001>
- Reusch, H. (1988) *Untersuchungen zur Faunistic, Phanologie und Morphologie der Limoniidae im Niedersächsischen Tiefland (Insecta, Diptera, Nematocera)*. Dissertation, University Hamburg, 154 pp.
- Savchenko, E.N. (1983) Crane-flies (Fam. Tipulidae), Introduction and the beginning of systematics part. Subfam. Dolichopezinae, subfam. Tipulinae (start). *Fauna USSR. Diptera*, 2 (1–2), 1–585. [in Russian]
- Savchenko, E.N. (1986) Limoniidae: Introduction, Pediciinae, Hexatomiinae. *Fauna Ukraini*, 14 (2), 1–379. [in Russian]
- Savchenko, E.N. (1989) *Limoniid crane flies of the USSR fauna*. Kiev, Naukovaya Dumka, 378 pp. [in Russian]
- Sary, J. (1994) Revision of European species related to *Tricyphona livida* (Diptera: Pediciidae). *European Journal of Entomology*, 91, 437–450.
- Ujvarosi, L., Kolcsar, L.P., Balint, M. & Ciprian, M. (2010) Pediciidae larva (Insecta, Diptera) in the carpatian basin: preliminary results and further perspectives. *Acta Biologica Debrecina, Supplementum Oecologica Hungarica* 21, 233–246.
- Wahlgren, E. (1904) Über einige Zetterstedtsche Nemocerentypen. *Arkiv for Zoologi*, 2 (7), 1–19.
- Young, C.W. (1987) A revision of the crane fly genus *Dicranoptycha* in North America. *Kansas University Science Bulletin*, 53, 215–274.
- Zetterstedt, J.W. (1837) Conspectus familiarum, generum et specierum Dipterorum, in fauna insectorum Lapponica descriptorum. *Isis (Oken)*, 1837 (1), 28–67.
- Zetterstedt, J.W. (1838) *Sectio tertia. Diptera. Dipterologis Scandinaviae amicis et popularibus carissimus. Insecta Lapponica. Lipsiae [=Leipzig]*, pp. 477–868.