



<http://dx.doi.org/10.11646/zootaxa.3802.1.3>

<http://zoobank.org/urn:lsid:zoobank.org:pub:A62F9CC8-F21D-4992-862A-1C2E12694832>

## Revision of the Afrotropical species of *Gonatopus* group 3 (Hymenoptera: Dryinidae), with description of a new species from Ghana

ADALGISA GUGLIELMINO<sup>1,3</sup> & MASSIMO OLMI<sup>2</sup>

<sup>1</sup>Department of Agriculture, Forests, Nature and Energy, University of Tuscia, Viterbo, 01100 Italy. E-mail: [guglielm@unitus.it](mailto:guglielm@unitus.it)

<sup>2</sup>Tropical Entomology Research Center, Via De Gasperi 10, Viterbo, 01100 Italy. E-mail: [olmi@unitus.it](mailto:olmi@unitus.it)

<sup>3</sup>Corresponding author E-mail: [guglielm@unitus.it](mailto:guglielm@unitus.it)

### Abstract

The Afrotropical species of *Gonatopus* Ljungh, 1810 group 3 are revised. A new species is described from Ghana, Eastern Region: *G. schwarzorum* Guglielmino & Olmi, **sp. nov.** A new key to the females of the Afrotropical species of *Gonatopus* group 3 is presented.

**Key words:** Gonatopodinae, Chrysidoidea, Africa, Eastern Region, *Gonatopus schwarzorum*, key

### Introduction

Dryinidae (Hymenoptera: Chrysidoidea) are parasitoids of Hemiptera Auchenorrhyncha (Guglielmino & Bückle 2003, 2010; Guglielmino *et al.* 2006, 2008, 2013; Guglielmino & Olmi 1997, 2006, 2007; Guglielmino & Virla 1998; Mangione & Virla 2004; Virla & Mangione 2000). Afrotropical Dryinidae have been studied in recent years mainly by Olmi (1984, 1986, 1987a, 1987b, 1987c, 1989, 1990, 1991, 1992, 1993, 1994a, 1994c, 1995, 1998a, 1998b, 1998c, 1998d, 2000, 2002, 2003, 2004a, 2004b, 2004c, 2005, 2006, 2007a, 2007b, 2008, 2009, 2010, 2011), Olmi & van Harten (2000, 2006), Ponomarenko & Olmi (2006), Azevedo *et al.* (2010), Olmi & Copeland (2011), Penati & Olmi (2011), Olmi *et al.* (2012) and Guglielmino *et al.* (2013). Among Dryinidae, *Gonatopus* Ljungh, 1810 (Gonatopodinae) is one of the largest genera. The species of *Gonatopus* are known to parasitize hosts belonging to many families of planthoppers and leafhoppers, many of which are important pests of cultivated plants (Guglielmino & Olmi 1997, 2006, 2007; Guglielmino *et al.* 2013).

According to Olmi and Virla (2014), the genus *Gonatopus* can be divided into 12 groups. According to the above papers, the 111 species known in the Afrotropical region are attributed to the following groups: 1 (one species); 2 (19 species); 3 (ten species); 4 (nine species); 5 (one species); 6 (nine species); 7 (59 species); 8 (two species); 11 (one species). The groups 9, 10 and 12 are not known in the Afrotropical region.

In the Afrotropical region, the following ten species are attributed to *Gonatopus* group 3 (including species of the former genus *Agonatopoides* Perkins, 1907, now junior synonym of *Gonatopus* Ljungh, 1810 (Olmi, 1993)): *Gonatopus acuminatus* (Olmi, 1984); *G. cafer* (Olmi, 1984); *G. ceres* (Olmi, 1984); *G. fuscus* (Olmi, 1984); *G. madecassus* Olmi, 1998; *G. mixtus* Olmi, 2004; *G. nicator* Olmi, 1998; *G. pluvialis* Olmi, 2004; *G. ruber* (Olmi, 1984); *G. ruvidus* Olmi, 2010.

In 2013, the authors have examined a collection of dryinids deposited in the Oberösterreichisches Landesmuseum of Linz (Austria). This study not only resulted in the discovery of a new species from Ghana described herein, but it gave the opportunity to revise the entire group 3 of the Afrotropical species of *Gonatopus*.

The description of the new species is based on the study of one only specimen. The authors are aware that descriptions of new taxa should normally be based on more individuals. However, Dryinidae are so rare that it is not common to find more than one specimen of each species. In addition, on the basis of the experience and knowledge of the authors, the new species is sufficiently characterized to justify its description.

surface of propodeum, mesopleuron and metapleuron transversely striate. Meso-metapleural suture distinct and complete. Protarsal segments in following proportions: 15:2.5:6:15:23. Segment 5 of protarsus (Fig. 22) with two rows of 19 lamellae; distal apex with about 14 lamellae. Enlarged claw (Fig. 22) with one large subdistal tooth and one row of 10 lamellae. Tibial spurs 1, 0, 1.

*Male.* Unknown.

**Hosts.** Unknown.

**Etymology.** The species is named after the collectors, Martin and Jonathan Schwarz.

**Distribution.** Madagascar.

## Acknowledgements

We are very grateful to Dr Martin Schwarz (Oberösterreichisches Landesmuseum, Linz, Austria) for sending on loan the new species described in this paper. Many thanks go to curators at all institutions that provided other specimens used in this study. We thank anonymous reviewers and the subject editor Dr Arkadiy S. Lelej for the comments and suggestions.

## References

- Azevedo, C.O., Madl, M. & Olmi, M. (2010) A Catalogue of the Bethyridae, Chrysididae, Dryinidae, Embolemidae, Sclerogibbidae and Scolebythidae (Hymenoptera: Chryridoidea) of the Malagasy Subregion. *Linzer biologische Beiträge*, 42 (2), 845–918.
- Carcupino, M., Guglielmino, A., Mazzini, M. & Olmi, M., (1998) Morphology and ultrastructure of the cephalic vesicles in two species of the *Gonatopus* genus: *Gonatopus camelinus* Kieffer and *Gonatopus clavipes* (Thunberg) (Hymenoptera, Dryinidae, Gonatopodinae). *Invertebrate Reproduction and Development*, 34, 177–186.  
<http://dx.doi.org/10.1080/07924259.1998.9652651>
- Guglielmino, A. (2002) Modalità di alimentazione delle larve immature dei Dryinidae (Hymenoptera Chryridoidea): stato delle conoscenze e nuovi reperti. *Bollettino dell'Accademia Gioenia di Scienze Naturali*, 35 (361), 559–569.
- Guglielmino, A. & Bückle, C. (2003) Description of larval instars of *Neodryinus typhlocybae* (Ashmead, 1893) (Hymenoptera Dryinidae), with remarks on its biology. *Mitteilungen aus dem Museum fuer Naturkunde in Berlin - Deutsche Entomologische Zeitschrift*, 50 (1), 143–150.  
<http://dx.doi.org/10.1002/mmnd.20030500114>
- Guglielmino, A. & Bückle, C. (2010) Description of larval instars of *Mystrophorus formicaeformis* Ruthe (Hymenoptera: Dryinidae). *Zootaxa*, 2602, 57–66.
- Guglielmino, A., Bückle, C. & Moya-Raygoza, G. (2006) Description of the larval instars of *Gonatopus bartletti* Olmi, 1984 (Hymenoptera: Dryinidae). *Zootaxa*, 1226, 51–60.
- Guglielmino, A. & Olmi, M. (1997) A host–parasite catalog of world Dryinidae (Hymenoptera: Chryridoidea). *Contributions on Entomology, International*, 2(2), 165–298.
- Guglielmino, A. & Olmi, M. (2006) A host–parasite catalog of world Dryinidae (Hymenoptera: Chryridoidea): first supplement. *Zootaxa*, 1139, 35–62.
- Guglielmino, A. & Olmi, M. (2007) A host–parasite catalog of world Dryinidae (Hymenoptera: Chryridoidea): second supplement. *Bollettino di Zoologia agraria e di Bachicoltura, Ser. II*, 39, 121–129.
- Guglielmino, A., Olmi, M. & Bückle, C. (2013) An updated host–parasite catalog of world Dryinidae (Hymenoptera: Chryridoidea). *Zootaxa*, 3740 (1), 1–115.  
<http://dx.doi.org/10.11646/zootaxa.3740.1.1>
- Guglielmino, A. & Virla, E.G. (1998) Postembryonic development of *Gonatopus lunatus* Klug (Hymenoptera: Dryinidae: Gonatopodinae), with remarks on its biology. *Annales de la Société entomologique de France (N. S.)*, 34 (3), 321–333.
- Guglielmino, A., Virla, E.G., Olmi, M., Moya-Raygoza, G. & Vollaro, M. (2008) Parasitization behaviour and postembryonic development in the subfamily Gonatopodinae. *Bulletin of Insectology*, 61 (1), 211.
- Ljungh, S.J. (1810) *Gonatopus*, novum insectorum genus. *Beiträge zur Naturkunde*, 2, 161–163.
- Mangione, S. & Virla, E.G. (2004) Morfología de los estadios preimaginales de *Gonatopus bonaerensis*, y consideraciones sobre la morfología interna de sus larvas inmaduras (Hymenoptera, Dryinidae). *Acta zoológica Lilloana*, 48 (1–2), 91–102.
- Olmi, M. (1984) A revision of the Dryinidae (Hymenoptera). *Memoirs of the American Entomological Institute*, 37, 1–1913.
- Olmi, M. (1986) New species and genera of Dryinidae (Hymenoptera Chryridoidea). *Frustula entomologica, N.S.*, 7–8, 63–105.
- Olmi, M. (1987a) New species of Dryinidae (Hymenoptera, Chryridoidea). *Fragmenta Entomologica*, 19, 371–456.

<http://dx.doi.org/10.5733/afin.050.0212>

- Olmi, M. (1987b) New species of Dryinidae, with description of a new subfamily from Florida and a new species from Dominica amber (Hymenoptera, Chrysidoidea). *Bollettino del Museo Regionale di Scienze Naturali di Torino*, 5, 211–238.
- Olmi, M. (1987c) Descrizione di nuove specie di Dryinidae (Hymenoptera Chrysidoidea). *Bollettino di Zoologia agraria e di Bachicoltura*, Series II, 19, 31–70.
- Olmi, M. (1989) New Dryinidae from Africa and Asia (Hymenoptera: Chrysidoidea). *Oriental Insects*, 23, 157–162.
- Olmi, M. (1990) I Dryinidae della Somalia: considerazioni sistematiche e biogeografiche (Hymenoptera Chrysidoidea). *Biogeographia*, 14, 403–406.
- Olmi, M. (1991 [“1989”]) Supplement to the revision of the world Dryinidae (Hymenoptera Chrysidoidea). *Frustula entomologica, N.S.*, 12, 109–395.
- Olmi, M. (1992) Contribution to the knowledge of the Gonatopodinae (Hymenoptera Dryinidae). *Bollettino dell’Istituto di Entomologia dell’Università di Bologna*, 46, 109–122.
- Olmi, M. (1993) A new generic classification for Thaumtodryininae, Dryininae and Gonatopodinae, with descriptions of new species (Hymenoptera Dryinidae). *Bollettino di Zoologia agraria e di Bachicoltura*, Series II, 25, 57–89.
- Olmi, M. (1994a) Taxonomic studies on the Dryinidae of Mozambique (Hymenoptera: Chrysidoidea). *Oriental Insects*, 28, 67–80.
- <http://dx.doi.org/10.1080/00305316.1994.10432296>
- Olmi, M. (1994b) *The Dryinidae and Embolemidae (Hymenoptera: Chrysidoidea) of Fennoscandia and Denmark*. Fauna Entomologica Scandinavica, 30. E.J. Brill, Leiden, Netherlands, 100 pp.
- Olmi, M. (1994c) New species of Dryinidae from Madagascar (Hymenoptera Chrysidoidea). *Frustula entomologica, N.S.*, 17, 1–12.
- Olmi, M. (1995) Description de trois nouvelles espèces de Dryinidae (Hymenoptera, Chrysidoidea). *Revue française d’Entomologie, N.S.*, 17, 133–136.
- Olmi, M. (1998a) A contribution to the knowledge of the Dryinidae (Hymenoptera, Chrysidoidea). *Lambillionea*, 98, 49–59.
- Olmi, M. (1998b) A contribution to the knowledge of Dryinidae (Hymenoptera: Chrysidoidea) and Strepsiptera of Mozambique. *Oriental Insects*, 32, 59–78.
- <http://dx.doi.org/10.1080/00305316.1998.10433767>
- Olmi, M. (1998c) *Gonatopus orangensis*: a new species of Dryinidae from South Africa (Hymenoptera Chrysidoidea). *Tropical Zoology*, 11, 177–181.
- <http://dx.doi.org/10.1080/03946975.1998.10539359>
- Olmi, M. (1998d [“1997”]) New Embolemidae and Dryinidae (Hymenoptera Chrysidoidea). *Frustula entomologica, N.S.*, 20, 30–118.
- Olmi, M. (2000 [“1998”]) New species of Oriental *Anteon*, with new synonymies (Hymenoptera Dryinidae). *Frustula entomologica, N.S.*, 21, 68–74.
- Olmi, M. (2002) Description of two new species of Dryinidae from Botswana: *Bocchus martellii* and *Gonatopus martellii* (Hymenoptera Chrysidoidea). *Bollettino di Zoologia agraria e Bachicoltura*, Series II, 34 (3), 273–280.
- Olmi, M. (2003 [“2001”]) A contribution to the knowledge of Dryinidae (Hymenoptera Chrysidoidea). *Frustula entomologica, N.S.*, 24, 21–49.
- <http://dx.doi.org/10.1080/00305316.2004.10417403>
- Olmi, M. (2004a) A contribution to the knowledge of Dryinidae (Hymenoptera: Chrysidoidea) of Northern Mozambique. *Oriental Insects*, 38, 353–372.
- <http://dx.doi.org/10.1080/00305316.2004.10417403>
- Olmi, M. (2004b [“2002”]) New species of Dryinidae and Embolemidae from Madagascar (Hymenoptera Chrysidoidea). *Frustula entomologica, N.S.*, 25, 86–109.
- Olmi, M. (2004c) Description de deux nouvelles espèces de Dryinidae (Hymenoptera, Chrysidoidea). *Revue française d’Entomologie, N.S.*, 26 (4), 179–181.
- Olmi, M. (2005) A contribution to the knowledge of Afrotropical Dryinidae (Hymenoptera: Chrysidoidea). *The Entomologist’s Monthly Magazine*, 141, 233–247.
- Olmi, M. (2006 [“2005”]) A catalogue of Dryinidae and Embolemidae of South Africa, with descriptions of new species (Hymenoptera Chrysidoidea). *Frustula entomologica, N.S.*, 28–29, 1–57.
- Olmi, M. (2007a) New species of Afrotropical Dryinidae (Hymenoptera: Chrysidoidea), with description of a new genus and a new subfamily. *African Invertebrates*, 48 (2), 199–232.
- Olmi, M. (2007b) Apodryininae of Madagascar and South Africa (Hymenoptera: Dryinidae). *Frustula entomologica, N.S.*, 30, 1–46.
- Olmi, M. (2008) New species of Dryinidae from the Afrotropical Region (Insecta, Hymenoptera, Chrysidoidea). *Spixiana*, 31 (2), 215–221.
- Olmi, M. (2009) New species of South African Dryinidae (Hymenoptera: Chrysidoidea). *African Invertebrates*, 50 (2), 447–460.
- Olmi, M. (2010 [“2008”]) Descriptions of new species of Dryinidae and Embolemidae from Madagascar (Hymenoptera Chrysidoidea). *Frustula entomologica, N.S.*, 31, 53–76.
- Olmi, M. (2011 [“2009”]) A contribution to the knowledge of world Dryinidae (Hymenoptera Chrysidoidea). *Frustula*

*entomologica*, N. S., 32, 43–76.

<http://dx.doi.org/10.1080/00305316.1998.10433767>

- Olmi, M. & Copeland, R.S. (2011) A catalogue of Dryinidae, Embolemidae and Sclerogibbidae of Kenya and Burundi, with descriptions of new species (Hymenoptera: Chrysidoidea). *African Invertebrates*, 52 (1), 177–206.  
<http://dx.doi.org/10.5733/afin.052.0109>
- Olmi, M. & Guglielmino, A. (2010) Description of Erwiniinae, new subfamily of Dryinidae from Ecuador (Hymenoptera: Chrysidoidea). *Zootaxa*, 2605, 56–62.
- Olmi, M., Guglielmino, A., Natha, S.A. & Nota Alfredo, A.A. (2012) A catalogue of Dryinidae of Mozambique, with description of a new species (Hymenoptera: Chrysidoidea). *African Invertebrates*, 53 (2), 715–731.  
<http://dx.doi.org/10.5733/afin.053.0216>
- Olmi, M. & van Harten, A. (2000) Notes on Dryinidae, Embolemidae and Sclerogibbidae (Hymenoptera: Chrysidoidea) of Yemen, with keys to the species of the Arabian Peninsula. *Fauna of Arabia*, 18, 253–271.
- Olmi, M. & Van Harten, A. (2006) Dryinidae, Sclerogibbidae and Embolemidae (Hymenoptera: Chrysidoidea) of Yemen, with revised keys to the species of the Arabian Peninsula. *Fauna of Arabia*, 21, 307–337.
- Olmi, M. & Virla, E.G. (2014) Dryinidae of the Neotropical region (Hymenoptera: Chrysidoidea). *Zootaxa*, 3792 (1), 1–534.  
<http://dx.doi.org/10.11646/zootaxa.3792.2.1>
- Penati, F. & Olmi, M. (2011) Catalogue of Dryinidae, Embolemidae and Sclerogibbidae of the Museo Civico di Storia Naturale “Giacomo Doria” (Insecta, Hymenoptera, Chrysidoidea). *Annali del Museo Civico di Storia Naturale di Genova*, 103, 71–92.
- Perkins, R.C.L. (1907) Parasites of leaf-hoppers. *Report of Work of the Experiment Station of the Hawaiian Sugar Planters' Association, Division of Entomology, Bulletin*, No. 4, 5–59.
- Ponomarenko, N.G. (1975) [Characteristics of larval development in the Dryinidae (Hymenoptera)]. *Entomologicheskoe Obozrenie* 54, 534–540. [in Russian]
- Ponomarenko, N.G. & Olmi, M. (2006) Dryinidae (Hym.) collected in Ethiopia by Dr Alexander F. Emelyanov, with descriptions of two new species. *The Entomologist's Monthly Magazine*, 142, 7–10.
- Virla, E.G. & Mangione, S. (2000) Morfología de los estados preimaginales de *Gonatopus chilensis* y consideraciones sobre las estructuras relacionadas a la nutrición de sus larvas inmaduras (Insecta: Hymenoptera: Dryinidae). *Neotrópica*, 46, 37–49.
- Xu, Z., Olmi, M., Guglielmino, A. & Chen, H. (2011a) A new species of Dryinidae (Hymenoptera: Chrysidoidea) from China. *Florida Entomologist*, 94 (4), 848–852.  
<http://dx.doi.org/10.1653/024.094.0418>
- Xu, Z., Olmi, M., Guglielmino, A. & Chen, H. (2011b) Description of *Aphelopus mangshanensis*, a new species of Dryinidae from China. *Bulletin of Insectology*, 64 (2), 243–246.
- Xu, Z., Olmi, M., Guglielmino, A. & Chen, H. (2011c) Description of *Anteon diaoluoshanense* sp. nov. from China (Hymenoptera: Dryinidae). *Pan-Pacific Entomologist*, 87 (3), 172–176.  
<http://dx.doi.org/10.3956/2011-31.1>
- Xu, Z., Olmi, M., Guglielmino, A. & Chen, H. (2012a) Checklist of Dryinidae (Hymenoptera: Chrysidoidea) from Shaanxi Province, China, with descriptions of two new species. *Zootaxa*, 3164, 1–16.
- Xu, Z., Olmi, M., Guglielmino, A. & Chen, H. (2012b [“2010”]) Descriptions of two new species of *Anteon* (Hymenoptera: Dryinidae) from China. *Entomological News*, 121 (5), 409–415.  
<http://dx.doi.org/10.3157/021.121.0502>
- Xu, Z., Olmi, M., Guglielmino, A. & Chen, H. (2012c) Checklist of Dryinidae (Hymenoptera) from Guangdong Province, China, with descriptions of two new species. *Zootaxa*, 3231, 1–28.
- Xu, Z., Olmi, M., Guglielmino, A. & Dong, W. (2011d) Description of a new species of *Aphelopus* Dalman from China (Hymenoptera: Chrysidoidea: Dryinidae). *Journal of the Kansas Entomological Society*, 84 (4), 298–303.  
<http://dx.doi.org/10.2317/jkes110428.1>
- Xu, Z., Olmi, M. & He, J. (2013) Dryinidae of the Oriental region (Hymenoptera: Chrysidoidea). *Zootaxa*, 3614 (1), 1–460.  
<http://dx.doi.org/10.11646/zootaxa.3614.1.1>