

Description of *Aphelopus fuscoflavus*, a new species of Dryinidae from Thailand (Hymenoptera, Chrysidoidea)

Adalgisa Guglielmino¹, Massimo Olmi², Alessandro Marletta³, Zai-fu Xu⁴

1 Department of Agriculture and Forestry Sciences (DAFNE), University of Tuscia, Viterbo, Italy **2** Tropical Entomology Research Center, Viterbo, Italy **3** Department of Biological, Geological and Environmental Sciences, Animal Biology section, University of Catania, Catania, Italy **4** Department of Entomology, College of Agriculture, South China Agricultural University, Guangzhou, P.R. China

Corresponding author: Zai-fu Xu (xuzaifu@scau.edu.cn)

Academic editor: Michael Ohl | Received 28 February 2017 | Accepted 7 April 2017 | Published 30 June 2017

<http://zoobank.org/7F135A17-F735-4A56-9721-99135D774EF5>

Citation: Guglielmino A, Olmi M, Marletta A, Xu Z-f (2017) Description of *Aphelopus fuscoflavus*, a new species of Dryinidae from Thailand (Hymenoptera, Chrysidoidea). Journal of Hymenoptera Research 57: 115–121. <https://doi.org/10.3897/jhr.57.12462>

Abstract

A new species of *Aphelopus* Dalman is described from Thailand, Sakon Nakhon: *A. fuscoflavus* sp. n. Morphologically the new species is similar to *A. zonalis* Xu, Olmi & He, 2013, known from China, Hainan, but it is clearly different in having the basivolsella fused with the paramere, while the basivolsella is not fused with the paramere in *A. zonalis*. Published identification keys to the Oriental species of *Aphelopus* are modified to include the new species.

Keywords

Aphelopinae, *Aphelopus*, new species, Oriental region, key, Thailand

Introduction

Dryinidae (Hymenoptera, Chrysidoidea) are parasitoids of leafhoppers, planthoppers and treehoppers (Hemiptera, Auchenorrhyncha) (Guglielmino and Virla 1998; Guglielmino and Bückle 2003, 2010; Guglielmino et al. 2006, 2013, 2015). *Aphelopus* Dalman, 1823 is a genus that is present in all zoogeographical regions (Olmi 1984; Xu et al. 2013; Olmi and Virla 2014; Olmi and Xu 2015). In total 78 species have been described from all continents (Olmi and Xu 2015) and the genus was revised at

world level by Olmi (1984, 1991) and in the Oriental, Neotropical and Eastern Palearctic regions by Xu et al. (2013), Olmi and Virla (2014) and Olmi and Xu (2015), respectively. The species of *Aphelopus* inhabiting the Oriental region have been recently studied by Xu et al. (2013); they listed 31 species in total.

Aphelopus species are parasitoids of leafhoppers belonging to Typhlocybae (Cicadellidae) (Guglielmino et al. 2013). Contrarily to almost all dryinids, females of *Aphelopus* do not have chelae and do not feed on their hosts; they grasp the body of their hosts between the two fore legs, with or without the help of their mandibles (Olmi 1984, 1994).

In 2016 we examined additional specimens of *Aphelopus* from Thailand and discovered a new species described in this paper.

Materials and methods

The descriptions follow the terminology used by Olmi (1984) and Xu et al. (2013). The measurements reported are relative, except for the total length (head to abdominal tip, without the antennae), which is expressed in millimetres. The following abbreviations are used in the descriptions: POL is the distance between the inner edges of the two lateral ocelli; OL is the distance between the inner edges of a lateral ocellus and the median ocellus; OOL is the distance from the outer edge of a lateral ocellus to the compound eye; OPL is the distance from the posterior edge of a lateral ocellus to the occipital carina; TL is the distance from the posterior edge of an eye to the occipital carina.

The term “metapectal-propodeal complex” is here used in the sense of Kawada et al. (2015). It corresponds to the term “propodeum” *sensu* Olmi (1984, 1994), Olmi and Virla (2014), Olmi and Xu (2015) and Xu et al. (2013). The term “ADO’s” is here used in the sense of Riolo et al. (2016). It corresponds to the term “rhinaria” *sensu* Olmi (1984, 1994), Olmi and Virla (2014), Olmi and Xu (2015) and Xu et al. (2013).

The types of all Oriental species of *Aphelopus* have been previously examined by the authors.

The type specimen described in this paper is deposited in the collection of the Queen Sirikit Botanic Garden, Chiang Mai, Thailand (QSBG).

Results

Genus *Aphelopus* Dalman, 1823

Aphelopus Dalman, 1823: 8. Type species: *Dryinus atratus* Dalman, 1823, by subsequent designation of Westwood (1839).

Diagnosis. Female: Fully winged; epistomal suture not touching antennal toruli; occipital carina complete; antenna without ADO’s; palpal formula 5/2; forewing with cos-

tal cell enclosed by pigmented veins, with pterostigma; stigmal vein long and regularly curved; course of forewing veins not marked by dark stripes; hind wing hyaline, with costal cell, without dark medial longitudinal stripe; protarsus not chelate; tibial spurs 1/1/2. Male: fully winged; epistomal suture not touching antennal toruli; occipital carina complete; palpal formula 5/2; forewing with costal cell enclosed by pigmented veins, with pterostigma; stigmal vein long and regularly curved; course of forewing veins not marked by dark stripes; hind wing hyaline, with costal cell, without dark medial longitudinal stripe; basivolsella situated completely below distivolsella apex; tibial spurs 1/1/2.

***Aphelopus fuscoflavus* sp. n.**

<http://zoobank.org/FF150F3A-F60D-4702-B992-08DE179813E9>

Figs 1–3

Diagnosis. Male with antenna filiform; head testaceous, except large brown spot on vertex; mesosoma testaceous, except area of scutum between notauli darkened, scutellum and metanotum brown, metapectal-propodeal complex black; notauli complete, posteriorly separated; basivolsella with one subdistal bristle, fused with paramere.

Description. *Male.* Fully winged (Fig. 1). Length 1.7 mm. Head testaceous, except large brown spot on vertex. Antenna yellow, except segments 4–10 darkened. Mesosoma testaceous, except area of scutum between notauli darkened, scutellum and metanotum brown, metapectal-propodeal complex black. Metasoma brown. Legs yellow. Antenna filiform. Antennal segments in following proportions: 3:3:4:4:5:6:6:6:9. Head dull, granulated. Frontal line incomplete, present in anterior half of face. Occipital carina complete. POL = 7; OL = 3; OOL = 2; OPL = 2.5; TL = 2; greatest breadth of posterior ocelli shorter than OL (2:3). Scutum, scutellum and metanotum dull, granulated. Notauli complete, posteriorly separated; minimum distance between notauli longer than greatest breadth of posterior ocelli (3:2). Metapectal-propodeal complex with dorsal surface (i.e. metapostnotum) dull, reticulate rugose; posterior surface (i.e. first abdominal tergum) reticulate rugose, with median area shiny, unsculptured. Forewing hyaline, without dark transverse bands. Basivolsella (Fig. 2) fused with paramere and with one subdistal bristle. Tibial spurs 1/1/2.

Female. Unknown.

Material examined. **Holotype:** male, Thailand, Sakon Nakhon Province, Phu Phan National Park, Nam Hom Waterfall, Sao Hi, 17°07.340'N 104°20.788'E, 344 m, 25–31.III.2007, Malaise trap, T2377, Sailom Tonqboonchai leg. (QSBG).

Hosts. Unknown.

Etymology. The name *fuscoflavus* derives from the Latin adjectives “*fuscus*” (dark) and “*flavus*” (yellow), because of the partly testaceous and partly brown colour.

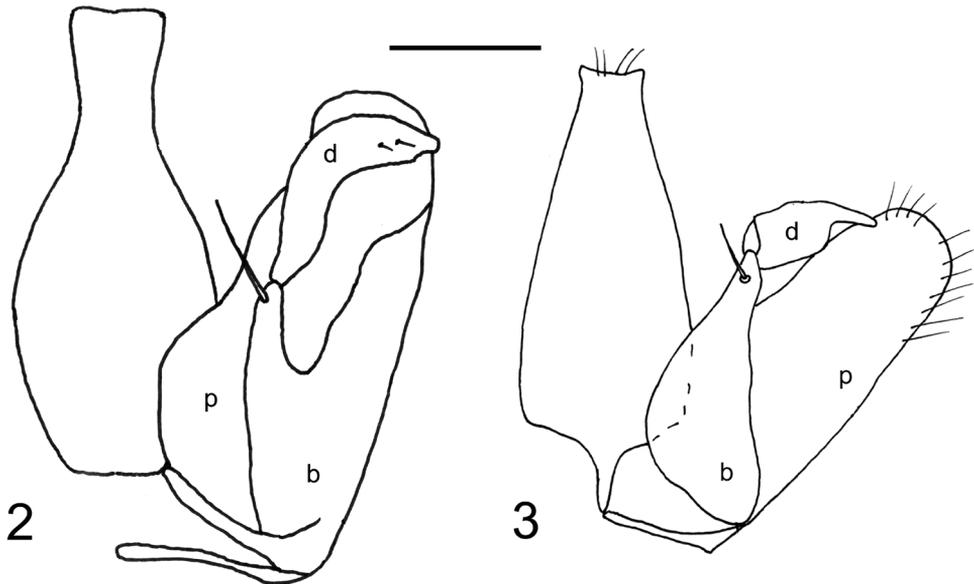
Remarks. Because of the head testaceous, except large brown spot on vertex, the mesosoma partly testaceous and partly brown, the complete notauli, the basivolsella with one subdistal bristle, the new species is similar to *Aphelopus zonalis* Xu, Olmi & He, 2013, described from China, Hainan. The main difference between *A. fuscoflavus*



Figure 1. *Aphelopus fuscoflavus* sp. n.: male holotype in dorsal view. Length 1.7 mm.

and *A. zonalis* is centered on the structure of the basivolsella; fused with the paramere (Fig. 2) in *A. fuscoflavus*, not fused in *A. zonalis* (Fig. 3). In the key to the males of the Oriental *Aphelopus* species published by Xu et al. (2013), the new species can be included by replacing couplets 1–4 as follows:

- | | | |
|---|---|---------------------------------|
| 1 | Mesosoma and metasoma totally testaceous, except petiole black..... | <i>A. borneanus</i> Olmi |
| – | Mesosoma and metasoma partly or totally black or brown..... | 2 |
| 2 | Head testaceous, at most with ocellar region, or vertex, or part of face darkened | 3 |
| – | Head mostly or totally black or brown..... | 8 |
| 3 | Notauli absent | <i>A. maculiceps</i> Bergman |
| – | Notauli distinct | 4 |
| 4 | Basivolsella with one subdistal bristle (Figs 2, 3) | 4' |
| – | Basivolsella with two subdistal bristles | 5 |
| 5 | Basivolsella not fused with paramere (Fig. 3) | <i>A. zonalis</i> Xu, Olmi & He |
| – | Basivolsella fused with paramere (Fig. 2)..... | <i>A. fuscoflavus</i> sp. n. |



Figures 2–3. Male genitalia, holotypes, left half removed. **2** *Aphelopus fuscoflavus* sp. n. **3** *A. zonalis* Xu, Olmi & He, 2013 (from Xu et al. 2013) (**b** = basivolsella; **d** = distivolsella; **p** = paramere). Scale bars = 0.09 mm (**2**), 0.10 mm (**3**).

Conclusion

Xu et al. (2013) recorded 71 species of Dryinidae from Thailand. Subsequently, Olmi et al. (2015) added an additional species: *Anteon huettingeri* Olmi, Xu & Guglielmino, 2015. Dryinidae of Thailand belong to the following genera: *Aphelopus* Dalman, 1823 (seven species), *Crovettia* Olmi, 1984 (one species), *Anteon* Jurine, 1807 (27 species), *Deinodryinus* Perkins, 1907 (two species), *Bocchus* Ashmead, 1893 (three species), *Thaumatodryinus* Perkins, 1905 (two species), *Dryinus* Latreille, 1804 (13 species), *Pseudodryinus* Olmi, 1991 (one species), *Neodryinus* Perkins, 1905 (five species), *Echthrodolphax* Perkins, 1903 (three species), *Haplogonatopus* Perkins, 1905 (one species) and *Gonatopus* Ljungh, 1810 (seven species). With the description of the above new species the number of species now known from Thailand is 73.

In comparison with the 193 species recorded in China by He and Xu (2002) and the 62 and 40 listed respectively in India and Laos (Xu et al. 2013), the dryinid fauna of Thailand is poorly known. Some genera such as *Gonatopus* (with only seven species listed) are clearly understudied.

However, the dryinids of Thailand will be better understood in the future. In fact, during the three year period 2006–2009, an intensive survey of the terrestrial arthropod fauna of Thailand was conducted by the Queen Sirikit Botanic Garden, The Thai Forestry Group, The Hymenoptera Institute and The Natural History Museum of Los Angeles County (TIGER: Thailand Inventory Group for Entomological Research,

coordinated by Michael Sharkey) (<http://sharkeylab.org/tiger/>). This survey resulted in the collection of about 5000 specimens of Dryinidae, which are actually in study in the authors' laboratories. The new species described herein is one of the first results of this study.

Acknowledgements

Many thanks to Dr. Michael Sharkey (Department of Entomology, University of Kentucky, Lexington, Kentucky, USA) for sending the specimen of *Aphelopus* described in the present paper. We are also grateful to all curators of collections who have sent us type material on loan. We are very indebted to Michael Ohl and Denis Brothers for their useful comments and suggestions to improve the manuscript. This paper was supported by the National Natural Science Foundation of China (No. 31472027).

References

- Ashmead WH (1893) Monograph of the North American Proctotrypidae. Bulletin of the United States National Museum, 45: 1–472. <https://doi.org/10.5479/si.03629236.45.1>
- Dalman CR (1823) *Analecta entomologica*. Typis Lindhianis, Holmiae, Sweden, 104 pp. <https://doi.org/10.5962/bhl.title.66069>
- 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. <https://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, Virla EG (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, 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, Bückle C (2013) An updated host-parasite catalogue of world Dryinidae (Hymenoptera: Chrysidoidea). *Zootaxa*, 3740: 1–113. <https://doi.org/10.11646/zootaxa.3740.1.1>
- Guglielmino A, Parise G, Bückle C (2015) Description of larval instars of *Dryinus tarraconensis* Marshall, 1868 and *Gonatopus baeticus* (Ceballos, 1927) (Hymenoptera: Chrysidoidea: Dryinidae), parasitoids of the genus *Dictyophara* Germar, 1833 (Hemiptera: Auchenorrhyncha: Dictyopharidae). *Zootaxa*, 4032(1): 42–54. <https://doi.org/10.11646/zootaxa.4032.1.2>
- He JH, Xu ZF (2002) *Hymenoptera Dryinidae* (Fauna Sinica 29). Science Press, Beijing, China, 464 pp.

- Jurine L (1807) Nouvelle méthode de classer les Hyménoptères et les Diptères, 1. Hyménoptères. Paschoud, Genève, Switzerland, 326 pp+14 plates.
- Kawada R, Lanes GO, Azevedo CO (2015) Evolution of metapostnotum in flat wasps (Hymenoptera, Bethyridae): implications for homology assessments in Chrysoidea. PLoS ONE, 10(10): e0140051. <https://doi.org/10.1371/journal.pone.0140051>
- Latreille PA (1804) Nouvelle dictionnaire d'Histoire naturelle, 24. F. Dufart, Paris, France, 104 pp.
- Ljungh SJ (1810) *Gonatopus*, novum insectorum genus. Beiträge zur Naturkunde, 2: 161–163.
- Olmi M (1984) A revision of the Dryinidae (Hymenoptera). Memoirs of the American Entomological Institute, 37: 1–1913.
- Olmi M (1991) Supplement to the revision of the world Dryinidae (Hymenoptera Chrysoidea). Frustula entomologica (1989) (N. S.), 12 (25): 109–395.
- Olmi M (1994) The Dryinidae and Embolemidae (Hymenoptera: Chrysoidea) of Fennoscandia and Denmark (Fauna Entomologica Scandinavica 30). E. J. Brill, Leiden, Netherlands, 100 pp.
- Olmi M, Virla EG (2014) Dryinidae of the Neotropical Region (Hymenoptera: Chrysoidea). Zootaxa, 3792 (1): 1–534. <https://doi.org/10.11646/zootaxa.3792.2.1>
- Olmi M, Xu ZF (2015) Dryinidae of the Eastern Palaearctic region (Hymenoptera: Chrysoidea). Zootaxa, 3996(1): 1–253. <https://doi.org/10.11646/zootaxa.3996.1.1>
- Olmi M, Xu ZF, Guglielmino A (2015) A new species of the genus *Anteon* Jurine (Hymenoptera, Dryinidae) from Thailand. ZooKeys, 504: 141–147. <https://doi.org/10.3897/zookeys.504.9333>
- Perkins RCL (1903) The leafhopper of the sugar cane. Territory of Hawaii, Board of Agriculture and Forest, Division of Entomology, Bulletin, 1: 1–38.
- Perkins RCL (1905) Leafhoppers and their natural enemies (Pt. i. Dryinidae). Report of Work of the Experiment Station of the Hawaiian Sugar Planters' Association, Division of Entomology, Bulletin, 1(1): 1–69.
- Perkins RCL (1907) Parasites of leaf-hoppers. Report of Work of the Experiment Station of the Hawaiian Sugar Planters' Association, Division of Entomology, Bulletin, 4: 5–59.
- Riolo P, Isidoro N, Ruschioni S, Minuz RL, Bin F, Romani R (2016) Anatomy of the antennal dorsal organ in female of *Neodryinus typhlocybae* (Hymenoptera: Dryinidae): a peculiar sensory structure possibly involved in perception of host vibration. Journal of Morphology, 277: 128–137. <https://doi.org/10.1002/jmor.20485>
- Westwood JO (1839) Synopsis of the genera of the British Insects. In: An Introduction to the Modern Classification of Insects, vol. 2. Longman, Orme, Brown, Green and Longmans, London, p. 76.
- Xu ZF, Olmi M, He JH (2013) Dryinidae of the Oriental region (Hymenoptera: Chrysoidea). Zootaxa, 3614: 1–460. <https://doi.org/10.11646/zootaxa.3900.1.1>