



A New Pteromalid Species: *Anisopteromalus quinarius* (Gokhman & Baur, 2014) Found in Tunisia

A. Ben Hamouda*, I. Chaieb, K. Zarrad, A. Laarif

UR13AGR09, Centre Régional des Recherches en Horticulture et Agriculture Biologique (CRRHAB),
Université de Sousse, Tunisia

ABSTRACT

A recently described species of Pteromalidae, *Anisopteromalus quinarius* (Hymenoptera: Pteromalidae) parasitizing *Lasioderma serricorne* (Coleoptera: Anobiidae), a pest of stored products, has been found for the first time in Tunisia. The affinities of the new species along with the related species are discussed in this paper.

Keywords: Parasitoid Wasp, *Anisopteromalus quinarius*, *Lasioderma serricorne*

HOW TO CITE THIS ARTICLE: A. Ben Hamouda, I. Chaieb, K. Zarrad, A. Laarif, Suprunchuk, A New Pteromalid Species: *Anisopteromalus Quinarius* (Gokhman & Baur, 2014) Found in Tunisia, Entomol Appl Sci Lett, 2017, 4 (4): 7-10.

Corresponding author: Amel Ben Hamouda

E-mail ✉ ben.hamouda@yahoo.fr

Received: 02/06/2017

Accepted: 04/10/2017

INTRODUCTION

In Tunisia, stored chickpeas are damaged by several species of weevil (Coleoptera: Anobiidae, Silvanidae, Chrysomelidae, Tenebrionidae, Curculionidae, Bostrichidae and Laemophloeidae) among which: *Lasioderma serricorne* (Fabricius) [Anobiidae], *Catharthus quadricollis* (Guérin-Méneville) [Silvanidae], *Oryzaephilus surinamensis* (Linnaeus) [Silvanidae], *Callosobruchus maculatus* (Fabricius) [Chrysomelidae], *Tribolium* spp. [Tenebrionidae], *Sitophilus zeamais* (Motschulsky) [Curculionidae], *Rhyzopertha dominica* (Fabricius) [Bostrichidae] and *Cryptolestes* spp. [Laemophloeidae] are the most frequently found ones.

The species of the genus *Anisopteromalus* Ruschka (Pteromalidae) are parasitoids of Coleopteran pests of stored products, more specifically they are parasitoids of anobiids, bruchids, curculionids and dryophthorids [1, 2]. *Anisopteromalus* species are also recorded as hyperparasitoids on *Plutella xylostella* Linnaeus (Lepidoptera) [3, 4, 5]. Eight species have been described so far in the genus of *Anisopteromalus* [2]: *Anisopteromalus apiovorus* [6]; *Anisopteromalus calandrae* [7]; *Anisopteromalus camerunus* [8]; *Anisopteromalus caryedophagus* [6]; *Anisopteromalus ceylonensis* Sureshan (2010) [1,9]; *Anisopteromalus glaber* [10], *Anisopteromalus schwenkei* [11] and *Anisopteromalus quinarius*

[12], and the later which was recently identified by [13].

Anisopteromalus calandrae (Howard) (Pteromalidae) is an important parasitoid of pests of stored products such as cereals, e.g., the granary weevil *Sitophilus granarius* (Linnaeus) or the drugstore beetle *Stegobium paniceum* (Linnaeus). For a long time, *A. calandrae* has been considered as one of the major antagonists of these pest species and has also been used in biological control. However, the karyotypic investigation of [14] revealed that this parasitoid was in fact two distinct species. The second species was described only recently as *A. quinarius* Gokhman & Baur by [13]. Indeed, the 2 species differ in their karyotypes with the haploid chromosome numbers of $n=7$ and $n=5$, for *A. calandrae* and *A. quinarius* respectively.

The two species are generally similar morphologically [13]. The discovery of this new species is significant for any biological control project, as the two species differ strongly in their host preferences: Specifically, *A. quinarius* prefers to attack certain Anobiidae, for example *Stegobium paniceum* or *Lasioderma serricorne* while *A. calandrae* prefers *Sitophilus* [13].

MATERIAL AND METHODS

In December, 2014, during the rearing of populations of *Lasioderma serricorne* on chickpeas, at the Laboratory of Entomology, Regional Centre of Research on Horticulture and Organic Agriculture, Chott-Mariem, Tunisia (35° 55' 06.0" N,

10° 34' 34.9 "E), the authors observed the emergence of wasps belonging to the species *Anisopteromalus quinarius* [12], which is a new record for Tunisia. The wasps were located alongside two pest species, firstly *Lasioderma serricornae* and later *Rhizopertha dominica* (Coleoptera: Anobiidae and Bostrichidae). *Lasioderma serricornae* and its parasitoid were reared in rearing boxes (21 × 15 × 10 cm) at 28°C and a photoperiod (16 h light/8 h dark).

The specimens were captured by a mouth aspirator and placed in 70% alcohol in eppendorf tubes and sent to the department of Invertebrates, Natural History Museum, Bern, Switzerland, where the identification was confirmed. Specimens were studied with a Leica MZ 12.5 stereoscopic microscope; photographs were taken with a Nikon Coolpix 4600 camera.

RESULTS AND DISCUSSION

Taxonomy

Class: Insecta (Linnaeus, 1758)
 Order: Hymenoptera (Linnaeus, 1758)
 Suborder: Apocrita (Gerstaecker, 1867)
 Superfamily: Chalcidoidea (Latreille, 1817)
 Family: Pteromalidae (Dalman, 1820)
 Subfamily: Pteromalinae (Dalman, 1820)
 Genus: *Anisopteromalus* (Ruscka, 1912)
 Species: *Anisopteromalus quinarius* (Gokhman & Baur, 2014)

Etymology

The species' name is derived Latin and means 'of five'. It refers to the haploid chromosome number, which is only five in this species. The name 'quinarius' is treated as a noun in apposition and does not change with gender [13].

DESCRIPTION

Female: The head is olive-green and the abdomen is black uniform; the body size is (2-2.5mm) (fig. 1a); mesosoma is greenish black (fig. 1b); eyes and ocelli are dark reddish brown (fig. 1c); and antenna with scape and pedicel is light brown. First and second anellus are testaceous, and the rest of flagellum is fuscous (fig. 1d). The wings are hyaline, and the veins are dark brown (fig. 1e). Coxae is concolourous with mesosoma; femora are brownish yellow with paler apices; the fore tibia is white apically and pale yellow in basal half; the fore tarsi is pale brown (fig. 1f) and the head is distinctly reticulate and moderately setose.

Male: Similar to the female in colour, the body size is small (1.5-2mm) (fig. 2a). There is a sexual dimorphism in colour on the abdomen: the

male exhibits a lack of pigmentation in the ventral base of the gaster (fig. 2 b, c).



Fig. 1 *A. quinarius* female: (a) lateral view, (b) mesosoma in dorsal view, (c) head in frontal view, (d) antenna, (e) forewing, (f) leg.

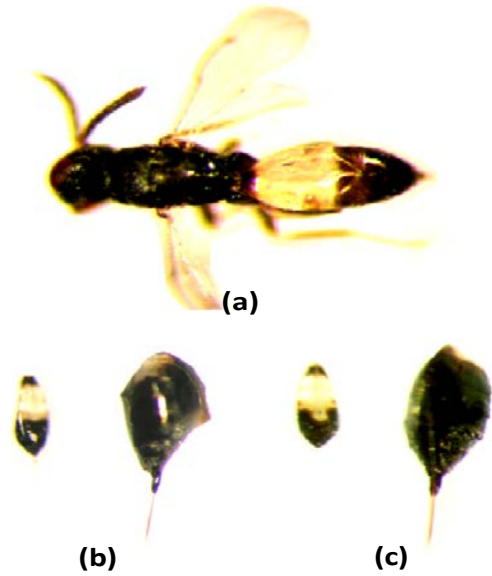


Fig. 2 (a) *A. quinarius* male in lateral view, (b) gaster in dorsal view of male and female, (c) gaster in ventral view of male and female.

Biology

The insect is a parasitoid wasp of cosmopolitan distribution that attacks several species of weevils in stored grains. The host preferences of this species contrasts somewhat with those of *A. calandreae*. Specifically, it prefers to attack certain Anobiidae, for example *Stegobium paniceum* or *Lasioderma serricorne*; however, it can easily be reared on *Sitophilus* spp. [13]. *A. quinarius* is an idiobiontic ectoparasitic wasp. The females use their ovipositor to drill holes in e.g. chickpeas, paralyze the host larvae and place an egg on the outside of the host larva. The wasp larva develops on the outside of the host while sucking out its inside. Finally, the wasp larva pupates and hatches (fig. 3).



Fig. 3 Pupa of *A. quinarius* (arrow) attached to a *L. serricorne* larva.

ACKNOWLEDGEMENTS

The authors thank Dr. Hannes BAUR (Natural History Museum, Berne, Switzerland) for identifying the wasp and for reviewing the manuscript. They also thank Dr. Mohamed Braham (CRRHAB) for the help in taking photos related to the wasp identification.

REFERENCES

1. Sureshan PM. A new species of Anisopteromalus Ruschka (Hymenoptera: Chalcidoidea: Pteromalidae) from Sri Lanka. Journal of threatened taxa 2010; 2, 1144-1146.
2. Noyes JS. Universal Chalcidoidea database, <http://www.nhm.ac.uk/chalcidoids> 2013; (last accessed 18/April/2017).
3. Herting B. Part 1 (Microlepidoptera). A catalogue of parasites and predators of terrestrial arthropods. Section A: host or prey/enemy. Commonwealth Agricultural Bureaux, Commonwealth Institute of Biological Control 1975; 6, 41-42.
4. Herting B. Hymenoptera. A catalogue of parasites and predators of terrestrial arthropods. Section A: host or prey/enemy. Commonwealth Agricultural Bureaux, Institute of Biological Control 1977; 4, 45.
5. Beccaloni G, Scoble M, Kitching I, Simonsen T, Robinson G, Pitkin B, Hine A & Lyal C. The Global Lepidoptera Names Index (Lepindex), <http://www.nhm.ac.uk/entomology/lepindex> 2003; (last accessed 28/March/2013).
6. Rasplus JY. Description de deux nouvelles espèces du genre Anisopteromalus Ruschka. Clé des espèces afrotropicales (Hym. Pteromalidae). Bulletin de la Société entomologique de France 1988; 93, 123-125.
7. Comstock P. Report of the entomologist. Report of the United States Department of Agriculture 1881; 273.
8. Risbec J. Les parasites des insectes borers du riz au Cameroun. Agronomie Tropicale, Nogentsur-Marne 1956 ;11, 238.
9. Sureshan PM. Taxonomic studies on Pteromalidae (Hymenoptera: Chalcidoidea) of Southeast Asia based on collections of Bohart Museum of Entomology, University of California, Davis, USA. Records of Zoological Survey of India, Occasional Paper 2007; 268, 1-42.
10. Szélnyi G. Some new Palaearctictorymid and pteromalid species (Hymenoptera: Chalcidoidea). Acta Zoologica Academiae Scientiarum Hungaricae 1981; 27, 215-216.
11. Roomi MW, Khan ZI & Khan SA. *Pteromalus schwenkei* (Hymenoptera: Pteromalidae), a

- new species as a primary parasite of the bean weevil, *Bruchus chinensis* L., from Pakistan. Zeitschrift für Angewandte Entomologie 1973; 72, 395-400.
12. Gokhman VE & Baur H. Universal Chalcidoidea database, <http://www.nhm.ac.uk/ourscience/data/chalcidoids/database/validName.dsml?index=ValidName&searchPageURL=indexValidName.dsml&familyqtype=contains&Family=&Genusqtype=contains&Genus=Anisopteromalus&Speciesqtype=contains&Species=quinarius> 2014; (last accessed 18/April/2017).
 13. Baur H, Kranz-Baltensperger Y, Cruaud A, Rasplus JY, Timokhov AV & Gokhman VE. Morphometric analysis and taxonomic revision of *Anisopteromalus ruschka* (Hymenoptera: Chalcidoidea: Pteromalidae) - an integrative approach. Systematic Entomology 2014; 39 (4),691-709.
 14. Gokhman VE, Timokhov AV & Fedina TY. First evidence for sibling species in *Anisopteromalus calandrae* (Hymenoptera: Pteromalidae). Russian Entomological Journal 1998; 7, 157-162.