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Revision of the world *Monoctonia* Starý, parasitoids of gall aphids: taxonomy, distribution, host range, and phylogeny (Hymenoptera, Braconidae: Aphidiinae)

EHSAN RAKHSHANI¹, PETR STARÝ², NICOLÁS PÉREZ HIDALGO³, JELISAVETA ČKRKIĆ⁴,
MOSTAFA GHAFOURI MOGHADDAM¹, SNEŽANA TOMANOVIĆ⁵, ANDJELJKO PETROVIĆ⁴
& ŽELJKO TOMANOVIĆ⁴

¹Department of Plant Protection, College of Agriculture, Zabol University, Zabol, P. O. Box: 998615–538, I. R. Iran.
E-mail: rakhshani@uoz.ac.ir

²Institute of Entomology, Biology Centre, Academy of Sciences of the Czech Republic, Branišovská 31, 37005 České Budějovice, Czech Republic. E-mail: stary@entu.cas.cz

³Departamento de Biodiversidad y Gestión Ambiental, Universidad de León, 24071 León, Spain; email: nperh@unileon.es

⁴Institute of Zoology, Faculty of Biology, University of Belgrade, Studentski trg 16, 11000 Belgrade, Serbia.

E-mail: ztoman@bio.bg.ac.rs; andjeljko@bio.bg.ac.rs; jckrkic@bio.bg.ac.rs

⁵Laboratory for Medical Entomology, Department for Parasitology, Center of Excellence for Toxoplasmosis and Medical Entomology, Institute for Medical Research, University of Belgrade, 11129, Belgrade, Serbia. E-mail: snezanat@imi.bg.ac.rs

Abstract

The present paper represents a contribution to the knowledge of the taxonomy of *Monoctonia* Starý aphid parasitoids obtained using the barcoding region of the mitochondrial COI gene. We discuss the phylogenetic position of the genus within the subtribe Monoctonina, redescribe known species, and describe *Monoctonia japonica* sp. n. from Japan in the association *Pemphigus matsumurai* Monzen/*Populus maximowiczii*. A key for species identification is provided. Also, we review and discuss the host records, origin, and geographical distribution of *Monoctonia* species. It is hypothesized that the genus *Monoctonia* evolved in Paleogene forests of the temperate (and subtropical) belt, most probably in the European part of the Mediterranean region, which is also the center of origin of their host plants.

Key words: *Monoctonia japonica*, Eriosomatinae, COI, parasitic wasps

Introduction

Species of the subfamily Eriosomatinae (Hemiptera, Aphididae) include most of the gall forming aphids on different host plants (Blackman & Eastop 1994). Among them species of *Pemphigus* Hartig (Pemphigini) have a specific affinity for poplars (*Populus* species, Salicaceae) (Whitham 1992), while species from the tribe Fordini (genera *Smynthuroides* Westwood, *Aploneura* Passerini, *Forda* von Heyden, *Geoica* Hartig, *Baizongia* Rondani, *Paracletus* von Heyden, *Slavum* Mordvilko, *Rectinasus* Theobald, and *Asiphonella* Theobald) attack host plants of different *Pistacia* species (Anacardiaceae) (Rezwani 2004). The closed galls formed by those aphids are very specific microhabitats which call for specific and specialized natural enemies (Urban 2002; Rakhshani *et al.* 2007).

Two species of the genus *Monoctonia* Starý (Braconidae, Aphidiinae) are known as parasitoids of the pemphigid gall-making aphids (Starý 1963, 1968; Tremblay 1991; Wool & Burstein, 1991a, b; Suay Cano & Michelena Saval 1998; Wool 2004). *Monoctonia* is a small genus of aphid parasitoids. *Monoctonia pistaciaecola* Starý from *Forda* spp. (Starý 1962) and *M. vesicarii* Tremblay from *Pemphigus* spp. (Starý 1968; Tremblay 1991) are periodically reported in the literature. Both species are distributed in Europe (mostly in Mediterranean countries) and in Central Asia (Starý 1962; Burstein & Wool 1991). Apart from the description of *M. vesicarii* in 1991, in Europe that species appears to have been mentioned just once, namely when Starý (2006) reclassified the earlier recorded “*Monoctonia pistaciaecola*” from *Pemphigus* aphid hosts in the Czech Republic as *M. vesicarii*. Takada *et al.* (2010) reported *M. vesicarii* from Japan in association with *Pemphigus matsumurai* Monzen/*Populus*

Mackauer vs. *C. watanabei* (Takada), *Falciconus pseudoplatani* Marshall vs. *F. longiradius* Takada] (Starý 1970; Takada & Shiga 1974; Takada 1983; Takada & Hashimoto 1985; Davidian 2007).

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