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Zombrus bicolor (Enderlein, 1912): evidence of its establishment in Italy (Hymenoptera: Braconidae: Doryctinae)

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Abstract. *Zombrus bicolor* (Enderlein, 1912) is recorded from new and further sites in Tuscany, far from the previous and only record, suggesting its establishment in Italy.

Riassunto. Zombrus bicolor *(Enderlein, 1912): una specie aliena si stabilizza in Italia (Hymenoptera: Braconidae: Doryctinae)*. *Zombrus bicolor* (Enderlein, 1912) è segnalato per nuove stazioni in Toscana, lontane dalla precedente ed unica segnalazione, confermando la sua stabilizzazione in Italia.

Key words. Alien species, Braconidae, parasitoid, distribution.

Introduction

Doryctinae is a subfamily of Braconidae with over 1200 described species and nearly 180 extant genera (SHENEFELT & MARSH, 1976; BELOKOBYLSKIJ *et al*., 2004a, 2004b; YU *et al*., 2012). The monophiletic condition of the taxon is uncertain, as well as the higher-level classification of its members (FISCHER, 1981; BELOKOBYLSKIJ, 1992; MARSH, 2002; BELOKOBYLSKIJ *et al*., 2004b; ZALDÍVAR-RIVERÓN *et al*., 2007, 2008). Three monophyletic tribes are currently recognized (ZALDÍVAR-RIVERÓN *et al*., 2008), and among them, Holcobraconini is widely distributed in the tropical and subtropical regions, but is scarcely present in the temperate regions of the world. Only the genus *Zombrus* Marshall, 1897 is represented in the Palearctic region (SHENEFELT & MARSH, 1976; YU *et al*., 2012). This genus has a subcosmopolitan distribution (it is absent from the New World) and counts approximately 50 species, mostly distributed in the Eastern Palaearctic and Afrotropical regions (YU *et al*., 2012). *Zombrus bicolor* (Enderlein, 1912) is the only species recorded for Italy, where it was observed only in recent times most probably as an alien species in Tuscany and, in particular, in Siena province (LONI *et al*., 2012). It is an ectoparasitoid of woodboring beetles larva mainly belonging to the family Cerambycidae, but few records are known also from the family Bostrychidae (SMITH *et al*., 2007; BELOKOBYLSKIJ & MAETO, 2009; BELOKOBYLSKIJ & SAMARTSEV, 2011; YU *et al*., 2012). This note provides further records of this exotic species in Italy, confirming its occurrence within the peninsula.

Material and methods

A dissecting stereomicroscope (OPTIKA SZM-2) was used for observation and study. Photographs were taken by a Canon Eos 600D, lens Canon MP-E 65mm f/2.8 1-5x Macro and Sigma 105mm f/2.8 Macro DG OS HSM, using Combine ZP for the stacking (HADLEY, 2008). Specimens were identified using BELOKOBYLSKIJ & SAMARTSEV (2011).

The coordinates of the records are in decimal degree (datum WGS84) and the distribution map has been produced by using QGIS 2.14.3 Essen.

Abbreviations

DDP = Davide Dal Pos private collection (Treviso, Italy);
FEI = Forum Entomologi Italiani, http://www.entomologiitaliani.net, accessed 07 July 2016.

Records

Zombrus bicolor (Enderlein, 1912) (Figs 1-2)
Neotrimorus bicolor Enderlein, 1912: 29.
Odontobracon sjoestedti Fahringer, 1929: 83.
Zombrus bicolor Shenefelt & Marsh, 1976: 1367.
Zombrus sjoestedti Shenefelt & Marsh, 1976: 1371.

Collected material. Italy. **Tuscany:** Parco della Maremma (GR), 10 m, 42.590° N 11.138° E (WGS84), dead wood, 25.V.2016, D. Dal Pos & A. Pandolfi leg., 2 ♂♂, DDP.
Photographic documentation. Italy. **Tuscany:** Florence (FI), city centre, 10.IX.2013, photo by David Baldo, 1 ♀, FEI.

Fig. 1. *Zombrus bicolor*: habitus, dorsal view.

Fig. 2. *Zombrus bicolor*: hind coxa, outer view.

Discussion

The species can be easily distinguished by the following morphological features: the completely dark fore wings, the body covered with long and dense setae (Fig. 1) and the presence of occipital dorsal and, partly, lateral carina (BELOKOBYLSKIJ & SAMARTSEV, 2011). Within the Italian fauna, it is also easily recognized by the teeth in the hind coxa (Fig. 2) and the recurrent vein (*m-cu*) clearly curved to the apex of the wing, that are anyway diagnostic features of the whole genus.

The species is widespread in the central and eastern Palaearctic region and, except for the particular findings of Italy, records are only known for the European part of Russia (Astrakhan' Province), Kazakhstan (Almaty Province), Mongolia, China, Korean Peninsula, Japan (ENDERLEIN, 1912; FAHRINGER, 1929; FISCHER, 1980; CHOU, 1981; PAPP, 2003; BELOKOBYLSKIJ & SAMARTSEV, 2011; LONI *et al*., 2012; SAMARTSEV & BELOKOBYLSKIJ, 2013). Thus, the species could probably be an alien species in Italy, where it was first observed in Siena province in 2012 (LONI *et al*., 2012).

The present data provide other scientific evidence of a potential establishment of this species in Italy (at least in Tuscany) and expand the known range, including the coastal area of Maremma (Grosseto) and the Arno flood plain (Florence), besides the finding in Siena province (Fig. 3).

One of the several hosts of *Zombrus bicolor* listed by SMITH *et al*. (2007) is *Anoplophora chinensis* (Förster, 1771), an exotic longhorned beetle, first recorded in Northern Italy in 2001 (COLOMBO & LIMONTA, 2001). LONI *et al*. (2012) suggested that this beetle, together with *Anoplophora glabripennis* (Motschulsky, 1853), another exotic Cerambycidae found in the same area by MASPERO *et al*. (2007), could be the carrier for the introduction of *Zombrus bicolor* in Italy. However, these two cerambycids have not been recorded in Tuscany yet, suggesting the occurrence of other hosts as possible carriers.

LONI *et al*. (2012) collected their specimen in an organic farm vineyards, while the two males of this note were directly collected over a pile of dead wood in a olive grove within Maremma Natural Park (Italy), a suitable reproductive site that suggest the presence of a resident colony.

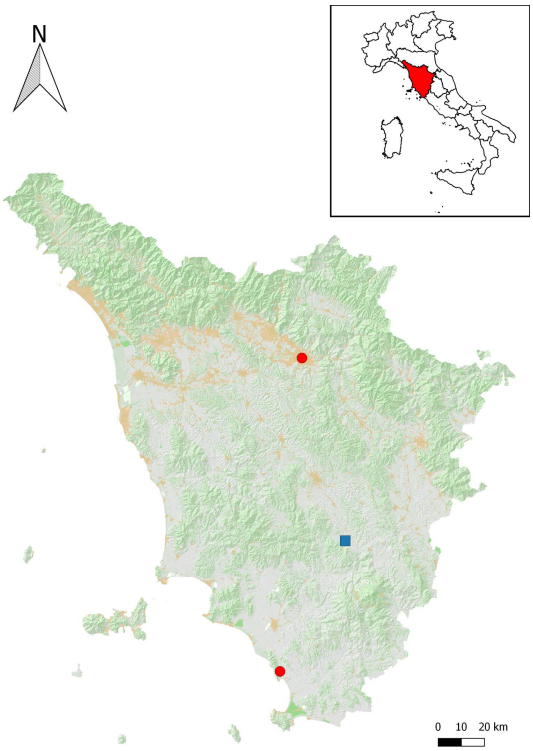

Fig. 3. Occurrence of *Zombrus bicolor* (Enderlein, 1912) in Italy, including the published record (blue square) and new data (red circles).

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