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FIRST REPORT OF *STREBLOCERA MACROSCAPUS* (RUTHE) (HYMENOPTERA BRACONIDAE EUPHORINAE) IN ITALY

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Loni A., Fornaciari M., Rossi E. – First report of *Streblocera macroscapus* (Ruthe) (Hymenoptera Braconidae Euphorinae) in Italy.

A female of *Streblocera macroscapus* (Ruthe) (Hymenoptera Braconidae Euphorinae) was captured on a yellow sticky trap during a monitoring survey aimed at studying insect biodiversity in Viareggio district (Lucca, Italy). This is the first report of this species in Italy. Biological information on *S. macroscapus* and its particular ecological niche are reviewed, and images of the specimen are presented. The importance of urban gardens and their proximity to the surrounding wild areas is also considered.

KEY WORDS: New record; parasitoid; habitats connectivity

INTRODUCTION

Streblocera Westwood (Braconidae: Euphorinae) is a cosmopolitan genus distributed worldwide and particularly speciose across East and Far East Asia (CHEN & VAN ACHTERBERG, 1997; QUICKE & PURVIS, 2001; SHAMIM, 2013; TAHIRA *et al.*, 2015; LEE *et al.*, 2016). It includes 98 species (YU *et al.*, 2011), six of which have been reported in the European fauna (TOBIAS, 1995; VAN ACHTERBERG, 2013). The taxonomic position of this genus has been debated by several authors (SHAW, 1985; BELOKOBYLSKIJ, 2000; LEE *et al.*, 2016). The most recent taxonomic revision considers it as part of the tribe of Townesilitini Shaw, although further studies and genetic analysis are needed to establish its position within this tribe (STIGENBERG *et al.*, 2015). Little detailed information is available on the biology of the *Streblocera* species; few papers report them as solitary, endophagous, parasitoids of adult chrysomelid beetles (WATANABE, 1942; HE, 1984; MAETO & NAGAI, 1985). In this paper, we report the first record of the species *S. macroscapus* (Ruthe) in Italy, collected during a monitoring survey in an urban garden in Viareggio district (Lucca, Italy).

MATERIALS AND METHODS

In 2018, from mid-March to the beginning of December, insect biodiversity was monitored in some gardens placed in Viareggio (Lucca Italy). Eight sites were selected for sampling: four gardens were bordered by natural and semi-natural vegetation; the other four were in a central part of the city, a long way (over 500 m) from any wild-natural area (Fig. I). In each garden three yellow-sticky traps (TEM-O-CID, Kollant, Padova, Italy) with a surface area of 375 cm² (25 x 15 cm) were hanged to the branches of trees and bushes at about 1.5 m high. Their arrangement was homogeneous in the garden to ensure the best monitoring of the area; the replacement was carried out every two weeks. Once removed, they

were covered with cellophane wrap and stored in the freezer (-18°C) until direct observation under a stereomicroscope. We selected, counted and identified all Ichneumonoidea, Syrphidae and Coccinellidae specimens captured. The analysis of such data will be reported in a further paper on urban biodiversity.

To remove specimens by the trap surface, a small piece of the sticky trap with the chosen specimen was cut and immersed in small container with mineral oil. After about ten minutes, when the glue resulted solved, the specimen was washed in a solution of water and generic liquid dishwashing detergent. Eventually the specimen was prepared for the classification and the photographic documentation. Photographs were taken with a Nikon D5300 digital camera attached to a Leica Z16 APO stereoscope. Images were stacked in a single in-focus image using Helicon Focus 3D (version 3.9.7W) and Zerene Stacker software (version 1.04). The specimens are preserved in the collection of the Department of Agriculture, Food and Environment of University of Pisa.

RESULTS AND DISCUSSION

In the trap coded 5-2-C (the acronym corresponds to garden 5, replicate 2, “Close” a wild-covered area), a female identified (WATANABE, 1942, TOBIAS, 1986) as the species *S. macroscapus* was captured (Fig. II). The geographical coordinates of the trap are 43.831821, 10.302592 (Fig. I). The garden, one of the smallest in the study, has an L-shaped area of 74 m². The plants in the garden are poor in terms of biodiversity: a *Pit-tosporum tobira* (Thumb.) W.T. Aiton hedge along the external border, a climbing *Bougainvillea* sp., one small *Magnolia grandiflora* L. tree and one small *Eriobotria japonica* (Thumb.) Lindl tree. The soil was covered by a spontaneous turf. The garden, however, is bordered by a huge peri-urban park which is connected to the wet, wild-area of the “Padule di Massaciuccoli” that surrounds the lake of the same name.



Fig. I – Map of the survey. Dots indicate the trap locations. White dots are the gardens close to a wild area, black dots are those far away. The arrow indicates the site where *S. macroscapus* was captured. The image is a screenshot of Google Maps.



Fig. II – *Streblocera macroscapus* female, glued to the trap surface.

The site is characterized by many different ecosystems, included wooded areas (with species such as *Populus alba* L., *Salix alba* L., *Alnus glutinosa* (L.) Gaertn, *Ulmus* sp.), large turf areas and artificial or natural permanent bodies of water, with typical riparian and wet-soil vegetation.

Fig. III 1-9, shows the morphological details of the captured specimen. *S. macroscapus* is the most widespread of the European species of *Streblocera*, and has been recorded in Britain, Bulgaria, Central European Russia, the Czech Republic, Finland, Germany, Hungary, Lithuania, Northwest European Russia, Poland, Slovakia, mainland Spain, Sweden, Switzerland, The Netherlands (VAN ACHTERBERG, 2013), and Turkey (YILMAZ *et al.*, 2010; KOLDAS *et al.*, 2013).

This is the first report of a species of the genus *Streblocera* in Italy. The genus belongs to the subfamily Euphorinae, which have the most diverse host association among Braconids (SHAW & HUDDLESTON, 1991; SHAW, 2004; QUICKE, 2015). Their parasitoid behaviour is extended from larval/nymphal to adult stages of a large range of orders, including Coleoptera, Hymenoptera, Lepidoptera, Orthoptera, Neuroptera, Psocoptera and Rhyncota Heteroptera, adopting a koinobiont, endophasic parasitoid strategy (SHAW, 2004).

The parasitoid species that exploit adult insect stages represent a rare behavioural condition within parasitic Hymenoptera. The adult victims can more easily avoid parasitoid attacks as they possess a more densely sclerotized exoskeleton and are the least numerous among the developmental stages of a species (SHAW, 2004). The large variety of strategies euphorines adopt to parasitize their hosts is reflected in their morphological diversity. Most have morphological features specialized for adult-parasitism. Many Euphorinae species present a narrow and unusually elongated petiole allowing the females to flex their abdomen forwards, extending the ovipositor, and large eyes for optimal visualization of the host movements (SHAW, 1985; BELOKOBILSKJI, 1996 a, b; SHAW, 2004). Adults of the genus *Streblocera* are distinguishable by the particular structure of their antenna, which have a very large, specialized scapus with a typical raptorial shape (WATANABE, 1942; SHAW, 1985; TOBIAS, 1986). This morphological feature is presumably an evolutionary adaptation for grasping hosts, which as far as is known, comprise only adult chrysomelids (Coleoptera, Chrysomelidae) (SHAW, 1985).

Among the six European species of the genus *Streblocera*, the females of *S. macroscapus* can be distinguished by the least specialized antennal structure with

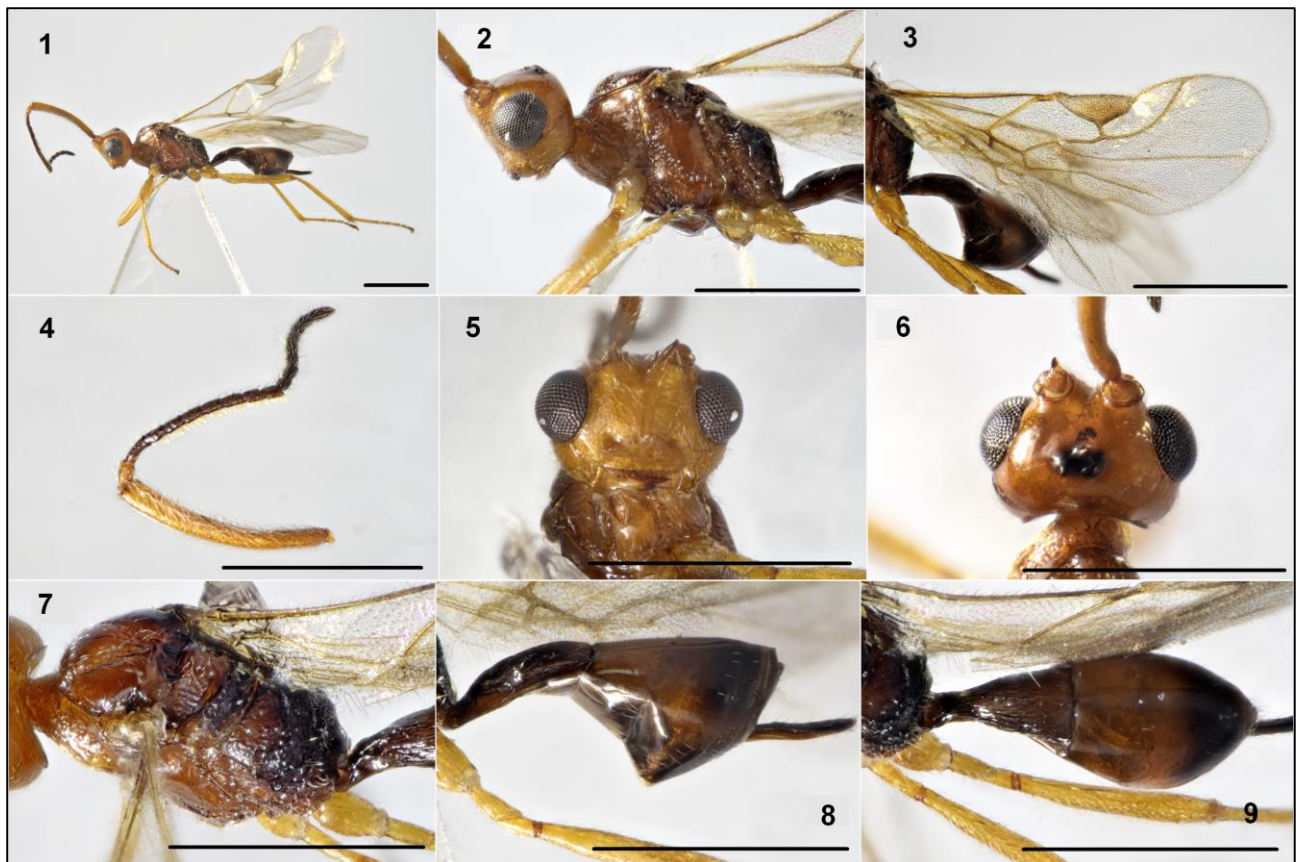


Fig. III - *Streblocera macroscapus* female, 1 - Body lateral view, 2 - mesosoma lateral view, 3 - fore wing, 4 - antenna, 5 - head, frontal view, 6 - head, dorsal view, 7 - mesosoma, dorso-lateral view, 8 - metasoma, lateral view, 9 - metasoma, dorsal view. Black bars size 1 mm.

only one geniculation, but with a very distinctive long scapus, the longest among all six species (WATANABE, 1942; TOBIAS, 1986) (Fig. III 1, 4). This record represents the first finding in Italy of a specimen belonging to the genus *Streblocera*. Interestingly, this finding occurred in an urban garden confirms how urban environments can host insect biodiversity (OWEN, 2010). Urban gardens present a large variety of habitat types and flora and could represent an attractive resource for wildlife from marginal wild ecosystems (RUDD *et al.*, 2002; GODDARD *et al.*, 2010). Our finding of *S. macroscapus* reasonably depends on the presence of the near wild area. The connectivity between gardens representing the nodes of an ecological network could reasonably play a key role. Individually they cannot support a large number of species, however with the corridors required for connectivity, they can provide suitable habitats for the species coming from the spill over from the surrounding wild areas. Knowledge of urban entomofauna should be the basis for adopting specific conservation measures aimed at a more general management of the biotic component of the urban ecosystem (NILON, 2011; HALL *et al.*, 2017). Public education on gardening with native plants and planning appropriate habitats, could be a crucial tool for creating the structural connectivity of urban gardens and improving the viability of the corridors (RUDD *et al.*, 2002). This could also apply to rare species, which occupy very particular ecological niches, with specific needs, as the case of *Streblocera*.

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