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FIRST FINDING OF *MEGACHILE SCULPTURALIS* SMITH (HYMENOPTERA, MEGACHILIDAE) IN FRIULI VENEZIA GIULIA (NORTH-EASTERN ITALY)

PRIMO RINVENIMENTO DI *MEGACHILE SCULPTURALIS* SMITH (HYMENOPTERA, MEGACHILIDAE) IN FRIULI VENEZIA GIULIA (ITALIA NORD-ORIENTALE)

Abstract - In the summer of 2017 the first specimens of the giant resin bee, *Megachile sculpturalis* SMITH (Hymenoptera, Megachilidae), a polylectic allochthonous species of Asian origin, were observed in a family garden in Romans d'Isonzo (district of Gorizia, Friuli Venezia Giulia region, north-eastern Italy). Outside the house, these large blackish wild bees nested in two sites: the hollow of a large ornamental log and a metal ventilation pipe emerging from a wall. In the previous three years until the spring of 2017, the same log hollow had been used for nesting by the carpenter bee *Xylocopa* cfr. *violacea* (L.) (Hymenoptera, Apidae). After being discovered in France in 2008, *M. sculpturalis* was observed for the first time in Italy in 2009 in Piedmont and then in other Italian regions, as well as in Switzerland, Germany and Hungary. In particular, the finding of giant resin bees presented in this paper is the easternmost record in Italy for this species to date, which is rapidly spreading throughout Europe.

Key words: Apoidea, Wild bee, Allochthonous species, Diversity, Distribution, North-eastern Italy.

Riassunto breve - Nell'estate 2017 la presenza di esemplari *Megachile sculpturalis* SMITH (Hymenoptera, Megachilidae), una specie poliletica di origine asiatica, è stata osservata per la prima volta in un giardino di Romans d'Isonzo (provincia di Gorizia). Nel giardino la specie ha nidificato in due siti: in una cavità di un grosso tronco e in un tubo metallico di ventilazione uscente da un muro. La cavità del tronco nei tre anni precedenti e nella prima parte del 2017 era stata utilizzata per la nidificazione da *Xylocopa* cfr. *violacea* (L.) (Hymenoptera, Apidae). Dopo essere stata rinvenuta in Francia nel 2008, *M. sculpturalis* è stata osservata per la prima volta in Italia nel 2009 in Piemonte e successivamente in altre regioni italiane, in Svizzera, in Germania e in Ungheria. In particolare, i reperti di *M. sculpturalis* presentati in questa nota sono attualmente i più orientali per l'Italia relativamente a questa specie in rapida espansione in Europa.

Parole chiave: Apoidea, Ape solitaria, Specie alloctona, Biodiversità, Distribuzione, Italia nord-orientale.

Introduction

The deliberate or accidental introduction of allochthonous insects is increasingly common (PELLIZZARI & DALLA MONTÀ 1997; ROQUES et al. 2009). In many cases these species have become a serious threat to both biodiversity and the economy, causing direct damage to crops and ornamental plants, and representing health and welfare problems to animals and humans.

Over 80 bee species, including *Apis mellifera* L. (Hymenoptera, Apidae), have been introduced around the world outside of their native ranges (Russo 2016). The giant resin bee *Megachile* (*Callomegachile*) *sculpturalis* SMITH (Hymenoptera, Megachilidae), a polylectic species native to East Asia (China, Korea, Taiwan, Japan) (QUARANTA et al. 2014; PARYS et al. 2015), is among the wild bees on this list.

In the 1990s the giant resin bee was found in North America (MANGUM & BROOK 1997), where it has mostly colonized the eastern coast of the United States (HINOJOSA-DÍAZ et al. 2005; HINOJOSA-DÍAZ 2008) and south-eastern Canada (HINOJOSA-DÍAZ et al. 2005; SHEFFIELD et al. 2011).

The species is also spreading across Europe. The first report was made near Marseille (southern France) in 2008 (VERECKEN & BARBIER 2009) and subsequently it was recorded in Piedmont (northern Italy) in 2009 (QUARANTA et al. 2014) and Canton Ticino (southern Switzerland) in 2010 (AMIET 2012). In 2012 the species was reported breeding successfully in southern France (GIHR & WESTRICH 2013). In 2015 an individual of the species was observed north of the Alps, in southern Germany, on the northern border of Lake Constance (WESTRICH et al. 2015). In the same year, adults of *M.*



Fig. 1 - Female of *Megachile sculpturalis* with a metric reference.
- *Femmina di Megachile sculpturalis con riferimento metrico.*

sculpturalis were observed in Hungary in the garden of the Mátra Museum in Gyöngyös (Kovács 2015).

In recent years, other reports on the occurrence of the species in other European localities have been published. All these data have been summarized (until October 31, 2015) by WESTRICH et al. (2015). Moreover, in 2016, specimens of the giant resin bee were observed in another northern region of Italy, i.e. in Emilia Romagna, near Ravenna (LUTHI 2016) and in the city of Bologna (GARRIDO 2016). In this paper, new data relating to the finding of an allochthonous wild bee observed in north-eastern Italy in 2017 are reported.

Materials and methods

Field observations

The observations were carried out from April to September 2017 in the locality of Romans d'Isonzo (5°53'26"N, 13°26'46"E; 23 m a.s.l.), in the district of Gorizia of the Friuli Venezia Giulia region.

The site is the garden of a private house, located at the edge of the urban area, surrounded by other gardens with small meadows, flowerbeds, ornamental trees and surrounding hedges. Over 80-100 metres away there are large areas cultivated with vineyards and annual crops.

Identification of the species

For the identification, one collected female of *M. sculpturalis* was prepared and mounted on a pin (Figs 1 and 2). Diagnostic keys, images and detailed descriptions of *Megachile* occurring in Canada were used (SHEFFIELD et al. 2011). Moreover, several scientific papers containing descriptions and illustrations of the species were consulted (HINOJOSA-DÍAZ et al. 2005; HINOJOSA-DÍAZ 2008; VERECKEN & BARBIER 2009; QUARANTA et al. 2014; PRAZ 2017), as well as pictures and comments posted on the internet.



Fig. 2 - Female of *Megachile sculpturalis* (same specimen as Fig.1) prepared for storage in an entomological collection.
- *Lo stesso esemplare di Fig. 1 preparato ad arte per la collocazione in una collezione entomologica.*

Results

Record of one collected specimen

M. sculpturalis, 1 female, July 18, 2017, Italy, Friuli Venezia Giulia region, district of Gorizia, locality Romans d'Isonzo, garden of a private house, M. Grion legit, P. Zandigiacomo determinavit. The specimen is deposited in the collection of the Department of Agricultural, Food, Environmental and Animal Sciences, University of Udine. The collected specimen held a mass of whitish resinous material between the mandibles.

Field observations in 2017

In April, the activity of a carpenter bee, *Xylocopa* cfr. *violacea* L. (Hymenoptera, Apidae), that had nested in a hollow of a large ornamental log (Fig. 3) placed close to a house wall facing the garden, was noted. The external opening of the cavity measures approximately 17x8 cm. In the previous three years, the same hollow had already been used for nesting by individuals of *Xylocopa*.

In early June, the same log hollow was found to be frequented by 4-5 large blackish bees, belonging to a different species from the previous *X. cfr. violacea*. The finding of some fragments of at least two adults of *X. cfr. violacea* on the ground at the base of the log indicated a probable aggressive eviction of the carpenter bee.

On July 18, an unknown bee specimen entering the log hollow was captured in order to identify the species. Another 4-5 specimens remained active. The captured bee was euthanised by placing it in a freezer for a few hours. After posting a picture of the collected specimen on a naturalists forum (<http://www.astorefvfg.org/forum/>) the bee has been identified as the giant resin

bee *M. sculpturalis*, and then prepared for placement in an entomological collection.

In June, near the log, another specimen of *M. sculpturalis* was observed to enter and exit repeatedly from a metal ventilation pipe (inner diameter around 2.5 cm), emerging from the house wall at around 2.20 m from ground level (fig. 4).

In the second half of July, some giant resin bees were observed as they flew to a nearby garden, where some trees of the glossy or Chinese privet, *Ligustrum lucidum* (Oleaceae), were blooming.

During the month of August, the number of flying giant resin bees progressively decreased until August 23, when an active specimen was observed for the last time in the log hollow. In mid-September a small nest of *Polistes* sp. (Hymenoptera, Vespidae) was observed in the metal pipe where a specimen of *M. sculpturalis* had previously nested.

Discussion

The findings of *M. sculpturalis* specimens described in this note represent the first records of the species in the Friuli Venezia Giulia region (north-eastern Italy). In addition, the locality of Romans d'Isonzo, district of Gorizia, represents the easternmost site of the known distribution area of the species in Italy (Fig. 5). The closest Italian sites where the bees had been previously recorded were in the district of Ravenna (noted July 17, 2016, locality Marina Romea) and Bologna city (noted July 20, 2016), both located in the Emilia Romagna region at a distance of over 200 km from the Friulian locality under investigation in this paper.

The new findings of the species in the district of Gorizia indicate its rapid spread in Europe, where it is currently present in France, Italy, Switzerland, Germany and Hungary. Detection of the giant resin bee is expected in Slovenia (GOGALA 2014).

In the future it will be important to establish the role of the giant resin bee as a pollinator of agricultural, ornamental and wild plants. Indeed, it is a polylectic species that seems to be associated with numerous plants, such as the Japanese pagoda tree, *Styphnolobium japonicum* (= *Sophora japonica*, Fabaceae), and *L. lucidum*, as evidenced by several authors (HINOJOSA-DÍAZ et al. 2005; LAPORT & MINCKLEY 2012; QUARANTA et al. 2014; PARYS et al. 2015). In Romans d'Isonzo the giant resin bees most likely foraged on *L. lucidum* flowers.

Moreover, it will be necessary to investigate the phenomena of competition or aggressive eviction with other pollinating species, such as *Xylocopa* spp., which has been observed by various researchers in America (LAPORT & MINCKLEY 2012; ROULSTON & MALFI 2012), hypothesized for Europe by some authors (QUARANTA et al. 2014) and also considered in this paper.



Fig. 3 - Romans d'Isonzo, July 2017. The log, near a wall, with a hollow (in the red circle) used initially for nesting by *Xylocopa* cfr. *violacea*, then by *Megachile sculpturalis*.

- Romans d'Isonzo, luglio 2017. Tronco d'albero, presso un muro, con una cavità (nel cerchio rosso) utilizzata per la nidificazione prima da *Xylocopa* cfr. *violacea*, poi da *Megachile sculpturalis*.



Fig. 4 - Romans d'Isonzo, July 2017. Metal ventilation pipe, emerging from a wall, used for nesting by *Megachile sculpturalis*.

- Romans d'Isonzo, luglio 2017. Tubo metallico di ventilazione, emergente da un muro, utilizzato per la nidificazione da *Megachile sculpturalis*.

The potential negative and positive impacts following the introduction of non-indigenous bee species around the world have not been explored yet (LAPORT & MINCKLEY 2012; RUSSO 2016).

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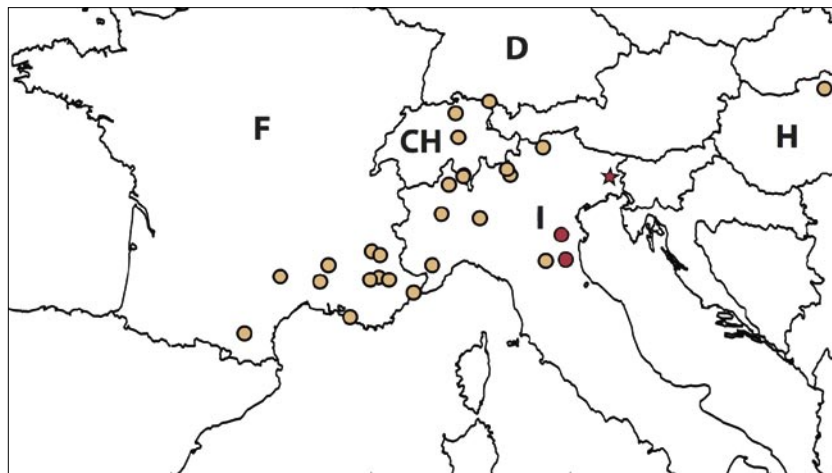


Fig. 5 - Distribution of *Megachile sculpturalis* in Europe; orange circles indicate the known sites until 2015; red circles indicate the two findings in Ravenna and Bologna in 2016; the red star indicates the discovery site of Romans d'Isonzo (Gorizia) in 2017, presented in this paper (from WESTRICH et al. 2015, mod.).
 - *Distribuzione di Megachile sculpturalis in Europa; i cerchi arancione indicano i siti noti fino al 2015; i due cerchi rossi indicano i rinvenimenti di Ravenna e di Bologna nel 2016; la stella rossa indica il sito di rinvenimento di Romans d'Isonzo (Gorizia) nel 2017, presentato in questa nota (da WESTRICH et al. 2015, mod.).*

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