

## ARTIGO / ARTÍCULO / ARTICLE

### First record of the mullein bug *Campylomma miyamotoi* Yasunaga, 2001 (Heteroptera: Miridae) in Europe

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**Abstract:** *Campylomma miyamotoi* Yasunaga, 2001, an alien plant bug species (Hemiptera: Heteroptera: Miridae) associated to the Persian silk tree *Albizia julibrissin* Durazz, 1772 (Fabaceae), is recorded for the first time in the Iberian Peninsula. Described from Japan, it is also found in Korea. The species was recently reported for the first time from Turkey. This Iberian record is the first one in Europe and the second one out of its native distribution range, and spreads the presence of *C. miyamotoi* largely westwards within the Palaearctic area.

**Key words:** Heteroptera, Miridae, Phylinae, *Campylomma miyamotoi*, allochthonous species, faunistics, new record, Iberian Peninsula.

**Resumen:** Primer registro del mirdido *Campylomma miyamotoi* Yasunaga, 2001 (Heteroptera: Miridae) en Europa.

*Campylomma miyamotoi* Yasunaga, 2001, una especie exótica de mirdido (Hemiptera: Heteroptera: Miridae) asociada al árbol de la seda *Albizia julibrissin* Durazz, 1772 (Fabaceae), se registra por primera vez en la Península Ibérica. Descrita de Japón, también se encuentra en Corea. La especie fue señalada recientemente por primera vez de Turquía. Este registro ibérico es el primero de Europa y el segundo fuera de su ámbito geográfico nativo, y extiende ampliamente la presencia de *C. miyamotoi* hacia el extremo occidental del área paleártica.

**Key words:** Heteroptera, Miridae, Phylinae, *Campylomma miyamotoi*, especie alóctona, faunística, nueva cita, Península Ibérica.

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## Introduction

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Human actions have increased the introduction of exotic species at a global scale (McNeely *et al.*, 2001). The increased mobility of people and their goods increases the probability of transporting species worldwide, via trade of manufactured products or livestock, pets, or nursery stock, as well as agriculture and forestry products (Hulme, 2009). Growing attention is paid to the arrival of allochthonous species, which in certain circumstances may have significant impact, either environmental, economic or on public health (Genovesi & Shine, 2004). Alien Heteroptera have been object of an inventory available via the Internet, in the frame of the DAISIE Research Program. Rabitsch (2008) thoroughly studies more than 40 species and analyzes the factors that contribute to their introduction or expansion.

Phylinae is a large subfamily within the Miridae, presently organized in 9 tribes (Menard *et al.*, 2014). The characterization of the subfamily is supported by the inner genital structures (Schuh &

Weirauch, 2020), and the study of the male endosoma and parameres is often needed to reach a reliable sorting to species. The subfamily, which includes five hundred genera (including *Campylomma* Reuter, 1878), shows its greatest diversity in temperate regions (Cassis & Schuh, 2012).

*Campylomma* is a Palaearctic and Palaeotropical genus, extending to the Pacific Islands, which includes more than 130 tiny or very tiny species (Schuh, 1995). In the Palaearctic region the genus includes around fifty species (Kerzhner & Josifov, 1999; Aukema *et al.*, 2013), and three of them, *C. annulicorne* (Signoret, 1865), *C. ribesi* Goula, 1986 and *C. verbasci* (Meyer-Dür, 1843), already known from the Iberian Peninsula, after *C. nicolasi* Reuter, 1883 was synonymized to *C. verbasci* by Carapezza (1997). Yasunaga *et al.* (2015) diagnose the genus and here we summarize the most relevant external features to quickly identify it in the context of the Iberian fauna: head large and very short, with big eyes which extends down to the gula; a certain number of species show greenish or yellowish habitus, including legs and antennae, and the species identification is very often only reliable on genitalic characters of any of both sexes (Schuh, 1984; Yasunaga *et al.*, 2015). Other *Campylomma* species are darker, which are usually more easily identifiable. Tibiae are provided with dark spots, from which a dark spine arises. In addition, first and second antennal segments may present dark spots or rings, or are completely dark.

As for its biology, herbivorous or predatory species may be found within the genus. In case of herbivory, oligophagy is the rule, while monophagy, although possible, is only the case for few *Campylomma* species. Certain predator species are regarded as potential auxiliary fauna in orchards as they prey on small insect pests (Schaefer & Panizzi, 2000). A zoophytophagous diet is estimated for *C. miyamotoi* and *C. fukagawai* Yasunaga, Schuh & Dewal, 2015, which suck on their host plant *Albizia julibrissin*, and prey on psyllids and aphids living on the same plant (Yasunaga *et al.*, 2015).

The aim of this work is to record *C. miyamotoi* in Europe for the first time by means of samples collected in the Iberian Peninsula, and provide useful comparative information to reliably identify the Iberian *Campylomma* species.

## Material and methods

Specimens of *C. miyamotoi* were collected by the second author in his home. Previously to capture, he observed that specimens of a small insect were attracted to domestic light, which was also the capture method in Izmir, in the Asian part of Turkey (Çerçi *et al.*, 2019).

Samples were dry kept, glued to pinned cardboard labels.

The photographs of the habitus were taken with a Canon Eos 600D camera with a Canon 65 mm macro lens. Each final habitus image is the result of stacking seven photographs using Adobe Photoshop CS5 software.

### Material studied:

#### *Campylomma ribesi* Goula, 1986

SPAIN: Barcelona: Liors (Montseny), 15.VII.198., *Populus* sp., 1♂, 1♀ (M. Goula leg., det. et coll.).

#### *Campylomma annulicorne* (Signoret, 1865)

BULGARIA: Mariza Bai, Harmanli, 17.VI.1962, 1♀ (M. Josifov leg. et det., M. Goula coll.); Rupite bei Petrisch, 25.VI.1981, 1♂ (M. Josifov leg. et det., M. Goula coll.).

#### *Campylomma verbasci* (Meyer-Dür, 1843)

SPAIN: Barcelona: Santa Fe del Montseny, Can Lleonart, 16.VII.1984, *Orobanche* sp., 1♀ (M. Goula leg., det. et coll.); Santa Fe del Montseny, Can Lleonart, 27.VII.1984, *Verbascum* sp., 1♂ (M. Goula leg., det. et coll.).

***Campylomma miyamotoi* Yasunaga, 2001**

SPAIN: Barcelona: Cerdanyola del Vallès (urban area, position: N41° 29' 01.5" E2° 08' 57.6"), 22.VII.2021, *Albizia julibrissin*, 1♂, 1♀ (E. Mateos leg., M. Goula det. et coll.).

**Results and discussion**

After examining the material from Cerdanyola del Vallès, the specimens were identified as *C. miyamotoi* Yasunaga, 2001.

*Campylomma miyamotoi* was described from samples swept from the Persian silk tree *Albizia julibrissin* Durazz, 1772 in different Japanese localities, in August (Yasunaga, 2001). It is a tiny species of ca. 2,5 mm long. Its general habitus (Figs. 1-3) and colour (greenish, fading to yellowish after death; with dark rings or spots on legs and two first antennal segments), make it very close to the Iberian species *C. annulicorne* (Figs. 4-5) and *C. verbasci* (Figs. 6-7). On the other hand, the Iberian endemism *C. ribesi* is darker, and antennae are much thicker in males than in females (Figs. 8-9). However, male vesica is clearly different between the four species (Figs. 10-13). Moreover, *C. miyamotoi* is much smaller than the other Iberian species.

Another Japanese species, *C. fukagawai*, has been also found on the Persian silk tree. Comparative description of endosoma in Yasunaga *et al.* (2015) is as follows: endosoma of *C. fukagawai* is "weakly sigmoid, with bifurcate, short, broad apical appendages", while in *C. miyamotoi* endosoma shows "short, broad apical processes, and small". According to figures in the original description of *C. miyamotoi* (Yasunaga, 2001) and in the Korean revision for the genus (Duwal *et al.*, 2013), and descriptions already mentioned, we assume that in Yasunaga *et al.* (2015) Fig. 55 belongs in fact to *C. fukagawai*, and Fig. 47 belongs to *C. miyamotoi*. We would like to point out that in *C. fukagawai* endosomal processes are divergent, while in *C. miyamotoi* these processes run in parallel. Yasunaga *et al.* (2015) sustain that both species possibly do not compete on their host plant, as adults of *C. fukagawai* were collected earlier than those of *C. miyamotoi*.

*Campylomma* species usually exhibit a short range of host plants. Among the Iberian species, *Campylomma annulicorne* is known to live on willow *Salix* spp. (Wagner, 1975), mainly *S. babylonica* (Yasunaga *et al.*, 2015), but also on *Polygonum aviculare* and *Tripelurospermum* sp. (Nau, 1979) and *Artemisia* spp. (Duwal *et al.*, 2013). According to present knowledge, *C. miyamotoi* is monophagous on *Albizia julibrissin*. *Campylomma ribesi* is associated to *Populus* sp. (Goula, 1986a), including *Populus nigra* (Gessé, 2011) and *P. deltoides* (Pagola-Carte, 2009), and to *Salix alba* (Pagola-Carte & Zabalegui, 2007). *Campylomma verbasci* is mainly associated to *Verbascum* spp. (Goula, 1986b), but it is reputed to be polyphagous (Wagner, 1975), with *Cupressus sempervirens*, *Gossypium herbaceum*, *Heliotropium* sp., *Orobanche* sp., *Pirus communis*, *Prunus spinosa* or *Suaeda vera* being recorded as host plants, among others.

Concerning their geographic distribution, *C. annulicorne* is found in Europe, extending to central Asia, and recently introduced in China (Kerzhner & Josifov, 1999; Aukema *et al.*, 2013); *C. miyamotoi* has been previously reported from Japan and Korea (Duwal *et al.*, 2013) and Turkey (Çerçi *et al.*, 2019), the present Iberian citation being the westernmost location; *C. ribesi* is an Iberian endemism (Kerzhner & Josifov, 1999); and *C. verbasci* is Palaearctic, present also in the Canary Islands, and accidentally introduced in North America (Kerzhner & Josifov, 1999; Aukema *et al.*, 2013).

**Concluding remarks**

The increasing use of exotic ornamental plants in urban environments may result in the facilitation of the arrival of exotic species. It is worth to know that Persian silk tree, whose natural distribution area extends from Far East to Central Asia, was introduced in Europe in 1745 (Salvador Palomo *et al.*, 2002).

Its pleasant appearance, together with its resistance to pests and to short periods of drought, make it a good candidate as ornamental in urban green areas. Çerçi *et al.* (2019) suggest that *C. miyamotoi* may have been recently introduced through travelling of people or trading of goods including plant seedlings, or that it spread naturally following its host plant. Because of its small size, *C. miyamotoi* could be present out of its native area much before than noticing it recently either in Turkey or in the Iberian Peninsula. These two scattered reports, East and West of the Mediterranean Basin, will most probably be followed by others elsewhere Persian silk trees are present.

The consequences of the arrival of this insect species to these new areas is difficult to predict, as its biology is still poorly known. On the other hand, its monophagy related to *Albizia julibrissin* allows to anticipate that, if any, the consequences of the presence of *C. miyamotoi* will be restricted to ornamentals in urban areas.

## Acknowledgments

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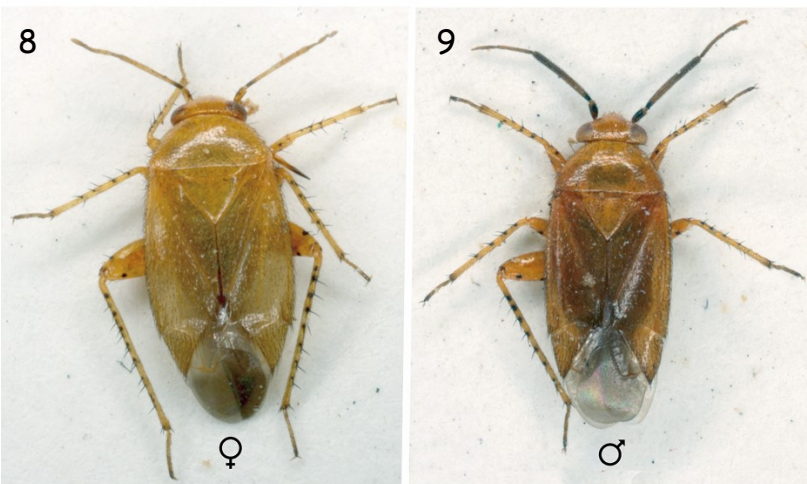
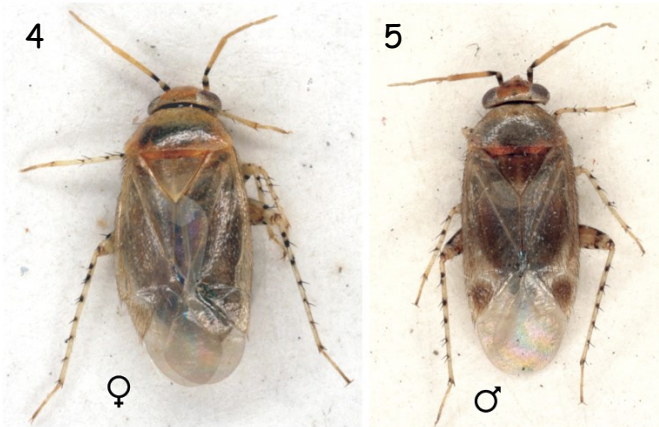
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## References

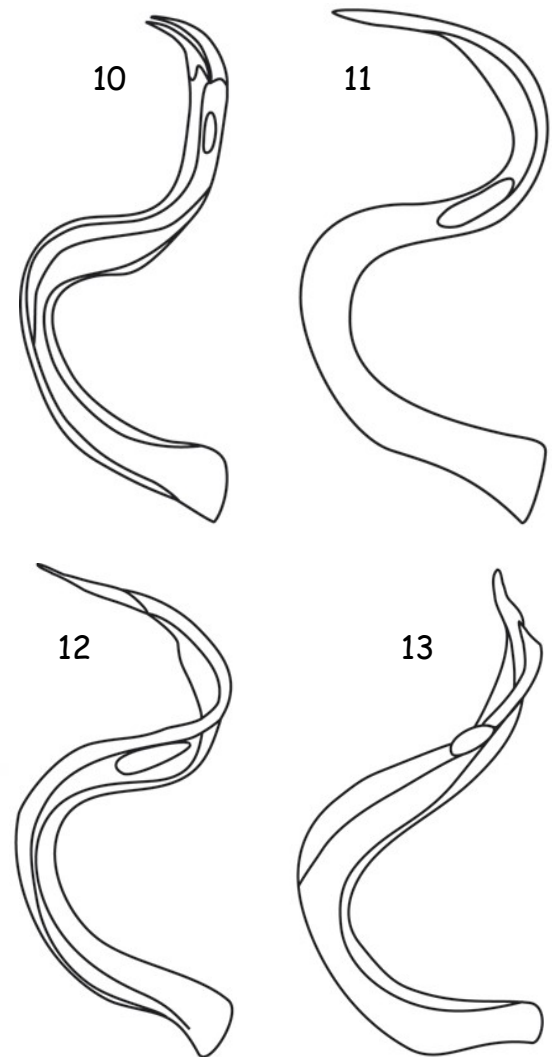
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2 mm



0,2 mm

10  
11, 12, 13

**Figs. 1-9.-** Habitus of the Iberian *Campylomma* species. 1-3.- *C. miyamotoi* (lateral, dorsal, ventral). 4-5.- *C. verbasci* (dorsal). 6-7.- *C. annulicorne* (dorsal). 8-9.- *C. ribesi* (dorsal).

**Figs. 10-13.-** Endosoma of the Iberian *Campylomma* species. 10.- *C. miyamotoi*. 11.- *C. verbasci*. 12.- *C. annulicorne*. 13.- *C. ribesi*.

**Figs. 1-9.-** Habitus de las especies ibéricas de *Campylomma*. 1-3.- *C. miyamotoi* (lateral, dorsal, ventral). 4-5.- *C. verbasci* (dorsal). 6-7.- *C. annulicorne* (dorsal). 8-9.- *C. ribesi* (dorsal).

**Figs. 10-13.-** Endosoma de las especies ibéricas de *Campylomma*. 10.- *C. miyamotoi*. 11.- *C. verbasci*. 12.- *C. annulicorne*. 13.- *C. ribesi*.