

NOTA / NOTE

First record of the Cylapine mirid bug *Fulvius borgesii* Chérot, J. Ribes & Gorczyca, 2006 (Heteroptera: Miridae) in the Canary Islands.

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Abstract: *Fulvius borgesii* Chérot, J. Ribes & Gorczyca, 2006 (Heteroptera: Miridae) is recorded for the first time in the Canary Islands. The species was described on specimens from the Azores Islands and a record was reported later from the northern Iberian Peninsula. *F. borgesii* belongs to the *Fulvius bisbistillatus* species group, mainly including New World species, among which palaeartic *F. borgesii* is the exception. Therefore, it is hypothesized that *F. borgesii* is an alien species, introduced in the Macaronesia maybe by means of goods import from Central and South America. *F. borgesii* preys on a variety of non-endemic Canarian species belonging to Diptera (Syrphidae, Culicidae, Drosophilidae, among others) and Coleoptera (mainly Hydrophilidae). In La Palma, *F. borgesii* has been recorded for more than 15 years, thus confirming that the species is well established in this island. Prospects to explore its presence in the rest of the Canarian archipelago are needed.

Key words: Heteroptera, Miridae, *Fulvius borgesii*, Plant bugs, Alien species, Faunistics, Canary Islands, Macaronesia.

Resumen: Primera cita del mívrido cilapino *Fulvius borgesii* Chérot, J. Ribes & Gorczyca, 2006 (Heteroptera: Miridae) en las Islas Canarias. Se cita por primera vez *Fulvius borgesii* Chérot, J. Ribes & Gorczyca, 2006 (Heteroptera: Miridae) en las Islas Canarias. Esta especie fue descrita a partir de especímenes del Archipiélago de las Azores y hubo una cita posterior en el norte de la Península Ibérica. *F. borgesii* pertenece al grupo de especies de *Fulvius bisbistillatus*, que básicamente incluye especies del Nuevo Mundo, entre las cuales la paleártica *F. borgesii* es la excepción. Por esta razón, se hipotetiza que *F. borgesii* es una especie introducida en la Macaronesia, muy probablemente debido al comercio con Centro y Sudamérica. *F. borgesii* se alimenta de una gran variedad de presas no endémicas de las Islas Canarias pertenecientes a los órdenes Diptera (Syrphidae, Culicidae, Drosophilidae, entre otras) y Coleoptera (mayormente Hydrophilidae). En la isla de La Palma, *F. borgesii* ha sido hallada durante más de 15 años, confirmando que la especie está bien establecida en la isla. Se necesitan más prospecciones para verificar la presencia de esta especie en otras islas del archipiélago.

Palabras clave: Heteroptera, Miridae, *Fulvius borgesii*, Chinchas, Especies introducidas, Faunística, Islas Canarias, Macaronesia.

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Introduction

The Canary Islands archipelago includes seven islands and various islets of volcanic origin situated between 100 and 550 km off the northwest coast of Africa (Enghoff & Báez, 1993).

The study of the Heteroptera from the Canary Islands began in the mid XIXth century (Brullé, 1836-1840; Noualhier, 1893), and since then several campaigns and recollections from numerous authors

have taken place, with large amount of species described and reported. Most actualized information on Canarian true bugs may be consulted in Oromí et al. (2010) and Aukema et al. (2013). Until now, 434 species are reported from the Canary Islands, of which nearly 21% are endemic (Goula & Mata, 2015).

Cylapinae is a small subfamily among the Miridae, organized in five tribes. Only two of them, Fulviini (14 species) and Bothriomirini (1 species) occur in the Palaearctic Region (Kerzhner & Josifov, 1999).

Fulvius Stål, 1862 is the largest genus within the Cylapinae, with more than 80 species described from both the Old and New World, particularly from tropical areas (Gorczyca, 2006; Chérot & Pagola-Cardé, 2012). The biology of *Fulvius* species is poorly known, but evidences show that probably some of them are predators on other small groups of invertebrates (Carvalho & Costa, 1994; Gorczyca, 2006).

In the European mainland, only *Fulvius oxycarenoides* (Reuter, 1878) is native, and four additional species of *Fulvius* have been reported in the last years and are considered to be alien species (Chérot et al., 2011): *F. borgesii* Chérot, J. Ribes & Gorczyca, 2006, from Azores Islands; *F. anthocoroides* (Reuter, 1875) and the recently described *F. carayoni* Pluot-Sigwalt & Chérot, 2013, both from West Africa; and *F. subnitens* Poppius, 1909, from South East Asia.

In the Canary Islands, six Heteropteran species can be considered as allochthonous: *Cimex lectularius* Linnaeus, 1758 (Cimicidae), *Leptoglossus gonagra* (Fabricius, 1775) (Coreidae), *Oxycarenus lavaterae* (Fabricius, 1787) (Lygaeidae), *Nezara viridula* (Linnaeus, 1758) (Pentatomoidae), *Scantius aegyptius* (Linnaeus, 1758) (Pyrrhocoridae) and *Reduvius personatus* (Linnaeus, 1758) (Reduviidae) (Oromí et al., 2010). The Canarian archipelago has been a step-stone during most of the migration processes occurred in the last centuries with the American continent; the plant and animal hitchhikers and fellow travelers who accompany humans to islands generally increase the total number of species in an island and interact with other causes of extinction; biological invaders endanger native species especially in reserves, protected lands and vulnerable ecosystems (Mooney & Drake, 1986). Allochthonous species may have significant environmental, economic and public health impact as they represent a significant risk for the wholesale homogenization of ecosystems (Genovesi & Shine, 2004), particularly in islands and archipelagos where species introductions, either deliberate or accidental, are extremely important (Elton, 1958). This importance is due mainly to isolation, associated to the lack of major elements that contribute to continuity of the continental communities, and to native species often devoid of defense mechanisms against predators (Mooney & Drake, 1986). The origin of *F. borgesii* remains still unknown, but its introduction in Azores and the Canary Islands seems very likely (Chérot et al., 2006), thus being an alien species in the archipelago.

The objective of the present work is to report *F. borgesii* for the first time in the Canarian archipelago, give some details on its feeding behavior, discuss about its origin and way of entrance to the Palaearctic, and provide *in vivo* habitus.

Material and methods

Specimens were collected with a pooter, from a population living on rotting and decaying plant material, floating on a liquid compost barrel. Specimens were euthanized with ethyl acetate. Male genitalia was removed and treated with a 30% solution of potassium hydroxide in order to transparent muscle tissues, washed in distilled water and dry mounted included in water soluble resin on an entomological cardboard, pinned together with the whole specimen. Specimens were examined under a Leica MZ160A (10-115X) and Leica MZ 125 binocular stereoscopes.

Specimens are deposited as follows:

- SPAIN: Canary Islands, La Palma, La Grama, 2 males dissected, 1 female, collected 5.IX.2000, Goula coll.; 1 male, collected 23.I.2010, Roca-Cusachs coll.; the rest of La Palma specimens, García-Becerra coll.
- Portuguese sample, Museu de Ciències Naturals de Barcelona (Zoologia) coll., Barcelona, Spain.

Material studied

SPAIN: Canary Islands: La Palma Island: 1 ex., Breña Alta, La Grama, 5.IX.2000, found dead in swimming pool; 2 males (dissected), 1 female, La Grama, 5.IX.2000; 1 ex., Mazo, Lomo Oscuro, 12.IIX.99; 3 exx., Mazo, Lomo Oscuro, 14.XII.2001; 2 exx., Mazo, Lomo Oscuro, 7.XI.2006; 1 male (dissected), Mazo, Lomo Oscuro, 23.I.2010 leg. 1 ex., Mazo, Lomo Oscuro, 29.III.2010 (in vivo photographed specimen); 1 ex., Mazo, Lomo Oscuro, 8.IX.2011, Attracted to light at night; 2 exx., Mazo, Lomo Oscuro, 5.X.2012; 2 exx., Mazo, Lomo Oscuro, 17.VII.2014. All specimens were collected by R. García-Becerra (García-Becerra leg.).

PORTUGAL: Açores Terceira, Porto Judeu, São Sebastião (42 m), UTM 490966-4278171, Paratype male. 01-08.X.2003, P.A.V. Borges leg.

Results and discussion

Material from La Palma was identified according to the description of *F. borgesii* (Chérot *et al.*, 2006). Canarian males deposited in Roca-Cusachs and Goula's collections were dissected and their left paramer compared with male paratype paramer deposited in the Museu de Zoologia de Barcelona. According to the gathered data, the specimens captured in the Canarian archipelago belong to *F. borgesii*.

The second author of this paper (García-Becerra) provides the information concerning biology, feeding preferences and prey identification. *F. borgesii* (Fig. 1) is a very active flying species, which is attracted to light. Most of the specimens were found in a liquid-compost barrel with a large amount of rotting and decaying plant matter. The population is maintained stable during most of the year. Specimens were found feeding on larvae of several Diptera and Coleoptera families. Diptera preyed upon belong to families Psychodidae: *Clogmia albipunctata* (Williston, 1893); Syrphidae: *Eristalis tenax* (Linnaeus, 1758) and *E. taeniops* (Wiedemann, 1818); Culicidae: *Culiseta longiareolata* (Macquart, 1838); and Drosophilidae, among other indetermined Diptera. Coleoptera species preyed upon correspond to family Hydrophilidae: *Sphaeridium bipustulatus* Fabricius, 1781, *Pachysternum capense* (Mulsant, 1894), *Dactylosternum abdominale* (Fabricius, 1792), *Cercyon terminatus* (Marsham, 1802), *Cercyon atricapillus* (Marsham, 1802) and *Cercyon quisquilius* (Linnaeus, 1761), among others. All these preys are present all year through in the liquid-compost barrel. The consequences of *F. borgesii* in the ecosystem are difficult to predict as its biology is still poorly known. However, despite the fact that it is well accepted that *Fulvius* preys on the larval stages of some other insects, none of the species consumed recorded until present is endemic to the archipelago.

This new finding of *F. borgesii* in the Canary Islands expands its distribution range, after being described from Azores (Chérot *et al.*, 2006) and newly cited from North Iberian Peninsula (Gipuzkoa) (Chérot & Pagola-Cardé, 2012). *F. borgesii* belongs to the *bisbistillatus* species group (Sadowska-Woda & Gorczyca, 2003), a group of *Fulvius* species from the New World, particularly diversified in Central and South America and apparently not including any native species from the Old World. The origin of *F. borgesii* is still doubtful, but its inclusion in the New World *bisbistillatus* species group supports the hypothesis of its very likely introduction (Chérot *et al.*, 2006).

Its arrival could be probably due to the great amount of crop and ornamental plants, fruit and goods import from Central and South America during the last centuries by boat. The banana plantations give an ideal habitat for this species due to high humidity, high temperature and lots of rotting plant matter, and therefore more prospection, particularly in non-treated banana plantations across the archipelago could be advisable as candidate habitat for *F. borgesii*.

Stable populations of the species have been observed for more than 15 years in two localities ca 10 km away. Thus, it can be sustained that *F. borgesii* is well established at least in La Palma Island,

confirming its potential to wide-spread and establish permanent colonies in various temperate Mediterranean regions (Chérot & Pagola-Carte, 2012). Its presence in the other Canary Islands has to be explored.

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Fig. 1. - *In vivo* habitus of the species *F. borgesii*. Mazo, La Palma. (Photo R. García-Becerra).