

## GEA, FLORA ET FAUNA

# *Monomorium monomorium* Bolton, 1987 in Spain (Hymenoptera: Formicidae)

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Rebut: 25.05.2024; Acceptat: 05.06.2024; Publicat: 30.06.2024

## Abstract

The presence of a population of *Monomorium monomorium* Bolton in a citrus orchard at the fluvial island of Gràcia (Tarragona, Spain) is reported, this being the second Iberian record for that very small shining black species. Soil nesting, polygyny and tending of honeydew producing insects was ascertained. We briefly discuss if this species should be considered as native or exotic in the Iberian Peninsula.

**Key words:** *Monomorium monomorium*, Ebro Delta, Iberian Peninsula.

## Resum

### *Monomorium monomorium* Bolton, 1987 a Espanya (Hymenoptera: Formicidae)

S'informa de la presència d'una població de *Monomorium monomorium* Bolton en un hort de cítrics de l'illa fluvial de Gràcia (Tarragona, Espanya), sent el segon registre ibèric d'aquesta espècie negra brillant i molt petita. Es va comprovar la nidificació al sòl, la poligínia i la cura d'insectes productors de melassa. Comentem breument si aquesta espècie s'ha de considerar autòctona o exòtica a la Península Ibèrica.

**Paraules clau:** *Monomorium monomorium*, Delta de l'Ebre, Península Ibèrica.

## Introduction

During a study on the effect of ants on biological control on citrus orchards, the abundance and diversity of ant species occurring in a commercial mandarin orchard was studied from spring until autumn along with citrus key pests' populations, natural enemies, and crop phenology.

Ants were collected using pitfall traps and among the 7 species, one of them is of biogeographic and faunistic interest, *Monomorium monomorium* Bolton, 1987. An old Iberian citation by Saunders (1888; as *M. minutum* Mayr, 1855), from Gibraltar has never been confirmed: in effect, *M. monomorium* workers, under the current species concept, are not present in the classic Saunders' collection at the British Museum of Natural History and has not been detected in Gibraltar since that old mention in 1888 (R. Guillem, pers. com.). It is highly likely that Saunders' material belonged in the newly described *M. andrei* two years later by himself (Saunders, 1890). The mention by Collingwood (1978) of *M. monomorium* (as *M. minutum*) in the south part of Spain is likely based on Saunders first paper, as no specimens of that species were present in the extense collections done by Prof.

H. Franz (Vienna) (Collingwood & Yarrow 1969) in his long trip in Spain and Portugal.

In Spain the species *M. monomorium* had already been detected at a public garden in Córdoba city, therefore being that one the single locality known for this species from the Iberian Peninsula (Reyes-López *et al.*, 2008). The population in Córdoba seems well established since workers were regularly collected between 2003 and 2007. Despite the eight literature records in Iberia noted for *M. monomorium* in Antmaps (2024), a critical appraisal of them clearly boils down to a single record at a single locality (Córdoba city). Here we add a second, verified, Spanish population, also flourishing and well established.

## Methods

Island of Gràcia, Deltebre, Tarragona province. The fluvial island (surface 125 ha approx.) lies within the Ebro delta region and is surrounded by the river fresh water. The habitat studied is a citrus grove (40.7221 N 0.6847 E; elevation 2 m) with peripheral small remnants of a mosaic of poplar woods



Figure 1. *Monomorium monomorium*, worker, lateral view (CASENT0916000). Type material. Collection date: before 1855, by P. Strobel, at the Venice Lido Island (Italy). Image: Anna Pal, from Antweb (2024) with permission. The specimen lacks the long and curved mesosoma hairs present in fresh specimens.

and cane community (Camarasa *et al.*, 1977). Soil is alluvial and humid because of the close level of the water table, with very fine particles and easy to excavate.

The study was conducted in a 0.58 ha plot selected within a commercial mandarin *Citrus clementina* Hort. ex Tanaka. cv. 'Nules' orchard. Trees were grafted on citrange Carrizo rootstock with a tree spacing of  $5.8 \times 3$  and a drip irrigation system. Twelve pitfall traps ( $\text{Ø}=9.5$  cm;  $L=11$  cm) containing 300 ml of water and liquid soap (0.2%) were installed in the soil of the orchard. Traps remained in the orchard for 72h. After this period, ants caught inside the traps were identified in the laboratory. This activity was conducted three times: late May, late July, and late September. A general field survey (18.vi.2018) was conducted by direct visual search on tree trunks. Ant identification was done using Bolton (1987). Vouchers have been deposited with the Museu de Ciències Naturals de Barcelona.

## Results and discussion

Running the workers through the keys in Bolton (1987), the name *M. monomorium* was obtained. Their morphology fits exactly with workers from Córdoba city and other samples from the Mediterranean coast of France and Italy in our dry collection; also, with images available at <http://Antweb.org> (accessed 11.ii.2020) (Fig. 1). This is the verified second record for the Iberian Peninsula. Other ant species found in pitfall traps apart from *M. monomorium* were: *Lasius grandis*

Forel, *Pheidole pallidula* (Nylander), *Plagiolepis pygmaea* (Latreille), *Tapinoma erraticum* (Latreille), *Hypoponera eduardi* (Forel) and *Solenopsis monticola* Bernard. The most abundant species were *M. monomorium* and *P. pallidula* representing 60 % and 36 % respectively of the overall individuals captured. Depending on the date, *M. monomorium* was the most abundant in late May and *P. pallidula* was the most abundant in late July and late September.

During the general field survey workers were seen foraging up the trunk on citrus trees, tending honeydew-producing insects. Nests were located by following workers returning to the nest. The entrance was a small hole, scarcely wider than worker body width size, and without any trace of soil or litter surrounding it. This fits exactly with Emery's (1916) description for *M. monomorium*: «Formicai piccolo nel suolo, aventi una sola apertura non circondata da un cerchio di terra». Three nests were located. Polygyny (two queens, three queens) was ascertained in two partially excavated nests. The soil where this small ant may be collected close to Muggia (Italy) was already described by Muller (1923) as: «... terreno alluvionale leggermente salmastro».

Other species detected in the same habitat during the general field survey were *Cardiocondyla mauritanica* Forel, *Formica* sp. and *Plagiolepis pygmaea* (Latreille). This last species was seen also foraging on citrus trees and could easily be confused with *Monomorium*. The dense and clear-cut trails produced by *Monomorium* and a check with a magnifier allowed distinction of both species at the field (Formicine with a single petiole vs. Myrmicine with petiole and postpetiole).

It is debatable if this species should be considered as native or exotic in the Iberian Peninsula. Its origin is unknown. The species seems indeed to be infrequent in its geographical extension in Southern Europe (Antmaps, 2024), and shows an Eastern tendency. In Spain, it was tentatively considered either as exotic (Reyes-López *et al.*, 2008) or as native (Reyes-López & Carpintero, 2014). McGlynn (1999) treated *M. monomorium* as exotic in places as Hawaiian Islands, China, SE Asia, or Caribbean Islands. Subsequently, Schlick-Steiner *et al.* (2008), based on McGlynn (1999) and likely because the ant is registered only indoors, treated it as exotic in Austria. Blatrix *et al.* (2018) consider it as native in France. Similar conclusion for Italy (Schifani, 2022), Croatia (Bračko, 2006), Albania (Wagner *et al.*, 2018) and, seemingly, Crete (Salata *et al.*, 2020). Surprisingly, Borowiec & Salata (2021) qualify it as a tramp species commonly found in tourist resorts or suburban and urban areas from Greece and many Greek islands. Karaman & Kiran (2018) considered it as native in Turkey although as introduced two years later (Kiran & Karaman 2020). No clear pattern. In short, the species seems to be constantly sparse and geographically restricted in several habitats. The extreme rarity in space and time of this species in Iberia and the fact that the two available records (city garden Córdoba; citrus grove Deltebre) are certainly anthropized habitats, further suggests accepting the exotic label for *M. monomorium* in Iberia.

It remains to be clarified an intriguing taxonomic question, the assertion from Bolton (1987: 288) stating «... Finally I suspect that southern European populations currently referred to as *minutum* Mayr may in truth consist of two separate species.». As far as we know, a characteristic and single phenotype is collected, albeit rarely, in Southern European countries. The population now discovered in Spain seems well posited for a focused sociometric study (Tschinkel, 1989; 2011).

## Acknowledgements

We would like to express our sincere gratitude to Benito Medina, technical manager of Illa de Gràcia S.A. for generously allowing us access to their farm facilities and for facilitating our study. To Rhian Guillem, from the Gibraltar Botanic Gardens, for her comments on Saunders' collection. A reviewer did a careful, and much needed, check of the whole text.

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