

Monomorium carbonarium in south-eastern France (Hymenoptera: Formicidae)

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Abstract

Monomorium carbonarium (Smith, 1858) is reported for the first time from south-eastern France. This new localization indicates that this invasive insect may be more widespread over the country.

Introduction

Biological invasions represent one of the major causes of biodiversity loss after direct destruction of habitats (Bellard *et al.* 2016; Lowe *et al.* 2000) and generate high costs for society (Turbelin *et al.* 2023). Fortunately, not all alien species have serious ecological, and socio-economic impacts in the areas where they have been introduced (Mack *et al.* 2000; Williamson 1996).

Out of the approx. 15,000 described ant species, around 250 are currently considered alien species (i.e. introduced outside their native range) (Bertelsmeier 2021). About 40 alien ant species are established in Mediterranean Europe (Schifani 2019), some of which are

included in the IUCN “top 100 world’s worst invasive alien species” (Lowe *et al.* 2000), such as the Argentine ant, *Linepithema humile* and the electric ant, *Wasmannia auropunctata*. In France, three alien ant species have established permanent and stable populations among which *Monomorium carbonarium* (Blatrix *et al.* 2018).

Monomorium carbonarium (Smith 1858) belongs to the “*M. monomorium* group” (Bolton 1987; Lebas *et al.* 2016). Now widely dispersed across the world, it is native to the western Atlantic islands in the Macaronesian biogeographic domain (described from Madeira and present in the Azores). In continental Europe, it was first discovered in the Atlantic Iberian coast, in Spain (San Sebastián, Guipúzcoa county) (Espadaler & Collingwood 2001) and in Portugal next to Viana do Castelo (Collingwood & Prince 1998). More recently, its presence has been confirmed in other counties of Spain, in Cádiz (Reyes-López & Taheri 2018), Alicante (Arcos Gonzalez 2021) and Catalonia (Arcos Gonzalez 2021; Gómez 2015; Miravete *et al.* 2013). In the latter, this species was observed indoors, living on the 7th floor of a building in Castelldefels (Espadaler & Castillo 2014).

Keywords: alien species, ant, urban area, Mediterranean.

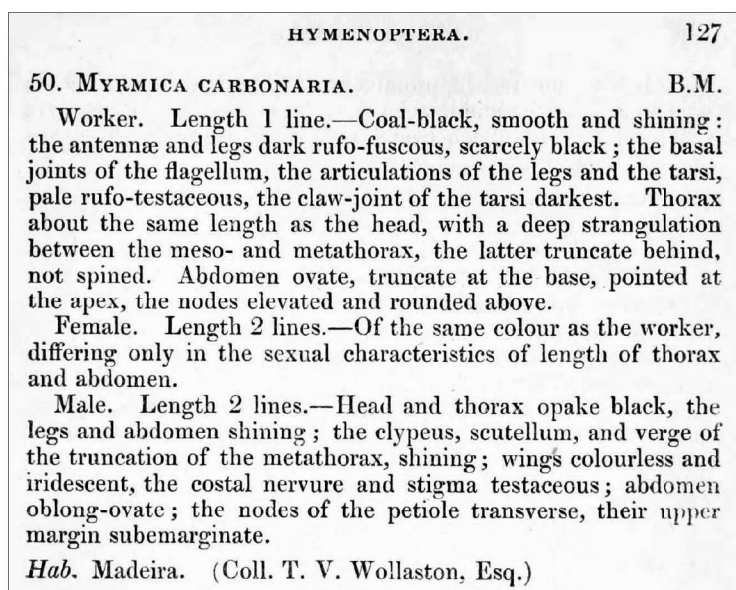


Figure 1 – Original protologue by Frederick Smith in 1858.



Figure 2 – View of a worker of Salon-de-Provence (@C. Galkowski).



Figure 3 – View of habitat ("place Morgan").

In the World, its presence is now confirmed in Central and North America, the Iberian Peninsula, France, Egypt, Iraq, Yemen, Oman, India and China (Janicki *et al.* 2016; Guénard *et al.* 2017; AntMaps 2023). It seems to be a rather thermophilic species that likes dry and anthropized environments (Wetterer *et al.* 2004, 2007).

In France, *M. carbonarium* was first observed in Yeu island (Vendée county) by Janine Casevitz-Weulersse in 1970 (Galkowski 2008). Now, it is known from 13 counties (AntArea 2023), mainly in the Atlantic biogeographic domain (see also Blatrix *et al.* 2018). However, its presence in the French Mediterranean region is confirmed by a recent observation in Port-Vendres in the county of Pyrénées-Orientales (AntArea website: C. Galkowski, C. Lebas, 29/03/2019). Like in north-eastern Spain, *Monomorium carbonarium* was observed living indoors, on the 2nd floor of a school in Pauillac (Gironde county, C. Galkowski, pers. obs.).

Material and methods

This ant was detected in a square ("place Morgan": lat. 43.63918° / long. 5.09492°; alt.: 72m) of the center of the city of Salon-de-Provence (south-eastern France, Bouches-du-Rhône county).

Workers were sighted by direct visualization.

Results

Monomorium carbonarium (Smith, 1858)

- Basionyme: *Myrmica carbonaria* (Smith, 1858) [Cat. Hymen. Insects Coll. British Museum, p. 127] (Figure 1).
- Locus typicus: Madeira
- Supposed original distribution: Macaronesian islands

The individuals collected in Salon-de-Provence were identified by C. Galkowski and compared to other populations from different localizations in western France. It is a small black ant of about 2-2.5mm in length for the workers (Figure 2). It can be confused

at first glance with a *Plagiolepis* but the latter genus, which belongs to the Formicinae subfamily, has a simple petiole and 11-segmented antennae. Conversely, the genus *Monomorium* belongs to the subfamily Myrmicinae and has a double petiole and 12-segmented antennae. Its small size, its completely dark coloration and the lack of spines on the thorax are characters which locally allow an easy distinction compared to the other genera of the subfamily. The first observation was made on April 22nd 2023 in “place Morgan”. This square has been completely renovated about ten years ago. It hosts a farmer’s market with fruits and vegetables once a week, as well as entertainment events (concerts, fairgrounds, etc.) less frequently. It is very sparsely vegetated and there are only a few trees arranged in large planters. A colony was detected at the foot of a tree (Figure 3).

To finish, we present a map of the species current distribution in France, which is likely to become obsolete very quickly (Figure 4).

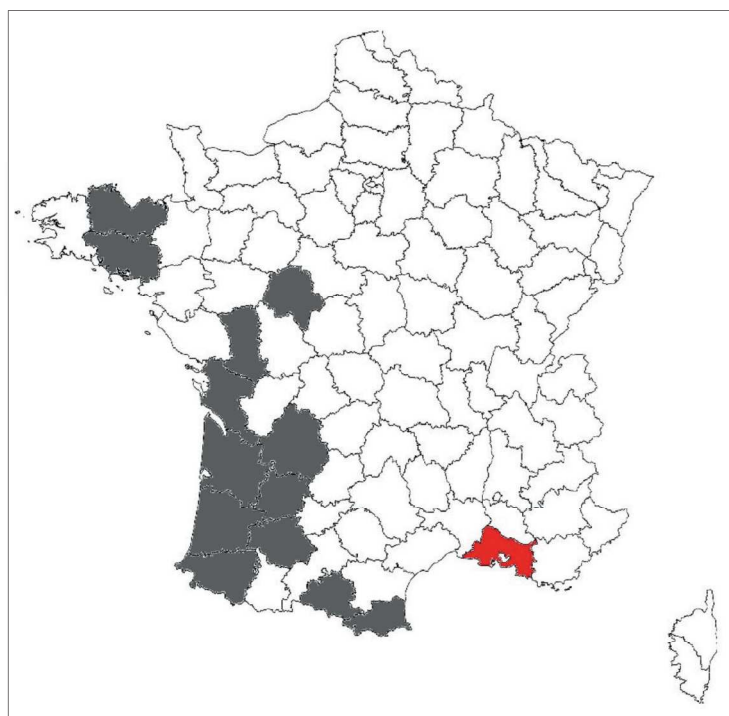


Figure 4 – French distribution map (in red the recent discovery).

Discussion and conclusions

The small black ant *Monomorium carbonarium* is spreading in France, and we believe that there is unfortunately nothing that can be done to prevent or even slow its expansion.

To date, no impacts have been reported to local ecosystems and species or human populations and economic activities to characterize the species as an invasive alien species, unlike other introduced species, such as *Linepithema humile* (Carpintero *et al.* 2005; Touyama *et al.* 2003; Wetterer *et al.* 2009) or *Tapinoma spp.* (Centanni *et al.* 2022; Gippet *et al.* 2022; Lenoir & Galkowski 2017; Seifert *et al.* 2017).

It will be interesting to follow its progress and in particular its possible encounters with the two other invasive species mentioned previously (Berville *et al.* 2016; Berquier *et al.* 2018; Blight *et al.* 2009, 2010, 2014). It must now be considered as an additional species to the myrmecological fauna of Provence.

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