

# First record of *Formica fusca* (Hymenoptera: Formicidae) from Crete

## První nález *Formica fusca* (Hymenoptera: Formicidae) na Krétě

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**Abstract:** We report here the first record of *Formica fusca* Linnaeus, 1758 from Crete. In 2006, we found a nest of this species on the Omalos Plateau. In 2024, we confirmed the presence of a strong population at the site. Two species of the genus *Formica* – *F. cunicularia* Latreille, 1798 and *F. fusca* – are currently known to occur on the island.

**Abstrakt:** V příspěvku představujeme první nález *Formica fusca* Linnaeus, 1758 na Krétě. V roce 2006 jsme na lokalitě Omalos Plateau našli jedno hnízdo tohoto druhu. V roce 2024 jsme zde potvrdili přítomnost silné populace. V současné době je tedy z ostrova znám výskyt dvou druhů rodu *Formica* – *F. cunicularia* Latreille, 1798 a *F. fusca*.

**Key words:** Hymenoptera, Formicidae, *Formica fusca*, Greece, Crete, first record

### INTRODUCTION

With an area of approximately 8,300 km<sup>2</sup>, Crete is the fifth largest Mediterranean island and the largest and most populous in Greece. Together with a number of surrounding islands and islets, it constitutes the region of Crete, one of the 13 administrative units of Greece (crete.gov.gr 2024).

Located on the southern margin of the Aegean Sea, Crete is the southernmost part of the Aegean archipelago. The island is characterised by topographical and climatic diversity. It is predominantly mountainous, with 15 mountain ranges, three of which are over 2,000 metres high, numerous large valleys and mountain plains, and more than 100 gorges. The high massifs create huge regional variations in Crete's climate, with excessive rainfalls and rain shadows. In general, aridity increases from west to east and from north to south (Vogiatzakis et Rackham 2008). The natural conditions combined with its isolation since the Miocene and a long history of human presence dating back at least 8,000 years have resulted in the formation of a wide variety of habitats and a high rate of plant endemism (see e.g. Legakis et al. 1993, Legakis et Kypriotakis 1994, Vogiatzakis et Rackham 2008, Menteli et al. 2019).

Interest in Cretan biota has a relatively long history, with the first works describing observations of animals and plants on the island appearing in the 16th century (e.g. Belon 1553). Gradually, more and more researchers, especially botanists, but also zoologists and palaeontologists focusing on the Pleistocene fauna, have turned their attention to the island (summarised in Vogiatzakis et Rackham 2008). Currently, Crete is considered one of the centres of plant diversity (Davis et al. 1994) and biodiversity hotspots (Médail et Quézel 1997) in the Mediterranean, based on its plant endemism and species richness.

The study of Crete's ant fauna began after the mid-19th century with individual records, and continued with taxonomic studies, descriptions of new taxa, collection of distribution data, compilation of checklists, and also biogeographical analyses throughout the 20th century. The 21st century is a period of significant progress in the study of Crete's ant fauna, with new checklists and taxonomic studies (summarised in detail by Salata et al. 2020). In 2020, Salata et al. produced a comprehensive catalogue of the ants of Crete, providing detailed information on 100 species and subspecies, including 18 endemics, in 28 genera and six subfamilies, together with identification keys. The most recent work by Scupola et Borowiec (2022) reports the occurrence of 99 species and subspecies in Crete, of which 21 are endemic to the island. In both reviews, only a single *Formica* species – *Formica cunicularia* Latreille, 1798 – is listed for Crete. During our visits to Crete in 2006 and 2024, we noted the presence of another member of the genus, *Formica fusca* Linnaeus, 1758. Thus, two species of the genus *Formica* – *F. cunicularia* and *F. fusca* – are currently known to occur on the island. In this paper, we provide details of our records of *F. fusca* in Crete.

### METHODS

The first *F. fusca* sample was collected by hand from its nest by the authors. The identification was performed by the authors according to Seifert (1996, 2018), and verified by Petr Werner (in 2021). The voucher material is deposited in the Muzeum Vysočiny Jihlava. Identification of other ant taxa was performed by Pavel Bezděčka, Klára Bezděčková, and Petr Werner according to Salata et al. (2020), Seifert (2020), and Borowiec et Salata (2022a,b). Nomenclature follows Bolton (2024).

## RESULTS AND DISCUSSION

### MATERIAL EXAMINED:

*Formica fusca* Linnaeus, 1758, Greece, Crete, Omalos Plateau, 35°19'36.810"N, 23°53'6.886"E (35.3268917N, 23.8852461E), 1050 m a.s.l., 1 June 2006 (Fig. 1); 5 workers, P. Bezděčka et K. Bezděčková lgt. et det., P. Werner revid. (2021), Muzeum Vysočiny Jihlava coll.

Collection circumstances: One nest found under a stone at the edge of a pasture.

*Formica fusca* Linnaeus, 1758, Greece, Crete, Omalos Plateau, 35°19'35.928"N, 23°54'2.774"E (35.3265767N, 23.9006633E), 1080 m a.s.l., 3 May 2024 (Fig. 2), P. Bezděčka et K. Bezděčková observ.

Collection circumstances: Dozens of nests found under stones, in pastures, especially on their edges in open places close to footpaths.



Fig. 1. Omalos Plateau in 2006 (photo by P. Bezděčka).

Obr. 1. Omalos Plateau v roce 2006 (foto P. Bezděčka).



Fig. 2. Omalos Plateau in 2024 (photo by P. Bezděčka).

Obr. 2. Omalos Plateau v roce 2024 (foto P. Bezděčka).

Tab. 1. Ant taxa found by the authors on the Omalos Plateau. DC - described from Crete, DOP - described from Omalos Plateau.

Tab. 1. Taxony mravenců nalezené autory na Omalos Plateau. DC - popsáno z Kréty, DOP - popsáno z Omalos Plateau.

Taxon	2006	2024	Note
Myrmicinae			
<i>Aphaenogaster simonellii</i> Emery, 1894	-	+	DC
<i>Messor creticus</i> Salata et Borowiec, 2019	-	+	DOP
<i>Messor concolor</i> Santschi, 1927	+	-	DC
<i>Solenopsis</i> sp.	+	-	
<i>Solenopsis orbula</i> Emery, 1875	-	+	
<i>Strongylognathus huberi dalmaticus</i> Baroni Urbani, 1969	+	-	
<i>Tetramorium</i> sp.	+	+	
Dolichoderinae			
<i>Tapinoma</i> sp.	+	+	
Formicinae			
<i>Camponotus (Myrmentoma)</i> sp.	-	+	Maybe several species
<i>Camponotus (Myrmentoma) candiotes</i> Emery, 1894	+	-	DC
<i>Camponotus (Tanaemyrmex) oertzeni</i> Forel, 1889	-	+	
<i>Cataglyphis cretica</i> (Forel, 1910)	+	-	DC
<b><i>Formica fusca</i> Linnaeus, 1758</b>	+	+	
<i>Lasius kritikos</i> Seifert, 2020	+	+	DC

of 1045–1110 m, it is the highest plateau in Crete and the second largest after the Lasithi Plateau. It lies at the head of the vast Samaria Gorge, which runs 16 km from it to the south coast. The Omalos Plateau is home to a number of endemic plants, including the emblematic *Zelkova abelicea* (see Ispikoudis et Papanastasis 2003 for details).

For the first time, we recorded a nest of *F. fusca* in an open area at the edge of a pasture in the south-western part of the site. We also observed several other ant taxa on the Omalos Plateau, including the endemic species *Cataglyphis cretica* (Forel, 1910) and *Lasius kritikos* Seifert, 2020, the latter a taxon yet undescribed at the time (see Tab. 1). We did not find another nest of *F. fusca* in 2006. In the years 2011 to 2014, several researchers collected ants on the Omalos Plateau (see Salata et al. 2020), but none of them reported *F. fusca*.

In 2024, we visited the Omalos Plateau to verify the presence of *F. fusca*. We found a strong population of this species in the south-east, about 1.4 km in a straight line from the original location, on pastures and their margins. At the same time, we noted the presence of other ant taxa, including the endemics *Messor creticus* Salata et Borowiec, 2019 and *L. kritikos* (see Tab. 1). In both 2006 and 2024, the habitat of *F. fusca* coincided with that reported by Borowiec et Salata (2021, 2022a). This species has not been recorded from any other part of Crete and adds to the set of taxa known from only one site at that time (see Salata et al. 2020).

The question is why such a large population of *F. fusca* went unnoticed before 2024. Perhaps it was due to the location of the surveys. Another explanation could be that recent changes caused by intensive grazing at the site have made the habitat more suitable for this species, increasing the originally small and easily overlooked population.

The discovery of *F. fusca* on the Omalos Plateau supports the assumption that the ant fauna of Crete has not yet satisfactorily been investigated and that further new finds can be expected with more intensive research. It also extends the last Cretan checklist (Scupola et Borowiec 2022) to 100 species and subspecies.

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