

New data on the genus *Dorylus* Fabricius, 1793 (Formicidae, Dorylinae) in Morocco

Nouvelles données sur le genre Dorylus Fabricius, 1793 (Formicidae, Dorylinae) au Maroc

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Abstract. Authors summarise knowledge of the primarily tropical ant genus *Dorylus* (Hymenoptera, Formicidae) in Morocco. Until now, only one species has been recorded from Morocco : *Dorylus fulvus*. We add a second species, *Dorylus aethiopicus* recorded from Mirleft (southwestern Morocco). This species has already been recorded in the Maghreb, from Tunisia. We provide additional records of *D. fulvus* for Morocco, as well as two records of males of *D. aethiopicus* collected by other colleagues, and describe the characters which separate the two Moroccan species.

Keywords : Formicidae, *Dorylus fulvus*, *Dorylus aethiopicus*, Morocco.

Résumé. Les auteurs présentent une synthèse à propos d'un genre de fourmi principalement tropical, *Dorylus* (Hymenoptera : Formicidae) pour le Maroc. Jusqu'à présent, une seule espèce avait été enregistrée : *Dorylus fulvus*. Nous ajoutons une deuxième *Dorylus aethiopicus*, qui a été localisée à Mirleft (sud-ouest du Maroc). Cette espèce avait été déjà enregistrée au Maghreb, en Tunisie. Nous fournissons des enregistrements supplémentaires de *D. fulvus* au Maroc et nous décrivons les caractères qui distinguent les deux espèces marocaines.

Mots-clés: Formicidae, *Dorylus fulvus*, *Dorylus aethiopicus*, Maroc.

INTRODUCTION

The genus *Dorylus* Fabricius, 1793 is currently comprised of 60 species (Bolton 2014). It is distributed from West Africa to northern Australia (Aktaş *et al.* 2004), but most species have an afrotropical distribution (Kronauer *et al.* 2007). Three species have been recorded in North Africa. *Dorylus fulvus* (Westwood, 1839) is known from Morocco (Cagniant 2006), Algeria (Cagniant 1968), Tunisia (Santschi 1926), Libya (Finzi 1940) and Egypt (Finzi 1936), whilst *Dorylus aethiopicus* Emery, 1895 has so far been cited from Tunisia (Emery 1895) and Libya (Finzi 1940). In addition, *Dorylus affinis aegyptiacus* Mayr, 1865 was described from Egypt, based on a male (Mayr 1865). Within Morocco, *D. fulvus* has been recorded from Ouezzane, Casablanca, Rabat, El Jadida, Oulmes, the Middle Atlas, Sefrou, Midelt and the High Atlas (Cagniant 1964, 2006).

The Moroccan ant fauna is relatively well studied. It is rich and new discoveries can be expected in a country with such topographic and ecological diversity. For example, new species are still to be added to the Moroccan myrmecofauna regularly (e.g., Delabie & Jacques 2007, Cagniant 2009, Taheri *et al.* 2010, Taheri & Reyes López 2011, 2015, Cagniant & Galkowski 2013) and the genus *Cerapachys* Smith, 1857 was very recently recorded for the first time (Guillem *et al.* 2012). In this article, we summarise current knowledge of the genus *Dorylus* in Morocco and add a new species to its fauna: *Dorylus aethiopicus*. We also include unpublished records of *D. fulvus* that expand its known distribution considerably.

METHODS AND RESULTS

Our records of *Dorylus* species from Morocco have been compiled as a result of regular surveys of the ant fauna throughout this country by the authors, as well as unpublished records supplied by colleagues. We have also compiled records from the published literature, which have so far shown that *D. fulvus* records are scattered throughout northern and western Morocco (Cagniant 1964, 2006). To these, we add records that span from Tangier and the Mediterranean coast to the western Anti-Atlas and the oriental region (Tab. 1), extending the species' known distribution within Morocco considerably.

In addition to our records of *D. fulvus*, we collected approximately 140 workers of *D. aethiopicus* at Plage Imi n'Tourga, Mirleft, Sidi Ifni province, 29°35.350'N, 10°02.206'W, 12 m elevation, Leg. R. Guillem & K. Bensusan 25.XI.2014 (Collection No. RG-14-427). The species was identified as *D. aethiopicus* using the keys for African *Dorylus* provided by Taylor (2014). It was found in sand dune habitat next to the beach, with some open scrub of *Atriplex halimus* L., other *Amaranthaceae* and some *Euphorbia regis-jubae* J.Gay (*Euphorbiaceae*) (Fig. 1). The habitat was strewn with litter and showed signs of degradation. The first specimens were found when some small holes in the sand were dug up. Further digging around a ca. 50 cm radius produced more specimens. We dug deeper than 30 cm, but most specimens were located above ca. 20 cm. The substrate was pure beach sand.

Table 1. New records of *Dorylus fulvus* from Morocco.

Date	Castes	Province	locality	Coordinates	Elevation (m)	Habitat	Circumstances of Capture	Leg. & Accession No.
23. IV.2000	Males	Chtouka Aït Baha	Ait Baha	30°06.435', 9°16.713'W	753	Arid habitat with open woodland of <i>Argania spinosa</i> .	Light trapping under <i>Argania spinosa</i> .	P. Aguilera, C. Hernando, A. Millán & I. Ribera
21. VI.2008	Worker	Ouarzazate		31°08.890', 7°08.194'W	1427	River bank along the Asif Ounila gorge.	Artificial flooding of river bank.	C. Hernando
27. VI.2011	Workers	Bouleman	Missour	33°00.431' 4°05.863'	954	Garden, humid compost.	Active collecting.	ECP-A. François
01. VIII.2011	Males	Bouleman	Enjil	33°11.862' 3°54.376'	1608	Steppe with <i>Stipa</i> , <i>Krascheninnikovia</i> , <i>Peganum</i> .	Light trap.	ECWP-A. François
21. VII.2012	Males	Driouch	Boudinar, douar Aberkhach	35°12.912' 3°41.225'	431	Hill with abandoned agricultural fields.	Light trap.	A. Taheri AT-0707
13. X.2012	Workers	Al-Hoceima	Rouadi, Tikkit valley	35°11.243' 4°07.727'	188	Very steep and deep valley. On the edge of a fast-flowing stream, at the roots of <i>Ficus carica</i> , <i>Pistacia lentiscus</i> and <i>Tetraclinis auriculata</i> .	Under a stone.	A. Taheri AT-0774
23. XI.2012	Workers	Kénitra	Chouafaa, Oulad al Hamri	34°56.058' 6°13.636'	79	Forest of <i>Quercus suber</i> .	Nesting within a dead stump of <i>Q. suber</i> .	A. Taheri AT-799
11. VII.2013	Male	Al-Hoceima	Al-Hoceima, Cala Bonita	35°13.933' 3°55.507'	57	Recently urbanised area, a few metres from the coast.	Attracted by house light.	A. Taheri AT-1006
02. VIII.2013	Workers	Drioeuch	Boudinar, Abelkhache	35°12.915' 3°41.229'	427	Area with little cover on a hill.	Light trap.	A. Taheri AT-1004
12. VII.2013	Workers	Drioueuch	Boudinar, Abelkhache	35°12.909' 3°41.185'	418	Area with dense cover of <i>Opuntia ficus-indica</i> .	Huge nest in the ground at roots of <i>O. ficus-indica</i> .	A. Taheri AT-1007
23. VII.2013	Workers	Sefrou	Sefrou	33°51.876' 4°51.216'		On the side of a road.	Found at night.	A. Taheri AT-1005
01. VIII.2013	Worker, Male (worker transported by male)	Taza	Tizi Ousli, Taghilaste	34°46.941' 3°46.149'	930	Fields with agriculture.	Attracted by house light.	A. Taheri AT-1039
01. X.2013	Workers	Tangier	Ville de Tanger	35°47.776' 5°50.676'	70	Very degraded Mediterranean maquis.	Pitfall trap.	A. Taheri AT-B 2013
19. XI.2014	Workers	Tiznit	Kerdous	29°32.959' 09°20.329'	1198	Moist, grassy verges around small inundated area, alongside a stand of <i>Pinus halepensis</i> woodland and open, arid habitat.	Under numerous stones.	R. Guillem & A. Taheri RG-14-196
04. VIII.2015	Male	Taurirt	Debdou	33°58.326' 2°59.837'	1622	<i>Quercus ilex</i> and <i>Juniperus</i> .	Light trap.	ECWP - A. François & B. Michel
05. VIII.2015	Male	Guercif	Ouled el Haj (Tafrata)	34°16.734' 3°34.876'	720	Steppe of <i>Ziziphus</i> , <i>Anabasis</i> , <i>Pistacia atlantica</i> .	Light trap.	ECWP - A. François & B. Michel
06. VIII.2015	Male	Midelt	Col de Tizi n'Talghemt	32°35.255' 4°33.114'	1960	Steppe of <i>Stipa</i> , <i>Artemisia</i> and some <i>Juniperus phoenicea</i> .	Light trap.	ECWP - A. François & B. Michel
07. VIII.2015	Male	Jerada	Col de Jerada	33°57.541' 1°59.289'	1065	Steppe of <i>Stipa</i> , <i>Artemisia</i> , <i>Tetraclinis</i> , <i>Pistacia lentiscus</i> .	Light trap.	ECWP - A. François & B. Michel
08. VIII.2015	Male	Taurirt	Chouihia	34°53.045' 2°20.513'	225	Steppe of <i>Stipa</i> , <i>Asteris</i> , <i>Rosmarinus</i> , <i>Asphodelus</i> .	Light trap.	ECWP - A. François & B. Michel
09. VIII.2015	Male	Berkane	Saïdia	35°06.585' 2°20.809'	8	Formation of <i>Tamarix</i> , <i>Lycium</i> , <i>Atriplex</i> and lawn grasses.	Light trap.	ECWP - A. François & B. Michel



Figure 1. Habitat of *Dorylus aethiopicus* at Plage Imi n'Tourga, Mirleft (Morocco).

Other ant species recorded in this habitat were *Aphaenogaster praedo* Emery, 1908, *Camponotus thoracicus* (Fabricius, 1804), *Cataglyphis albicans* (Roger, 1859), *Gonnioma* sp. ('sp. 3' in Cagniant 2006), *Messor* sp., *Monomorium* sp., *Temnothorax obscurior* (Dalla Torre, 1893), *Tetramorium semilaeve* ssp. *depressum* Forel, 1892 and *Tetramorium sericeiventre* Emery, 1877. A male of the same species was also collected by A. François (August, 2011)

using a light trap (Pers. Comm.) at Foug Zguid, Tata province, 30°03.615'N, 6°52.173'W, 651m elevation, 15.III.2013. Another male was collected using the same method by F. Marty at Merzouga, 27.VII.2010 (unpublished data, Dr. H. Cagniant Pers. Comm.).

All known records of *Dorylus* from Morocco are illustrated on a map (Fig. 2).

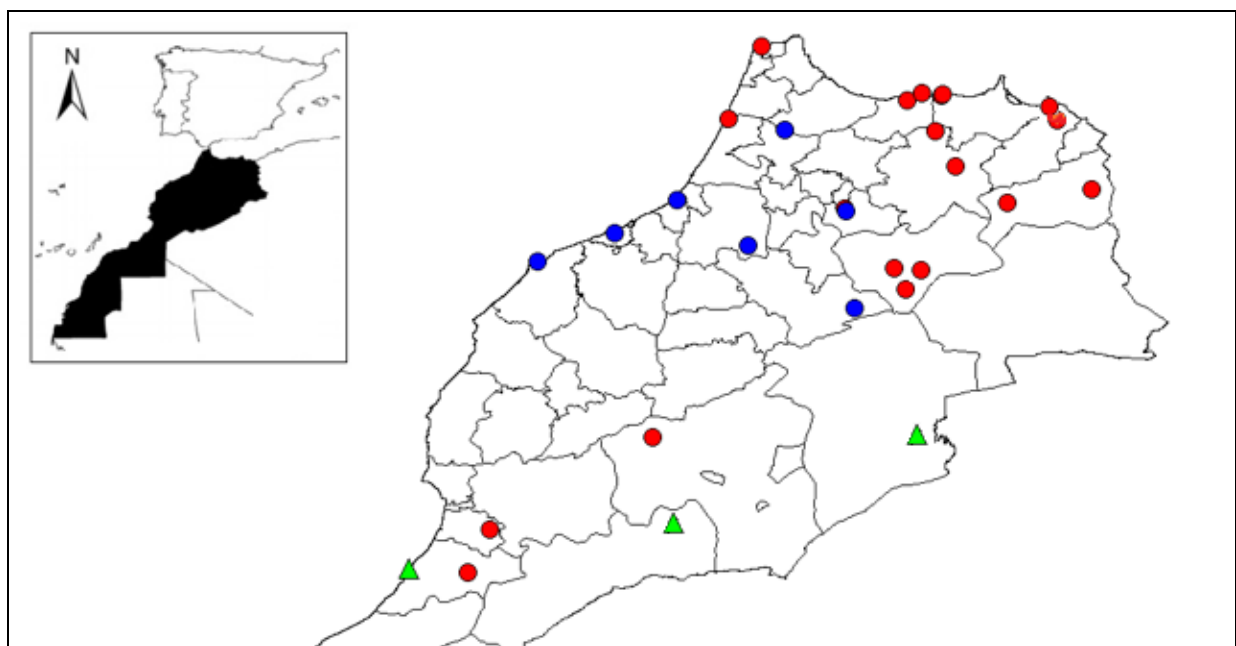


Figure 2. Distribution of *Dorylus fulvus* (red circles = new records) and *Dorylus aethiopicus* (triangle) in Morocco.

DISCUSSION

The Moroccan ant fauna currently consists of 233 published species, but more species will be added with time. As understood at present, the subfamily Dorylinae Leach, 1815 subsumes the former subfamilies Aenictinae Emery, 1901 and Cerapachyinae Forel, 1893 (Brady *et al.* 2014). The Dorylinae are therefore currently represented by four species in Morocco: *D. aethiopicus*, *D. fulvus*, *Aenictus vaucheri* Emery, 1915 and the *Cerapachys* species reported in Guillem *et al.* (2012).

The two Moroccan species of *Dorylus* belong to different subgenera. *D. fulvus* is currently placed within *Typhlopone* Westwood, 1939, whereas *D. aethiopicus* is placed in *Alaopone* Emery, 1881. Both subgenera have been shown to constitute monophyletic clades (Kronauer *et al.* 2007) and the genus *Dorylus* is probably monophyletic itself (Brady *et al.* 2014), so it is therefore likely that this classification will remain. The two species are easily separated due to their quite different morphologies. Their diagnostic characters are summarised (Tab. 2) and their morphologies are illustrated (Fig. 3).

Table 2. Distinguishing characters for *Dorylus* species in Morocco (adapted from Taylor 2014).

<i>Dorylus fulvus</i>	<i>Dorylus aethiopicus</i>
Antennae of workers with 11 segments (subgenus <i>Typhlopone</i>)	Antennae of workers with 9 segments (subgenus <i>Alaopone</i>)
Mandibles of males narrow; pincer-like (subgenus <i>Typhlopone</i>)	Mandibles of males broad; plate-like (subgenus <i>Alaopone</i>)
Total length of major worker = ca. 13mm	Total length of major worker = ca.5.0 mm
Petiole without a distinct ventral tooth	Petiole with a sharp and distinct ventral tooth
Head smooth, with only tiny punctures	Head sparsely but noticeably puncturate

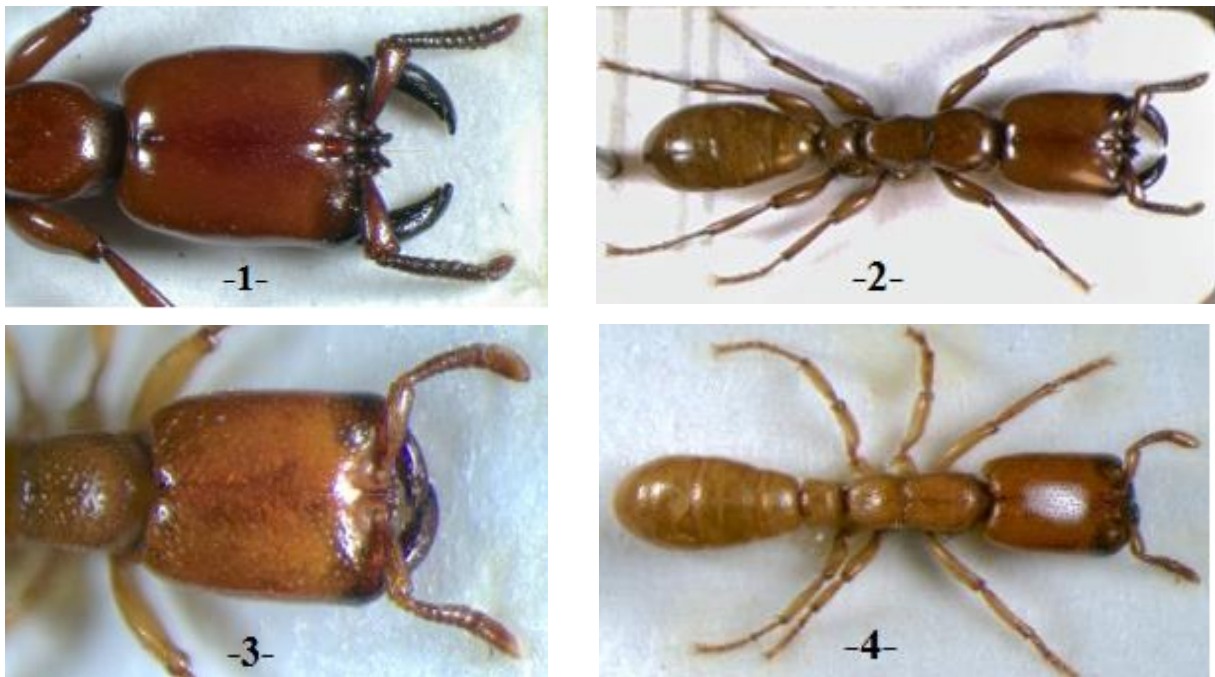


Figure 3. Head and body of Moroccan *Dorylus* species : *D. fulvus* (1, 2) and *D. aethiopicus* (3, 4).

The subgenera *Typhlopone* and *Alaopone* both consist entirely of subterranean species (Kronauer *et al.* 2007) and it is for this reason that *Dorylus* are infrequently encountered in Morocco, where at least one species - *D. fulvus* - is widespread and appears to exist in quite a range of habitats and elevations.

Although this constitutes the first record of *D. aethiopicus* from Morocco, Gómez *et al.* (2012) published a photograph of a male *Dorylus* belonging to the subgenus *Alaopone*, also

from Morocco (unfortunately, the website is no longer available). The locality, which was given as 'Sidi Ifni', lies some 25 km SSW of our locality for *D. aethiopicus*, and it is likely that this record also refers to *D. aethiopicus*. Only further sampling can determine the distribution of *D. aethiopicus* in Morocco, but if the species is confined to the southwest of the country, then this could account for the lack of records so far.

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