First report of *Lioponera longitarsus* Mayr, 1879 (Hymenoptera: Formicidae) in Algeria: an exotic or a rare native ant species from North Africa?

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Myrmecological investigations were conducted in an olive grove agro-ecosystem. Among the taxa we report the presence of the cryptic ant species *Lioponera longitarsus*, subfamily Dorylinae, for the first time in Algeria. Standard morphological measurements are presented for worker and queen. The discovery of this genus for the fourth time in North Africa in different habitats within a semi-arid climate suggests that the populations of *Lioponera* may be native but it is not possible to exclude them having been transported by humans.

**Key words**: Dorylinae, *Lioponera longitarsus*, new record, North Africa, semi-arid.

**INTRODUCTION**

In terms of their numerical abundance, size and species richness, ants are a prominent taxonomic group in many terrestrial ecosystems (Majer 1983). The ant community is an important contributor to the biodiversity of many habitats and can also profoundly influence distribution and abundance of other invertebrates (Majer 1976).

The myrmecofauna of Algeria is poorly known. In particular, there is scant knowledge of exotic or tramp species with only seven species reported in old references. These are *Monomorium destructor* (Jerdon, 1851), *Monomorium pharaonis* (Linnaeus, 1758), *Linepithema humile* (Mayr, 1868), *Paratrechina longicornis* (Latreille, 1802), *Pheidole megacephala* (Fabricius, 1793), *Tetramorium bicarinatum* (Nylander, 1846) and *Tetramorium simillimum* (Fr. Smith, 1851).

An eighth exotic species, *Tetramorium lanuginosum* Mayr, 1870, was recorded in Algeria by Barech et al. (2011) in an irrigated green within the installations of the Institut National Agronomique at Algiers. *Linepithema humile* was rediscovered by Barech et al. (2015) at Melbou (Bejaïa).

Here we report a further species, *Lioponera longitarsus* Mayr, 1879, for the first time in Algeria. Brown (1975) considered *Lioponera* as subgenus of the genus *Cerapachys* but Brady et al. (2014) suggested that *Cerapachys* (*Lioponera*) is a group molecularly distinct enough to deserve reversion to Mayr’s original genus status under the name *Lioponera*. This was supported by Borowiec (2016) and is accepted by us. In a further change, Borowiec (2016) placed *Cerapachys* and *Lioponera* within the subfamily Dorylinae.

The ant genus *Lioponera* in North Africa was recorded in three countries: with *Lioponera noctambula* from Tunisia (Santschi 1910); *Lioponera cooperi* (Donisthorpe, 1939) renamed as *Cerapachys aegyptiacus* by Brown (1975), *Lioponera alfieri* Donisthorpe, 1939, and *Lioponera collingwoodi* (as *Cerapachys collingwoodii* Sharaf, 2007, in Fadl et al. 2007) from Egypt; and a *Lioponera* sp. as *Cerapachys* group *longitarsus* by Guillem et al. (2012), from Morocco. Taylor & Sharaf (2015) suggested that the males recorded as *Cerapachys collingwoodii* and *Cerapachys noctambulus* may be synonymous with *L. longitarsus*.

In North Africa, only a few, mostly male, specimens were found, which characterises members of the genus as cryptic and rare in the region. According to Gaston (1994) rare species are regarded as those having low abundance and/or small ranges. Likewise Flather & Sieg (2007) defined that species are considered rare if their area of occupancy or their numbers are small compared to the other species that are taxonomically or ecologically comparable.

In the classification of ant communities done by Andersen (1995, 1997), the ant genus *Cerapachys* (*Lioponera*) appears within both the functional group of specialist predator and cryptic species.

Here we provide the first report and standard morphological measurements of this rare ant in Algeria, and we briefly discuss if *Lioponera longi-
**MATERIAL AND METHODS**

We conducted a pitfall trap collecting programme (from 11–14 April 2013; leg. G. Barech) in an olive grove (Nouara, M’sila) in Algeria (Fig. 1). *Lioponera longitarsus* specimens were identified using Brown (1975), Bharti & Akbar (2013), and visual comparison with www.antweb.org resources. The worker is in the entomological collection of G.B. (University of M’Sila, Algeria). The queen is in the personal collection of X.E.

The study site was a plantation of olive trees (Fig. 1) located at Nouara (M’sila, NE Algeria; 35°43′22″N 4°33′34″E at 490 m altitude. The local climate is classified as lower arid with a cold winter. Precipitation is variable, with a mean of 207.5 mm and ranging between 105 and 348 mm/year. Annual

*tarsus* is to be considered a native or exotic ant in North Africa.

![Image of geographical location, olive grove, and olive trees](image)

**Fig. 1.** A, Geographical location for Nouara (M’Sila, NE Algeria) (image Google Earth); B, perspective of the olive grove (image Google Earth); C, some constituent olive trees.
mean temperatures are 19.43 °C (ranging between 8.73 °C to 31.63 °C). The dry period can last 11 months.

The 60-year-old olive grove covered an area of 6 ha and consisted of 500 olive trees (Olea europaea var. Chemlal). The olive grove complied with all organic agriculture standards, i.e. no pesticides, fungicides or herbicides were applied. Trees were regularly watered during dry periods by furrow irrigation (surface irrigation).

In association with olive trees diverse adventive plants (17 species) were recorded, for example: Asteraceae (Dittrichia viscosa (L.) Greuter, Launaea nudicaulis (L.) Hook. f., Pallenis spinosa (L.) Cass., Echinops spinosus L., Phagnalon saxatile (L.) Cass., Sonchus sp.), Poaceae (Oryzopsis miliacea (L.) Asch. et Schweinf., Cynodon dactylon (L.) Pers. and Apiaceae (Eryngium campestre (L.) Greuter, Pallenis spinosa (L.) Pers. and Apiaceae (Eryngium campestre (L.) Greuter, Cynodon dactylon (L.) Pers. and Apiaceae (Eryngium campestre (L.) Greuter, Cynodon dactylon (L.) Pers. and Apiaceae (Eryngium campestre (L.) Greuter, Cynodon dactylon (L.) Pers. and Apiaceae (Eryngium campestre (L.) Greuter). The vegetation cover was estimated at 69 %. The most dominant species was Oryzopsis miliacea.

Measurements (mm) were taken using a Nikon SMZ-U stereomicroscope at ×75 magnification with an ocular micrometer. HW: Head width across eyes; HL: maximum head length; SL: scape length, excluding neck and basal condyle; PW: pronotum width, dorsal view; WL: Weber’s length; PetW: petiole width, dorsal view; IIIAW: fourth abdominal segment width, dorsal view; IVAW: third abdominal segment width, dorsal view; IVAW: third abdominal segment width, dorsal view; IVAW: fourth abdominal segment width; IVAW: fourth abdominal segment width; Femur III: hind femur length; Tibia III: hind tibia length; Basitarsus III: hind basitarsus length; TL: total body length.

Two legs of each specimen were destructively sampled for molecular analysis. Unfortunately two attempts at DNA extraction failed.

RESULTS AND DISCUSSION

One worker (Fig. 2) and one ergatoid queen (Fig. 3) of Lioponera longitarsus were recovered (11 April 2013) from a single pitfall trap set at an olive grove in Nouara (M’sila, Algeria).

General morpholgy. Both specimens (worker, ergatoid queen) have 12-segmented antennae. Ocelli absent in the worker; ocelli present in the ergatoid queen. Post-ocular carinae absent. Sculpture predominantly punctuate on a smooth or finely sculptured background. Dorsum of pronotum and propodeum rounding into the sides. Petiole with strong overhanging dorsolateral margins. Bicoloured, with the head and mesosoma reddish brown and gaster blackish.

Worker biometry. HW 0.63; HL 0.72; SL 0.40; PW 0.43; WL 0.91; PetW 0.44; IIIAW 0.53; IVAW 0.43; IVAW 0.64; IVAL 0.56; Femur III 0.51; Tibia III 0.41; Basitarsus III 0.39. TL 3.3.

Ergatoid queen biometry. HW 0.72; HL 0.76; SL 0.44; PW 0.51; WL 1.08; PetW 0.53; IIIAW 0.67; IVAW 0.52; IVAW 0.81; IVAL 0.65; Femur III 0.56; Tibia III 0.47; Basitarsus III 0.44. Spurs of middle and hind tibia (Bolton 2003, p. 274): 1p, 1p. Both legs have a single pectinated spur. TL 3.7. The ergatoid queen morphology fits exactly the specimen shown at ANTWB1008626. This poorly differentiated caste was already noted in the original description as Lioponera longitarsus Mayr, 1879, and subsequently by Bingham (1903) and Brown (1975). Its bigger size and presence of ocelli separates it from the worker. Winged queens, in addition to ergatoid queens, are also indicated for this species (Bharti & Akbar 2013), as with several other formerly Cerapachys species, now in Cerapachys (C. sulcinodis Emery), Parasycia (P. seema Bharti & Akbar) or Ooceraea (O. biroi Forel) (Borowiec 2016).

The nest was not detected, so we have no data on nest population size. Further dedicated searches failed to find more specimens (e.g. baits at night composed of dead ants, in deadwood, other pitfall traps and hand sampling).

But for the widely distributed Tetramorium sericeiventre Emery, 1877, other species within the same habitat (Table 1) indicate a native, strongly anthropophilous fauna. Monomorium salomonis (Linnaeus, 1758) and Cataglyphis bicolor (Fabricius, 1793) are the most abundant species in the olive grove of Nouara.

Lioponera longitarsus is a new addition to Algerian myrmecofauna. The species is noted as probably twig-nesting (Brown 1975) and possibly as predators of other ants. Some formerly Cerapachys species are mainly myrmecophagous and conduct group raids on other ant nests (Wilson 1958; General & Alpert 2012). In nests prey larvae can be stored for several weeks without showing any sign of decay (Hölldobler 1982). The nesting behaviour of these ants may have facilitated their dispersal (Framenau & Thomas 2008). It is widespread in the Indo-Australasian region and China (Brown 1975; Terayama et al. 1988; Shattuck 2000; Guénard & Dunn 2012). Populations from the Middle East (Collingwood 1985; Collingwood & Van Harten 2001; Sharaf et al. 2013; Vonshack & Ionescu-
Hirsch 2009) and North Africa (Santschi 1910; Donisthorpe 1939; Guillem et al. 2012) are perhaps exotic in those regions. *Lioponera* is part of a well-supported Old World clade where the intergeneric relationships are known (Brady et al. 2014). A phylogeny of the relatively few species of *Lioponera* that have been sequenced suggests that the genus may have originated in Africa and later spread to the Indomalayan and Australasian regions (Borowiec 2016).

*Lioponera longitarsus* was sampled at different altitudes from 25 m below sea level in Egypt by Donisthorpe (1939) to 1000 m in the Himalaya Mountains by Bharti et al. (2013).

In North Africa *Lioponera longitarsus* is recorded in different habitats within a semi-arid climate. The first report of this species is mentioned by Donisthorpe (1939) at two localities (Siwa Oasis, as

![Image](image_url)

**Fig. 2.** Worker of *Lioponera longitarsus* collected in the olive grove of Nouara (Algeria). A, Lateral view; B, dorsal view of propodeum, petiole and postpetiole. Scale bars = 0.5 mm.

<table>
<thead>
<tr>
<th>Subfamilies</th>
<th>Species</th>
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<tbody>
<tr>
<td>Dolichoderinae</td>
<td><em>Tapinoma nigerrimum</em> (Nylander, 1856)</td>
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<tr>
<td>Myrmicinae</td>
<td><em>Monomorium subopacum</em> (Smith, 1858)</td>
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<td></td>
<td><em>Monomorium salomonis</em> (Linnaeus, 1758)</td>
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<td><em>Messor barbarus</em> (Linnaeus, 1767)</td>
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<td></td>
<td><em>Cardiocondyla mauritanica</em> Forel, 1890</td>
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<td></td>
<td><em>Tetramorium semilaeve</em> André, 1883</td>
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<td></td>
<td><em>Tetramorium sericeiventre</em> Emery, 1877</td>
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<td></td>
<td><em>Solenopsis</em> sp.</td>
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<tr>
<td>Formicinae</td>
<td><em>Cataglyphis bicolor</em> (Fabricius, 1793)</td>
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<td></td>
<td><em>Cataglyphis albicans</em> Roger, 1859</td>
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<td></td>
<td><em>Lepisiota frauenfeldi</em> s.l. Mayr, 1855</td>
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<tr>
<td></td>
<td><em>Camponotus thoracicus</em> (Fabricius, 1804)</td>
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</tbody>
</table>
Lioponera cooperi, and Wadi Digla, as Lioponera alfieri), from Egypt. Both are characterised by a desertic climate. Siwa Oasis is a fertile basin, sitting about 25 m below sea level and brimming with olive and palm trees. This species is relatively rare and the worker caste is less abundant (Fadl et al. 2007). In Morocco the habitat was a dry oued surrounded by stony, desert steppe of Hammada.

Fig. 3. Ergatoid queen of Lioponera longitarsus collected in the olive grove of Nouara (Algeria). A, Lateral view; B, close up lateral view of mesosoma, petiole and postpetiole; C, head, frontal view. Scale bars = 0.5 mm.
scoparia (Pomel) Iljin (Amaranthaceae) with scattered Ziziphus lotus (L.) (Guillem et al. 2012).

The other species of Lioponera, L. noctambulus was found by Santschi (1910) on the plain of Kairouan where a steppe climate is present with low rainfall. The unique report of L. collingwoodi was in Port Said which has a hot desert climate but only one male was collected from leaf litter inhabited by many groups of terrestrial invertebrates (Fadl et al. 2007).

Collectively the varied L. longitarsus habitats suggest the species is native to North Africa because exotic species tend to establish in regions with similar climatic conditions to their region of origin (Williamson 1996). According to Miravete et al. (2013) regions in similar latitudes or in the same biogeographic realm are more likely to have similar climates and habitats which might increase the odds of the success of introduced species. Here, we cannot determine with certainty whether the population of Lioponera longitarsus is native or exotic to Algeria.

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