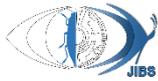


Original Article 

Seven species in seven days: new additions to the ant fauna (Hymenoptera, Formicidae) of Lebanon

Enrico Schifani ¹  | Mark Massaad ² ¹ Institute of Evolutionary Biology (CSIC – Pompeu Fabra University), Barcelona, Spain² Department of Agricultural, Food, and Forest Sciences, University of Palermo, Palermo, Italy

Corresponding authors

Enrico Schifani |  enrico.schifani@protonmail.com; Mark Massaad |  mark.massaad@unipa.it<https://zoobank.org/urn:lsid:zoobank.org:978DA4B9-0A75-400E-ABE6-2D9916545DDA>

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ABSTRACT. Lebanon is expected to be among the most important biodiversity hotspots in the Mediterranean. The latest ant checklist of the country, counting 110 taxa, was published in 2014. Here we record seven species to be added to the Lebanese checklist, belonging to five genera from the Formicinae, Myrmicinae, and Ponerinae subfamilies. Four are considered natives [*Hypoponera eduardi* (Forel, 1894), *Lasius illyricus* Zimmermann, 1935, *Lasius israelicus* Seifert, 2020, and *Trichomyrmex perplexus* (Radchenko, 1997)] and three non-native species [*Pheidole indica* Mayr, 1879, *Pheidole parva* Mayr, 1865, and *Tetramorium bicarinatum* (Nylander, 1846)]. The record of *L. illyricus* represents the first from the Levant, while the recently described *L. israelicus* likely has a much wider distribution in the region than its formal name suggests. None of the non-native species is considered invasive. The new discoveries, attained with a relatively limited sampling effort during seven days, highlight the need for further studies to describe the Lebanese ant fauna.

KEYWORDS: Eastern Mediterranean, Distribution, *Hypoponera*, *Lasius*, *Pheidole*, *Tetramorium*, *Trichomyrmex*

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INTRODUCTION

The Mediterranean is one of the global hotspots for ant biodiversity and is particularly rich in species with short distribution ranges (Kass et al. 2022). At the same time, ant taxonomy in the region is still far from being well-resolved (Oberski et al. 2025). Within the region, a recent analysis of occurrence data of ants across the world predicted the Levant to stand as one of the most important diversity centres, even when greater exploration of ant diversity in currently understudied regions of the globe may push other parts of the Mediterranean out of the global hotspots (Kass et al. 2022; Oberski et al. 2025).

The earliest data on the Lebanese ants were perhaps those published by André (1881), which included the description of *Camponotus libanicus* André, 1881 at a time when the state of Lebanon did not yet exist. Georges Tohmé and Henriette Tohmé in a long series of publication (from 1969 to 2000) played a particularly important role in describing the Lebanese ants through several publications that focused on faunistic, taxonomic, and ecological aspects (Tohmé 1969a, 1969b, 1970, 1972a, 1972b, 1977, 1983; Tohmé & Tohmé 1975a, 1975b, 1975c, 1977, 1978, 1979, 1980a, 1980b, 1980c, 1981, 1982a, 1982b, 1985, 1999, 2000). Additional contributions focusing on Lebanon focused on taxonomic, behavioral, and physiological features of *Tapinoma phoeniceum* Emery, 1925 (Hanna 1975, 1981, 1985, 1988), and on the karyotype characterization of some Lebanese ant species (Lakkis 1983). To gather a complete picture of faunistic data published on Lebanon, we made use of the resources available on AntMaps.org (Janicki et al. 2016; Guénard et al. 2017).

The only available checklist of the Lebanese ant fauna was published in 2014 (Tohmé & Tohmé 2014), and included 110 taxa, a high number considering the country's relatively small size (10,452 km²). These

belonged to five subfamilies (Dolichoderinae, Dorylinae, Formicinae, Myrmicinae, Ponerinae) and twenty one genera (*Aphaenogaster* Mayr, 1853; *Camponotus* Mayr, 1861; *Cataglyphis* Foerster, 1850; *Colobopsis* Mayr, 1861; *Crematogaster* Lund, 1831; *Formica* Linnaeus, 1758; *Hypoponera* Santschi, 1938; *Lasius* Fabricius, 1804; *Lepisiota* Santschi, 1926; *Messor* Forel, 1890; *Monomorium* Mayr, 1855; *Nylanderia* Emery, 1906; *Paratrechina* Motschoulsky, 1863; *Pheidole* Westwood, 1839; *Prenolepis* Mayr, 1861; *Oxyopomyrmex* André, 1881; *Solenopsis* Westwood, 1840; *Tapinoma* Foerster, 1850; *Temnothorax* Mayr, 1861; *Tetramorium* Mayr, 1855; and *Trichomyrmex* Mayr, 1865) (Tohmé & Tohmé 2014; Bolton 2025).

Despite this history of exploration, the country was largely overlooked during the last few decades, while ant taxonomy witnessed a notable methodological advancement leading to the ongoing rapid improvement in the understanding of countless groups, especially in Central Europe but partly also in the Mediterranean (Seifert 2018; Oberski et al. 2025). Many of the taxa included in the checklist by Tohmé & Tohmé (2014) still need their group to be taxonomically revised for a proper assessment of their status. Other species groups have been recently revised, but the status of the Lebanese populations was not addressed (e.g., *Lasius*, see Seifert 2020). The Mediterranean has also been witnessing a rapid increase in the number of non-native species accidentally introduced, including a minority of threatening invasive taxa, raising the alarm on the need for heightened biosurveillance (Espadaler et al. 2018; Schifani 2019; Menchetti et al. 2022, 2023, 2024). The introduction of non-native ants across the world mainly happens through trade, with plant trade (Bertelsmeier et al. 2017; Ollier & Bertelsmeier 2022; Wong et al. 2023).

Here are seven species that are new to the Lebanese ant checklist. These include both native and non-native taxa, which were found during a seven-day opportunistic sampling campaign conducted across the country.

MATERIAL AND METHODS

Sampling. Ants were collected by the authors across Lebanon through direct sampling (Agosti et al. 2000) between 21 and 27 August 2025 across the center and north of the country (Baalbek-Hermel, Beirut, Beqaa, Keserwan-Jbeil, Mount Lebanon, and North Lebanon administrative divisions) as illustrated in Figure 1. Opportunistic sampling covered both urban, agricultural, and natural habitats. Samples were stored in 96% ethanol in our personal collections.

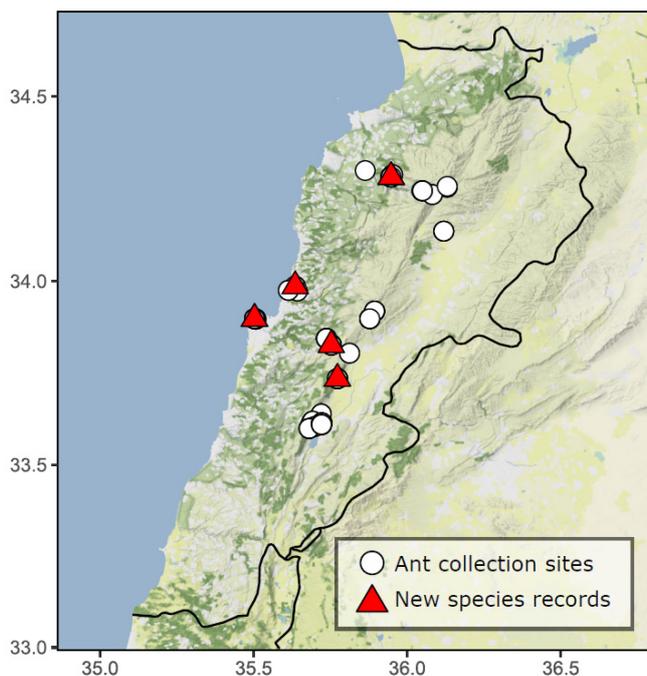


Figure 1. Map of sites sampled during this study with the locations of the new species records highlighted in red. Map from Stadia Maps (stadiamaps.com and Stamen Design – stamen.com).

Imaging. Focus-stacked images were taken using a Canon MP-E 65mm f/2.8 1–5x macro lens. A series of images was captured at successive focal planes by incrementally shifting the focus, and the resulting image stack was combined into a single extended-depth-of-field image using the software Helicon Focus. Scale bars were added using the software ImageJ (Schneider et al. 2012).

Taxonomic identification. Sample identification was conducted under a stereoscopic microscope following the taxonomic keys provided by Bolton & Fisher (2011), Hita-Garcia & Fisher (2011), Sarnat et al. (2015), Seifert (2020), and Hoffmann (2021) (either directly addressing the Palearctic fauna or tropical groups, non-native species we detected are part of).

RESULTS

Here follows the list of species new to the country. All distribution data are also given in the online [supplementary material](#) of this paper.

Class Insecta Linnaeus, 1785

Order Hymenoptera Linnaeus, 1758

Family Formicidae Latreille, 1809

Subfamily Ponerinae Lepeletier de Saint-Fargeau, 1835

Genus *Hypoponera* Santschi, 1938

***Hypoponera eduardi* (Forel, 1894)**

Fig. 2

Material examined. 1 worker, Shrine of Lady Shawana, Houch El Saalouk, Beqaa, 33°44'5"N, 35°46'22"E, 25.VIII.2025, collected under a stone near a water source.

Status. Native.

Identification remarks. *Hypoponera eduardi* is a distinctive member within the *punctatissima* species group whose workers are easy to identify based on the relatively long scapi, the petiole shape, the short median impression in the head dorsum, terminating just behind the frontal lobes, and the dark overall pigmentation (Bolton & Fisher 2011).

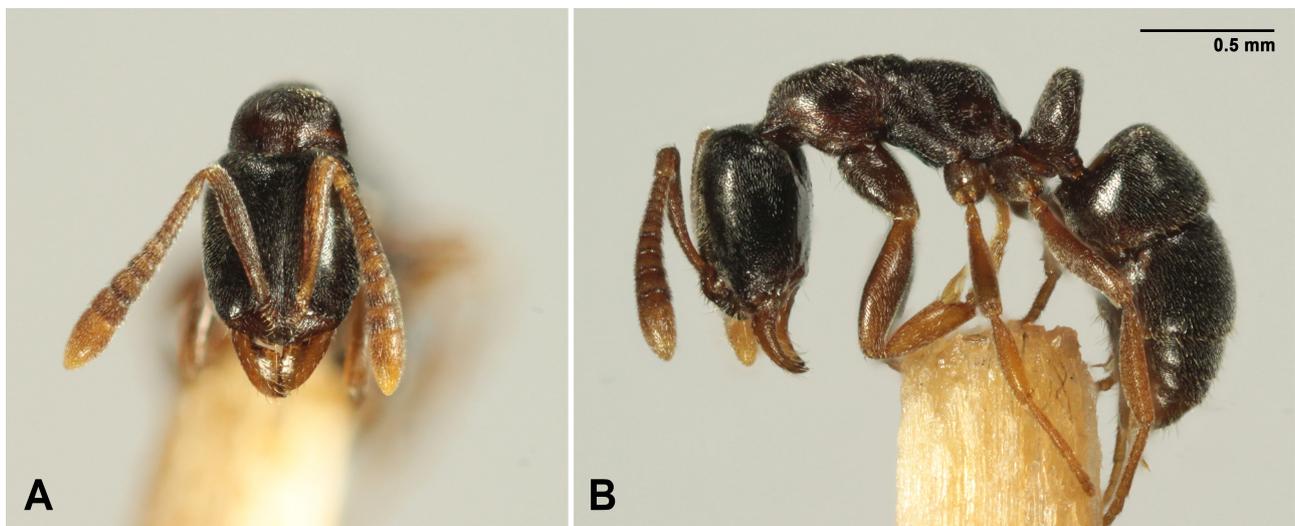


Figure 2. *Hypoponera eduardi* (Forel, 1894). **A.** Head in full-face view; **B.** lateral view of the body. Worker from near the Shrine of Lady Shawana, Houch El Saalouk, Beqaa.

Subfamily Formicinae Latreille, 1809

Genus *Lasius* Fabricius, 1804

Lasius illyricus Zimmermann, 1935

Fig. 3

Material examined. 12 workers, Qadisha Valley, North Lebanon, 34°16'55"N, 35°56'53"E, 24.VIII.2025, workers collected on *Juglans regia* L. in an area with riparian vegetation near the Abou Ali river (Fig. 3).

Status. Native.

Identification remarks. *Lasius illyricus* belongs to the *emarginatus* species complex and is most similar to *L. emarginatus* (Olivier, 1792) in the eastern Mediterranean region, but has comparatively much fewer setae on the posterior head margin, genae, scapi, and hind tibiae, while still having longer and more abundant setae than the western Mediterranean *L. tunisius* Seifert, 2020 (Seifert 2020).

Lasius israelicus Seifert, 2020

Fig. 4

Material examined. 6 workers, Falougha, Mount Lebanon, 33°49'35"N, 35°45'10"E, 22.VIII.2025, *Pinus* forest.

Status. Native.

Identification remarks. *Lasius israelicus* belongs to the *turcicus* species complex and presents a distinctive combination of genae and hind tibiae with many erect hairs and scapi without or with very few of them, while the petiole scale in profile view is thin and with a sharp dorsal crest (Seifert 2020).

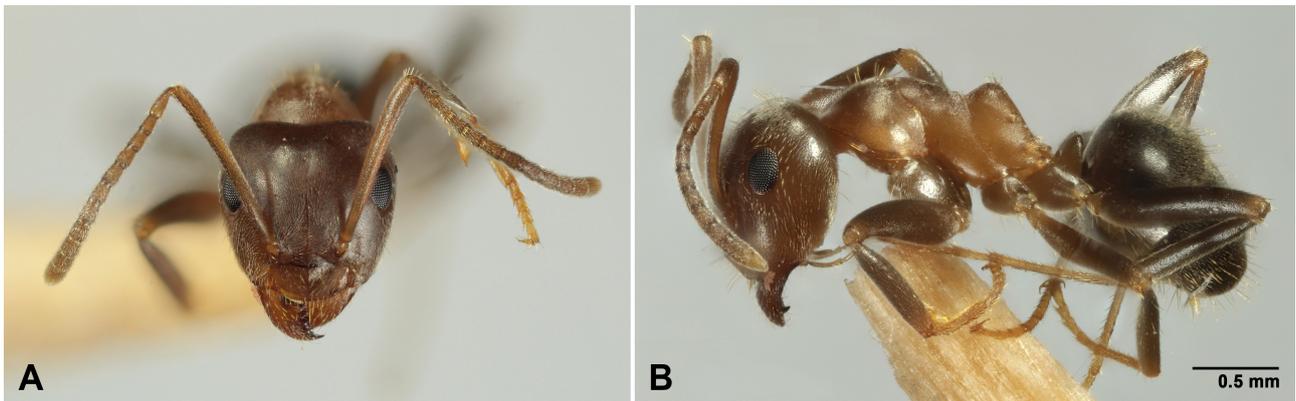


Figure 3. *Lasius illyricus* Zimmermann, 1935. **A.** Head in full-face view; **B.** Lateral view of the body. Worker from Qadisha Valley, North Lebanon.

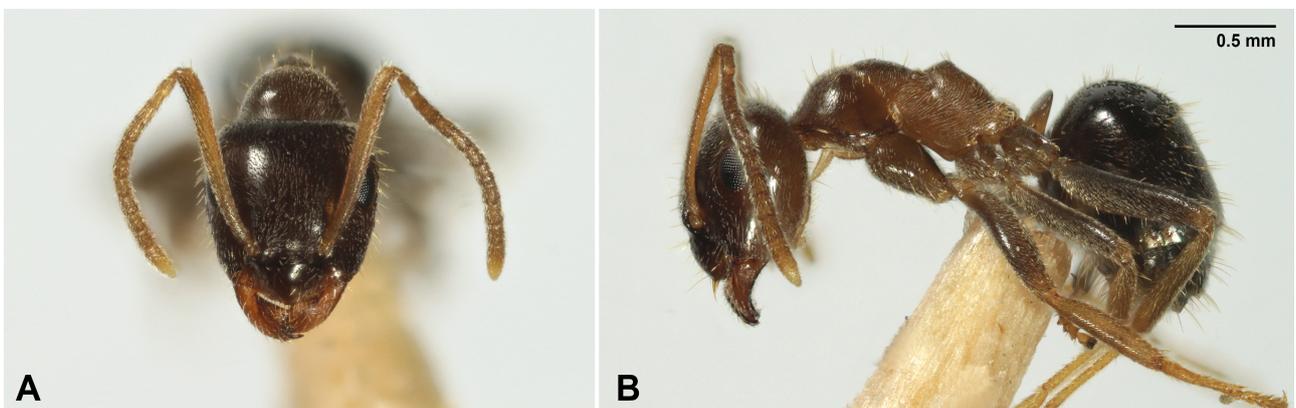


Figure 4. *Lasius israelicus* Seifert, 2020. **A.** Head in full-face view; **B.** Lateral view of the body. Worker from Falougha, Mount Lebanon.

Subfamily Myrmicinae Lepeletier de Saint-Fargeau, 1835

Genus *Pheidole* Westwood, 1839

Pheidole indica Mayr, 1879

Fig. 5

Material examined. 8 minor and 5 major workers, Beirut, 33°53'51"N, 35°30'10"E, 27.VIII.2025, colony under a deadwood piece in an urban garden.

Status. Non-native.

Identification remarks. *Pheidole indica* belongs to the *fervens* species group and can be distinguished from the other species of the group by the relatively short frontal carinae and stouter propodeal spines in major workers, large eyes in minor workers, and pronounced and rounded promesonotal prominence in both minors and majors (Sarnat et al. 2015).

Pheidole parva Mayr, 1865

Fig. 6

Material examined. 6 minor and 1 major worker, Jounieh, Keserwan-Jbeil, 33°59'10"N, 35°38'8"E, 24.VIII.2025, foraging near irrigated plants on the sidewalk.

Status. Non-native.

Identification remarks. *Pheidole parva* is better identified by major workers, while minors can hardly be separated even from species of some unrelated lineages (Sarnat et al. 2015). Compared to similar species in the *flavens* complex and *punctatissima* clade, major workers have a promesonotum in dorsal view with strongly projecting shoulders and a unique combination of surface sculpturing, including strongly rugoreticulate posterolateral lobes, including the posterior head margin, and rugoreticulate promesonotal dorsum with distinct long longitudinal striae in addition to shorter sections of transverse and intersecting striae (Sarnat et al. 2015).

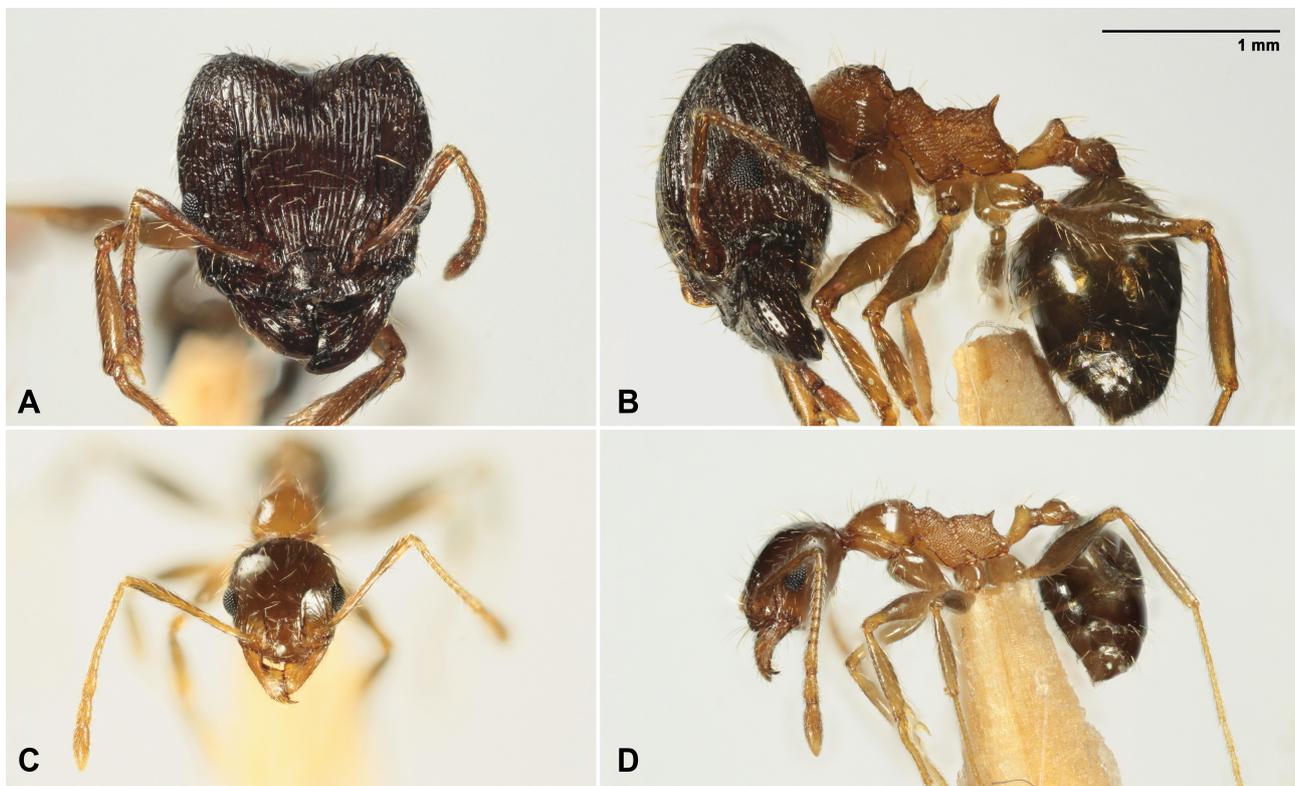


Figure 5. *Pheidole indica* Mayr, 1879. **A.** Major worker, head in full-face view; **B.** Major worker, lateral view of the body. **C.** Mxinor worker, head in full-face view; **D.** Minor worker, lateral view of the body. Specimens from Beirut.

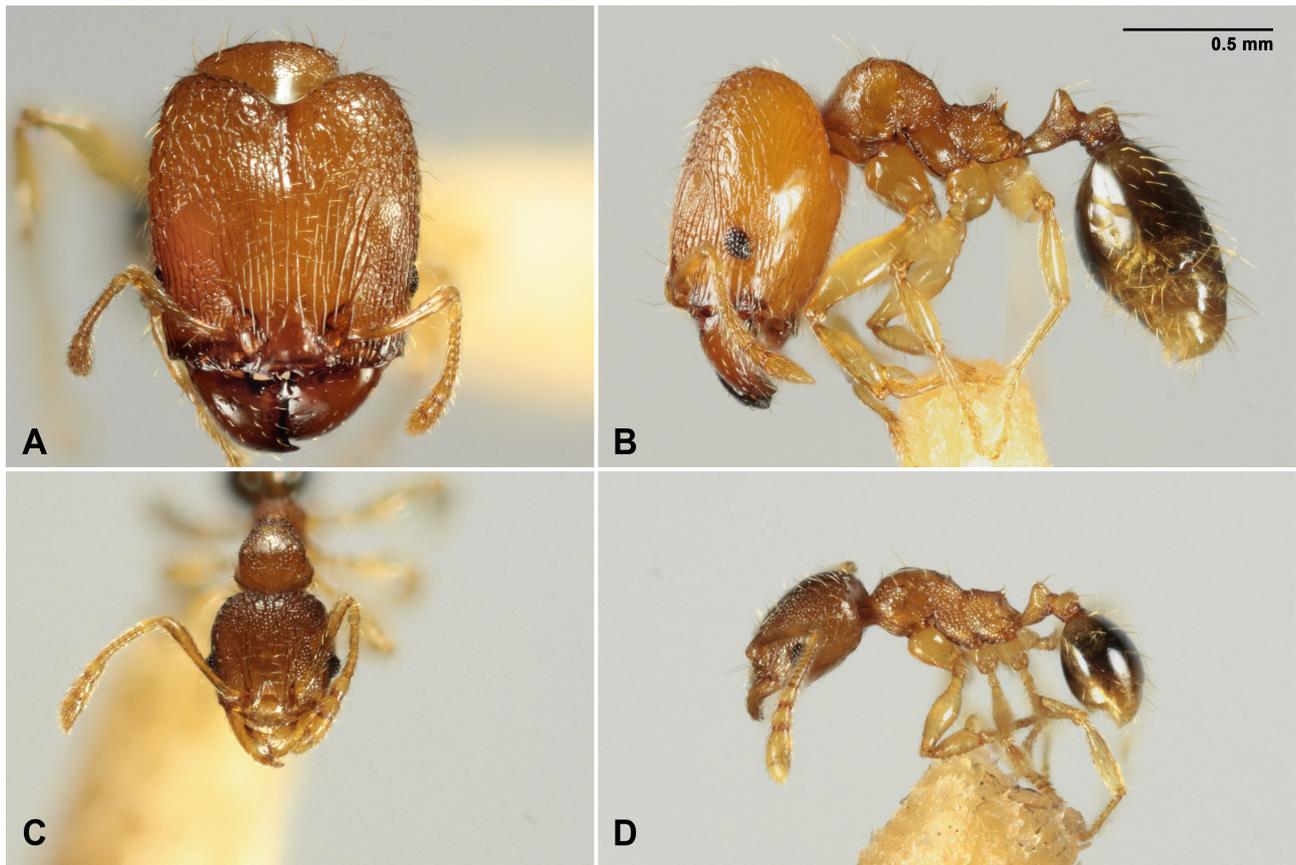


Figure 6. *Pheidole parva* Mayr, 1835. **A.** Major worker, head in full-face view; **B.** Major worker, lateral view of the body. **C.** Minor worker, head in full-face view; **D.** Minor worker, lateral view of the body. Specimens from Jounieh, Keserwan-Jbeil.

Genus *Tetramorium* Mayr, 1855

Tetramorium bicarinatum (Nylander, 1846)

Fig. 7

Material examined. 5 workers, Beirut, 33°53'51"N, 35°30'10"E, 27.VIII.2025, in an urban garden. 1 worker, Beirut, 33°53'52.44"N, 35°30'24.17" E, 27.VIII.2025, on a sidewalk near some cultivated plants.

Status. Non-native.

Identification remarks. One of the three species of the *bicarinatum* group to occur outside East Asia, *T. bicarinatum* can easily be differentiated from the others by having a distinguishable sculpture on the mandibles, anterodorsal and posterodorsal angles of petiolar node equally developed and situated at about the same height, head, mesosoma, and nodes yellow to orange-brown, gaster always much darker, dark brown to blackish (Hita-Garcia & Fisher 2011).

Genus *Tetramorium* Mayr, 1865

Trichomyrmex perplexus (Radchenko, 1997)

Fig. 8

Material examined. 15 workers, Qadisha Valley, North Lebanon, 34°16'57"N, 35°56'51"E, 24.VIII.2025. 6 workers, Qadisha Valley, North Lebanon, 34°16'56.66"N, 35°56'51.00"E, 24.VIII.2025. Workers were foraging in trails and transporting seeds to their nests.

Status. Native.

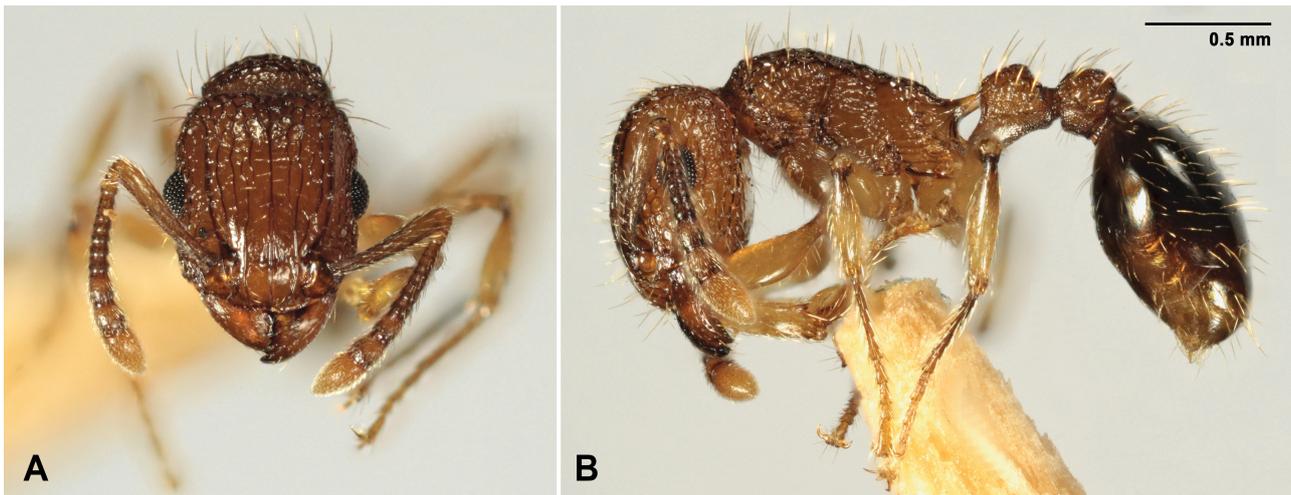


Figure 7. *Tetramorium bicarinatum* (Nylander, 1846). A. Head in full-face view; B. Lateral view of the body. A worker from Beirut.

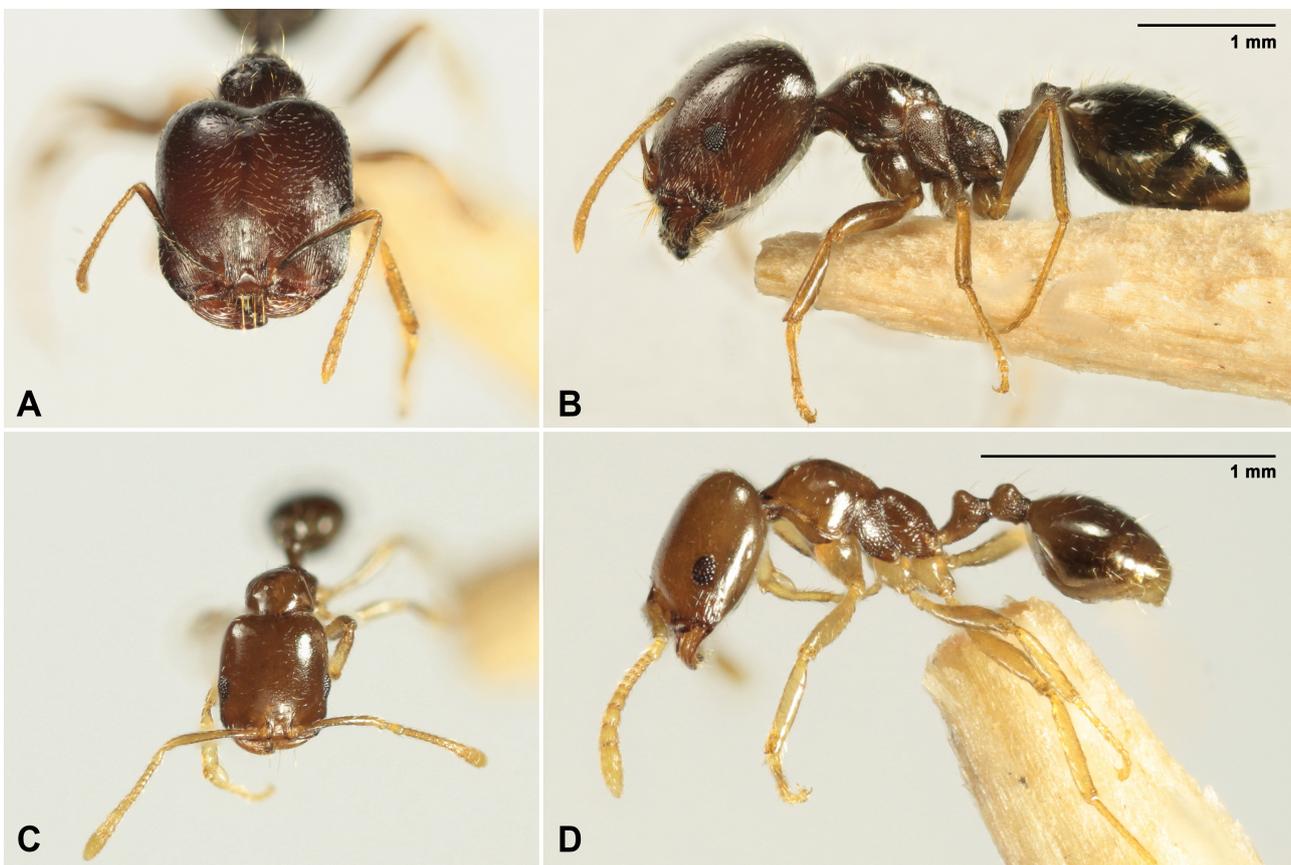


Figure 8. *Trichomyrmex perplexus* (Radchenko, 1997). A. Major worker, head in full-face view; B. Major worker, lateral view of the body. C. Minor worker, head in full-face view; D. Minor worker, lateral view of the body. Specimens from Qadisha Valley, North Lebanon.

Identification remarks. *Trichomyrmex perplexus* is identifiable as a uniformly dark-colored species without punctuation or striae in the head dorsum from the level of the eyes to the posterior margin, no psammophore, no well-developed teeth in the anterior clypeal margin, sparse standing hairs over the body, petiolar spiracle positioned on the peduncle (anterior to the beginning of the rise of the petiolar node), and promesonotal profile relatively flattened after rising sharply anteriorly (Hoffmann 2021).

DISCUSSION

Our data document four native and three non-native ant species to be added to the Lebanese checklist (Tohmé & Tohmé 2014). All of them are discovered from single sites, and further efforts are needed to uncover their distribution inside the country. The new additions raise the total number of ant species formally known for the country to 117. Both Jordan and Syria have smaller numbers in their checklists, ranging from about sixty to one hundred respectively, despite being countries whose surface is nine to eighteen times larger (Guénard et al. 2017; Borowiec & Salata 2020). This is certainly partly due to an underestimation of the true richness of both, but also likely to reflect the different ecological and biogeographical characteristics of most of their territory (Borowiec & Salata 2020). On the other hand, Palestine – overall more ecologically similar to Lebanon for its proximity to the Mediterranean – hosts about two hundred species, roughly 70% more, while being approximately twice as big (Vonshak & Ionescu-Hirsch 2009). However, the current knowledge of the region is still likely to improve significantly if sufficient taxonomic and faunistic efforts are conducted, making accurate comparisons premature.

Concerning *H. eduardi*, while Emery (1895) had mentioned its presence in Lebanon, he did not provide any locality. It is worth noting that at that time, Lebanon was part of the Ottoman Empire, and the current borders had not yet been defined. A further mention by Seifert (2018), also generically mentioning Lebanon, was perhaps referring to Emery's record, but the species was not included in the latest Lebanese checklist (Tohmé & Tohmé 2014), where *Hypoponera punctatissima* (Roger, 1859) was the only ponerine ant species (note that *Ponera libani* Tohmé, 1969 is not an ant but a Mutillidae, see Bolton 1995). *Hypoponera eduardi* is widespread across the Mediterranean, where it is considered native, and it is also sparsely introduced elsewhere across the world (Bolton & Fisher 2011; Guénard et al. 2017). As is often the case in the Mediterranean, we collected it near a water source (Fig. 9).

Lasius illyricus ants were collected as they were tending the aphid *Panaphis juglandis* (Goeze, 1778) on walnut leaves, an association previously recorded for the closely related *L. emarginatus* but new for this species (Fig. 9; Schifani et al. 2023). *Lasius illyricus* ranges from the Balkans through Türkiye, Georgia, Armenia, Azerbaijan, east to Iran south of the Caspian Sea (Schifani & Massa 2020; Seifert 2020). Ours represents the first record from the Levant. Previous records of *L. emarginatus* in Lebanon (from Aley, Hadath, Qoubayat and Chanbouq, see Tohmé & Tohmé 2014) are likely to represent *L. illyricus* for biogeographical reasons (see Seifert 2020). Nonetheless, *L. emarginatus* sometimes occurs as an introduced species (Kennett et al. 2024), with an introduced urban population recorded from Al Quds (Seifert 2020). *Lasius israelicus* was recently described from five sites across Palestine (Seifert 2020), some very close to Lebanese and Syrian borders (Khirbat Bayt Hassan – incorrectly mentioned as if it was in Jordan, Jebel Jarmaq, Nahr al-Hasbani, Wadi Karkara, and Qalaat Al-Qurain), so that its finding in Lebanon is not surprising. Our record further suggests its distribution to be likely much wider than so far documented.

Pheidole indica, also known as the Indian big-headed ant, is an Indian species widely introduced worldwide, including in the Mediterranean, West Asia, and North Africa, where it has often been recorded under the name *P. teneriffana* Forel, 1893 (Sarnat et al. 2015; Guénard et al. 2017). Kugler (1988) marks its presence in Lebanon in a table, but without any specific locality, detail, or explanation on how he had obtained this information, and the species was not included in the latest Lebanese checklist (Tohmé & Tohmé 2014). In the region, it appears to remain associated with urban, agricultural, and heavily disturbed areas, without causing significant issues or posing a threat to natural ecosystems (Schifani 2019; Demetriou et al. 2023a, 2023b, Schifani et al. 2024). The nest was inhabited by myrmecophile isopods, collembola, and lepidoptera. The site at which the species was collected was notably inhabited mainly by disturbance-tolerant and/or non-native ant species: *Lepisiota* cf. *frauenfeldi* (Mayr, 1855), *Monomorium bicolor* Emery, 1877, *Paratrechina longicornis* (Latreille, 1802), *Plagiolepis* cf. *pallenscens* Forel, 1889, and *Tetramorium bicarinatum*. *Pheidole parva* is considered native to India and southeastern Asia, while it has been introduced in the Arabian Peninsula (Oman, Saudi Arabia, United Arab Emirates – Fischer & Fisher 2013; Sharaf et al. 2018), Cyprus (Demetriou et al. 2025), and Central Europe (indoor in Austria and Germany, Eguchi 2008; Steiner et al. 2017). This is the first record from the Levant. Plant trade may be the most-likely source of introduction (Demetriou et al. 2025). This species is not considered ecologically threatening or harmful to human activities. As in the case of *P. parva*, the collection site was also colonized by *P. longicornis*.



Figure 9. The sampling localities. **A.** *Pinus* forest in Falougha, Mount Lebanon, where *Lasius israelicus* was found; **B.** Qadisha Valley, North Lebanon, where *Lasius illyricus* and *Trichomyrmex perplexus* were found; **C.** *L. illyricus* workers tending *Panaphis juglandis* aphids; **D.** Trail of *T. perplexus* workers transporting seeds to the nest on a sandy soil; **E.** Coast of Jounieh, Keserwan-Jbeil, where *Pheidole parva* was collected from the irrigated at the side of the walk; **F.** Archaeological site and green area in the city centre of Beirut, where *Pheidole indica* and *Tetramorium bicarinatum* were found; **G.** View from a hill near the Shrine Lady Shawana, Houch El Saalouk, Beqaa, with a small stream originating from water tubes and passing under *Quercus libani* G. Olivier oaks, where *Hypoponera eduardi* was found.

The third non-native species, *Tetramorium bicarinatum*, is also considered to be native to Southeastern Asia and China, while it has become widespread globally due to human-mediated introductions, including in the Mediterranean and in the Levant (Wetterer 2009; Guénard et al. 2017). Like the previous non-native species mentioned in this paper, it is not known as a notably harmful species and is normally restricted to urban areas in the region (Schifani 2019; Demetriou et al. 2023a). It was collected in the same site as *P. indica*, where several non-native species concentrated.

Finally, *Trichomyrmex perplexus* is a granivorous ant distributed from Iran to Greece, including Anatolia, Caucasus, Jordan, Syria, and the United Arab Emirates (Sharaf et al. 2016; Guénard et al. 2017). It is the second *Trichomyrmex* species discovered in Lebanon after *T. dentiger* (Roger, 1862) (Tohmé & Tohmé 2014).

Our sampling was intensive but confined to a single week. Access to the southern part of the country was limited by the Lebanese authorities due to security concerns, including Israeli military occupation and airstrikes (five occurred during our fieldwork). The likely disruptive effects of prolonged war on ecosystems and biodiversity in this region remain largely undocumented (Garcês & Pires 2025). However, particularly the southern regions have been reported to suffer, for instance, from extensive wildfires caused by military attacks, some documented to include the use of concerning chemical munitions such as white phosphorus, or the extensive spraying of highly concentrated glyphosate, leading to further devastating effects (Kallab & Mouawab 2023; Hassoun et al. 2025). Despite these limitations, we rapidly discovered a relatively high number of new species records (seven in seven days). While the discovery of some species widespread in the Mediterranean is unsurprising (e.g., *P. indica*), others were so far only known from a relatively small range (e.g., *L. israelicus*) or are new to the whole Levant region (e.g., *L. illyricus*). None of the non-native species we report for the first time has been documented as ecologically harmful despite having been introduced widely across the world, yet it would still be worth monitoring their spread and interactions with native fauna and flora in the context of Lebanon. The results presented in this paper encourage further studies on the Lebanese ant fauna, suggesting high chances of further discoveries with increased research efforts.

AUTHOR'S CONTRIBUTION

The authors confirm their contribution to the paper as follows: Both authors conceived the study and carried out together the sampling activity in the field. Mark Massaad conceived the fieldwork plan and curated its logistics. Enrico Schifani provided the sampling equipment, identified the ants, prepared the images and wrote the first draft of the paper. Both authors revised the manuscript and approved its final version. The authors read and approved the final version of the manuscript.

FUNDING

This research received no specific grant from any funding agencies.

AVAILABILITY OF DATA AND MATERIAL

The specimens listed in this study are deposited in the authors' personal collection. All distribution data produced in this study are also available in the [supplementary material](#) file.

ETHICS APPROVAL AND CONSENT TO PARTICIPATE

This study only included arthropod material, and all required ethical guidelines for the treatment and use of animals were strictly adhered to in accordance with international, national, and institutional regulations. No human participants were involved in any studies conducted by the authors for this article.

CONSENT FOR PUBLICATION

Not applicable.

CONFLICT OF INTERESTS

The authors declare that there is no conflict of interest regarding the publication of this paper.

GENERATIVE AI STATEMENT

No generative AI tools were used in the preparation of this paper.

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هفت گونه در هفت روز: یافته‌های جدید از تنوع مورچه‌ها (Hymenoptera, Formicidae) در لبنان

انریکو سکیفانی^۱، مارک مساعد^۲

^۱ موسسه زیست‌شناسی تکاملی، دانشگاه پومپه‌فابرا، بارسلونا، اسپانیا
^۲ دانشکده علوم کشاورزی، غذایی و جنگل، دانشگاه پارمو، پارمو، ایتالیا

نویسندگان مسئول: انریکو سکیفانی، مارک مساعد | enrico.schifani@protonmail.com; mark.massaad@unipa.it

چکیده: لبنان یکی از مناطق با تنوع زیستی غنی در منطقه مدیترانه‌ای در نظر گرفته می‌شود. آخرین فهرست مورچه‌های این کشور، شامل ۱۱۰ تاکسون، در سال ۲۰۱۴ منتشر شد. در این مقاله، هفت گونه به فهرست مورچه‌های لبنان افزوده می‌شود، که متعلق به پنج جنس از زیرخانواده‌های Formicinae، Myrmicinae و Ponerinae هستند. چهار گونه شامل *Lasius israelicus* Seifert, 2020، *Lasius illyricus* Zimmermann, 1935، *Hypoponera eduardi* (Forel, 1894) و *Pheidole indica* Mayr, 1879 و سه گونه *Trichomyrmex perplexus* (Radchenko, 1997) بومی، و *Tetramorium bicarinatum* (Nylander, 1846) و *parva* Mayr, 1865 غیر بومی محسوب می‌شوند. ثبت حضور گونه *L. illyricus* نمایانگر اولین گزارش آن در سرزمین شام است، در حالی که گونه به‌تازگی توصیف شده *L. israelicus*، نسبت به آنچه نام رسمی آن نشان می‌دهد، انتشار بسیار وسیع‌تری در منطقه دارد. هیچ‌یک از گونه‌های غیر بومی به عنوان گونه‌های مهاجم در نظر گرفته نمی‌شوند. یافته‌های جدید، که با حجم نمونه‌برداری نسبتاً محدود در طول هفت روز به دست آمده‌اند، نشان‌دهنده ضرورت مطالعات بیشتر برای توصیف تنوع مورچه‌ها در کشور لبنان هستند.

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واژگان کلیدی: شرق مدیترانه، انتشار مورچه‌ها، *Trichomyrmex*، *Tetramorium*، *Pheidole*، *Lasius*، *Hypoponera*