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A PRELIMINARY SYNOPSIS OF THE ANT FAUNA (HYMENOPTERA: FORMICIDAE) OF QATAR WITH REMARKS ON THE ZOOGEOGRAPHY

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Abstract.— The ant fauna of the State of Qatar is reviewed based on collected material and literature. In total, 23 species, belonging to 12 genera and four subfamilies, were reported from the country. Given that *Messor arenarius diabolus* Santschi, 1938 is endemic in Egypt, and it was recorded by mistake in Qatar, we excluded it from the country faunal list. Six genera are recorded for the first time from the country, *Cardiocondyla* Emery, 1896, *Crematogaster* Lund, 1831, *Lepisiota* Santschi, 1926, *Monomorium* Mayr, 1855, *Paratrechina* Motschoulsky, 1863, and *Pheidole* Westwood, 1839. Fourteen species are recorded for the first time from Qatar, namely, *Camponotus oasium* Forel, 1890, *Cardiocondyla emeryi* Forel, 1881, *Cataglyphis livida* (André, 1881), *Cataglyphis arenaria* Finzi, 1940, *Cataglyphis nigra* (André, 1881), *Lepisiota bipartita* (Smith, 1861), *Lepisiota gracilicornis* (Forel, 1892), *Monomorium abeillei* André, 1881, *Monomorium areniphilum* Santschi, 1911, *Monomorium subopacum* (Smith, 1858), *Monomorium venustum* (Smith, 1858), *Pheidole sinaitica* Mayr, 1862. *Tapinoma melanocephalum* (Fabricius, 1793), and *Tapinoma simrothi* Krausse, 1911. Preliminary analysis of the zoogeography of Qatar's ants reveals the remarkable predominance of Palearctic faunal elements (13 species/ ~57%), followed by minor proportions of Afrotropical (4 species/ ~17%) and Indomalayan (1 species/ ~4%) species, while the five invasive species (~22%) reflect human impacts on the country. *Monomorium tumaire* Collingwood & Agosti, 1996 is known as endemic in the Arabian Peninsula. No species are considered endemic to Qatar. Ecological and biological notes on species are provided when available.

Key words.— Arabian Peninsula, Biodiversity, Middle East, Qatar, invasive, faunal list, new records, Palaearctic region

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Introduction

The State of Qatar is a small and peninsular country located in southwest Asia on the northeastern coast of the Arabian Peninsula. This Middle Eastern nation lies between 25°30'N and 51°15'E, covers an area of about 11,586 km^2, and features 900 km of coastline (CIAWF 2020). Qatar is bordered solely by the Kingdom of Saudi Arabia (KSA) to the south, while the rest of its terrain protrudes 160 km (100 mi) into the Arabian Gulf. Qatar is separated from nearby Bahrain by the Gulf of Bahrain, an inlet of the Arabian Gulf. The land features constitute mostly flat and rocky barren desert with sand dunes in the south. Qatar ranges in elevation from 0 m (Arabian Gulf) to 103 m (Tuwayyir al Hamir, in the south). Its climate is arid, with very mild winters and very hot summer, the average temperature ranges from 14°C in January to 43°C in July. The precipitation averages about 81 mm per year (Richer 2008) and occurs during the winter months.

However, its combination of high temperatures, low rainfall, low soil nutrient availability, and strong winds of the Arabian Peninsula mean that terrestrial ecosystems in the region recover only slowly from disturbance. Hence, Qatar's habitats are among the most fragile environments on earth (Brook *et al.* 2006). Qatar's terrestrial biodiversity includes ca. 1955 known species, but these lack sufficient data regarding their habitats, population estimates, and species distribution (Kamel 2008, Richer 2008). This lack of knowledge limits conservation efforts in Qatar. While some forms of environmental degradation can be remediated, biodiversity loss is considered irreversible (Michalski *et al.* 2010).

About 250 species of Formicidae belonging to 38 genera and 7 subfamilies are known from the Arabian Peninsula, a region including Kuwait, Oman, KSA, United Arab Emirates (UAE), Yemen, and adjacent islands (Tigar and Collingwood 1993, Collingwood and Agosti 1996, Collingwood *et al.* 1997, Collingwood *et al.* 2011, Sharaf *et al.* 2013, 2014, 2015, 2016 a, b, 2017, 2018, 2019, 2020 a, b, c) and more than 250 from Iran (Khalili-Moghadam *et al.* 2019). However, the ant fauna of Qatar is rather poorly studied and knowledge is based on fragmentary records scattered throughout scarce available literature. This include the following records; *Camponotus aegyptiacus* Emery, 1915; *C. xerxes* Forel, 1904; *Cataglyphis savignyi* (Dufour, 1862); *Messor* sp.; *Monomorium salomonis* (Linnaeus, 1758); *Tapinioma* sp.; *Tetramorium* sp. (Abdel-Dayem 2007); and *Messor arenarius diabolus* Santschi, 1938 (misidentified as *Camponotus arenarius* var. *diabolus*) (Abdu and Shaumar 1985); *Cataglyphis nigra* (André, 1881), *Monomorium pharaonis* (Linnaeus, 1758) (Abushama 1997, 1999); *Monomorium tumaire* Collingwood and Agosti, 1996 (Lush 2009).

The material studied herein was collected more than 15 years ago by the second author. During that long period, little significant additional or published material from Qatar has been reported. The handful of species records scattered in recent literature include *Crematogaster antaris* Forel, 1894 (Sharaf *et al.* 2019), *Strumigenys membranifera* Emery, 1869 (Sharaf *et al.* 2015), and *Trichomyrmex mayri* (Forel, 1902) (Sharaf *et al.* 2016 b), in addition to *Brachyponera sennaarensis* (Mayr, 1862) (Wetterer 2013, Bertelsmeier *et al.* 2017), bringing the total number of ant species known from this country to 13. Therefore, Qatar, in addition to Bahrain and Kuwait, represent gaps in our knowledge of the ants of the Arabian Peninsula and on the global ant map as well. These omissions make it difficult to complete the ongoing study of the diversity and zoogeography of ants in the Arabian Peninsula.

Additional invasive ants are expected to be reported from Qatar due to increased international trade, urbanization, and globalization (Seebens *et al.* 2018). For instance, Collingwood *et al.* (1997) listed 15 introduced ant species in the UAE. Among these are five species recorded for the first time in the Arabian Peninsula, including the widely distributed *Camponotus compressus* (Fabricius, 1787), *Iridomyrmex anceps* (Roger, 1863), *Linepithema humile* (Mayr, 1868), *Solenopsis geminata* (Fabricius, 1804), and *Tetramorium bicarinatum* (Nylander, 1846). Further, Collingwood *et al.* (2011) extensively studied the ant fauna of the UAE reporting few invasive species such as *Anoplolepis gracilipes* (Smith, 1857), *B. sennaarensis*, *L. humile*, and *S. geminata*.

We addressed this gap by investigating additional material collected by the second author from Qatar in 2005. Since the faunal diversity of this country has not been well-sampled in recent years, we wish to carry out an inventory of Qatar's Formicidae as soon as possible. Although representatives of genera such as *Camponotus* and *Cataglyphis* include several larger-sized ants, many more cryptic species probably remain to be discovered.

Below we list all species hitherto known from Qatar. The checklist was compiled based on new material and literature records. Species new to Qatar are listed synoptically. Native and invasive ant species are also denoted.

Material and methods

The studied material was collected by the second author in 2005, while he was working at the Department of Biological and Environmental Science, College of Art and Science, Qatar University, Qatar (2004–2005). The names and zoogeography of the treated

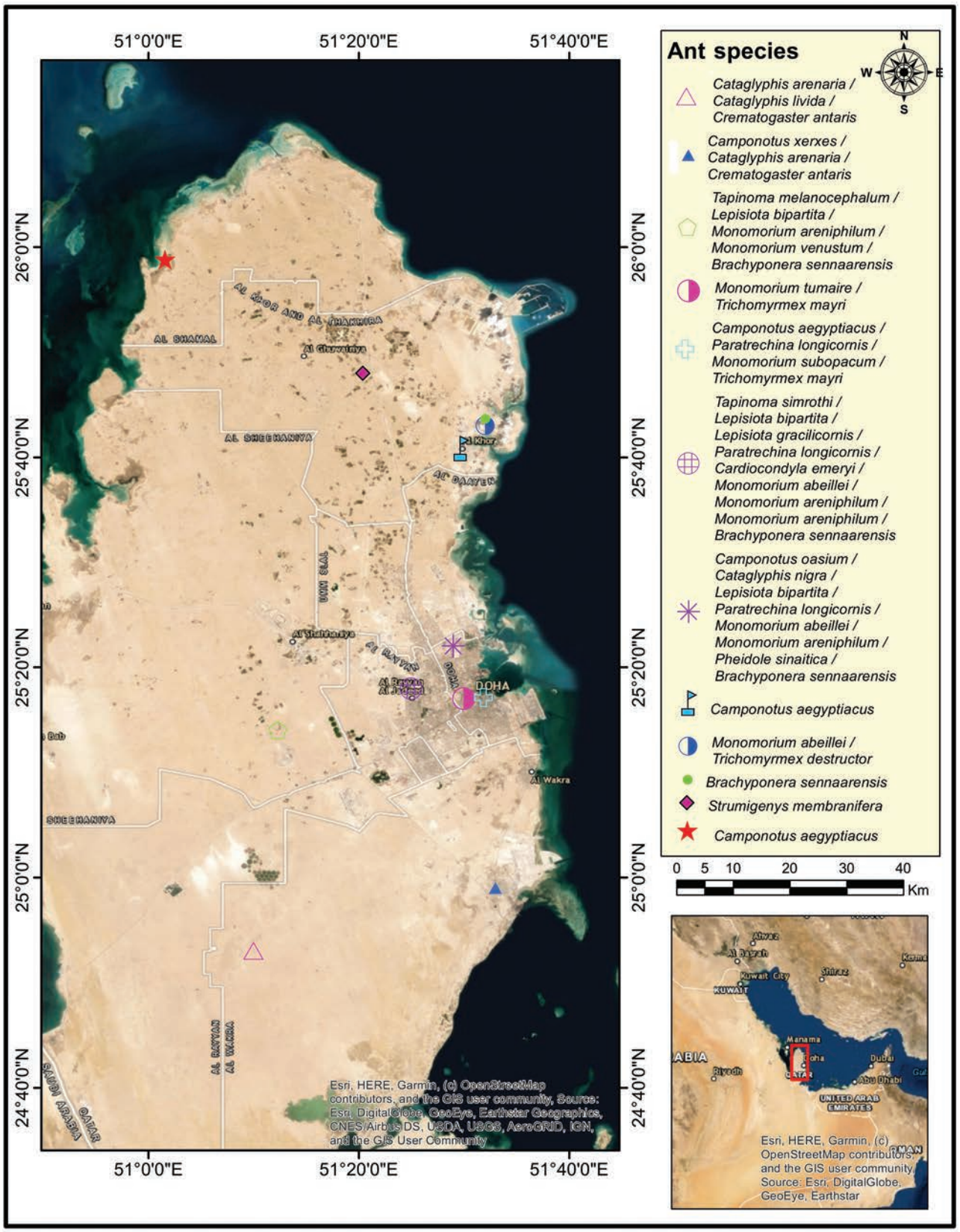

Figure 1. Map of Qatar with sample sites and species distribution.

species follow the online catalogue (Bolton 2020), and identification is carried out using keys from Collingwood (1985), Collingwood and Agosti (1996), Sharaf *et al.* (2014), Sharaf *et al.* (2016 a, b), Sharaf *et al.* (2020 a, b), and studying material from the following museums:

BMNH – The Natural History Museum (British Museum, Natural History), London, U.K.;
CASC – California Academy of Sciences, San Francisco, California, U.S.A.;
KSMA – King Saud University Museum of Arthropods, Plant Protection Department, College of Food and Agriculture Sciences, King Saud University, Riyadh, Kingdom of Saudi Arabia;
NHMB – the Naturhistorisches Museum, Basel, Switzerland;
OUMC – Oxford University Museum, Oxford, U.K.;
WMLC – World Museum Liverpool, Liverpool, U.K.

Museum abbreviations listed below follow Brandão (2000), Evenhuis (2020).

The distribution map of the encountered species was developed with ArcGis v10.3 (Fig. 1). Digital color images of the profile, dorsal views of the entire body, and full-face views of the head of each species were created using a Leica DFC450 digital camera with a Leica Z16 APO microscope and LAS (v3.8) software. Images of the studied species are available online on AntWeb (https://www.antweb.org/) and accessible through unique specimen identifiers attached to each pin (e.g., CASENT0922868). Subfamilies, genera, and species are arranged in alphabetical order with diagnoses, material examined, geographic distribution and ecological and biological information when available. Measurements and indices of *Lepisiota* species follow standards of Sharaf *et al*. 2020a. Type material in the following museums were examined for species confirmation.

Results

Subfamily **Dolichoderinae**

Genus ***Tapinoma*** Foerster, 1850

Tapinoma melanocephalum (Fabricius, 1793)
(Fig. 2 A–C)

Formica melanocephala Fabricius, 1793: 353 (w.) French Guiana. Neotropical.

Diagnosis. **Worker.** This species is easily recognized among the members of the genus by its small size (1.20–1.90 mm) and bicolored body. Head and mesosoma brown to dark brown, antennae, maxillary palps and mandibles pale brown to yellow, gaster and legs pale yellow; prothorax laterally compressed, broadening anteriorly; mesosoma without erect hairs.

Material examined. Qatar, Rawdet Rashed, 12.iii.2005, (M.S. Abdel-Dayem leg.), 25°14.006'N, 51°12.286'E, 1 w, (KSMA).

Geographic distribution. This successful invasive species has a remarkable worldwide spread (Wetterer 2009). On the Arabian Peninsula it was collected from KSA and Oman (Collingwood 1985), Yemen (Colling-

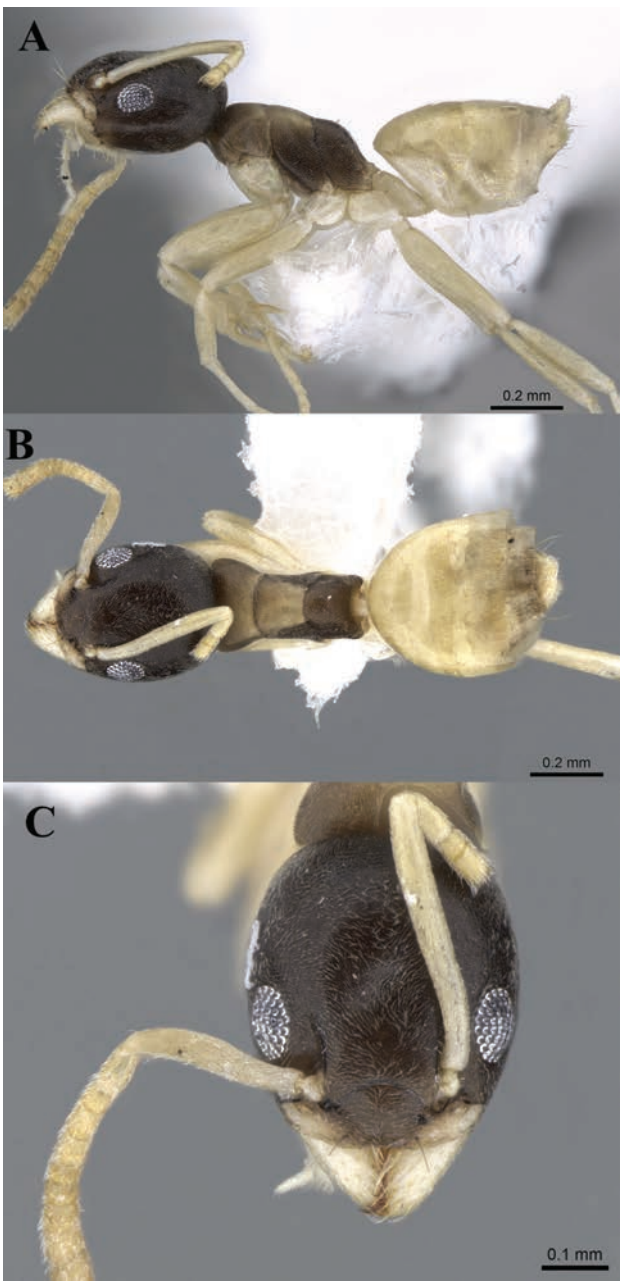

Figure 2. *Tapinoma melanocephalum*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0746621 (Zach Lieberman), www.AntWeb.org.

wood and Agosti 1996) including the Socotra Archipelago (Sharaf *et al*. 2017), and UAE (Collingwood *et al*. 1997). The present collection represents the first record for Qatar.

***Ecological and biological notes*.** This species has remarkably diverse habitat preferences (Wetterer 2009, Sharaf *et al*. 2017) that range from humid and dry soil of wild vegetation to urban sites rich in organic matter, under bark and stones, in leaf litter, and sometimes nests in walls and potted plants indoors (Ellison *et al*. 2012).

Tapinoma simrothi Krausse, 1911
(Fig. 3 A–C, 4 A–C)

Tapinoma erraticum var. *simrothi* Krausse, 1911: 18 (w.) Italy (Sardinia). Palearctic.

***Diagnosis*. Worker.** Anterior clypeal margin with a slit-like median notch; scapes relatively long, when laid back from their insertions surpass posterior margin of head by about one third of scape length; funicular segments at least twice as long as broad; body surfaces covered with dense appressed pubescence; body color uniformly dark brown to black with legs including tarsi uniformly brownish.

***Material examined*.** Qatar, Doha, Al-Rayyan, 12.iii.2005, (M.S. Abdel-Dayem leg.), 8w, (KSMA).

***Geographic distribution*.** A Palearctic species, distributed across northern and southern Mediterranean Basin (Sharaf 2006) and eastwards to most of Arabian Peninsula (Collingwood 1985, Collingwood and Agosti 1996, Collingwood *et al*. 1997), Iran and Afghanistan. This material represents the first record for Qatar.

***Ecological and biological notes*.** *Tapinoma simrothi* was observed in Riyadh Province (KSA) nesting among roots of graminae plants, attending unidentified mealybugs under a discarded carpet, and coexisting with *Solenopsis abdita* Thompson, 1989 (Senior synonym of *S. saudiensis* Sharaf and Aldawood, 2011 (Sharaf *et al*. 2020 c)). The species is also known to attend aphids, protecting these insects from predators (Karami-jamour *et al*. 2018).

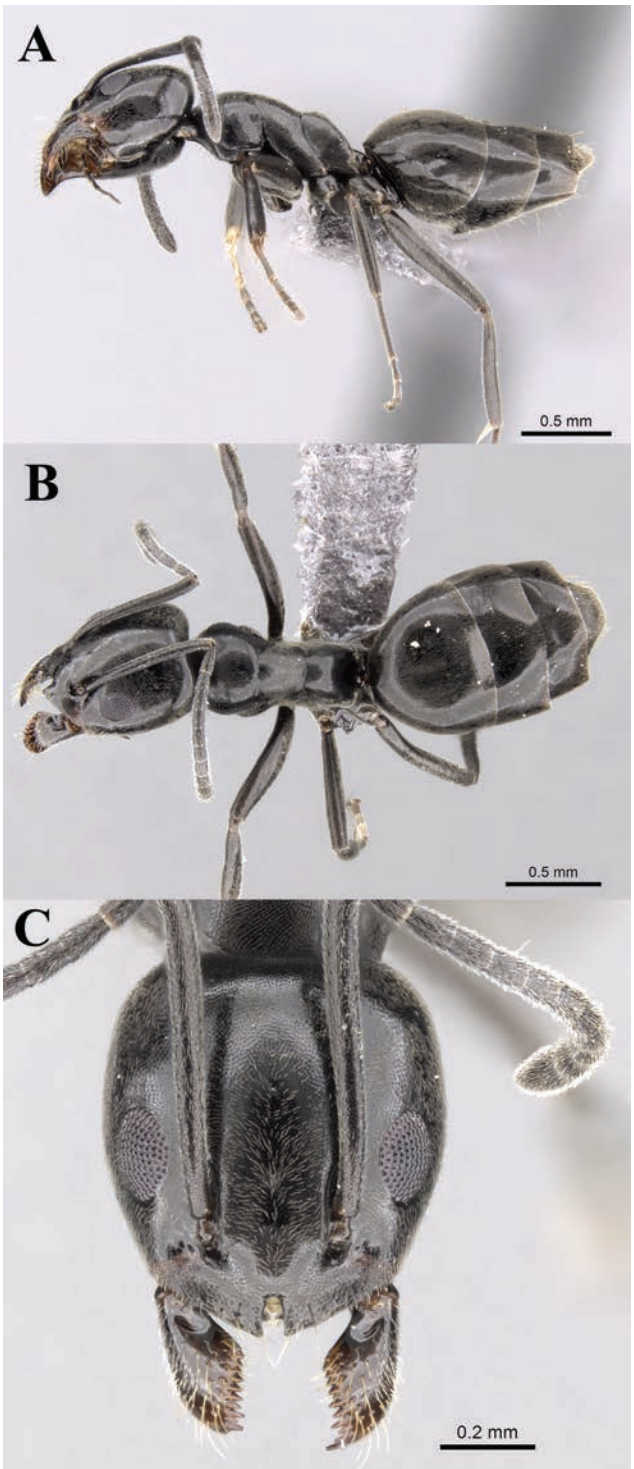

Figure 3. *Tapinoma simrothi*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0263927 (Estella Ortega), www.AntWeb.org.

Subfamily **Formicinae**

Genus ***Camponotus*** Mayr, 1861

Camponotus aegyptiacus Emery, 1915
(Fig. 5 A–C)

Camponotus maculatus subsp. *aegyptiacus* Emery, 1915: 79 (w.) Egypt. Palearctic.

***Diagnosis*. Worker.** Like many species of the genus, *C. aegyptiacus* is a strongly polymorphic species; small workers are clear yellow; large workers are dark brown to black-brown. The species can be

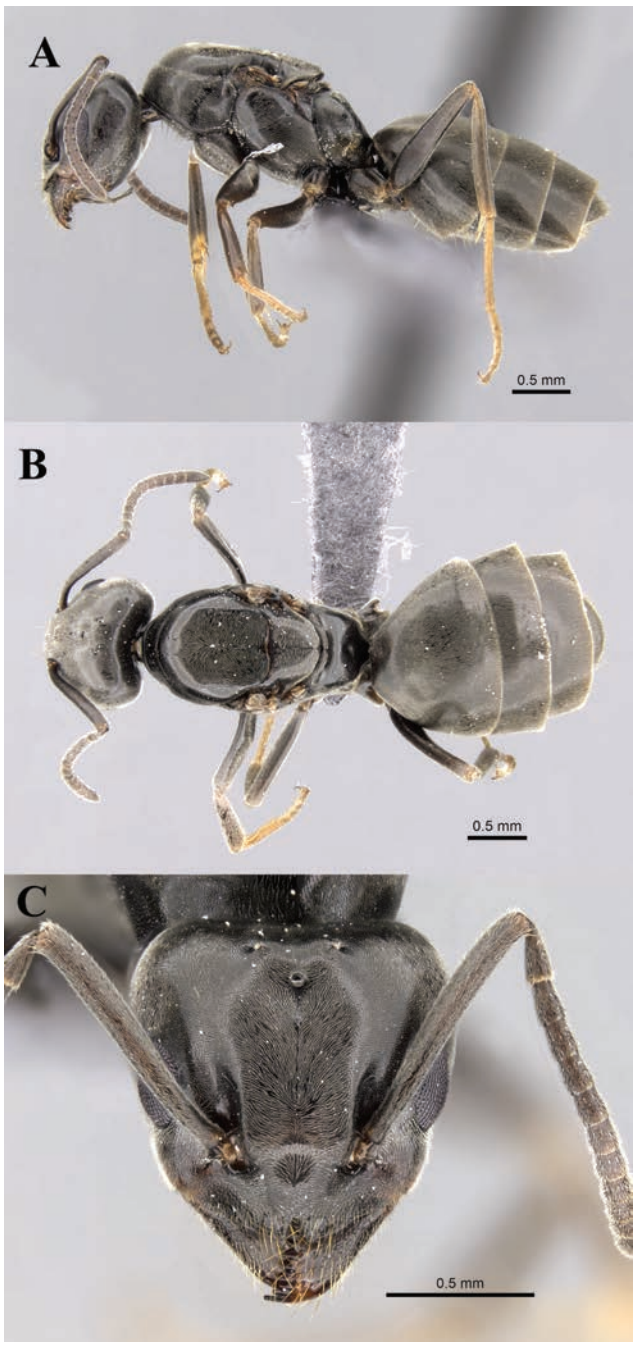

Figure 4. *Tapinoma simrothi*, queen, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0263646 (Estella Ortega), www.AntWeb.org.

separated from other Arabian species and specifically from its congener *C. maculatus* (Fabricius, 1782) by the presence of three yellow blotches on each side of the gaster that merge laterally; underside of head with few gular setae (6–10), whereas *C. maculatus* has two to three discretegastral blotches on each side and underside of head with numerous setae (more than 10).

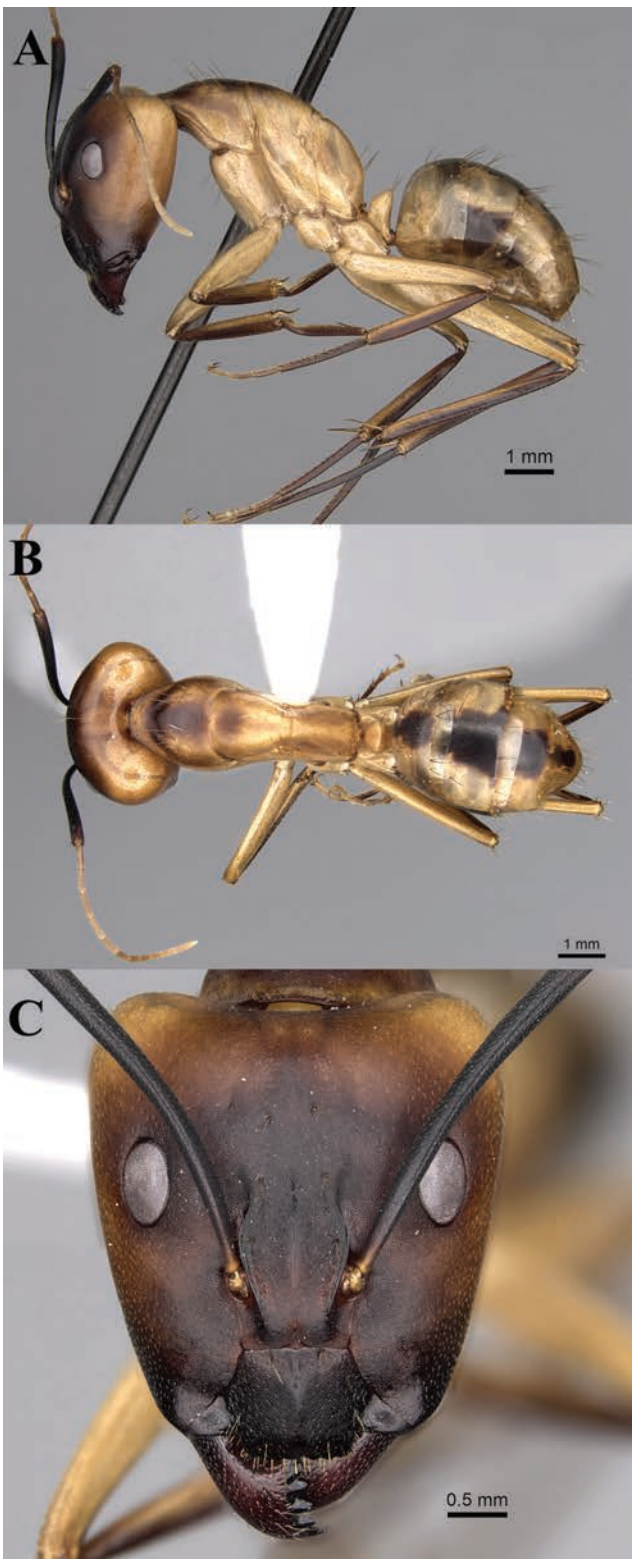

Figure 5. *Camponotus aegyptiacus*, large worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0280281 (Ryan Perry), www.AntWeb.org.

Previous records. Doha, 25°17.124'N, 51°31.86'E, 05.x.1982, 8 w; Doha, 25°17.124'N, 51°31.86'E, 03.iv. 1983, 6 w; Al Zubarah, 25°58.794'N, 51°1.602'E, 11.iii. 1984, 15 w; Al Khor, 25°40.824'N, 51°29.814'E, 02.iv. 1985, 7 w, (Abdo and Shaumer 1985).

Geographic distribution. This species was originally described from Egypt and is known from West, East and Northeast Africa (Sharaf 2006) and the Arabian Peninsula, including KSA, Kuwait, Oman, Yemen (Collingwood and Agosti 1996), and Qatar (Abdo and Shaumer 1985, Abdel-Dayem 2007).

Ecological and biological notes. This species is omnivorous (Sharaf 2006), frequently foraging at night (Collingwood 1985).

Camponotus oasium Forel, 1890
(Fig. 6 A–C)

Camponotus rubripes r. *oasium* Forel, 1890: lxv (s.w.q.) Algeria. Palearctic.

Diagnosis. **Worker.** Underside of head with one or two setae; mesosomal dorsum with about ten erect setae; dorsum of petiole steeply rounded; first gaster tergite with basal two thirds testaceous; large workers with head, mesosoma, and dorsum dark brown to black, head brown, lower half of mesosoma usually yellow and distinctly paler than mesosomal dorsum, gaster and appendages yellow; small workers uniform yellow with end of gaster brown.

Material examined. Qatar, Doha, Al-Dohuil, 14.iii.2005, 25°22'N, 51°29'E, (M.S. Abdel-Dayem leg.), 4w (KSMA).

Geographic distribution. A species described from Algeria and distributed in the west Africa (Benin, Mali, Niger, Senegal), Horn of Africa (Ethiopia), and North Africa [Algeria, Egypt (Sharaf 2006)]; eastwardly from Arabian Peninsula to Afghanistan and north to Turkey (Karaman and Aktaç 2013) and Central Asia [Kazakhstan, Turkmenistan (Radchenko 1997a)]. In the Arabian Peninsula, it is recorded from the UAE (Collingwood *et al.* 2011), KSA, Oman (Collingwood 1985). It is recorded for the first time from Qatar.

Ecological and biological notes. This species was collected from a tamarisk tree, *Tamarix nilotica* (Ehrenb.) Bunge, in the Nile Delta (Egypt) and was observed attending the membracids (Sharaf 2006).

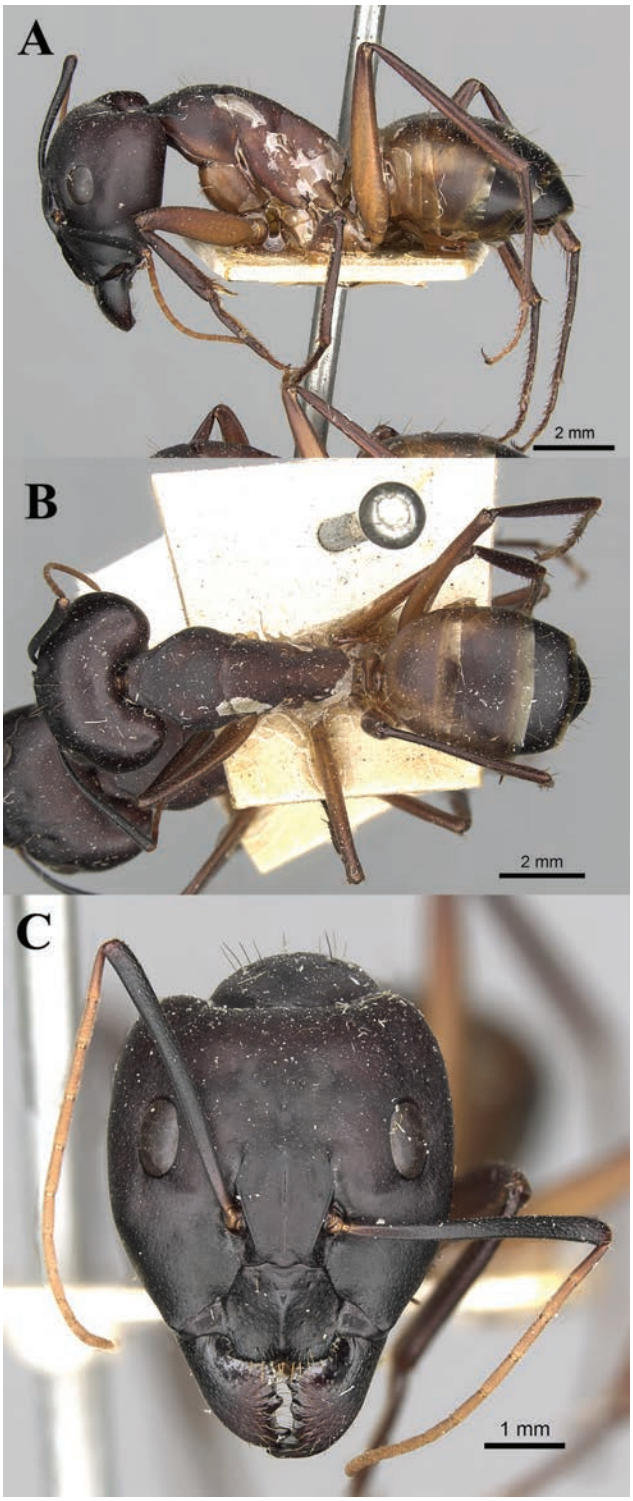

Figure 6. *Camponotus oasium*, large worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0249629 (Shannon Hartman), www.AntWeb.org.

Camponotus xerxes Forel, 1904
(Fig. 7 A–C)

Camponotus maculatus r. *xerxes* Forel, 1904g: 424 (w.q.) Iran. Palearctic.

Diagnosis. **Worker.** A species with a high degree of polymorphism (Collingwood 1985, Collingwood and Agosti 1996, Sharaf *et al.* 2013). Large workers entirely dark brown to black except for the paler legs;

propodeum unicolorous dark with rest of mesosoma; underside of head without setae. *Camponotus xerxes* is closely related to *C. fellah* Emery, 1908 but can be distinguished by the absence of erect setae on the underside of head, whereas *C. fellah* has 1–10 setae (Ionescu-Hirsch, 2009).

Material examined. Qatar, Msaid Road, 09.iv.2005, 24°59'N, 51°33'E, (M.S. Abdel-Dayem leg.) 7w, (KSMA).

Geographic distribution. A Palearctic species originally described from Iran and widely spread in several countries in the Arabian Peninsula including the KSA (Collingwood 1985), Kuwait, Oman, UAE (Collingwood and Agosti 1996), Qatar (Abdel-Dayem 2007), Syria (Tohmé and Tohmé 2000), North Africa (Sharaf 2006), Turkey (Karaman and Aktaç 2013), and central Asia: Turkmenistan and Uzbekistan (Radchenko 1997 a).

Ecological and biological notes. The seasonal foraging activity of this species stretches from March to October with a peak in September (Sharaf *et al*. 2013), where workers frequently forage on the milkweed tree, *Calotropis procera* (Aiton) W. T. Aiton (Apocynaceae). Collingwood (1985) mentioned that the species start foraging in the early evening in the KSA.

Genus ***Cataglyphis*** Foerster, 1850

Cataglyphis arenaria Finzi, 1940
(Fig. 8 A–C)

Cataglyphis (*Cataglyphis*) *albicans* var. *arenaria* Finzi, 1940: 164 (w.) Algeria. Palearctic.

***Diagnosis*. Worker.** Head, mesosoma, and petiole yellow, gaster golden yellow, and apex of terminal gastral tergites brown, in some individuals the body is uniform yellow; propodeum distinctly low in profile; petiole a truncated node with a flat dorsal surface sloping forward in profile; mesosoma covered with dense, whitish, appressed pubescence.

Material examined. Qatar, Msaid Road, 09.iv.2005, 24°59'N, 51°33'E, (M.S. Abdel-Dayem leg.) (1w); Al Kharara-Seleiyn Road, 09.iv.2005, 24°53'N, 51°10'E, (M.S. Abdel-Dayem leg.), 2w, (KSMA).

Geographic distribution. A Palearctic species originally described from Algeria and is known from Jordan (Borowiec and Sałata 2020) KSA, Oman (Collingwood and Agosti 1996), UAE (Collingwood *et al*. 2011), and Egypt (Sharaf 2006). This species is recorded for the first time from Qatar.

Cataglyphis livida (André, 1881)
(Fig. 9 A–C)

Myrmecocystus albicans var. *lividus* André, 1881a: 58 (w.) Palestine. Palearctic.

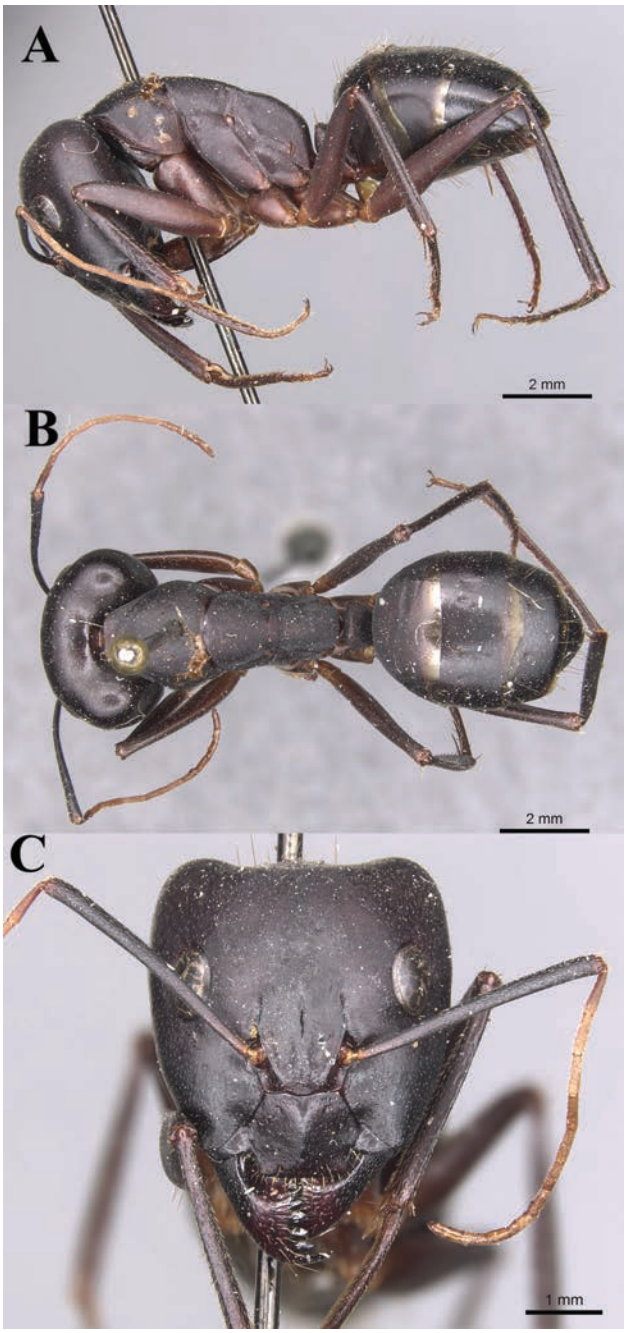

Figure 7. *Camponotus xerxes*, large worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0905292 (Will Ericson), www.AntWeb.org.

***Diagnosis.* Worker.** Body uniformly yellow, gaster usually darker; posterior margin of head with about three pairs of setae; propodeum and petiole with few erect setae; sides of mesonotum and propodeum with appressed silvery pubescence; cephalic surface superficially sculptured.

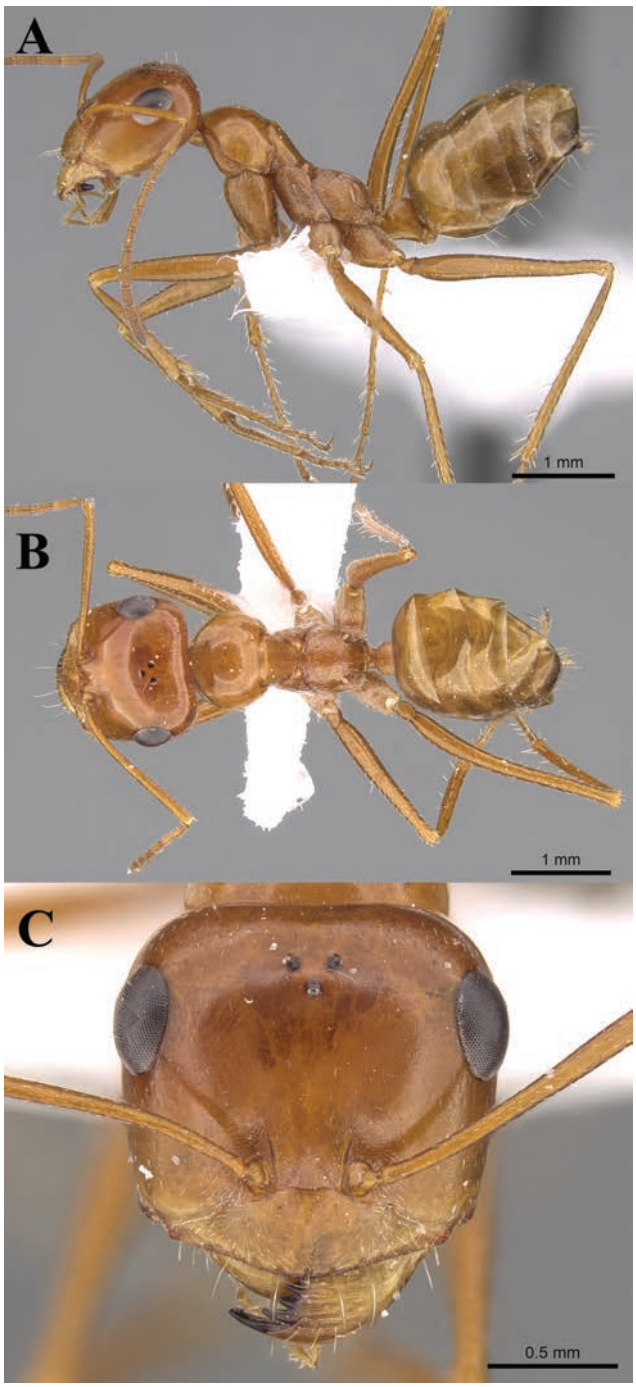

Figure 8. *Cataglyphis arenaria*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0906455 (Cerise Chen), www.AntWeb.org.

Material examined. Al Kharara-Seleiyn Road, 09.iv.2005, 24°53'N, 51°10'E, (M.S. Abdel-Dayem leg.), 2w, (KSMA).

Geographic distribution. *Cataglyphis livida* occupies a broad geographic range through the Palearctic region ranging from Algeria and Egypt to Afghanistan (Radchenko, 1997 b); and extends north into Turkey and Bulgaria. It also has been reported from most countries of the Arabian Peninsula (Collingwood 1985, Tigar and Collingwood 1993, Collingwood

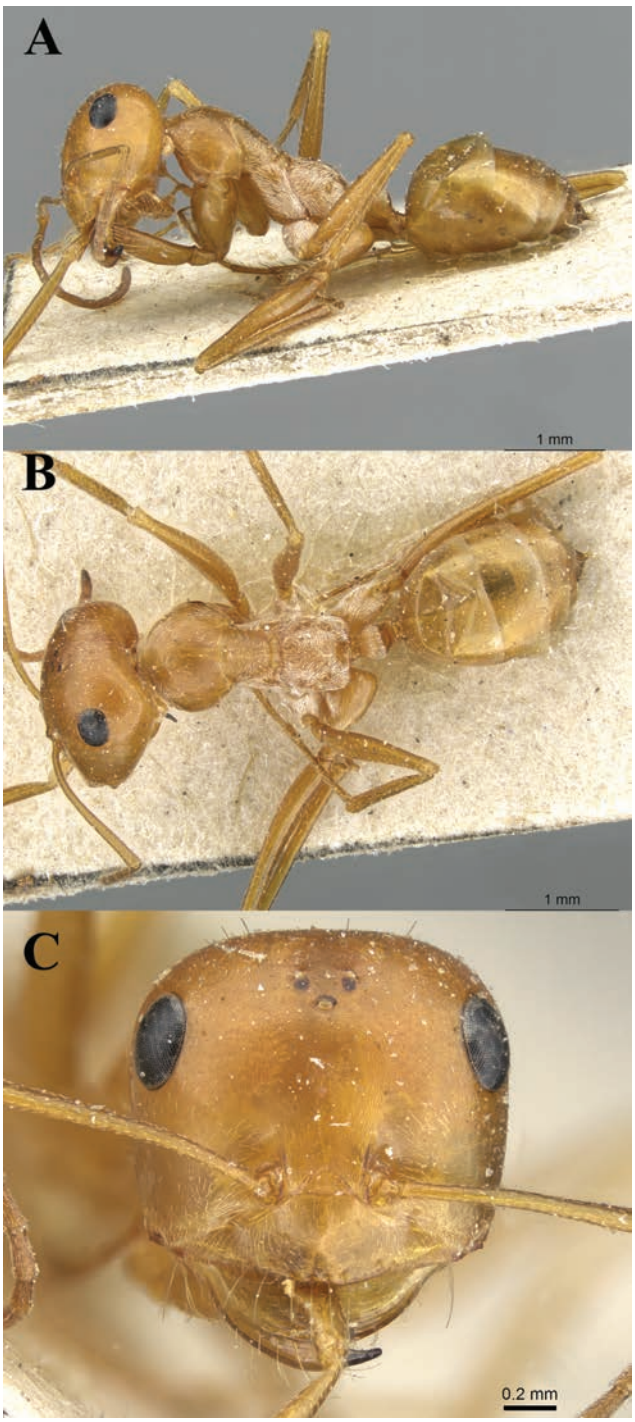

Figure 9. *Cataglyphis livida*, syntype worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0911099 (Zach Lieberman), www.AntWeb.org.

and Agosti 1996, Tigar and Osborne 1999, Collingwood *et al.* 2011).

Ecological and biological notes. *Cataglyphis livida* is a common species at nature reserves in Riyadh Province (e.g. Rawdhat Khorim) where the population peaks in spring and in June (Sharaf *et al.* 2013). This species was found to be abundant foraging on *Acacia gerrardii* Benth. (Fabaceae). This species is recorded for the first time from Qatar.

Cataglyphis nigra (André, 1881)
(Fig. 10 A–C)

Myrmecocystus viaticus var. *niger* André, 1881a: 56 (w.) Palestine. Palearctic.

Diagnosis. **Worker.** Uniform black; head usually red-black; first funiculus segment nearly 2× as long as second; propodeum high in profile with dorsum rounding evenly into its descending face; petiole a thick node, about as high as long in profile; cephalic surface densely superficially sculptured.

Material examined. Doha, Al-Dohuil, 14.iii.2005, 25°22'N, 51°29'E, (M.S. Abdel-Dayem leg.), 2w (KSMA)

Geographic distribution. *Cataglyphis nigra* is a Palearctic species originally described from Palestine and is broadly distributed in the Arabian Peninsula inclding KSA, Kuwait, Oman, Yemen (Collingwood 1985), UAE (Walker and Pittaway 1987, Collingwood *et al.* 2011), and some countries in the Middle East including Syria (Santschi 1929), Israel (Ionescu and Eyer 2016), North Africa, from Algeria eastwardly to Egypt (Sharaf 2006, Borowiec and Salata 2020). The distribution map presented by Walker and Pittaway (1987) shows a geographic range extending eastward and including Qatar without any details about the record. Therefore, we consider our record to be the first confirmed collection of the species from the country.

Ecological and biological notes. This species is abundant in most countries of the Arabian Peninsula (Collingwood 1985, Collingwood and Agosti 1996), with a seasonal peak in June that then decreases in cooler months (Sharaf *et al.* 2013). In Rawdhat Khorim (Riyadh Province, KSA), *C. nigra* was found foraging next to the following plants: *Acacia gerrardii*, Benth. (Fabaceae), *Calotropis procera* (Aiton) W. T. Aiton (Apocynaceae), *Rhazya stricta* Decne (Apocynaceae) and *Ziziphus nummularia* (Burm. f) Wight & Arn. (Rhamnaceae) (Sharaf *et al.* 2013). Pashaei Rad *et al.* (2018) mentioned its habitat preference in Iran includes moderate and low rainfall.

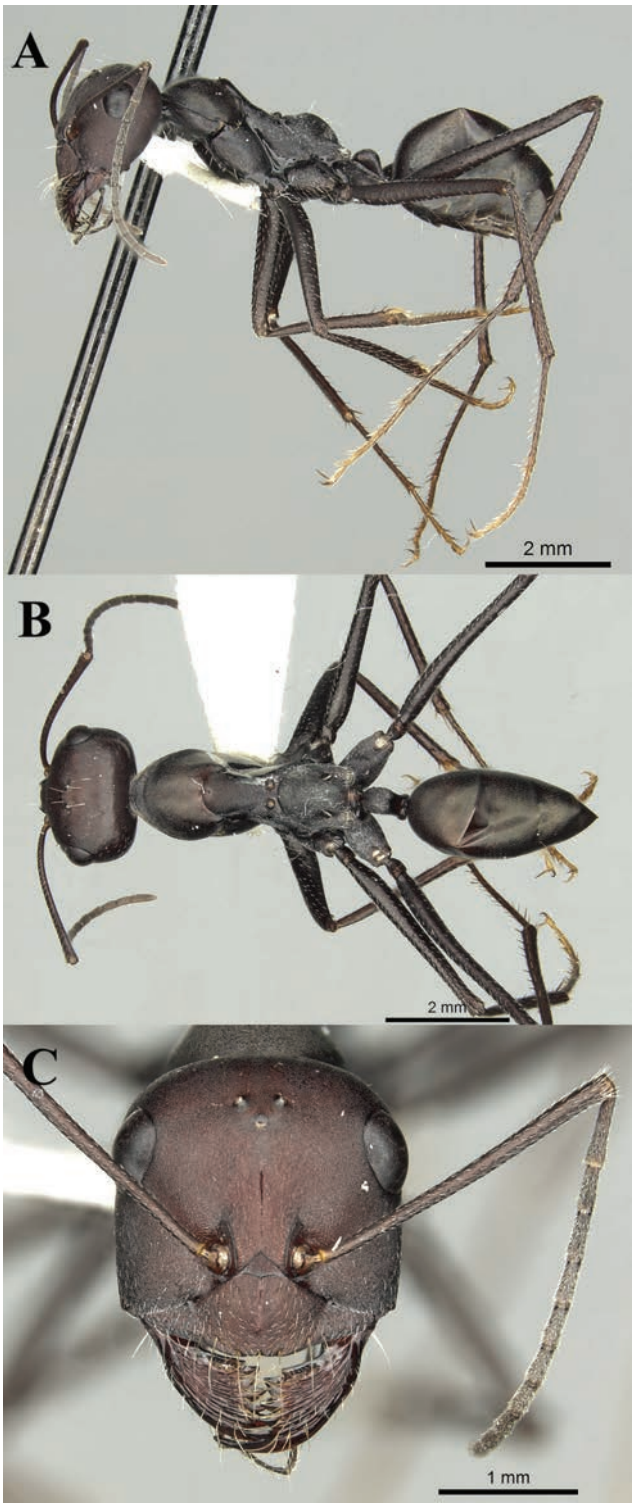

Figure 10. *Cataglyphis nigra*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0280330 (Ryan Perry), www.AntWeb.org.

Genus ***Lepisiota*** Santschi, 1926

Lepisiota bipartita (Smith, 1861)
(Fig. 11 A–C)

Formica bipartita Smith, 1861a: 33 (w.) Lebanon. Palearctic.

Diagnosis. **Worker.** Bicolored species with head, mesosoma, petiole, and appendages red, gaster dark brown to black; antennal scape relatively short (SI < 200); petiole narrower, less than 0.30 × HW; body sculpture coarse, general appearance opaque; gaster always with some projecting hairs; body pilosity rare except for a few long setae on anterior clypeal margin, and promesonotum, and sparse appressed pubescence on cephalic dorsum.

Material examined. Qatar, Rawdet Rashed, 12.iii.2005, (M.S. Abdel-Dayem leg.), 25°14.006'N, 51°12.286'E, 12w; Al-Rayyan, 25°18'N, 51°25'E, 15.iii. 2005, (M.S. Abdel-Dayem leg.), 4 w; Al-Dohuil, 15.iii.2005, 25°22'N, 51°29'E, (M.S. Abdel-Dayem leg.), 11w; Al-Dohuil, 8-18.iii.2005; 25°22'N, 51°29'E, (M.S. Abdel-Dayem leg.), 82w (KSMA).

Geographic distribution. The species is distributed across the Palearctic region from Algeria to Levant: Egypt, Israel, Jordan, Lebanon, Syria (Sharaf 2006, Vonshak and Ionescu 2009, Borowiec and Salata 2020); the Arabian Peninsula: KSA, UAE (Collingwood and Agosti 1996, Sharaf *et al*. 2020); and Iran (Paknia *et al*. 2008, Pashaei Rad *et al*. 2018). Its distributional range reaches the Central Asia: Turkmenistan; and Oriental region: India.The studied material represents a new record for Qatar.

Lepisiota gracilicornis (Forel, 1892)
(Fig. 12 A–C)

Acantholepis gracilicornis Forel, 1892: 42 (diagnosis in key) (w.) Yemen. Afrotropic.

Diagnosis. **Worker.** This species is easily diagnosed from other members of the Arabian *Lepisiota* by the distinctly long antennae (SI 175–195) and legs, the smooth and shining body surfaces, and the bare mesosoma.

Material examined. Qatar, Doha, 08.iii.2005, 25°18'N, 51°25'E, (M.S. Abdel–Dayem leg.), 31w; Doha, 02.iv.2005, 25°18'N, 51°25'E, 6 w, 3 q, 6 m, (KSMA).

Geographic distribution. Afrotropical species known from west and east Africa: Senegal, Sudan, Eritrea, Ethiopia; Levant: Egypt, Israel, Jordan (Sharaf 2006, Ionescu and Eyer 2016, Borowiec and Salata 2020); and the Arabian Peninsula: KSA (Collingwood 1985), UAE (Collingwood *et al*. 2011), Oman (Collingwood and Agosti 1996, Sharaf *et al*. 2018), Yemen (Sharaf *et al*. 2020 a). This species is a new record for Qatar.

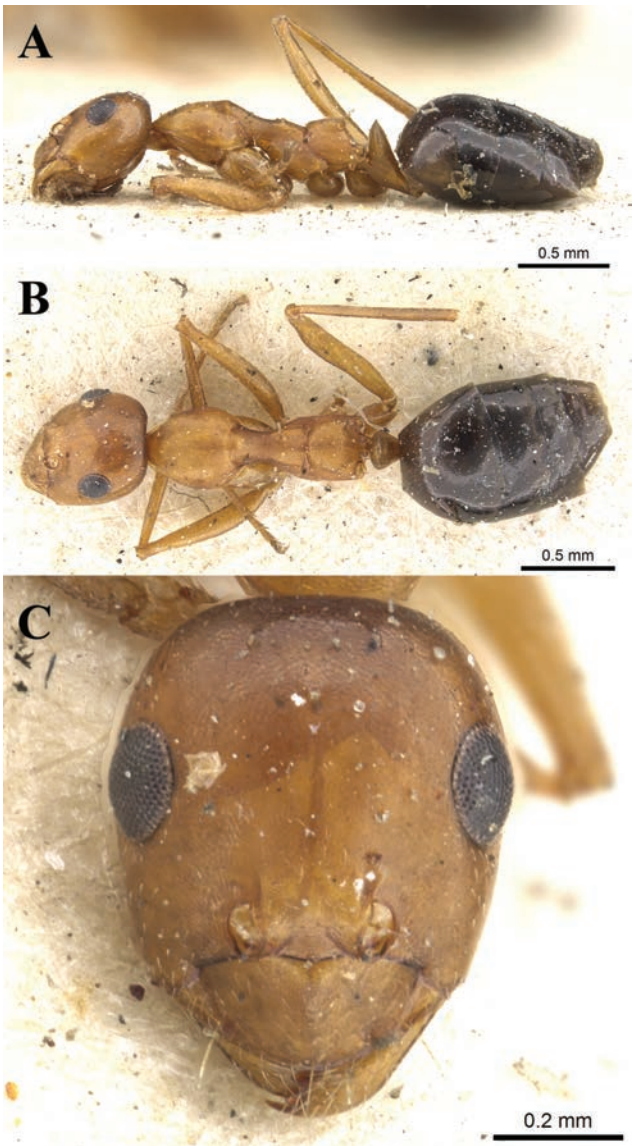

Figure 11. *Lepisiota bipartita*, syntype worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0903167 (Zach Lieberman), www.AntWeb.org.

Paratrechina Motschoulsky, 1863

Paratrechina longicornis (Latreille, 1802)
(Fig. 13 A–C)

Formica longicornis Latreille, 1802: 113 (w.) Senegal. Afrotropic.

Diagnosis. **Worker.** Head, mesosoma, petiole, and gaster dark brown to black-brown; body with faint bluish iridescence; antennae long with 12 segments; scapes exceptionally long, when laid back from their insertions surpassing posterior margin of head by at

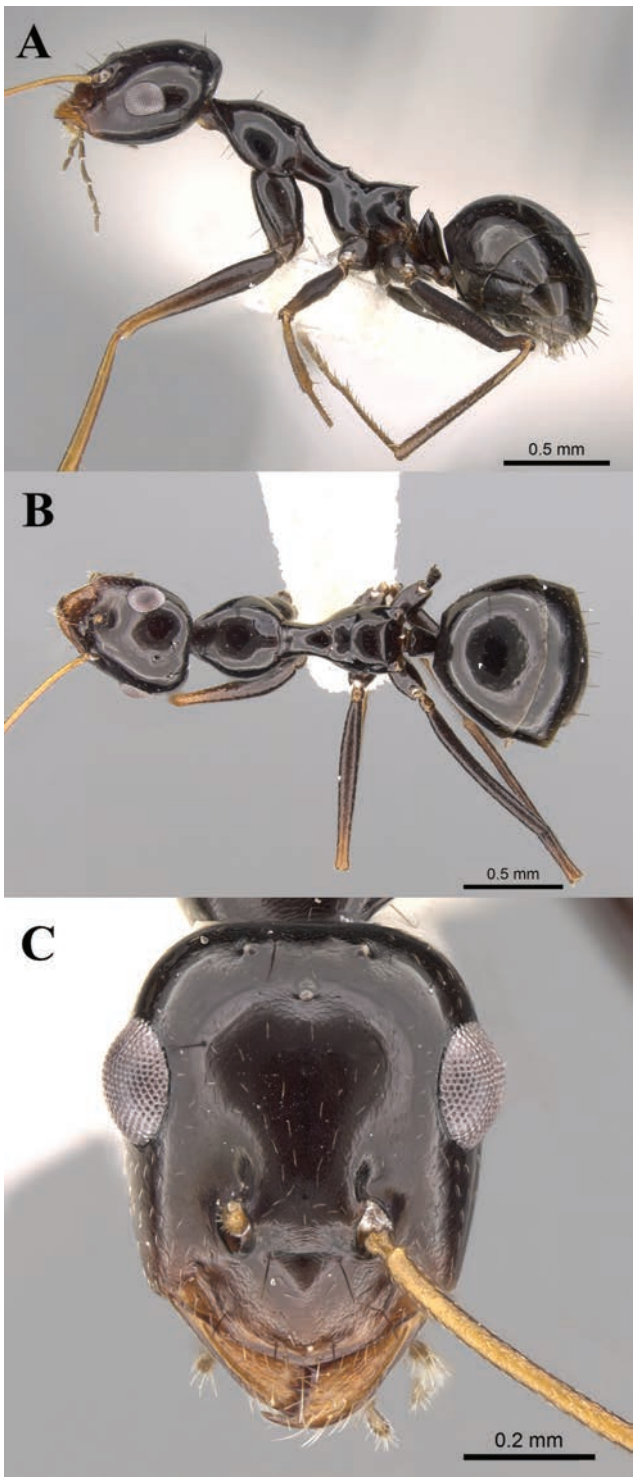

Figure 12. *Lepisiota gracilicornis*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0906458 (Cerise Chen), www.AntWeb.org.

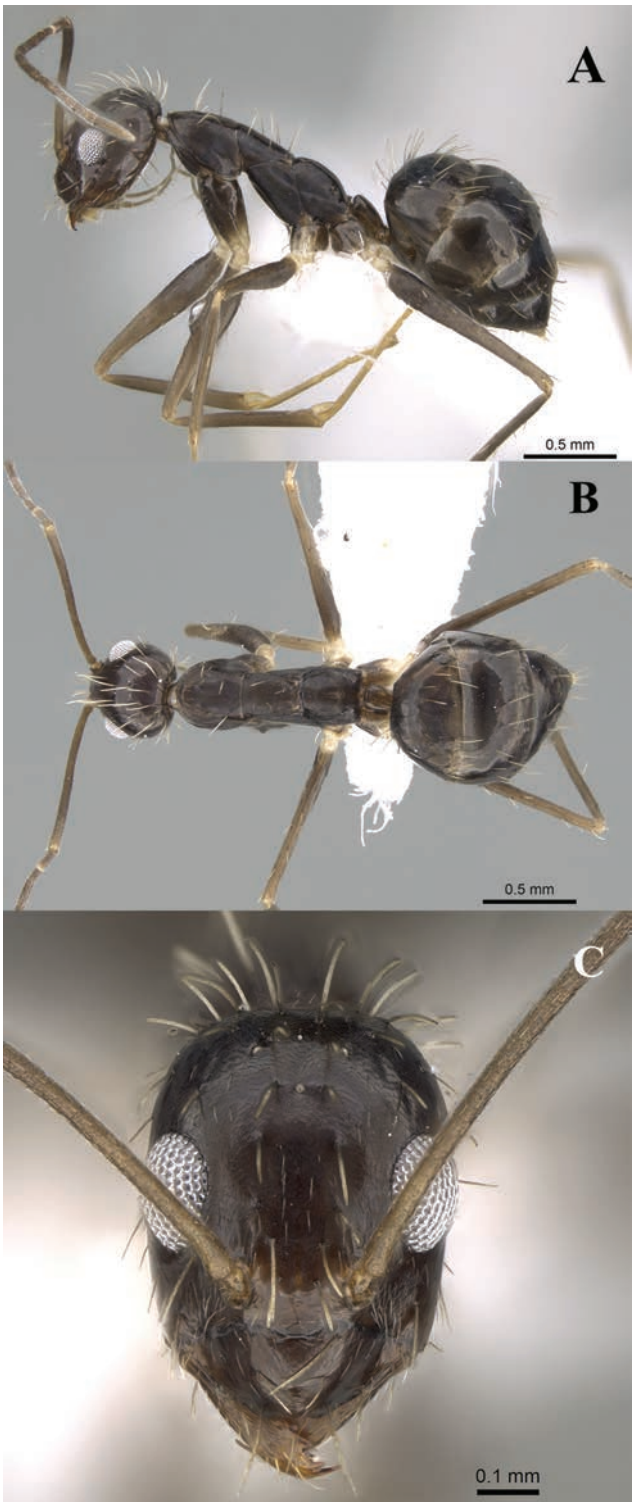

Figure 13. *Paratrechina longicornis*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0919823 (Michele Esposito), www.AntWeb.org.

least one-half its length; eyes close to posterior margin of head; legs exceptionally long; pilosity characteristically long, stout, scattered, suberect to erect, greyish or whitish setae.

Material examined. Qatar, Doha, 25°17.124'N, 51°31.86'E, 08.iii.2005, 34w; Al-Dohuil, 15.iii.2005, 25°22'N, 51°29'E, (M.S. Abdel-Dayem leg.), 5w; Al-Rayyan, 07.iii.2005; 25°18'N, 51°25'E, (M.S. Abdel-Dayem leg.), 37w; Al-Rayyan, 8.iii.2005, 25°18'N, 51°25'E, (M.S. Abdel-Dayem leg.), 3w, (KSMA).

Geographic distribution. A successful tramp species originally described from Senegal and widely spread throughout the tropical and subtropical regions worldwide (Wetterer 2008). In the Arabian Peninsula it was reported from Qatar (Wetterer 2008), the KSA, Oman, Yemen (Collingwood 1985, Collingwood and Agosti 1996, Sharaf *et al.* 2018), and UAE (Collingwood *et al.* 1997). It is also collected from Egypt (Sharaf 2006) and Israel (Vonshak and Ionescu 2009).

Ecological and biological notes. The nesting preference includes both disturbed and wild sites (Sharaf *et al.* 2017). In Socotra Archipelago Sharaf *et al.* (2017) collected it from dry leaf litter in the wild sites. It is a generalized scavenger and also known to attend honeydew-producing Homoptera (Wetterer *et al.* 1999).

Subfamily **Myrmicinae**

Genus ***Cardiocondyla*** Emery, 1869

Cardiocondyla emeryi Forel, 1881
(Fig. 14 A–C)

Cardiocondyla emeryi Forel, 1881: 5 (w.) Virgin Is. Neotropic.

***Diagnosis*. Worker.** Bicolored species with head and mesosoma yellow to brown, or orange-brown; terminal funicular segments always darker than rest of antennae; gaster black-brown to black, strongly contrasting head and mesosoma; antennal scapes of moderate length, when laid back from their insertions fail to reach posterior margin of head; eyes of moderate size with 8–10 ommatidia in longest row; pronotal corners rounded in dorsal view; metanotal groove sharply impressed; propodeal spines relatively short and stout; postpetiole in profile with a ventral bulge projecting anteriorly.

Material examined. Qatar, Al-Rayyan, 08.iii. 2005, 25°18'N, 51°25'E, (M.S. Abdel-Dayem leg.), 3w (KSMA).

Geographic distribution. A successful cosmopolitan tramp species (Bolton 1987, Wetterer 2012). The species was originally described from the Virgin Islands, and reported from most countries of the Arabian Peninsula, including Oman, Yemen (Collingwood and Agosti 1996), KSA (Collingwood 1985), UAE (Collingwood *et al.* 1997), and the Socotra Archipelago (Collingwood *et al.* 2004, Sharaf *et al.* 2017). Our material represents the first record from Qatar.

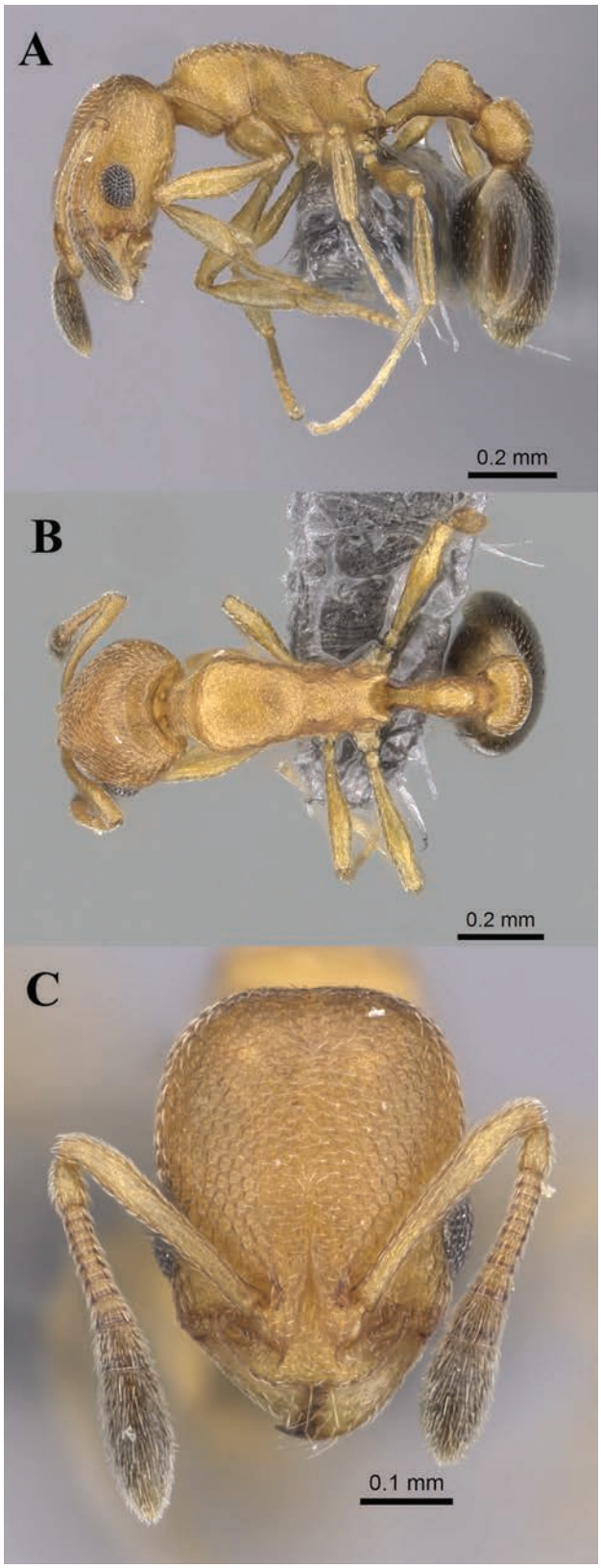

Figure 14. *Cardiocondyla emeryi*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0264222 (Will Ericson), www.AntWeb.org.

Ecological and biological notes. This species has a broad global distribution facilitated by human trade (Seifert 2003, Wetterer 2012), and it is commonly encountered in heated buildings and greenhouses of the Afrotropical region (Bolton 1987).

Genus ***Crematogaster*** Lund, 1831

Crematogaster antaris Forel, 1894
(Fig. 15 A–C)

Crematogaster (*Acrocoelia*) *auberti* r. *antaris* Forel, 1894: 26 (w. q.) Algeria. Palearctic.

Diagnosis. **Worker.** Uniform brown species with posterior third of gaster dark brown; mesonotum in profile with a small tubercle close to promesonotal suture; petiole in dorsal view with concave anterior margin; petiole in dorsal view with rounded anterior corners; anterior half of cephalic surface or at least area in front of eyes and clypeus longitudinally striated; promesonotum and mesonotum dorsum unsculptured; promesonotum without hairs; hairs on first gastral tergites rare and restricted to a few pairs on posterior margin of the tergite.

Material examined. Qatar, Msaid Road, 09.iv.2005, 24°59'N, 51°33'E, (M.S. Abdel-Dayem leg.), 10w; Al Kharara-Seleiyn Road, 09.iv.2005, 24°53'N, 51°10'E, (M.S. Abdel-Dayem leg.), 13 w, (KSMA).

Geographic distribution. This is a Palearctic species originally described from Algeria and is distributed eastwardly across Egypt (Sharaf 2006), Israel (Vonshak and Ionescu 2009), the Arabian Peninsula: UAE (Tigar and Collingwood 1993), Kuwait, UAE, Oman and Yemen (Collingwood 1985, Collingwood and Agosti 1996, Collingwood and van Harten 2001), Qatar (Sharaf *et al.* 2019), to Iran (Paknia *et al.* 2008).

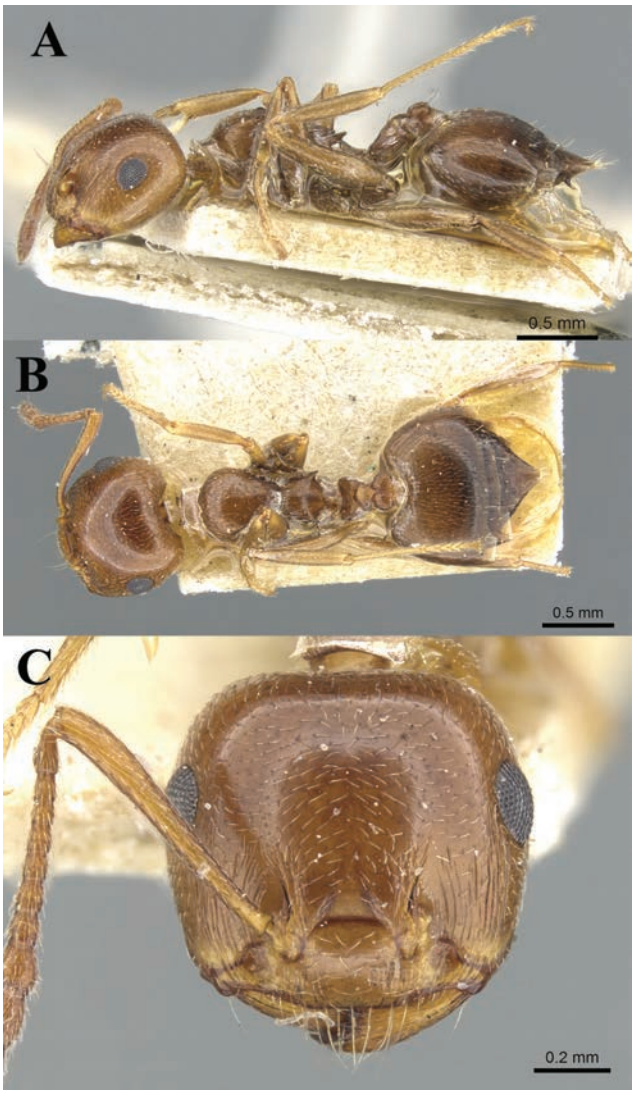

Figure 15. *Crematogaster antaris*, syntype worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0903658 (Will Ericson), www.AntWeb.org.

Genus ***Messor*** Forel, 1890

Messor arenarius diabolus Santschi, 1938

Messor arenarius diabolus Santschi, 1938: 35, fig. 5 (w.) Egypt. Palearctic.

Diagnosis. **Worker.** Uniform black with black-brown mandibles, funiculus and tarsi brown-red; posterior margin of head strongly deeply concave in full-face view; body pilosity profuse, especially on the gaster.

Previous records. Doha, 02.v.1983, 5 w; Abu Samrah, 03.iv.1984, 20 w; Al Shahaniyah, 20.iii.1985, 7w, (Abdo and Shaumer 1985).

Geographic distribution. This subspecies was originally described from Egypt and seems to be endemic to the country.

Remarks. This record was mentioned in Abdo and Shaumer (1985) under the name *Camponotus arenarius* var. *diabolus*. Since there is no species of this name under the genus *Camponotus*, it is most likely referring to *Messor arenarius diabolus*. This subspecies, however, is only known from the type locality and has not been collected from any country in the Arabian Peninsula, therefore, we consider the record of Abdo and Shaumer (1985) is dubious and represents a misidentified taxon.

Genus ***Monomorium*** Mayr, 1855

Monomorium abeillei André, 1881
(Fig. 16 A–C)

Monomorium abeillei André, 1881b: 531 (footnote) (w.) Palestine. Palearctic.

***Diagnosis*. Worker.** Color evenly brown-black to black with pale funiculi, tarsi, and mandibles; anterior margin of clypeus slightly concave; eyes moderately large, with 9–10 ommatidia in the longest row; posterior margin when seen in full-face view weakly emarginate with rounded corners; mesosoma in profile with promesonotal dorsum meeting the flat propodeum at an oblique angle; propodeum with a characteristic, well-defined, longitudinal, V-shaped furrow bordered by a distinct raised edge at each side; petiole in profile is a high, rounded triangle; pronotum and petiole each have one pair of hairs, postpetiole with two pairs; few scattered hairs on first gastral tergite; head, pronotum, and nodes superficially reticulate; gaster shining with superficial sculpture.

Material examined. Qatar, Al Dhakira Park, 07.iii, 2005, 25°43'N, 51°32'E, (M.S. Abdel-Dayem leg.), 8w; Al-Dohuil, 18-8.iii.2005, 25°22'N, 51°29'E, (M.S. Abdel-Dayem leg.), 3w; Al-Rayyan, 08.iii.2005, 25°18'N, 51°25'E, (M.S. Abdel-Dayem leg.), 4 w (KSMA).

Geographic distribution. A Palearctic species originally described from Palestine and is known from Levant: Egypt, Palestine, Israel, Jordan, Syria (Borowiec and Salata 2020); Arabian Peninsula: KSA, Kuwait, Oman, Yemen (Collingwood 1985, Collingwood and Agosti 1996), UAE (Tigar and Collingwood 1993; Collingwood *et al*. 2011); and east to Iran and Afghanistan. This species is recorded for the first time from Qatar.

Ecological and biological notes. The habitat preference of *M. abeillei* includes sandy desert, coastal areas, and high ground in the Asir mountains above 2200 m.a.s.l. (Collingwood 1985).

Monomorium areniphilum Santschi, 1911
(Fig. 17 A–C)

Monomorium Salomonis var. *areniphila* Santschi, 1911: 84 (w.) Tunisia. Palearctic.

***Diagnosis*. Worker.** Uniform dark brown with paler tarsi; eyes with 12–14 ommatidia in longest row; mesosoma in profile with the promesonotal outline, with the posterior portion of the mesonotum sharply down curved and descending to impressed metanotal groove; dorsal of mesosoma without standing hairs; propodeal dorsum with a narrow, flattened, median, longitudinal strip.

Material examined. Qatar, Al-Dohuil, 15.iii.2005, 25°22'N, 51°29'E, (M.S. Abdel-Dayem leg.), 8w; Rawdet Rashed, 12.iii.2005, 25°14.006'N, 51°12.286'E, (M.S. Abdel-Dayem leg.), 47w; Doha. 08.iii.2005, 25°18'N, 51°25'E, (M.S. Abdel-Dayem leg.), 31w; Al-Rayyan, 08.iii.2005, 25°18'N, 51°25'E, (M.S. Abdel-Dayem leg.), 26w, (KSMA).

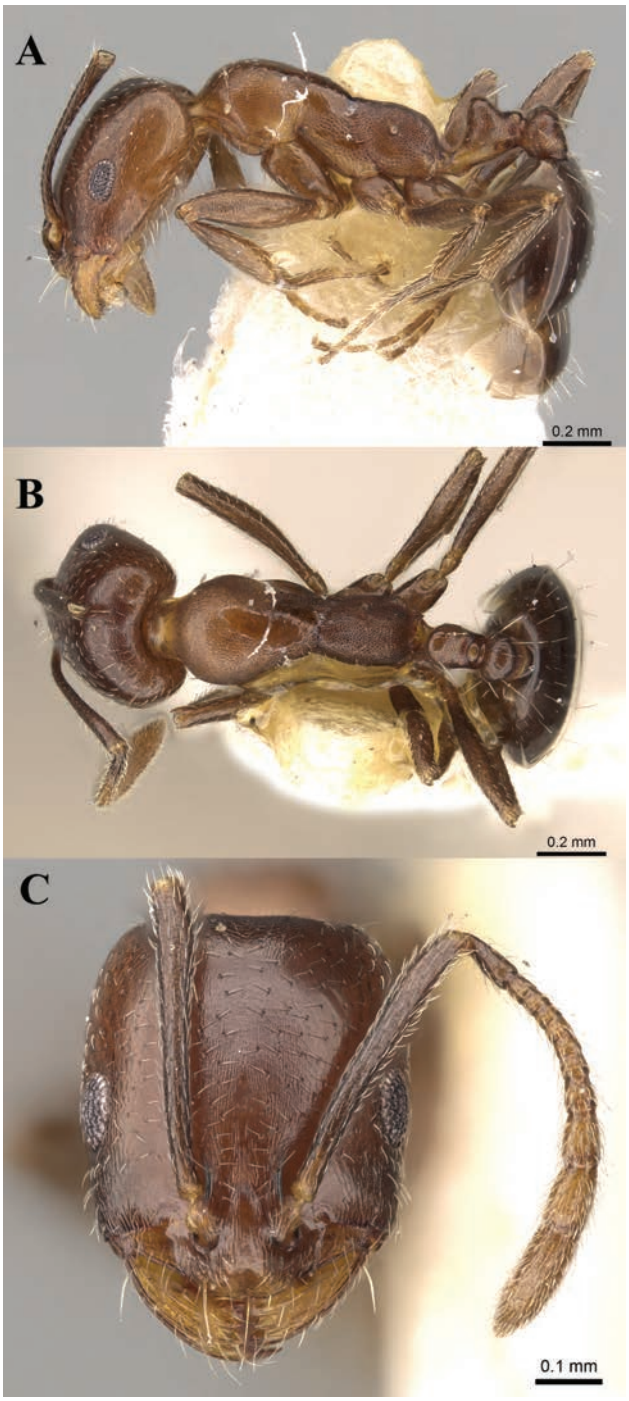

Figure 16. *Monomorium abeillei*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0914317 (Zach Lieberman), www.AntWeb.org.

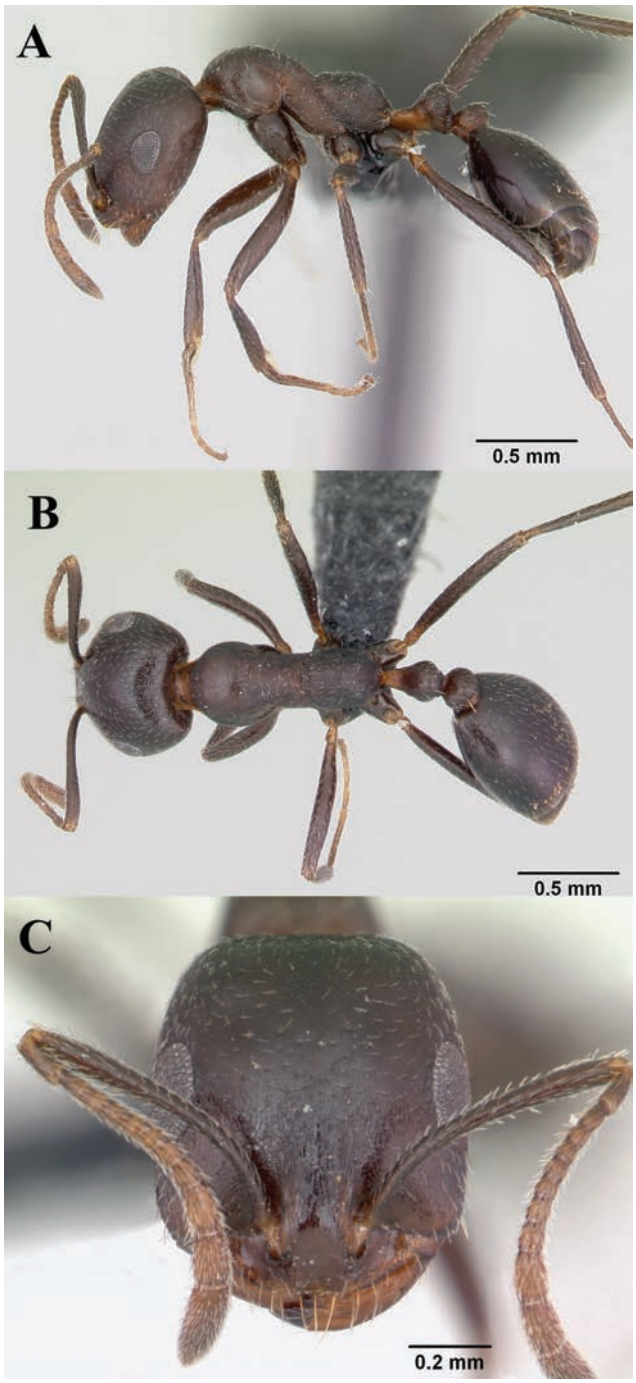

Figure 17. *Monomorium areniphilum*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0048600 (April Nobile), www.AntWeb.org.

Geographic distribution. The species is widely distributed throughout the Saharan and sub-Saharan Africa (Bolton 1987, Sharaf 2006) and extending eastward to the Arabian Peninsula: KSA, Kuwait, Oman, UAE, and Yemen (Collingwood 1985; Collingwood and Agosti 1996; Collingwood *et al*. 2011). This material represents the first record from Qatar.

Monomorium subopacum (Smith, 1858) (Fig. 18 A–C)

Myrmica subopaca Smith, 1858: 127 (w.q.) Portugal (Madeira Is.). Afrotropic.

***Diagnosis*. Worker.** Color brown, with gaster darker than head and mesosoma; eyes with 9–11 ommatidia in the longest row; mesonotum sloping evenly back to a shallow metanotal groove; cephalic surface in profile without standing hairs; mesosoma dorsum without standing hairs; petiole and postpetiole each with a single pair of hairs or rarely the postpetiole with two pairs.

Material examined. Qatar, Doha, 25°17.124'N, 51°31.86'E, 08.iii.2005, (M.S. Abdel-Dayem leg.), 15w, (KSMA).

Geographic distribution. *Monomorium subopacum* is widely distributed in the Mediterranean Basin and has sporadic distribution in the Afrotropical and Oriental regions (Bolton 1987). It has been recorded from KSA, Oman, UAE, and Yemen (Collingwood 1985, Collingwood and Agosti 1996, Collingwood *et al*. 2011). Our material represents the first record from Qatar.

Monomorium tumaire Collingwood & Agosti, 1996 (Fig. 19 A–B)

Monomorium tumaire Collingwood & Agosti, 1996: 356, fig. 29 (w.) Saudi Arabia. Afrotropic.

***Diagnosis.* Worker.** Color light brown or yellow-brown; metanotal groove shallowly impressed; propodeal furrow distinct; underside of head with numerous hairs, the longest exceeding the maximum eye length; posterior margin of head with two pairs of hairs; pronotum with one pair of hairs, petiole with one pair and postpetiole with two pairs of hairs; gaster with 12–16 suberect hairs on the first tergite; head and mesosoma shallowly reticulate-punctate.

Previous records. Qatar, Doha, 25°17'N, 51°30'E, 22.ix.2005, (M. Lush leg.).

Geographic distribution. *Monomorium tumaire* was originally described from KSA and is endemic to the Arabian Peninsula, where it is reported from KSA, Oman, UAE (Tigar and Collingwood 1993, Collingwood and Agosti 1996, Collingwood *et al.* 2011), and Qatar (Lush 2009).

Monomorium venustum (Smith, 1858) (Fig. 20 A–C)

Myrmica venusta Smith, 1858: 126 (w.) Syria. Palearctic.

***Diagnosis.* Worker.** Bicolored species with head, mesosoma, petiole, and postpetiole red, gaster brown

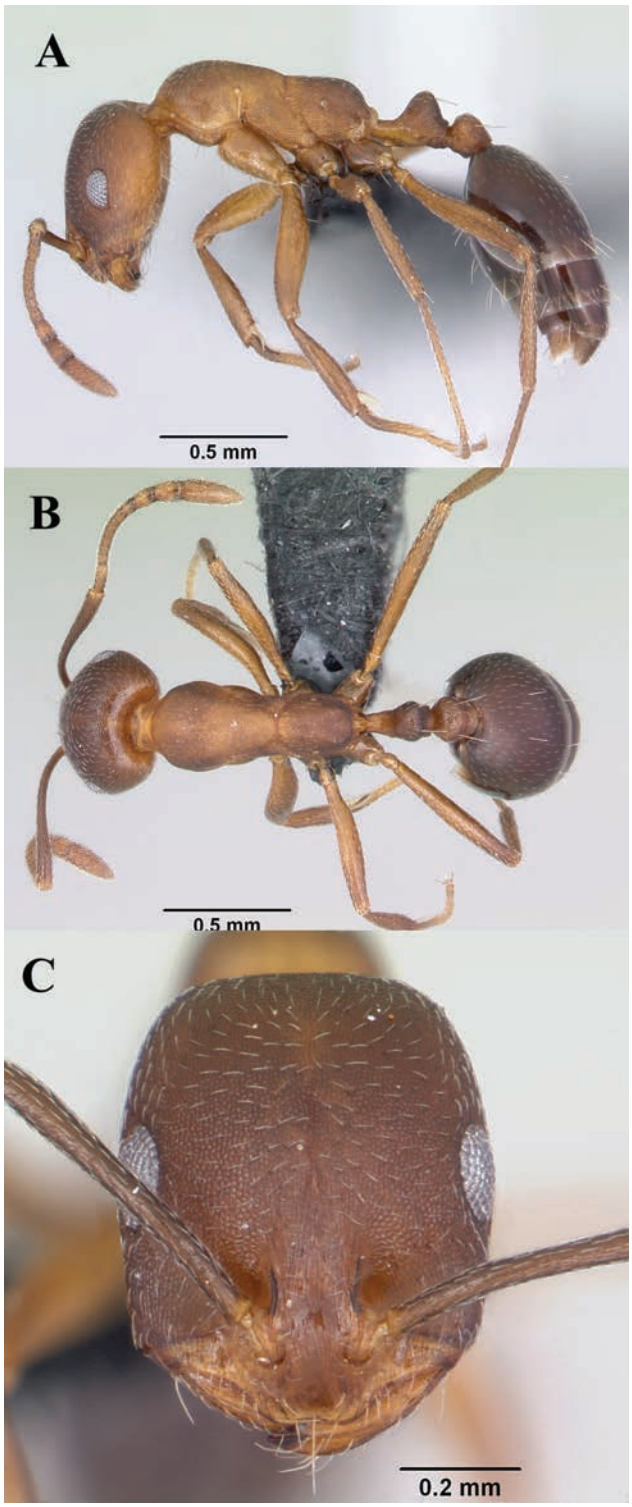

Figure 18. *Monomorium subopacum*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0064820 (April Nobile), www.AntWeb.org.

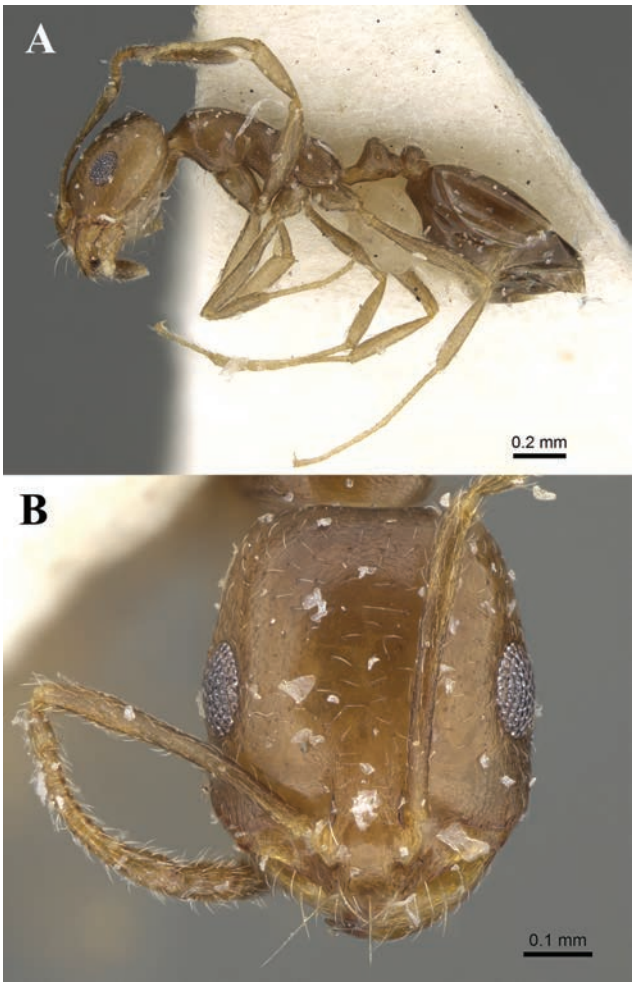

Figure 19. *Monomorium tumaire*, syntype worker, A, body in profile B, head in full-face view, CASENT0922347 (Michele Esposito), www.AntWeb.org.

to black; metanotal groove well-developed, deep, and broad; petiolar node high and rounded in profile; mesosoma, petiole, and postpetiole superficially faintly sculptured; petiole and postpetiole each have one pair of dorsal hairs while the first gastral tergite is bare.

Monomorium venustum closely resembles *M. niloticum* Emery, 1881 from which it can be differentiated by a lack of mesosomal pilosity.

Material examined. Qatar, Rawdet Rashed, 12.iii.2005, 25°14.006'N, 51°12.286'E, (M.S. Abdel-Dayem leg.), 9w, (KSMA).

Geographic distribution. This species was originally described from Syria and is known from Libya, east to Levant: Egypt, Israel, Jordan, Lebanon, Syria (Borowiec and Salata 2020); Arabian Peninsula: KSA, Kuwait, and Oman (Collingwood 1985, Collingwood and Agosti 1996); Iran, and Turkmenistan (Borowiec and Salata 2020). This material represents a new record for Qatar.

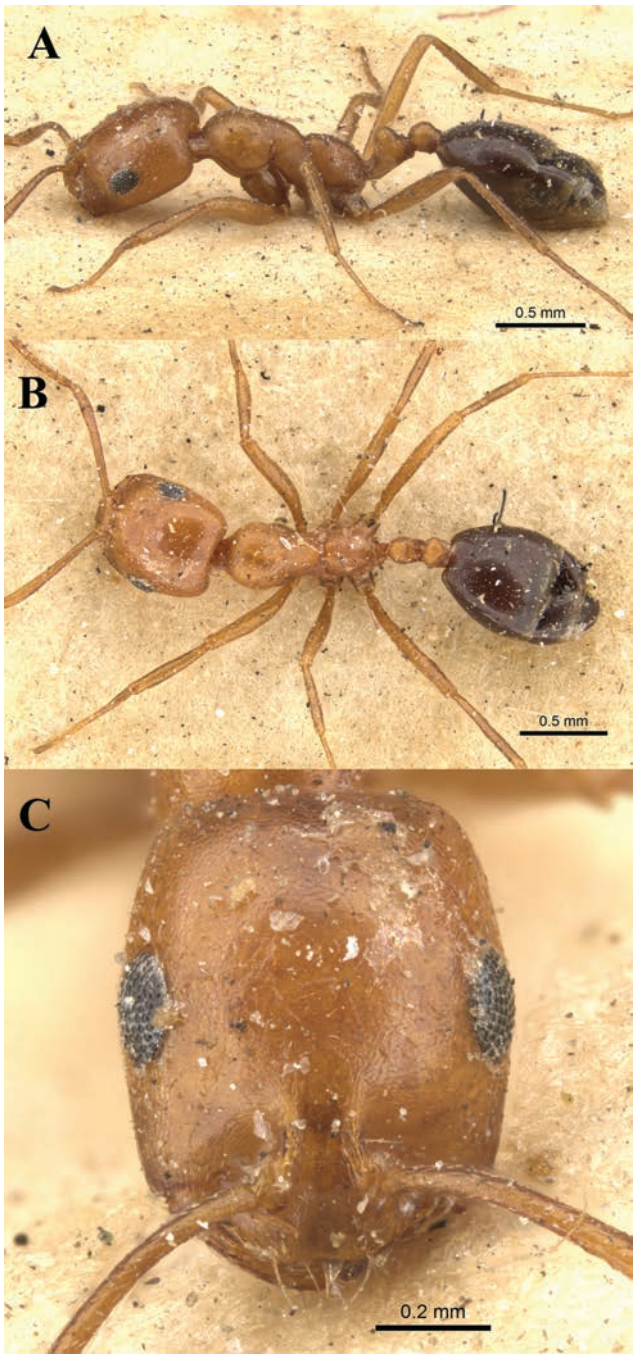

Figure 20. *Monomorium venustum*, syntype worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0902221 (Will Ericson), www.AntWeb.org.

Genus ***Pheidole*** Westwood, 1839

Pheidole sinaitica Mayr, 1862
(Fig. 21 A–C, 22 A–C)

Pheidole sinaitica Mayr, 1862: 745 (s.w.) Egypt. Palearctic.

Diagnosis. **Major worker.** Color uniform brown to light brown; posterior margin of head deeply emarginated in full-face view; second funicular segment slightly longer than broad; metanotal groove well-developed and broad; propodeal spines short and acute; cephalic surfaces longitudinally rugulose running posteriorly to two-thirds of head length; posterior corners of head without striae; body surfaces with abundant long hairs.

Material examined. Qatar, Al-Dohuil (Doha), 8-18.iii.2005; 25°22'N, 51°29'E, (M.S. Abdel-Dayem leg.), 4w, (KSMA).

Geographic distribution. This species was described from Egypt and is known from East Africa: Eritrea, Kenya, Sudan; Morocco; Levant: Egypt, Israel, Iraq (Sharaf 2006, Vonshak and Ionescu 2009); the Arabian Peninsula: KSA, Oman, UAE, Yemen (Collingwood 1985, Collingwood and Agosti 1996, Collingwood *et al.* 2011); and Iran (Paknia *et al.* 2008). This material represents a new record for Qatar.

Genus ***Strumigenys*** Smith, 1860

Strumigenys membranifera Emery, 1869
(Fig. 23 A–C)

Strumigenys (*Trichoscapa*) *membranifera* Emery, 1869: 24, fig. 11 (w.) Italy. Palearctic.

Diagnosis. **Worker.** Dull yellow to yellow-brown; masticatory margin of mandibles armed with 12 teeth; anterior clypeal margin broadly and weakly convex; eyes minute, with few ommatidia, located at ventral margin of antennal scrobes; metanotal groove absent; spongiform appendages of petiole and postpetiole massively developed; cephalic surfaces reticulate-punctate; sides of mesosoma smooth; propodeal dorsum and declivity smooth; cephalic pilosity restricted to one pair of hairs situated at highest point of vertex; cephalic dorsum with sparse, minute, appressed pubescence; lateral margins of head, clypeus with its anterior and lateral margins, and humeral pronotal angles all without projecting hairs; dorsal surfaces of petiole, postpetiole, and gaster bare.

Material examined. Qatar, Rawdat Al Faras, Qatar University Farm for Training and Research, 25°48'N, 51°20.4'E, 21.v.2015 (M. R. Sharaf leg.), 1w; Saudi Arabia, Qassim, Buraydah, 26.36°N, 44.03°E, 653 m a.s.l., 19.x.2013 (S. Salman leg.), (2 workers CASENT0914337, CASENT0914338).

Geographic distribution. A successful, broadly spread, pantropical tramp species originally described from Italy, introduced into most zoogeographical regions worldwide by human commerce (Bolton 1983, Bolton 2000, Wetterer 2011). In the Arabian Peninsula, the species is known from KSA, UAE (Sharaf *et al.* 2014), and Qatar (Sharaf *et al.* 2015).

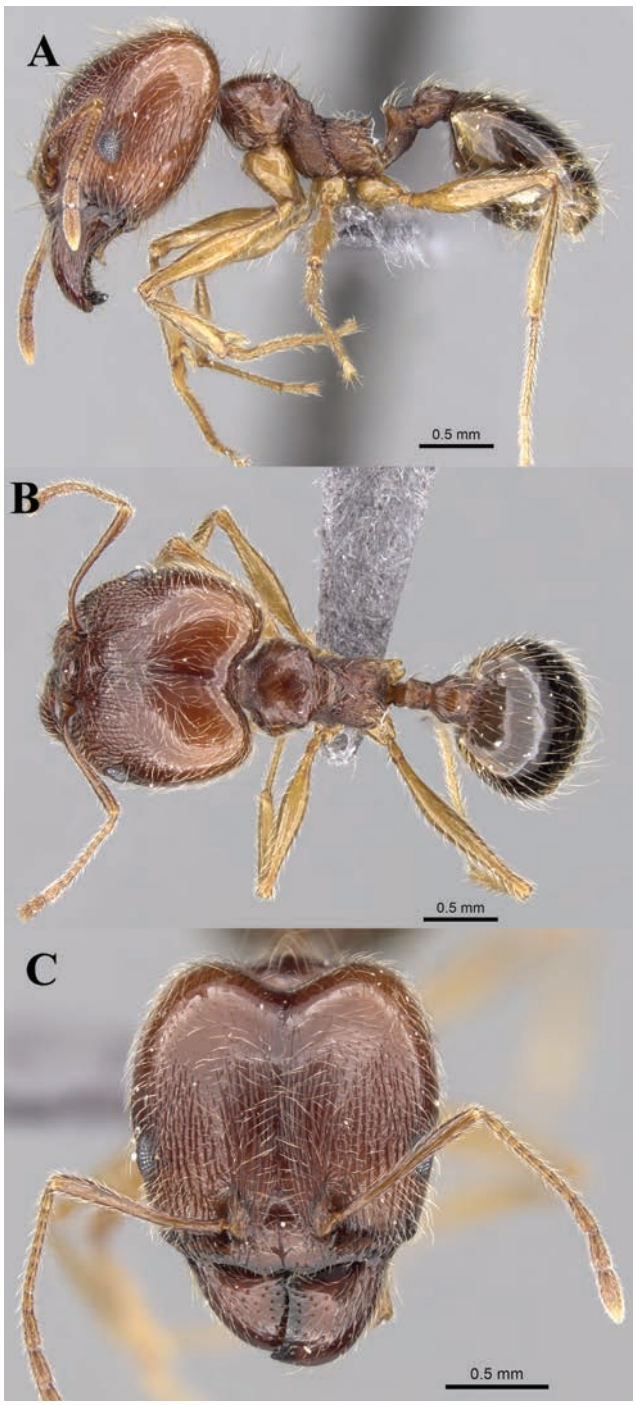

Figure 21. *Pheidole sinaitica*, Major worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0263723 (Estella Ortega), www.AntWeb.org.

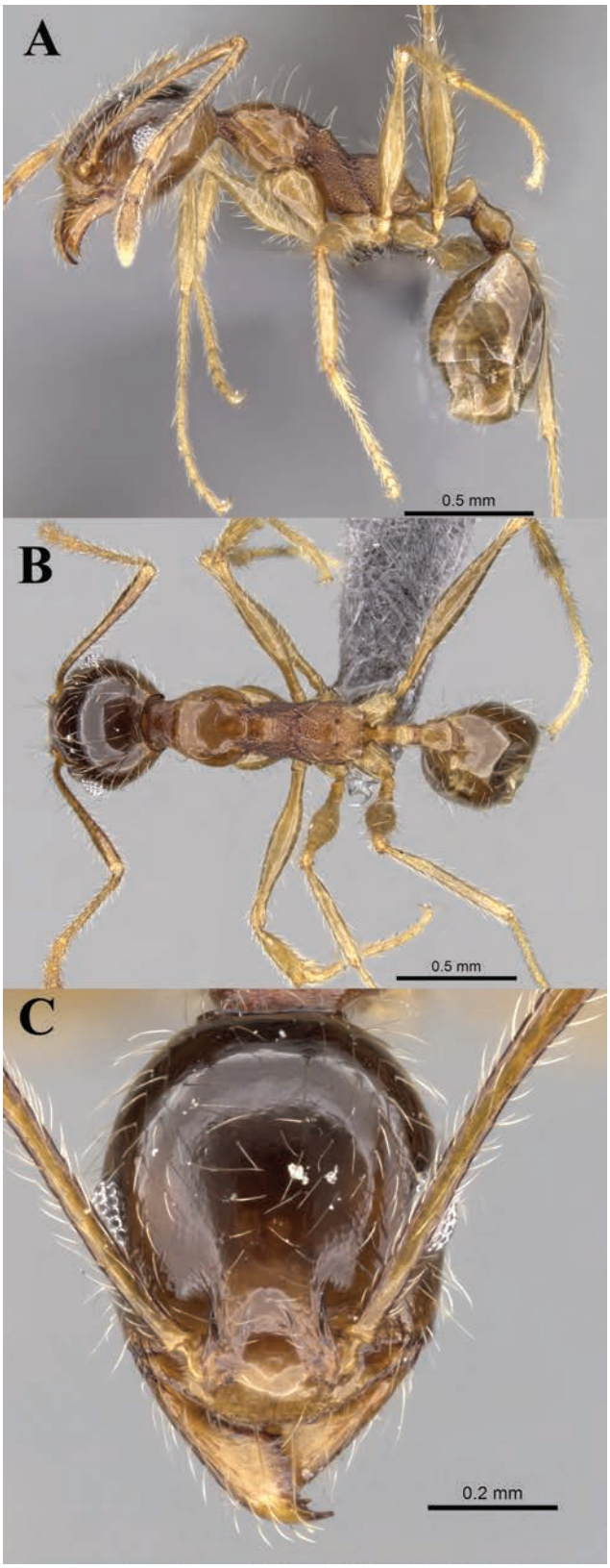

Figure 22. *Pheidole sinaitica*, Small worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0263666 (Estella Ortega), www.AntWeb.org.

Ecological and biological notes. *Strumigenys membranifera* seems to prefer habitats with some degree of ecological disturbance (Wetterer 2011, Tang *et al*. 2019) where nests are built in the dry or semidry soil of lawn and pastures (Wilson and Hunt 1967,

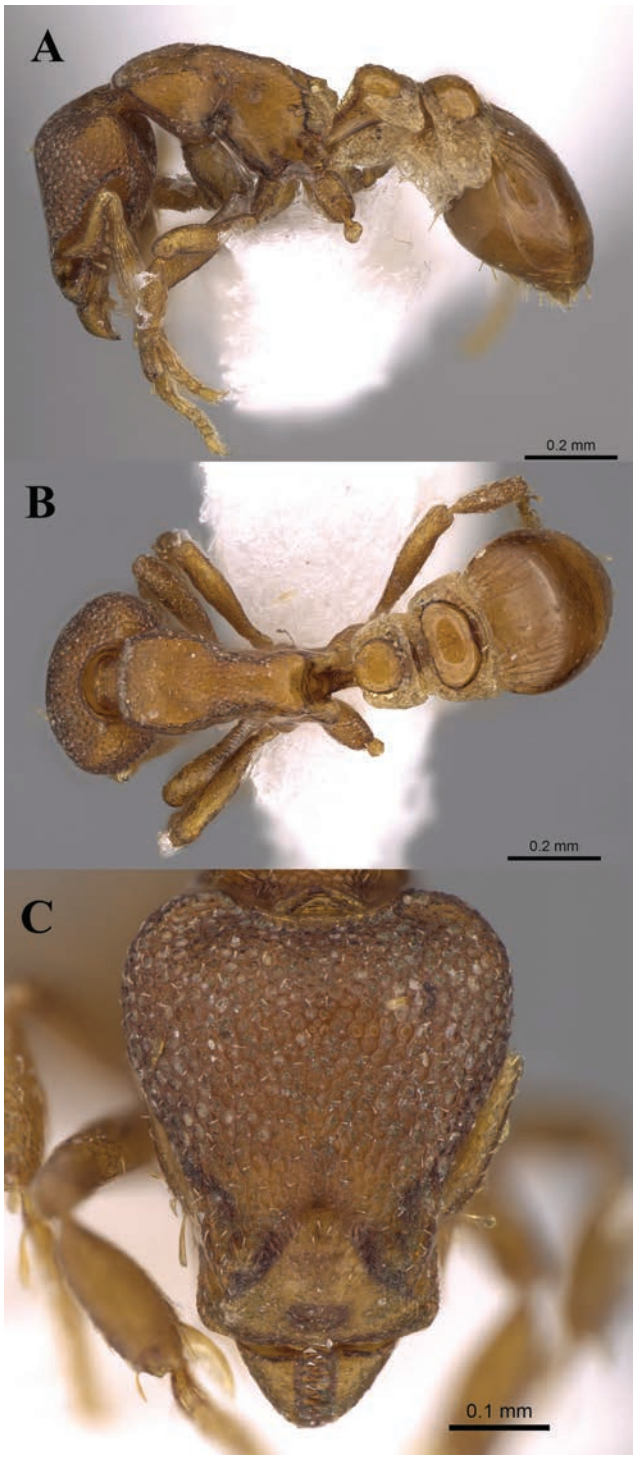

Figure 23. *Strumigenys membranifera*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0914338 (Michele Esposito), www.AntWeb.org.

Deyrup 1997, Ordóñez-Urbano *et al.* 2008) and in the soil of date palm plantations (Sharaf *et al.* 2015).

Genus ***Trichomyrmex*** Mayr, 1865

Trichomyrmex destructor (Jerdon, 1851)
(Fig. 24 A–C)

Atta destructor Jerdon, 1851: 105 (w.) India. Indomalaya.

Diagnosis. **Worker.** Posterior margin of head transversely striolate in dorsal view; promesonotum in profile nearly flat or weakly convex; propodeal dorsum in a continuous curve with propodeal declivity; transverse sculpture of propodeal dorsum fine and dense; pilosity of mesosoma, petiole, postpetiole, and gaster short and weakly curved.

Trichomyrmex destructor is closest to *T. mayri*, from which it can be distinguished only by its bicolored body. Its head, mesosoma, petiole, and postpetiole are yellow to brown-yellow, and its gaster dark brown to black, whereas *T. mayri* is unicolorous dark brown or black-brown.

Material examined. Qatar, Al Dhakira Park, 07.iii, 2005, 25°43'N, 51°32'E, (M.S. Abdel-Dayem leg.), 4w; Doha, no locality, 17.iii.2005, (M.S. Abdel-Dayem leg.), 8w, (KSMA).

Geographic distribution. A species originally described from India, and is broadly spread in tropical and subtropical regions (Wetterer 2009). The species is originated in central Asia but has been distributed by human commerce to tropical and subtropical regions (Wetterer 2009) and extending to southern Europe (Ruzsky 1907) and North America. The species is known from most countries of the Arabian Peninsula (Collingwood 1985, Collingwood and Agosti 1996), and the Socotra Archipelago (Collingwood *et al.* 2004, Sharaf *et al.* 2017). More information on species distribution is given by Wetterer (2009).

Ecological and biological notes. This successful invasive species can invade a broad range of habitats including highly polluted sites (Wetterer 2009). In the KSA, this species builds nests in humid soil under stones in wild sites where *Acacia*, date palm, *Phoenix dactylifera* L. (Arecaceae), and *Calotropis procera* (Aiton) W.T. Aiton (Asclepiadaceae) trees exist (Sharaf *et al.* 2016).

Trichomyrmex mayri (Forel, 1902)
(Fig. 25 A–C)

Monomorium (*Parholcomyrmex*) *gracillimum* var. *mayri* Forel, 1902: 209 (w.) India. Indomalaya.

Diagnosis. **Worker.** *Trichomyrmex mayri* is closest to *T. destructor*, from which it can be separated by its uniform dark brown or black-brown color, whereas *T. destructor* has a yellow to brown-yellow head, mesosoma, petiole, and postpetiole, while its gaster is dark brown.

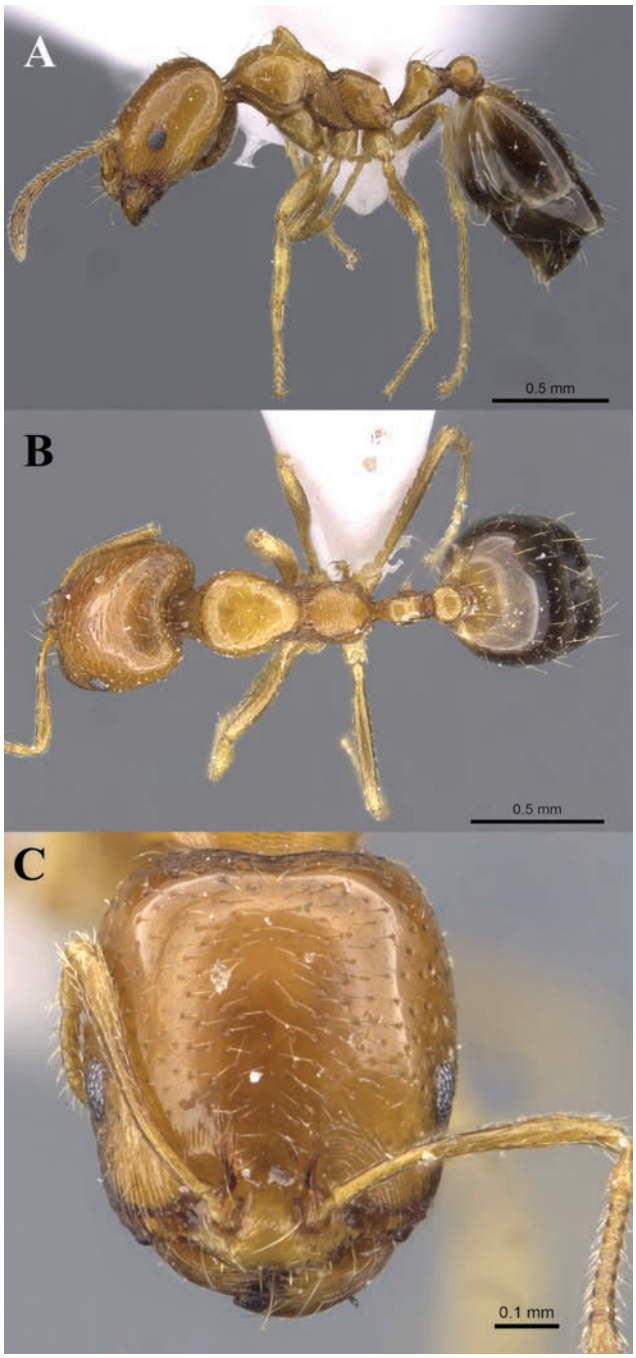

Figure 24. *Trichomyrmex destructor*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0910235 (Alexandra Westrich), www.AntWeb.org.

Material examined. Doha, Fereej Ben Mahmoud, 14.iii.2005, 25°17'N, 51°30'E, (M.S. Abdel-Dayem leg.), 1w; Doha, 25°17.124'N, 51°31.86'E, 17.iii. 2005, (M.S. Abdel-Dayem leg.), 1w, (KSMA).

Geographic distribution. *Trichomyrmex mayri* was described from India and is widely distributed in the sub-Saharan Africa (Bolton 1987); Levant (Sharaf 2006, Vonshak and Ionescu 2009); the Arabian Peninsula (Collingwood 1985, Collingwood and Agosti 1996, Sharaf *et al*. 2013, 2016 b), the Socotra Archipelago (Sharaf *et al*. 2017), and it was recorded from Qatar by Sharaf *et al*. (2016 b).

Ecological and biological notes. In the Arabian Peninsula, *T. mayri* invades a wide range of habitats

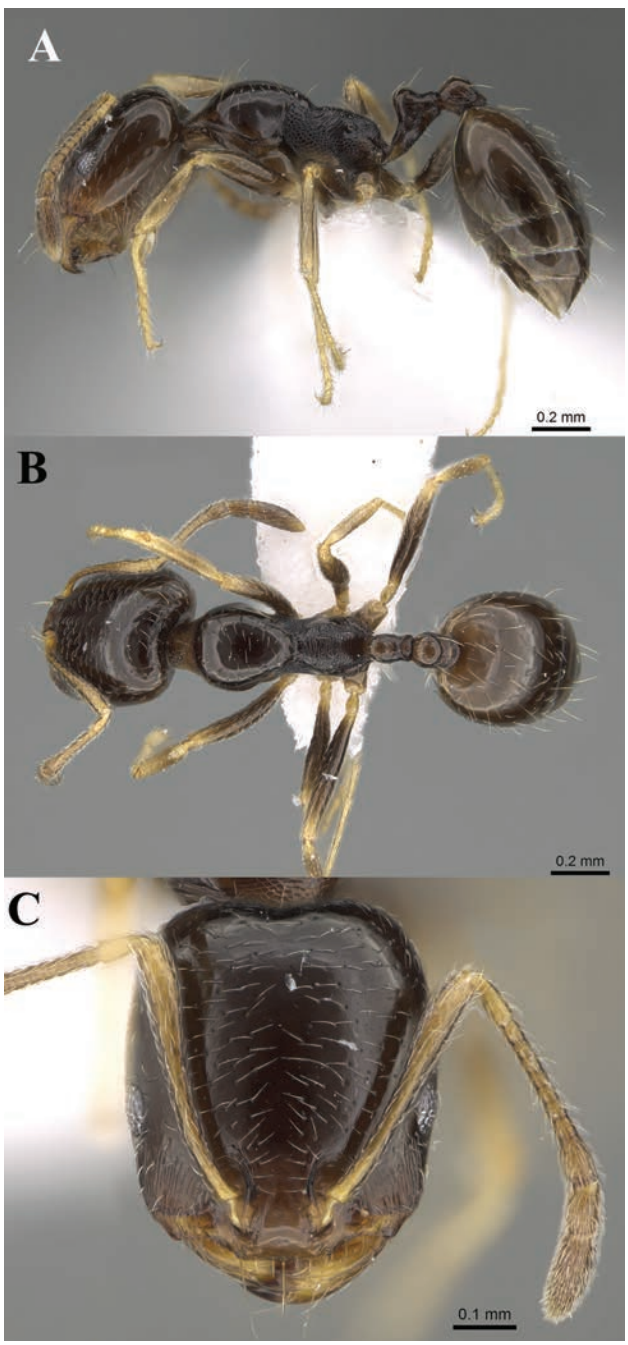

Figure 25. *Trichomyrmex mayri*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0919809 (Michele Esposito), www.AntWeb.org.

and constitutes the most common species of the genus (Sharaf *et al*. 2013, 2016). Nests are built in moist soil under stones next to date palm *Phoenix dactylifera* L. (Arecaceae) plantations, or close to *Acacia* trees in sites impacted by trash and human waste, whereas some exist next to the milkweed tree, *Calotropis procera* (Aiton) W.T. Aiton (Asclepiadaceae).

Subfamily **Ponerinae**

Genus ***Brachyponera*** Emery, 1900

Brachyponera sennaarensis (Mayr, 1862)
(Fig. 26 A–C, 27 A–C)

Ponera sennaarensis Mayr, 1862: 721 (w.) Sudan. Afrotropic.

***Diagnosis*. Worker.** Dark brown to black-brown, with antennae, tibiae, and tarsi reddish. In full-face view head with convex sides and concave posterior margin; eyes relatively large; metanotal groove deeply impressed; petiole a high and thick node with a straight anterior surface and convex posterior surface; first and second gastral tergites separated by a distinct constriction characteristic of ponerine ants; gaster ending with a powerful sting. All body surfaces covered with fine and dense pubescence.

Material examined. Qatar, Rawdet Rashed, 12.iii. 2005, 25°14.006'N, 51°12.286'E, (M.S. Abdel-Dayem leg.), 3w; Al-Rayyan, 14.iii.2005, 25°18'N, 51°25'E, (M.S. Abdel-Dayem leg.), 25w; Al Dkakhira Park, 14.iii.2005, 25°43.65'N, 51°32.052'E, (M.S. Abdel-Dayem leg.), 9w; Al-Rayyan, 17.iii.2005, 25°18'N, 51°25'E, (M.S. Abdel-Dayem leg.), 11w; Al-Dohuil, 18-8.iii.2005, 25°22'N, 51°29'E, (M.S. Abdel-Dayem leg.), 31w, (KSMA).

Geographic distribution. *Brachyponera sennaarensis* is an African native species originally described from Sudan, and spreads eastwardly from the Arabian Peninsula to Iran and India (Wetterer 2013). This ponerine ant is widely spread in all countries of the Arabian Peninsula (Collingwood 1985, Collingwood and Agosti 1996, Collingwood *et al*. 2011) and the Socotra Archipelago (Sharaf *et al*. 2017). It was recorded from Qatar by Wetterer (2013).

Ecological and biological notes. *Brachyponera sennaarensis* has the ability to invade a diverse range of habitats including moist soils around date palm trees, leaf litter, public gardens, under rocks and objects associated with moist soils, and any habitat close to human settlements (Collingwood 1985, Collingwood and Agosti 1996, Wetterer 2013). In Socotra Archipelago, Sharaf *et al*. (2017) found a colony under a rock next to a dragon blood tree *Dracaena cinnabari* Balf.f. (Asparagaceae). *Brachyponera sennaarensis* is a predaceous scavenger feeding on insects (Lachaud and Dejean 1994, Collingwood and Agosti 1996) and the seeds of tropical plants (Levieux and Diomande 1978). [Table 1]

Discussion

The list of ant taxa known from Qatar has significantly increased to 23 species, belonging to 12 genera and four subfamilies. The subfamilies included are: Dolichoderinae (1 genus, 2 species), Formicidae (4 genera, 9 species), Myrmicinae (6 genera, 11 species),

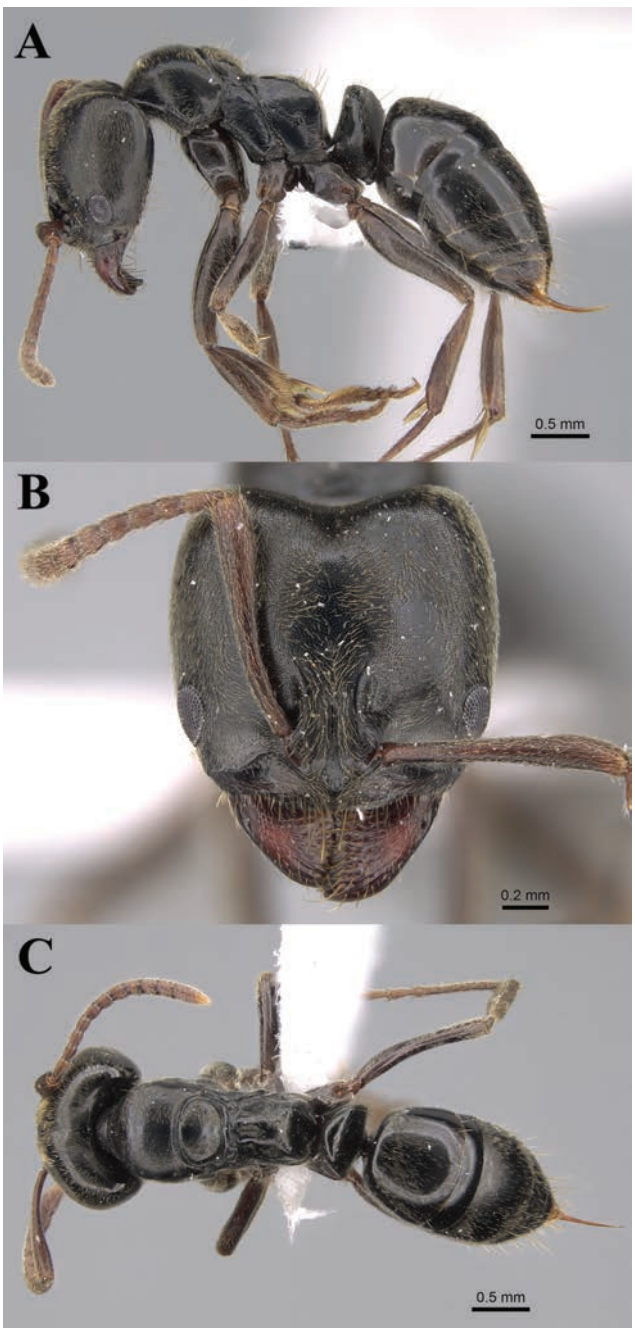

Figure 26. *Brachyponera sennaarensis*, worker, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0922868 (Michele Esposito), www.AntWeb.org.

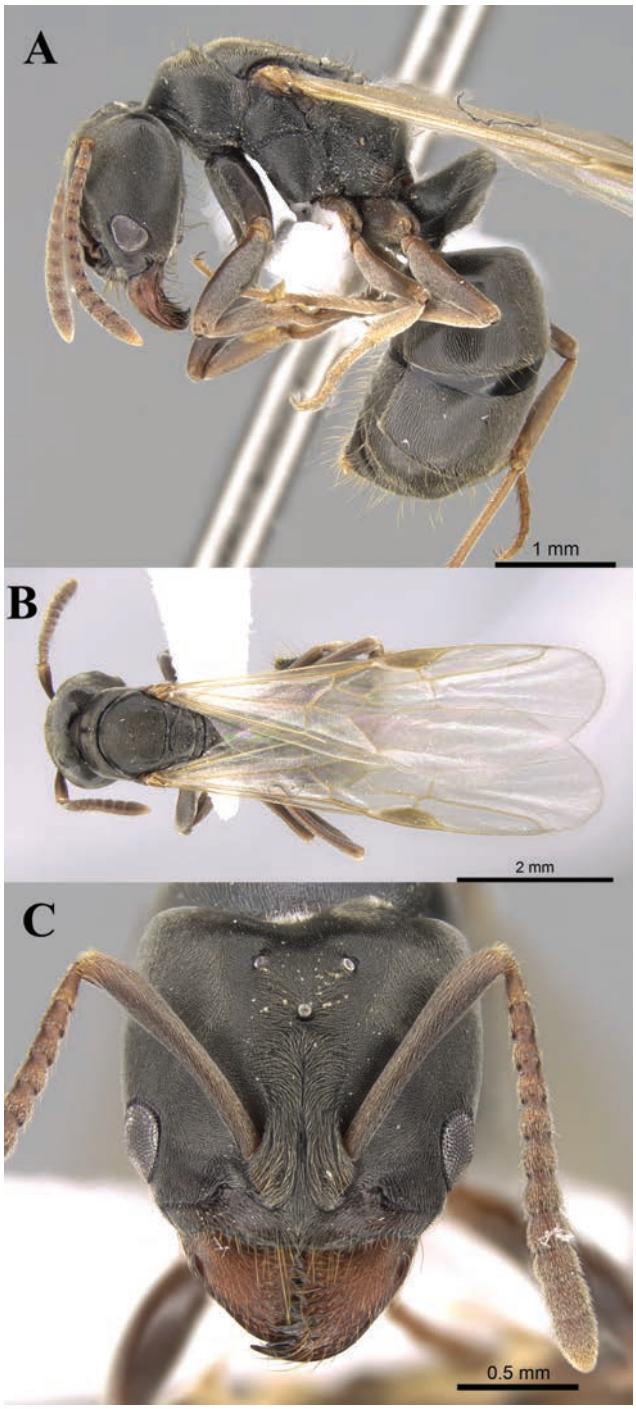

Figure 27. *Brachyponera sennaarensis*, queen, A, body in profile B, body in dorsal view C, head in full-face view, CASENT0906476 (Cerise Chen), www.AntWeb.org.

and Ponerinae (1 genus, 1 species). The list includes 14 new species records for Qatar and one species, *Messor arenarius diabolus* is excluded from the faunal list because it is endemic to Egypt and has not been reported out its type locality.

Table 1. Updated list of ant species of Qatar, (+) new records

Subfamilies/Species	Zoogeographical affinities
Dolichoderinae	
Tapinoma melanocephalum (+)	Neotropical/invasive
Tapinoma simrothi (+)	Palearctic
Formicinae	
Camponotus aegyptiacus	Palearctic
Camponotus oasium (+)	Palearctic
Camponotus xerxes	Palearctic
Cataglyphis arenaria (+)	Palearctic
Cataglyphis livida (+)	Palearctic
Cataglyphis nigra (+)	Palearctic
Lepisiota bipartita (+)	Palearctic
Lepisiota gracilicornis (+)	Afrotropical
Paratrechina longicornis	Afrotropical/invasive
Myrmicinae	
Cardiocondyla emeryi (+)	Neotropical/invasive
Crematogaster antaris	Palearctic
Monomorium abeillei (+)	Palearctic
Monomorium areniphilum (+)	Palearctic
Monomorium subopacum (+)	Afrotropical
Monomorium tumaire	Afrotropical
Monomorium venustum (+)	Palearctic
Pheidole sinaitica (+)	Palearctic
Strumigenys membranifera	Palearctic/invasive
Trichomyrmex destructor	Indomalayan/invasive
Trichomyrmex mayri	Indomalayan
Ponerinae	
Brachyponera sennaarensis	Afrotropical

Ants from two main biogeographical regions, the Palearctic and the Afrotropical, are encountered in Qatar. The geographic location of the State of Qatar in the eastern part of the Arabian Peninsula makes it an entry point for possible introductions of invasive/tramp ants. While the present study has recorded only five invasive species, *C. emeryi*, *P. longicornis*, *S. membranifera*, *T. melanocephalum*, and *T. destructor* (~ 22%), this list likely underestimates the actual number of introduced invasives. The relatively low percentage of recorded invasive species is due to the lack of serious collecting efforts in the country.

Many more invasive species surely await discovery (e.g., *Cardiocondyla mauritanica* Forel, 1890, *Cardiocondyla wroughtonii* (Forel, 1890), *Hypoponera punctatissima* (Roger, 1859), *Lioponera longitarsus* (Mayr, 1879), *Monomorium exiguum* Forel, 1894, *Monomorium pharaonis* (Linnaeus, 1758), *Plagiolepis pygmaea* (Latreille, 1798), *Pheidole*

indica Mayr, 1879, *Pheidole megacephala* (Fabricius, 1793), *Solenopsis abdita* Thompson, 1989, *Syllophopsis cryptobia* (Santschi, 1921), *Technomyrmex albipes* (Smith, F., 1861), *Tetramorium caespitum* (Linnaeus, 1758), *Tetramorium caldarium* (Roger, 1857), *Tetramorium lanuginosum* Mayr, 1870 and *Tetramorium simillimum* (Smith, F., 1851), and members of the subfamily Leptaniliinae. This point of view is supported by the fact that most of those taxa are recorded from neighboring countries in the Arabian Peninsula (Collingwood 1985, Collingwood and Agosti 1996, Collingwood *et al.* 2011, Sharaf *et al.* 2014, 2017, 2018, 2019, 2020 a). Numerous studies have showed the negative environmental impacts of invasive species on native fauna (Goodenough 2010, Bertelsmeier *et al.* 2015) that may lead to the extinction of endemic species (Blackburn *et al.* 2004, Clavero and Garcia-Berthou 2005).

Our study reveals a predominance of the Palearctic faunal elements (13 species / ~57%), followed by a relatively high proportion of invasive species (5 species/ ~22%), a small proportion of faunal elements from the Afrotropical (4 species / ~17%), a minor fraction of Indomalayan species (1 species / ~4%). The supremacy of Palearctic elements is not surprising, since several works have pointed out that the fauna of the central and eastern region of the Arabian Peninsula bear clear similarities with those of the Palearctic region (e.g. Collingwood 1985, Cowie 1989, Collingwood and Agosti 1996, Penati and Vienna 2006, Collingwood *et al.* 2011, El-Hawagry *et al.* 2013, Sharaf *et al.* 2020 a). In addition, the low percentage of the Oriental species agrees with the results of Larsen (1984) on the Arabian fauna of the butterflies, Penati and Vienna (2006) on the Arabian Histeridae, and Abdel-Dayem *et al.* (2019) on the Carabidae of the southwestern mountains of the KSA.

The complete lack of any species endemism among the ant fauna of Qatar is surprising. A few endemic species are likely to be found with future inventories, but we expect the degree of endemism will remain low compared to the rest of the ant fauna. Many common/ native species that are supposedly endemic to the Arabian Peninsula and have been recorded from adjacent territories may also occur in similar habitats in Qatar (e.g. *Cataglyphis adenensis* (Forel, 1904), *Camponotus adenensis* Emery, 1893, *Camponotus thoracicus* (Fabricius, 1804), *Monomorium luteum* Emery, 1881, and *Nylanderia jaegerskioeldi* (Mayr, 1904), providing direction for further collecting efforts.

Qatar will host the FIFA World Cup 2022, an event that will increase the probability of introducing invasive ants and other groups of animal species to the country and the Arab region as a whole. Human travel is breaking down biogeographic barriers, resulting in shifts in the geographical distribution of organisms (Bertelsmeier *et al.* 2017). The huge numbers of people that will accompany this international sport event will strain Qatar's quarantine inspection capabilities. Human activities, population movements, and global trade around the world greatly contribute to the further spread of invasive species outside their native habitats (e.g. McGlynn 1999, Sax *et al.* 2002, Sax and Gaines 2003, Steadman 2006, Van Damme and Benfield 2011). This assertion is supported by the abundance of the most collected invasive species around the Qatari capital, Doha (Fig. 1). Cities and harbors are both hotspots of introduction. The warmer climates of cities, caused by the urban heat island effect (Oke 1973), make cities ideal starting points for introduced species to spread (Von der Lippe and Kowarik 2007). Similarly, harbors represent major introduction pathways for of ants in particular (Suarez *et al.* 2010). Trade in Qatar goes through large harbors such as Al Wakrah, Doha, Halul Island, Ras Laffan, and Mesaieed (Oxford Business Group 2020). Among other products, ships carry agricultural and food products as well as fertilizers, all of which are mediums through which new species can be introduced.

From an ecological perspective, ants play a pivotal role in the regulation of other arthropod populations, since they occur in significant numbers in every type of habitatin the Arabian Peninsula as well as other Middle East and subtropical countries (Collingwood 1985, Collingwood and Agosti 1996, Collingwood *et al.* 2011, Sharaf *et al.* 2020 a, b). Many carnivorous species, including *Cataglyphis* and *Camponotus*, are scavengers rather than predators. They are also possibly a chief source of food for insectivorous birds. Finally, the ant fauna of Qatar is still far from being complete. With greater collection efforts, we expect the number of species found in the country might reach about 60.

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