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Review of ants (Hymenoptera: Formicidae) from Jordan

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Abstract: We present an updated checklist of ant species known from Jordan. In total we list 58 species and 26 morphospecies identified to genus or species group level. Ten species are recorded from the country for the first time: *Aphaenogaster schmitzi* Forel, 1910, *Camponotus gestroi* Emery, 1878, *Camponotus rebeccae* Forel, 1913, *Crematogaster warburgi* Menozzi, 1933, *Hypoponera punctatissima* (Roger, 1859), *Lepisiota bipartita* (Smith, 1861), *Monomorium luteum* Emery, 1881, *Monomorium venustum* (Smith, 1858), *Tapinoma simrothi* Krausse, 1911, and *Trichomyrmex destructor* (Jerdon, 1851). We also recognize 26 morphospecies which determination, due to lack of comprehensive taxonomic studies, is unachievable and some of them can represent species new to science. Furthermore, we list doubtful records of ten taxa: *Camponotus aethiops* (Latreille, 1798), *Cataglyphis bicolor* (Fabricius, 1793), *Cataglyphis livida* (André, 1881), *Messor concolor* Santschi, 1927, *Messor meridionalis* (André, 1883), *Plagiolepis pallescens maura* Santschi, 1920, *Tapinoma erraticum* (Latreille, 1798), *Tapinoma nigerrimum* (Nylander, 1856), *Temnothorax luteus* (Forel, 1874), and *Tetramorium caespitum* (Linnaeus, 1758), and discuss their possible affiliation with species of documented and certain presence in Jordan.

Key words: ants, biogeography, new records, the Middle East.

INTRODUCTION

Ant fauna of the Middle East is poorly known. So far only Israel and Saudi Arabia can be considered as countries with relatively satisfactory knowledge of distribution and richness of ant species. But recent studies on ants in both countries indicate that these lists are incomplete and contain species that require further confirmation (M. Sharaf A. Ionescu-Hirsch, letter inf.). Based on most recent data there are 235 ant taxa known from Israel (Vonshak & Ionescu-Hirsch 2009, Ionescu-Hirsch 2010, Salata & Borowiec 2015) and 251 ant species recorded from Saudi Arabia (i.e. Sharaf & Aldawood 2019). The knowledge of ant fauna of other countries of this region is rather poor. The only available

recent lists report on 110 species from Lebanon (Tohmé & Tohmé 2014) and more than 250 from Iran (Khalili-Moghadam *et al*. 2019). Additionally, AntMaps (Guénard *et al.* 2017) provides records of 98 species from Syria, 81 species from Iraq and only 51 species from Jordan. However, several records listed on this website are questionable and require verification or confirmation.

Thank to courtesy of Italian and Czech collectors we had the opportunity to study material collected in recent years in Jordan, which remarkably contributed to studies on ant diversity of this region. Below we list all species and morphospecies known from Jordan. The checklist was compiled based on historical (literature) data and new material mentioned above. Species new to Jordan are marked with an asterisk.

Photos were taken using a Nikon SMZ 1500 stereomicroscope, Nikon D5200 photo camera and Helicon Focus software. Material is preserved in the Museum of Natural History, University of Wrocław. Abberviations: **Q** – gyne, **m** – male, **w** – worker.

LIST OF SPECIES

Aphaenogaster cf. *epirotes*

Material examined: 1w: Ajlun gov., 30 km W of Jarash, 850 m, 32.31666 N / 35.71666 E, 20 V 2007, leg. J. Bezděk.

Comments: The specimen from Jordan belongs to the *Aphaenoagster obsidiana* group (sensu Schulz 1994), which comprises five species. Three of them are distributed in the Balkan Peninsula, Turkey, and Caucasian countries, and two other are known from mountains of northern India, Nepal and Pakistan. Jordanian specimen is close to *Aphaenogaster epirotes* (Emery, 1895), a species widely distributed in the Balkan Peninsula, and *A. subcostata* Viehmeyer, 1922, known from southern Turkey and Samos island. It differs from both taxa in several morphometric details and probably belongs to an undescribed species. *Aphaenogaster epirotes* was recorded from two regions of northern Israel (Vonshak & Ionescu-Hirsch2010), but with great probability these records concern *A. subcostata* or this undescribed taxon. The true *Aphaenogaster epirotes* (Emery) is distributed only in the Balkans (our unpublished data).

Aphaenogaster phillipsi Wheeler & Mann, 1916

Aphaenogaster (*Deromyrma*) *phillipsi* Wheeler & Mann, 1916: 168, fig. 1 (w.)

Distribution: Described from Jordan: ancient Petra (Ma'an gov.) by Wheeler and Mann (1916).

Comments: This species belongs to the *Aphaenogaster cecconii* group and was recently redescribed (Borowiec & Salata 2014). Except from the type locality, it was recorded also from Israel: Judean Hills, Judean Desert and northern Negev (Bodenheimer 1937, Kugler 1988, Vonshak & Ionescu-Hirsch 2010).

Aphaenogaster schmitzi Forel, 1910* **(Fig. 1)**

Aphaenogaster schmitzi Forel, 1910: 10 (w.)

Material examined: 7w: Ajlun gov., 3 km W of Ajloun, 855 m, 32.33116 N / 35.71835 E, 20 V 2007, leg. Z. Kejval; **1w:** Ajlun gov., 10 km N of Ajloun, 304 m, 32.40137 N / 35.68871 E, 22 V 2007, leg. Z. Kejval; **1w:** Ajlun gov., 30 km W of Jarash, 850 m, 32.31666 N / 35.71666 E, 20 V 2007, leg. J. Bezděk; **2w:** Jerash gov., 24 km N of Amman, 249 m, 32.21507 N / 35.88487 E, 19 V 2007, leg. Z. Kejval.

Comments: Recorded from Israel and Turkey. New to Jordan.

Bothriomyrmex syria Forel, 1910

Bothriomyrmex meridionalis var. *syria* Forel, 1910a: 13 (w.)

Distribution: Recorded from Jordan: Ain Gleidat (Tafila gov.) by Wheeler and Mann (1916).

Comments: The only reliable records of this species are from Lebanon (terra typica), Israel and Syria.

Camponotus fellah Dalla Torre, 1893

Camponotus oasium var. *fellah* Dalla Torre, 1893: 245 (w.)

Distribution: Recorded from Jordan: Akaba (Aqaba gov.) by Ionescu-Hirsch (2009).

Comments: *Camponotus fellah* was recorded from Egypt, Israel, Iran, Iraq, Jordan, Kuwait, Lebanon, Oman, Saudi Arabia, Syria, Turkey, United Arab Emirates and Yemen.

Camponotus gestroi Emery, 1878* **(Fig. 2)**

Camponotus gestroi Emery, 1878: 44, fig. (s.w.)

Material examined: 1w: Ajlun gov., 16 km N of Ajloun, 580 m, 32.45122 N / 35.70673 E, 21 V 2007, leg. Z. Kejval.

Comments: Widespread in the Mediterranean area east to Iran. New to Jordan.

Camponotus husseini Dietrich, 2004 **(Fig. 3)**

Camponotus husseini Dietrich, 2004: 328, fig. 9 (w.)

Distribution: Described from Jordan: Wadi Arava (Aqaba gov.) in Jordan by Dietrich (2004).

Material examined: 1w: Tafila gov., 20 km NW of At Tafila, - 260 m, 30.88166 N / 35.63135 E, 1 VI 2007, leg. Z. Kejval.

Comments: Recorded also from Egypt, Saudi Arabia and Yemen. Because Wadi Arava is a border area between Jordan and Israel its occurrence is Israel is highly possible.

Camponotus interjectus Mayr, 1877

Camponotus interjectus Mayr, 1877: 4 (w.q.)

Distribution: Recorded from Jordan: Wadi Kerak (Karak gov.) by Wheeler and Mann (1916).

Comments: Known from Afghanistan, Azerbaijan, Dagestan, Iran, Iraq, Israel, Kazakhstan, Kirgizstan, Uzbekistan and Xinjiang Province in western China.

Camponotus rebeccae Forel, 1913* **(Fig. 4)**

Camponotus lateralis var. *rebeccae* Forel, 1913: 436 (s.)

Material examined: 2w: Ajlun gov., 3 km W of Ajloun, 855 m, 32.33116 N / 35.71835 E, 20 V 2007, leg. Z. Kejval; **1w:** Ajlun gov., 10 km N of Ajloun, 304 m, 32,40137 N / 35,68871 E, 22 V 2007, leg. Z. Kejval; **1w:** Ajlun gov., 16 km N of Ajloun, 580 m, 32.45122 N / 35.70673 E, 21 V 2007, leg. Z. Kejval; **1w:** Jerash gov., 24 km N of Amman, 249 m, 32,21507 N / 35,88487 E, 19 V 2007, leg. Z. Kejval.

Comments: Recorded from Cyprus, Greece (Crete, Dodecanese), Israel, Lebanon, Syria and southern Turkey. New to Jordan.

Camponotus sanctus Forel, 1904

Camponotus maculatus r. *sanctus* Forel, 1904: 18 (s.w.q.m.)

Distribution: Recorded from Jordan: ancient Petra (Ma'an gov.) by Wheeler and Mann (1916)

Material examined: 5w, 2m: Ajlun gov., 3 km W of Ajloun, 855 m, 32.33116 N / 35.71835 E, 20 V 2007, leg. Z. Kejval; **2w:** Aqaba gov., Wadi Ramm, 800 m, 29.65 N / 35.48333 E, 29 V 2007, leg. J. Bezděk; **3w:** Tafila gov., 25 km S of At-Tafila, 1500 m, 30.68333 N / 35.61666 E, 27 V 2007, leg. J. Bezděk; **1Q, 3w, 1m:** Tafila gov., 3.5 km S of At Tafila, 1520 m, 30.69293 N / 35.62406 E, 27 V 2007, leg. Z. Kejval.

Comments: Known from Afghanistan, Cyprus, Greece (Aegean islands, Dodecanese), Iran, Israel, Lebanon, Syria, and Turkey.

Camponotus sinaiticus Ionescu-Hirsch, 2010

Camponotus (*Tanaemyrmex*) *sinaiticus* Ionescu-Hirsch, 2010: 89, figs. 9, 44 (s.w.)

Distribution: Described from Jordan: Karak (Karak gov.) by Ionescu-Hirsch (2010).

Comments: Type locality includes also Egypt (Sinai) and Israel (Ionescu-Hirsch 2010).

Camponotus turkestanicus Emery, 1887

Camponotus sylvaticus st. *turkestanicus* Emery, 1887a: 212 (w.)

Distribution: Recorded from Jordan: Wadi Hisa in Tafila gov. by Wheeler and Mann (1916).

Comments: Most likely this record is based on misidentification, as *C. turkestanicus* has more eastern distribution (eastern part of European Russia, Iran and Central Asia). It is also possible that it was confused with *Camponotus turkestanus* André, 1882, a species known from Iran, Israel, Lebanon and several countries of Central Asia (see comments below on *Camponotus turkestanus*).

Camponotus turkestanus André, 1882

Camponotus sylvaticus var. *turkestanus* André, 1882: 145.

Distribution: Menozzi (1993) recorded this species generally from Palestine and Transjordan.

Comments: Although *C. turkestanus* and *C. turkestanicus* are distinct species, they are commonly confused, probably due to their similar names. Thus, the occurrence of both *C. turkestanus* and *C. turkestanicus* in Jordan needs confirmation.

Cardiocondyla bicoronata Seifert, 2003

Cardiocondyla bicoronata Seifert, 2003: 242, figs. 21, 22 (w.q.)

Distribution: Described from Jordan: Shaumari Wildlife Reserve (Zarqa gov.), Abyad (Karak gov.), Ma'an (Ma'an gov.), Quasr Burqu (Mafraq gov.) and Safawo (Mafraq gov.) by Seifert (2003).

Comments: Type specimens come also from Israel, United Arab Emirates, Yemen and "Turkestan" Seifert (2003).

Cardiocondyla mauritanica Forel, 1890

Cardiocondyla nuda var. *mauritanica* Forel, 1890: lxxv (w.)

Distribution: Recorded from Jordan: Hammamat Main and Wadi Mujib (Madaba gov.), and Rum (Aqaba gov.) by Seifert (2003).

Comments: An invasive species known from almost all continents except Australia, most records are from the Mediterranean.

Cardiocondyla tenuifrons Seifert, 2003

Cardiocondyla tenuifrons Seifert, 2003: 243, fig. 24 (w.)

Distribution: Described from Jordan: Abdallah between Shobek and Wadi Musa (Ma'an gov.) by Seifert (2003).

Comments: Known only from the type locality.

Cataglyphis arenarius (Finzi, 1940)

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

Material examined: 2w: Ajlun gov., 16 km N of Ajloun, 580 m, 32.45122 N / 35.70673 E, 21 V 2007, leg. Z. Kejval.

Comments: Known from whole North Africa, the Middle East, and Arabian Peninsula.

Cataglyphis holgerseni Collingwood & Agosti, 1996 **(Fig. 6)**

Cataglyphis holgerseni Collingwood & Agosti, 1996: 379 (w.)

Distribution: Recorded from Jordan: Aqba by Ionescu and Eyer (2016).

Material examined: 3w: Aqaba gov., Wadi Ramm, 800 m, 29.65 N / 35.48333 E, 29 V 2007, leg. J. Bezděk; **1w:** Aqaba gov., Wadi Rum, 1110 m, 29.49 N / 35.43 E, 16 III 2019, leg. G. Platia.

Comments: Known from Egypt, Israel, Oman and Saudi Arabia.

Cataglyphis* cf. *livida

Material examined: 1w: Amman gov., 3.6 km S of Al. Zumayla, 730 m, 31.512 N / 36.057 E, 1 IV 2010, leg. G. Sabatinelli; **1w:** Aqaba gov., Wadi Rum, Delseh, 1115 m, 29.498 N / 35.432 E, 20 III 2010, leg. G. Sabatinelli.

Comments: Examined specimens belong to the small, pale species close to *Cataglyphis livida* (André) but differ in slightly darker yellow colour and less shiny body surface.

Cataglyphis nigra (André, 1881) **(Fig. 5)**

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

Distribution: The species was recorded from Jordan by Knaden *et al.* (2012) from Al-Jafr, but Eyer *et al.* (2017) considered this record as doubtful and suggested misidentification with *C. holgerseni*. Here we confirm the presence of these two taxa for Jordan.

Material examined: 1w: Amman gov., 3.6 km S of Al. Zumayla, 730 m, 31.512 N / 36.057 E, 1 IV 2010, leg. G. Sabatinelli.

Comments: Species known from Afghanistan, Egypt, Iran, Israel, Kuwait, Libya, Oman, Saudi Arabia, United Arab Emirates and Yemen. Status of Jordanian populations of *Cataglyphis nigra* is still under discussion due to complex genetic structure of members of the *Cataglyphis bicolor* group (Eyer *et al*. 2017).

Figs. 1–6. Worker lateral: 1 – *Aphaenogaster syriaca* Emery, 2 – *Camponotus gestroi* Emery, 3 – *Camponotus husseini* Dietrich, 4 – *Camponotus rebeccae* Forel, 5 – *Cataglyphis nigra* (André), 6 – *Cataglyphis holgerseni* Collingwood & Agosti (photo L. Borowiec).

Cataglyphis nodus (Brullé, 1833)

Formica nodus Brullé, 1833: 326, pl. 48, fig. 1 (w.)

Distribution: Recorded from Jordan: Wadi Hisa (Tafila gov.) and Wadi Mojeb (now Wadi al-Mujib, Kerak gov.) by Wheeler and Mann (1916) as *Cataglyphis viatica* ssp. *bicolor* var. *orientalis*.

Comments: Widely spread in northern Africa, south-eastern Europe, Asia Minor, the Middle East, Arabian Peninsula and Central Asia east to Afghanistan. Eyer *et al*. (2017) suggested that there is no true *C. nodus* in Israel, only its hybrids with other local species thus status of Jordanian populations needs conformation by genetic studies.

***Cataglyphis* cf. *nodus* sp. 1**

Material examined: 1w: Ajloun gov., Ajloun vic., 850 m, 32.33126 N / 35.7185, 2 VI 2007, leg. Z. Kejval.

Comments: At first glance this species reminds *Cataglyphis nodus* (Brullé) but it differs

in very short erect setae on head, mesosoma and gastral tergites. It belongs to the *Cataglyphis bicolor* species group which is speciose and consist several taxa of uncertain position. Eyer *et al*. (2017) noted high level of hybridization between species of the *Cataglyphis bicolor* species group. Thus, the proper identification of the Jordanian specimen is impossible until the comprehensive revision of the whole *C. bicolor* group.

***Cataglyphis* cf. *nodus* sp. 2**

Material examined: 3w: Jerash gov., 20 km N of Amman, 250 m, 32.2 N / 35.88333 E, 26 V 2007, leg. J. Bezděk; **1w:** Madaba gov., 20 km SW of Madaba, 400 m, 31.63333 N / 35.68333 E, 19 V 2007, leg. J. Bezděk.

Comments: Another species of the *Cataglyphis bicolor* species group close to *C. nodus* but with short erect setae on head, mesosoma and gastral tergites, dark, brownish-red body, and almost black legs. See also comments under *Cataglyphis* cf. *nodus* sp. 1.

Cataglyphis semitonsa Santschi, 1929

Cataglyphis (*Cataglyphis*) *albicans* var. *semitonsa* Santschi, 1929: 61 (w.)

Distribution: Recorded generally from Jordan by Ghahari and Collingwood (2013) but with no bibliographic data. Thus occurrence of this species in Jordan needs confirmation.

Comments: Known from North Africa except Egypt and Tunisia, Iran, Iraq, Lebanon, Oman, Saudi Arabia and Yemen.

Cataglyphis* cf. *viaticoides

Material examined: 4w: Amman gov., 3.6 km S of Al. Zumayla, 730 m, 31.512 N / 36.057 E, 1 IV 2010, leg. G. Sabatinelli.

Comments: This is a small species with reddish head and mesosoma, and reddish brown gaster. At first glance it is similar to *Cataglyphis viaticoides* (André, 1881) but differs in slightly more sculptured body, and more dull and paler coloured gaster surface. Probably an undescribed species.

Colobopsis truncata (Spinola, 1808)

Formica truncata Spinola, 1808: 244 (q.)

Material examined: 1w: Ajlun gov., 3 km W of Ajloun, 855 m, 32.33116 N / 35.71835 E, 20 V 2007, leg. Z. Kejval.

Comments: Wide spread in Europe, north-eastern Africa, and southern Siberia, in the Middle East rare, known only from Israel and Lebanon. General information on occurrence in Jordan by Borowiec (2014) based on the specimen noted above.

Crematogaster inermis Mayr, 1862

Crematogaster inermis Mayr, 1862: 766.

Distribution: Recorded from Jordan: Wadi Mojeb (now Wadi al-Mujib, Kerak gov.) by Wheeler and Mann (1916).

Comments: The taxon *Crematogaster inermis* was recorded from Cyprus, Egypt, Iran, Israel, Syria, Yemen, Libya and Morocco but some of these records need confirmation. Recent materials suggest that this is a group of cryptic taxa. We compared our material of this group from Jordan with type of *Crematogaster warburgi* Menozzi, 1933 and they appear to be conspecific. Thus, record of *C. inermis* from Jordan needs confirmation.

Crematogaster ionia (Forel, 1911)

Crematogaster scutellaris var. *ionia* Forel, 1911: 340 (w.q.)

Distribution: Recorded from Jordan: Petra (Ma'an gov.) by Wheeler and Mann (1916) as *Crematogaster scutellaris* ssp. *schmidti* var. *ionia*.

Material examined: 1w: Ajlun gov., 3 km W of Ajloun, 855 m, 32.33116 N / 35.71835 E, 20 V 2007, leg. Z. Kejval.

Comments: Recorded from the Balkan Peninsula, Cyprus, Turkey, Israel, Lebanon and Syria. Eastern populations differ slightly from western ones and with great probability this taxon is a complex of two cryptic taxa. Until the revision of this species group we use the name *C. ionia* for Jordanian specimen.

Crematogaster jehovae Forel, 1907 **(Fig. 7)**

Crematogaster (*Acrocoelia*) *auberti* subsp. *jehovae* Forel, 1907a: 207 (w.)

Distribution: Recorded from Jordan: Wadi Kerak (Karak gov.) and Ain Gleidat (Tafila gov.) by Wheeler and Mann (1916).

Material examined: 8w: Aqaba gov., Wadi Rum, Delseh, 1115 m, 29.498 N / 35.432 E, 20 III 2010, leg. G. Sabatinelli; **6w:** Karak gov., 3 km NNW of Rabba, 900 m, 31.3 N / 35.71666 E, 27 V 2007, leg. J. Bezděk; **5w:** Tafila gov., 3.5 km S of At Tafila, 1520 m, 30.69293 N / 35.62406 E, 27 V 2007, leg. Z. Kejval.

Comments: *Crematogaster jehovae* Forel was recored from several Balkan and eastern Mediterranean countries but the only confirmed records of this species are from Egypt and all countries in the Middle East.

Crematogaster* cf. *jehovae

Material examined: 1w: Ajlun gov., 16 km N of Ajloun, 580 m, 32.45122 N / 35.70673 E, 21 V 2007, leg. Z. Kejval; **1w:** Jerash gov., 24 km N of Amman, 249 m, 32.21507 N / 35.88487 E, 19 V 2007, leg. Z. Kejval.

Comments: A member of the *Crematogaster jehovae* species group. Differs from the typical *C. jehovae* in more convex promesonotum and distinct microreticulation between rugae on pronotum.

Crematogaster lorteti Forel, 1910

Crematogaster lorteti Forel, 1910b: 435 (w.q.)

Distribution: Recorded from Jordan: Ain Gleidat (Tafila gov.) by Wheeler and Mann (1916).

Comments: Known from the Balkan Peninsula, Turkey, Israel, Lebanon and Syria.

Crematogaster luctans Forel, 1907

Crematogaster luctans Forel, 1907b: 22 (w.q.)

Distribution: Recorded generally from Jordan by Ghahari and Collingwood (2013) but with no bibliographic data. Thus occurrence of this species in Jordan needs confirmation.

Comments: Recorded from 8 countries of Central and East Africa, Arabian Peninsula and Iran. Due to lack of comprehensive revision of the genus *Crematogaster* from arid parts of Africa and western Asia some records are probably based on misidentification.

Crematogaster warburgi Menozzi, 1933* **(Fig. 8)**

Crematogaster (*Acrocoelia*) *warburgi* Menozzi, 1933: 59, fig. 1 (w.)

Material examined: 1w: Ajlun gov., 3 km W of Ajloun, 855 m, 32.33116 N / 35.71835 E, 20 V 2007, leg. Z. Kejval; **25w:** Ajlun gov., 10 km N of Ajloun, 304 m, 32.40137 N / 35.68871 E, 22 V 2007, leg. J. Bezděk and Z. Kejval.

Comments: Known from Egypt, Turkey, Iran, Israel, Lebanon and Syria. New to Jordan.

Hypoponera punctatissima (Roger, 1859)* **(Fig. 9)**

Ponera punctatissima Roger, 1859: 246, pl. 7, fig. 7 (w.q.)

Material examined: 3w: Aqaba gov., Wadi Ramm, 789 m, 29.66438 N / 35.48515 E, 30 V 2007, leg. Z. Kejval.

Comments: Cosmopolitan species, in the Near East recorded Egypt, Israel, Lebanon, Oman, Saudi Arabia, United Arab Emirates and Yemen. New to Jordan.

Lasius cf. *emarginatus*

Material examined: 2w: Ajlun gov., 10 km N of Ajloun, 304 m, 32.40137 N / 35.68871 E, 22 V 2007, leg. Z. Kejval.

Comments: This is probably an undescribed member of the *Lasius emarginatus* complex with strongly setose antennal scapi and legs. It is well distinguished from other species in shiny, lacking microreticulation surface of gastral tergites. At first glance it looks similar to *Lasius tebessae* Seifert, 1992 described from Algeria but comparison of our specimens with types of *L. tebessae,* available in AntWeb, show strong differences. *Lasius tebessae* was recorded from Israel (Vonshak & Ionescu-Hirsch 2010) thus our Jordanian material requires more detailed comparison with Algerian specimens.

Lepisiota bipartita (Smith, 1861)* **(Fig. 10)**

Formica bipartita Smith, 1861: 33 (w.)

Material examined: 1w: Ajlun gov., 3 km W of Ajloun, 855 m, 32.33116 N / 35.71835 E, 20 V 2007, leg. Z. Kejval; **1w:** Ajlun gov., 10 km N of Ajloun, 304 m, 32.40137 N / 35.68871 E, 22 V 2007, leg. Z. Kejval; **5w:** Ajlun gov., 16 km N of Ajloun, 580 m, 32.45122 N / 35.70673 E, 21 V 2007, leg. Z. Kejval; **1w:** Tafila gov., 20 km NW of At Tafila, - 260 m, 30.88166 N / 35.63135 E, 1 VI 2007, leg. Z. Kejval.

Comments: Known from Algeria, Tunisia, Israel, Lebanon, Syria, Iran and Turkmenistan. New to Jordan.

Lepisiota cf. *bipartita* sp. 1

Material examined: 3w: Ajlun gov., 30 km W of Jarash, 850 m, 32.31666 N / 35.71666 E, 20 V 2007, leg. J. Bezděk; **1w:** Ajlun gov., 10 km N of Ajloun, 304 m, 32.40137 N / 35.68871 E, 22 V 2007, leg. J. Bezděk; **4w:** Ajlun gov., 16 km NW of Ajlun, 600 m, 32.43333 N / 35.68333 E, 21 V 2007, leg. J. Bezděk; **4w:** Karak gov., 3 km NNW of Rabba, 900 m, 31.3 N / 35.71666 E, 27 V 2007, leg. J. Bezděk.

Comments: Similar to *Lepisiota bipartita* (Smith) but differs in narrower petiolar scale and shinier gaster. Proper identification impossible due to taxonomic and nomenclatorial chaos in the *Lepisiota frauenfeldi* complex.

Lepisiota frauenfeldi (Mayr, 1855)

Hypoclinea frauenfeldi Mayr, 1855: 378 (w.)

Distribution: Recorded from Jordan: Wadi Hisa (Tafila gov.) by Wheeler and Mann (1916)

Comments: This record needs confirmation due to taxonomic and nomenclatorial chaos in the *Lepisiota frauenfeldi* complex.

Lepisiota gracilicornis (Forel, 1892)

Acantholepis gracilicornis Forel, 1892: 42 (w.)

Distribution: Recorded from Jordan: Wadi Titin 8 km S of Aqaba and Baqin in Wadi Araba 36 km N of Aqaba (Aqaba gov.) by Dietrich (2004).

Comments: Recorded from Senegal, Egypt, Eritrea, Ethiopia, Sudan, Israel, Saudi Arabia, Oman, United Arab Emirates and Yemen.

Lepisiota opaciventris (Finzi, 1936)

Acantholepis frauenfeldi var. *opaciventris* Finzi, 1936: 187, fig. 11 (w.)

Distribution: Recorded from Jordan: Petra (Ma'an gov.), Wadi Titin and Wadi Hisman (Aqaba gov.) by Dietrich (2004).

Comments: Recorded from Egypt, Israel, Saudi Arabia, Oman, United Arab Emirates and Yemen.

Messor* cf. *caducus

Material examined: 5w: Tafila gov., 3.5 km S of At Tafila, 1520 m, 30.69293 N / 35.62406 E, 27 V 2007, leg. Z. Kejval.

Comments: This species is similar to *Messor caducus causcasicola* Arnoldi, 1977 but differs in shiny, less sculptured head and first gastral tergite, and higher, triangular propodeal denticles. The *Messor caducus* complex is speciose in Arabian and Turanian area and needs comprehensive revision.

Messor dentatus Santschi, 1927

Messor semirufus var. *dentatus* Santschi, 1927a: 228 (w.q.m.)

Distribution: Recorded generally from Jordan by Borowiec (2014) based on a specimen housed in CAS and labeled: [Amman gov.] Amman, Zitadelle, 450 m, 2 VI 1990, leg. D. Agosti (CASENT0281607).

Comments: Recorded from Turkey, Israel, Lebanon, Syria and Iran.

Messor* cf. *ebeninus

Material examined: 1w: Ajlun gov., 10 km N of Ajloun, 304 m, 32.40137 N / 35.68871 E, 22 V 2007, leg. Z. Kejval; **1w:** Jerash gov., 24 km N of Amman, 249 m, 32.21507 N / 35.88487 E, 19 V 2007, leg. Z. Kejval.

Comments: This moderately large, almost completely black species belongs to the *Messor semirufus* group, and is similar to *M. ebeninus* Santschi, 1927, known from Libya, Egypt, Turkey, Arabian Peninsula, Israel, Lebanon, Syria and Iran. This group is speciose in the Middle East and without comprehensive revision its identification is impossible.

Messor foreli Santschi, 1923

Messor aegyptiacus var. *foreli* Santschi, 1923: 322, fig. 1 (w.)

Distribution: Recorded from Jordan: Aqaba gov., Aqaba by Santschi (1928).

Comments: Known from North Africa, Chad, Saudi Arabia, Oman and United Arab Emirates.

Messor galla (Mayr, 1904)

Stenamma (*Messor*) *barbarum* var. *galla* Mayr, 1904: 5 (w.)

Distribution: Recorded generally from Jordan by Ghahari and Collingwood (2013) but with no bibliographic data thus occurrence of this species in Jordan needs confirmation.

Comments: This species is widely distributed in sub-Saharan Africa, and was recorded also from Egypt, Libya, Saudi Arabia, Oman and Yemen. Due to taxonomic chaos in the genus *Messor* some records are doubtful.

Messor* cf. *minor

Material examined: 5w: Amman gov., 3.6 km S of Al. Zumayla, 730 m, 31.512 N / 36.057 E, 1 IV 2010, leg. G. Sabatinelli;

Comments: This small, almost completely red species belongs to the *Messor semirufus* complex, and at first glance is similar to *Messor minor* (André, 1883), which is known mostly from the western part of the Mediterranean basin. It was mentioned also for Arabian Peninsula, Iraq and Iran but these records are probably based on misidentifications. This complex is speciose in the Middle East and without comprehensive revision difficult to identification.

Messor orientalis (Emery, 1898)

Stenamma (*Messor*) *structor* var. *orientalis* Emery, 1898: 143 (w.q.m.)

Distribution: Recorded from Jordan: Wadi Hissa (now Wadi al Hasa.) and Ain Gleidat (Tafila gov.) by Wheeler and Mann (1916).

Comments: Revised records of this species come from Cyprus and southern Turkey (Steiner *et al*. 2018 and our unpublished data). Records from Jordan, Israel, Lebanon and Syria are possible but need confirmation due to taxonomic and nomenclatorial chaos in eastern taxa of the *Messor structor* group.

Messor rufotestaceus (Foerster, 1850)

Myrmica rufotestacea Foerster, 1850: 489 (w.)

Distribution: Recorded from Jordan: Petra (Ma'an gov.) by Wheeler and Mann (1916).

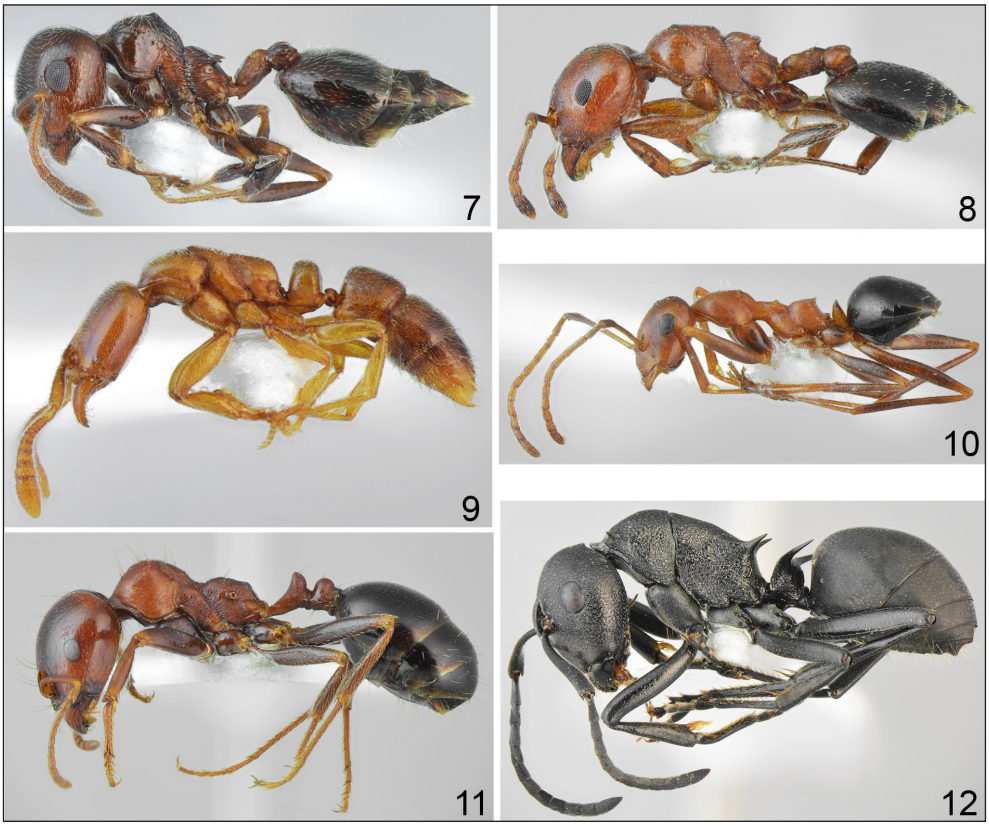
Comments: Known from Morocco, Algeria, Egypt, Israel, Lebanon, Syria, Iran, Saudi Arabia, Oman and United Arab Emirates.

Messor semirufus (André, 1883) **(Fig. 11)**

Aphaenogaster barbara var. *semirufa* André, 1883: 355 (w.q.)

Distribution: Recorded from Wadi Hisa (Tafila gov.) by Wheeler and Mann (1916)

Material examined: 6w: Ajlun gov., 10 km N of Ajloun, 304 m, 32.40137 N / 35.68871 E, 22 V 2007, leg. J. Bezděk.



Figs. 7–12. Worker lateral: 7 – *Crematogaster jehovae* Forel, 8 – *Crematogaster warburgi* Menozzi, 9 – *Hypoponera punctatissima* (Roger), 10 – *Lepisiota bipartita* (Smith), 11 – *Messor semirufus* (André), 12 – *Polyrhachis lacteipennis* Smith (photo L. Borowiec).

Comments: Jordanian specimens have frontal face of the head with more or less developed dark patch of diffused borders and belong to the form described as *Messor semirufus* var. *maculifrons* Santschi, 1927, sometimes treated as independent species. *Messor semirufus* was recorded from several localities in Mediterranean Basin, the Middle East, Arabian Peninsula, Iran, Afghanistan and Kashmir but most records based probably on misidentification. The *Messor semirufus* group needs comprehensive revision. It is highly possible that the type series of this taxon consists a group of specimens belonging to more than one species. Thus, until a designation of lectotype of *M. semirufus* we use this name for all populations from the Middle East.

Messor cf. *semirufus* sp. 1

Material examined: 10w: Tafila gov., 20 km NW of At Tafila, - 260 m, 30.88166 N / 35.63135 E, 1 VI 2007, leg. Z. Kejval.

Comments: Member of the *Messor semirufus* group characterized by small size, reddish mesosoma, head darker than mesosoma but not black, and black gaster. This group is speciose in the Middle East and without comprehensive revision difficult to identification.

Messor cf. *semirufus* sp. 2

Material examined: 9w: Karak gov., 3 km NNW of Rabba, 900 m, 31.3 N / 35.71666 E, 27 V 2007, leg. J. Bezděk.

Comments: Similar to *Messor semirufus* (André, 1883) but differs in less reticulate first gastral tergite and distinct propodeal denticles.

Messor sultanus Santschi, 1917

Messor barbarus var. *sultana* Santschi, 1917: 89 (w.)

Distribution: Recorded generally from Jordan by Ghahari and Collingwood (2013) but with no bibliographic data. Thus, occurrence of this species in Jordan needs confirmation.

Comments: This species was described from Israel, later recorded from Iran, Egypt, Lebanon, Syria and Turkey, but some of these records need confirmation. Its occurrence in Jordan is possible.

Messor cf. *syriacus*

Material examined: 7w: Jerash gov., 20 km N of Amman, 250 m, 32.2 N / 35.88333 E, 26 V 2007, leg. J. Bezděk.

Comments: This species resembles *Messor syriacus* Tohmé, 1969 but differs in well-marked microreticulate sculpture and more numerous erect setae on first gastral tergite.

Monomorium abeillei André, 1881

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

Distribution: Recorded from Jordan: Petra (Ma'an gov.) by Wheeler and Mann (1916).

Comments: Known from Egypt, Sudan, Israel, Lebanon, Syria, whole Arabian Peninsula except Qatar, Iran and Afghanistan.

Monomorium baal Wheeler & Mann, 1916

Monomorium (*Holcomyrmex*) *dentigerum* var. *baal* Wheeler and Mann, 1916: 171 (w.)

Distribution: Described from Jordan: Wadi Kerak (Karak gov.) in Jordan and Shiba (Sheeba) in Syria as *Monomorium* (*Holcomyrmex*) *dentigerum* var. *baal* by Wheeler and Mann (1916).

Comments: *Monomorium dentigerum* var. *baal* was raised to species rank by Agosti and Collingwood (1987a, b), but Radchenko (1997) synonymized it with *Monomorium dentigerum* (Roger, 1862). Because authors of above-mentioned publications did not examine types of *Monomorium* (*Holcomyrmex*) *dentigerum* var. *baal* Wheeler & Mann, its status remains uncertain.

Monomorium dentigerum (Roger, 1862)

Atta dentigera Roger, 1862: 259 (w.)

Distribution: Recorded from Jordan: Petra (Ma'an gov.) by Wheeler and Mann (1916).

Comments: Certain records are from Israel, Lebanon, Syria, Iraq and Iran.

Monomorium luteum Emery, 1881* **(Fig. 13)**

Monomorium luteum Emery, 1881: 533 (w.)

Material examined: 3w: Aqaba gov., Wadi Rum, Delseh, 1115 m, 29.498 N / 35.432 E, 20

III 2010, leg. G. Sabatinelli; **10w:** Tafila gov., 20 km NW of At Tafila, - 280 m, 30.86666 N / 35.43333 E, 31 V 2007, leg. J. Bezděk.

Comments: Known from Egypt, Eritrea, and whole Arabian Peninsula except Qatar. New to Jordan.

Monomorium phoenicum Santschi, 1927

Monomorium (*Xeromyrmex*) *subopacum* var. *phoenicum* Santschi, 1927b: 242 (w.q.)

Distribution: Recorded from Jordan: Aqaba (Aqabq gov.) and Petra (Ma'an gov.) by Wheeler and Mann (1916).

Comments: Known from Tunisia, Libya, Egypt, Turkey, all countries of the Middle East and Arabian Peninsula. Doubtful records from Greece and Serbia based probably on misidentifications.

Monomorium salomonis (Linnaeus, 1758)

Formica salomonis Linnaeus, 1758: 580 (w.)

Distribution: Recorded from Jordan: Wadi Mojeb (now Wadi al-Mujib, Kerak gov.) by Wheeler and Mann (1916).

Comments: *Monomorium salomonis* was recorded from several countries of northern and Saharan Africa, the Middle East and Saudi Arabia. It is also known as invasive species from the Mediterranean part of Spain, Madagascar, Antilles, and as introduced species from some European countries. Probably many of these records are based on misidentifications. *Monomorium salomonis* auct. appears to be a group of similar species and needs revision based on large materials from North Africa, the Middle East and Mediterranean area. Confirmed records are from northwestern Africa and western part of the Mediterranean basin. Samples from Jordan probably belong to one of members of the *M. salomonis* group but not to the true *Monomorium solomonis*.

Monomorium* cf. *salomonis

Material examined: 5w: Karak gov., 3 km NNW of Rabba, 900 m, 31.3 N / 35.71666 E, 27 V 2007, leg. J. Bezděk.

Comments: Member of the *salomonis* grup. Slightly more sculptured and duller than true *M. salomonis* and shinier than *M. subopacum* (Smith, 1858). See also comments under *Monomorium salomonis* (Linnaeus).

***Monomorium* cf. *subopacum* sp. 1**

Material examined: 14w: Aqaba gov., Wadi Ramm, 800 m, 29.65 N / 35.48333 E, 29 V 2007, leg. J. Bezděk.

Comments: The *Monomorium subopacum* complex (sensu Bolton 1987) is speciose and needs comprehensive revision. Thus, before the revision a correct identification of samples from the Middle East is impossible.

***Monomorium* cf. *subopacum* sp. 2**

Material examined: 4w: Aqaba gov., Aqaba, Red Sea shore, 10 m, 29.51666 N / 34.98333 E, 30 V 20017, leg. J. Bezděk **; 6w:** Aqaba gov., 30 km N of Aqaba, 180 m, 30.11666 N / 35.18333 E, 31 V 2007, leg. J. Bezděk.

Comments: See comments in *Monomorium* cf. *subopacum* sp. 1.

Monomorium sp.

Material examined: 1w: Tafila gov., 20 km NW of At Tafila, - 260 m, 30.88166 N / 35.63135 E, 1 VI 2007, leg. Z. Kejval.

Comments: This is a distinct species characterized by elongate, parallelsided head, pronotum with a pair of erect setae, first gastral tergite with numerous erect setae and ventral side of head with few erect setae. This set of characters occurs in several species described from Saudi Arabia but none of the Arabian species has head as elongate as specimen from Jordan.

Monomorium venustum (Smith, 1858)* **(Fig. 14)**

Myrmica venusta Smith, 1858: 126 (w.)

Material examined: 11w: Amman gov., 3.6 km S of Al. Zumayla, 730 m, 31.512 N / 36.057 E, 1 IV 2010, leg. G. Sabatinelli.

Comments: Known from Libya, Egypt, Ethiopia, Israel, Lebanon, Syria, Iran, Turkmenistan, Kuwait, Oman and Saudi Arabia. New to Jordan.

Nylanderia jaegerskioeldi (Mayr, 1904)

Prenolepis (*Nylanderia*) *jaegerskioeldi* Mayr, 1904: 8 (w.)

Distribution: Recorded from Jordan: Wadi Kerak (Karak gov.) by Wheeler and Mann (1916).

Comments: Wide spread in Mediterranean area as invasive species, the Middle East, recorded also from several African countries.

Pheidole jordanica Saulcy, 1874

Pheidole jordanica Saulcy, 1874: 17 (s.w.)

Distribution: Described from Jordan River valley by Emery (1889).

Comments: Except type locality recorded from the whole northern Africa, Chad, Sudan, Israel, Saudi Arabia and United Arab Emirates.

Pheidole koshewnikovi Ruzsky, 1905

Pheidole pallidula subsp. *koshewnikovi* Ruzsky, 1905: 648 (s.w.)

Distribution: Recorded from ancient Petra (Ma'an gov.) and Wadi Kerak (Karak gov.) as *Pheidole pallidula* by Wheeler and Mann (1916).

Material examined: 2w: Ajlun gov., 16 km NW of Ajlun, 600 m, 32.43333 N / 35.68333 E, 21 V 2007, leg. J. Bezděk; **5w:** Tafila gov., 3.5 km S of At Tafila, 1520 m, 30.69293 N / 35.62406 E, 27 V 2007, leg. Z. Kejval.

Comments: According to the recent revision of the Mediterranean *Pheidole pallidula* group (Seifert 2016) in eastern part of the Mediterranean basin occurs *Pheidole koshewnikovi* Ruzsky, 1905 and previous records from Jordan should be attributed to this taxon. *Pheidole pallidula* (Nylander, 1849) is more western species.

Plagiolepis pygmaea (Latreille, 1798)

Formica pygmaea Latreille, 1798: 45 (w.q.)

Distribution: Recorded from Jordan: Ain Gleidat (Tafila gov.) and Petra (Ma'an gov.) by Wheeler and Mann (1916).

Comments: Widely spread in central and southern Europe, North Africa, the Middle East and Central Asia.

Polyrhachis lacteipennis Smith, 1858 **(Fig. 12)**

Polyrhachis lacteipennis Smith, 1858: 60, pl. 4, fig. 40 (q.)

Distribution: Recorded from Wadi Kerak (Karak gov.) by Wheeler and Mann (1916).

Material examined: 5w: Tafila gov., 20 km NW of At Tafila, - 260 m, 30.88166 N / 35.63135 E, 1 VI 2007, leg. Z. Kejval.

Comments: Recorded from Egypt, Israel, Lebanon, almost whole Arabian Peninsula, Iraq, Iran, Afghanistan, India and Myanmar.

Polyrhachis palaearctica Dietrich, 2004

Polyrhachis palaearctica Dietrich, 2004: 330, figs. 11, 12 (w.q.m.)

Distribution: Described from Jordan: 5.4 km N of mouth of Wadi Zarqa Main (Madaba gov.), Hammamat Main (Madaba gov.), south end of Dead Sea (Karak gov.); 30 km N of Tafila (Karak gov.).

Comments: Known from type localities and Israel.

Tapinoma simrothi Krausse, 1911* **(Fig. 15)**

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

Material examined: 1Q, 1w: Ajlun gov., 10 km N of Ajloun, 304 m, 32.40137 N / 35.68871 E, 22 V 2007, leg. Z. Kejval; **1w:** Ajlun gov., 16 km N of Ajloun, 580 m, 32.45122 N / 35.70673 E, 21 V 2007, leg. Z. Kejval; **1w:** Amman gov., 3.6 km S of Al. Zumayla, 730 m, 31.512 N / 36.057 E, 1 IV 2010, leg. G. Sabatinelli; **1Q, 6w:** Balqa gov., NE side of Dead Sea, 9 m, 29.519 N / 35.001 E, 18 III 2019, leg. G. Platia; **5w:** Balqa gov., Jordan Valley, 280 m, 31.98333 N / 35.56666 E, 22 V 2007, leg. J. Bezděk; **4w:** Jerash gov., 20 km N of Amman, 250 m, 32.2 N / 35.88333 E, 26 V 2007, leg. J. Bezděk; **2w:** Jerash gov., 24 km N of Amman, 249 m, 32.21507 N / 35.88487 E, 19 V 2007, leg. Z. Kejval; **5w:** Karak gov., 3 km NNW of Rabba, 900 m, 31.3 N / 35.71666 E, 27 V 2007, leg. J. Bezděk; **3w:** Tafila gov., 20 km NW of At Tafila, - 260 m, 30.88166 N / 35.63135 E, 1 VI 2007, leg. Z. Kejval; **1Q:** Tafila gov., 3.5 km S of At Tafila, 1520 m, 30.69293 N / 35.62406 E, 27 V 2007, leg. Z. Kejval.

Comments: Common species in the Mediterranean area, recorded also from Turkmenistan, Afghanistan and Xinjiang Province in China. New to Jordan.

Temnothorax* cf. *aveli

Material examined: 1w: Ajlun gov., 30 km W of Jarash, 850 m, 32.31666 N / 35.71666 E, 20 V 2007, leg. J. Bezděk.

Comments: At first glance it is similar to members of the *T. aveli* species group due to regularly microreticulate head and completely yellow antennae, but is distinct from all revised taxa of this group in a series of morphological features. Probably an undescribed species.

Temnothorax cf. *exilis*

Material examined: 1w: Ajlun gov., 3 km W of Ajloun, 855 m, 32.33116 N / 35.71835 E, 20 V 2007, leg. Z. Kejval.

Comment: This species belongs to the *Temnothorax exilis* group but differs from all Mediterranean species in several characters. At first glance it is similar to *Temnothorax elmenshawyi* Sharaf, Wachkoo, Hita Garcia, 2019, recently described from SW Saudi Arabia, but differs from Arabian species in uniformly brown body, less marked metanotal groove and longer propodeal spines.

Temnothorax cf. *graecus* sp. 1

Material examined: 1w: Ajlun gov., 3 km W of Ajloun, 855 m, 32.33116 N / 35.71835 E, 20 V 2007, leg. Z. Kejval.

Comments: This is a member of the *Temnothorax graecus* group. The group is speciose in western part of the Mediterranean basin with some undescribed species (our unpublished data). Until the comprehensive revision of the group proper identification of Jordanian specimen is impossible.

Temnothorax cf. *graecus* sp. 2

Material examined: 3w: Ajlun gov., 30 km W of Jarash, 850 m, 32.31666 N / 35.71666 E, 20 V 2007, leg. J. Bezděk.

Comments: See comments under *Temnothorax* cf. *graecus* sp. 1.

Temnothorax cf. *graecus* sp. 3

Material examined: 1w: Ajlun gov., 30 km W of Jarash, 850 m, 32.31666 N / 35.71666 E, 20 V 2007, leg. J. Bezděk.

Comments: See comments under *Temnothorax* cf. *graecus* sp. 1.

Tetramorium argentirubrum Dietrich, 2004

Tetramorium argentirubrum Dietrich, 2004: 332, fig. 3 (w.)

Distribution: Described from Jordan: Shaumari Wildlife Reserve (Zarqa gov.) and Wadi Butm (Madaba gov.) by Dietrich (2004).

Comments: Known only from type localities.

Tetramorium cf. *depressiceps*

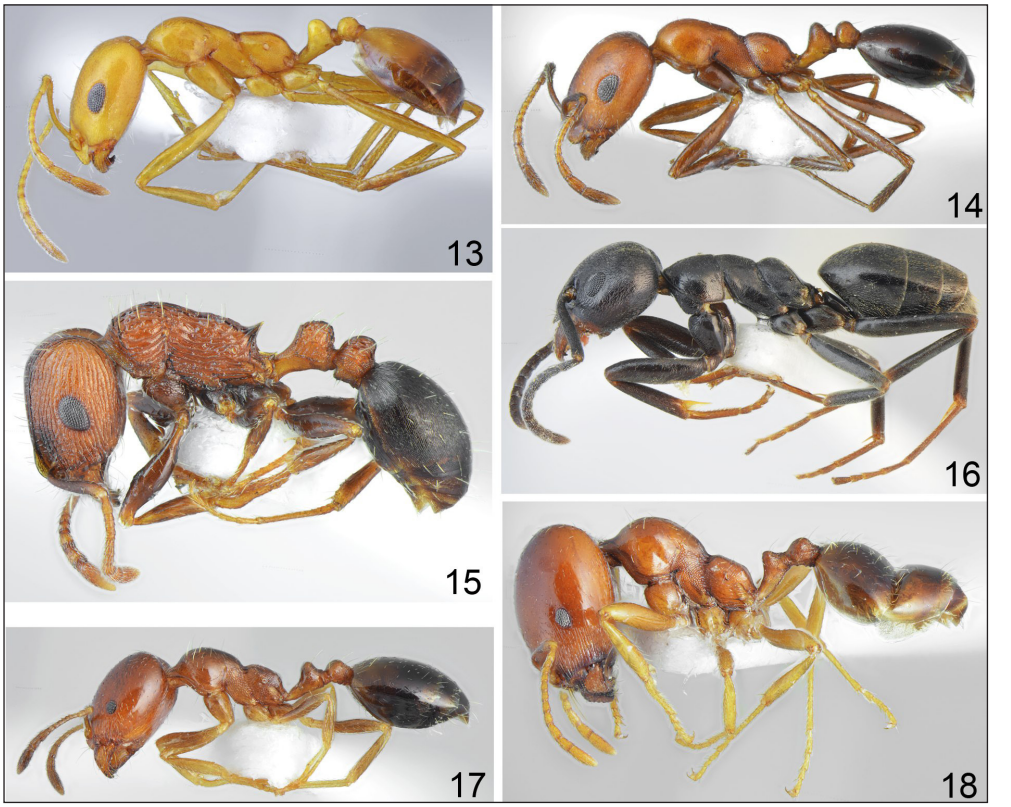
Material examined: 3w: Ajlun gov., 10 km N of Ajloun, 304 m, 32.40137 N / 35.68871 E, 22 V 2007, leg. Z. Kejval; **6w:** Jerash gov., 20 km N of Amman, 250 m, 32.2 N / 35.88333 E, 26 V 2007, leg. J. Bezděk; **3w:** Jerash gov., 24 km N of Amman, 249 m, 32.21507 N / 35.88487 E, 19 V 2007, leg. Z. Kejval.

Comment: A member of group of species characterized by mostly smooth and shiny frontal part of head. The group is speciose in the Middle East and needs comprehensive revision.

Tetramorium lucidulum Menozzi, 1933

Tetramorium punicum var. *lucidulum* Menozzi, 1933: 69 (w.)

Distribution: Recorded from Jordan: ancient Petra (Ma'an gov.) by Wheeler and Mann (1916).



Figs. 13–18. Worker lateral: 13 – *Monomorium luteum* Emery, 14 – *Monomorium venustum* (Smith), 15 – *Tapinoma simrothi* Krausse, 16 – *Tetramorium sabatinelli* Radchenko & Scupola, 17 – *Trichomyrmex destructor* (Jerdon), 18 – *Trichomyrmex perplexus* (Radchenko) (photo L. Borowiec).

Comments: *Tetramorium lucidulum* Menozzi was described from Syria, Asia Minor and Turkestan but series of syntypes probably comprises more than one species. It belongs to the speciose group of species from the eastern part of the Mediterranean Basin, the Middle East and Central Asia, characterized by mostly smooth and shiny frontal part of head. Before the designation of a lectotype of *Tetramorium lucidulum* and revision of Wheeler's material record from Jordan is uncertain.

Tetramorium cf. *meridionale* sp. 1

Material examined: 17w: Ajlun gov., 30 km W of Jarash, 850 m, 32.31666 N / 35.71666 E, 20 V 2007, leg. J. Bezděk; **1Q, 9w:** Tafila gov., 3.5 km S of At Tafila, 1520 m, 30.69293 N / 35.62406 E, 27 V 2007, leg. Z. Kejval.

Comments: This species, together with *Tetramorium meridionale* Emery, 1870 and *T. davidi* Forel, 1911, has ridges of head divergent in occipital part of head but differs from both relatives in some details. This group of species appears to be more speciose in the eastern part of Mediterranean Basin and needs revision (our unpublished data).

Tetramorium cf. *meridionale* sp. 2

Material examined: 1w: Amman gov., 3.6 km S of Al. Zumayla, 730 m, 31.512 N / 36.057 E, 1 IV 2010, leg. G. Sabatinelli

Comments: See comments under *Tetramorium* cf. *meridionale* sp. 1.

Tetramorium sabatinellii Radchenko & Scupola, 2015 **(Fig. 16)**

Tetramorium sabatinellii Radchenko & Scupola, 2015: 221, figs. 1-4 (w.q.m.)

Distribution: Described from Jordan: 3.6 km to the north of Al Zumayla (Amman gov.) by Radchenko and Scupola (2015).

Comments: Known only from the type locality.

Tetramorium schmidti Forel, 1904

Tetramorium caespitum var. *Schmidti* Forel, 1904: 15 (w.)

Distribution: Recorded from Jordan: Wadi Mojeb (now Wadi al-Mujib, Kerak gov.) by Wheeler and Mann (1916).

Comments: Known from Algeria, Tunisia, Egypt, Israel, Lebanon, Syria, Turkey and Iran.

Tetramorium semilaeve judas Wheeler & Mann, 1916

Tetramorium caespitum subsp. *judas* Wheeler & Mann, 1916: 172 (w.)

Distribution: Described from Jordan: Wadi Mojeb (now Wadi al-Mujib, Kerak gov.).

Comments: Status of this taxon remains uncertain. According to the recent redescription (Borowiec *et al.* 2015) the nominotypical taxon *Tetramorium semilaeve semilaeve* André, 1883 is distributed only in the western part of the Mediterranean area, in Balkans the group of species comprises four taxa (Salata & Borowiec 2017). Our material from the eastern part of the Mediterranean area suggests that eastern Turkey, the Middle East and Iran are occupied by a number of undescribed taxa and the group needs further studies.

Tetramorium striativentre Mayr, 1877

Tetramorium caespitum var. *striativentre* Mayr, 1877: 17 (q.)

Distribution: Recorded from Jordan: Wadi Mojeb (now Wadi al-Mujib, Kerak gov.) by Wheeler and Mann (1916).

Comments: Known from Central Asia, Afghanistan, Iran, NW China. This species was recorded also from Israel and Syria. However, Radchenko and Scupola (2015) suggested that records from the Middle East may concern *Tetramorium sabatinelli* Radchenko & Scupola, 2015.

Trichomyrmex destructor (Jerdon, 1851)* **(Fig. 17)**

Atta destructor Jerdon, 1851: 105 (w.)

Material examined: 12w: Tafila gov., 20 km NW of At Tafila, - 260 m, 30.88166 N / 35.63135 E, 1 VI 2007, leg. Z. Kejval (both yellow and brown forms).

Comments: Invasive species distributed almost worldwide, mostly in warm, arid regions, in temperate regions as indoor species. New to Jordan.

Trichomyrmex perplexus (Radchenko, 1997) **(Fig. 18)**

Monomorium perplexum Radchenko, 1997: 213, figs. 1-11 (w.q.m.)

Distribution: Recorded generally from Jordan by Borowiec and Salata (2012) and Borowiec (2014) based on specimens noted here.

Material examined: 1w: Ajlun gov., 30 km W of Jarash, 850 m, 32.31666 N / 35.71666 E, 20 V 2007, leg. J. Bezděk.

Comments: Known from Greece, Cyprus, southern part of European Russia, Turkey, Georgia, Armenia, Azerbaijan, Syria, Iran and United Arab Emirates.

Doubtful records

Camponotus aethiops (Latreille, 1798)

Formica aethiops Latreille, 1798: 35.

Distribution: Menozzi (1993) recorded generally from Palestine and Transjordan under the name *Camponotus aethiops* var. *concavus* Dalla Torre, 1893.

Comments: Although *Camponotus aethiops* was recorded from Israel, its occurrence in Jordan needs confirmation. Recent studies on the *Camponotus aethiops* group in the eastern part of the Mediterranean Basin showed that this taxon is a group of at least two cryptic species: true *C. aethiops* and *C. oertzeni* Forel, 1889. Our studies on Balkan populations indicate that *C. oertzeni* is a more thermophilic than *C. aethiops* and is much more common in arid habitats. Thus, materials of *C. aethiops* complex from the Middle East should be revised.

Cataglyphis bicolor (Fabricius, 1793)

Formica bicolor Fabricius, 1793: 351.

Distribution: Recorded from Jordan: Wadi Hisa (Tafila gov.) and Wadi Mojeb (now Wadi al-Mujib, Kerak gov.) by Wheeler and Mann (1916) as *Cataglyphis viatica* subsp. *bicolor*.

Comments: *Cataglyphis bicolor* group is a complex of similar species difficult to identify. Eyer *et al.* (2017) support the occurrence of at least four distinct species in the *C. bicolor* group in Israel, one of which may be a complex of three more species.

Cataglyphis livida (André, 1881)

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

Distribution: Recorded from Jordan: Petra (Ma'an gov.) by Wheeler and Mann (1916)

Comments: Published recently genetic study on members of the C*ataglyphis albicans* group showed that *Cataglyphis livida* occurs only on coastal part of Israel. While the border zone between Israel and Jordan is occupied by *Cataglyphis arenarius* Finzi (Eyer and Hefetz 2018). Both species are very similar morphologically and probably record from Petra by Wheeler and Mann (1916) concerns rather *C. arenarius* than *C. livida*.

Messor concolor Santschi, 1927

Messor semirufus var. *concolor* Santschi, 1927a: 229 (s.w.m.)

Distribution: Recorded from Jordan: Wadi Hisa (Tafila gov.) by Wheeler and Mann (1916).

Comments: *Messor concolor* Santschi, 1927 was firstly described under an unavailable

name *Messor barbarus semirufus* var. *concolor* Emery, 1908 from Syria and Crete. Santschi (1927) validated this name as trinome *Messor semirufus* var. *concolor* and figured specimen from Crete thus it should be tretaed as type of the name. With great probability material from Syria and Crete studied by Emery (1908 a) comprised more than one species. The most recent data suggests that *Messor concolor* is endemic to Crete (Salata and Borowiec 2019).

Messor meridionalis (André, 1883)

Aphaenogaster barbara var. *meridionalis* André, 1883: 355 (w.)

Comments: This taxon is species dubium. According to the original description (André 1883), it was described from specimens belonging to more than one species. Location of types is unknown and before their study and designation of the lectotype the status of this species is uncertain. Recent authors assigned records of *Messor meridionalis* (André) from Europe, Turkey and the Middle East to *Messor wasmanni* Krausse, 1910.

Plagiolepis pallescens maura Santschi, 1920

Plagiolepis maura Santschi, 1920: 169, fig. 1 (w.q.m.)

Distribution: Recorded generally from Jordan by Ghahari and Collingwood (2013) but with no bibliographic data.

Comments: Status of this taxon remains unclear and with great probability its records from the Middle East concern recently described *Plagiolepis perperamus* Salata, Borowiec & Radchenko, 2018.

Tapinoma erraticum (Latreille, 1798)

Formica erratica Latreille, 1798: 44.

Distribution: Recorded from Jordan: Petra (Ma'an gov.) by Wheeler and Mann (1916).

Comments: Wagner *et al.* (2018) suggest that southeastern populations of *Tapinoma erraticum* belong to an independent species named provisionally as *Tapinoma* sp. Balc. Both taxa differ mostly in subtle characters in male genitalia, the southern taxon is also slightly larger than true *T. erraticum*. We re-examined our materials from Greece and Bulgaria and confirmed that in this region occurs only *Tapinoma* sp. Balc. The only confirmed localities of true *T. erraticum* from Balkan Peninsula are from Croatia, Montenegro, North Macedonia and Slovenia. With great probability populations from Jordan belong to the undescribed species. However, we cannot exclude occurrence of another cryptic species from this group in this region.

Tapinoma nigerrimum (Nylander, 1856)

Formica nigerrima Nylander, 1856: 71 (w.)

Distribution: Recorded from Jordan: ancient Petra (Ma'an gov.) by Wheeler and Mann (1916).

Comments: According to the recent revision of the *Tapinoma nigerrimum* species group (Seifert 2017) the true *T. nigerrimum* is distributed only in southern France and Spain and generally this group occurs only in the western part of Mediterranean basin. Only *Tapinoma magnum* Mayr, 1861 was recorded also as invasive species from disturbed urban habitats of Belgium, France, Germany, Italy, Slovenia, and the Netherlands but not from the countries of the eastern part of Mediterranean Basin except Slovenia. Thus, record of *Tapinoma nigerrimum* from Jordan is doubtful and probably concerns *Tapinoma simrothi.*

Temnothorax luteus (Forel, 1874)

Leptothorax tuberum r. *luteus* Forel, 1874: 85 (w.)

Distribution: Recorded from Jordan: Ain Gleidat (Tafila gov.) by Wheeler and Mann (1916).

Comments: *Temnothorax luteus* (Forel, 1874) is a western Mediterranean species known from Spain, Andorra, France, Italy and Switzerland. In the eastern part of Mediterranean Basin occur some undescribed species of this group (our unpublished data) and probably Jordanian record concerns one of those species.

Tetramorium caespitum (Linnaeus, 1758)

Formica caespitum Linnaeus, 1758: 581.

Distribution: Recorded from Jordan: Petra (Ma'an gov.) by Wheeler and Mann (1916).

Comments: Recent revision of *Tetramorium caespitum* species group showed that this is a complex of 8 cryptic species (Wagner *et al*. 2017), partly very difficult to identification. Before the re-examination of material collected by Wheeler and Mann in Jordan it is impossible to determine which species they examined. A true *T. caespitum* was not recorded by Wagner *et al.* (2017) from this region.

DISCUSSION

The list of ant taxa known from Jordan has greatly increased to 84 species, with 26 morphospecies identified to the genus or species-group level. Some of the morphospecies are expected to be species new to science but their status reminds uncertain until taxonomic revisions. The taxonomic and nomenclatorial chaos in some of the genera and species groups known from the region unable the proper and precise investigation of collected material. Especially the genera *Cataglyphis*, *Crematogaster*, *Messor*, *Monomorium*, *Temnothorax* and *Tetramorium* require thorough revisions.

Amr *et al.* (2018) identified four biogeographical regions in Jordan: Mediterranean, Irano-Turanian, Saharo-Arabian and Sudanian. Comparison of locations of sampling sites, both historical and new, with ranges of those biogeographical regions reveals that the majority of collected material comes from the Mediterranean part of Jordan (Fig. 19). The material collected in the remaining three regions is very scarce and our knowledge of their biodiversity is insufficient. In particular, the fact that most of the endemic and rare taxa are known from those regions urge to intensify studies there. This concern was also expressed by Dietrich (2004) who pointed arid and open habitats as least studied and probably the most diverse in Jordan.

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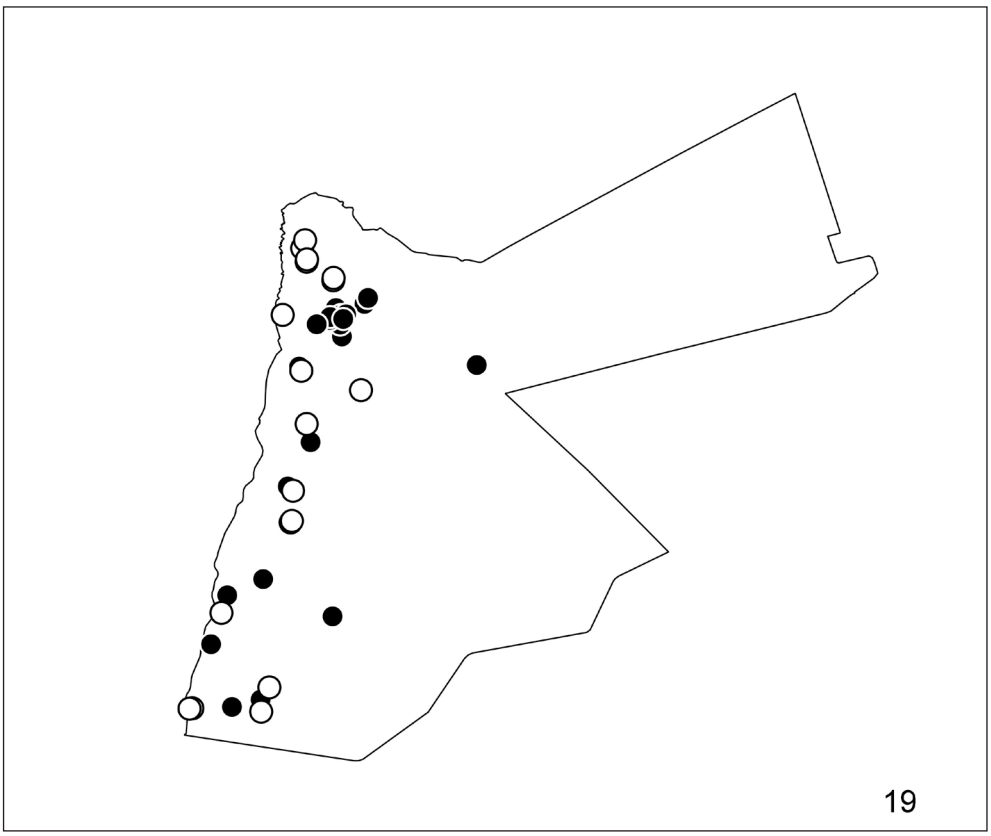

Fig. 19. Map of Jordan with sampling sites. Black dots – literature data, white dots – new sites.

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