

New records of ants (Hymenoptera: Formicidae) from the Chaharmahal va Bakhtiari Province of Iran with taxonomic comments

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ABSTRACT. The ant fauna from the Chaharmahal va Bakhtiari Province of Iran was surveyed. As a result, a total of 28 ant species belonging to 11 genera of Formicidae were collected and identified. Species status is proposed for *Messor barbarus* subsp. *mediosanguineus* DONISTHORPE, 1946, the species status of *Messor platyceras* CRAWLEY, 1920 is restored with *Messor platyceras* var. *rubella* CRAWLEY, 1920 as a new synonym of the nominotypical form, and *Camponotus oasium ninivae* PISARSKI, 1971 is removed from synonyms of *Camponotus oasium* FOREL, 1890. The genera *Messor* FOREL, 1890, with seven species and *Cataglyphis* FÖRSTER, 1850 with six species, have the highest species richness. *Messor mediosanguineus* DONISTHORPE, 1946, *Pheidole koshewnikovi* RUZSKY, 1905 and *Camponotus oasium ninivae* PISARSKI, 1971 were recorded in Iran for the first time.

KEY WORDS: ants, faunistics, taxonomy, new national records, new regional records, Chaharmahal va Bakhtiari Province, Iran

INTRODUCTION

Ants are among the most successful organisms on planet Earth (WILSON 1990). Knowledge of Iranian ants is relatively poor. PAKNIA et al. (2008) reviewed the literature, added new records and provided the first checklist of Iranian ant fauna. Since that time, several faunistic and taxonomic studies have been carried out in various parts of Iran (PAKNIA

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& KAMI 2007, GHAHARI et al. 2009, 2011, 2015, RAFINEJAD et al. 2009, PAKNIA et al. 2010, RADCHENKO & PAKNIA 2010, FIROUZI et al. 2011, MOHAMMADI et al. 2012, HOSSEIN NEZHAD et al. 2012, SHIRAN et al. 2013, HOSSEINI et al. 2015, KHANDEHROO et al. 2015, MIRZAMOAMADI et al. 2015, MORADLOO et al. 2015, MORTAZAVI et al. 2015, GHOBADI et al. 2016, HEIDARI et al., 2017). More than 248 species have been reported from Iran to date (PASHAEI RAD et al. 2018). Considering that many areas of Iran have not been studied, the number of ant species in this country's fauna is very likely much higher. On the other hand, in view of the lack of keys for identifying the ants from this area and the fact that recent ant research from Europe and the Middle East indicates a large number of cryptic species and the distinctiveness of the West and East Mediterranean faunal complexes (CSÓSZ et al. 2015, WAGNER et al. 2017, CSÓSZ et al. 2018, SALATA et al. 2018, STEINER et al. 2018), several records from Iran are open to question and require verification or confirmation.

Chaharmahal va Bakhtiari Province is situated in the south-west of Iran on the eastern slopes of the Zagros Mountains with oak forests and grazing areas. This province has a rich and diverse flora and fauna, but the ant fauna has hardly been studied. This paper is the first one focusing on the ants of the province. Some samples remain unidentified. A preliminary overview indicates that they may contain species new to science, so comparative studies with materials from neighbouring areas will be required.

MATERIALS AND METHODS

This study focused on ant fauna and the mesostigmatid mites associated with it in Chaharmahal va Bakhtiari Province. The results of the research on mesostigmatid mites will be published separately. The specimens were collected from different counties of Chaharmahal va Bakhtiari Province during 2015–2018. For sampling purposes, not only the ants but also the soil around their nests were collected with forceps and a shovel and placed in a plastic bag. Important data – geographical location (with GPS), name of location, date, habitats, etc. – were recorded. After the samples had been transferred to the laboratory, the ants were separated using appropriate forceps and needles. The specimens were preserved in 75% alcohol. The morphological keys by ARAKELYAN (1994), BOLTON (1994), COLLINGWOOD & AGOSTI (1996), DLUSSKY et al. (1990) and RADCHENKO (1996b, 1998), as well as the extensive resources of comparative materials preserved in the Department of Biodiversity and Evolutionary Taxonomy, University of Wrocław, Poland, were used for identification. The specimens have been deposited in the Insect collection, Jalal Afshar Zoological Museum, Department of Plant Protection, Faculty of Agriculture, University of Tehran, Karaj, Iran, and at the Department of Biodiversity and Evolutionary Taxonomy,

University of Wrocław. The photographs were taken using a Nikon SMZ 1500 stereomicroscope, Nikon D5200 photo camera and Helicon Focus software. All the samples were collected by the senior author and his students. An asterisk (*) indicates the first record of a taxon for the fauna of Iran. Worker caste is identified by the symbol ♀ in the text. Geographical coordinates, along with the altitude of the sampling sites, were measured in the field using GPS. Distribution data are cited mainly after BOROWIEC (2014), with corrections resulting from recent papers and work in areas not covered by this catalogue.

RESULTS AND DISCUSSION

Subfamily Dolichoderinae FOREL, 1878

1. *Tapinoma* FÖRSTER, 1850

1.1. *Tapinoma erraticum* (LATREILLE, 1798)

Formica erratica LATREILLE, 1798: 44; for synonyms, see BOLTON (2019).

Material examined. Bazoft region, Kachuz (32° 14' 52" N, 49° 58' 56" E, 1814 m a.s.l.), oak forest, 8 ♀, 02 June 2017; Ben county, Karsenak (32° 31' 12" N, 50° 28' 16" E, 2571 m a.s.l.), grazing area, 5 ♀, 13 July 2017; Lordegan county, Oureh (31° 31' 03" N, 50° 29' 32" E, 1756 m a.s.l.), oak forest, 11 ♀, 11 April 2017.

Distribution. Widespread in central and southern Europe, the Caucasus, Iran, Israel, Kazakhstan, Kyrgyzstan, Turkey and Turkmenistan.

Comment. A recent paper on Albanian ants by WAGNER et al. (2018) suggested that southern populations from the Balkans recorded as *Tapinoma erraticum* represent a cryptic undescribed species. Parts of populations from areas east of the Balkans probably belong to the same cryptic taxon but prior to the formal description we applied the appellation *T. erraticum* to the Iranian populations.

1.2. *Tapinoma karavaievi* EMERY, 1925

Tapinoma simrothi ssp. *karavaievi* EMERY, 1925: 52.

Material examined. Ben county, Karsenak (32° 31' 14" N, 50° 28' 18" E, 2540 m a.s.l.), grazing area, 10 ♀, 13 July, 2017; Ben county, Larak (32° 35' 14" N, 50° 40' 27" E, 2425 m a.s.l.), grazing area, 7 ♀, 07 April, 2017; Boldaji region, Chamangoli (32° 16' 10" N, 49° 57' 36" E, 1925 m a.s.l.), grazing area, 6 ♀, 01 June 2017; Cheghakhor (31° 51' 12" N, 50° 56' 30" E, 2295 m a.s.l.), ant nest in poplar trees, 6 ♀, 21 June, 2013; Farsan county (32° 12' 41" N, 50° 37' 30" E, 2008 m a.s.l.), grazing area, 16 ♀, 14 April, 2017; Kohrang county, Sudejan (32° 32' 25" N, 50° 21' 08" E, 2391 m a.s.l.), grazing area, 19 ♀, 25 April, 2017; Lordegan county, Bardbor (31° 31' 48" N, 50° 01' 14" E, 1819 m a.s.l.), ant nest in poplar trees, 11 ♀, 21 June, 2013; Lordegan county, Oureh (31° 30' 17" N, 50° 30'

03" E, 1753 m a.s.l.), oak forest, 23 ♀, 14 April, 2017; Saman county, Shoorab (32° 30' 40" N, 50° 56' 13" E, 2015 m a.s.l.), ant nest in almond garden, 17 ♀, 05 May, 2016; Sheshyek farm (32° 27' 29" N, 50° 54' 573" E, 1943 m a.s.l.), walnut garden, 8 ♀, 10 June, 2013; Shahrekord county, Chaleshtor (32° 23' 09" N, 50° 45' 10" E, 2099 m a.s.l.), agricultural area, 17 ♀, 18 August, 2017.

Distribution. Afghanistan, Armenia, Azerbaijan, Georgia, Iran, Kazakhstan, Turkmenistan.

Comment. The status of *Tapinoma karavaievi* EMERY, 1925 requires revision. The male genitalia are extremely similar to those of *Tapinoma simrothi* KRAUSSE, 1911. Perhaps *T. karavaievi* is the only eastern morphotype of the widespread *T. simrothi*. Both taxa have been recorded in Iran but only *T. karavaievi* probably occurs in this area.

Subfamily Formicinae LATREILLE, 1809

1. *Camponotus* MAYR, 1861

1.1. *Camponotus armeniacus* ARNOLDI 1967

Camponotus micans subsp. *armeniacus* ARNOLDI, 1967: 1828.

Material examined. Borujen county, Sefiddasht (32° 04' 58" N, 51° 12' 40" E, 2177 m a.s.l.), ant nest in a grazing area, 12 ♀, 24 June 2014; Farokhshahr county, Tangesayad (32° 15' 57" N, 51° 02' 18" E, 2263 m a.s.l.), ant nest in a grazing area, 9 ♀, 25 June 2014.

Distribution. Armenia, Iran, Turkey.

1.2. *Camponotus oasium ninivae* PISARSKI, 1971*, subspecies status restored, new combination (Fig. 1)

Camponotus (Tanaemyrmex) thoracicus subsp. *ninivae* PISARSKI, 1971 a: 674.

Material examined. Bazoft region, Mavarz (32° 08' 59" N, 50° 06' 15" E, 1515 m a.s.l.), oak forest, 16 ♀, 01 June 2017.

Distribution. Iraq (PISARSKI, 1971 a); new to Iran.

Comment. RADCHENKO (1997) treated *Camponotus (Tanaemyrmex) thoracicus* subsp. *ninivae* PISARSKI, 1971 as a synonym of *Camponotus oasium* FOREL, 1890; this point of view was repeated in BOLTON's (2019) catalogue. In our opinion this is at least a distinct subspecies if not a good species of the *Camponotus oasium* species-group. This group contains a lot of different infraspecific taxa, but many of them are probably more or less cryptic species. Our sample from Mavraz agrees well with the types of *C. oasium ninivae* described from Iraq and preserved in the Museum and Institute of Zoology, Polish Academy of sciences, Warsaw, Poland (available on AntWeb CASENT0911141, CASENT0917224 and CASENT0917225). Specimens of *C. oasium ninivae* differ from the types of *C. oasium oasium* FOREL, 1890 from Tunisia not only in their paler colour but also

in the softer sculpture. Thus the surface of the head in both major and minor workers



Figs 1, 2. 1. *Camponotus oasium ninivae* PISARSKI, 1971, major worker lateral (scale bar = 2 mm); 2. *Messor mediosanguineus* DONISTHORPE, 1946, major worker lateral (scale bar = 1 mm) (photo L. BOROWIEC).

appears slightly shiny in contrast to the matt surface of the head of *C. oasium oasium*, especially in major workers. We have examined specimens similar to the *C. oasium oasium* morphotype from Fars province in Iran, but their conspecificity with true *C. oasium* is also uncertain.

1.3. *Camponotus xerxes* FOREL, 1904

Camponotus maculatus r. *xerxes* FOREL, 1904: 424.

Material examined. Saman county, Shoorab (32° 30' 38" N, 50° 56' 13" E, 2015 m a.s.l.), almond garden, 9 ♀, 05 May 2016; Karab farm, (32° 28' 27" N, 50° 54' 21" E, 1942 m a.s.l.), walnut garden, 5 ♀, 05 March 2014.

Distribution. Afghanistan, Egypt, Iran, Iraq, Israel, Kuwait, Turkey, Turkmenistan, Uzbekistan.

2. *Cataglyphis* FÖRSTER, 1850

2.1. *Cataglyphis bellicosa* (KARAVAIEV, 1924)

Myrmecocystus (Cataglyphis) bicolor subsp. *bellicosus* KARAVAIEV, 1924: 307.

Material examined. Bazoft region, Taraz (32° 21' 07" N, 49° 52' 46" E, 1674 m a.s.l.), oak forest, 4 ♀, 02 June 2017; Saman county, Shoorab (32° 30' 46" N, 50° 56' 06" E, 2021 m a.s.l.), almond garden, 3 ♀, 28 March 2014.

Distribution. Iran (KARAVAIEV 1924).

2.2. *Cataglyphis foreli* (RUZSKY, 1903)

Myrmecocystus foreli RUZSKY, 1903: 36.

Material examined. Farokhshahr county, Tangesayad (32° 15' 57" N, 51° 02' 18" E, 2263 m a.s.l.), ant nest in a grazing area, 5 ♀, 25 June 2014.

Distribution. Iran, Turkmenistan.

2.3. *Cataglyphis kurdistanica* PISARSKI, 1965

Cataglyphis kurdistanicus PISARSKI, 1965: 417.

Material examined. Ben county, Karsenak (32° 32' 19" N, 50° 28' 07" E, 2409 m a.s.l.), grazing area, 22 ♀, 13 July 2017.

Distribution. Iran, Iraq, Turkey.

2.4. *Cataglyphis nigripes* ARNOLDI, 1964

Cataglyphis setipes subsp. *nigripes* ARNOLDI, 1964: 1806.

Material examined. Saman county, Babapir Ahmad village (32° 30' 47" N, 50° 51' 31" E, 1882 m a.s.l.), Chelevan village (32° 29' 25" N, 50° 54' 40" E, 1884 m a.s.l.), walnut garden, 7 ♀, 10 May 2016; Shahrekord county, Chaleshtor (32° 21' 38" N, 50° 47' 55" E,

2070 m a.s.l.), agricultural area, 11 ♀, 02 June 2016; Shahre-Kian, Bahram Abad (32° 15' 49" N, 50° 52' 15" E, 2046 m a.s.l.), agricultural area, 4 ♀, 05 August 2015.

Distribution. Armenia, Georgia, Iran.

2.5. *Cataglyphis nodus* (BRULLÉ, 1833)

Formica nodus BRULLÉ, 1833: 326.

Material examined. Shahrekord, Shahrekord University (32° 21' 10" N, 50° 49' 43" E, 2093 m a.s.l.), park area, 7 ♀, 10 May 2017; Chaleshtor (32° 21' 46" N, 50° 45' 56" E, 2104 m a.s.l.), agricultural area, 11 ♀, 18 August 2017; Farokhshahr, Khyr Abad (32° 09' 47" N, 50° 57' 23" E, 2167 m a.s.l.), grazing area, 5 ♀, 10 August 2017; Kiar County, Sartishniz (32° 06' 23" N, 50° 57' 29" E, 2070 m a.s.l.), grazing area, 8 ♀, 10 August 2017; Kiar County, Dareh Garm (32° 08' 11" N, 50° 53' 58" E, 2073 m a.s.l.), grazing area, 15 ♀, 10 August 2017; Bazoft, Mavarz (32° 08' 51" N, 50° 06' 20" E, 1515 m a.s.l.); Chamangoli (32° 12' 57" N, 50° 00' 52" E, 1567 m a.s.l.), oak forest, 9 ♀, 02 June 2017.

Distribution. Afghanistan, Albania, Arabian Peninsula, Armenia, Azerbaijan, Bulgaria, Bosnia and Herzegovina, Croatia, Georgia, Greece, Egypt, Hungary, Iran, Israel, Iraq, Montenegro, North Macedonia, Romania, Russia (North Caucasus), Serbia, Slovakia, Syria, Turkey, Turkmenistan, Uzbekistan.

Comment. The Iranian samples are generally darker in colour than the typical populations from the Balkans. Unfortunately, the material from Chaharmahal va Bakhtiari Province contained only workers, so we were unable to compare the male genitalia of the Iranian and Balkan populations. We do not know, therefore, whether these darker populations represent a separate morphotype or even a separate species.

2.6. *Cataglyphis setipes* (FOREL, 1894)

Myrmecocystus viaticus r. *setipes* FOREL, 1894: 60.

Material examined. Shahrekord, Rahmatieh (32° 20' 01" N, 50° 54' 12" E, 2087 m a.s.l.), ant nest in an agricultural area, 5 ♀, 18 August 2017; Saman county, Shoorab (32° 17' 29" N, 50° 49' 08" E, 2054 m a.s.l.), almond garden, 11 ♀, 02 June 2016.

Distribution. Afghanistan, Dagestan, Iran, Kazakhstan, Kyrgyzstan, Turkey, Turkmenistan, Uzbekistan.

3. *Formica* LINNAEUS, 1758

3.1. *Formica clara* FOREL, 1886 sensu SEIFERT & SCHULTZ (2009)

Formica rufibarbis var. *clara* FOREL, 1886: 206; for synonyms, see BOROWIEC 2014: 73.

Material examined. Ben county, Karsenak (32° 31' 28" N, 50° 28' 23" E, 2500 m a.s.l.), grazing area, 5 ♀, 13 July 2017.

Distribution. Central and southern Europe, Azerbaijan, China, Cyprus, Georgia, northern India, Iran, Israel, Kazakhstan, Kyrgyzstan, Pakistan, Syria, Turkey, Turkmenistan (SEIFERT & SCHULZ 2009).

4. *Lasius* FABRICIUS, 1804

4.1. *Lasius neglectus* VAN LOON, BOOMSMA & ANDRASFALVY, 1990

Lasius (*Lasius*) *neglectus* VAN LOON, BOOMSMA & ANDRASFALVY, 1990: 350.

Material examined. Saman county, Kahkesh (32° 28' 45" N, 50° 55' 10" E, 1839 m a.s.l.), ant nest in rotting wood, 25 ♀, 30 June 2013; Saman county, Dashti (32° 32' 26" N 50° 51' 40" E, 1891 m a.s.l.), ant nest in the rotting wood of poplar trees, 11 ♀, 09 July 2013; Saman county, Markadeh (32° 40' 49" N, 50° 48' 59" E, 1952 m a.s.l.), walnut garden, 9 ♀, 31 July 2017; Saman county, Gharagoosh (32° 31' 39" N, 50° 48' 06" E, 1965 m a.s.l.), ant nest in the rotting wood of poplar trees, 15 ♀, 31 July 2017; Saman county, Shoorab (32° 30' 44" N, 50° 56' 19" E, 2010 m a.s.l.), almond garden, 14 ♀, 04 June 2013; Saman county, Chelevan (32° 28' 46" N, 50° 55' 21" E, 1840 m a.s.l.), ant nest in the rotting wood of a plane tree, 5 ♀, 06 May 2017; Saman county, Garmdareh (32° 40' 20" N, 50° 49' 021" E, 1953 m a.s.l.), walnut garden, 30 ♀, 31 July 2017; Ben county, Bardeh (32° 33' 46" N, 50° 32' 04" E, 2379 m a.s.l.), ant nest in the rotting wood of willow trees, 23 ♀, 13 July 2017; Ben county, Karsenak (32° 31' 56" N, 50° 28' 04" E, 2476 m a.s.l.), grazing area, 9 ♀, 13 July 2017; Nafch (32° 23' 52" N, 50° 47' 17" E, 2095 m a.s.l.), ant nest in the rotting wood of willow trees, 28 ♀, 16 Jun 2017.

Distribution. Andorra, Belgium, Bulgaria, England, France, Georgia, Germany, Greece, Hungary, Iran, Israel, Italy, Kyrgyzstan, Macaronesia, the Netherlands, Poland, Portugal, Romania, Russia (European part), Spain, Switzerland, Turkey, Ukraine, Uzbekistan.

5. *Lepisiota* SANTSCHI, 1926

5.1. *Lepisiota karawaiewi* (KUZNETSOV-UGAMSKY, 1929)

Acantholepis frauenfeldi subsp. *karawaiewi* KUZNETSOV-UGAMSKY, 1929a: 483 (= *Acantholepis frauenfeldi melas* var. *karawaiewi* SANTSCHI, 1917: 44 unavailable name).

Material examined. Samsami region, Chery mountain (32° 10' 04" N, 50° 10' 04" E, 2811 m a.s.l.), mountain area, 7 ♀, 06 July 2017.

Distribution. Iran, Kazakhstan, Kuwait, Uzbekistan.

5.2. *Lepisiota semenovi* (RUZSKY, 1905)

Acantholepis frauenfeldi var. *semenovi* RUZSKY, 1905: 461; for synonyms, see BOROWIEC 2014: 95.

Material examined. Bazoft region, Sartang Sardab (31° 59' 40" N, 50° 53' 39" E, 1760 m a.s.l.), oak forest, 23 ♀, 02 June 2017; Kian county, Bahramabad (32° 15' 47" N, 50° 51' 09" E, 2047 m a.s.l.), ant nest in an agricultural area, 4 ♀, 05 August 2015; Borujen county, Sefiddasht (32° 04' 58" N, 51° 12' 40" E, 2177 m a.s.l.), ant nest in a grazing area, 3 ♀, 24 June 2014; Farokhshahr county, Tangesayad (32° 15' 57" N, 51° 02' 18" E, 2263 m a.s.l.), ant nest in a grazing area, 7 ♀, 25 June 2014.

Distribution. Iran, Kazakhstan, Kyrgyzstan, Russia (North Caucasus), Turkmenistan.

6. *Plagiolepis* MAYR, 1861

6.1. *Plagiolepis perperamus* SALATA, BOROWIEC & RADCHENKO, 2018

Plagiolepis perperamus SALATA, BOROWIEC & RADCHENKO, 2018: 816 (= *Plagiolepis pallescens* sensu RADCHENKO 1996a: 184).

Material examined. Samsami region, Chery mountain (32° 09' 49" N, 50° 16' 33" E, 2028 m a.s.l.), walnut garden, 9 ♀, 02 June 2017.

Distribution. Greece, Iran, North Macedonia, Turkey (SALATA et al. 2018).

6.2. *Plagiolepis pallescens* FOREL, 1889

Plagiolepis pallescens FOREL, 1889: 265 (= *Plagiolepis tauricus* sensu RADCHENKO 1996a: 185); for synonyms see SALATA et al. 2018: 812.

Material examined. Shahrekord, Chaleshtor (32° 21' 56" N, 50° 45' 48" E, 2104 m a.s.l.), agricultural area, 11 ♀, 18 August 2017.

Distribution. Albania, Armenia, Austria, Belgium, Bosnia and Herzegovina, Bulgaria, China, Croatia, Czech Republic, France, Germany, Greece, Hungary, Iran, Italy, Kyrgyzstan, Libya, Montenegro, North Korea, North Macedonia, Romania, Russia (European part), Serbia, Slovakia, Slovenia, Spain, Switzerland, Turkey, Ukraine, United Kingdom.

Subfamily Myrmicinae FOREL, 1878

1. *Crematogaster* LUND, 1831

1.1. *Crematogaster sorokini* RUZSKY, 1905

Crematogaster auberti var. *sorokini* RUZSKY, 1905: 495.

Material examined. Shahrekord county, Chaleshtor (32° 21' 38" N, 50° 47' 55" E, 2070 m a.s.l.), ant nest in an agricultural area, 7 ♀, 02 June, 2016.

Distribution. Iran, Iraq, Kazakhstan, Turkmenistan.

1.2. *Crematogaster subdentata* MAYR, 1877

Crematogaster subdentata MAYR, 1877: 19; for synonyms, see BOROWIEC, 2014: 69.

Material examined. Saman county, Gharagoosh (32° 41' 55" N, 50° 48' 17" E, 1959 m a.s.l.), ant nest in rotting wood, 7 ♀, 31 July 2017; Saman county, Markadeh (32° 40' 30" N, 50° 48' 60" E, 1955 m a.s.l.), ant nest in the rotting wood of a plane tree, 3 ♀, 31 July 2017; Saman county, Garmdareh (32° 41' 20" N, 50° 48' 34" E, 1957 m a.s.l.), walnut garden, 5 ♀, 31 July 2017.

Distribution. Afghanistan, Armenia, western China, Georgia, Iran, Kazakhstan, Kyrgyzstan, Mongolia, Turkmenistan, Russia, Ukraine, Uzbekistan.

2. *Messor* FOREL, 1890

2.1. *Messor caducus* (MOTSCHOULSKY 1839)

Formica caduca MOTSCHOULSKY, 1839: 47.

Material examined. Saman county, Shoorab (32° 30' 38" N, 50° 56' 13" E, 2015 m a.s.l.), almond garden, 8 ♀, 05 May 2016; Kian county, Bahram Abad (32° 15' 47" N, 50° 51' 39" E, 2047 m a.s.l.), agricultural area, 9 ♀, 30 July 2016; Bazoft region, Chamangoli (32° 12' 53" N, 50° 00' 45" E, 1616 m a.s.l.), grazing area, 17 ♀, 02 June 2017.

Distribution. Armenia, Georgia, Iran, Kazakhstan, Turkey.

2.2. *Messor incorruptus* KUZNETSOV-UGAMSKY, 1929

Messor barbarus subsp. *incorruptus* KUZNETSOV-UGAMSKY 1929 b: 16 (= *Messor barbarus* ssp. *aegyptiacus* var. *incorruptus* RUZSKY, 1905: 751 unavailable name).

Material examined. Lordegan county, Ali Abad (31° 30' 48" N, 50° 46' 15" E, 1534 m a.s.l.), ant nest in an agricultural area, 5 ♀, 24 March 2014; Farsan county, Gusheh (32° 12' 18" N, 50° 35' 53" E, 2005 m a.s.l.), ant nest in an agricultural area, 3 ♀, 10 September 2016; Hafshejan county, Cheshmehzaneh (32° 12' 17" N, 50° 46' 03" E, 2120 m a.s.l.), ant nest in a grazing area, 9 ♀, 06 June 2015; Farokhshahr county, Tangesayad (32° 15' 57" N, 51° 02' 18" E, 2263 m a.s.l.), ant nest in a grazing area, 8 ♀, 25 June 2014; Kiar county, Irancheh (32° 07' 15" N, 50° 03' 31" E, 2247 m a.s.l.), ant nest in the Tangesayad National Park, 6 ♀, 24 June 2014.

Distribution. Armenia, Georgia, Iran, Kazakhstan, Lebanon, Syria.

2.3. *Messor intermedius* SANTSCHI, 1927

Messor semirufus var. *intermedius* SANTSCHI, 1927: 229 (= *Messor barbarus* ssp. *semirufus* var. *intermedia* FOREL, 1910: 10 unavailable name).

Material examined. Borujen county, Sefiddasht (32° 04' 58" N, 51° 12' 40" E, 2177 m a.s.l.), ant nest in a grazing area, 58 ♀, 24 June 2014.

Distribution. Iran, Israel, Syria, Turkey, Turkmenistan.

2.4. *Messor mediosanguineus* DONISTHORPE, 1946* new status (Fig. 2)

Messor barbarus subsp. *mediosanguineus* DONISTHORPE, 1946: 53.

Material examined. Bazoft region, Deh Chendar (32° 14' 50" N, 49° 59' 09" E, 1774 m a.s.l.), ant nest in a grazing area, 30 ♀, 02 June 2017; Ben county, Larak (32° 35' 12" N, 50° 40' 22" E, 2046 m a.s.l.), ant nest in a grazing area, 7 ♀, 07 April 2017; Farokhshahr county, Tangesayad (32° 16' 28" N, 51° 01' 20" E, 2365 m a.s.l.), ant nest in a grazing area, 6 ♀, 24 June 2014.

Distribution. Turkey (DONISTHORPE 1946); new to Iran.

Comment. This is the first certain record of *M. mediosanguineus* from Iran. A previous record of *Messor denticulatus* SANTSCHI, 1927 (now a junior synonym of *Messor laboriosus* SANTSCHI, 1927) from western Iran (PASHAEI RAD et al. 2018) probably concerns *M. mediosanguineus*. *M. laboriosus* is a species with a more easterly distribution, widespread in Central Asia, and only the records from NE Iran are reliable. *M. mediosanguineus* is a more westerly species hitherto known only from Turkey. After studying the paratype preserved in the Museum of Natural History, London (available on AntWeb, specimen no. CASENT0900484), we concluded that it is a good species, not a subspecies of *Messor barbarus* (LINNAEUS, 1767). *Messor barbarus* is distributed in the western part of the Mediterranean Basin east to Italy. It has long and dense, erect setae on the first gastral tergite and usually a red head (but some specimens have the head partly or completely black, or the whole body black) and a regularly rounded propodeum, whereas *M. mediosanguineus* has the head black, the mesosoma mostly reddish, the propodeum with two obtuse denticles and the first gastral tergite with only a few short, erect setae. *Messor laboriosus* differs from *M. mediosanguineus* in the more setose first gastral tergite and the reddish-brown head (black in *M. mediosanguineus*) and the yellowish to yellowish-brown legs (mostly black in *M. mediosanguineus*). *Messor mediosanguineus* belongs to the complex of species close to *Messor semirufus* (ANDRÉ, 1883), very speciose and diverse in the Middle East, and requiring revision owing to the number of infraspecific names available in the nomenclature.

2.5. *Messor platyceras* CRAWLEY, 1920 restored species status (Figs 3-9)

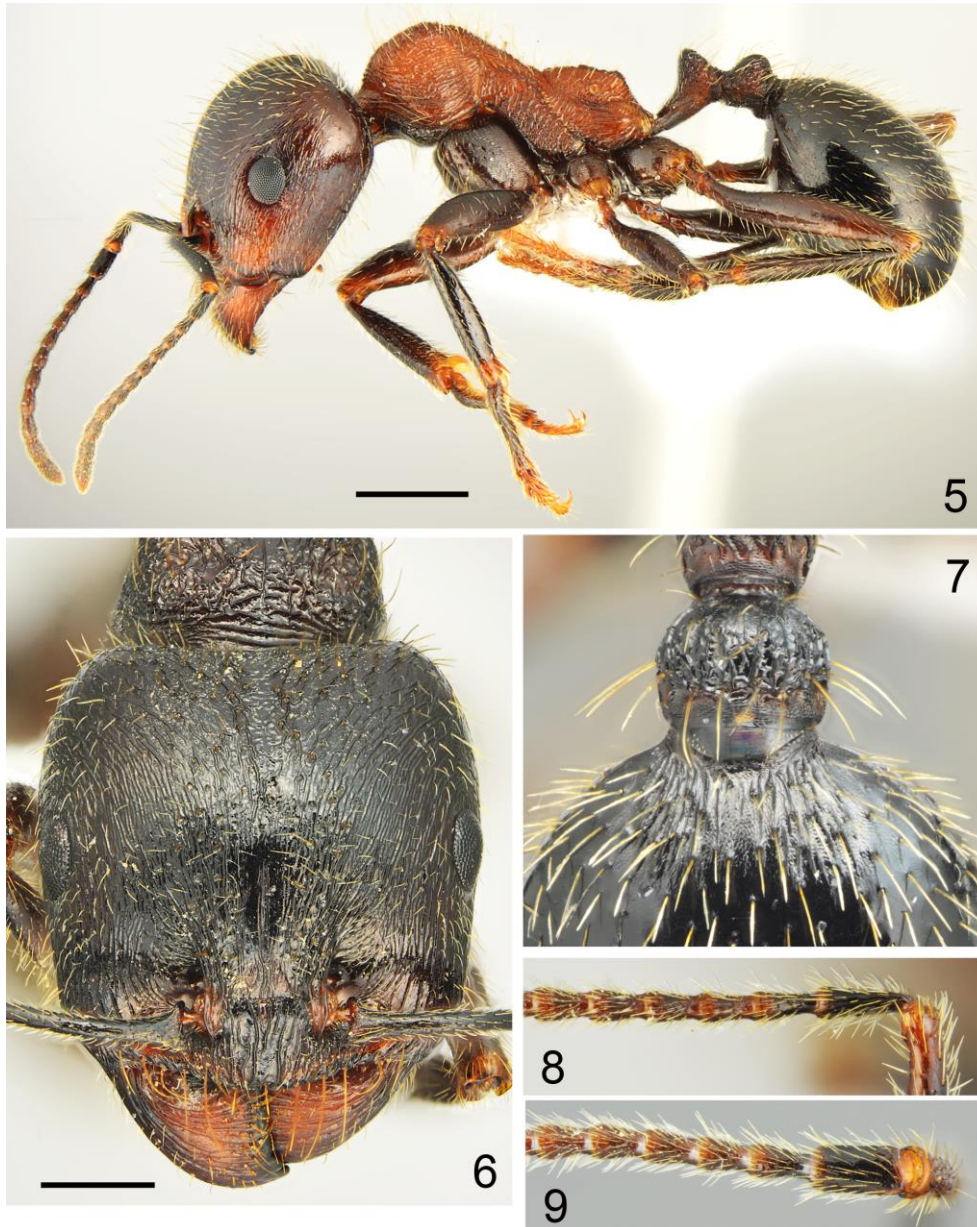
Messor platyceras CRAWLEY, 1920: 163; EMERY, 1921: 210 (as a subspecies of *Messor structor* (LATREILLE, 1798).

Messor platyceras var. *rubella* CRAWLEY, 1920: 164, **new synonymy**.

Material examined. Ben county, Larak (32° 35' 14" N, 50° 40' 27" E, 2425 m a.s.l.), nest in the soil in a grazing area, 23 ♀, 7 and 11 April 2017; Ben county, Karsenak (32° 31' 16" N, 50° 28' 23" E, 2528 m a.s.l.), ant nest in the soil on an alfafa farm, 11 ♀, 13 July 2017; Kohrang county, Bazoft (32° 12' 53" – 32° 28' 18" N, 49° 45' 53" – 50° 00' 45" E,



Figs 3, 4. *Messor platyceras* CRAWLEY, 1920: **3.** Major worker dorsal, **4.** Major worker lateral (scale bar = 1 mm) (photo L. BOROWIEC).



Figs 5-9. *Messor platyceras* CRAWLEY, 1920: **5.** Major worker of ab. *rubella* lateral (scale bar = 1 mm), **6.** Head (scale bar = 0.5 mm), **7.** Base of first gastral tergite, **8.** Basal segments of funiculus in anterior view, **9.** Basal segments of funiculus in lateral view (photo L. BOROWIEC).

1613 – 1942 m a.s.l. (23 sampling points)), ant nest in the soil in a grazing area and in an oak forest, 55 ♀, 1-2 June 2017; Kohrang county, Dejdaran valley (32° 11' 44" N, 50° 12' 27" E, 2319 m a.s.l.), nest in the soil in a grazing area, 9 ♀, 2 June 2017; Kohrang county, Soodejan (32° 32' 33" N, 50° 21' 02" E, 2143 m a.s.l.), nest in the soil in a grazing area and on a wheat farm, 27 ♀, 24 March 2017, 25 May 2017 and 25 April 2017; Kiar county, Sartishniz (32° 06' 03" N, 50° 51' 38" E, 2011 m a.s.l.), ant nest in the soil in a grazing area, 138 ♀, 11 August 2017; Shahrekord county, Chaleshtor (32° 21' 42" – 32° 21' 82" N, 50° 45' 25" – 50° 45' 56" E, 2090 – 2104 m a.s.l. (7 sampling points)), ant nest in the soil in an agricultural area, 43 ♀, 18 August 2017; Shahrekord county, Nafch (31° 23' 59" N, 50° 47' 18" E, 2094 m a.s.l.), ant nest in the soil in a grazing area, 21 ♀, 18 August 2017.

Distribution. Both the nominotypical taxon and its variety were described from NW Persia without the precise locality being stated.

Comment: Based solely on the original description, EMERY (1921) placed *Messor platyceras* CRAWLEY, 1920 as a subspecies of *Messor structor* (LATREILLE, 1798). This point of view was accepted by BOLTON (1995). In their revision of the *Messor structor* group, STEINER et al. (2018) commented regarding *M. platyceras* and its variety that both taxa “do not fit morphologically either of the two species occurring closest to Iran, *M. muticus* and Lineage 7.” and concluded that both of CRAWLEY's taxa were “not relevant to identifying names for any of the species characterized here”. The location of the types is unknown, but CRAWLEY (1920) well characterized *M. platyceras* by the following combination of characters: first segment of funiculus longer than 2nd, flattened so as to be twice as long as broad with parallel sides, and much wider than 2nd segment when viewed on its flat side (Figs 8, 9), strong body sculpture (Figs 3-6), and base of gaster longitudinally striate for a short distance, the rest smooth and shining (Fig. 7). This combination of characters is unique within the *Messor structor* group, especially the distinctly striate base of the gaster in combination with the elongate and flattened first segment of the funiculus. This set of characters was observed in several of the samples noted above, and we concluded that they belong to this forgotten taxon. The location of the types of *M. platyceras* is unknown, but the type locality (NW Iran) and the unique set of characters led us to infer that *Messor platyceras* is a good species from the *Messor structor* group. The samples examined indicated that there were workers in a single nest with an almost completely black body (Fig. 4) and with a partly reddish mesosoma (Fig. 5). We therefore concluded that *Messor platyceras* var. *rubella* was only an infraspecific colour variation.

2.6. *Messor syriacus* TOHMÉ 1969

Messor syriacus TOHMÉ 1969: 9 (= *Messor minor* st. *laborious* var. *syriacus* SANTSCHI, 1927: 241 unavailable name).

Material examined. Saman county, Karab farm (32° 27' 42" N, 50° 54' 30" E, 1953 m a.s.l.), ant nest in a walnut garden, 25 ♀, 29 June 2017; Nafch (32° 23' 52" N, 50° 47' 17" E, 2095 m a.s.l.), ant nest in the rotting wood of willow trees, 17 ♀, 16 June 2017; Farokhshahr county, Kheyrahad (32° 08' 09" N, 50° 55' 49" E, 2073 m a.s.l.), ant nest in the soil in an agricultural area 13 ♀, 12 May 2017.

Distribution. Armenia, Iran, Iraq, Israel, Lebanon, Syria, Turkey.

2.7. *Messor variabilis* KUZNETSOV-UGAMSKY, 1927

Messor variabilis KUZNETSOV-UGAMSKY, 1927: 94; *Messor excursionis* var. *macrops* SANTSCHI, 1927: 248.

Material examined. Farokhshahr county, Tangesayad (32° 16' 28" N, 51° 01' 20" E, 2365 m a.s.l.), ant nest in a grazing area, 5 ♀, 24 June 2014.

Distribution. Iran, Kazakhstan, Turkmenistan.

3. *Monomorium* MAYR, 1855

3.1. *Monomorium abeillei* ANDRÉ, 1881

Monomorium abeillei ANDRÉ, 1881: 531.

Material examined. Cholicheh region, Rastab (32° 13' 44" N, 50° 36' 55" E, 2011 m a.s.l.), ant nest in an agricultural area, 14 ♀, 14 April 2017; Shahrekord county, Daneshgah, (32° 21' 10" N 50° 49' 43" E, 2093 m a.s.l.), ant nest in an agricultural area, 10 ♀, 10 May 2015; Gahroo region (32° 00' 19" N, 50° 52' 08" E, 2098 m a.s.l.), ant nest in an agricultural area, 7 ♀, 10 May 2017.

Distribution. Afghanistan, Egypt, Iran, Israel, Kuwait.

4. *Pheidole* WESTWOOD, 1839

4.1. *Pheidole koshewnikovi* RUZSKY, 1905*

Pheidole pallidula subsp. *koshewnikovi* RUZSKY, 1905: 648

Material examined. Saman county, Markadeh (32° 40' 20" N, 50° 49' 02" E, 1946 m a.s.l.), ant nest in a walnut garden, 40 ♀, 06 July 2017; Samsami region, Chery mountain (32° 11' 16" N, 50° 11' 58" E, 2389 m a.s.l.), ant nest in a grazing area, 5 ♀, 06 July 2017; Bazoft region, Deh Chendar (32° 14' 45" N, 49° 59' 09" E, 1775 m a.s.l.), ant nest in a grazing area, 9 ♀, 01 April 2016; Mavarz (32° 08' 59" N, 50° 06' 15" E, 1515 m a.s.l.), ant nest in an oak forest, 7 ♀, 01 June 2017; Ben county, Karsenak (32° 31' 15" N, 50° 28' 25" E, 2531 m a.s.l.), ant nest in a grazing area, 6 ♀, 13 July 2017.

Distribution. Azerbaijan, Cyprus, Greece, Kazakhstan, Kyrgyzstan, Montenegro, Russia (south of European part), Turkey, Uzbekistan (SEIFERT 2016).

Comment. This is the first record of *P. koshewnikovi* from Iran. According to the recent revision of the *Pheidole pallidula* species-group (SEIFERT 2016), however, all previous Iranian records of *Pheidole pallidula* probably relate to *P. koshewnikovi*, which is the species with the easternmost distribution of this group.

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