New faunistic records of Formicidae (Insecta: Hymenoptera) from Iran’s Northeast

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ABSTRACT. The ant fauna in two northeastern province of Iran (Khorasan-e-Razavi and Khorasan-e-Shomali) was surveyed in 2003, 2005 and 2013. A total of 10 species belonging to 6 genera were identified; of which two species, Tetramorium sulcinode Santschi, 1927 and Tetramorium feroxoide Dlussky & Zabelin, 1985, were newly recorded for the Iranian ant fauna. By adding these two new records, the total number of ant species recorded from Iran has increased to 183.

Keywords: Ant, Khorasan-e-Razavi, Khorasan-e-Shomali, Iran

INTRODUCTION

Iran is a vast plateau (1.6 million km$^2$) with diverse climatic and ecological zones disposed to having rich ant fauna. The first reports of ants from Iran were presented by the pioneer myrmecologists during the early 20th century. For example, Forel (1904 a, b) studied 10 ant species from the north, northwest, south and southeast of Iran, Crawley (1920 a, b) recorded nine species from the north, northwest and south of Iran, and Me-nozzi (1927) reported only three species from the north and south of Iran. After a long pause, relative large-scale investigations on the ant fauna of the country began in the mid 90’s, which have continued until now (Ardeh 1994; Radchenko 1996; Kiran et al. 2013). The most speciose genera in Iran as well as in Khorasan-e-Razavi and Khorasan-e-Shomali are Componotus and Catalyphus (Paknia et al., 2008). Tetramorium Mayr, 1855 is species-rich in the Palearctic region (Csosz et al., 2007; Kiran & Karaman, 2012), however, a few species from the genus have been recorded until now for Iran and only one species, T. inerme for the above regions (Paknia et al., 2008).

Moreover, most studies of Formicidae in Iran have focused on the north, the northwest and the south regions of Iran (Paknia & Kami 2007; Paknia et al. 2008). Thus, compared to the other areas of the country, faunistic study of Formicidae in north-eastern Iran has suffered from relative neglect.

Thus, we investigated the ant fauna of the two northeastern Iranian provinces, namely Khorasan-e-Razavi and Khorasan-e-Shomali, which represent a large proportion of Iran’s semi-arid regions.
Materials and Methods

The specimens used in this study were collected in different areas of Khorasan-e-Razavi and Khorasan-e-Shomali in 2003, 2005 and 2013 (Figure 1). The surveyed areas were mostly non-urban, including pastures, semi-arid and agricultural lands. Sampling was carried out by hand during spring and summer. The collected materials were transferred into 75% alcohol in 1.5 ml. glass vials. For identification of the specimens at genus level, the keys presented by Bolton (1994) and Collingwood et al. (2011) were used. Samples were also sent to Sandor Csosz (Eötvös Loránd University, Hungarian Natural History Museum, Budapest, Hungary) and Kadri Kıran and Celal Karaman (Trakya University, Turkey) for confirmation. All material but one species was deposited in the Insect Collection of Plant Protection Department at Ferdowsi University of Mashhad (ICFUM); the species Tetramorium sp.IR-Kashmar-01 (chefketi-complex) was kept in the Hungarian Natural History Museum (HNHM). Pictures were taken using an Olympus DP-71 camera attached to an Olympus SZH-10 stereomicroscope.

RESULTS

Subfamily Myrmicinae Lepeletier de Saint-Fargeau, 1835

Genus Tetramorium Mayr, 1855

Tetramorium sulcinode Santschi, 1927 (Figs 2-4)

Tetramorium caespitum var. sulcinode Santschi, 1927 [original description].

Tetramorium caespitum sulcinode: Pisarski, 1970 [subspecies of T. caespitum].

Tetramorium sulcinode: Csosz, Radchenko & Schulz, 2007 [raise to species].


Distribution. Outside of Iran, Tetramorium sulcinode is recorded from Afghanistan, Pakistan and Turkmenistan (Csosz et al. 2007). This is a new record for Iran.

Remarks. The following characters distinguish Tetramorium sulcinode from the other Tetramorium species in Iran: head and gaster brown, mesosoma yellowish brown, antennae and legs lighter than mesosoma in color; in dorsal view, spiracles on lateral margins of metanotum; propodeum with short black spines; body surface with light sparse pubescence which more condensed in anterior part of head and gaster; median portion of clypeus more outstanding in comparison with the other Tetramorium species. Petiole more protruding than postpetiole. The second segment of gaster with transverse and light strips.

Tetramorium feroxoide Dlussky & Zabelin, 1985 (Figs 5-7)

Tetramorium feroxoides Dlussky & Zabelin, 1985 [original description].

Tetramorium feroxoide: Csosz & Schulz, 2010 [redescription].


Distribution. Holotype gyne and paratype workers as well as gynes and males of Tetramorium feroxoide were recorded from Turkmenistan (Csosz & Schulz 2010). This is a new record for Iran.

Remarks. It is notable that Tetramorium feroxoide belongs to the T. ferox species-complex. Within the Tetramorium ferox species-complex, external morphological characters of T. feroxoide gynes include very smooth surface of mesosoma, sparse pubescence and smooth and shiny first gastral tergite, making the species unique (Csosz & Schulz 2010). However, T. feroxoide workers can be confused with the smallest T. ferox workers. The general appearance of the head and mesosoma of T. ferox workers is always rugulose, microreticulate and dull, but workers of T. feroxoide usually bear feebler (and often parallel) rugulae on head and mesosoma than T. ferox workers (Csosz & Schulz 2010). In T. feroxoide gynes found in Iran, the whole body and appendages are brown to light brown in color, whereas in the reported specimen from Turkmenistan, these...
New Records of Formicidae for Iran

Fig. 1. Map of investigated regions. Dark numbered rectangles indicate locations where species collection took place (1- *Tetramorium sulcinode*; 2- *Tetramorium feroxoide*; 3- *Tetramorium striativentre*; 4- *Tetramorium* sp. IR-Kashmar-01(*chefketi*-complex); 5- *Tetramorium* sp. IR-Neyshabur-01 (*caespitum*-complex); 6- *Monomorium areniphilum*; 7- *Messor denticulatus*; 8- *Tapinoma erraticum*; 9- *Componotus xerxes*; 10- *Lepisiota frauenfeldi*). The small inset in the right side of map, shows outline of Iran.

are dark brown or black (Csosz & Schulz 2010). The difference in color between Iran’s species and those from Turkmenistan’ is probably due to geographical variation.

**Tetramorium striativentre** Mayr, 1877 (Figs 8-10)

*Tetramorium caespitum* var. *striativentre* Mayr, 1877 [original description].

*Tetramorium caespitum striativentre*: Emery, 1891 [subspecies of *T. caespitum*].

*Tetramorium striativentre*: Dalla Torre, 1893 [raise to species].


**Distribution.** For Iran, *Tetramorium striativentre* is recorded from Khojir National Park in Tehran province (Paknia 2008) and Aranva Bidgol and Maranjab in Isfahan province (Nasiri 2011). Outside of Iran, the distribution range of this species is Turkestan (i.e. Kazakhstan) (Collingwood 1961). This species is also reported from Afghanistan (Collingwood 1961).

**Remarks.** The following characters distinguish *Tetramoriums triativentre* from the other *Tetramorium* species in Iran: head, postpetiole and gaster dark brown to black in color; thorax, peti-
ole and appendages brown; body surface with light sparse setae. Petiole more protruding than postpetiole. Propodeum with relatively long brown spines.

**Tetramorium sp. IR-Kashmar-01 (chefketi-complex)**


**Remarks.** According to Dr. Csosz’s determination (2014), this species belongs to the *Tetramorium chefketi*-complex and probably is new to science and needs to be further investigated in the future.

**Tetramorium sp. IR-Neyshabur-01 (caespitum-complex)** (Figs 11-13)


**Remark.** According to Dr. Csosz’s determination (2014), this species is new to science and needs to be further investigated in the future.

**Genus Monomorium Mayr, 1855**

*Monomorium areniphilum* Santschi, 1911 (Figs 14-16)

*Monomorium salomonis* var. *areniphila* Santschi, 1911 [original description].

*Monomorium salomonis areniphilum* Santschi, 1936 [subspecies of *M. salomonis*].

*Monomorium areniphilum*: Collingwood, 1985 [raise to species].


**Distribution.** Outside of Iran, this species has been reported from North Africa, Saudi Arabia, Tunisia, Egypt, Kuwait and Lebanon (Emery 1915; Collingwood 1985). For Iran, it has previously been reported anonymously (www.antweb.org).

**Remarks.** It is notable that *Monomorium areniphilum* is like *M. salomonis* (L.), but the former is more shining with a much deeper metanotal groove and more rounded propodeum which clearly differentiate it as a separate species not a subspecies of *M. salomonis* (Collingwood 1985). The following characters distinguish *M. Areniphilum* from the other *Monomorium* species in Iran: head, petiolar node and appendages brown, mesosoma light brown, gaster black in color. Compound eyes white. Distance between two antennae very short. Anterior margin of clypeus with one pair of great and erect hairs. Petiole relatively higher than postpetiole. Surface of gaster with scarce long hairs.

**Genus Messor Forel, 1890**

*Messor denticulatus* Santschi, 1927 (Figs 17-19)

*Messor minor* st. *denticulatus* Santschi, 1927 [original description].

*Messor denticulatus*: Tarbinsky, 1976 [raise to species].


**Distribution.** Outside of Iran, this species is widely distributed in central Asia and also has been recorded from Turkey and Israel (Borowiec & Salata 2012). However *Messor denticulatus* had before been reported by Arno’ldi (1977) from the northeastern Iran, name of location was not reported in that record.

**Remarks.** The following characters distinguish *Messor denticulatus* from the other *Messor* species in Iran: head, antennae and gaster dark brown; head minutely foveolate. Mesosoma and legs relatively lighter than gaster in color; mesosoma dorsum transversely rugose. Sparse and light hairs on upper surface of gastral tergite. Dorsum of waist with the long and erect setae; hairs on head scarcely.
Figs 2 – 4. *Tetramorium sulcinode*. 2, Mesosoma in profile view; 3, Body in dorsal view; 4, Head in frontal view. a) Median portion of clypeus more outstanding in comparison with the other *Tetramorium* species.
Figs 8 – 10. *Tetramorium striativentris*. 8, Mesosoma in profile view; 9, Body in dorsal view; 10, Head in frontal view. a) Propodeum with relatively long brown spines.
Figs 17 – 19. *Messor denticulatus*. 17, Mesosoma in profile view; 18, Body in dorsal view; 19, Head in frontal view.
Figs 20 – 22. Componotus xerxes. 20, Mesosoma in profile view; 21, Body in dorsal view; 22, Head in frontal view.
Subfamily Dolichoderinae Forel, 1878
Genus Tapinoma Foerster, 1850
Tapinoma erraticum (Latreille, 1798)

Formica erratica Latreille, 1798 [original description].
Tapinoma erraticum: Mayr, 1853 [combination in Tapinoma].


Distribution. This species is an inhabitant of dry heath (Collingwood 1958). Outside of Iran, Tapinoma erraticum is found throughout central Europe from Spain to the Caucasus and from mountains of the south Italy to the north Germany (Collingwood 1979). For Iran, Crawley (1920 a) reported this species from the north (Caspian region) and the south of Iran, but he did not clarify in which city it was collected.

Remarks. The following characters distinguish Tapinoma erraticum from the other Tapinoma species in Iran: body surface with light condensed pubescence; head trapezoid in full-face view; workers without ocelli; upper margin of clypeus with a concavity. Anterior margin of last gasteral segment with 6 setae.

Among species of the present study, Tapinoma erraticum is widely spread in the surveyed regions and colonies are abundant. Furthermore, this species has a strong beneficial reciprocal relationship with several damaging hemipterans on important crops (such as Gossypium hirsutum L. and Cucumis sativus L.) (unpublished data, Hosseini et al., 2015).

Sufamily Formicinae Latreille, 1809
Genus Componotus Mayr, 1861
Componotus xerxes Forel, 1904 (Figs 20-22)

Camponotus maculates r. xerxes Forel, 1904a [original description].
Componotus xerxes: Pisarski, 1967 [raise to species].


Distribution. This species ranges from Central Asia to the Middle East (Collingwood et al. 2011) and is reported from Middle Eastern countries: Saudi Arabia, United Arab Emirates (UAE), Oman (Collingwood 1985; Collingwood & Agosti 1996), Kuwait (Collingwood et al. 2011), Egypt (Vonshak & Ionescu-Hirsch 2009) and Turkey (Karaman & Aktac 2013). For Iran, Componotus xerxes is recorded from Boushehr, Shiraz (Vonshak & Ionescu-Hirsch 2009) and Sabzevar city as well as Khorasan-e-Razavi province (Radchenko 1997).

Remarks. Camponotus xerxes is closely related to C. fellah Tohme, but it can be distinguished by the absence of erect setae on the ventral head surface, whereas in C. fellah there are 1-10 setae (Collingwood & Agosti 1996). Foragers are often seen from March to October with the greatest abundance in September (Sharaf et al. 2013).

Genus Lepisiota Santschi, 1926
Lepisiota frauenfeldi (Mayr, 1855)

Hypoclinea frauenfeldi Mayr, 1855 [original description].
Acantholepis frauenfeldi: Mayr, 1861 [combination in Acantholepis].
Lepisiota frauenfeldi: Baroni Urbani, Bolton & Ward, 1992 [combination in Lepisiota].


Distribution. Outside of Iran, Lepisiota frauenfeldi is found in Central Asia, Mediterranean regions and North Africa (Collingwood 1961). In Iran, the species is reported from Aghchehpir city in Zanjan province (Hossein Nezhad 2008).

Remarks. The following characters distinguish Lepisiota frauenfeldi from the other Lepisiota spe-
cies in Iran: four pairs of standing hairs on dorsal - anterior portion of head. Anterior margin of clypeus with two- pair white and erected hairs.

**DISCUSSION**

In our study, two species (*Tetramorium feroxoidae, T. sulcinode*) are newly recorded for the ant fauna of Iran and four species including *Tetramorium striativentre* Myer, 1877, *Monomorium areniphilum* Santtschi, 1911, *Tapinoma erraticum* Latrille, 1798, and *Lepisiota fraunfeldi*, Mayr 1855 are new records for Khorasan-e-Razavi and Khorasan-e-Shomali provinces. By including the present records, the total number of ant species from Iran and the northeastern provinces has increased to 183 and 20, respectively. We suggest that a comprehensive and systematic survey of family Formicidae fauna not limited to Khorasan-e-Razavi and Khorasan-e-Shomali provinces, but in the whole Iran, needs to be carried out in the future using standardized collecting methods (such as a pitfall trap, Berlese, bark Spray).

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