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A Contribution to the Knowledge of Ants (Hymenoptera: Formicidae) from the Arasbaran Biosphere Reserve and Vicinity, Northwestern Iran

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ABSTRACT

The fauna of ants is studied in Arasbaran and its vicinity (Northwestern Iran), an interesting region with boundaries with Armenia, Azerbaijan and Turkey. In this research, totally 29 species and subspecies from 19 genera and 4 subfamilies (including, Aenictinae, Dolichoderinae, Formicinae and Myrmicinae) were collected from the mentioned region. *Aenictus rhodiensis* Menozzi, *Camponotus* (*Tanaemyrmex*) *obliquipilosus* Forel, *Oxyopomyrmex krueperi* Forel and *Proformica pilosiscapa* Dlussky are new records for Iran.

Keywords: Formicidae, Fauna, New record, Arasbaran, North Western Iran.

INTRODUCTION

Ants (Hymenoptera: Formicidae) are among the most numerous of creatures on the planet, and consequently they greatly impact the lives of man (Wilson, 1987). Surprisingly, despite the high numbers and great importance of ants, they are still a very troublesome group to identify and classify (Bolton, 2003). Ants can be found in many different habitats and microhabitats such as in soil and leaf litter, in rotting logs, and on nesting in various plants, etc. Additionally, many species are minute and likely to be overlooked by casual observation (Hölldobler & Wilson, 1990).

Iran is bordered on the north by the Caspian Sea, Armenia, Azerbaijan and Turkmenistan, on the east by Afghanistan and Pakistan, on the south by the Persian Gulf and the Gulf of Oman, and on the west by Iraq and Turkey. Its area is 1,648,000 square kilometres, of which 14% is arable land, 8% is forest, 47% is natural (i.e. non-arable) pastures and the remaining 31% is varied arid environments, including salt swamps, sand and gravel deserts and bare-rock high mountains. In general, Iran consists of a central plateau, 1000 to 1500 m above sea level (Zehzad et al. 2002; Hangay et al. 2005). Arasbaran is a large reserve in East Azarbayjan Province, northwestern Iran, ranging from 38°40' to 39°08'N and from 46°39' to 47°02'E, and situated in the north of Iran at the border to Armenia and Azerbaijan, belongs to the Caucasus Iranian Highlands. In-between the Caspian, Caucasus and Mediterranean regions, the area includes mountains up to 2,200 meters, high alpine meadows, semi-arid steppes, meadows and forests, rivers and springs. Arasbaran is the territory of about 23,500 nomads who are mainly living in the buffer and transition zones.

Although a diverse fauna is expected for Formicidae in Iran, the fauna of Iranian ants was studied only very poorly. The few works on this topic are Tirgari & Paknia

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(2004), Paknia & Kami (2007), Paknia et al. (2008), Sakenin et al. (2008) and Ghahari et al. (2009).

With attention to the importance of ants in human's life and also in almost agroecosystems (Hölldobler & Wilson, 1990), in this paper the fauna of these beneficial insects is studied in northwestern Iran. This paper is a partial work of huge project "Iranian Formicidae" which was established between the 1st and 2nd authors in 2003.

MATERIALS AND METHOD

The main method for collecting the ants in Arasbaran and its vicinity was pitfall traps which were applied by the 3rd author. In a total 75 traps were used in different regions which were checked and emptied each 15 days. The pitfall traps were approximately 15 cm tall and 5 cm in diameter at the opening, and included 90% ethanol. In addition to the pitfall traps, sweeping nets (with 40 cm in diameter) was used randomly on different plants, and collecting of the specimens by aspirator was conducted too. The materials were collected through 2002 - 2007 from various geographical localities especially from agricultural fields, pastures and forests of Ahar, Ardabil, Aslandooz, Aynalo, Horand, Kaleibar, Khalkhal, Khodafarin, Khoy, Maco, Mahabad, Maragheh, Marand, Meshkinshahr, Ourmieh and Tabriz. The collected specimens are preserved in the collections of the authors. The information concerning the species' name, describer, locality and the date of collection, places from which the species were collected, and the number of specimens (in brackets) were also recorded. For classification and nomenclature of Formicidae we followed works of Collingwood (1985), Collingwood & Agosti (1996) and Bolton (1994, 1995, 2003).

RESULTS AND DISCUSSION

On the basis of the conducted survey on the ant fauna of Arasbaran and vicinity (Northwestern Iran), a total of 29 species and subspecies from 19 genera and 4 subfamilies were collected. The list of species is given below.

Subfamily Aenictinae

Genus *Aenictus* Shuckard, 1840

***Aenictus rhodiensis* Menozzi, 1936**

Material examined: East Azarbayjan Province: Marand (pasture), 1326 m (1 specimen), June 2005. **New record for Iran.**

Subfamily Dolichoderinae

Genus *Dolichoderus* Lund, 1831

***Dolichoderus quadripunctatus* (Linnaeus, 1771)**

Material examined: East Azarbayjan Province: Maragheh (agricultural fields), 1494 m (1 specimen), June 2005.

Subfamily Formicinae

Genus *Acantholepis* Kroyer, 1846

***Acantholepis frauenfeldi* var *sericea*, Forel, 1892**

Material examined: West Azarbaijan province: Ourmieh (agricultural fields), 1416 m (1 specimen), August 2006.

Genus *Camponotus* Mayr, 1861

***Camponotus buddhae* Forel, 1892**

Material examined: West Azarbaijan province: Ourmieh (agricultural fields), 1370 m (3 specimens), August 2006.

***Camponotus interjectus* Mayr, 1877**

Material examined: East Azarbayjan Province: Khodafarin (pasture), 674 m (1 specimen), July 2005.

***Camponotus* (*Tanaemyrmex*) *obliquipilosus* Forel, 1903**

Material examined: West Azarbaijan province: Khoy (agricultural fields), 1153 m (1 specimen), September 2006. **New record for Iran.**

***Camponotus turkestanus* André, 1881**

Material examined: Ardabil province: Khalkhal (agricultural fields), 1753 m (2 specimens), October 2005.

Genus *Cataglyphis* Förster, 1850

***Cataglyphis albicans* (Roger, 1859)**

Material examined: East Azarbayjan Province: Maragheh (forests), 1494 m, (2 specimens) June 2005.

***Cataglyphis setipes* ssp. *turcomanica* (Emery, 1898)**

Material examined: Ardabil province: Meshkinshahr (agricultural fields), 1550 m (1 specimen), October 2005.

Genus *Formica* Linnaeus, 1758

***Formica cinerea* Mayr, 1853**

Material examined: East Azarbayjan Province: Tabriz (pasture), 1427 m (2 specimens), September 2002.

***Formica cunicularia* Latreille, 1798**

Material examined: East Azarbayjan Province: Ahar (agricultural fields), 1370 m (3 specimens) and Varzeghan (pasture), 1687 m (2), June 2005.

***Formica pratensis* Retzius, 1783**

Material examined: West Azarbayjan Province: Mahabad (agricultural fields), 1344 m (1 specimen), Unknown date.

Genus *Proformica* Ruzsky, 1902

***Proformica pilosiscapa* Dlussky, 1969**

Material examined: East Azarbayjan Province: Kaleibar (pasture), 1131 m (1 specimen), July 2005. **New record for Iran.**

Subfamily Myrmicinae

Genus *Aphaenogaster* Mayr, 1853

***Aphaenogaster raphidiiceps* (Mayr, 1877)**

Material examined: Ardabil province: Ardabil (forests), 1335 m (4 specimens), Unknown date.

Comment: This species is an egg predator of Colorado potato beetles in potato fields.

Genus *Cardiocondyla* Emery, 1869

***Cardiocondyla kushanica* Pisarski, 1967**

Material examined: Ardabil Province: Ardabil (forests), 1299 m (2 specimens), June 2002.

Genus *Crematogaster* Lund, 1831

***Crematogaster hezaradjatica* Pisarski, 1967**

Material examined: Ardabil Province: Aslandooz (forests), 212 m (1 specimen), August 2006.

***Crematogaster subdentata* Mayr, 1877**

Material examined: West Azarbaijan province: Maco (pasture), 1730 m (3 specimens), September 2004.

Genus *Messor* Forel, 1890

***Messor picturatus* Santschi, 1927**

Material examined: Ardabil Province: Aslandooz (agricultural fields), 212 m (1 specimen), August 2006.

Genus *Monomorium* Mayr, 1855

***Monomorium barbatulum* Mayr, 1877**

Material examined: Ardabil province: Meshkinshahr (agricultural fields), 1550 m (1 specimen), June 2007.

***Monomorium pharaonis* (Linnaeus, 1758)**

Material examined: West Azarbaijan province: Maco (pasture), 1730 m (3 specimens), September 2004.

Genus *Myrmica* Latreille, 1804

***Myrmica aimonissabaudiae* Menozzi, 1939**

Material examined: West Azarbayjan province: Mahabad (pasture), 1344 m (1 specimen), July 2004.

Genus *Oxyopomyrmex* Andre, 1881

***Oxyopomyrmex krueperi* Forel, 1911**

Material examined: West Azarbayjan Province: Ourmieh (agricultural fields), 1370 m (2 specimens), August 2004. **New record for Iran.**

Genus *Pheidole* Westwood, 1839

***Pheidole palludula* (Nylander, 1848)**

Material examined: East Azarbayjan province: Aynalo (agricultural fields), 824 m (2 specimens), July 2002.

Genus *Plagiolepis* (Mayr, 1861)

***Plagiolepis taurica* Santschi, 1920**

Material examined: East Azarbayjan Province: Horand (pasture), 1113 m (3 specimens), July 2005.

Genus *Solenopsis* Westwood, 1840

***Solenopsis fugax* ssp. *orientale* Ruzsky, 1905**

Material examined: East Azarbayjan Province: Kaleibar (forests), 1131m (2 specimens), August 2005.

Genus *Temnothorax* Mayr, 1861

***Temnothorax tuberum* (Fabricius, 1775)**

Material examined: East Azarbayjan Province: Khodafarin (forests), 674 m (3 specimens), June 2005.

***Temnothorax anodonta* (Arnoldi, 1977)**

Material examined: East Azarbayjan Province: Ahar (forests), 1360 m (1 specimen), July 2005.

Genus *Tetramorium* Mayr, 1855

***Tetramorium nursei* Bingham, 1903**

Material examined: West Azarbaijan province: Ourmieh (agricultural fields), 1416 m (2 specimens), July 2005.

***Tetramorium simillimum* (Smith F., 1851)**

Material examined: East Azarbayjan province: Maragheh (pasture), 1494 m (2 specimens), August 2002.

The result of this research indicated that there is a diverse fauna of Formicidae in Arasbaran and vicinity, northwestern Iran. Iran is a large country with various geographical climates. Therefore these faunistic surveys must be continued for discovering new data on the Iranian Formicidae. Of course, not only the Iranian fauna but also fauna of other countries in Middle East and Middle Asia was poorly studied so far. Outside the boundaries of Iran, only the formicid's fauna of Saudi Arabia was studied more that other contries in the area by Collingwood (1985) and Collingwood & Agosti (1996).

Ants can be powerful role in biological control of agricultural and forest pests. The stability, social organization, and foraging behavior of some predatory ants enable them to react quickly increasing prey density, and also make them uniquely able to protect crops from low-density pests. Such qualities require dependence on honeydew-producing Homoptera that may sometimes be made harmful by ant attendance. Predacious ants also affect to other natural enemies, but less than might be expected, and may indeed benefit some. Ants tend to overlap the food niches of other predators and may force them into one competitive system. Whether overall biological control is benefited by such interactions is unknown. Work on the role of ants as part of overall natural-enemy complexes is needed. Other useful criteria for ants as biological control agents include broad habitat range and choice of species that are unlikely to be out-competed by other ants (Vinson, 1986; Khoo & Chung, 1989; Way & Khoo, 1992). Undoubtedly the most important attribute of useful or potentially useful predatory ants is stability as large populations, which together with efficient recruitment enables the ants to react quickly to surging numbers of a pest. The proposal to protect, enhance or introduce an ant for biological control can be rationalized by a sequence of decisions, just as for any control practice (Room, 1973). Once it has been decided to make use of a particular ant. One must answer two

main questions: first, how to suppress undesirable competing ants that otherwise displace the desired ant or keep it too scarce to be effective, and second, how to improve other favorable conditions. Although the introduction of exotic predatory ants for biological control is potentially hazardous, it should not be discounted. Therefore, fundamental to use of an ant species in IPM is appropriate understanding of relevant aspects of its ecology and that of undesirable competing species (Hölldobler & Wilson, 1990).

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اسهام لمعرفة نوعا من النمل (غشائية الأجنحة) في محمية ارسباران والمنطقة المجاورة لها ، شمال غرب ايران

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ملخـص

تمت دراسة مجموعات من النمل في محمية ارسباران والمنطقة المجاورة لها (شمال غرب ايران)، وهي منطقة مثيرة للاهتمام بحدود مع أرمينيا وأذربيجان وتركيا. في هذا البحث، تم جمع 29 نوعا وسلالة من 19 جنسا و 4 عائلات فرعية (بما في ذلك Aenictinae، Dolichoderinae، وMyrmicinae Formicinae) من المنطقة المذكورة. Aenictusواصبحت كل من الأنواع التالية Menozzi rhodiensis، Forel (Tanaemyrmex) Camponotus obliquipilosus، Forel Oxyopomyrmex krueperi وProformica Dlussky pilosiscapa سجلات جديدة لإيران.

الكلمات الدالة: Formicidae،مجموعات النمل ، سجل جديد ، ارسباران ، شمال غرب ايران.

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