A contribution to the knowledge of Meloidae (Insecta: Coleoptera) fauna of Northeastern Iran

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Abstract: The Meloidae, known as blister beetles, a widespread family of Tenebrionoidea that includes approximately 2500 species, is still scarcely known faunistically in several areas of the world. Because of specific biogeographical feature, Iran harbors a rich diversity of meloids and due to the lack of basic and integrated studies, particularly in eastern parts of Iran, our current knowledge of Iranian meloids should be considered preliminary. In order to improve the knowledge of the meloidae species of north eastern Iran, faunistic investigations on blister beetles of this region were carried out during 2011-2012. Collected specimens as well as deposited specimens in Insect Museum of Ferdowsi University of Mashhad were examined, in detail. As a result, 31 species belonging to 11 genera from 2 subfamilies were identified. Among the identified specimens, 24 species were new for fauna of Khorasan provinces. Ctenopus simulatipennis Fairmaire (1892) is reported for the first time from Iran.

Keywords: Meloidae, Blister beetle, Fauna, Khorasan, Iran.

Introduction

The family Meloidae, the blister beetles (Coleoptera: Tenebrionoidea) contains approximately 120 genera and 2500 species (Bologna and Pinto, 1999 & 2002). Blister beetles are distributed in most regions of the world except of New Zealand and some parts of Oceania (Bologna, 2000a) and their diversity is greatest in temperate steppes, arid or semiarid regions (Bologna and Pinto, 2002). This family is one of the most interesting coleopterans, largely because of the remarkable biology (hypermetamorphosis), parasitic larval habits, their importance to pharmacology, veterinary and agriculture as well as their defensive attributes and diverse courtship behavior (Bologna, 2000a). The systematics, bionomics and biogeography of meloids were extensively studied by Bologna (1991).

Because of various zoogeographical elements, Iran harbors a rich diversity of meloids including some endemic and subendemic species. Several papers of Kaszab (1957, 1959, 1965 and 1968), Mirzayans (1970), Aksentjev (1984) have substantially contributed to our understanding of meloids in Iran. Kaszab in his several papers described many new species from different parts of Iran. The fauna of meloids were investigated in various parts of the country (Nikbakhtzadeh and Tigrari, 2002; Serri, 2004) and many species newly recorded.

The Meloidae fauna of Iran is poorly known, particularly in eastern parts of Iran which there are still several areas not well explored or not explored at all. Khorasan provinces with an area of 313, 335 sq km which are located in the northeast of Iran with cold winters whilst warm summers,bounded northward by Turkmenistan, eastward by Turkmenistan and Afghanistan, westward by Golestan, Semnan and Yazd and southward by Sistan and Baluchestan and
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Kerman provinces. The temperature of this area increases from north to south, but annual rainfall decreases from north to south of it. These geographical characters causes proper habitat for the blister beetles. The aim of this study is to indicate the meloid diversity in these provinces.

Material and Methods

This study is based mostly on the material stored in the Museum of Ferdowsi University of Mashhad and those collected by the first author from different locations in Khorasan provinces (Fig. 1). We collected meloids by netting them directly from flowers of their host-plants or via hand-catch and the materials transferred to a killing jar. The best time for collecting meloids was from 10:00 a.m. to 4:00 p.m., when the weather was sunny. The whole material is deposited in the Entomological Museum of Plant Protection Department, at Ferdowsi University, Mashhad, Iran. Marco Alberto Bologna confirmed the identification of the species studied in this paper during a study period in Roma (July 2012).

Results

In this study, 31 species of 11 genera belonged to two subfamilies of Meloidae were reported.

Subfamily Nemognathinae Leporte, 1840

Tribe Nemognathini Laporte, 1840

Genus Ctenopus Fischer von Waldheim, 1823

Ctenopus sinuatipennis Fairmaire, 1892

Material examined: Khorasan Razavi province, Neishabour (Khiaran), 23. IV. 2012, 2♀, 1♂; Leg. L. Fekrat.

Distribution: Asia: Turkmenistan, Uzbekistan and China (Löbl & Smetana, 2008).

Diagnosis: Head capsule wider than long, sides of head after eyes are quite convex; antennae 11 segmented and short in both sexes, never reaching middle of body, usually extending only to base of elytra; elytra completely covering abdomen and wings; Hind tarsal segment I shorter than combined length of segments II and III; head and pronotum are orange, pronotum is quite shiny, antennal segments I-IV are orange but the rest antennal segments are dark brown, elytra are reddish-orange with dense yellow short setation, legs are quite orange, ventral side of the body is quite orange except for mesosternum which is dark brown (Fig. 2).

Genus Euzonitis Semenov, 1893

Euzonitis terminate Abeille de Perrina, 1880

Material examined: South Khorasan province, Ferdos, 15.V. 2010; 2♂, Leg. L. Fekrat.

Distribution: Europe: Greece, Hungary, Italy, Romania and Turkey; Asia: Afghanistan, Iran, Israel, Jordan, Syria and Turkmenistan; North Africa: Egypt (Löbl & Smetana, 2008).

Tribe Stenoderini

Genus Stenodera Eschscholtz, 1818

Stenodera caucasica Pallas, 1781


Distribution: Europe: Albania, Armenia, Bulgaria, Croatia, Georgia, Greece, Macedonia,
Moldavia, Romania, South Russia, Turkey, Ukraine, Yugoslavia; Asia: Israel, Jordan, Lebanon, Syria, Turkmenistan, Turkey (Löbl & Smetana, 2008), Iran (Golestan) (Mirzayans, 1970).

Subfamily Meloinae Gyllenhal, 1810
Tribe Cercomini Leach, 1815
Genus Cerocoma Geoffroy, 1762
_Cerocoma_ (Meloides) _bodemeyeri_ Reitter, 1909
Distribution: Iran (Luristan), Iraq, Doubtful records from Turkey and Syria (Turco & Bologna, 2011).

Tribe Lyttini Solier, 1851
Genus _Eolydus_ Denier, 1913
_Eolydus conspicuus_ Waterhouse, 1889
Distribution: Asia: Afghanistan, Pakistan, Turkestan (Löbl and Smetana, 2008), Iran (Balouchestan, Fars, Hormozgan, Kerman) (Mirzayans, 1970).

Genus Lydomorphus Fairmaire, 1882
_Lydomorphus angusticollis suturellus_ Hagg-Rutenberg, 1880
Material examined: South Khorasan province, Birjand, 15.V. 2007; 1♂, Akharzadeh; Nehbandan, 12.V. 2003, 1♀, Leg. M. Tabatabaei.
Distribution: Asia: United Arab Emirates, Iran, Oman, Saudi Arabia, Pakistan and Yemen (Löbl & Smetana, 2008).

Genus Lytta Fabricius, 1775
_Lytta (Mesolytta) coccinea_ Ménétriés, 1849
Material examined: Khorasan Razavi province, Taibad, 8.IV. 1988, 1♀, Leg. F. Amirabadi.
Distribution: Asia: Afghanistan, Kazakhstan, Turkmenistan and Uzbekistan (Löbl and Smetana, 2008), Iran (Khorasan) (Modaress Awal, 2012).

_Lytta (Lytya) menetresi_ Faldermann, 1832
Distribution: Europe: Azerbaijan, Armenia; Asia: Kazakhstan, Turkmenistan, Uzbekistan and Tajikistan (Löbl & Smetana, 2008), Iran (East Azarbaijan, Markazi, Tehran and other northern provinces) (Modaress Awal, 2012).

**Figure 2** _Ctenopus sinuatipennis_, a. dorsal view, b. lateral view.
Genus *Teratolytta* Semenov, 1894

*Tetralytrida tricolor* Hagg-Rutenberg, 1880

Material examined: Khorasan Razavi province, Mashhad, 19.V. 2012; 1♀, 2♂, Leg. H. Javanshir.

Distribution: Iran (Guilan, Mazandaran, Golestan, Khorasan, Kermanshah, Kerman), Uzbekistan (Löbl & Smetana, 2008).

Tribe Mylabrini Laporte, 1840

Genus *Mylabris* Fabricius, 1775

*Mylabris* (*Argabris*) *klugi klugi* Redtenbacher, 1850


Distribution: Asia: Kazakhstan Turkmenistan, Tajikistan, China (Löbl and Smetana, 2008), Iran (Tehran).

*Mylabris* (*Micrabris*) *frolovi frolovi* Fischer von Waldheim, 1823


Distribution: Asia: Kazakhstan Turkmenistan, Tajikistan, China (Löbl and Smetana, 2008), Iran (Golestan, Khorasan, Mazandaran) (Mirzayans, 1970; Modarres Awal, 2012).

*Mylabris* (*Eumylabris*) *calida* Pallas, 1782

Material examined: Khorasan Razavi province, Mashhad, 10.VI. 2011, 5♀, 1♂, Leg. L. Fekrat.


*Mylabris* (*Eumylabris*) *cincta* Olivier, 1811


Distribution: Europe: Azerbaijan, Armenia, Georgia, Greece, Macedonia, South Russia, Turkey, Ukraine; North Africa (Morocco, Tunis, Algeria, Libya and Egypt); Asia: Afghanistan, Israel, Jordan, Kazakhstan, Pakistan, Saudi Arabia, Syria, Turkey (Löbl and Smetana, 2008), Iran (East Azarbaijan, Esfahan, Fars, Gilan, Golestan, Hormozgan, Kerman, Kermanshah, Khorasan, Lorestan, Mazandaran, Tehran) (Mirzayans, 2012; Modarres Awal, 2012).

*Mylabris* (*Eumylabris*) *magnoguttata iranica* Kaszab, 1957


*Mylabris* (*Eumylabris*) *schrenki* Gebler, 1841


Distribution: Asia: Afghanistan, Kazakhstan, Turkmenistan, Uzbekistan, Tajikistan and China (Löbl and Smetana, 2008), Iran (Balouchestan, Esfahan, Fars, Golestan, Hormozgan, Kerman, Tehran) (Mirzayans, 1970; Modarres Awal, 2012).

*Mylabris* (*Mylabris*) *apicenigra* Sumakov, 1915

Material examined: South Khorasan province, Nehbandan, 22.IV. 2004, 2♀, Leg. F. Moghadam, Khorasan Razavi province, Mashhad (Torghabeh), 15.VI. 2012, 2♀, 1♂, Leg. L. Fekrat.
Distribution: Asia: Turkey (Löbl and Smetana, 2008); Iran (Esfahan, Fars, Tehran) (Mirzayans, 1970).

**Mylabris (Mylabris) quadripunctata (Linnaeus, 1767)**
Distribution: Europe: Albania, Armenia, Bulgaria, Georgia, Greece, Italy, Macedonia, Turkey, Ukraine, Yugoslavia; Asia: Afghanistan, Iraq, Israel, Iran, Kiribati, Kazakhstan, Kyrgyzstan, Kyrgyzstan, Turkey, Uzbekistan, China (Löbl and Smetana, 2008), Iran (Balouchestan, East Azerbaijan, Esfahan, Kerman, Mashhad, Mazandaran, Tehran) (Modarres Awal, 2012).

**Mylabris (Mylabris) variabilis Pallas, 1781**
Distribution: Europe: Albania, Armenia, Bulgaria, Croatia, Georgia, Greece, Macedonia, Romania, Ukraine, Yugoslavia; Asia: Afghanistan, Kazakhstan, Kyrgyzstan, Turkey, Uzbekistan, China (Löbl and Smetana, 2008), Iran (Balouchestan, East Azerbaijan, Golestan, Kerman, Mashhad, Mazandaran, Tehran) (Mirzayans, 1970; Modarres Awal, 2012).

**Genus Hycleus Latreille, 1817**

**Hycleus colligatus Redtenbacher, 1850**

**Hycleus fuscus Olivier, 1811**


**Hycleus javeti Marseul, 1870**
Material examined: Khorasan Razavi province, Mashhad, 15.VI. 2012, 5♀, 1♂, Leg. L. Fekrat; South Khorasan province, Birjand, 4.V. 2010, 3♀, 2♂, Leg. N. Bahrami.
Distribution: Asia: Turkey, Turkmenistan, Turkestan (Löbl and Smetana, 2008), Iran (Balouchestan, Fars, Hormozgan, Kerman, Kermanshah, Khuzestan, Tehran) (Modarres Awal, 2012).

**Hycleus scabiosae Olivier, 1811**
Distribution: Europe: Armenia, Bulgaria, Georgia, Greece, Romania, South Russia; Asia: Iraq, Mongolia, Syria, Tajikistan, Turkmenistan, Turkey, Uzbekistan, China (Löbl and Smetana, 2008), Iran (East Azerbaijan, Fars, Golestan, Kermanshah, Tehran and other northern provinces) (Modarres Awal, 2012).

**Hycleus schah shah Reiche, 1866**

**Hycleus trianguliferus reitteroides Mader, 1929**
Distribution: Asia: Iran (Löbl and Smetana, 2008) (Balouchestan, Hormozgan, Kerman,
Hycleus zebraeus Marseul, 1870
Distribution: Europe: Albania, Armenia, Bulgaria, Georgia, Macedonia, Turkey, Asia: Iraq, Israel, Jordan, Syria, Turkmenistan, Turkey (Löbl and Smetana, 2008), Iran (East Azarbaijan, Kermanshah, Khuzestan).

Tribe Meloini Gyllenhal, 1810
Genus Meloe Linnaeus, 1758
Meloe (Coelomeloe) tuccius Rossi, 1792
Material examined: Khorasan Razavi province, Mashhad, 22.IV. 2012, 2♀, 1♂; Mashhad (Shandiz), 4.V. 2012, 1♀, 1♂, Leg. L. Fekrat.
Distribution: Widely distributed in the Macaronesian archipelago, from the Iberian Peninsula through southern Europe, Near East, Caucasus and Central Asia, East to Afghanistan, Tajikistan and western China, from Morocco through northern Africa, east to Egypt, Levant and Iran (Bologna, 1995).

Meloe (Lampromeloe) variegates Donovan, 1793
Distribution: Europe: Argentina, Belgium, Bosnia-Herzegovina, Britain, Bulgaria, Byzantine, Croatia, Czechoslovakia, Denmark, France, Georgia, Germany, Greece, Hungary, Italy, Romania, Slavic, Slovakia, Spain, South Russia, Ukrain, Yugoslavia; North Africa (Morocco, Tunis, Algeria); Asia: Afghanistan, Jordan, Kashmir, Kazakhstan, Lebanon, Turkmenistan, West of Siberia (Löbl and Smetana, 2008), Iran (Chahar Mahal & Bakhtiari, Guilan, Hamadan, West-Azarbaijan, Zanjan) (Modarres Awal, 2012).

Meloe (Meloeo) proscarabaeus Linnaeus, 1758

Meloe (Meloeo) cicatricosus Leach, 1815
Material examined: Khorasan Razavi province, Mashhad (Torogh), 12.V. 1987, 2♀, 3♂, Leg. H. Afzali.

Meloe (Meloeo) rufiventris rufiventris Germar, 1817
Distribution: Widely distributed from East France (Alsace) through central Europe to Russia, south to northern Italy and northern Greece; in the Near East and central Asia, from Kazakhstan to Afghanistan, Tajikistan and Kirghizstan. In North Africa recorded in isolated localities from Algeria and Cyrenaica (Bologna, 2009).

Meloe (Taphromeloe) erythrocnemus Pallas, 1782
Distribution: Europe: Bosnia-Herzegovina, Bulgaria, Croatia, Greece, Italy, Romania, South Russia, Turkey, Ukraine; North Africa: Algeria, Morocco; Asia: Afghanistan, Kazakhstan, Tajikistan, Turkmenistan, Turkey, Uzbekistan, China (Löbl and Smetana, 2008); Iran (Fars, Kermanshah, East Azarbaijan, Tehran) (Modarres Awal, 2012).
Discussion

Since the faunistical exploration of Iran is greatly incomplete, more investigations still result in discovering many new taxa for the fauna of our country. From an ecological point of view, Iran’s geographical location and natural physical characteristics import a wide climatic diversity to the country. However, about 75% of the total land area of Iran is dominated by an arid or semi-arid climate (Kehl, 2009) and because arid and semi-arid zones harbor a rich diversity of Meloidae at the generic and species level (Bologna, 2009), Iran is considered a suitable habitat for the meloids.

In our study, 31 species belonging to 11 genera (2 Nemagnathini, 1 Stenoderini, 1 Cercomini, 4 Lyttini, 2 Mylabrini and 1 Meloini) from 2 subfamilies (Nemagnathinae and Meloinae) were identified. We have found 1 species of genus Ctenopus in our study for the first time in Iran; this genus is poorly known and its limits remain questionable. According to Reitter (1896) and Reichardt (1934) four of the central Asian species of this genus should be considered synonyms of C. sinuatipennis (Fairmaire, 1892). In our study, one species from genus Euzonitis, E. Terminata, was identified. This species has black head and pronotum with golden yellow setation. This genus needs complete revision based on characters other than coloration (Bologna and Pinto, 2002). There was one species of genus Stenodera, S. caucasica, in our samples. Selander (1964) separated this genus as the most primitive tribe of Nemognathinae based on adult morphology. Phylogenetic analysis supported his placement (Bologna and Pinto, 2001).

One species of genus Lydomorphus was in our samples. The taxonomy of L. angusticollis is still debates about, and the validity of six described subspecies needs to be confirmed. Color differences, which considered as constant characters by Kaszab (1955; 1983), are used to distinguish these subspecies; actually it seems that they form a cline (Bologna and Turco, 2007). This species needs a complete taxonomical revision to define the validity of subspecies.

Most of our samples belong to tribe Mylabrini. This tribe with approximately 750 described taxa, is the largest tribe of Meloinae subfamily (Bologna, 2000b). We have nine species of genus Mylabris and seven species of genus Hycleus in our study. Genus Hycleus, with more than 400 species, is the largest genus of Meloidae. Several authors have confused this group with Mylabris and other Mylabrini (Bologna and Pinto, 2002). Hycleus species usually have a furrow on pronotum but the species belong to genus Mylabris do not have such furrow. The only exception is the subgenus Euymylabris, which has a furrow on pronotum but unlike Hycleus species, the claws of this subspecies are dentate.

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References

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کمک به ارتقای دانش در زمینه فون سوسک‌های خانواده Meloidae (Insecta: Coleoptera) در شمال شرق ایران

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چکیده: خانواده Meloidea که به‌نام سوسک‌های تاولزا نیز معروف هستند، خانواده‌ای بپراکنش وسیع از بالاخانواده Tenebrionoidea با حدود 2500 گونه می‌باشد که در بسیاری از نقاط جهان مطالعات فوستیکی محضی را برای گرفتن رشته است. بهدلیل واژگی‌های خاص بیوجرافی‌ای، ایران پایگاهی برای طیف وسیعی از سوسک‌های تاولزا به‌شمار رفته و بهدلیل فقدان مطالعات بنیادین و یکپارچه، خصوصاً در تواحی شرق ایران، داشت که این اثر در مردم سوسک‌های تاولزا در ایران به بیان مقدمات و ابتدایی در نظر گرفته شود. به‌منظور ارتقای آگاهی در مورد گونه‌های تاولزا در نواحی شمال شرقی ایران، در طی سال‌های 1390-1391، بررسی فوستیک سوسک‌های تاولزا در این ناحیه انجام گردید. گونه‌های جمع‌آوری شده هرما و نمونه‌های موجود در موزه حشرات دانشگاه فردوسی مشهد مورد بررسی قرار گرفتند. براساس نتایج بدست آمده، 31 گونه متعلق به 11 جنس از ۲ زیرخانواده شناسایی گردیدند. در بین گونه‌های شناسایی شده، ۲۴ گونه برای فون استان‌های خراسان جدید بودند.

واژگان کلیدی: سوسک تاولزا، فون، خراسان، ایران.

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