

THE FAUNISTIC SURVEY OF LADY BEETLES (COLEOPTERA,
COCCINELLIDAE) IN THE MEHRIZ REGION(YAZD PROVINCE),
IRAN

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ABSTRACT

In this study the faunistic of lady beetles (Coleoptera, Coccinellidae) was studied in Mehriz region (Yazd province) during 2009-2010. The total number of specimens of coccinellid beetles were collected from 6 different localities having altitudes from 1420-2420 m. Altogether 11 species from 8 genera, 3 tribes and 3 subfamilies were collected and identified. External characters plus characteristics male and female genitalia were used in order to diagnose species. Seven species were recorded for the first time from Yazd province (marked*). Many species were predacious, preying on various species of aphids, mites and coccids. Some species were also sent to Dr. Helmut Fursch in Germany for identification or confirmation. The collected species are:

- 1- *Coccinella septempunctata* (Linnaeus) *
- 2- *Coccinella undecimpunctata* (Linnaeus)
- 3- *Hippodamia variegata* (Goeze) *
- 4- *Coccinula elegantula* (Weise) *
- 5- *Adalia bipunctata* (Linnaeus)
- 6- *Oenopia oncina* (Olivier) *
- 7- *Oenopia conglobata* (Linnaeus)
- 8- *Chilocorus bipustulatus* (Linnaeus)
- 9- *Exochomus quadripustulatus* (Linnaeus) *
- 10- *Exochomus nigripennis* (Erichson) *
- 11- *Scymnus syriacus* Marseul *

KEY WORDS: Coccinellidae, Fauna, Mehriz region, Iran

INTRODUCTION

The species of Coccinellidae are commonly known variously as ladybirds (English English, Australian English, and South African English), ladybugs (North American English), lady beetles or coccinellid beetles (preferred by scientists). The family name comes from its type genus, *Coccinella*. Most of them are bright shining colors with a pattern of spots or patches against a contrasting background. Many appear to be distasteful to birds and their conspicuous appearance is an example of warning coloration (Moreton, 1969). They belong to superfamily Cucujoidea and are a large family with about 6,000 species described worldwide (Iablokoff-Khnzorian, 1982; Vandenberg, 2002).

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In general, the ladybird species are grouped in four categories according to certain features such as: the basic colours of red, black, yellow and brown on the elytra (Brakefield, 1985). The species are small to medium size, oval, oblong to hemi spherical (Majerus, 1994).

They are predators and major biological control agents of hemipteran pests such as aphids, mealybugs and scale insects, as well as thrips (Thysanoptera) and mites (Acarina) in all parts of the world (Moreton, 1969; Hawkeswood, 1987; Majerus, 1994). Some are specific in their food choice, while many are polyphagous. The introduction of the vedalia ladybird, *Rodolia cardinalis* Mulsant, from Australia into California in 1888 to control cottony cushion scale, *Icerya purchasi*, which threatened the citrus industry, is widely regarded the most successful instances of biological pest control (Majerus, 1994).

Borumand (2000) listed 52 species of coccinellids in Iran. The present study was done to explore and prepare an inventory of the predacious Coccinellid, found on different altitudes in Mehriz region at 31° 04' 34" to 31° 57' 25"N latitude and 54° 13' 01" to 54° 55' 07" E longitude (Figure 1).

This covers an area of 6,700 km², while the total cultivated area was 14,000 hectares, wheat, alfalfa, pistachio, almond, pomegranate, walnut, apricot and peach are the major crops, the climate of Mehriz is temperate. The whole Mehriz region has many rare species of flora and fauna. The goal of this paper is faunistic survey of ladybeetls (Coleoptera, Coccinellidae) in the Mehriz region.

MATERIALS AND METHODS

The study was conducted to collect coccinellid beetles from 6 localities at different altitudes (1420 to 2420 m) in the Mehriz region. Each locality was repeatedly sampled throughout 18 month (April, 2009 through September, 2010). Samples were collected from a wide variety of terrestrial habitats throughout in each locality to ensure that the overall landscape of that locality was represented. Adult specimens were collected with a standard sweeping net and a hand-held aspirator. In some localities more than one method were used in collection. Adult insects collected from various habitats and were killed in a cyanide bottle and pinned. Each specimen was tagged with the information too. To protect the specimens from the insect pests, naphthalene tablets were put in collection boxes. Immature stages were collected directly from the habitats and preserved in 70% ethyl alcohol in bottles. Each bottle was labeled with information of host, area and date from which it was collected. The Mehriz region is divided into six regions. Two sites in each region were chosen. These are shown in Table 1 along with the altitude of each site.

Table 1. Locations and altitudes of collection sites.

Collection Sites	Altitudes (meter)
Mehriz	1502
Khormiz	1520
Manshad(Miankoh)	2420
Saryazd	1420
Bahadoran	1480
Tange Chenar	2245

IDENTIFICATION OF SPECIMENS

The collected Ladybirds were taken to laboratory. The adults of each species were carefully studied for all details under binocular microscope. The insects were separated into different

species with the help of available keys (Chapin, 1965 a, b; Leeper, 1976); (Gordon, 1985; Pope, 1988); (Fürsch, 1981 and 1989; Majerus and Kearns, 1989). The samples, which could not be identified in the laboratory, were sent to Dr. Helmut Fürsch in Germany.

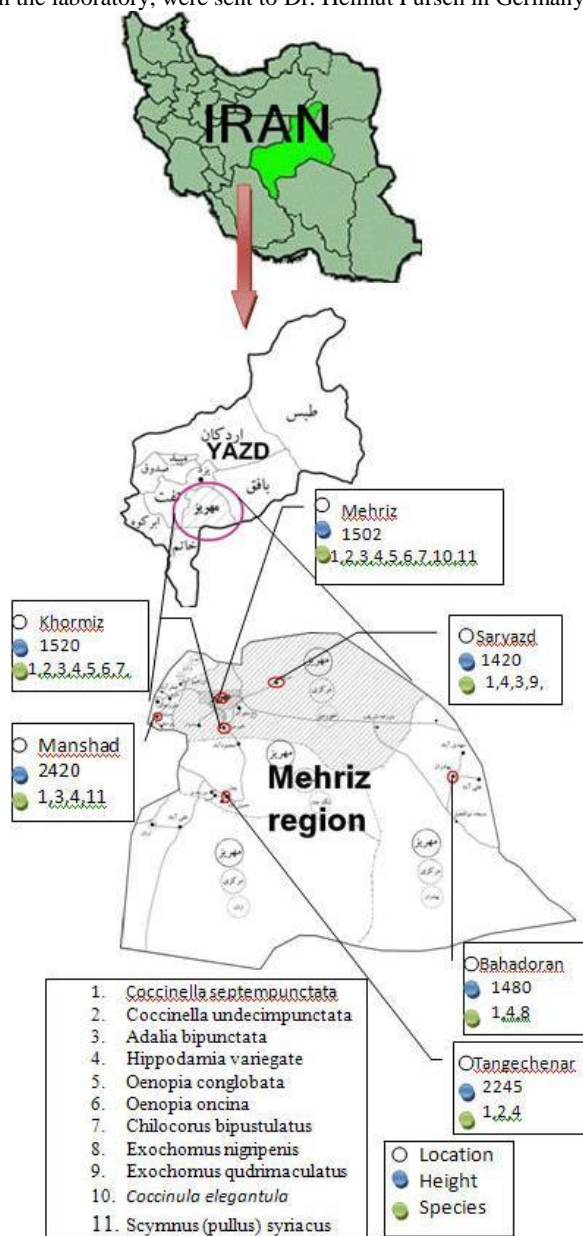


Figure 1. Locations of coccinellid species collected in the Mehriz region.

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Table 2. Coccinellid species collected from the Mehriz region.

SUB FAMILY	TRIBE	SPECIES
Scymninae	Scymnini	<i>Scymnus syriacus</i> Marseul
Chilocorinae	Chilochorini	<i>Exochomus nigripennis</i> (Erichson)
		<i>Exochomus quadripustulatus</i> (Linnaeus)
		<i>Cholocoros bipustulatus</i> (Linnaeus)
Coccinellinae	Coccinellini	<i>Hippodamia variegata</i> (Goeze)
		<i>Adalia bipunctata</i> (Linnaeus)
		<i>Coccinula elegantula</i> (Weise)
		<i>Coccinella septempunctata</i> (Linnaeus)
		<i>Coccinella undecimpunctata</i> (Linnaeus)
		<i>Oenopia conglobata</i> (Linnaeus)
		<i>Oenopia oncina</i> (Olivier)

RESULTS AND DISCUSSION

Eleven species of beetles belonging to three different tribes (Chilocorini, Coccinellini and Scymnini), and three sub-families, Coccinellinae Latreille 1807, Chilocorinae Mulsant 1846 and Scymninae Mulsant 1846 the Coccinellidae family, were identified from the Mehriz region, Iran (Figure 1, Table 2). All identified species were recorded for the first time from Mehriz region and seven species from these were recorded for the first time from Yazd province.

Family:Coccinellinae Latreille

Tribe:Coccinellini Latreille

Coccinella septempunctata Linnaeus

Length 6.50 to 7.80 mm. Head black with 2 well separated pale spots; pronotum with anterior margin black at middle with ventral pale spot small, extending posteriorly 1/3 as far as dorsal spot; elytron with 3 black spots in addition to scutellar spot(Gordon, 1985). *Coccinella septempunctata* was found in all localities from altitudes ranging 1420 to 2420 m. It was collected while feeding on aphids and scale insects on alfalfa, walnut, broad bean, pistachio and wheat. *C. septempunctata* was previously reported from Iran by a number of authors (Farahbakhsh, 1961; Naiem,1349); Duverger (1983) and Fatemi (1983) recorded *C. septempunctata* from Isfahan.

Hippodamia variegata Goeze

Length 3.60 to 5.00 mm, width 2.50 to 3.40mm.Head yellow; pronotum black, with variable maculated, sometime with convergent spots on anterior and lateral sides and the number of these spots variability (Iablokoff-Khuzorian, 1982). The second most frequent species after *C. septempunctata* was *Hippodamia variegata*, which was found in all the selected localities and

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at all altitudes (1420–2420m). This species was collected from Alfalfa, wheat, pistachio and walnut.

Adalia bipunctata (Linnaeus)

Length 3.50 to 5.20 mm, width 2.80 to 4.0 mm. Dorsal color pattern highly variable (Gordon, 1985). This species was collected from the Mehriz site and khormiz, Manshad and Saryazd site on Alfalfa, pomegranate, walnut, peach and feeding on wheat aphids.

Coccinella undecimpunctata (Linnaeus)

Length 4.0 to 5.0 mm. More elongate and less convex than any other species of genus *Coccinella*. Head black with 2 well separated pale spots; pronotum with anterior margin black at middle, ventral pale spot large, extending posteriorly nearly as far as dorsal spot; elytron usually with 5 black spots and a small scutellar spot (Gordon, 1985). This species was collected from in all localities altitudes ranging 1420 to 2420 m. It was collected while feeding on aphids and scale insects on walnut, alfalfa and wheat.

Oenopia conglobata Linnaeus

Length 3.20 to 4.20, width 2.40 to 3.20mm; form oval, convex. Head and pronotum light color; 7 dark spots usually on pronotum; elytron light color with 8 dark spots (Iablokoff-Khnzorian, 1982). This species was collected from the Mehriz site and khormiz, Manshad and Saryazd sites on alfalfa, pomegranate, walnut, grape, peach, pistachio and wheat. Kuznetsov (2001) earlier reported this species from far eastern Russia.

Oenopia oncina (Olivier)

Length 3.10 to 4.20, width 2.70 to 3.20 mm; form oval, convex. Head black; labrum, antenna and mouthparts yellow; pronotum black, anterior margin and anterolateral angle yellow; elytron yellow with joinining black spots (Iablokoff-Khnzorian, 1982). This species was also collected from Mehriz and khormiz site on alfalfa and broad bean.

Coccinula elegantula Weise

Length 2.30 to 2.60mm, width 1.70 to 2mm; form oval, convex. Dorsal surface glabrous. Head light yellow to cream (Yaghmaee and Kharazipakdel 1995). This species was also collected from Mehriz sit on alfalfa.

Family:Chilocorinae Mulsant

Tribe:Chilocorini Mulsant

Chilocorus bipustulatus (Linnaeus)

Length 3.0 to 4.50 mm, width 3.10 to 4.0 mm. Form oval, tapered posteriorly, moderately convex. light to dark brown dorsally, elytron with narrow irregular band of 3 partially connected spots on disc, external spot often free (Fig. 537d), venter light brown to black except prosternum, mesosternum, and metasternum usually black. Dorsal surface smooth, polished, punctures fine (Gordon, 1985). This species was collected from the Mehriz and khormiz site on alfalfa, almond and peach.

Exochomus quadripustulatus (Linnaeus)

Length 3.60 to 4.80 mm, width 2.85 to 4.0 mm. Form oval, lateral margin of elytron strongly beaded and somewhat explanate. Head and pronotum black except anterior margin and angle of pronotum narrowly yellow; elytron with comma-shaped yellow or orange humeral spot (spot sometimes rectangular) and spot on suture just behind middle. ventral surface black except inner 1/2 of epipleuron in basal 1/2 and broad border around abdomen

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reddish yellow. Dorsal surface smooth, punctures fine, distinct; epipleuron moderately descending, obliquely inclined (Gordon, 1985). This species was also collected from Saryazd sit on Peach.

Exochomus nigripennis (Erichson)

Length 3.0 to 4.0mm, width 2.50 to 3.40mm. Form oval, convex; dorsal surface shining and glabrous. Head black; mouthparts, antennae and legs yellow; pronotum yellow completely; elytron black (Fursh, 1979). This species was collected from the Mehriz and Bahadoran site on Broad bean and pistachio.

Family: Scymninae Mulsant

Tribe: Scymnini Mulsant

Scymnus syriacus Marseul

Length 1.65 to 2.30mm, width 1.15 to 1.60mm. Dorsal surface covered with bright pubescence. Head light brown; mouthparts, antennae, and legs orange, to light brown; pronotum brown, anterior margin and anterolateral angle yellow; elytron light to dark brown, with one spot on middle, around spot yellow and cycle shape hole (Fursh, 1989). This species was collected from the Mehriz, Khormiz and Manshad site on Apricot, walnut, almond and peach.

Conclusion

The results of this study suggest that the coccinellid community structure in the six study sites with different ecosystems and altitudes. The present study was the first attempt to describe the coccinellid fauna of the Mehriz region. The object of this study was to explore, identify and prepare inventory of predatory coccinellid species in the Mehriz region, which will be helpful for the future researchers working on predatory coccinellid species of this region. According to the results 11 different species from 9 genera belonging to sub-families Coccinellinae, Chilocorinae and scymninae existed in the area. The species were, *Coccinella septempunctata*, *Coccinella undecimpunctata*, *Hippodamia variegata*, *Coccinula elegantula*, *Adalia bipunctata*, *Oenopia oncina*, *Oenopia conglobata*, *Chilocorus bipustulatus*, *Exochomus quadripustulatus*, *Exochomus nigripennis* and *Scymnus syriacus*. Further survey is needed of those areas that were not covered in this study to fully explore predatory coccinellids fauna of Mehriz. The total area of Mehriz region is approximately 6700 km², which is mostly desert.

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دراسة تواجد الخنفساء السيدة *Coleoptera coccinellidea* في منطقة مهرز في محافظة يزد - إيران

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الخلاصة

درست الدعاسيق *Coleoptera coccinellidea* المتواجدة في منطقة مهرز (محافظة يزد) في هذه الدراسة خلال ۲۰۰۹-۲۰۱۰. جمع العدد الكلي لعينات الدعاسيق من ستة مواقع مختلفة ذات مرتفعات من ۱۴۲۰-۲۴۲۰م، جمعت وشخصت ۱۱ نوعاً من ثمانية اجناس، ثلاث عوائل وثلاث عويلات.

استخدمت صفات خارجية بالاضافة الى صفات السوءات الذكرية والانثوية في تشخيص الانواع. سجلت سبعة انواع لاول مرة من محافظة يزد. انواع كثيرة كانت مفترسات وفرائس على انواع مختلفة من المن والحلم والدعاسيق. بعض الانواع لتشخيصها او تاكيدها. والانواع التي جمعت هي:

- 1- *Coccinella septempunctata* (Linnaeus) *
- 2- *Coccinella undecimpunctata* (Linnaeus)
- 3- *Hippodamia variegata* (Goeze) *
- 4- *Coccinula elegantula* (Weise) *
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