



Research Article

Research on Coccinellidae (Coleoptera) fauna in Mazandarn province, Iran

KATAYOUN PAHLAVAN YALI¹, SHAHROKH PASHAI RAD¹, MEHDI ZARE KHORMIZI^{2*}, ZAHRA MOJIB HAGH GHADAM³, MINOO HEIDARI LATIBARI⁴ and GUY HANLY⁵

¹Faculty of Biological Sciences, Shahid Beheshti University, Tehran, Iran

²Young Researchers and Elite Club, Yazd Branch, Islamic Azad University, Yazd, Iran

³Guilan Agricultural and Natural Resources Research and Education Center, Rasht, Guilan, Iran

⁴Department of Plant Protection, Faculty of Agriculture, Ferdowsi University of Mashhad, Mashhad, Iran

⁵Northern Plains Entomology, Minot, North Dakota

*Corresponding author E-mail: zare7002@gmail.com

ABSTRACT: Ladybirds beetles belonging to the family Coccinellidae, Order Coleoptera, play an important role in pest control. The aim of this research was to explore, identify and characterize the coccinellid fauna of the Mazandaran Province (Iran). Coccinellid beetles were collected during 2013- 2015 from different Agriculture Stations with a wide range of agricultural lands and plants. A total of 21 species in 15 genera and 4 subfamilies were identified.

1. *Coccinella septempunctata* (Linnaeus, 1758)
2. *Adalia bipunctata* (Linnaeus, 1758)*
3. *Harmonia quadripunctata* (Pontoppidan, 1763) *
4. *Haippodemia variegata* (Goeze, 1777)
5. *Oenopia congolobata* (Linnaeus, 1758)
6. *Propylea quatuordecimpunctata* (Linnaeus, 1758)
7. *Adalia decempunctata* (Linnaeus, 1758)
8. *Vibidia duodecimguttata* (Poda, 1761) *
9. *Psylloboraviginti duopunctata* (Linnaeus, 1758)
10. *Chilocorus bipustulatus* (Linnaeus, 1758)
11. *Exochomus nigromaculatus* (Goeze, 1777)
12. *Platynaspis luteorubra* (Redtenbacher, 1843)*
13. *Nephusbi punctatus* (Kugelann, 1794)*
14. *Nephus qadrimaculatus* (Herbst, 1783)
15. *Scymnus subvillosus* (Goeze, 1777)
16. *Scymnus frontalis* (Fabricius, 1787)*
17. *Scymnus apetzy* (Mulsant, 1846)
18. *Scymnus impexus* (Mulsant, 1850)*
19. *Stethorus punctillum* (Weise, 1891)*
20. *Stethorus gilvifrons* (Mulsant 1850)*
21. *Serangium montazeri* (Montazeri, 1994)*

Nine species that are marked by *are new records for MazandaranCoccinellid fauna.

KEY WORDS: Ladybird, New record, Mazandaran, Insect

(Article chronicle: Received: 29-06-2017; Revised: 12-09-2017; Accepted: 30-09-2017)

INTRODUCTION

The Family Coccinellidae, which are known as Ladybugs and ladybird beetles, belong to the superfamily Cucujoidea, order Coleoptera. This family is the largest

in the recently characterized superfamily Coccinellidae (Robertson *et al.*, 2015). The color patterns of ladybirds is surprisingly variable, which can range from a reddish or yellowish to black background with dark and light spots,

respectively, or to a brown background with light spots. Ladybirds also have various diets, and although they are mainly predators, some are phytophagous, and are serious economic pests for crops (Shaefer, 1983). Most members of this family, are beneficial insects (William, 2002), With many species preying on herbivorous pests such as aphids or scale insects. Most coccinellids lay their eggs directly on aphids and scale insects colonies, hence they ensure that their larvae have access to the necessary food source (Montazer and Mosaddegh, 1995). Some species, such as the subfamily Epilachninae, is phytophagous and have undesirable effects causing damage to various crops such as potatoes and beans Their numbers are decreased with activity of parasitoid wasps.

MATERIALS AND METHODS

Specimens were collected from 15 different Stations in Mazandaran Province Iran (36° 33' 56.16" N, 53° 3' 31.68" E) during 2013-2015. Collecting methods included aspirator, white dish and direct hand picking from various plants. The specimens were sent to the Biosystematic laboratory of Shahid Beheshti University for identification. All species were stored in 70% ethanol and were identified using available keys (Reimundo and Harten, 2000) in few cases,

genital dissections were carried out by using 10% KOH and permanent slides were made by Hoyer solution. All identified samples were confirmed by Dr. Oldrich Nedved at university of south Bohemia in Czech Republic.

Table 1. List of the sampling localities in west of Mazandaran Province

Number	Locations	Coordinate of locations	Altitude
1	Ramsar	36°90N - 50°67'E	-8
2	Javaherdeh	36°91N - 50°61'E	1768
3	Tnekabon	36°81N - 50°87'E	-14
4	GhaleGardan	36°75N - 50°84'E	45
5	Falakdeh	36°61N - 50°92'E	923
6	EshkevarMahaleh	36°64N - 50°72'E	1395
7	Abbas Abad	36°72N - 51°11'E	-20
8	Valasht Lake	36°49N - 51°30'E	774
9	Chaloos	36°49N - 51°30'E	80
10	KalarDasht	36°64N - 51°40'E	1343
11	Marzan Abad	36°44N - 51°29'E	519
12	ArbehKaleh	36°86N - 50°67'E	312
13	Garsmasar	36°81N - 50°56'E	2205
14	Nashtarood	36°78N - 50°94'E	-22
15	Salman Shahr	36°70N - 51°19'E	-10

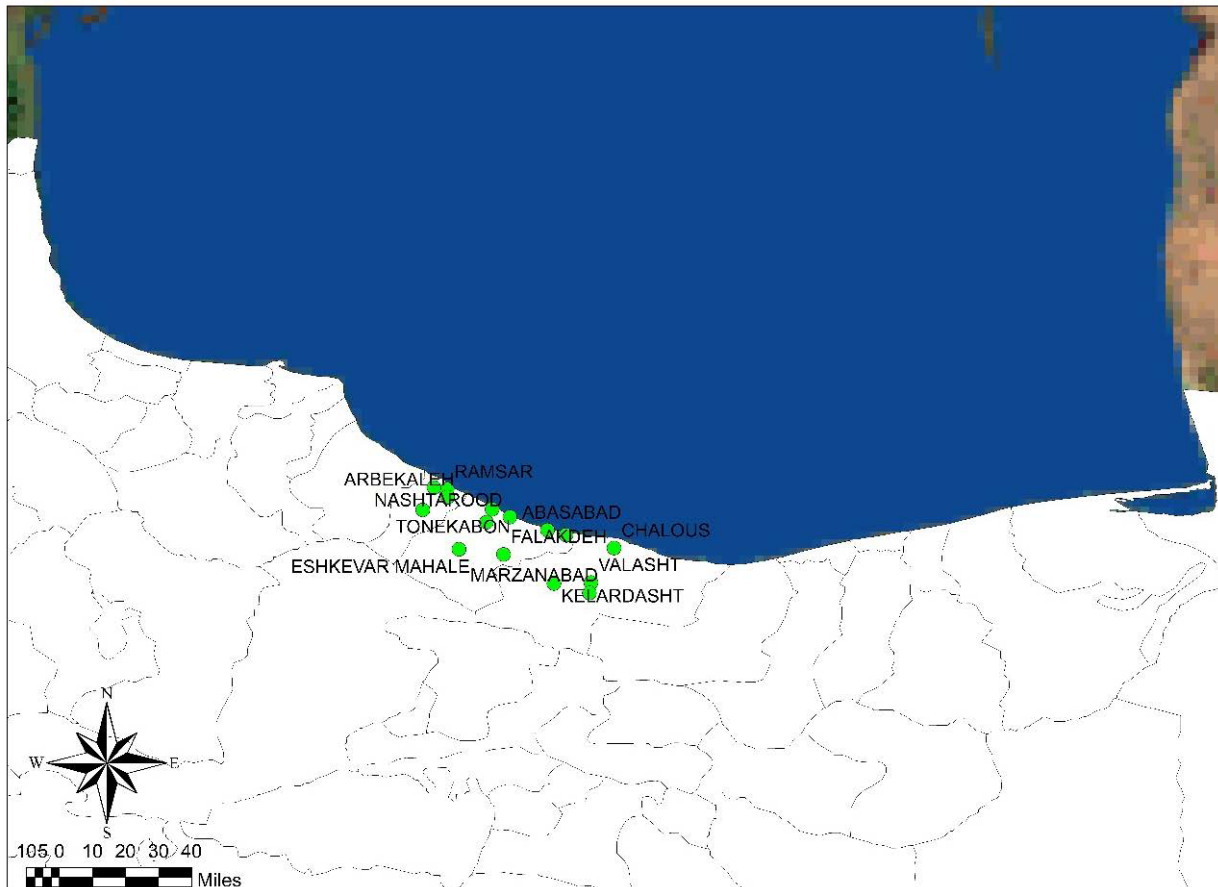


Fig. 1. Drawn map of the stations.

RESULTS AND DISCUSSION

A total of 21 species belong to 15 genera and 4 sub-families were identified. Identified species are listed as below:

ACKNOWLEDGMENTS

Thanks to Dr. Oldrich Nedved, Associate Professor at University of South Bohemia, Czech Republic for identification of ladybirds species. This research was a part of MSc studies of the first author at Shahid Beheshti University, Tehran, Iran.



Fig. 2. a-b) *Adalia bipunctata* (Linnaeus, 1758), c) *Harmonia quadripunctata* (Pontoppidan, 1763), d) *Nephus bipunctatus* (Kugelann, 1794), e) *Nephus quadrimaculatus* (Herbst, 1783), f) *Oenopia conglobata* (Linnaeus, 1758), g) *Platynaspis luteorubra* (Redten Bacher, 1843), h) *Scymnus frontalis* (Fabricius, 1787), i) *Scymnus subvillosus* (Goeze, 1777), j) *Stethorus gilvifrons* (Mulsant 1850), k) *Stethorus punctillum* (Weise, 1891), l) *Vibidiaduo decimguttata* (Poda, 1761), m-n) *Adalia decempunctata* (Linnaeus, 1758), o) *Scymnus apetzi* (Mulsant, 1846), p) *Chilocorus bipustulatus* (Linnaeus, 1758), q) *Coccinella septempunctata* (Linnaeus, 1758), r) *Hippodamia variegata* (Goeze, 1777), s) *Parexochomus nigromaculatus* (Goeze, 1777), t) *Propylea quatuordecimpunctata* (Linnaeus, 1758), u) *Psyllobora vigintiduopunctata* (Linnaeus, 1758), v) *Serangium montazerii* (Montazeri, 1994) All images have been scaled to one standard size, refer to species description for actual size.

Table 2. Collected species and Host plant in north of Iran

Species	Host plant
<i>Adalia bipunctata</i> (Linnaeus, 1758)	<i>Juglans regia</i> L, <i>Urtica folium</i>
<i>Adalia decempunctata</i> (Linnaeus, 1758)	<i>U. folium</i> , <i>J. regia</i> , <i>Citrus</i> sp , <i>Punica granatum</i> , <i>Cirsium vulgare</i>
<i>Chilocorus bipustulatus</i> (Linnaeus, 1758)	<i>Citrus</i> sp.
<i>Coccinella septempunctata</i> (Linnaeus, 1758)	<i>Trifolium</i> sp, <i>Phlomis persica</i> , <i>Eryngium planum</i> , <i>Galium aparine</i> L, <i>U. folium</i> , <i>C. vulgare</i> , <i>Citrus</i> sp.
<i>Harmonia quadripunctata</i> (Pontoppidan,1763)	<i>U. folium</i>
<i>Haippodemia variegata</i> (Goeze, 1777)	<i>U. folium</i>
<i>Nephus bipunctatus</i> (Kugelann, 1794)	<i>C. vulgare</i>
<i>Nephus qadrimaculatus</i> (Herbst, 1783)	<i>Citrus</i> sp.
<i>Oenopia congolobata</i> (Linnaeus, 1758)	<i>U. folium</i> , <i>C. vulgare</i> , <i>Trifolium</i> sp, <i>Verbascum thapsus</i>
<i>Propylea quatuordecimpunctata</i> (Linnaeus, 1758)	<i>J. regia</i> , <i>U. folium</i> , <i>Citrus</i> sp.
<i>Psyllobora vigintiduopunctata</i> (Linnaeus, 1758)	<i>G. aparine</i> L
<i>Parexochomus nigromaculatus</i> (Goeze, 1777)	<i>U. folium</i> , <i>C. vulgare</i> ,
<i>Platynaspis luteorubr</i> (Redtenbacher,1843)	<i>Citrus</i> sp.
<i>Scymnus subvillosus</i> (Goeze, 1777)	<i>P. granatum</i> , <i>Citrus</i> sp.
<i>Scymnus frontalis</i> (Fabricius, 1787)	<i>P. granatum</i> , <i>Citrus</i> sp.
<i>Scymnus apetzi</i> (Mulsant, 1846)	<i>C. vulgare</i>
<i>Scymnus impexus</i> (Mulsant, 1850)	<i>Citrus</i> sp.
<i>Stethorus punctillum</i> (Weise, 1891)	<i>Citrus</i> sp.
<i>Stethorus gilvifrons</i> (Mulsant 1850)	<i>Citrus</i> sp, <i>J. regia</i>
<i>Serangium montazerii</i> (Montazeri, 1994)	<i>Citrus</i> sp.
<i>Vibidia duodecimguttata</i> (Poda, 1761)	<i>Morus</i> sp., <i>Citrus</i> sp.

REFERENCES

Alizadeh MS, Mossadegh MS, Esfandiari M. 2013. Natural enemies of *Maconellicoccus hirsutus* (Green) (Hemiptera: Pseudococcidae) and their population fluctuations in Ahvaz, southwest of Iran. *J Crop Prot.* **2**(1):1 3–21.

Biranvand A, Jafari R, Zare Khormizi M. 2014. Diversity and distribution of Coccinellidae (Coleoptera) in Lorestan province, Iran. *Biodiversity J.* **5**(1): 3–8.

Ebrahimi S, ModarresAwal M, Karimi J, Fekrat L, Nedved O. 2014. Two new records of ladybirds (Col.: Coccinellidae) for the Iranian beetle fauna. *J Entomol Soc Iran* **34**: 11–12.

Farsi A, Kocheili F, Mossadegh MS, Rasekh A, Tavooosi M. 2014. Natural enemies of the currant lettuce

aphid, *Nasonovia ribisnigri* (Mosely) (Hemiptera: Aphididae) and their population fluctuations in Ahvaz, Iran. *J Crop Prot.* **3**(4): 487–497.

Hunt T, Bergsten J, Levkanicova Z, Papadopoulou A, John OS, Wild R, Hammond PM, Ahrens D, Balke M, Caterino MS, Gomez-Zurita J, Ribera I, Barraclough TG, Bocakova M, Bocak L, Vogler AP. 2007. A comprehensive phylogeny of beetles reveals the evolutionary origins of a superradiation. *Science* **318**: 1913–1916. Crossref PMid:18096805

Mehrnejad MR, Jalali MA, Mirzaei R. 2011. Abundance and biological parameters of psyllophagous coccinellids in pistachio orchards. *J Appl Ent.* **135**(9): 673–681. Crossref

Michaud JP.2004. Natural mortality of Asian citrus psyllid, *Diaphorina citri* (Homoptera: Psyllidae) in central

- Florida. Science Direct. *Biol Control* **29**: 260–269. Crossref
- Montazeri MM, Mossadegh MS. 1995. The coccinellids (Coleoptera) fauna of Gorgan plain and *Gonbad Kavus*, p: 325. In: *Proceeding of the 12Th plant protection congress of Iran 2- 7 September 1995*, Karaj, Iran.
- Raimundo AC, Harten AV. 2000. An annotated checklist of the Coccinellidae (Insecta: Coleoptera) of Yemen. *Fauna Arabia* **18**: 211–243.
- Robertson J, Sliplinski A, Moulton M, Shockley F et al. 2015. Phylogeny and classification of Cucujoidae and recognition of a new superfamily Coccinelloidae (Coleoptera: Cucujiformia). *Syst Entomol.* **40**(4): 745–778. Crossref
- Salehi T, Mehrnejad MR, Pashaei S. 2013. Diversity pattern of adult ladybird (Coleoptera: Coccinellidae) communities on pistachio trees in southern parts of Iran in different months. *Zool Ecol.* **23**(4): 286–292. Crossref
- Shaefer PW. 1983. Natural enemies and host plants of species in the Epilachninaea world list. *Agric. Exp. Station, Univ. Delaware, Bull.* **445**: 1–42.
- Smirnoff WA. 1956. Observation sur les prédateurset parasites des cochenillesnuisibles du Maroc et sur leursennemis. *Ministère de l’Agriculture et des Forêts, Service de la Défense des Végétaux* **11**: 1–60.
- William FL. 2002. Lady Beetles. Ohio State University Extension Fact Sheet, Horticulture and Crop Science. Division of Wildlife, 2021 Coffey Rd. Columbus, Ohio, 857 pp.
- Zare Khormizi M, Ostovan H, Fallahzadeh M. 2014. Status of Ladybirds (Coleoptera:Coccinellidae) in Khatam County (Yazd Province) and the first report of *Hyperaspis reppensis* (Herbst, 1783) for Iranian Fauna. *J Biol Control* **28**:126-131