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RECOGNITION OF LADYBIRD FAUNA (COL.: COCCINELLIDAE) IN THE ALFALFA FIELDS OF KHORRAMABAD

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ABSTRACT

Ladybird fauna in alfalfa fields of the Khorramabad district were studied during 2009 – 2011. In this study, a total of 15 species were detected belonging to 8 genera of ladybird. Samples were collected then identified by characteristics of their appearance and genitalia using valid keys. The species identified were: *Coccinella septempunctata* (Linnaeus, 1758), *Coccinella undecimpunctata* (Linnaeus, 1758), *Hippodamia variegata* (Goeze, 1777), *Hyperaspis quadrimaculata* (Redtenbacher, 1843), *Exochomus pubescens* (Kuster, 1848), *Exochomus flavipes* (Goeze, 1777), *Exochomus melanocephalus* (Zoubkoff, 1833), *Scymnus apetzi* (Mulsant, 1846), *Scymnus flavicollis* (Redtenbacher, 1843), *Scymnus syriacus* (Marseul, 1868), *Scymnus pallipes* (Mulsant, 1850), *Propylea quatuordecimpuctata* (Linnaeus, 1758), *Psyllobora vigintiduopunctata* (Linnaeus, 1758), *Oenopia conglobata* (Linnaeus, 1758), *Oenopia oncina* (Olivier, 1808)

Keywords: Ladybird, Fauna, Khorramabad, Lorestan, Iran.

INTRODUCTION

From a human perspective ladybirds are one of the most beautiful insects (Gordon, 1985), In many parts of Iran, this beautiful insect is particularly popular with indigenous people. Ladybirds are also widely recognized for their role in biological ecosystems (Gordon, 1985; Sadeghi, 1991; Moadi & Mossadegh, 1995; Tsaganou *et al.,* 2004; Inayatullah, *et al.,* 2005; Chowdhury *et al.,* 2008; Farahi & Sadeghi Namghi, 2009). They are environmentally beneficial and have been used in different parts of the world to control pests such as aphids, mealybugs, thrips and mites (Moreton, 1969; Hawkeswood, 1987; Majerus, 1994). Linnaeus, in the mid-seventeenth century AD, was the first person to classify groups of animals and plants, and it was then that this category of ladybird was first classified (Gordon, 1985). During the next 100 years classification of ladybird species, together with other insects, was advanced by Fabricius, Degger, Thunberg and Herbst (Gordon, 1985). Then in 1850, Mulsant reviewed and changed the earlier classification of ladybirds (Gordon, 1985). The identification of ladybirds, as for other groups of insects is largely characterized by morphology of the male genitalia. The male genitalia are composed of two parts; the tegmen and the sipho, and exact identification of a species of ladybird is possible from an observation the sipho of the male insect (Sadeghi, 1991; Bagheri & Mossadegh, 1995; Hajizade, 1995).

Various and widespread research has been done to report lists of ladybird species for different regions of the world. Ladybird species were studied in the Himalayas and Nepal, by Canepari, (1997), and new species were recorded for the region. The list for ladybirds in eastern Russia was published by Kuznetsov, (1997), and in this list 92 species of ladybird were identified. The list of coccinellidae species in Khorramabad district of Lorestan province, Iran has been reported by Ansari pour *et al.* (2011), in this research 22 species of ladybird was recorded for Iranian fauna in the Khorramabad district including that of *Hyperaspis quadrimaculata* (Redtenbacher, 1843). A list of ladybird species, in the Poona and Kashmir regions of Pakistan was compiled by Inayatullah *et al.,* (2005). Species of the province Maritime in Canada were studied by Majka & Mccroquodale, (2006). A list of predators to aphids, *Brachycaudus amygdalinus,* was published in Syria by Almatni & Khalil, (2007). The various ladybird species of different regions of Iran have been compiled in several lists; the lists record 114 species of ladybird in different parts of Iran (Farahi & Sadeghi Namghi, 2009). A study of ladybird fauna in different regions of the country has been reported for Iran and registered there (Sadeghi, 1991; Montazeri and Mosadegh, 1995; Haji zade *et al.,* 2001; Yaghmaei and Pakdel, 1995; Farahi and Namghi, 2009; Ansari pour & Shakarami, 2011; Ansari pour *et al.* 2011).

This research in to ladybird species of the alfalfa fields of the Khorramabad region, aims to identify various species and to pave the way for more extensive future research in the field. It is hoped that this research will lead to more widespread use of these useful insects in fields as a natural enemy to enable a reduction in the use of pesticides.

MATERIALS AND METHODS

Ladybirds collected from alfalfa fields in the Khorramabad district began in March 2009. The collection of samples continued until June 2011. The ladybirds were collected using standard nets and in some cases ladybirds were collected straight from the alfalfa crops by hand (Sadeghi, 1991; Farahi & Sadeghi Namghi, 2009; Ansari pour & Shakarami, 2011; Ansari pour *et al. 2011*). Samples of adult ladybirds were kept in 70% ethanol (alcohol) to be used for the separation and preparation of their genitalia for microscope slides. For the preparation of the microscopic slides, the ladybirds' abdomens (that in term of size are large) were separated from other parts of the body and placed in cold 10% potassium hydroxide solution for 24 hours but for the ladybirds with small bodies, the whole insect was placed into a solution of potassium hydroxide (Sadeghi, 1991; Ansari pour & Shakarami, 2011). This procedure was used to decolorize the genital organs in order for them to appear clear on the microscope slide. In the next step, the sections of insects necessary for observation were put in to alcohol with various proportions until the texture showed a state of dehydration and air bubbles were observed on the surface of the samples. Then the male genitalia that include the sipho and tegmen were separated using two dissecting needles and then placed on a slide. For the determination of species, the scientific name of each ladybird species was used for identification on a valid key, for example the coccinellidae (coleoptera) of America North of Mexico (Gordon, 1985). A number of ladybird species were identified and those that could not be identified using the key were referred to Dr. Fursch from Germany for identification.

RESULTS AND DISCUSSION

In this study, a total of 15 species of ladybird were collected from the alfalfa fields and identified. They were from different parts of the Khorramabad region. Descriptions of some important characteristics of the morphologies of ladybirds are identified below:

Coccinella septempunctata **(Linnaeus, 1758):** The length of body in this ladybird is 7-8.5 mm. The elytra are red with seven black spots. This ladybird can be regarded as 'the sultan of ladybirds of Khorramabad', it is a dominant species of ladybird in the Khorramabad region (Ansari pour, 2010). This specie was collected from alfalfa crops from throughout the Khorramabad region. A total of 346 ladybirds of this species were collected; 190 of which were male and the rest were female. Seven- spotted ladybird is the most famous ladybird species in the word.

Coccinella undecimpunctata **(Linnaeus, 1758):** This ladybird species has a length of 4–5.5 mm. The elytra are red with 11 black spots. This specie was collected from the alfalfa fields of Khorramabad city. A total of 17 ladybirds of this specie were collected; 8 of which were female and the rest male.

This species takes 85% of its nourishment from Aphis, Psylls and Chrysomelidae (Hodek, 1973).

This specie has also been found in other areas of Iran: in Kerman province (Koohpayezadeh & Mossadegh, 1991), Mazandaran province (Montazeri & Mossadegh, 1995), Southeastern Khorasan province (Moadi & Mossadegh, 1995) and Mashhad province (Yaghmae & Kharazi Pakdel, 1995, Ansari pour & Shakarami, 2011).

Hippodamia variegata **(Goeze, 1777):** This ladybird species has a length of 3 – 3.5 mm. The elytra are red with spots. Numbers of spots on the elytra are highly variable hence the name of this ladybird (*variegata*). This ladybird was collected from alfalfa crops from throughout the Khorramabad region. This species was recommended as one of the dominant species of the Khorramabad district. A total of 200 ladybirds of this species were collected; 133 of which were male and rest were female.

This species has been reported in most areas of Iran (Sadeghi, 1991; Koohpayezadeh & Mossadegh, 1991; Yaghmae & Kharazi Pakdel, 1995; Bagheri & Mossedegh, 1995 and Ansari pour *et al.* 2011).

Hyperaspis quadrimaculata **(Redtenbacher, 1843):** This ladybird species has a length of 3 – 3.5 mm. The elytra are black and with 4 reddish-orange spots on them. The pronotum is black with 2 reddish-orange spots on it. The tegmen is asymmetrical in the male genitalia and easily identified from other genera of coccinellidae. This ladybird was reported for the first time in the Khorramabad region by Ansari pour & Shakarami (2011), this was also the first report of the species in Iran. A total of 3 ladybirds of this species were collected; one of which was female and the others male.

Oenopia conglobata **(Linnaeus, 1758):** This ladybird species has a length of 3 – 4.5 mm. The elytra are a reddish-orange color and with 16 black spots. The pronotum is a pale red color with 5 black spots. This ladybird was collected from alfalfa fields near peach gardens. A total of 28 ladybirds of this species were collected; 12 of which were female and the rest were male.

This ladybird has also been reported in other areas of Iran: in the province of Kerman (Koohpayezadeh & Mossadegh, 1991), Mazandaran (Montazeri & Mossadegh, 1995), South eastern Khorasan province (Moadi & Mossadegh, 1995), Chahar and Bakhtiari (Bagheri & Mossedegh, 1995), in Mashhad (Yaghmae &

Kharazi Pakdel, 1995), Gilan (Haji zade *et al.,* 2001), Lorestan province (Jafari & Kamali, 2007) and in Khorasan (Farahi & Sadeghi Namghi, 2009; Khorramabad district t(Ansari pour & Shakarami, 2011; Ansari pour *et al.* 2011).

***Oenopia oncina* (Olivier, 1808):** This species of ladybird has a length of 3.5 – 4 mm. The elytra are black in color with 5 yellowish-orange colored spots. In total, 12 of this ladybird species were collected; 7 of which were female and the rest were male.

This species usually feeds on Aphididae (Lu & Montgomery 2001, Slipinski 2007, Giorgi *et al*. 2009).

***Propylea quatuordecimpuctata* (Linnaeus, 1758):** This species has a length of 3.5 – 5 mm. The elytra are yellow in color with 7 quadrangular shaped black spots. This ladybird was collected from alfalfa fields near peach gardens. A total of 11 ladybirds of this species were collected; 6 were female and the rest were male.

Other areas where this ladybird has been reported are cited as follows; by (Montazeri & Mossadegh, 1995), in Chahar Mahal and Bakhtiari (Bagheri and Mossedegh, 1995), in Mashhad (Yaghmae & Kharazi Pakdel, 1995), Gilan (Haji Zade *et al.,* 2001), Lorestan province (Jafari & Kamali, 2007), Khorasan (Farahi & Sadeghi Namghi, 2009) Golestan province (Afshari, 2010) and Khorramabad district (Ansari pour & Shakarami, 2011).

***Psyllobora vigintiduopunctata* (Linnaeus, 1758):** This species has a body length of 3.5 – 4 mm. The elytra are yellow in color with 22 black spots. The pronotum is yellow with 5 black spots. This species was only collected from alfalfa fields in the Darvishabad region of Khorramabad (33°40.73'N, 48°61.25'E, at an altitude of 1639m above sea level). In total 19 ladybirds of this species were collected; 18 were female and only one was male.

This ladybird species has been reported in other areas of the province of Kerman (Koohpayezadeh & Mossadegh, 1991), Mazandaran (Montazeri & Mossadegh, 1995), South eastern province of Khorasan (Moadi & Mossadegh, 1995), Chahar Mahal and Bakhtiari (Bagheri & Mossedegh, 1995), in Mashhad (Yaghmae & Kharazi Pakdel, 1995), Gilan (Haji Zade *et al.,* 2001), Lorestan province (Jafari & Kamali, 2007), Khorasan (Farahi & Sadeghi Namghi, 2009).

***Scymnus apetzi* (Mulsant, 1846):** This species has a length of 1.8 – 2 mm. The elytra are black with 2 red spots. This ladybird is covered in abundant tiny hairs like other *Scymnus*, the legs and mouthparts of this insect are brown. In total 4 ladybirds of this species were collected, all of which were male.

The ladybirds were collected from the Khorramabad district, from fruit gardens and alfalfa fields. The ladybird has also been reported in other areas of Fars province Mazandaran (Montazeri & Mossadegh, 1995), Chahar Mahal and Bakhtiari (Bagheri & Mossedegh, 1995), Mazandaran (Mafi, 1997), Guilan (Haji Zade *et al.,* 2001), Lorestan province (Jafari & Kamali, 2007), Khorasan (Farahi & Sadeghi Namghi, 2009) and Khorramabad district (Ansari pour & Shakarami, 2011).

***Scymnus flavicollis* (Redtenbacher, 1843):** This species has a body length of 2 – 2.5 mm. Its head, mouthparts and legs are brown in color and the elytra are black with 2 brown spots. The elytra are entirely covered with tiny gray hairs. In total 7 ladybirds of this species were collected; 4 were female and the rest were male.

This species of ladybird usually feeds on Aphidoidae (Lu & Montgomery 2001, Slipinski 2007, Giorgi *et al*. 2009).

***Scymnus syriacus (Marseul, 1868*):** This species has a length of 1.8 – 2.2 mm. Its body is brown in color, the elytra are brown with 2 light brown spots and in the middle part of each of these spots there is a black spot. The insect body is entirely covered with brown hair. The insect's abdomen is not covered completely by the elytra and the abdominal terminal segment from above is quite distinct. In total 5 ladybirds of this species were collected; one female and rest were male.

The ladybird has been reported in other areas of the province of Fars Southeastern Khorasan (Moadi & Mossadegh, 1995), in Mashhad (Yaghmae & Kharazi Pakdel, 1995), Gilan (Haji Zade *et al.,* 2001) and Khorasan (Farahi & Sadeghi Namghi, 2009), Khorramabad district (Ansari pour & Shakarami, 2011).

***Scymnus pallipes* (Mulsant, 1850):** This species has a body length of 1.8 – 2 mm. The body is black in color and the surface covered with brownish black hair. The pronotum is black and the front part of it that conceals the head in the fallowing is brown. The head, mouthparts and legs are brown in color. In total 3 ladybirds of this species were collected; one of them was female and others were male.

This species of ladybird usually feeds on Aphidoidae (Lu & Montgomery 2001, Slipinski 2007, Giorgi *et al*. 2009).

***Exochomus pubescens* (Kuster, 1848):** The body length of this species is 3.5 – 4 mm. The elytra are shiny black and the dorsal surface of which is without hair. The pronotum and head are brown in color, the ventral surface of the body is also brown. In total 14 ladybirds of this species were collected; 7 ladybirds were female and the rest were male.

Other areas in which this ladybird species has been cited are; in Mazandaran by Montazeri & Mossadegh (1995), Southeastern Khorasan (Moadi & Mossadegh, 1995), in Lorestan province by (Jafari & Kamali, 2007).

***Exochomus flavipes* (Goeze, 1777):** The body length of this species is 3.5 – 4 mm. The elytra are black in color with many dimples. Pronotum is black, lateral parts of the pronotum are reddish brown. This ladybird has yellow legs and is known in Iran as 'yellow leg ladybird'. In total 10 ladybirds of this species were collected; 5 were female and rest were male.

***Exochomus melanocephalus* (Zoubkoff, 1833):** This species has a body length of 4 – 4.4 mm. The elytra are black in color and the pronotum is brownish-black. The head, mouthparts, legs and the ventral surface of the body are brown. In total 5 ladybirds of this species were collected; of which, only one was female and the others were male.

Percentages of ladybird species in alfalfa fields of the Khorramabad district: In this study, each species of ladybird collected from alfalfa fields of the Khorramabad district were studied separately and ratios were compiled of each species to numbers in all species (Fig. 1). In total 684 different species of ladybird were collected and identified; 390 ladybirds were male and the others were female. In (Fig. 1) the percentages of each ladybird species is compared with the other 14 species. It can be concluded that *C. septempunctata* had the highest frequency with 51% followed by *H. variegata* with 29%. These results are consistent with those of Ansari (2010).

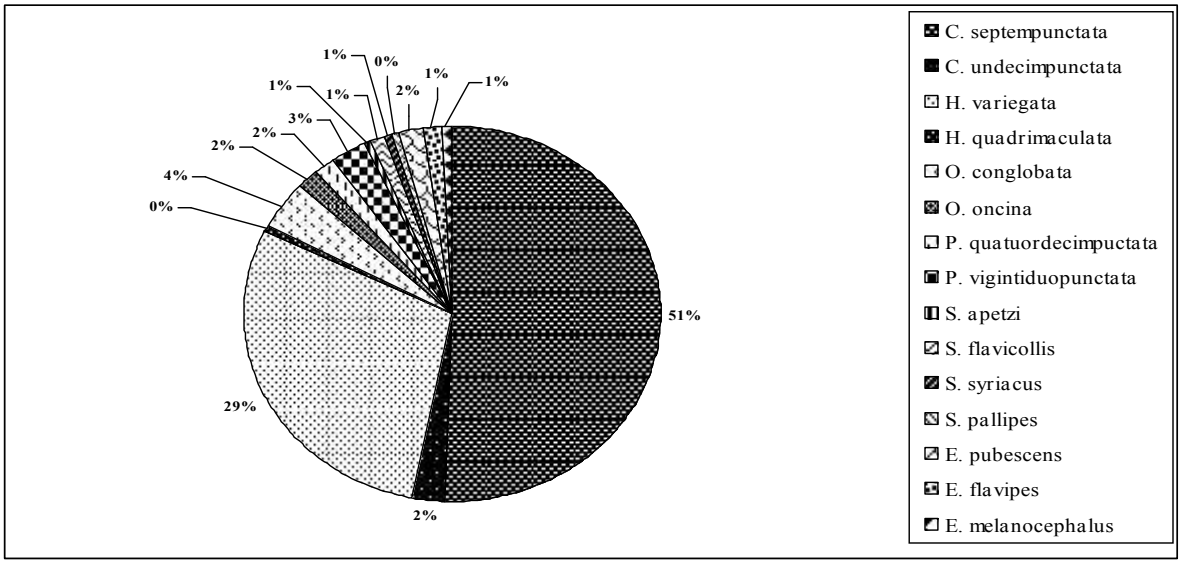

Fig. 1: The percentage of existent ladybird species in alfalfa fields of Khorramabad.

REFERENCES

Afshari, A. (2010). Relative abundance, spatial distribution and sequential sampling for four main predators of cereal aphids in winter wheat fields of Gorgan, northern Iran. M.S.c thesis. dissertation, Shahid Chamran University, Ahwaz. 156 pp.

Almatni, W. and N. Khalil (2007). A primary survey of aphid species on almond and peach, and natural enemies of Brachycaudus amygdalinus in As-Sweida, Southern Syria. Available in: http://orgprints.org/13654/.

Ansari pour, A. (2010). Study of Ladybird fauna (Col.: Coccinellidae) in khorramabad district and population dynamic of dominant species. M.Sc. thesis, Islamic Azad Univ. Arak. Iran.

Ansari pour, A. and J. Shakarami (2011). Study of ladybirds (Col:Coccinellidae) in Khorramabad district and the first report of *Hyperaspis quadrimaculata* (Redtenbacher 1844) for Iranian fauna. Life Science Journal, 8(3): 488-495.

Ansari pour, A. Vafaei-shoushtari, R. and J. Shakarami (2011). Study of faun ladybirds (Col., Coccinellidae) in Khorramabad district. J. Entomological Res., 3(2):102-107.

Bagheri, M.R. and M.S. Mossadegh (1995). The faunistic studies of Coccinellidae in Charmahal Bakhtiari province. p: 308. In: Proceeding of the 12th plant protection congress of Iran 2-7 September 1995, Karaj, Iran.

Canepari, C. (1997). Coccinellidae (Coleoptera) from the Nepal Himalayas. Stuttgarter Beitrage zur Naturkunde, Serie A (Biologie), 565 (65): 1-65.

Chowdhury, S.P., M. A. Ahad, M. R. Amin and M.S. Hasan (2008). Biology of ladybird beetle *Micraspis discolors* (Fab.) (Coccinellidae: Coleoptera). Int. J. Sustain. Crop Prod. 3(3): 39-44.

Farahi, S. and H. Sadeghi namghi (2009). Species diversity of aphids and ladybird Mashhad district (Khorasan razavi province). Journal of Plant Protection, 23(2): 89-95.

Giorgi, J.A., Vandenberg, N.J., and J.V. McHung (2009). The evolution of food preferences in Coccinellidae. Biological control, 51: 215-231.

Gordon, R. (1985). The coccinellidae (coleoptera) of America North of Mexico. J. Entomol. Soc. 93(1): 1-912.

Haji zade, J. (1995). A survey for identification of Coccinellid species of *Stethorus Weise* particular reference on biology, efficiency and mass rearing possibilities of *S. golvifrons* (Mulsant) in Tehran province. M.S.c thesis. dissertation, Tarbiat modares university, Tehran. 196 pp.

Haji zade, J., Jalali sanadi, J. and H. Peyrovi chashnasar (2001). Introduction part of ladybirds (Col.: coccinellidae) in Guilan province. Agricultural science and natural resourses, 4: 99-112.

Hawkeswood, T. (1987). Beetles of Australia. Augus and Robertson, Sydney, Australia.

Hedek, I. 1973. Biology of coccinellidae. Academia, Czechoslovak Acad. Sci., Prague, 260pp.

Inayatullah, M., Hayat, A. and M. Ather Rafi (2005). Species composition and seasonal occurrence of Coccinellidae (Coleoptera) in district Poonch, Azad Kashmir with new records. Sarhad J. Agric. 21(1): 97-100.

Jafari, R. and K. Kamali (2007). Faunestic study of ladybird (Col.: Coccinellidae) in Lorestan province and report of new records in Iran. New findings in agriculture, 4: 349-359.

Koohpayezadeh N. and M.S. Mossadegh (1991). Some of the ladybirds (Coccinellidae) fauna of Kerman province, p: 64. In: Proceeding of the 10th plant protection congress of Iran 1-5 September 1991, Kerman, Iran.

Kuznetsov, V.N. (1997). Lady Beetles of the Russian Far East. Memoir No. 1, Center for Systematic Entomology, 248 pp.

Lu, W. and M.E. Montgomery (2001). Oviposition, development, and feeding of *Scymnus* (*Neopullus*) *sinuanodulus* (Coleoptera: Coccinellidae): a predator of *Adelges tsugae* (Homoptera: Adelgidae). Annals of the Entomological Society of America 94, 64–77.

Mafi, S. (1997). Identification of mealybug species (Pseudococcidae) in Mazandaran province and study on dominant species and its natural enemies. M.S. thesis. dissertation, Tarbiat modares university, Tehran. 112 pp.

Majerus, M.E.N. (1994). Ladybirds. Harper Collins London, 359 pp.

Majka, C.G. and D.B. Mccorquodale (2006). The Coccinellidae (Coleoptera) of the Maritime Provinces of Canada: new records, biogeographic notes, and conservation concerns, *Zootaxa* 1154: 49–68 (2006).

Moadi, S. and M.S. Mossadegh (1995). The coccinellids (Coleoptera) of southeast Khorasan province, Iran, p: 326. In: Proceeding of the 12Th plant protection congress of Iran 2-7 September 1995, Karaj, Iran.

Montazeri, M.M. and M.S. Mossadegh (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.

Moreton, B.D. (1969). Ladybirds and spider mites. In: Beneficial insects and mites. Her Majesty, Stationary Office London. Ministry of Agriculture, Fisheries and Food. Bulletin, 20: 15-20.

Sadeghi, I. (1991). An investigation on the Coccinellidae fauna of alfalfa fields and determination of dominant species at Karaj.

Slipinski, A. (2007). Australian ladybird beetles (Coleoptera: Coccinellidae): their biology and classification. Australian Biological Resources Study, Canberra.

Tsaganou, F. C., C. J. Hodgson, C. G. Athanassiou, N. G. Kavallieratos and Z. Tomonovic (2004). Effect of *Aphis gossypii* (Hemiptera: Aphidoidea) on the development of the predator *Harmonia axyridis* (Pallus) (Coleoptera: Coccinellidae). Biological Control. 31: 138-144.

Yaghmaei, F. and A. Kharazi Pakdel (1995). A faunestic survey of Coccinellids in Mashhad region, p: 307. In: Proceeding of the 12Th plant protection congress of Iran 2-7 September 1995, Karaj, Iran.