

THE PRELIMINARY STUDY OF TRUE BUGS (HEMIPTERA: HETEROPTERA) FAUNA IN THE ALFALFA FIELD OF HAMEDAN PROVINCE (WESTERN IRAN)

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ABSTRACT

The alfalfa due to its specific floristic and faunistic status has provided particular microclimate suitable to become the habitat of the insects and arthropods. In these studies which have been taken for gathering and identification of the bugs in the field of alfalfa in Hamedan province in 2006, totally 14 species belongs to 10 genera and 6 families. Out of collected species *Lygus*, *Adelphocoris*, *Stenodema* and *Nezara* were phytophagous and among them the bugs in genus of *Lygus* were the main pests of the seed alfalfa; that with the nutrition of the flower stage led to the most damage on the second and third cuts on the seed alfalfa. Also, the bugs in genera *Deraeocoris* and *Nabis* were predator which fed upon aphids and phytophagous bugs nymph to some extent which caused the decrease the populations of these insects.

Key word: Alfalfa, true bugs, Hamedan, Iran.

INTRODUCTION

Alfalfa is highly valued legume forage, extensively cultivated in warm temperate and cool subtropical regions. It has been heralded as having the highest feeding value of all commonly grown hay crops, producing more protein per ha than any other crop for livestock (Metcalf and Luckmann, 1982). The alfalfa due to its specific floristic and faunistic status has provided particular microclimate that because it is the habitat of the insects and arthropods. Hemiptera, known as True Bugs, is a very large and diverse order. They are found all over the world; there are few habitats without a Hemiptera adapted to living there. There are 80,000 described species in 37 families (Slater and Baranowski, 1987). The defining feature of hemipterans is their possession of mouthparts where the mandibles and maxillae have evolved into a proboscis, sheathed within a modified labium to form a beak or rostrum which is capable of piercing tissues (usually plant tissues) and sucking out the liquids - typically sap. They may be held roofwise over the body, or held flat on the back, with the ends overlapping. The hindwings are entirely membranous and are usually shorter than the forewings. The antennae in Hemiptera are typically five-segmented, although they can still be quite long, and the tarsi of the legs are three-segmented or shorter. Although hemipterans are very variable in their overall form, their mouthparts (formed into a

rostrum) are quite distinctive (Bei-Bienkov *et al.*, 1955; Ross *et al.*, 1982; Schuh and Slater, 1995; Borror *et al.*, 1989). Hemiptera are also important in agriculture, known to cause direct damage to plants by herbivory and indirectly by transporting diseases (Dolling, 1991). Predatory Hemiptera have also been used in agricultural systems to control pests (Ross *et al.*, 1982; Wheeler, 2001).

MATERIALS AND METHODS

Population samples of the true bugs species were collected from several different sites in Hamedan province (33° 59' N; 47° 44' E), which is located at west of Iran. A total sampling, were performed in about 30000 ha area in this province, between early March and late September 2006. The material was collected with a standard sweeping net and a hand-held aspirator. The sampling twice per week and each time there were taken 100 nets in different hours per day by the motion in 2 diameters of the field. The specimens of the net were poured in to the packet and there were written all the attribution following date, the place and plant phenology and there were sent to Entomology laboratory in Bu-Ali Sina University to be discrimination. The specimens were discriminated and then detected in the laboratory.

RESULTS AND DISCUSSION

In these studies which have been taken for gathering and identification of the bugs in the field of alfalfa in Hamedan province in 2006, totally 14 species belonging to 10 genera and 6 families have been collected. These species and their particular features were as follows:

1- Miridae (the plant bugs): This is the largest family of the Heteroptera. The majority of the species are delicate, fragile insects that are sometimes brightly marked but often cryptically coloured in green and brown. They are small, terrestrial insects, usually oval-shaped or elongate. Most of the well-known mirids have received attention because they are agricultural pests. They pierce plant tissues and feed on the juices (Knight, 1941; Bei-Bienkov, 1955; Ross *et al.*, 1982; Slater and Baranowski, 1987; McGavin, 1992). In this family 4 genera and 8 species contain *Lygus rugulipennis* Poppius, *Lygus pratensis* Linnaeus, *Lygus punctatus* (Zetterstedt), *Lygus gemellatus* Herrich-Schaffer, *Stenodema virens* Linnaeus, *Adelphocoris lineolatus* (Goeze), *Deraeocoris pallens* and *Deraeocoris punctulatus* were collected, in which *Deraeocoris* were predators and they have an important role in decrease of aphid population and nymphs of phytophagous *Lygus* and also the *Lygus* and *Adelphocoris* are the most important alfalfa pest in the flower stage. *L. rugulipennis* attacks a wide variety of economically important herbaceous plants, vegetable crops, commercial flower plants, fruit trees, and nursery stock (Kelton 1975; Conti and Bin, 2001; Khanjani, 2005; Mirabalou, 2007). This polyphagous bug is reported to attack more than 400 species of plants and is a dangerous pest to numerous vegetables (Khanjani, 2007). This species is one of the most important pests in alfalfa fields in most parts of Iran. This bug has a key role in flower shattering, drying green terminal buds, shrinkage and weight loss of seeds in alfalfa seeds production (Khanjani, 2005).

2- Nabidae (the damsel bugs): The insect family Nabidae has over 400 species (Slater and Baranowski, 1978). They are soft-bodied, elongate, winged terrestrial predators. They are considered helpful species in agriculture because of their predation on many types of crop pests, such as cabbage worms, aphids, and *Lygus* bugs (Mirabalou, 2007). Damsel bugs of the genus *Nabis* are

the most common. They and other genera are most numerous in the fields of legumes such as alfalfa, but they can be found in many other crops and in non-cultivated areas. They are generalist predators, catching almost any insect smaller than themselves, and cannibalizing each other when no other food is available (Bei-Bienkov, 1955; Slater and Baranowski, 1978; Wheeler, 2001). In this family just *Nabis ferus* L. was collected which has a predatory role critical in decrease of population by the feeding of nymphs of phytophagous bugs and aphids.

3- Pyrrhocoridae (the red bugs): Pyrrhocoridae is a family of insects with more than 300 species world-wide. A few are important crop pests (Schuh and Slater, 1995; Wheeler, 2001). The Fire Bugs eat the seeds of plants, presumably when the population is high. Of this family just *Pyrrhocoris apterus* L. was collected. This insect feeds on the seed, plants fallen on the land and from the other insects, but there are not injurious in alfalfa field.

4- Lygaeidae (the seed bugs): The Lygaeidae are one of the larger and more diverse families in the Hemiptera, with over 4000 species in 500 genera, and are commonly known as seed bugs even though a number of species do not feed on seeds; some are predators on other insects and others feed on blood (hematophagy) (Schuh and Slater, 1995; Wheeler, 2001). Of this family just *Geocoris* sp. was collected. This bugs feeds upon smaller insects, butterflies eggs, the nymphs of phytophagous bugs, aphids and mites. *Geocoris* spp., are among the most abundant and important predaceous insects in many cropping systems. *Geocoris* spp. are known to feed on plants, however they rarely cause economic damage. Their most distinguishing characteristic is their large, bulging eyes. The potential for *Geocoris* spp. as biological controls is well founded. Adults and immatures can consume dozens of prey per day (Hagler and Cohen, 1991; Hagler and Naranjo, 1994).

5- Anthocoridae (the minute pirate bugs): They feed on other small insects, spider mites and insect eggs. They cut a hole into their prey, pump saliva into it and drink the contents. This makes them beneficial as biological control agents (Slater and Baranowski, 1978; Schuh and Slater, 1995). Of this family *Orius minutus* L. and *Anthocoris confosus* Reut. were collected. They were crowded and

predators. *O. minutus* is very important predator of phytophagous mites, insect eggs, a number of soft bodied insects, aphids, thrips and small caterpillars. All stages move quickly and adults are good flyers. *Orius* kills its prey by piercing them with its mouthparts, and sucking out the body fluids.

6- Pentatomidae (the stink bugs): Pentatomidae is a family of insects that includes some of the stink bugs and shield bugs. If disturbed, stink bugs will emit a pungent liquid, whose rancid almond smell is due to cyanide compounds. Their antennae are 5-segmented, which gives the family its name. Their body is usually shield-shaped. Many stink bugs and shield bugs are considered agricultural pest insects, because they can have large populations; they suck plant juices and damage crop production, and they are resistant to many pesticides. However, some genera of Pentatomidae are considered highly beneficial (Jones, 1918; Drake, 1920; McPherson, 1982), of this family just *Nezara viridula* L. was collected, which was phytophagous but it is rarely seen in alfalfa field. The southern green stink bug is a highly polyphagous feeder, attacking many important food crops.

Out of collected species *Lygus*, *Adelphocoris*, *Stenodema* and *Nezara* were phytophagous and among them the bugs in genus of *Lygus* were the main pests of the seed alfalfa that with the nutrition of the flower stage led to the most damage on the second and the third cuts on the seed alfalfa. *L. rugulipennis* is one of the most important pests in alfalfa fields in most parts of Iran and this bug has a key role in flower shattering, drying green terminal buds, and shrinkage and weight loss of seeds in alfalfa seeds production. This insect is highly polyphagous, and its preferred host under Hamedan conditions is alfalfa in flower stage and its main damage is flower shattering (Khanjani, 2005; Mirabalou, 2007). Also, the bugs in genera *Deraeocoris*, *Nabis*, *Anthocoris* and *Orius* were predator which feed upon aphids, mites and phytophagous bug's nymph to some extent.

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