

Agriculturally Important Insects Diversity in Kharif and Rabi crops of Talwandi sabo, Punjab

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Abstract- The field investigation during 2013-14 at Talwandi sabo, Punjab revealed that there are 19 insect pests identified from kharif crops whereas 13 insect pests were recorded from rabi crops. The 5 bio control agents and 2 ant species were recorded from agriculture field. In these Hemiptera and Lepidoptera are having maximum number of insect pests causing major damage to both kharif and rabi crops. Hence the present studies provide good information about different insect pests and its associated insects in agriculture fields.

Index Terms- Insect pest, Bio control agents, Hemiptera, Lepidoptera, Kharif and Rabi crops

I. INTRODUCTION

Worldwide food plants are damaged by more than 10,000 species of insects (Dhaliwal *et al.*, 2007). Despite using various control methods the control of agriculture pests continues to be critical for farmers. The yield loss by insects reaches as high as 60-70%. In India agriculture is currently suffering an annual loss of about Rs. 8, 63, 884 million due to insect pests (Dhaliwal *et al.*, 2010). This heavy crop loss causes the farmer to use huge amount of pesticides (Aktar *et al.*, 2009). But, both the quantity of food loss to pests and the cost of pest control in terms of money and human health are significant (Pimentel and Greiner, 1997). Therefore the present study during 2013-14 makes a modest attempt to explore the existing occurrence and infestation rate of insect pests and diversity of their associated insects in agriculture fields (kharif and rabi crops) of Talwandi sabo, Punjab.

II. MATERIALS AND METHODS

a) Collection Method and Identification:

Agriculture fields were visited twice a month. The sampling was done twice in a day: a) Morning hrs (6:30 am to 9:30 am) b) Evening hrs (4:30 pm to 6:30 pm). Collection was done by using Hand picking and Sweep net method. Small sucking pest like aphids and mealy bugs and large sized caterpillars were handpicked. Whereas in sweep net method each quadrat was swept several times (10 sweeps were performed each time and new 10 sweeps was repeated after a gap of 10 minutes). For storage and preservation the killing jars with potassium cyanide were used to killed large insects. The small insects were preserved in glass vials consisting of 70-90% ethyl alcohol.

Identification and labelling was done in the laboratory using the keys available in standard taxonomic literature and standard manuals.

b) Estimation of Incidence as well as Infestation-rate of Insect Pests on kharif and rabi crops

The scale given by Vennila and his Co- author in National Centre for Integrated Pest Management, New Delhi in year 2010 was followed to estimation of incidence and infestation-rate of insect pests on various kharif and rabi crops

0-4 Scale infestation

0 Grade: No insect/ indecently seen

1 Grade: Scattered appearance of few insect pests on the plants

2 Grade: Severe incidence of insect pests on only one branch

3 Grade: Severe incidence of insect pests on more than one branch

4 Grade: Severe incidence of insect pests on whole plants was recorded

III. RESULTS AND DISCUSSION

Assessment of the agricultural fields during the period of 2013-14 showed economically important kharif and rabi crops was damaged by a wide range of insect pests.

The present study identified 19 species of insect pests from kharif crop which are belongs to order Orthoptera, Hemiptera and Lepidoptera. Whereas 13 species of insect pests was recorded from rabi crops which are belongs to order Hemiptera, Thysanoptera, and Lepidoptera in agriculture fields of Talwandi sabo, Punjab. Out of which the maximum insect pests percentage (58% & 69%) was of order Hemiptera in both karif and rabi crop respectively; which was followed by order lepidoptera presenting (37% & 23%) of pest percentage respectively. However the minimum pest percentage was recorded from order Orthoptera (5%) in kharif crop & 8% of pest percentage was recorded from order Thysanoptera in rabi crops respectively (Graph 1 and 2).

Insect pests belonging to order hemiptera *Aphis gossypi*, and *Myzus persicae* (Family: Aphididae); *Bemisia tabaci* (Family: Aleyrodidae); *Phenacoccus solenopsis* (Family: Pseudococcidae); *Dysdercus cingulatus* (Family: Pyrrhocoridae) and *Pyrilla perpusilla* (Family: Lophopidae) were considered as serious concern to kharif crops such as paddy, cotton, maize and sugarcane. Whereas *Aphis crassivora*, *Rhopalosiphum maidis* and *M. persicae*; *B. tabaci* were causing damage to rabi crop like mustard, wheat and check pea in agriculture fields of Talwandi sabo (Table I& II). Damage symptom of *Pernpherulus*

affinis (Cotton stem weevil) (Family: Curculionidae) was also recorded from cotton plant.

The similar finding were reported by Olivera *et al.* (2001) who revealed the *Bemisia tabaci* as major concerned for subtropical and tropical agriculture as well as in greenhouse production systems causing damage to more than 600 plant species. *Pyrrilla perpusilla* (Family: Lophopidae) cause the damage to *Triticum sativum*, *Zea mays*, Sorghum and Sugarcane causing direct and indirect losses (Gupta and Ahmad, 1983; Kumara Singhe and Wratten, 1996; Gamehiarachi and Fernando, 2006).

The present study also reveals that *M. persicae*, *B. tabaci*; *P. perpusilla* and *Melanitis leda* are common insect pest species which persist throughout the year. This is due to their polyphagous nature and ability to migrate from one host to other. Similar type of research by Mishkatullah and Mahmood (2007) reported that due to multiple host range as well as the migration from wheat to sugarcane and maize helps *P. perpusilla* to survive throughout year. *Aphis gossypii* and *Phenacoccus solenopsis* are also considered to be a serious pest because of their polyphagous feeding habits (Minks and Harrewijn, 1987; Arif *et al.*, 2009; Abbas *et al.*, 2010).

This increasing pest population are control naturally by bio control agents. In Talwandi sabo 5 different species of insect predators and parasitoids were recorded. These predators like *Chrysoperla zastrowi Arabica* and *Symphorobius fallax* are

commonly seen to feed on mealy bugs and aphids. *Aenasius bambawalei* and *Apanteles rubecula* parasitoid on mealybugs and larva of cabbage butterfly (Table III)

But population of bioagents were affected by huge use of insecticides (Cork *et al.*, 2003). These uses of insecticides are increase to prevent yield loss by increased pest population. This forceful use of chemicals lead to resistance, resurgence, environmental hazards (Mascarenhas *et al.*, 1998). Therefore the proper management of insect pests are needed by integrating this knowledge with various proven methods of pest control against the target pests (Gupta *et al.* 2004). Ultimately this will replace insecticides to which the pest had developed resistance and increases the yield (Ahuja, *et al.*, 2012) and help in conservation and augmentation of exotic and native natural enemies. So, the present study provide the proper knowledge of insects (Pest or Bio control agents) occurrence and infestation status in the fields which will helpful for selecting effective and significant eco-friendly method for management of these polyphagous insect pests at appropriate time.

Table I List of insect pests recorded on kharif crops in Talwandi sabo, Punjab

Pest Name	Family	Order	Kharif Crop	Status
<i>Gryllotalpa fossor</i> (Mole cricket)	Gryllotalpidae	Orthoptera	Paddy	1 Grade
<i>Amrasca biguttula</i> (Cotton Jassid)	Cicadellidae	Hemiptera	Cotton	2 Grade
<i>Nephotettix nigropictus</i> (Green rice leafhopper)			Paddy	2 Grade
<i>Aphis gossypii</i> (Cotton aphids)	Aphididae		Cotton	4 Grade
<i>Myzus persicae</i> (Green peach aphids)			Cotton	4 Grade
<i>Dysdercus cingulatus</i> (Red cotton bug)	Pyrrhocoridae		Cotton	4 Grade
<i>Bemisia tabaci</i> (Whitefly)	Aleyrodidae		Cotton	4 Grade
<i>Pyrrilla perpusilla</i> (Sugarcane leaf hopper)	Lophopidae		Sugarcane, Maize	4 Grade
<i>Phenococcus solenopsis</i> (Mealy bug)	Pseudococcidae		Cotton	4 Grade
<i>Lygaeus militaris</i> (Plant bug)	Lygaeidae		Cotton	1 Grade
<i>Lygaeus hospes</i> (Lygaeid bug)			Cotton	0 Grade
<i>Nezara gramineae</i> (Green plant bug)	Pentatomidae	Paddy	0 Grade	
<i>Scirpophaga auriflua</i> (Sugarcane top shoot borer)	Pyralidae	Lepidoptera	Sugarcane	4 Grade
<i>Platyedra gossypiella</i> (Pink bollworm)	Gelechiidae		Cotton	4 Grade
<i>Melanitis leda</i> (Common Evening Brown)	Nymphalidae		Paddy	1 Grade
<i>Earias insulana</i> (Spiny bollworm)	Noctuidae		Cotton	4 Grade
<i>Helicoverpa armigera</i> (American bollworm)			Cotton	4 Grade
<i>Spodoptera littoralis</i> (African Cotton Leaf worm)			Cotton	4 Grade
<i>Pericallia ricini</i> (Darth Maul Moth)			Maize	1 Grade

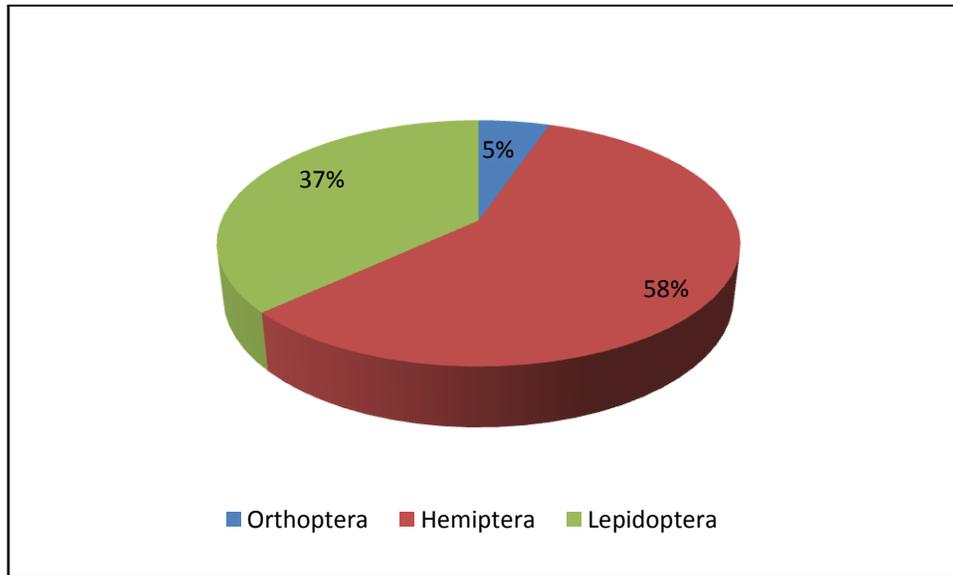


Fig-1 Insect Pests Percentage in Kharif crops of Talwandi sabo, Punjab

Table II List of insect pests recorded on rabi crops in Talwandi sabo, Punjab

Pest Name	Family	Order	Rabi Crop	Status
<i>Aphis crassivora</i> (Cow pea aphids)	Aphididae	Hemiptera	Chick pea	4 Grade
<i>Rhopalosiphum maidis</i> (Maize aphid)			Wheat	4 Grade
<i>Myzus persicae</i> (Green peach aphids)			Mustard, Wheat	4 Grade
<i>Bemisia tabaci</i> (Whitefly)	Aleyrodidae		Mustard, Wheat	4 Grade
<i>Pyrilla perpusilla</i> (Sugarcane leaf hopper)	Lophopidae		Pea, Wheat	2 Grade
<i>Anoplocnemis phasiana</i> (Coreid bug)	Coreidae		Chick pea	0 Grade
<i>Clavigralla gibbosa</i> (Pod sucking bug)			Chick pea	1 Grade
<i>Nezara gramineae</i> (Green plant bug)	Pentatomidae		Wheat,	2 Grade
<i>Bagrada picta</i> (Bagrada bug/ Colourful bug)	Psychidae		Cabbage	0 Grade
<i>Caliothrips indicus</i> (Thrips)	Thripidae		Thysanoptera	Wheat
<i>Pieris rapae</i> (Small white butterfly)	Pieridae	Lepidoptera	Mustard	3 Grade
<i>Melanitis leda</i> (Common Evening Brown)	Nymphalidae		Wheat	0 Grade
<i>Lampides boeticus</i> (Long-tailed Blue)	Lycaenidae		Chick pea	4 Grade

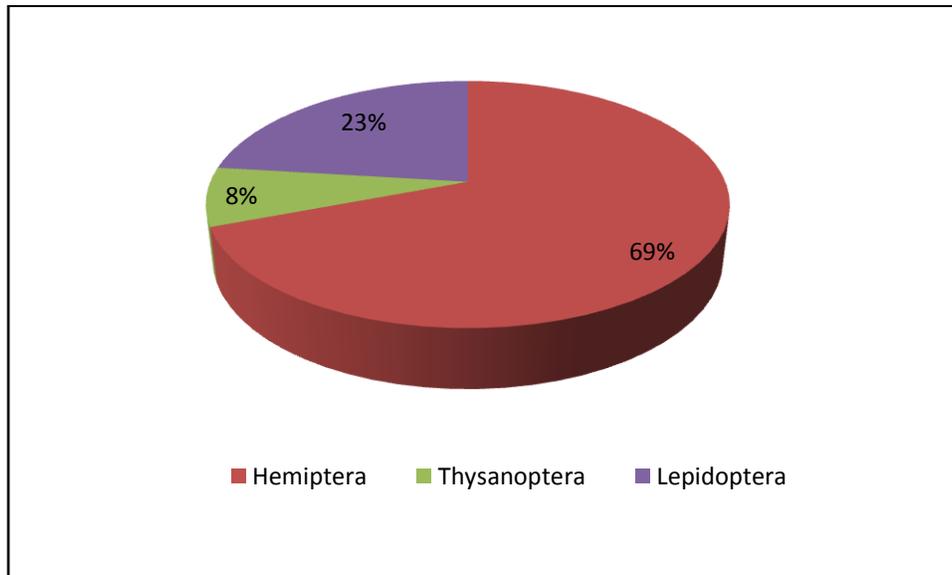


Fig- 2 Insect pests Percentage in Rabi crops of Talwandi sabo, Punjab

Table III Natural enemies recorded from kharif and rabi crops in fields of Talwandi sabo, Punjab

Pest Name	Family	Order	Status
<i>Cheilomenes-sexmaculata</i>	Coccinellidae	Coleoptera	Predator
<i>Chrysoperla zastrowi Arabica</i>	Chrysopidae	Neuroptera	
<i>Symphorobius fallax</i>			
<i>Aenasius bambawalei</i>	Encyrtidae	Hymenoptera	Parasitoid
<i>Apanteles rubecula</i>	Braconidae		

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