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INSECT PESTS ASSOCIATED WITH BASMATI RICE IN WESTERN PLAIN ZONE OF UTTAR PRADESH, INDIA

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Abstract

Insect pests associated with basmati rice in western plain zone of Uttar Pradesh were studied during *Kharif* 2014 at Crop Research Center, Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (U.P.), Inidia. During the period of study, twelve insect species were found associated with basmati rice in this region, which belong to 6 orders *viz*. lepidoptera (yellow stem borer, leaf folder and swarming caterpillar), homoptera (green leaf hopper, brown plant hopper and white backed plant hopper), heteroptera (rice gundhi bug), coleoptera (rice root weevil and white grub), isoptera (termite) and orthoptera (kharif grass hopper and grass hopper).

Key words : Insect pests, basmati rice, food crop, leaf folder.

Introduction

Rice (*Oryza sativa* L.) is the most important food crop that has been extensively cultivated in most diverse ecosystem of the world. India is amongst the top most rice producers in the world, second only to China. In India, it occupies an area of about 43.95 m ha with total production of 106.54 million tones and productivity of 2.4 tones/ha. In Uttar Pradesh, it is grown in about 5.98 million ha with total production of 14.63 million tones and productivity of 2.5 tones per ha (Anonymous, 2014). Basmati rice is the major export oriented crop grown mainly in Northern India and in parts of Pakistan touching India. Haryana, Punjab, Uttaranchal, Uttar Pradesh and Jammu Kashmir are the States, where basmati rice is grown in our country. Basmati rice crop suffers severely due to attack of various insect pests, which reduces its yield and quality. More than 100 species of insects have been reported to attacked rice crop from the germination of nursery till its harvests. In general, yield loss due to insect pest of rice has been estimated at about 25% in different rice ecosystem (Sachan *et al*., 2006 and Dhaliwal *et al*., 2010). Therefore, the detailed studies on insect pests associated with basmati rice have been undertaken.

Materials and Methods

A field experiment was carried out during *Kharif*, 2014 at Crop Research Center of Sardar Vallabhbhai Patel University of Agriculture and Technology, Meerut (U.P.), India. The rice variety Pusa basmati-1 was sown during mid of June and transplanted in the second week of July and adopted recommended crop production practices to raise good crop. Observations on insect pests associated with rice were recorded from the germination of seedlings till the harvest of crop at weekly interval. The insect were collected and identified. The nature and extent of damage caused by various insect pests were also recorded to assess the economic status of pest.

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Results and Discussion

During study, twelve insect species belonging to six orders and eight families were recorded on basmati rice at different crop growth stage. Among them, yellow stem borer, *Scirpophaga incertulas* Walker and leaf folder, *Cnaphalocrocis medinalis* Guenee were found as major pests. The brown plant hopper, *Nilaparvata lugens* Stal., white grub, *Holotrichia consanguinea* Blanch, termite, *Odontotermes obesus* Romb. and kharif grass hopper, *Hieroglyphus banian* Fab. were found moderately damaging the crop. The rice swarming caterpillar (army worm), *Spodoptera mauritia* Boisduval, green leaf hopper, *Nephotettix virescens* Distant, white backed plant hopper, *Sogatella furcifera* Horvath, rice gundhi bug, *Leptocorisa acuta* Thunb, rice root weevil, *Echinocnemus oryzae* Marshall, and grass hopper, *Oxya fuscovittata* Marshall recorded on the crop were of less importance and extent of their damage was found without

much economic loss (table 1).

Yellow stem borer, *Scirpophaga incertulas* Walker (Pyralidae : Lepidoptera) was recorded as most destructive and major insect pest of rice crop in this region. The appearance of this pest starts in the beginning of July and remained active throughout the crop season. The larvae of this insect bore inside the stem from the growing point and fed internally causing death of central shoot "dead heart" in vegetative stage and "white ear head" at reproductive stage, respectively. This resulted in chaffy grains. The damaged plants were easily pulled out. The severe damage of this pest was recorded from beginning of August to September end.

The damage of yellow stem borer on rice crop has also been reported by Kumar and Patil (2004), Gowda and Gubbaiah (2011), Kashyap (2013) and Gangwar *et al*. (2015). Sachan *et al.* (2006) also reported the severe incidence of *S. incertulas* on basmati rice throughout the crop season in tarai region of Uttar Pradesh.

Leaf folder, *Cnaphalocrocis medinalis* Guenee (Pyralidae : Lepidoptera), previously known as a minor foliage feeding pest has acquired the status of major pest of basmati rice and recorded during August–September. The young larvae fed on tender leaves without folding them. The second instars larvae glues the growing paddy leaves longitudinally for accommodation and fed voraciously green foliage, which results in papery dry leaves. Feeding greatly reduced the general vigor and photosynthetic ability of an infested plant. The swarming caterpillar, *Spodoptera mauritia* Boisduval (Noctuidae : lepidoptera) larvae fed on the upper portion of rice canopy by defoliating leaves during night. This insect recorded as minor pest in the month of July–August. Considerable losses to paddy crop due to leaf folder have been reported by several workers like Sachan *et al*. (2006), Gowda and Gubbaiah (2011), Kashyap (2013), Singh and Singh (2014) and Gangwar *et al*. (2015).

The leaf hoppers and plant hoppers are sucking insects, which remove plant sap from xylem and phloem tissues of the plant. The incidence of green leaf hopper, *Nephotettix virescens* Distant (Cecadellidae : Homoptera) was recorded during August–September. Both nymphs and adults of this insect sucked the plant sap from the leaves and tender part of plant by turning them yellow. They may also transmit viral disease to the plant. This insect was recorded as minor pest from this region. Brown plant hopper, *Nilaparvata lugens* Stal. (Delphacidae : Homoptera) is another important pest of rice. Its infestation was recorded from middle of August to September end. As a result of feeding by both nymphs and adults at the base of the tillers, plants turns yellow and dry up rapidly. At early infestation round yellow patches appeared which soon turn brownish due to the drying up of the plants. This condition is called "hopper burn". Complete distraction of the crop was recorded in severe cases. White backed plant hopper, *Sogatella furcifera* Horvath (Delphacidae: Homoptera) has been recorded in August - September as minor pest in this region. It sucked the sap from tender leaves, thus causing yellowishness of them. The honeydew produced by the hoppers serves as a medium for mould growth. The damage caused by green hopper, brown plant hopper, and white backed plant hopper on rice crop has been reported by various workers such as Sachan *et al*. (2006), Kashyap (2013) and Singh and Singh (2014).

The rice gundhi bug, *Leptocorisa acuta* Thumb. (Coreidae: Hetroptera) was recorded as important pest of rice crop in this region. Both nymphs and adults sucked the sap of grains during milky stage and thus make them chaffy. Whole panicle becomes white colored (chaffy) under severe infestation. Its occurrence was recorded during September–October. Sachan *et al*. (2006), Kashyap (2013), Singh and Singh (2014) and Gangwar *et al*. (2015) also reported the damage of this pest during September-October on rice crop.

Rice Root Weevil, *Echinocnemus oryzae* Marshall (Curculionidae : Coleoptera) was also recorded a common pest of basmati rice at vegetative stages. Grubs fed on the roots and rootlets of young rice plants, resulted in stunting and non formation of tillers. The leaves turn yellow and develop a rusty appearance and the plants eventually die. Incidence of this pest was noticed in the month of July and August. Singh and Singh (2014) also reported the occurrence of this pest on rice crop.

White grub, *Holotrichia consanguinea* Blanch (Curculionidae : Coleoptera) was recorded serious polyphagous pests from nursery to maturity stages of crop in western Uttar Pradesh. The adult beetles emerged out in June–July with the onset of pre monsoon showers and defoliate preferred host trees. Grubs fed on roots of plants. The second and third instars grubs are voracious feeder and destroy the entire root. As a result the plant withered and died. Kashyap (2013) also reported the incidence of this insect from July to October on various *Kharif* crops.

Termite, *Odontotermes obesus* Romb (Termitidae : Isoptera) is a polyphagous social insect, also caused damage to the rice crop by feeding on the roots of the plants. The growing shoots withered and died. The damaged plants pulled out easily. The incidence of this

Table 1 : Insect pests associated with basmati rice during *kharif* 2014.

Order	Family	Common name	Scientific name	Damaging stage of the pest	Severity of the pests
Lepidoptera	Pyralidae	Yellow stem borer	*Scirpophaga incertulas* (Walker)	Larvae	Severe
Lepidoptera	Pyralidae	Leaf folder	*Cnaphalocrocis medinalis* (Guenee)	Larvae	Severe
Lepidoptera	Noctuidae	Swarming caterpillar (Army worm)	*Spodoptera mauritia* (Boisduval)	Larvae	low
Homoptera	Cecadellidae	Green leaf hopper	*Nephotettix virescens* (Distant)	Nymphs and adults	low
Homoptera	Delphacidae	Brown plant hopper	*Nilaparvata lugens* (Stal.)	Nymphs and adults	Moderate
Homoptera	Delphacidae	White Backed plant hopper	*Sogatella furcifera* (Horvath)	Nymphs and adults	low
Hetroptera	Coreidae	Rice gundhi bug	*Leptocorisa acuta* (Thumb.)	Nymphs and adults	low
Coleoptera	Curculionidae	Rice Root Weevil	*Echinocnemus oryzae* (Marshall)	Grubs and adults	Low
Coleoptera	Curculionidae	White grub	*Holotrichia consanguinea* (Blanch)	Grubs and adults	Moderate
Isoptera	Termitidae	Termite	*Odontotermes obesus* (Romb.)	Worker	Moderate
Orthoptera	Acrididae	Kharif grass hopper	*Hieroglyphus banian* (Fab.)	Nymphs and adults	Moderate
Orthoptera	Acrididae	Grass hopper	*Oxya fuscovittata* (*Marshall*)	Nymphs and adults	Low

pest was observed throughout the crop season. Such type of effect has earlier reported on different crops by Prasad and Prasad (2006), Sachan *et al*. (2006), Kashyap (2013) and Singh and Singh (2014).

Grasshoppers, *Hieroglyphus banian* Fab. and *Oxya fuscovittata* Marshall (Acrididae : Orthoptera) were found to attack basmati rice in this region. They remained active throughout the crop season. Both nymphs and adults of grasshopper fed on the leaves by making holes. In severe infestation, the leaves are completely eaten by nymphs and adults, leaving the midrib and stalk. Both these species of grasshopper are polyphagous pest and have earlier been reported by Sachan *et al*. (2006), Prasad and Prasad (2006), Kashyap (2103), Singh and Singh (2014) and Gangwar *et al*. (2015) on paddy crop.

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