

Pest scenario in rice in eastern Uttar Pradesh

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ABSTRACT

A survey was conducted during July to December 2013 -2015 on the insect-pests and diseases incidence in rice eastern Uttar Pradesh of India. The crop is infested by many insect-pests which play a significant role in rice production. Insect-pests infest all parts of the plant at all growth stages, and a few transmit viral diseases such as leafhoppers and plant hoppers. In rice ecosystem some defender viz., dragon fly, spiders and praying mantis also were noticed. During the survey it was observed that the leaf folder and stem borer were found to be at significance level while Insect-pests as gall midge, gundhi bug, rice hispa, green leaf hopper, brown plant hopper, grasshopper etc. were also found at Rice field. Besides insectpests several diseases were noticed like root-rot, brown rot, and sheathblight. A large number of insecticides have been tried for insect-pests management; indiscriminate use of pesticides has led to severe ecological consequences, residues in consumable products and ultimately resistance to the pesticides. The increasing concern for environmental safety and global demands for pesticide residue free food evoked keen interest in pest control through eco-friendly methods.

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INTRODUCTION

Rice is the staple diet for more than two billion people in Asia and for a few hundreds of millions in Africa and Latin America (IRRI, 1985). Rice is grown in wide areas of eastern Uttar Pradesh. The crop is highly sensitive and a potential host for several insect pests (Prasad *et al.*, 2005). Two major factors are responsible for low yields in rice crops *i.e.* adverse weather (floods, drought, temperature, rainfall and wind velocity etc.) and pest epidemics. Insect-pests attack the rice crop from

the time of nursery bed is prepared until harvest. Rice field is managed ecosystems in which a large diversity of floral, faunal, and microbial species provides a wide range of services for human well-being (MEA, 2005). However, a few species become pests; they are responsible for crop losses exceeding acceptable thresholds. When they occur in high densities, then can affect production and threaten food security. Indiscrimination use of pesticides and the introduction of high yielding varieties of rice, distinct changes have

been occurred in insect pests in rice ecosystem of eastern Uttar Pradesh and in these areas which once were considered as minor pests, now are considered as major pests and causes significant losses. For example leaf folder, hispa, whorl maggot, blue beetle, brown leaf hopper and green leaf hopper. The yellow stem borer was considered as the most destructive pests of rice, however in recent years, pink stem borer becomes major pest in tarai belt of eastern U.P. The insect-pests not only cause direct losses for the rice crop but it occurs indirectly as vector of some diseases such as green plant hopper transmit viral disease. Major fungi sheath rot, sheath blight, brown spot, etc were also noticed.

The average loss caused by insect-pests was estimated at about 38 per cent of the expected rice crop yield per year. A study carried out by Rockefeller foundation (Herdt, 1991) reveals that seven out of 20 major challenges in rice production are insect-pests. Over 100 of species of insect-pests found in rice crops but only few are potential threat, so only the most common and specific insect pests of rice are discussed here. At National level, stem borers accounted for 30 per cent of the losses while plant hoppers (20%), gall midge (15%), leaf folder (10%) and other pests (25%). The rest are either beneficial in the form of a wide range of predators (such as bugs and spiders) and parasitoids (mostly parasitic wasps). Therefore, the present study was undertaken in the rice growing area during crop season 2013-2015 under AICRIP scheme to get the information about the crop pattern, incidence of crop pests, major diseases and their nature of damage and farmers practices.

MATERIAL AND METHODS

Monitoring on insect-pests and diseases in rice ecosystem were conducted in different rice growing areas of Eastern (U.P). Data were collected from the districts; Faizabad, Barabanki, Basti, Gonda, Sultanpur, Ambedkar Nagar, Sant Kabir Nagar, Varanasi, Azamgarh, Gorakhpur, Gonda and Bahraich. The information regarding pest succession, pesticides application in rice ecosystem and farmer's practices for insect-pests management mentioned during survey. Randomly data were taken regarding pests succession, diseases and pesticides application from each location.

Surveys and collections were carried out at fifteen days interval from rice fields. Samples were collected

and estimated by sweeping, aspirators, picking up insects by hand, pitfall traps, sticky traps set up in the study site from rice fields of all life stages of insects. For immature stage it is then necessary to rear them to the adult stage to obtain a precise identification. The collected specimens were brought to the laboratory for specimen preservation, mounting. Most of the insects were identified at the specific level by using keys (Barrion and Litsinger, 1994), and diseases were identified. Most of the insects belong to Lepidoptera, Diptera, Hemiptera and Hymenoptera seem to be casual visitor in search of food.

RESULTS AND DISCUSSION

During the year of survey of rice growing districts of Eastern U.P. insect pests and diseases were major biotic stresses causing considerable loss to the rice production. Data presented in the Table 1 revealed that major insect pest observed in the surveyed districts were stem borer, leaf folder, green leaf hopper, brown hopper, whorl maggot, gundhi bug, blue beetle, rice hispa and rice case worm. During *Kharif* 2013 Stem borer, leaf folder and Green Leaf hoppers were major insect pests observed in the surveyed districts. Due to normal rainfall coupled with congenial climatic conditions population of yellow stem borer species was observed in low to moderate intensity in all the surveyed districts while other major insect pests are observed in traces to low. Due to scanty and erratic rainfall in eastern Uttar Pradesh during *Kharif* 2014 and 2015 weed infestation in rice transplanted crop was very high which creates natural habitat for the growth of green leaf hoppers and leaf folders. About 20-30 per cent damage was observed due to the infestation leaf folder during *Kharif* 2015. All the prevailing varieties in eastern Uttar Pradesh were infested with the leaf folder. Low population of pink stem borer was observed in tarai region of eastern Uttar Pradesh.

Blast, bacterial leaf blight, brown spot, sheath blight and blast are the major diseases of rice in eastern Uttar Pradesh. Sheath blight is a serious problem in high rainfall areas of eastern U.P. The disease is mostly prevalent in areas where the relative humidity is very high (above 95%), the temperature is moderate (28-32^o C) and N application is high. The disease was observed in moderate to severe form during all the three consecutive years of survey. Incidence of Brown spot was also noticed in the surveyed districts. It was observed in low to moderate

intensity. Due drought year *Kharif* 2015 it was observed in severe form almost in all the districts. False smut is one the growing biotic stress which specifically infected

hybrids in eastern U.P. It was observed in moderate to severe form during *Kharif* 2013. Bacterial blight is essentially a monsoon season disease. The intensity of

Table 1 : Frequency and occurrence of various insect pests during 2013-15 in different districts of eastern U.P.

Districts	Year	Insects					
		SB	LF	GLH	BLH	WM	GB
Faizabad	2013	L-M	L	L-M	L	L	L-M
	2014	M-S	L	L-M	M	L	L
	2015	L-M	S	M-S	L	M	L-M
Ambedkarnagar	2013	L-M	L	M	M	L	L-M
	2014	M-S	L	L	L	L	L
	2015	L-M	S	M-S	M-S	M	L-M
Sultanpur	2013	L	L	L	L	T	T
	2014	L-M	L	L	L	T	L
	2015	L-M	S	L-M	M	M	M
Basti	2013	L-M	L	L	L	L	L
	2014	L-M	L	L-M	L-M	T	T
	2015	M	S	S	L-M	M	M
SantKabirnagar	2013	L-M	L	L-M	T	L	L-M
	2014	L-M	L	L	T	L	L
	2015	L-M	S	L-M	M	M	L
Barabanki	2013	L-M	L	L	L	L	T
	2014	L-M	L	L	L	T	T
	2015	M	S	M	M	L	M

KEY: T – Traces (Below 1%), L – Low (Below 5%), M – Moderate (5%-10%), S – Severe (More than 10%), SB – Stem Borer, LF – Leaf Folder, GLH – Green Leaf Hopper, BLH – Brown Leaf Hopper, WM – Whole Maggot, GB – Gundhi Bug

Table 2 : Frequency and occurrence of various diseases during 2013-15 in different districts of eastern U.P.

Districts	Year	Diseases			
		ShB	FS	BLB	BS
Faizabad	2013	S	M-S	L	L
	2014	M-S	L	L-M	M-S
	2015	L-M	T	L	S
Ambedkarnagar	2013	M-S	M-S	L-M	L
	2014	L-M	T	M	L-M
	2015	L	T	L	L-M
Sultanpur	2013	M	L-M	L	S
	2014	M	T	L-M	L
	2015	L	T	L	L-M
Basti	2013	M-S	M-S	L-M	L
	2014	M	L	L-M	L-M
	2015	L	T	L	S
Sant Kabirnagar	2013	M-S	M-S	L-M	M-S
	2014	M	L	L-M	T
	2015	L-M	T	L	S
Barabanki	2013	L-M	M	L	L
	2014	L	T	L	L-M
	2015	L	T	L	S

KEY: T – Traces (Below 5%), L – Low (5- 10%), M – Moderate (10-20%), S – Severe (More than 20%), ShB – Sheath Blight, FS – False Smut, BLB – Bacterial Leaf Blight, BS – Brown Spot

the disease is much influenced by rainfall, cloudy, drizzling and stormy weather and high nitrogen fertilizer. The disease is prevalent in moderate to severe form in almost all the rice-growing areas of surveyed districts during the monsoon season. The disease was prevalent in low to moderate form during *Kharif* 2013 and 2014 while low incidence of BLB was observed during *Kharif* 2015 due severe drought. Blast is favoured by the low night temperature (22-28°C), high relative humidity (>95%), dew deposit, leaf wetness for more than 10 hours and high nitrogen. The disease is a serious problem in tarai regions of eastern U.P. Incidence of neck blast was observed in low to moderate in tarai districts of eastern U.P.

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