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## Research Article



### Survey on pests and diseases in rice crop at District Mandibahauddin

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#### Abstract

A plant protection related survey was carried out by pest scouting team of plant doctorsof Pest Warning and Quality Control of Pesticides, District Mandibahauddin to evaluate percentage (%) attack of pests and diseases on rice crop during kharif 2012-14. In the month of August 0.63% grasshopper was recorded above economic threshold level (AETL) with temperature ranges 40.17-13.57 °C with relative humidity 34% with rainfall 16.47 mm which was average of three respective years. However 1.46% borer; 11.65% leaf roller; 0.49% grasshopper; 1.46% foot rot was recorded AETL during September with temperature ranges 36.60-12.55°C with RH 31.13% with rainfall 21.25 mm; however 2.27% AETL was recorded by grasshopper during the month of October with temperature ranges 30.50-11.42°C and RH 33.25% with rainfall 1.75 mm. On the other hand 4.43% attack was recorded below economic threshold level (BETL) by borer; 1.90% leaf roller; 1.90% grasshopper; 1.27% foot rot and 0.63% brown leaf spot during August. Borer attack was recorded BETL by 1.46%; leaf roller 7.77%; 4.85% grasshopper; 1.46% foot rot; 19.90% brown leaf spot and 3.40% blast under given environmental conditions during September. In October 3.98% spots were recorded BETL followed by brown leaf spot 67.05%; 30.11% spots of bacterial leaf blight and 11.93% blast with temperature ranges 30.50-11.42 °C; RH 33.25% with rainfall 1.75 mm. At the end it was concluded that insect infestation was recorded maximum in September started from end august and diseases were infected the plants from end August which was gradually increased in October. However the farmers were advised to be vigilant in said periods to overcome the problem of pest and diseases.

**Keywords:** Plant Protection; Survey; Rice; Leaf roller; grasshopper; borer; BLS; blast; BLB; PW; Punjab

#### Introduction

Rice is 2<sup>nd</sup> most important cash crop in Pakistan after wheat and major source of foreign exchange earnings after cotton. Rice accounts 3.1% of value added in agriculture and 0.7% of GDP. Agriculture sector recorded a growth of 2.1% against the growth of 2.9% last year. The decline in its growth is due to drop in cotton production and other minor crops after extreme weather conditions but somehow compensated by the better output of rice, sugarcane, wheat and maize crops. However important crop accounts for 25.24% of agricultural value addition; this sub-sector has

recorded a growth of 3.74% compared to a growth of 1.19% last year. The important crops includes all major crops like wheat, maize, rice, sugarcane and cotton which registered growth at 4.44%, 7.27%, 22.79%, 4.27% and (-) 2.00% respectively. Rice production has increased to 6,798 thousand tons in 2013-14 compared to 5,536 thousand tons in 2012-13, showing an increase of 22.8% (Anonymous, 2014).

#### Leaf roller

Leaf roller or Rice leaf folder *Cnaphalocrocismedinalis* (Lepidoptera: Pyralidae) is the most

widely distributed and found foliage feeder in rice. An increase in *C. medinalis* population attributed to large scale cultivation of high yielding varieties, excessive usage of nitrogenous fertilizers and continuous use of insecticides that created resistance against leaf roller (Khan et al., 1988; Shanmugam et al., 2006 and Kaushik, 2010). The insect attained the status of major pest during the last few years (Shah et al., 2008). In Pakistan this pest has been multiplied caused severe infestation during 2010, 2011, 2012 and 2013. Upto 25% attack on leaf was recorded reducing rice yield up to 30%; however upto 50% infestation was recorded in some local places (Salim et al., 1991). The young larvae feed on leaves by scratching it and fold the leaf longitudinally with self secreted sticky substance. The scratched leaves become membranous, turn whitish and finally drying up. Single larvae can damage number of leaves, which retarded photosynthesis; plant growth resulting huge yield loss (Farooq et al., 2014).

### **Borer**

Several insects feed on rice, but stem borers are considered the most important rice pests, in particular *Scirpophaga incertulas* (Walker) and *S. innotata* (Walker) (Lepidoptera: Pyralidae). Stem borer *S. incertulas* usually comprised more than 90% of the borer population in rice. The arrival of flooding and stem elongation provided most favorable environmental conditions for *S. incertulas*. The rice borer's activity increased steadily during the first 3 to 4 months of flooding, to average 23% damaged stems by the flowering stage (Sigsgaard, 2000).

### **Grasshopper**

Orthoptera is one of the largest order of insect having two suborder i.e., Caelifera (short horned grasshoppers) and Ensifera (Long horned grasshoppers). Super family Acridoidea and Pyrgomorpoidea comes under suborder Caelifera and members of these superfamilies are commonly known as locusts and grasshoppers. Acridoidea consists of eleven families while Pyrgomorpoidea has only one family. Family Acrididae and Pyrgomorphidae exhibited wide distribution in India. Grasshoppers caused significant damage to tree seedlings and agricultural crops (Joshi et al., 1999); hence considered as oligophagous and according to host preference classified as

graminivorous, forbivorous and ambivorous or mixed feeders (Mulkern 1967).

### **Bacterial Leaf Blight**

Bacterial leaf blight appears on leaves of young plants, as pale-green to grey-green water-soak streaks near the leaf tip and margins. These lesions unite and become yellowish-white with wavy edges. Eventually, the whole leaf becomes whitish or grayish and then dies. Leaf sheaths and culms of highly susceptible cultivars may also be attacked. Systemic infection, known as kresek, results in desiccation of leaves and death, particularly of young transplanted plants. The leaves become yellow and then die. Blight of rice affects filling of the grains and emergence of panicles, about 28-30% yield reduction was observed in susceptible cultivars (Shahjahan et al., 1991). Bacterial leaf blight has the potential to become a destructive bacterial disease of rice in Pakistan and caused huge losses mainly because of the lack of information regarding the pathogen and its effective measure of control (Waheed et al., 2009).

### **Rice Blast**

The rice blast disease is caused by the fungus *Pyricularia oryzae* also known as *Magnaporthe grisea*, however the disease strikes on all aerial parts of the plant. The infections occurred on the leaves, causing diamond-shaped lesions with a gray or white center to appear, or on the panicles, which turned white and die before being filled with grain. *P. oryzae* is highly specific to rice; on a rice plant, the fungus rapidly produces thousands of spores, carried readily through the air, by wind or rain, onto neighboring plants (Scardaci, 1997).

### **Brown Leaf Spot**

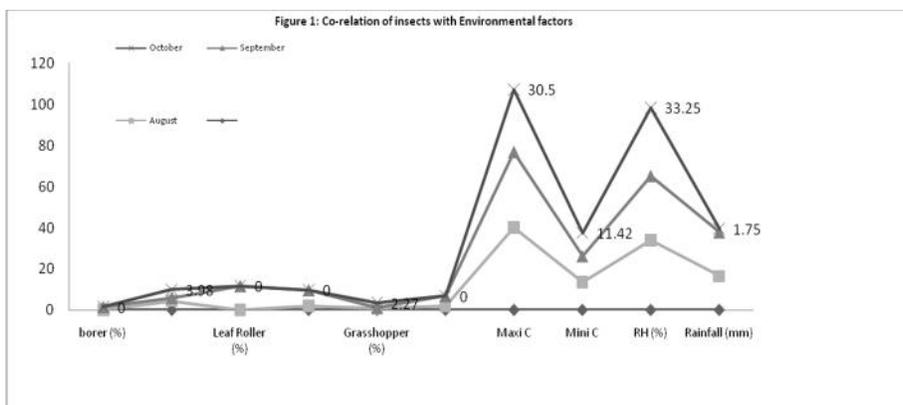
Brown spot is caused by the fungus *Cochliobolus miyabeanus* also called *Helminthosporium oryzae* it is one of the most prevalent rice diseases in Pakistan. When BLS attacks the rice plants at emergence resulting seedling blight causes thin or inadequate stands and weakened plants. Leaf spots are present on young rice, but the disease is more prevalent as the plants approach maturity and the leaves begin to senesce (Groth and Clayton).

It is incited by the fungus *Fusariummoniliforme*Sheld, the imperfect stage of *Gibberellafujikuroi* is one of the most important and widely distributed disease of rice (Ou, 1985). This disease was first reported by Khokhar (1990) most conspicuous and common symptoms are yellowish green, thin leaves and abnormal stem elongation, lower tillering and rotting at the root stem joint as well as the 1<sup>st</sup> node (Ou, 1985).

Results and Discussion

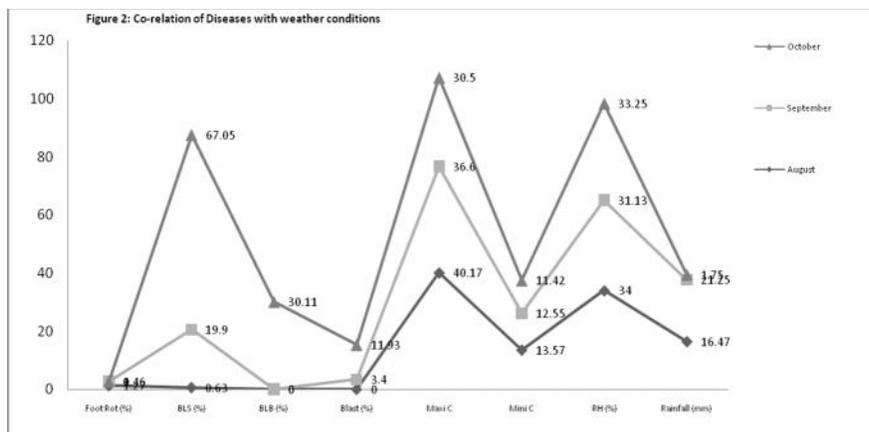
Figure 1 and 2 showed that in August 0.63% grasshopper was recorded above economic threshold level (AETL) with temperature ranges 40.17-13.57 °C;

relative humidity 34% with rainfall 16.47 mm which was average of three respective years. However 1.46% borer; 11.65% leaf roller; 0.49% grasshopper; 1.46% foot rot was recorded AETL during September with temperature ranges 36.60-12.55°C; RH 31.13% with rainfall 21.25 mm; however 2.27% AETL was recorded by grasshopper during October with temperature ranges 30.50-11.42°C and RH 33.25% with rainfall 1.75 mm. On the other hand 4.43% attack was recorded below economic threshold level (BETL) by borer; 1.90% leaf roller; 1.90% grasshopper; 1.27% foot rot and 0.63% brown leaf spot during August. Borer attack was recorded BETL by 1.46%; leaf roller 7.77%; 4.85% grasshopper; 1.46% foot rot; 19.90% brown leaf spot and 3.40% blast under given environmental conditions during September.



In October 3.98% spots were recorded BETL followed by brown leaf spot 67.05%; 30.11% spots of bacterial leaf blight and 11.93% blast with temperature ranges 30.50-11.42 °C; RH 33.25% with rainfall 1.75 mm. Favorable environmental conditions were helpful in flare up of leaf roller population. At 35 °C the attack of rice leaf folder was decreased drastically. These results were in accordance to (Karuppaiachet *al.*,

2012) reported that survival of leaf folder was greatly affected at 35 °C. These results were in accordance to Savary *et al.*, (2000) who reported that diseases of rice caused qualitative loss in yield up to 5%. The research showed that use Kasugamycin; Teboconazole+ Floroxystrobin; Teboconazole were most effective for controlling leaf blast because of most affective and economical (Iqbal *et al.*, 2014).



## Conclusion

At the end it was concluded that insect infestation was recorded maximum in the month of September started from end of August and diseases were attacked to the plants from end August which was gradually increased in the month of October. However the farmers should be vigilant in these said periods to overcome the problem of pest and diseases.

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