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Important pests and diseases of rice

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Introduction:

Farmers growing rice suffer heavy losses due to the depredations of insect-pests when they fail to take remedial measures. A number of diseases also take their toll. The important pests are stem borer, leaf folder, gall midge, plant & leg hopper, rice hispa, caseworm, cutworm and rice bug. The important diseases are blast, sheath blight, brown spot, bacterial blight and tungro. Technology for the control of these pests and diseases is now available. Rice farmers should adopt these control measures well in time and save their valuable crops from these pests and diseases.

Rice is essentially a crop of warm, humid environments conducive to survival and proliferation of many insect pests and diseases. Intensive use of pesticides has produced a number of problems namely pesticides resistance, death of natural enemies, pest resurgence, secondary pest outbreaks and human hazards. Different control measures such as cultural, chemical and varietal for different pests are available. Integrated pest management covers the aspects of selection, integration and implementation of different control tactis to control economically important pests based on ecological and socio-economic considerations at farmer's level. This is accomplished by the use of multiple tactis to maintain pest damage below economic injury level. Utilization of indigenous natural control, management through cultural practices, use of inherent plant resistance, selective use of chemicals based on economic threshold level, conservation of natural enemies and biocontrol methods are the fundamental tactis of IPM technology.

One of the best methods to control the different pests is to grow the resistant/tolerant varieties against at least a few major pests. Treatment of seeds before sowing is also easy and economical. Some of the insect-pests and diseases can be managed with judicious application of fertilizers and other cultural practices. Conservation of existing natural enemies and their augmentation through inundative releases whereever feasible are important in biocontrol tactis. These methods can be combined along with suitable tolerant varieties wherever available. Application of chemicals for the control of pests and diseases

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should be the minimum keeping in view the ETL. Timely and appropriate quantity of effective drug is absolutely essential in planning for chemical control. When the crop is at flowering stage, the chemicals should be applied either in afternoon or in evening hours. While applying the granular pesticides, the water should remain in the field for a minimum period of 3 to 4 days. While using emulsion or wettable powder, first they should be properly mixed with water in a separate container before filling in the sprayer.

Important Insect-pests

Stem borers- The most destructive and widely distributed stem borers are *Scirpophage incertutas*, *Chilo suppressis* and *Sesamia inferens*.The larvae of the stem borers bore into stem and severe apical parts of the plants from the base resulting into dead hearts at vegetative stage and white heads at floweing stage. Resistant varieties should be grown. Since the eggs of S. incertulus are laid near the tip of the blade, clipping of seedling before transplanting greatly reduces the carryover of eggs from seedbed to transplanted field. In fields having infection of stem borer, the crop should be harvested at the ground level so that majority of larvae can be removed. The stubbles should be burnt, removed or decomposed. Ploughing and flooding the field will be most effective in killing the larvae. Wherever possible the crop rotation with non graminaceous crop will also help in reducing the borer population. Nitrogen should be applied judiciously as high rates of nitrogenous fertilizers are preferred by stem borer moths for oviposition and rice plants containing higher levels of nitrogen are more suitable for larval growth. When the level of infection has reached the ETL (5 per cent dead hearts at tilering or one moth per square metre from panicle initiation to flowering stage), chemicals should be sprayed. *Trichogramma* spp. has been found effective for controllong borers.

Leaf folder (*Naphalacrosis medinalis*): The damage is caused by the caterpillars which fold the leaf blades into tubular structures and feed on the green leaf tissues resulting into white transparent streaks running parallel to the midribs. When the level of infection has reached the ETL (1 to 2 freshly damaged leaves per hill), recommended chemicals should be sprayed.

Gall midge (*Orselia oryzae*): The damage is caused by the transformation of regular tillers into a shiny tubular galls commonly called silver shoots which dryoff without bearing panicles. It is effectively controlled by seed, seedling root dip treatment and soil incorporation. When the level of infection has reached the ETL (5 per cent affected tillers at tillering stage),

recommended chemicals should be sprayed. Biological control with *Platygaster oryzae* can parasitize the larvae and pupae of gall midge and effectively brin g down the pest population.

Plant & leaf hopper: Brown plant hopper (*Nila parvatalugens*); White backed plant hopper (*Sogatella furcifera*) and Green leaf hopper (*Nephotettix impicticeps*). The plant and leaf hoppers damage the rice plants by sucking the sap and plugging the xylem & pholem with their feeding sheath and pieces of tissues pushed into these vessels. Due to excessive sucking, the whole plants becomes dry and patches of dried plants, that is "hopper burn" are very conspicuous. It is managed by growing resistant varieties. High rate of nitrogenous fertilizers and close spacing enhances the hopper population so in endemic areas spacing and nitrogenous fertilization should be adopted judiciously. Draining the field and spreading the plants apart can help in bringing down the population. When the level of infection has reached the ETL (5 to 10 insects per tiller), recommended chemicals should be sprayed. For brown plant hopper and white backed plant hopper, spraying should be made on the lower portion of plants. The miridbug (*Cyrtorhinus lividipennis*) has been found as a potent biocontrol agent. *Lycosa pseudoannulata*, ducks and certain entomoptherous fungi have also been known to reduce the hopper population.

Rice hispa (*Hispa armigera*): The adults scrub the upper surface of leaf blade often leaving only the lower epidermis. In severe infestations the leaves turn whitish and membranous and finally dryoff. When the level of infection has reached the ETL (1 damaged leaf per hill), recommended chemicals should be sprayed.

Caseworm (*Nymphula depunctalis*): The damage is caused by larval feeding which also cuts off the leaf tips for making leaf cases. The larva consunes the entire leaf tissue leaving only the upper papery epidermis. Such patches on leaves are the characteristics of the damage caused by this pest. When the level of infection has reached the ETL (1 or 2 cases per hill), recommended chemicals should be sprayed.

Cutworm (*Spodoptera litura*): Young caterpillars eat the soft leaves while fully grown are capable of devouring the entire plant. Seedlings are most affected. When the level of infection has reached the ETL (1 larva per hill), recommended chemicals should be sprayed.

Rice bug (Gundhibug: *Leptocorissa acuta*): Both the young and adults suck the sap from grains at milk stage leaving either empty and partially filled grains with brown spot at the sucking point. The affected fields have

characteristic odour**.** When the level of infection has reached the ETL, recommended chemicals should be sprayed.

Important diseases

Blast (*Pyricularia oryzae*): The leaves, nodes, panicles and grains may be affected. The symptoms on leaves are spindle shaped with pointed ends with grey or whitish centre. The margin of the spot may be brownish or reddish brown and size may vary on the basis of varieties & environmental characters. The disease is controlled by growing resistant varieties. High nitrogen fertilization increases the severity and incidence of blast, therefore, in endemic areas it should be applied judiciously (not more than 60 kg N/ha). Seed treatment is also useful in controlling seed borne blast. When the level of infection has reached the ETL(2 to 5 per cent disease severity or 1 to 2 per cent neck infection), recommended chemicals should be sprayed.

Sheath blight (*Rhizoctonia solani*): Initially ellipsoid or void, later irregular spots are formed on leaf sheath. The centre of spot becomes greyish white with a brown margin. Sclerotia are formed on or near the spots which are easily detached. The size, colour of spoys and formation of sclerotia depend upon environmental conditions. The disease is controlled by growing resistant varieties. Infected plants debries should be removed. Echinochloa colona, Brachiaria mutica and certain other weeds are harbouring the inoculum during off season. So these alernate hosts should be removed wherever possible and clean cultivation is suggested. During mixed cropping with shady crop, the severity of disease is known to be more. Such combination should be avoided. Disease can also be minimised by green manuring with dhaincha or sunhemp. When the level of infection has reached the ETL (1 per cent or more affected tillers), recommended chemicals should be sprayed.

Brown spot (*Drechalera oryzae*): Disease occurs mostly in nutrient deficient soil. The spots are brown with grey or whitish centre when fully developed while undeveloped spots are small, circular and may appear as brownish dots. The spots are relatively uniform and almost evenly distributed over the leaf surface. The disease is controlled by growing resistant varieties. Balanced and proper fertilization should be adopted after soil tests. The infected debries should be removed. Seed treatment with suitable fungicides is useful in controlling seed-borne infection. This treatment is also useful for sheath rot and other grain discolouration & other seed-borne infections. When the level of infection has reached the ETL, recommended chemicals should be sprayed.

Bacterial blight (*Xanthomonas campestris pv oryzae*): On leaf blade, lesions usually begin at the margin, a few cm from the tip as water soaked stripes. The lesions enlarge both in length and width, have a wavy margin and may even reach upto the lower portion of leaf sheath. In another symptom, the infected leaves become greyish green and begin to fold up and roll along the midrib. The bacterium spreads through xylem vessels to the growing point of young plant and infects the growing point of other leaves as a result the entire young plant dies. This phase of disease is known as Kresek phase. The disease is controlled by growing resistant varieties. Disinfection of seed with Streptomycin or any other suitable antibiotics is essential. Infected plant debris, self sown rice plants and ratoon have to be ploughed down and field irrigated a month before seeding or transplanting will help in reducing the inoculum potential. Pruning of leaves at the time of transplanting or later stages should be avoided in endemic areas. Moderate level of nitrogen with required level of potassium has to be used. Top dressing of nitrogenous fertilizers in small quantities several times is desirable than applying a large quantity at a time. Spraying of cowdung slurry (2 kg/10 litres of water) can minimise the disease development and spread of disease.

Tungro (Rice Tungro Virus): Tungro affected rice plants may show stunting in growth and discolouration of leaves ranging from various shades of yellow to orange. The degree of stunting and discolouration may vary with the rice variety, environmental condition, age of the plants as well as strain of virus. The virus is disseminated through green leaf hopper. disease is controlled by growing resistant varieties. Rouging of diseased plants may reduce the source of inoculum from further spread. When the level of infection has reached the ETL (1 affected hill per square metre), recommended chemicals should be sprayed.