

PLANT PROTECTION **MEASURES FOR RICE**

Insect Pests

Rice stemborers : The larvae of these insects bore into the stem and cause damage from July to October. The affected young plants show dead-hearts (yellowing and drying of central shoot) whereas the old ones produce empty earheads which turn white and stand erect. The fields showing more than 5% dead hearts (economic threshold level) should be sprayed with 350 ml of Hostathion 40 EC (triazophos) or 560 ml of Monocil 36 SL (monocrotophos) or 1 litre of Coroban/Dursban/Lethal/Chlorguard/Durmet/Classic/Force 20 EC (chlorpyrifos) in 100 litres of water per acre. Further application of any of these insecticides may be repeated as and when damage reaches economic threshold level.

Leaf folder : The larvae fold the leaves, eat out the green tissue and produce white streaks. The damage is highest during August-October. Spray the crop when the leaf damage reaches 10 per cent (ETL) with 350 ml of Hostathion 40 EC (triazophos) or one litre of Coroban/Durmet/ Force 20 EC (chlorpyrifos) or 560 ml of Monocil 36 SL (monocrotophos) in 100 litres of water per acre.

Plant hoppers : These hoppers include, whitebacked plant hopper and brown planthopper. Both nymphs and adults of these pests suck the cell sap particularly from the leaf-sheath from July to October. The crop dries up in patches. As the plants dry up, the hoppers migrate to the adjoining plants and kill them. In a few days, the area of the dry patches enlarge. To minimise the damage by whitebacked planthopper, grow PAU 201 which is moderately resistant to this insect. About one month after transplanting, a few plants in the field should be slightly tilted and tapped 2 or 3 times at the base at weekly interval. If minimum 5 plant hoppers per hill are seen floating in the water, only then the crop should be treated with insecticide. The plant hoppers can be controlled by spraying 40 ml Confidor 200 SL (imidacloprid) or 800 ml Ekalux/Quinguard 25 EC (quinalphos) or one litre Coroban/Dursban 20 EC (chlorpyrifos) or 560 ml Thiodan/ Endocel 35 EC (endosulfan) in 100 litres of water per acre. Repeat the spray if necessary.

For better effectiveness, direct the spray towards the base of the plants. If the damage is noticed at hopper burn stage, treat the affected spots along with their 3-4 metre periphery immediately as these spots harbour high population of the insect.

Grasshoppers : The adults and nymphs of the grasshoppers eat the leaves especially in nursery. Insecticides recommended for the control of plant hoppers are also effective for grasshoppers.

Rice hispa : Rice hispa is a serious pest in some areas of the Gurdaspur and Amritsar districts and is also found in the other rice growing areas of the State. The grubs of this pest tunnel into the leaves, whereas the adults are exposed feeders. The grubs cause damage by producing bold, white streaks on the leaves. If the attack starts in the nursery, clip-off and destroy the leaf tips of the affected seedlings before transplanting. On the transplanted crop, spray 120 ml Methyl Parathion 50 EC (methylparathion)/560 ml Monocil 36 SL (monocrotophos)/800 ml Ekalux 25 EC (quinalphos)/one litre Dursban 20 EC (chlorpyrifos) in 100 litres of water per acre with a manually operated sprayer. Repeat the spraying if the attack persists.

Rice root weevil : This weevil is a localized pest in the rice area around Rajpura. However, this pest has also been observed in some other areas in the State. Its white, legless grubs feed on roots in the soil from July to September. The attacked plants turn yellow, stunted and produce only a few tillers. Apply any of the following granular insecticides in the standing water :- 3 kg of Thimet/Foratox 10G (phorate) per acre.

Warning : Use gloves while applying granular insecticides.

Rice-ear-cutting-caterpillar : The larvae of this insect are gregarious in habit and are commonly known as 'armyworm'. The young larvae feed on leaves, leaving only the mid-ribs and stems. The old larvae cut off the panicles mostly at the base and hence the name "rice ear-cutting caterpillar".

This stage of the insect causes serious loss to the paddy crop. The larvae are shy of sunlight and generally feed at night. The damage to paddy crop is caused mostly during September to November. The insect can be controlled by spraying the crop with 400 ml of Ekalux/Quinguard 25 EC (quinalphos) in 100 litres of water per acre. As the pest is nocturnal in behaviour, the spray should be done in evening hours for getting better results.

Diseases :

Bacterial leaf blight (*Xanthomonas oryzae* pv. *oryzae*) : Greenish-yellow stripes appear along the leaf margins and extend both lengthwise and breadthwise. The leaf starts drying from the tip, becomes white in severe cases and dries up completely. The disease sometimes attacks the freshly transplanted seedlings which start wilting and in a few days the whole clump dries up. The bacterium perpetuates through seed, rice straw, and roots of non-host plants during the off-season. In order to mitigate the losses, adopt the following measures :

(i) For the management of bacterial leaf blight, grow rice varieties PR 120, PR 115, PR 113 and PR 111 which are resistant to most of the pathotypes of bacterial leaf blight pathogen or PR-118, PR-116 and PR-114 which are resistant to some of the pathotypes of the bacterial leaf blight pathogen.

(ii) Do not apply excessive dose of nitrogen. Nitrogen should not be applied beyond six weeks after transplanting (except when LCC is used).

(iii) Do not pond water in the field.

(iv) Treat seed before sowing to kill primary inoculum, see "Seed Treatment" under Agronomic Practices.

(v) (a) Do not grow nursery under shade.

(b) Rice crop itself should not be grown in the shady area.

(vi) The growing of rice in the area near Bhusa stack (*Kup*) should be avoided.

Bacterial leaf streak (*Xanthomonas oryzae* pv. *oryzicola*) : Small translucent streaks appear in the interveinal areas of the leaf. The streaks gradually enlarge and turn reddish, when the plants near maturity. For control measures, see "Seed treatment" under Agronomic Practices.

Blast (*Pyricularia grisea*) : The fungus causes spindle shaped spots with greyish centre and brown margin on the leaves at maximum tillering. It also causes brown lesions on the neck of the panicle, showing neck rot symptoms and the panicles fall over. The disease is more severe on *Basmati* particularly in the submontaneous areas and under application of heavy nitrogenous fertilizers. Spray the affected crop with Indofil Z-78, 75 WP (zineb) @ 500 g per acre in 200 litres of water, at the maximum tillering and ear-emergence stages. Alternatively, spray Hinosan (ediphenfos) 200 ml in 200 litres of water per acre.

Brown leaf spot (*Drechslera oryzae*) : It produces oval, eye-shaped spots with a conspicuous dark-brown dot in the centre and light brown margin. The spot is surrounded by yellow halo. Spots are also produced on the grains. This disease occurs in poor soils, therefore, give adequate and balanced nutrition to the crop. To control the disease, give two sprays of Tilt 25 EC (propiconazole) @ 200ml or Indofil Z-78 (zineb) @500g in 200 litres of water/acre. The first spray should be given at boot stage and second after 15 days.

Sheath blight (*Corticium sasakii*) : Greyish green lesions with purple margin develop on the leaf-sheath above the water level. Later, the lesions enlarge and coalesce with other lesions. The symptoms are usually not distinct till flowering. Its severe attack results in the poor filling of the grains. Burn the rice straw and stubbles after harvesting the affected crop. Avoid the excessive use of nitrogenous fertilizers. Keep the bunds clean by removing the grass.

To control sheath blight, spray the crop as soon as the disease is noticed at boot stage with Tilt 25 EC @ 200ml or Monceren 250 SC (pencycuron) @ 200 ml or Bavistin 50 WP (carbendazim) @ 200g in 200 litres of water per acre by directing the spray towards the base of the plant. Give one more spray after 15 days.

Sheath rot (*Sarocladium oryzae*) : The rot occurs on the uppermost leaf-sheaths where oblong to irregular and grey-brown to light-brown lesions develop. The lesions often coalesce to

cover the entire sheath. In severe cases, young panicles either do not emerge or emerge partially. A white-powdery growth of the fungus appears on the panicle inside the sheath. The glumes of infected florets are discoloured, dark-red or purple brown to black and often do not fill. The fungus over-winters in rice straw and grains. Burn the rice straw after harvesting the infected crop. Use disease free seed for sowing. Give two sprays of Tilt 25 EC @ 200 ml or Bavistin 50 WP @ 200 gm in 200 litres of water per acre. The first spray should be given at boot stage and second after 15 days interval.

Stem rot (*Sclerotium oryzae*) : The fungus affects the stem at earing and black lesions are produced on the sheath at water level. Later on, the stem gets infected and rots leading to withering and lodging of the plant. The incidence of this disease has declined on high yielding varieties due to improved cultural practices. Prefer to grow tolerant varieties of the *Basmati* group in the infested fields.

False smut (*Ustilagoideae virens*) : Its incidence is increasing on high-yielding rice varieties. The fungus transforms the individual grains into large greenish velvety spore-balls. High relative humidity, rainy and cloudy days during the flowering period increase the incidence of the disease.

The application of organic manures and high dose of nitrogenous fertilizers also increase the intensity of attack.

To control this disease, give first spray of Blitox 50 WP (copper oxychloride) @ 500 g in 200 litres of water per acre at boot stage of the crop in disease prone areas followed by second spray with Tilt 25 EC @ 200 ml in 200 liters of water after 10 days intergal.

Bunt (also called Kernel Smut) (*Neovossia horrida*) : Only a few grains in the panicle are infected. Frequently, only a part of the grain is replaced by a black powder. Sometimes, entire grain is also attacked and the black powder scatters on to other grains or leaves, and this is often the easiest way to detect the disease in the field. The disease incidence is more on short duration varieties, planted early.

Also avoid heavy doses of nitrogenous fertilizers. Two sprays of Tilt 25 EC @ 200 ml in 200 litres of water/ acre at 10% flowering stage and 10 days after should be given for controlling the disease.