



RATES PROJECT
Improvement of Rural Agricultural Technology
Extension System in Asia

GUIDELINES FOR
INTEGRATED PEST MANAGEMENT (IPM) ON RICE



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GUIDELINES

INTEGRATED PEST MANAGEMENT (IPM) ON RICE

FOREWORD

To help farmers cope with the increasingly common pest situation and ensure the quality of rice for export, we have compiled the document “Integrated Pest Management (IPM) Guide for Rice”.

The document “Integrated Pest Management (IPM) Guide for Rice” is a package of technical solutions for pest control on rice, from cultivation measures to biological and chemical measures to limit damage caused by pests on rice.

The document is applied with the support of AFACI in the framework of the project “Improvement of Rural Agricultural Technology Extension System in Asia.”. Compiling the document cannot avoid shortcomings. We look forward to receiving comments from technical staff and farmers to improve the document for future releases.

Sincerely, thank you!

I. CONCEPT OF IPM

According to the expert group of the Food and Agriculture Organization of the United Nations (FAO), “Integrated Pest Management” is a pest management system that, in the specific context of the environment and the population dynamics of pests, uses all appropriate techniques and measures available, to maintain the density of pests below the level that causes economic damage.



II. INTEGRATED PEST MANAGEMENT IPM

1. Applying integrated pest management IPM.

Based on 4 basic principles of IPM, including Growing healthy plants, Preserving natural enemies, and Regular winter visits, Farmers become experts.



Unqualified seeds

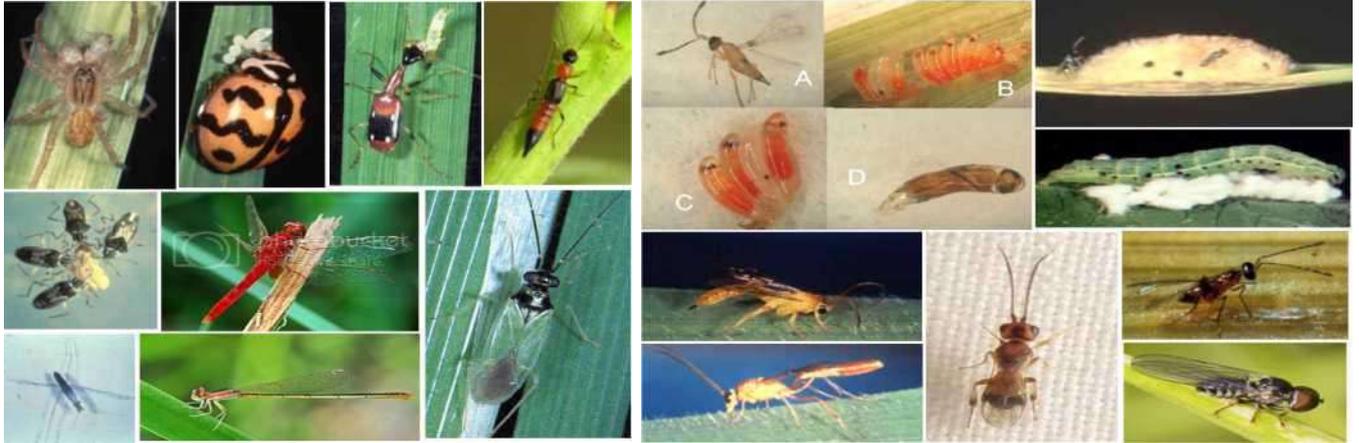


Qualified seeds

Seed selection measures: Select rice varieties resistant to pests (brown planthoppers, blast disease), local weather and soil conditions (tolerant to acid sulfate soils and salinity), and varieties that meet certification standards.

Technical measures for cultivation: Apply appropriate cultivation techniques to create favorable conditions for healthy plant growth that is resistant to pests and adverse environmental factors. Steps in cultivation techniques include Land preparation, plowing, leveling the field, Field sanitation, weed removal, Appropriate sowing density, Balanced fertilization, and Water management appropriate to each stage of rice plants.

Biological measures: Utilize available natural enemies in rice fields (spiders, ladybugs, 3-cavity ants, parasitic wasps, parasitic fungi, etc.) to control pests. Flowers should be planted on the banks of the fields to attract and create suitable habitats for natural enemies, minimizing the use of pesticides, especially not spraying leaf-eating pesticides.



Beneficial natural enemies predatory group

Beneficial natural enemies of parasitic group



Planting flowers on the banks of fields attracts natural enemies

Manual measures: Apply depending on the conditions; manual measures include Using a net or a dragnet, using hands to catch worms, breaking egg nests, cutting diseased leaves, etc.

Chemical measures: Do not use pesticides of chemical origin, only use biological pesticides, only use when absolutely necessary when pests exceed the control threshold, and adhere to the principle of 4 four rights.

2. Some common pests and diseases in rice fields and control measures

2.1. Weeds

Characteristics of damage: There are 3 groups of weeds in the field (the group of grasses, the group of broadleaf grasses, the group of broadleaf grasses). In the Summer-Autumn crop, weeds grow more strongly than in other crops. Depending on the conditions of each field and the sowing method, weeds grow more or less. Weeds compete with rice for nutrients, retain pests and diseases, and reduce the quality of commercial rice. Weed damage can reduce rice yield by 20-30% if not controlled in time.



Comprehensive measures: Use clean seeds (certified seeds) and remove weed seeds from seeds. Manage livestock and waterfowl (ducks) in rice fields. Prepare the land by



plowing thoroughly to receive weeds and sow with water (sã găt). Keep water in the field to suppress weeds. Weed by hand, use herbicides.

Weeds control: Apply the 4 correct principles.

Choose the right weeds: Based on the type of weed present in the field and the weeding stage in which the rice plant is growing, choose the appropriate herbicide.

Mix the right dose and concentration: Read the label of the bottle and the herbicide package carefully to mix.

Mix the herbicide with the right dose of water. Do not increase the dose, especially with herbicides that do not recommend increasing the dose.

Spray at the right time: Depending on the type of herbicide, spray at the right time according to the instructions on the herbicide package label. Do not spray too early or too late.

Spray correctly: Keep the water level on the field or drain the water before spraying the herbicide. Spray the weeds evenly on the field. Do not spray in dry soil conditions. Lack of water will not effectively eliminate the weed and can easily poison the rice plant.

2.2. Thrips (bù lách)

Thrips suck the sap of rice leaves, causing young leaves to have white stripes, the tips of the leaves curl up and live inside. Thrips cause serious damage to dry buds and uneven sowing. If the field has enough water, the rice plants will grow and the rice leaves will open, which is not suitable for thrips to live, and they will move. Thrips do not greatly affect the development of rice plants and do not reduce productivity.



Adult thrips



Larvae Thrips



Thrips damage young shoots and cause them to shrivel.

Prevention measures: Sow in a concentrated manner, keep water in the field, and fertilize early for rice growth. If possible, flood the rice shoots with water for about a day, the thrips will float up and die, then drain the water. Foliar fertilizer can be sprayed to help the rice shoots bloom, and the thrips will have no place to hide. If the thrips density exceeds

the control threshold (10% of rice shoots are damaged, about 3,000 individuals/m², seedling-tillering stage), spray the pesticide.



2.3. Leaf roller

Damage characteristics: Larvae spin silk on the two edges of rice leaves, roll them inside to form a scorpion, eat the green part, leaving a thin white membrane. Rice leaves damaged by larvae will dry up and wither, reducing productivity, especially when larvae attack flag leaves. Larvae cause damage in dense rice fields, soft young leaves, or fields where rice is thick and green, with excess nitrogen fertilization. Larvae damage rice at the tillering - panicle-flowering stages; the danger is in the panicle-flowering stage; if the density is high, it will damage the panicle leaves and reduce rice yield.

Prevention measures: Clean the fields, fertilize in a balanced way, do not apply excess nitrogen in the later stages. During the tillering stage, do not spray insecticide against leaf rollers because the rice plant can compensate and recover (replace new leaves) without affecting rice yield while preserving natural enemies. During the panicle-flowering stage, if the density of larvae exceeds the control threshold (over 20 live larvae/m²), then spray insecticide.

2.4. Rice leafworm

Damage characteristics: The worm bites young rice leaves, rolls into floats, falls into the water and lives inside the floats, moves thanks to water, crawls up at night to eat leaves, eats the green part leaving the white membrane, and bites young leaves and replaces the floats with new ones. Larvae cause damage mainly during the tillering stage, on uneven

fields, deep flooded areas with lots of water, and sparsely grown rice (floats move easily); the damage is reduced during the rice panicle stage.



Sâu non sâu cuốn lá

Sâu cuốn lá gây hại lá lúa



Prevention measures: Drain the water in the field if possible. Use a basket or net to pull the buoy to the shore. At this stage, the rice is tillering if the density of the worm exceeds the prevention threshold

2.5. Stem borer (tube worm)

Damage characteristics: The butterfly has 2 black dots on the wings and lays eggs near the tip of the leaf the size of a bean covered with hair. The larvae hatch and bore into the stem, then bore deep into the stem to eat the young part, causing the rice shoot to die. During the heading stage, the rice is attacked by the worm, causing the rice to turn white. In the direct seeded rice field, the worm causes less damage than in the transplanted rice field, in the deep flooded field, the rice grows poorly, the worm causes severe damage.



Prevention measures: Fertilize tillering plants to compensate for damaged rice shoots. Visit the field to detect and remove egg nests. If there is a 10% mortality rate at the tillering stage, carry out prevention. If there is 1 egg nest/2 m² at the heading - -flowering stage, and if there is a low rate of egg parasitism, spray or spread pesticides.

2.6. Brown planthopper

Damage characteristics: Brown planthoppers and adult planthoppers with long and short wings both suck the sap of broken rice plants, causing the planthopper to burn when the density is high. Planthoppers are the vectors for transmitting viruses that cause yellow dwarf, stunted leaf curl, and weedy rice to rice plants. Planthoppers concentrate their damage on fields with infected varieties, dense sowing, excess nitrogen fertilizer, or on the buds where the rice grows thick and green, near the garden edge. Especially in fields where pesticides are sprayed early in the early stages, killing all natural enemies or spraying incorrectly, planthoppers are likely to break out.

Prevention measures: Use planthopper-resistant rice varieties, do not sow densely, fertilize in a balanced manner, do not apply excess nitrogen fertilizer, especially in the later

stages. Regularly visit the fields (wade down to the fields to check the rice roots) to detect planthoppers.

Do not spray leaf-eating insecticides early in the first 40 days after sowing to protect natural enemies from controlling brown planthoppers in the later stages. If the density of planthoppers exceeds the control threshold of 1,500 individuals/m² (2-3 individuals/rice stalk), spray pesticides.



2.6. Rice blast disease (caused by fungi)

Characteristics of damage: On leaves, the lesions are diamond-shaped, surrounded by dark brown borders extending on both sides like swallow eyes. When the disease is severe, the lesions connect, causing the leaves to dry out in clusters, even in the entire field—damage to the stem nodes, causing rot and easy breakage.

The neck and spikes are damaged on the panicle, with dark black spots causing the panicles to collapse. The disease attacks rice after the rice is close to the canopy. The rice is in the flowering stage, causing severe damage to susceptible varieties, thick sowing, and excess nitrogen fertilizer, especially when the weather is rainy for a long time, the sky is cloudy, lacks light, there is a lot of dew at night, and high humidity (over 80%).



Prevention measures: Choose less susceptible varieties for planting. Sow at low density. Fertilize in a balanced manner, do not apply too much nitrogen, stop applying nitrogen fertilizer, and spray foliar fertilizer when there is disease. Keep water in the field.



Visit the field to detect the disease; depending on weather conditions (heavy rain, high humidity), the level of disease reaches the threshold (10% of leaves are damaged at the tillering and panicle initiation stages), and spray the medicine. Note that for blast disease that damages the rice neck, it is necessary to spray twice before and after the rice has fully bloomed.

2.7. Stem rot disease (caused by bacteria)

Damage characteristics: Bacteria attack the succulent rice stem sheath and then rot. The disease causes each shoot to turn yellow and severely destroys each cluster and the entire field. Pulling up the shoot, it breaks off at the base and smells rotten. The disease appears when the rice is close to the canopy, causing the rice to die at the maximum tillering stage. Severe disease

In the Summer-Autumn crop, the disease develops severely due to the wet and rainy weather, cloudy and low light, high humidity, high water levels in rice fields, thick sowing, and excess nitrogen fertilization. In addition, the disease is caused by combined organic poisoning, acid sulfate soil, brown planthopper infection, or rice blast disease, making the disease worse.

Use pesticides to prevent bacteria. If rice blast and stem rot appear simultaneously in the field, you can mix rice blast fungicides and bactericides to spray. Do not combine foliar fertilizers with fungicides.

2.8. Leaf blight disease (caused by bacteria)



Rice leaf blight disease

Rice leaf blight disease causes rice panicles to become severely stunted

Prevention measures: Choose disease-free seeds and sow at low density. Reduce water in the fields if possible. Increase the application of lime, phosphorus, and potassium; do not apply excess nitrogen or spray foliar fertilizers with high nitrogen. Regularly check the fields, especially rice leaves, when it rains a lot, causing waterlogging, which is favorable for bacteria to spread and develop. When the disease reaches the threshold (20% of leaves are damaged at the heading - -flowering stage), specific drugs are used to prevent the disease at the flowering and milky stages. Preventive spraying can be done if the cultivation conditions and weather favor the disease's development. Preventive spraying should be done twice before and after the rice fully blooms.

2.9. Seed smut disease (Caused by many species of fungi, bacteria ...)



Diseases that damage the husks



Diseases that damage the rice grains on the panicles



Prevention measures: Choose disease-free varieties for planting. Sow at low density. Do not over-fertilize, balance nitrogen, phosphorus, and potassium, or overuse foliar fertilizers after the rice has emerged. Preventive spraying can occur if the growing conditions and weather favor the disease's development. Preventive spraying should be done twice before and after the rice has emerged. Use fungicide sprays.

3. Safe and effective use of pesticides

To ensure the high quality and food safety of rice, following the 4 right principles when using pesticides is necessary.

Use pesticides only when absolutely necessary, choose pesticides that do not affect crops, do not leave residue on rice grains, do not pollute the environment, and are not toxic to users. Choose pesticides with a short isolation period, low toxicity (group III, IV) and biological pesticides sprayed at the end of the crop.

Note: Toxic group I: Very toxic and toxic (on the bottle, the drug packaging has a red line at the bottom); Toxic group II: Moderately toxic (on the bottle, the drug packaging has a yellow line at the bottom); Toxic group III: Slightly toxic (on the bottle, the drug packaging has a blue line at the bottom); Toxic group IV: Very slightly toxic (on the bottle, the drug packaging has a green line at the bottom).



Read the instructions on the label carefully to use the drug correctly.

Comply with the quarantine period of each type of drug when using, especially in the pre-harvest stage. Stop spraying at least 10-15 days before harvest to ensure time for the drug to decompose without residue in the rice grains.

Some types of pesticides, diseases, weeds, and golden apple snails used in high-yield rice production are safe (see appendix).

4. Harvesting - preservation

Harvesting: Harvest when the rice panicles are 85 - 90% ripe. The harvesting process must ensure that the dry rice is not wet. After harvesting, the rice is dried to the required moisture level for preservation and milling to ensure rice quality.