

RICE INSECTS	SYMPTOM	ECOLOGY	PHOTO	CONTROL
Stalk-eyed fly	<p>Adult flies are recognized by their characteristic eyes borne on the tip of stalks.</p> <p>Presence of maggot with black hooks</p> <p>Presence of dead tillers</p>			<p>Practice early and synchronized planting</p> <p>Manage plant spacing. There are indications that damage increase with an increase in plant density</p> <p>Apply calcium silicate to strengthen stem tissues.</p> <p>Avoid panicle harvesting (leaving tall stems) and destroy stubbles after harvest.</p> <p>Water management: keep basis of stems always under water.</p> <p>Conserve natural enemies. Spiders are the main natural enemies of these flies.</p> <p>Use resistant cultivars</p>
Rice leaf miner and whorl maggot	<p>Mines parallel to the veins. Maggots may pupate in an existing mine or migrate to a different leaf to form a new mine</p> <p>Whorl maggots start feeding on the leaf margins causing large scarred areas giving the leaf a ragged appearance and causing eventual leaf collapse. Eventually the maggots enter the whorl and tunnel the plant's developing stem.</p>	➤	➤	<ul style="list-style-type: none"> <li>➤ The rice leafminer can be controlled by managing the water level</li> <li>➤ Avoid leaf contact with water.</li> <li>➤ Drain the water at intervals of 3 to 4 days during the first 30 days after transplanting reduces egg laying as the adult flies are more attracted to standing water.</li> <li>➤ To reduce the potential for damage by the rice leafminer encourage the rice to emerge quickly and grow erect.</li> <li>➤ Level the field as accurately as possible and start the crop in 7-10 cm of water. Increase the water depth</li> </ul>

				<p>slowly after the leaves begin to grow upright.</p> <ul style="list-style-type: none"> <li>➤ Monitor for rice leafminers to determine the need to lower the water level.</li> <li>➤ Begin monitoring two to four weeks after planting, just after most of the rice plants have emerged from beneath the water and the leaves are lying on the water surface</li> </ul>
Termites	They generally attack plants in their later growth stage by hollowing out their root system and filling it with soil resulting in the lodging of the rice plants. The attacked plants are then predisposed to further damage by ground-dwelling pests such as rodents, ants, and secondary infection by fungi and bacteria. Damaged plants can easily be pulled up by hand because the roots are	❖	❖	<ul style="list-style-type: none"> <li>❖ Plant resistant varieties whenever available. Such as "NERICA 1" resistant to termites.)</li> <li>❖ Use neem products. They provide effective control of termites Applications close to the rice hills along the rows</li> <li>❖ Apply recommended insecticides such as chloropyrifos</li> <li>❖ Use attractant</li> </ul>
Root Feeders Mole C r i c k e t termites	<p>Root feeders attack the roots of the rice plant and feed on the living tissues,- causing either stunting or death.</p> <p>Damage severe during the seedling establishment and early tillering stages, when the plant's Root system is just beginning to develop extensively.</p> <p>The following signs: - Dead seedlings</p>			<p>Clear the bunds Clear the along the fields that are not banded. Water management flooding for irrigated rice.</p>

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Hispid beetle	Vector of RYMV. Adult beetles have numerous spines on thorax and abdomen.	❖	❖	<ul style="list-style-type: none"> <li>❖ Use wider spacing of 20x20 cm.</li> <li>❖ Keep bunds and surroundings free of grass weeds.</li> <li>❖ Destroy stubbles and avoid ratooning.</li> <li>❖ Ensure balanced nutrition. Avoid excessive nitrogen application.</li> </ul>
Flea beetles	Presence of small holes in the leaf when feeding, however, this damage is considered minor. Most important, these beetles are potential vectors of the Rice Yellow Mottle Virus. Flea beetles are small, and have enlarged hind legs and jump when disturbed	➤	➤	<ul style="list-style-type: none"> <li>➤ Use spacing of 20x20cm.</li> <li>➤ Keep bunds and surroundings free of grass weeds.</li> <li>➤ Destroy stubbles and avoid ratooning.</li> <li>➤ Ensure balanced nutrition.</li> <li>➤ Avoid excessive nitrogen application</li> </ul>
stem borer	<p>Dead heart Dead heart is a dried up central shoot of a tiller on the rice plant occurring during the vegetative(seedling to maximum tillering) stage that has been attacked by any one species of stem borers.</p> <p>White ear or white head In the grown up rice plants with panicles, the stem borer attack results in “white ear”- a condition wherein whole panicle becomes dried and discolored. The grains of such panicles are empty or only partially filled.</p>			<p><b>Management Strategies:</b></p> <p>(i) Removal and destruction of rice stubbles from field and also collection and destruction of egg masses.</p> <p>(ii) Clipping the tip of the seedlings prior to transplantation to eliminate egg masses.</p> <p>(iii) use of light traps.</p> <p>(iv) Spraying of with recommended insects if threshold level of 10% dead heart is crossed in the nursery a week prior to pulling out the seedlings and the second after 15 days of transplantation.</p>

			Planting resistant varieties
	<p>with white hind wings. Male are smaller than females</p> <p>Pink stem borer (PSB) larvae are pink and purplish on dorsal side and white at ventral side. Head capsule is orange in color</p>		<p><b>Management Strategies:</b></p> <p>(i) Removal and destruction of rice stubbles from field and also collection and destruction of egg masses.</p> <p>(ii) Clipping the tip of the seedlings prior to transplantation to eliminate egg masses.</p> <p>(iii) use of light traps.</p> <p>(iv) Spraying of with recommended insects if threshold level of 10% dead heart is crossed in the nursery a week prior to pulling out the seedlings and the second after 15 days of transplantation.</p> <p>Planting resistant varieties</p>
White stem borer	<p>Male and female adults moths are perfect white in appearance. They have a tuft of long hairs on the thorax. The male is smaller than the female. White stem borer (WSB) larvae are milky white and pupae are soft bodied</p>		<p><b>Management Strategies:</b></p> <p>(i) Removal and destruction of rice stubbles from field and also collection and destruction of egg masses.</p> <p>(ii) Clipping the tip of the seedlings prior to transplantation to eliminate egg masses.</p> <p>(iii) use of light traps.</p> <p>(iv) Spraying of with recommended insects if threshold level of 10% dead heart is crossed in the nursery a week prior to pulling out the seedlings and the second after 15 days of transplantation.</p>

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Leaf folder	<p>Moths are whitish yellow or golden yellow with three black bands on the forewings, either complete or incomplete. Forewings have a dark brown to gray band on their outer margin</p> <p>Rice plants have tubular folded leaves with or without larvae that are pale yellowish to green.</p> <p>Longitudinal and transparent whitish streaks are visible on damaged leaves.</p>		<p><b>Management Strategies:</b></p> <p>(i) Removal and destruction of rice stubbles from field and also collection and destruction of egg masses.</p> <p>(ii) Clipping the tip of the seedlings prior to transplantation to eliminate egg masses.</p> <p>(iii) use of light traps.</p> <p>(iv) Spraying of with recommended insects if threshold level of 10% dead heart is crossed in the nursery a week prior to pulling out the seedlings and the second after 15 days of transplantation.</p>

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Case worm	Leaves damaged by case worm become whitish and papery. Tubular cases formed by cutting the apical portion of leaves float on water around the plants. The leaves are cut at right angles as with a pair of scissors. Larva if present is pale and translucent with orange head and has filamentous gills on the sides of the body.			Practice field sanitation (burning debris or feeding of debris to livestock after harvest).  Practice early and synchronised planting.  Manage plant density. Closer spacing increases damage.  Practice proper water management. Ensure good drainage for three days, since larvae cannot survive without water.  Handpick and destroy rolled leaves in the nursery.
Gall midge	Infestation is most severe when the first rains are early and are followed by a relatively long drought, which delays rice planting The adults are mosquito like. Female midge has a bright red abdomen, and male has a yellowish brown body. Gall midge infestation results in formation of a tube like gall that is similar to “onion leaf” or “silver-shoot”. Gall is a silvery white hollow tube, 1 cm wide and 10-30 cm long. Infested tillers produce no panicles.			Practice early and synchronised planting  Manage plant spacing. There are indications that damage increase with an increase in plant density  Apply calcium silicate to strengthen stem tissues.  Avoid panicle harvesting (leaving tall stems) and destroy stubbles after harvest.  Water management: keep basis of stems always under water.  Conserve natural enemies. Spiders are the main natural enemies of these flies
Stink bug	Bugs are straw-colored, one fourth (1/4) to half (1/2) inch long, somewhat elongated and flattened			If necessary spray plant extracts. A number of plants (lantana, garlic, oleander, African marigold, blackjack, goat weed, wormseed, among others) are reported as effective against

	grains are shrivelled and unfilled. Severity of the damage depends on the stage of grain development and on the number of punctures in the grain.			various species of bugs Pyrethrins are recommended for control of sucking bugs
Grain sucking	Nymphs are green to brown. Adults are slender with long legs and antennae			If necessary spray plant extracts. A number of plants (lantana, garlic, oleander, African marigold, blackjack, goat weed, wormseed, among others) are reported as effective against various species of bugs. Pyrethrin are recommended for bugs control
Blue beetle	Adults are elongated, dark bluish green and shiny with striations on the elytra. Grubs are white with brown head and with tubular processes at tip of abdomen. Often grubs are found in groups			If necessary spray plant extracts. A number of plants (lantana, garlic, oleander, African marigold, blackjack, goat weed, wormseed, among others) are reported as effective against various species of beetles Pyrethrins are recommended for control of blue beetles
Black bug	Nymphs are brown and yellow with black spots and adults are shiny dark brown to black, and are found in groups at the base of plants.			If necessary spray plant extracts. A number of plants (lantana, garlic, oleander, African marigold, blackjack, goat weed, wormseed, among others) are reported as effective against various species of bugs Pyrethrins are recommended for control of sucking bugs
Rats	Rat damage is patchy in the fields with symptoms of chopped plants with tillers cut at 45°, missing panicles and chewed up grains.			Clear the bunds Clear along the fields Use rat poison
Storage pests	Presence of weevils, empty grains and white powder from grains			Remove infested residues from last season's harvest Proper drying and store in air tight bag or silo
Rice root-knot nematode	Symptoms consist of characteristic hooked-like galls on roots, newly emerged leaves appear distorted and			Practice crop rotation (e.g. castor, cauliflowers, cowpea, common beans, groundnut, maize, onion, sesame, soybeans,

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				<p>sunflower and sweet potatoes).</p> <p>Long rotations, greater than 12 months, will be needed to reduce nematode soil populations to low levels. Rotation crops like marigold (<i>Tagetes</i> sp.) are also effective in lowering root knot nematode populations because of its nematicidal properties.</p> <p>Amend soil with. chrysanthemum, neem and marigold, and oil cakes of sesame, neem and coconut oil cakes, incorporated at the rate of 0.12%, 0.50% and 1.00% (w/w), showed that these amendments decreased root knot severity by reducing nematode populations and increased seedling growth</p> <p>Water management. Continuous flooding and raising rice seedlings in flooded soils will help prevent root invasion by the nematodes</p> <p>Plant nematode-free seeds</p> <p>Plant resistant rice varieties if available</p>
Natural Enemies	-			
Dragon flies				Predators of rice pests
Green mirid bug	Adults are light green and slender (about seven to nine mm long), with long legs and antennae. Nymphs are completely green in colour. Brown mirids are also common but are different from green mirids			Predator of rice pest
Rove beetle	Adult rove beetles are brown, reddish brown, or black with gray markings on the wings and abdomen. Beetles are slender with slender elongate			Predator of rice pests

	ze Most			Predator of rice pests
	bodied beetles with many fine lengthwise ridges on their wing covers			
Wolf spider	Wolf spiders range from about 1/2 inch to 2 inches in length, hairy, and are typically brown to gray in color with various markings or lines			Predators of rice pests
Lady bird beetles	Adult beetles are brightly coloured and are oval and convex. Various color forms occur. Beetles could be pests feeding on pollen as well as predators feeding on other insects.			Predators of rice pests
Web spinning spiders	Spiders that are web spinners are found amidst silken strands that are differently shaped. Webs may be horizontal or vertical. Depending upon the species, the size and color of adults vary			Predators of rice pests
Wasps	Small tiny wasps			Parasites of rice pests

Compiled and edited by B. Ngare, W. Kouko, M.G. Kariaga, Catherine.....and W. Kore