

## **Pest, Diseases, Weeds of Rice & Their Management**

### **1. Pests and diseases of Rice**

#### **(a) Important Pest**

<b>Stage</b>	<b>Pests</b>	<b>Control measures</b>
<b>Nursery</b>	Stem-borer, gall midge, thrips, root-knot nematode, root nematode and white tip nematode	<ul style="list-style-type: none"><li>For insect-pests and nematodes, apply Phorate 10 G @ 12.5 kg/ha or Fipronil 0.3 G @ 33 kg/ha of nursery, 5 to 7 days before pulling the seedlings for transplanting or spray with Chlorpyriphos 20 EC @ 2,500 ml/ha or Quninalphos 25 EC @ 2,000 ml/ha.</li><li>In the stem-borer endemic areas, install pheromone traps with 5 mg lure @ 8 traps/ha for pest monitoring and 20 traps/ha for direct control through mass trapping</li><li>In gall midge/stem-borer-endemic areas apply phorate 10 G/ha 5 to 7 days before pulling the seedlings for transplanting.</li></ul>
<b>Vegetative stage</b>	Stem-borer	<ul style="list-style-type: none"><li>Clipping of leaf tips of the seedlings at the time of transplanting will help in destruction of egg masses.</li><li>Removal of excess nursery and incorporation into soil.</li><li>Clean cultivation and destruction of stubbles.</li><li>Apply Cartap 4 G @ 25 kg/ha or Phorate 10 G @ 10 kg/ha or Fipronil 0.3 G @ 25 kg/ha or Chlorpyriphos 10 G @ 10 kg/ha.</li><li>Install pheromone traps with 5 mg lure @ 8 traps/ha for pest monitoring or 20 traps/ha for direct control through mass trapping. Replace lures at 25 to 30 days interval during the crop period.</li><li>Inundative release of egg parasitoid, <i>Trichogramma japonicum</i> 5 to 6 times @ 100,000 adults/ha starting from 15 days after transplanting.</li></ul>
	Gall midge	<ul style="list-style-type: none"><li>Apply Fipronil 0.3 G @ 25 kg/ha or Phorate 10 G @ 10 kg/ha</li></ul>
	Green leafhopper	<ul style="list-style-type: none"><li>Spray Carbaryl 50 WP @ 900 g ha or BPMC 50 EC @ 600 ml/ha or Acephate 50 WP @ 700 g/ha or Ethofenprox 10 Ec @ 500 ml/ha or Imidacloprid 200 SL @ 125 ml/ha or</li></ul>

		Thiamethoxam 25 WG @ 100 g/ha or Clothianidin 50 WDG 30 g/ha. Alternatively, apply Phorate 10 G @ 12.5 kg/h or Fipronil 0.3 G @ 25 kg/ha.
	Hispa	<ul style="list-style-type: none"> <li>Spray Triazophos 40 EC @ 400 ml/ha or Phosalone 35 EC @ 850 ml/ha or Chlorpyriphos 20 EC @ 1,500 ml/ha or Quinalphos 25 EC @ 1,200 ml/ha or Ethofenprox 10 EC @ 450 ml/ha or Fipronil 5 SC @ 600 ml/ha</li> </ul>
	Leaf folder	<ul style="list-style-type: none"> <li>Spray Chlorpyriphos 20 EC @ 1,500 ml/ha or Cartap 50 WP @ 600 g/ha or Quinalphos 25 EC @ 1,200 ml/ha or Acephate 50 WP @ 700 g/ha or Fipronil 5 SC @ 600 ml/ha or Phosalone 35 EC @ 850 ml/ha or Carbaryl 50 WP @ 900 g/ha or Triazophos 40 EC @ 400 ml/ha or apply Cartap 4 g @ 25 kg/ha</li> <li>Inundative release of egg parasitoid, Trichogramma chilonis 5 to 6 times @ 100,000 adults/ha starting from 15 days after transplanting</li> </ul>
	Whorl maggot	<ul style="list-style-type: none"> <li>Apply Fipronil 0.3 G @ 25 kg/ha or Chlorpyriphos 20 EC @ 1,500 ml/Ha</li> </ul>
	Case worm	<ul style="list-style-type: none"> <li>Drain water from the field and spray Carbaryl 50 WP @ 900 g/ha or apply Carbaryl dust @ 30 kg/ha</li> </ul>
	Mealy bug	<ul style="list-style-type: none"> <li>Spot application of Phorate 10 G granules</li> </ul>
Reproductive Stage	Stem-borer	<ul style="list-style-type: none"> <li>Spray Cartap 50 WP @ 800 g/ha or Chlorpyriphos 20 EC @ 2,000 ml/ha or Quinalphos 25 EC @ 1,600 ml/h</li> </ul>
	Brown planthopper, White backed planthopper	<ul style="list-style-type: none"> <li>Spray Imidacloprid 200 SL @ 125 ml/ha or Thiamethoxam 25 WG @ 100 g/ha or Ethofenprox 10 EC @ 500 ml/ha or Acephate 50 WP @ 950 g/ha or BPMC 50 EC @ 600 ml/ha or Carbaryl 50 WP @ 900 g/ha</li> </ul>
	Green leafhopper	<ul style="list-style-type: none"> <li>Spray Imidacloprid 200 SL @ 125 ml/ha or Thiamethoxam 25 WG @ 100 g/ha or Ethofenprox 10 EC @ 500 ml/ha or Acephate 50 WP @ 950 g/ha or BPMC 50 EC @ 600 ml/ha or Carbaryl 50 WP @ 900 g/ha</li> </ul>
	Leaf folder	<ul style="list-style-type: none"> <li>Spray Cartap 50 WP @ 800 g/ha or Chlorpyriphos 20 EC @ 2,000 ml/ha or Phosalone 35 EC @ 1,100 ml/ha or Quinalphos 25 EC @ 1,600 ml/ha or Triazophos 40 EC @ 500 ml/ha or apply Cartap 4 G @ 25 kg/ha</li> </ul>
	Ear-cutting caterpillar/ cut worm	<ul style="list-style-type: none"> <li>Spray Quinalphos 25 EC @ 1,600 ml/ha or Chlorpyriphos 20 EC @ 2,000 ml/ha or Carbaryl 50 WP @ 1,500 g/ha or Phosalone 35 EC @ 1,100 ml/ha</li> </ul>

	Leaf/Panicle mite	<ul style="list-style-type: none"> <li>• Spray Sulphur wettable powder @ 3 g/litre, Dicofol @ 5.0 /ml/litre or Profenophos 50 EC @ 2.0 ml/litre water.</li> </ul>
	Gundhi bug	<ul style="list-style-type: none"> <li>• Spray Carbaryl 50 WP @ 1,500 g/ha during afternoon hours.</li> <li>• Dust Malathion or Carbaryl @ 30 kg of the formulation/ha</li> </ul>

**(b) Important diseases :**

Disease/Crop stage/season	States/Places endemic	Control measures
<b>Leaf blast</b> Nursery and vegetative Kharif and rabi	<p>Leaf blast is favoured by the low night temperature (22-28 °C), high relative humidity (&gt;95%), dew deposit, leaf wetness for more than 10 hours and high nitrogen. The disease is a serious problem in upland, irrigated and hilly ecosystems. In high rainfall zones (rainfall &gt;_1,500 mm) of north and north-eastern India, the disease is prevalent during June-September. In Western and Central India (rainfall around 1,000 mm) the disease occurs during August-October. In Southern India blast mainly occurs in dry season during November-February.</p> <p>During kharif season, the disease is prevalent throughout the rice-growing areas in India especially in Himachal Pradesh, Uttarakhand, Jharkhand, Madhya Pradesh, Chhattisgarh, Asom, Tripura, West Bengal, Orissa, parts of Maharashtra, Andhra Pradesh, Kerala, Karnataka and Tamil Nadu.</p> <p>During rabi season, the disease is prevalent in Southern States like Andhra Pradesh, Tamil Nadu, Karnataka. The disease is also common on boro rice in the states of Asom, Tripura, Eastern Uttar Pradesh, Orissa and West Bengal.</p>	<ul style="list-style-type: none"> <li>• In endemic areas, adopt seed treatment with Tricyclazole 75 WP @ 2 g/kg or Carbendazim 50 WP @ 1 g/kg.</li> <li>• Spray Tricyclazole 75 @ 0.6 g/litre or Carpropamid 30 SC @ 1ml/litre. or Isoprothiolane 40 EC @ 1.5 ml/litre or Iprobenphos 48 EC @ 2ml/litre or Propiconazole 25 EC @ 1ml/litre or Kasugamycin-B 3 SL@2.5 ml/litre or Carbendazim 50 WP @ 1 g/litre.</li> <li>• Grow resistant/tolerant varieties like Rasi, IR 64, Prasanna, IR 36, Vikas, Tulasi, Sasyasree etc.</li> </ul>
<b>Neck blast</b> Flowering and after	The neck blast phase of the disease is prevalent in the states like Andhra Pradesh, Asom, Chhattisgarh, Himachal Pradesh, Karnataka,	<ul style="list-style-type: none"> <li>• Spray Tricyclazole 75 WP @ 0.6 g/litre or Carpropamid 30 SC @ 1 ml/litre or Isoprothiolane 40 EC</li> </ul>

kharif/rabi	Orissa and Uttarakhand. The disease is of common occurrence in boro rice in the states of Assam and Tripura.	@ 1.5 ml/litre or Iprobenphos 48 EC @ 2 ml/litre or Propiconazole 25 EC @ 1 ml/litre or Carbendazim 50 WP @ 1 g/litre.
<b>Sheath blight</b> Maximum tillering, panicle initiation to booting stage kharif/rabi.	Sheath blight is a serious problem in coastal and high rainfall areas. The disease is mostly prevalent in areas where the relative humidity is very high (above 95%), the temperature is moderate (28-32 °C) and N application is high. The disease is prevalent in moderate to severe form in states like Andhra Pradesh(coastal), Assam, Bihar, parts of Chhattisgarh, Orissa, eastern Uttar Pradesh, West Bengal, Kerala, Haryana and Punjab. In boro season the disease has been observed regularly in moderate form in the states of Assam, Bihar, eastern Uttar Pradesh.	<ul style="list-style-type: none"> <li>Spray Validamycin 3 L @ 2.5 ml/litre or Thifluzamide 24 SC @ 0.75 g/litre or Hexaconazole 5 EC @ 2 ml/litre or Propiconazole 25 EC @ 1ml/litre or Carbendazim 50 WP @ 1g/litre</li> <li>Reduce or delay the top-dressing or nitrogen fertilizer and apply in 2-3 splits</li> </ul>
<b>Brown spot</b> Vegetative stage Kharif/rabi	Brown spot is problem mainly during kharif season especially in uplands and hill ecosystem. The disease also assumes a serious proportion in irrigated ecosystem especially in ill-managed plots. The disease is predominant in Jharkhand, eastern Uttar Pradesh, Bihar, Chhattisgarh, tarai region of West Bengal, Orissa, Assam, Tripura, Uttarakhand and Punjab. The boro rice the disease has been recorded in the states of Assam, Bihar and eastern Uttar Pradesh.	<ul style="list-style-type: none"> <li>In endemic area, adopt seed treatment with Carbendazim (12%) + Mancozeb (63%) combination 75 WP @ 2 g/kg or Carbendazim 50 WP @ 2 g/kg or Mancozeb (63%) 75 WP @ 2 g/litre or Mancozeb 75 WP @ 2.5 g/litre</li> <li>Growing of resistant/tolerant varieties like Rasi, Jagnanath, IR 36 etc.</li> </ul>
<b>False smut</b> Post-flowering stage Kharif	False smut of rice has emerged as a major disease in the recent years. The incidence of the disease is particularly more on hybrid varieties. The incidence of the disease is more in those years when spells of wet weather coincide with the heading stage. The disease is favoured by the prevalence of relatively low temperature and high humidity with moderate rainfall well distributed during the period of flowering. The incidence of the disease is more in states like Haryana, Punjab, Uttarakhand, Bihar, Chhattisgarh, Gujarat, Jharkhand, Orissa, Uttar Pradesh, Himachal Pradesh, Jammu and Kashmir, Maharashtra and Tamil Nadu.	<ul style="list-style-type: none"> <li>Spray Propiconazole 25 EC @ 1 ml/litre or Chlorothalonil 75 WP @ 2 ml/litre or Copper oxychloride at around flowering.</li> </ul>
<b>Sheath rot</b>	Sheath rot and grain discolouration are	<ul style="list-style-type: none"> <li>In endemic area adopt seed</li> </ul>

<b>and grain discoloration</b> Post-flowering stage Kharif	especially more in crops affected by stem-borer, rice tungro disease and various other biotic and abiotic stresses. In cytoplasmic male sterile lines (A lines) where the emergence of the panicles is poor, the incidence of sheath rot is very high. Grain discolouration of rice has become a serious problem in recent years especially when there is post-flowering rain. A variety of micro-organisms, viz. <i>Drechslera Oryzae</i> , <i>Sarocladium oryzae</i> , <i>Alternaria padwickii</i> , <i>Curvularia spp.</i> , <i>Epicoccum sp.</i> , <i>Fusarium moniliforme</i> etc. have been found associated with the grain discolouration. These problems have become wide spread in states like Andhra Pradesh, Tamil Nadu, Kerala, Orissa, Jharkhand, Bihar, West Bengal, Assam, eastern Uttar Pradesh, Gujarat, Haryana, Punjab, Uttarakhand and Chhattisgarh.	treatment with Mancozeb 75 WP @ 2.5 g/kg or Captan 50 WP  <ul style="list-style-type: none"> <li>• Spray Mancozeb 75 WP @ 2.5 g/kg or Propiconazole 25 EC @ 1 ml/litre or Hexaconazole 5 EC @ 2 ml/litre or Thiophanate methyl 70 WP @ 1 g/litre.</li> </ul>
<b>Stem rot</b> Panicle initiation to booting Kharif	Stem rot of rice has become an important disease of rice causing substantial loss due to increased lodging. The disease is favoured by high N fertilizers, high relative humidity, high temperature and waterlogging conditions. The disease is more in early planted crop because of high temperature and relative humidity prevailing during the susceptible stage of the crop. The disease is prevalent in Haryana, Bihar, Uttarakhand and Andhra Pradesh.	<ul style="list-style-type: none"> <li>• Burning the rice stubbles after harvest.</li> <li>• Draining out the field.</li> <li>• Addition of organic manure reduces the disease.</li> <li>• Spray Iprobenphos 48 EC @ 2 g/litre or Carbendazim 50 WP @ 1 g/litre or Thiophanate methyl 70 WP 1 g/litre or Isoprothiolane 40 EC @ 1.5 ml/litre.</li> <li>• Growing of resistant varieties like Jalmagna, Latisali, Pankaj, Rasi, etc.</li> </ul>
<b>Foot rot/ Bakanae</b> Vegetative Stage Kharif	Though the disease is of limited occurrence, it has potentiality to be highly serious. The disease is prevalent in Haryana, Tamil Nadu and Andhra Pradesh.	<ul style="list-style-type: none"> <li>• Seed dressing with Captafol 80% @ 4 g/kg or Mancozeb 75 WP @ 2.75 g/kg.</li> <li>• When observed in nursery, spray Carbendazim 50 WP @ 1 g/litre</li> </ul>
<b>Bacterial blight</b> Pre-tillering	Bacterial blight is essentially a monsoon season disease. The intensity of the disease is much influenced by rainfall, cloudy, drizzling and	<ul style="list-style-type: none"> <li>• Apply judicious level of fertilization (60-80 kg N/ha with required level of potassium) without sacrificing the yield.</li> </ul>

to mid-tillering and panicle initiation to booting Kharif	stormy weather and high nitrogen fertilizer. The disease is prevalent in moderate to severe form in almost all the rice-growing areas during the monsoon season. The disease is prevalent in coastal Andhra Pradesh, Tamil Nadu, Kerala, Punjab, Haryana, Uttarakhand, Uttar Pradesh, Gujarat, parts of Maharashtra, Chhattisgarh, Bihar, West Bengal, Orissa and Assam.	<ul style="list-style-type: none"> <li>Apply N in 3-4 splits.</li> <li>Avoid field to field irrigation.</li> <li>Avoid insect damage to the crop.</li> <li>Destroy infected stubbles and weeds.</li> <li>Avoid shade in the field.</li> <li>Grow resistant/tolerant varieties like Ajaya, IR 64, Radha, Pantdhan 6, Pantdhan 10.</li> </ul>
<b>Rice tungro disease</b> Nursery, tillering Kharif	Rice tungro disease is the most important virus disease of rice. It has been reported from many rice-growing areas of India. The disease is prevalent in Tamil Nadu, West Bengal, parts of Andhra Pradesh and Orissa.	<ul style="list-style-type: none"> <li>Remove and destroy infected plants and apply additional nitrogen for early recovery.</li> <li>Incorporate Phorate 10 G @ 12-15 kg/ha or Fipronil 0.4 G @ 25 kg/ha or nursery in top 2-5 cm layer of the soil before sowing of sprouted seeds. If such incorporation is not possible, broadcast the recommended insecticides 4-5 days after showing in a thin film of water and allow this water to seep completely.</li> <li>In the main crop, spray Carbaryl 50 WP @ 0.65 litre/ha or Fipronil 5 EC @ 1 litre/ha.</li> <li>Grow resistant/tolerant varieties like Nidhi, Vikramarya, Radha, Annapurna, Triveni etc.</li> </ul>

## 10.2 Weeds of Rice

### (i). Grasses, Sedges and broad leaves weeds in upland rice:

S.N	Botanical Name	Common Name	Family
<b>Grasses</b>			
1.	Echinochloa colonum Echinochloa crusgalli	Bansawan	Gramineae
2.	Cynodon dactylon	Doob grass	Gramineae
3.	Eleusine indica	Bankodo	Gramineae
4.	Dactyloctenium aegyptium	Makra	Gramineae
5.	Setaria glauca	Bottle grass	Gramineae

<b>Sedges</b>			
6.	Cyperus rotundus	Motha	Cyperaceae
<b>Broad leaves</b>			
7.	Caesulia axillarics	Thukaha(Gurguja)	Compositeae
8.	Eclipta alba	Bhangaria	Compositeae
9.	Euphoribia herita	Bari dudhi	Enphorbiaceae
10.	Solanum nigrum	Ban makoy	Solanaceae
11.	Leucces aspera	Gumma	Labiatae
12.	Phyllanthus niruri	Hazardana	Euphorbiaceae
13.	Lippia nodiflora	Mokana	Verbenaceae

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**(ii). Recommended dose and application time of Herbicides in Upland rice:**

<b>S.N</b>	<b>Herbicides</b>	<b>Recommended dose (Kg a.i. ha<sup>-1</sup>)</b>	<b>Application time</b>
1.	Butachlor	1.5	Pre-emergence
2.	Pretilachlor	1.0	Pre and early emergence
3.	Pyrazosulfuronethyl	40 g	Pre and early post emergence
4.	Oxyflurofen	1.5	Pre-emergence
5.	Anilofos	0.2-0.4	Pre-emergence
6.	Trifluralin	1.5	Pre-plant
7.	2,4-D	1.0-1.5	Post emergence
8.	Thiobencarb	1.0-1.5	Post emergence
9.	Propanil	2-3	Post emergence
10.	Bentazone	2.0	Post emergence
11.	Phenoxyprop-p-ethyle	100 g	Early post emergence