

## **PADDY**

### CLIMATE AND SOIL

Rice is a crop of tropical climate. However, it is also grown successfully in humid to sub-humid region under Subtropical and temperate climate. Rice is cultivated in almost all types of soils with varying productivity. Under high temperature, high humidity with sufficient rainfall and irrigation facilities, rice can be grown in any type of soil. The major soil groups where rice is grown are riverine alluvium, red-yellow, red loamy, hill and sub-mountain terai, laterite, coastal alluvium, red sandy, mixed red and black and medium and shallow black soils.

Depending upon the climate and water availability rice is grown in all the three seasons, i.e. Kharif, Rabi and summer. Depending upon the variety crop duration vary from 100 to 150 days. In northern and western India (J and K, Himachal Pradesh, Punjab, Haryana, Uttaranchal, Uttar Pradesh, Gujrat, Rajasthan, Maharashtra) rice is grown mainly in Kharif, while in southern and eastern India it is grown round the year in three seasons with varying sowing time and periods.

### **365 DGC (365 Days Green Cover):**

#### **Rainfed Paddy / Irrigated Paddy system:**

By taking the advantage of Pre-Monsoon showers, sow the field with 9 types of seeds (Dhabolkar Method – Cereals, Pulses, Oil seeds, Green manure crops, Spices like coriander and Mustard) to have a green cover until the paddy transplantation taken up.

**Paddy-Paddy-Fallow (Canal Irrigation System):** Taking up dry sowing 9 types of seeds (Dhabolkar Method – Cereals, Pulses, Oil seeds, Green manure crops, Spices like coriander and Mustard) 7 days before harvesting of Rabi paddy to have a green cover until the Kharif paddy taking up.

Incorporate the green matter into the soil before 7 days of transplantation

## SEED

I. Seed Varieties - Suitable recommended varieties.

II. Seed Rate–The seed rate varies according to the variety to be cultivated. The seed rate required for one hectare of land under irrigated condition is given below

- Short duration variety: 25–30kg
- Medium duration variety: 25–30kg
- Long duration variety: 20–25kg
- Dry and rainfed sowing: 40–50kg

### Separation of quality seed–

To separate good seed from bad, soak them in water: the unviable and chaffy seeds will float on the surface of water. These seeds can be easily removed and the seeds that sink can be used for cultivation. By this method, damaged seeds are easily removed.

Another method is used when there is an excess of chaffy grain in the seed stock. Take some water in a vessel and drop an egg in it. Keep adding salt slowly till the egg reaches the surface. When the seeds are dropped in to the water, the good quality seeds will sink. Remove the unviable seeds that float on the surface of the water. Wash the selected seeds in good water 2–3 times to remove the salt deposits. If this is not done, the germination capacity of the seeds will be affected.

## NON NEGOTIABLES

- Seed and Seedling treatment
- Clipping of leaf tips
- Alleys in paddy
- White and Yellow Sticky traps
- Bird Perches
- Pheromone traps
- Application of Azolla
- Redgram **and other suitable vegetables** on paddy field bunds
- Seed Treatment–Treat the seed with Beejamruth

## **Preparation of Beejamruth:**

### **Ingredients:**

Water	-	20 Lit
Cow dung	-	5 kg
Cow urine	-	5 lit
Lime	-	50 gm

Take 20 litres of water in bucket and mix 5 litres of cow urine in the bucket then 5 kg cow dung in a thin cloth hang it in the bucket, add 50 grams of lime to the solution and keep overnight (12 hours). Then take out cow dung after squeezing in the bucket. Then the Bheejamruth was ready for use. Then spread the paddy seed (Sprouted/ Dry) on a floor and sprinkle the Beejamruth on the seeds and thoroughly mix the seed in such a way that each and every seed coated with Bheejamruth. Then shade dry the seeds for 30 minutes, then take it for sowing.

## **NURSERY MANAGEMENT**

Preparation of Nursery Bed- Around 14 cents (160 Sq.m) nursery area is required for raising seedlings needed for one acre of land. After ploughing the nursery bed, spread neem leaves on the soil. The leaves should be allowed to decay in water for 6–7 days .When the leaves decayed completely, the land should be ploughed again four times and levelled. In case neem leaves are not available, 8–10 kg of neemcake **and 10–15 kg of NADEP composts ( if available ) and 40 kg of Ghana Jeevamrutham** should be added to the soil during the last ploughing. Later, the soil should be levelled and the **sprouted** seeds should be sown. This increases soil fertility; acts as an insecticide and renders the uprooting of the seedlings easier.

**Note: One may encounter many weeds if farmyard manure is added to the nursery. Hence, it is advisable to avoid it.**

- Nursery Pest and disease management –Pest and diseases like Yellow Stem borer, Root Knot Nematode, Blast and BLB attack seedlings in nursery. It can be prevented by spraying 10% cow urine solution at seven days interval at the presence of first symptom.
- Application of biofertilizers– Azospirillum /**Azotobacter** (@ 1kg / acre) with 25 kg of GhanaJeevamrutham and apply in the nursery **1 day** before pulling.

## MAIN FIELD PREPARATION

The main field should be irrigated and ploughed .The bunds should be trimmed and plastered to prevent water leakage. Rat Holes found in the field should be sealed. NADEP compost (2500kg /Acre), if available Ghanajeevamrutham (400 kg/acre) should be applied as basal manure during final ploughing and land should be levelled before sowing.

## TRANSPLANTATION – PLANT DENSITY AND POPULATION

### Seedling Treatment

The paddy seedlings can be treated with Beejamruth before transplanting. The seedling bundles are to be dipped in Beejamruth and transplant.

### Transplantation

The paddy seedlings are transplanted @ 2-3 seedlings per hill at a depth of 3 cm. The spacing between the seedlings will vary according to variety cultivated . Before transplanting, clip off the tip of the seedlings. This helps in controlling Stem borer.

### Spacing

- Short duration variety – 15x10 cm
- Medium duration variety -20x10 cm
- Long duration variety - 20x15 cm

### Plant Population

- Short duration – 40 to 44 hills per m<sup>2</sup>
- Medium duration – 35 to 40 hills per m<sup>2</sup>
- Long duration – 33 hills per m<sup>2</sup>

## SOIL FERTILITY MANAGEMENT

From the day of sowing till harvest ,the following NF soil fertility management techniques must be used to provide essential nutrients to the crop.

### **365 DGC ( 365 Days Green Cover)**

**Rain fed Paddy/ Irrigated Paddy system:** By taking the advantage of Pre-Monsoon showers, sow the field with 9 types of seeds (Dhabolkar Method – Cereals, Pulses,

Oil seeds, Green manure crops, Spices like coriander and Mustard) to have a green cover until the paddy transplantation taken up.

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### **Ghanajeevamrutham**

- ◆ 1<sup>st</sup> 200kg applied as a basal manure during the final ploughing
- ◆ 2<sup>nd</sup>– 200 kg after 30 days of plantation

### **Dhravajeevamrutham**

- ◆ 1<sup>st</sup>–200 liters 15 days after transplantation
- ◆ 2<sup>nd</sup>–200 liters 30 days after transplantation
- ◆ 3<sup>rd</sup>–200 liters 45 days after transplantation
- ◆ 4<sup>th</sup>–200 liters 60 days after transplantation
- ◆ 5<sup>th</sup>–200 liters 75 days after transplantation
- ◆ 6<sup>th</sup>–200 liters 90 days after transplantation

Plant Growth promoters

Panchagavya–At the time of flowering

### **WEED MANAGEMENT**

Azolla trample it in to soil with the help of manual labour.

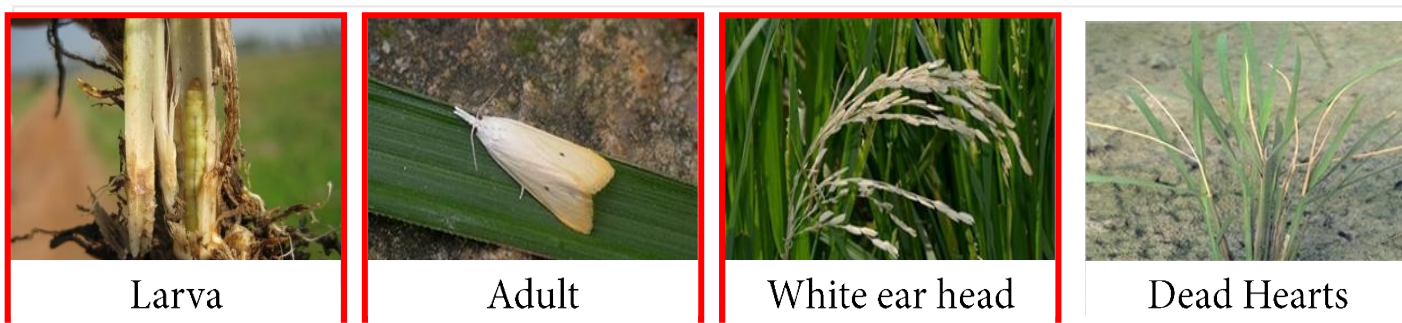
- It suppresses weed growth
- Reduces evaporation losses
- Also, adds Nitrogen to the crop

## PEST AND DISEASE MANAGEMENT

### YELLOW STEM BORER (*SCIRPOPHAGA INCERTULAS*)

Stem borers destroy rice at any stage of the plant from seedling to maturity. They feed up on tillers and causes dead hearts or drying of the central tiller, during vegetative stage; and causes white EARS at reproductive stage.

#### Control Measures



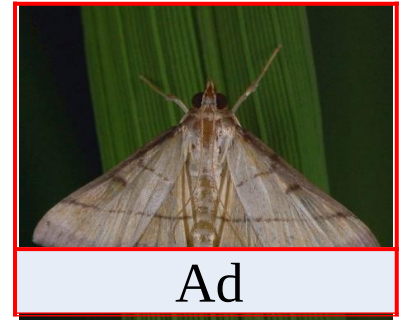
- Avoid applying nitrogenous fertilizers at high doses ,which favours population buildup. Instead apply 100 kgs of neem cake 30 days after planting.

- Flooding and harrowing and ploughing to turning stubble and /or straw after harvest destroys larvae and pupae.
- Clipping the tips of seedling before transplantation greatly reduces the carry over of eggs from seed beds to transplanted fields
- Erecting light traps

#### *Economic Threshold Level - Stem borer*

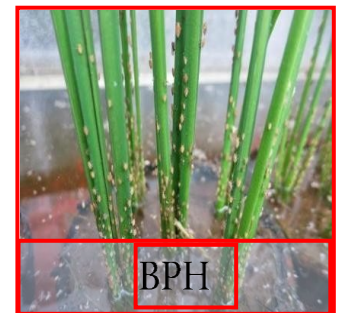
1. *Nursery-1 moth or 1 eggmass/ m<sup>2</sup>*
2. *Planting to PreTillering- 5% dead hearts or one egg mass or one moth/ m<sup>2</sup>*
3. *Mid Tillering-10% dead heart or 1 moth or 1 egg mass/m<sup>2</sup>*
4. *Panicle initiation -2 egg mass or moth/m<sup>2</sup> or 25moths /trap/week*

- Pheromone traps 5 per acre (Yellow stem borer)
  - Releasing of *trichogramma japonicum* egg parasite on appearance of egg masses /moth of yellow stem borer
  - Formation of alleys -to **20 cms** path at every 2 meters interval in East –West direction North South direction during Rabi Season
  - 5% NSKE or Neemastram during initial stage
- Spray Aghnastharam (Dose: 3 lts per 100 lts of water)



#### BROWN PLANT HOPPER (*NILAPARVATA LUGENS* STAL)

High population of plant hoppers cause leaves to initially turn orange-yellow before becoming brown and drying. This condition, called hopper burn, kills the plant. BPH can also transmit *Rice Ragged Stunt* and *Rice Grassy Stunt* diseases. Neither disease can be cured.



#### Control Measures

- Avoid high dosage of nitrogen fertilizers, close spacing
- Draining of fields can be effective in reducing initial infestation levels. The field should be drained for 3 to 4 days when heavy infestation occurs.
- Formation of alleys at 20 cm for every 2 meters
- Spray Ipomoea leaf extract at the base of the plants (Dose: 8-10 liters in 100 liters of water)
- Establish 20-30 white and yellow sticky traps per acre

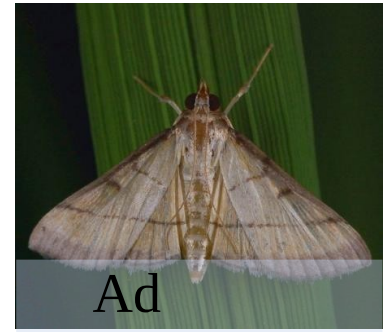


#### LEAF FOLDER (*CNAPHALOCROCIS MEDINALIS*)

Leaf folder caterpillars fold rice leaf around themselves and attach the leaf margins together with silk strands. They feed inside the folded leaf creating longitudinal white and transparent streaks on the blade.

## Control Measures

1. Early planting may help to avoid greater degrees of leaf damage
2. Wider spacing and low usage of nitrogen fertilizers
3. Remove weeds on bunds
4. Higher damage will occur in shaded areas. Therefore, remove the causes of shading within the field
5. Arrange Light traps
6. Dragging of Rope to control larva
7. 5% NSKE or Neemastram during initial stage
8. Spray Brahmasthram/Aghnastharam (Dose: 3 lts per 100 lts of water)



Ad



Larva&Damage

## GUNDHI BUG (*LEPTOCORISA ACUTA* THUNNBERG)

Rice bugs damage rice by sucking out the contents of developing grains from pre-flowering spikelets to soft doughstage, therefore causing unfilled or empty grains and discoloration. Immature and adult rice bugs both feed on rice grains.

### Control Measure

- 200 gundhi bug insect solution
- Spray Brahmasthram/Aghnastharam (Dose: 3 lts per 100 lts of water)

Bug

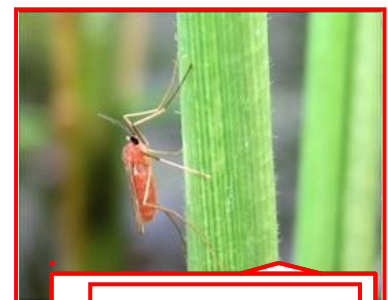


Damage



## GALL MIDGE (*ORSEOLIA ORYZAE* WOOD MASON)

Rice gallmidge forms a tubular gall at the base of tillers, causing elongation of leaf sheaths called silvershoot.

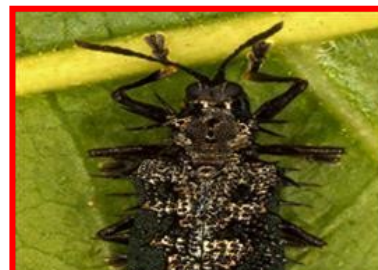


Gall Midge



### Control Measures

- Control of grassy weeds from surrounding areas can reduce gallmidge
- Draining of rice fields for 5-7 days
- Planting early and using early mature varieties
- Avoid staggered planting
- Spray Brahmasthram/Aghnastharam (Dose: 3 lts per 100 lts of water)



Hispa

### RICE HISPA (*DICLADISPA ARMIGERA* OLIVER)

Rice Hispa adults scrapes the upper surface of leaf blades leaving only the lower epidermis. Gurbs tunnels through the leaf tissues .When damage is severe,plants become less vigorous.

### Control Measures

- Clipping and destruction of top three fourth of the leaves of highly infested crops
- Spray Neemastram
- Spray Brahmasthram

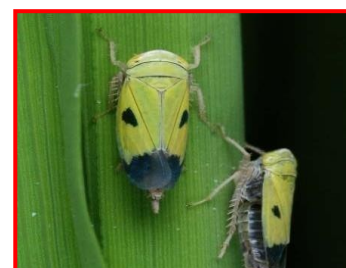


Damage

### JASSIDS/ GREEN LEAF HOPPERS

#### (*NEPHOTETTIX CINCTICEPS*)

Green leaf hoppers are the most common leaf hoppers in rice fields and are primarily important because they spread the viral disease tungro. Both nymphs and adults feed by extracting plant sap with their needle-shaped mouthparts.



Jassids

### Control Measure

- Spray Nirgundi leaves ( Karinochi) extract
- neem leaves+ seetaphal leaves extract
- Establish 20-30 Yellow sticky traps

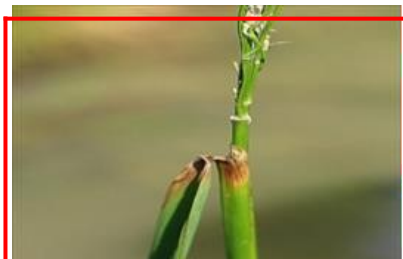


### RICE BLAST

Blast can occur wherever blast spores are present. It occurs in areas with low soil moisture, frequent and prolonged periods of rainshower, and cool temperature in the daytime. In uplandrice, large day-night temperature differences that cause dew formation on leaves and over a lcooler temperatures favour the development of disease. Rice can have blast in all growth stages. However, leaf blast incidence tends to lessen as plants mature and develop plant resistance to the disease.

### Control Measures

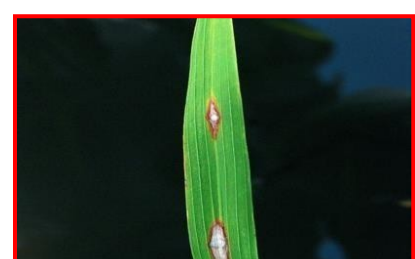
- Treat the seed with Bheejamruth
- Spray Sour Buttermilk solution (Dose: 6 lts per 100 lts of water)
- Spray extract of Beal leaf 8 kg+2kg Tulasi leaves



Neck Blast



Old Lesions



spindle shaped lesions

- Dung+Urine+Asafoetida solution

### BACTERIAL LEAF BLIGHT

Bacterial blight is caused by *Xanthomonas oryzae* pv. *oryzae*. It causes wilting of seedlings and yellowing and drying of leaves. The disease is most likely to develop in areas that have weeds and stubbles of infected plants. It can occur in both tropical and temperate environments, particularly in irrigated and rainfed lowland areas. In general, the disease favours temperatures at 25–34°C, with



BLB Damage

relative humidity above 70%. The spread of the disease is very fast when there is continuous drizzling and breeze, allowing the disease-causing bacteria to easily spread through ooze droplets on lesions of infected plants. Bacterial blight can be severe in susceptible rice varieties under high nitrogen fertilization.



Damage

#### Control Measures

- Treat the seed with Bheejamruth
- Spray dry ginger+milk extract
- Spray Dung+Urine + Asafoetida solution

#### SHEATH BLIGHT

Sheath blight is a fungal disease caused by *Rhizoctonia solani*. Infected leaves senesce or dry out and die more rapidly. Young tillers can also be destroyed. As a result, the leaf area of the canopy can significantly be reduced by the disease. This reduction in leaf area, along with the disease-induced death of leaves and young infected tillers are the primary causes of yield reduction.

#### Control Measure:

- Treat the seed with Bheejamruth
- Spray Sour Butter milk solution (Dose: 6 lts per 100 lts of water)
- Spray dung+urine+hing solution



Sheath blight Damage

#### FALSE SMUT

Due to False smut the complete grain transformed to a fungal mat in severe infestation almost half of the grains of a panicle will turn into yellow clod. It also reduces seed germination. The disease can occur in areas with high relative humidity (> 90%) and temperature ranging from 25–35°C. Rain, high humidity, and soils with high nitrogen content also favours disease



Damage

development . Wind can spread the fungal spores from plant to plant .False smut is visible only after panicle initiation. It can infect the plant during flowering stage.

#### Control Measure

Treat the seed with Bheejamruth Keep the field clean.

Remove infected seeds, panicles, and plant debris after harvest.

Spray dung+urine+ hing solution



**Extracted from :**

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