

RICE

INSECT PEST AND DISEASE WEATHER CALENDAR

NIZAMABAD
DISTRICT
TELANGANA



Professor Jayashankar Telangana State Agricultural University
Rajendranagar, Hyderabad



Rice Insect Pest and Disease Weather Calendar

Nizamabad District
Telangana



Professor Jayashankar Telangana State Agricultural University

Hyderabad

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Rice Insect Pest and Disease Weather Calendar – Nizamabad District, Telangana

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Foreword

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Rice is the staple food for more than half of the world's population, by virtue of its extent and adaptability to wide range of edaphic, climatic and cultural conditions. About 90 per cent of the rice production takes place in tropical / sub-tropical Asia and influences the lives of 60 per cent of the world population. Rice accounts for more than 43 per cent of total food grain production and 55 per cent of cereal production in India. Day to day seasonal climate

changes are considered to be the most limiting factors in crop production, influencing crop growth as well as insect-pest or disease progress.

Majority of the farmers resort to crop protection measures only after particular insect-pest or disease inflicts damage over large area without taking proper preventive steps based on the prevailing weather conditions. One strategy that farmers can adopt to sustain or increase crop yields in the face of a highly variable climate is to

Date: 17.05.2022

Place: Hyderabad

manipulate the crop environment through improved management strategies.

The concerted efforts of Govt. of Telangana to improve the irrigation resources of the state and pro-farmer policies have resulted in increased acreage under rice cultivation to 9.7 million acres as of 2021. An effort has been made to compile the historical data on rice insect pest and disease incidence and weather data to evolve a calendar that acts as a guide to agriculture extension functionaries of the concerned district. They in turn can take appropriate steps to alert the farmers on occurrence of insect-pests/diseases based on the prevailing weather conditions and suggest timely management of pests and diseases in rice, thereby reducing the cost on plant protection.

On this, occasion, I congratulate all the research scientists involved in bringing out this publication, for the benefit of rice farmers of Telangana state, which would go a long way in reducing pesticide use and promoting ecofriendly practices in rice ecosystem.

(V. PRAVEEN RAO)



PREFACE

PROFESSOR JAYASHANKAR TELANGANA STATE AGRICULTURAL UNIVERSITY

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Rice is the second most important cereal crop in the world and predominant staple food crop of India. Paddy is grown in almost all the districts of Telangana state. Owing to the large scale adoption of newly released rice varieties by Professor Jayashankar Telangana State Agricultural University and development of cost effective agrotechnologies addressing the major constraints faced by the farmers of the state, area under rice is showing an increasing trend occupying an area of 41.2 lakh hectares in 2020-21, as against only 14.2 lakh hectares in 2014-15. However, a significant portion of potential yield of rice is lost due to biotic and abiotic factors. Among these, weather vagaries play an important role in accentuation of insect pests and diseases and greatly influence the crop productivity.

Date: 17.05.2022
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Proper understanding on the role played by different weather parameters on incidence of major insect pests and diseases of rice and peak periods of their occurrence, will aid in appropriate monitoring and effective management. Rice insect pest weather calendar developed in rice is one such tool, which will act as a guide to extension functionaries and assists them in focusing on creating awareness to farmers on timely pest management.

This publication is one such attempt made by the rice team, duly utilizing long term light trap data, production-oriented survey information integrated it with predominant weather parameters. The role of Univ. Head, Entomology and Univ. Head, Plant Pathology in shaping up this publication is duly acknowledged. On this occasion, I place on record my appreciation to all the scientists of rice research team involved in bringing out this publication, which would immensely benefit extension functionaries, scientists and farmers.


(R. JAGADEESHWAR)





INTRODUCTION

Pest and disease management has played its role in doubling food production in the last 40 years and the food security of the country can only be assured through effective management of pests and diseases. Insect-pests and diseases are the most important and widespread biotic stresses that vary widely in intensity and can cause up to 37% yield loss in rice, besides affecting quality of the produce. Fungal diseases alone are estimated to reduce annual rice production by 14% globally. In Telangana, yellow stem borer (*Scirpophaga incertulas*), brown planthopper (*Nilaparvata lugens*), gall midge (*Orseolia oryzae*), leaf folder (*Cnaphalocrocis medinalis*) are the major insect pests causing considerable yield losses. Among the diseases, blast, sheath blight, bacterial leaf blight, stem rot, false smut, sheath rot and grain discolouration are considered to be major threats to rice production in Telangana, because of their wider distribution and potential to cause huge losses under favorable weather conditions. The outbreak of any one of these diseases is a serious and recurrent problem in most of the rice growing districts of Telangana.

Production and productivity of rice is determined by several factors of which, weather has a direct and indirect role in determining the same through its profound influence on the crop growth, development and yield. Increase in climatic variability and associated extreme weather events such as erratic rainfall distribution, abrupt change in day and night temperatures during crop season pose challenges to sustain production levels. Apart from these, weather also plays an important role in buildup of pests or diseases eventually defining their level of infestation in the crop. Among the climatic variables, temperature, rainfall and relative humidity are the key factors that influence development of any insect-pest and disease of rice. The weather requirements for optimal growth, development and yield of crops are different from incidence, multiplication and spread of pests and diseases. The susceptibility to weather-induced stresses and affliction by pests and diseases vary amongst crops and within the same crop, across varieties and their growth stages. The timing of incidence of insect-pests and diseases vary greatly both from region to region or from season to season. One can precisely predict the future peaks of populations by knowing the underlying mechanism of population dynamics.

Rice Insect Pest and Disease Weather Calendar

In Telangana, about 4,000 tonnes of pesticides is being sold annually. There is an opportunity for us to reduce the pesticide usage by properly understanding the pest, weather and phenophase relations and using the right kind of pesticide at right time and refraining their use when pest populations are below economic threshold level and adopting other integrated pest and disease management options to keep them below threshold levels.

Majority of the farmers are taking up the control measures over large area, when particular insect-pest or disease initiates without properly taking up any preventive measures or understanding the prevailing weather conditions. One strategy that farmers can adopt to sustain or increase crop yields in the face of a highly variable climate is to manipulate the crop environment through improved management strategies for adaptation. This can be achieved by thorough understanding of the existing normal weather parameters of a region, crop phenology, sowing windows of the area, optimal climatic requirements for different phenological stages, and pest scenario of the location. All these parameters are considered while preparing Rice Insect Pest and Disease Crop Weather Calendar (RIPDCWC).

Rice Insect Pest / Disease Crop Weather Calendar (RIPDCWC) developed for Nizamabad district is a comprehensive guide / tool which provides information on stage wise occurrence of insect-pests and diseases at district level to take up timely control measures thereby enabling reduction in yield losses. Information on crop, its stages and week by week weather information during the crop season is essential to forewarn the farmers on occurrence/prevalence and recommend management measures against insects, pests and diseases. The farm operations planned in conjunction with weather information are likely to curtail the cost of inputs and various other field operations. Rice-insect pest/disease-weather calendars contain the favorable conditions required for occurrence of key insect pests or diseases as well as susceptible crop phenological stages. Thus, if the weather conditions are conducive and the pests / pathogens come in contact with host, there are more chances of occurrence of the respective pests in serious proportions.

Keeping the importance of the crop and constraints of insect pests and diseases in rice, **Rice Insect Pest / Disease Crop Weather Calendars (RIPDCWC)** were prepared for Nizamabad district of Telangana state for the benefit of the farming community. This tool helps agriculture extension functionaries of the Nizamabad district in taking appropriate decisions to alert / forewarn the farmers on occurrence of insect-pests / diseases based on the prevailing weather conditions and suggest timely management of control measures for pests and diseases in rice thereby reducing the cost and quantity of pesticides in rice crop. The crop-pest-weather calendar will provide broad guidelines on when the pests will be at low ebb and when they will assume serious proportions. These would be useful in successful implementation of crop colonies concept and can be a useful guide for planning appropriate plant protection measures, which are of vital importance for effective crop planning and for maximizing and stabilizing food production and thus ensuring food security of the state.

Thus, the present **Rice Insect Pest and Disease Crop Weather Calendar (RIPDCWC)** was developed with an aim to:

- Reduce usage of pesticides and cost of plant protection at least by 25-30%.
- Keep insect-pests/diseases below threshold levels through cultural management measures.
- Encourage prophylactic measures at initial infestation of insect-pests / diseases depending on the crop phenophase.
- Guide and forewarn the farmers and extension functionaries on occurrence of insect-pests/diseases under prevailing weather conditions at district level.
- Guide the extension functionaries and farmers to be vigilant, monitor the crop and take up timely plant protection measures during peak occurrence periods, which would pave way for increasing farmers net income and create safer environment in the state of Telangana.

Methodology

Predominantly rice crop is cultivated in Telangana by transplanting method, through random planting. In *kharif* (*Vanakalam*), since farmers predominantly cultivate the long duration varieties in Nizamabad district during 22nd to 44th std. week (28th May to 4th November) and in *rabi* (*Yasangi*), mostly short duration varieties are grown during 49th to 16thstd. week (December 3rd to 22nd April). The Rice Insect Pest and Disease Crop Weather Calendar was developed accordingly to represent crop growth stages from sowing to maturity. It provides information on the crop growth stages (Fig. 1), climatic conditions favourable for development of insect pests and diseases of rice and act as guide for specific period to monitor and manage different insect pests and diseases.

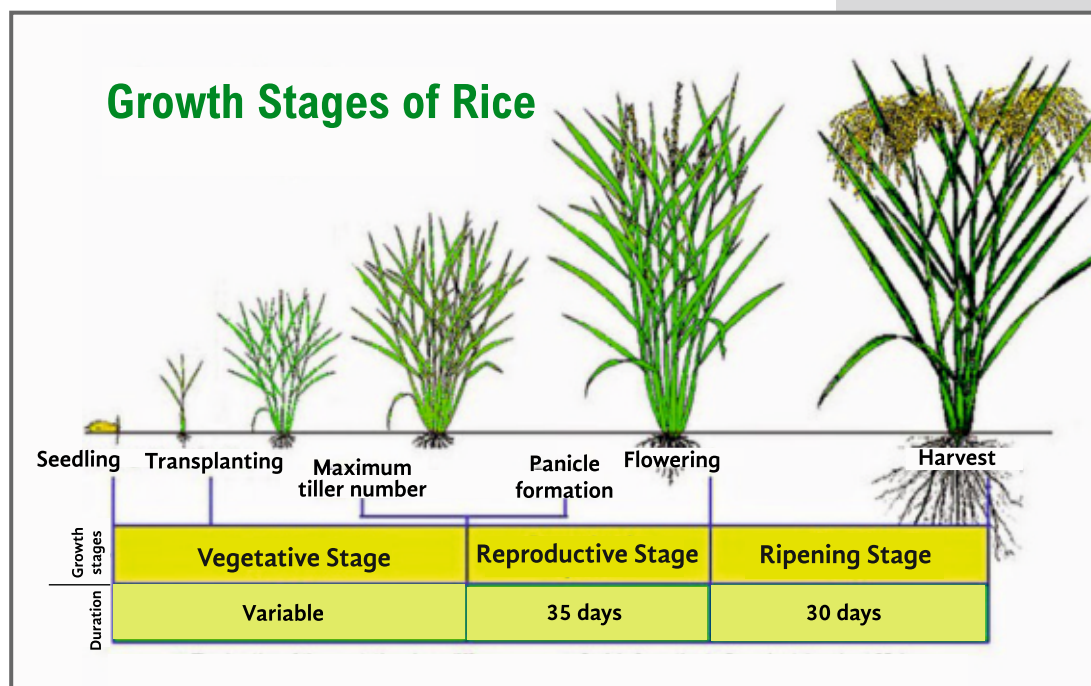


Fig.1: Different phenophases of rice crop

Rice Insect Pest and Disease Crop Weather Calendar (RIPDCWC)

The calendar is developed for both *kharif* (*vanakalam*) and *rabi* (*yasangi*) and comprises of 4 parts.

Part A: The uppermost part of the calendar contains typical life history of the crop in the form of a diagram depicting crop phenophases / growth phases. These phases show temporal and spatial variation depending on the place, crop variety, sowing window, which are depicted through horizontal bars and crop phenophase photographs. The months and standard meteorological weeks are mentioned at the top of the calendar. Normal climatic conditions favorable for the pest build up and phenological stage wise incidence of insect pests and diseases are depicted below the phenophase bars. The bars were marked in different colours to indicate intensity levels. For developing this chart, long term light trap data wherever available, insect pest / disease incidence data over the years, rice production-oriented (POS) survey data of Nizamabad district collected over a period of >10 years was utilized.

Part B: Phenological stage wise incidence of disease *vis a vis* favorable climatic conditions are provided in this part similar to Part A.

Insect-pest/disease	Low	Medium	High
Yellow Stem Borer (YSB)	<5%	5-10%	>10%
Brown Planthopper (BPH)	20/hill	20-50/hill	>50/hill
Gall Midge (GM)	<5	5-15	>15
Leaf Folder (LF)	<5	5-15	>15
Blast (BL)	<5%	5-15%	>15%
Bacterial Leaf Blight (BLB)	<5%	5-15%	>15%
Sheath Blight (ShB)	<5% tillers/m ²	5-20% tillers/m ²	>20% tillers/m ²
Sheath Rot & Grain Discolouration (ShR & GD)	<5%	5-25%	>25%
Stem Rot (StR)	<5%	5-15%	>15%

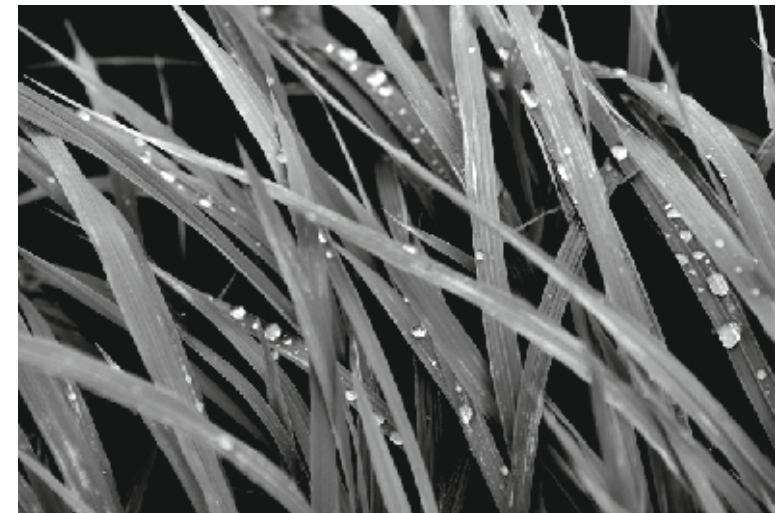
Rice Insect Pest and Disease Weather Calendar

Part C: It shows the average meteorological data of different months and respective standard meteorological weeks for the location and entire crop growth period. Meteorological parameters given were computed from the long-term averages of weather data of the respective districts from 1996 to 2017 (23 years). In addition to the above information, the middle part indicates the favorable meteorological conditions for the crop (stage-wise or whole crop growth period). The phenophase representation was inserted between climatic normals and stage wise optimum weather for higher yields, for easy understanding.

Part D: It consists of probable incidence of insect pests/diseases *vis-a-vis* meteorological standard weeks/months and the advisories based on the recommendations to act as a guide against different insect pests and diseases. The peak incidence for a particular pest or disease was given in red colour to alert the functionaries, wherein they need to be more vigilant and guide the farmers to monitor the crop more frequently and use the recommended pesticides for particular insect-pest or disease on need basis only.

Taking the clue from this calendar and based on the information and feedback obtained on prevailing local situation through extension functionaries such as MAOs and AEOs *etc.*, the extension scientists / agricultural officers can issue advisories for the management of disease / insect pest in the crop within their jurisdiction, duly considering the crop stage and pest severity.

The integrated insect pest/disease wise management options were provided at the end to act as a ready reckoner.

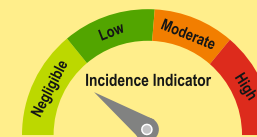




Rice insect pest weather calendar

Season: Kharif (Vanakalam)

District: Nizamabad



Month	May	June					July				August					September				October				Nov		
Std. Week	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44			
PHENOPHASE	Seedling (Nursery)					Seedling (Transplanting)				Tillering to Active Tillering					Panicle Initiation to Booting				Booting to Heading				Heading to Physiological maturity			
Favorable weather and insect pest scenario						Optimum Temp. for hatching : 28-33°C, Larvae: 23-29°C; SSH>7 hours/day																				
						YSB Adults & Larvae				Egg masses & Larvae					Dead heart Incidence											
						Optimum Temp. 25-30°C, RH: 70-90%, RF: >30 mm for 3-4 weeks (Aug. and Sept.), Cum. August RF: 200 mm use of higher dose of N. or Resurgence causing chemicals																				
										BPH Adults & Nymphs					Nymphs and adults suck the sap & hopper burn in susceptible varieties											
					Optimum Temp. 22-26°C, Max T: 31-34°C, Min T: 20-23°C, RH Max: 90-95% RH Min: 70%; late onset of monsoon with late planting																					
									GM Incidence of galls																	
					Optimum Temp: 25-30°C, Opt. Temp. for egg:28.9°C, larvae:25.1°C Pupa:23.7°C; prolonged dry spell after heavy rains																					
									LF Adults and Larvae					Leaf Folder Damage												

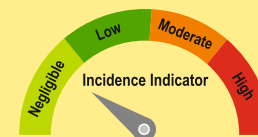
YSB: Yellow Stem Borer, BPH: Brown Planthopper, GM: Gall Midge, LF: Leaf Folder



Rice Disease Weather Calender

Season: *Kharif (Vanakalam)*

District: *Nizamabad*



Month	May	June					July				August					September				October				Nov
Std. Week	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	
PHENOPHASE																								
Favorable weather and disease scenario										High RH (93-99%), low night temp. (16-20°C for 7 days), Intermittent drizzles, cloudy weather, Application of excess 'N' and collateral hosts														
										High RH of canopy (90-95%), temp. (28-32°C), high RF, excess 'N' application, Water stagnation, closer planting and collateral hosts														
										Temperature (22-26°C), RH (above 70%). Continuous and heavy rainfall, cyclones, floods and strong winds. Application of excess 'N'														
										High RH (90%) and temperature (25-30°C), frequent RF, closer planting and application of high doses of 'N'. Injuries and wounds at PI stage														

BLB: Bacterial Leaf Blight, **ShR:** Sheath Rot, **GD:** Grain Discoloration

Rice Weather Calender

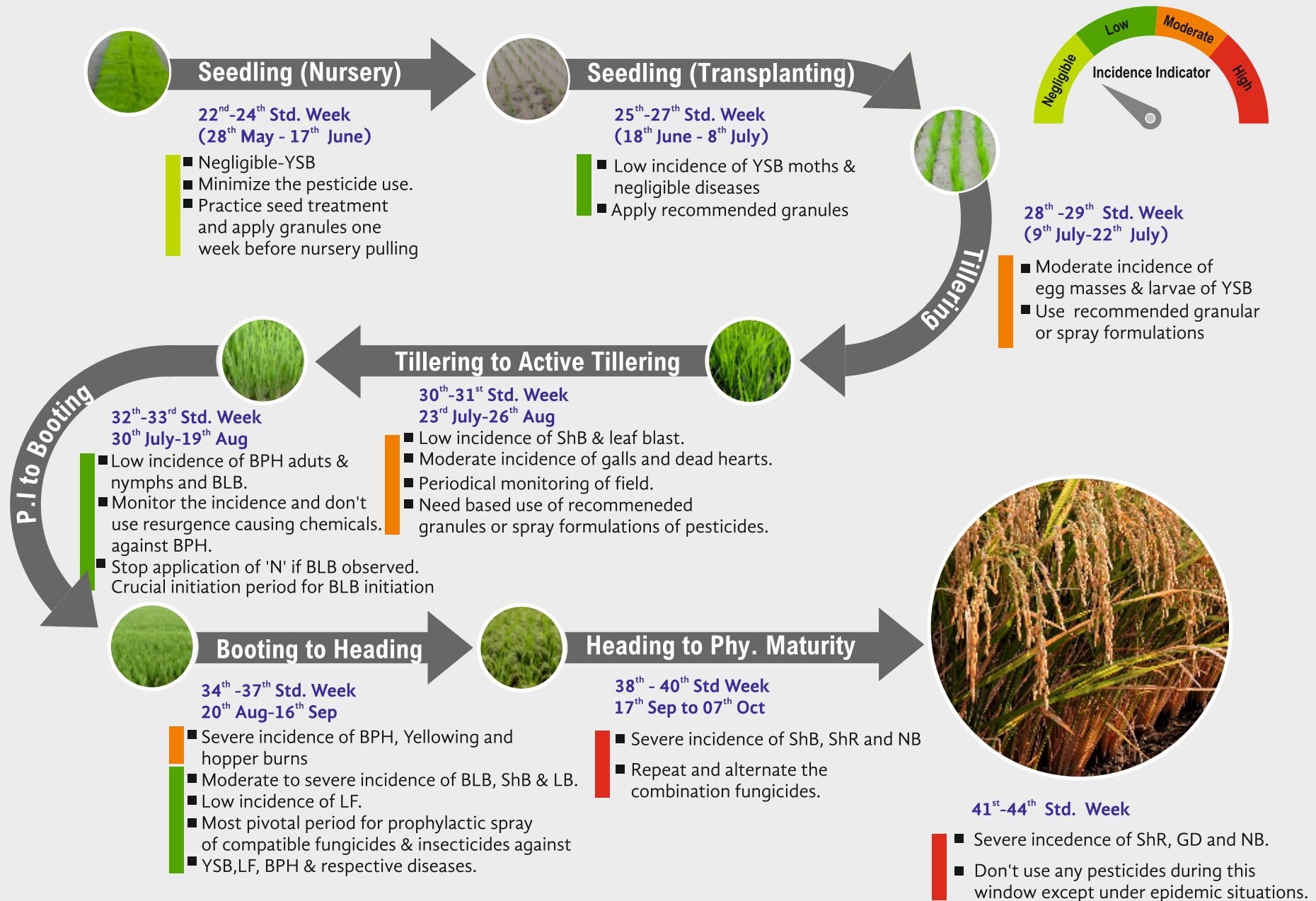
Season: *Kharif (Vanakalam)*

District: Nizamabad

Month	May	June					July				August					September				October				Nov
Std. Week	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	
Normal weather	T Max. (°C)	39.1	36.5	34.7	33.6	32.9	32.1	31.4	30.8	30.6	30.2	31.1	30.8	30.6	31.3	32.0	31.7	33.0	32.8	33.2	32.6	32.4	31.7	31.7
	T Min	27.2	26.0	25.4	25.1	24.9	24.5	24.3	23.8	23.9	23.7	24.0	23.6	23.6	23.7	23.8	23.6	23.4	22.3	21.3	20.0	19.0	19.0	33.2
	T Mean	31.2	30.0	29.3	28.9	28.3	27.9	27.3	27.2	27.0	27.6	27.2	27.1	27.5	27.9	27.7	28.2	23.0	27.09	27.7	26.9	26.2	25.4	25.4
	Rain (mm)	22.2	41.3	40.7	43.1	48.6	56.2	62.5	81.7	83.7	63.0	38.0	75.6	50.5	41.8	39.7	37.0	27.7	30.6	15.0	29.9	8.6	6.4	6.4
	RH Max. (%)	58.5	67.0	69.5	72.1	74.8	77.3	79.0	81.2	80.6	80.8	79.8	81.9	81.9	80.9	80.9	81.4	80.3	80.5	79.9	79.2	77.1	77.4	77.4
	RH Min. (%)	39.6	51.1	54.8	59.5	62.9	65.9	70.1	71.1	72.7	71.4	68.7	71.1	72.5	70.5	70.6	71.7	65.8	67.1	62.1	61.1	57.8	56.0	56.0
	Evap (mm)	8.8	7.1	6.3	5.3	4.5	4.1	3.6	3.0	3.0	3.2	3.4	3.3	3.1	3.3	3.1	3.1	3.4	3.2	3.3	3.2	3.6	3.1	3.1
	Sshr (hrs)	6.0	5.1	3.6	3.4	3.5	3.4	3.5	3.4	2.9	3.0	2.6	3.1	3.8	5.0	4.8	4.6	6.2	6.0	6.7	6.9	7.2	6.7	6.7
	WS (km/hr)	8.7	10.7	11.7	11.5	9.9	8.2	7.8	7.8	10.1	8.0	6.9	5.8	6.3	6.0	5.2	5.0	3.0	2.6	2.0	2.1	1.7	1.8	1.8
PHENOPHASE																								
Duration (days)		30-35					66-70					25-28				28-30								
Optimum weather	T Max. (°C)	31.1	-	42.5	29.1	-	31.5	30.9	-	32.6	31.2	-	33.0											
	T Min. (°C)	25.0	-	29.9	23.4	-	24.5	22.9	-	23.7	18.6	-	22.1											
	T Mean (°C)	29.0	-	36.2	26.3	-	28.0	27.3	-	28.0	24.9	-	27.6											
	Rain (mm)	187	659	146	32																			
	RH Max. (%)	41.0	-	75	79.0	-	85.0	81.0	-	84.0	79.0	-	83.0											
	RH Min. (%)	26.0	-	63	69.0	-	77.0	65.0	-	76.0	59.0	-	65.0											
	Evap (mm)	4.3	-	11.2	2.0	-	3.0	2.3	-	2.9	2.8	-	3.2											
	Sshr (hrs)	3.1	-	7.4	2.0	-	5.7	4.1	-	6.1	6.7	-	8.2											
WS (km/hr)	10.0	-	16.8	5.2	-	15.0	2.9	-	4.7	6.7	-	8.2												

Guide to use Rice Insect Pest and Disease Calendar

Kharif (Vanakalam)

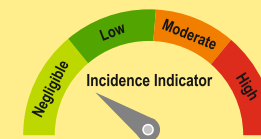




Rice insect pest weather calendar

Season: Rabi (Yasangi)

District: Nizamabad



Month	December				January				February				March				April											
Std. Week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16								
Phenophase																												
Favourable weather and insect pest scenario									Optimum Temp. for hatching : 28-35°C, Larvae: 23-29°C; SSH>7 hours/day																			
					Moths and Egg Masses 				Dead Heart 				Egg Masses and Larvae 				White Ear Incidence 											
													Optimum Temp. 25-30°C, RH: 70-90%, Use of higher dose of N. or Resurgence causing chemicals															
									Adults and Nymphs 				Nymphs and adults suck the sap 				Hopper Burn 											
				Optimum Temp. 22-26°C, Max T: 31-34°C, Min T: 20-23°C, RH Max: 90-95% RH Min: 70%																								
				Incidence of galls 				Incidence of galls 																				
												Optimum Temp: 25-30°C, Opt. Temp. for egg:28.9°C, Larvae:25.1°C, Pupa:23.7°C																
												Adults and Larvae 				Leaf Folder Damage 												

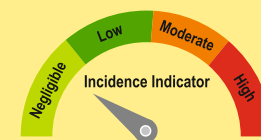
YSB: Yellow Stem Borer, BPH: Brown Planthopper, GM: Gall Midge, LF: Leaf Folder



Rice Disease Weather Calender

Season: *Rabi (Yasangi)*

District: *Nizamabad*



Month	December				January				February				March			April					
Std. Week	49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
PHENOPHASE	Seedling (Nursery)				Seedling (Transplanting)				Tillering to Active Tillering				Panicle Initiation to Booting			Booting to Heading			Heading to Physiological maturity		
Favorable weather and disease scenario	Blast								High RH (93-99%), low night temp. (16-20°C for 7 days), Intermittent drizzles, cloudy weather, Application of excess 'N' and collateral hosts												
	Sheath Blight								High RH of canopy (90-95%), Temp. (28-32°C), high RF, excess 'N' application, Water stagnation, closer planting and collateral hosts												
	Stem Rot								Temperature (22-26°C), RH (above 70%). Continuous and heavy rainfall, cyclones, floods and strong winds. Application of excess 'N'												
	SHR & GD								High RH (90%) and temperature (25-30°C), frequent RF, closer planting and application of high doses of 'N'. Injuries and wounds at PI stage												

SHR & GD: Sheath Rot & Grain discolouration

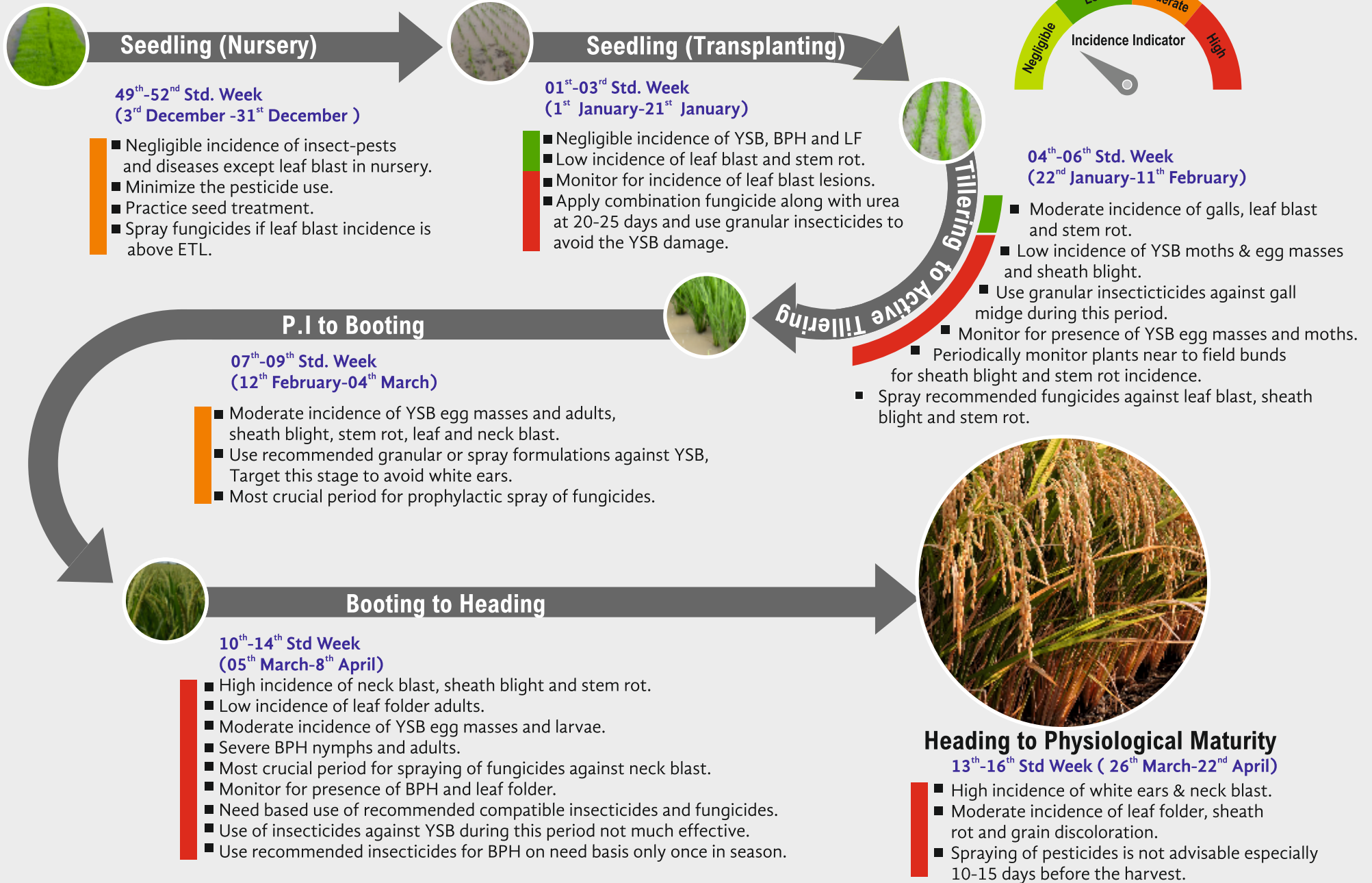
Rice Weather Calendar

Season: *Rabi (Yasangi)*

Month		December				January				February				March				April							
Std. Week		49	50	51	52	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16				
Normal weather	T Max. (°C)	31.0	30.9	30.5	30.6	30.5	30.6	31.3	31.8	32.4	33.1	33.9	35.3	36.1	36.2	36.8	36.9	37.4	38.0	38.2	40.5				
	T Min. (°C)	15.4	14.8	14.2	14.4	15.4	15.2	16.0	16.3	17.1	17.9	18.6	19.3	19.9	20.9	22.0	21.9	22.5	23.6	24.3	25.9				
	T Mean (°C)	23.2	22.9	22.4	22.5	23.0	22.9	23.8	24.0	24.7	25.5	26.2	27.3	28.0	28.5	29.4	29.4	29.9	30.8	31.2	33.2				
	Rain (mm)	0.9	0.0	0.8	0.2	3.4	4.2	3.9	1.6	1.3	1.7	1.5	1.2	3.5	7.0	1.2	1.7	2.8	3.1	6.0	5.2				
	RH Max. (%)	75.9	76.2	76.8	75.9	76.3	75.7	74.2	71.8	71.4	68.2	65.7	62.0	59.5	57.5	56.3	47.4	48.0	47.1	45.5	44.2				
	RH Min. (%)	46.4	46.4	43.7	43.0	43.3	41.2	40.3	38.0	36.9	34.9	33.3	31.0	28.9	30.5	29.5	25.6	24.8	25.6	25.5	26.1				
	Evap (mm)	2.8	2.9	2.8	2.7	2.9	3.0	3.2	3.2	3.2	3.6	4.2	4.3	4.6	4.7	5.1	5.6	6.0	6.2	6.7	7.0				
	Sshr (hrs)	6.9	7.1	7.2	6.9	6.5	6.9	7.0	6.9	7.0	7.1	7.8	8.2	7.7	7.1	7.3	7.4	7.7	8.1	7.5	7.8				
	WS (km/hr)	1.5	1.5	1.4	6.2	1.8	1.6	2.0	2.1	2.3	2.8	3.1	2.7	2.6	3.0	3.1	2.5	3.2	3.3	2.9	3.1				
PHENOPHASE		Seedling (Nursery)				Seedling (Transplanting)				Tillering to Active Tillering				Panicle Initiation to Booting				Booting to Heading				Heading to Physiological maturity			
Optimum weather	Duration (days)	30-35				66-70				25-28				28-30											
	T Max. (°C)	29.8	-	32.0		31.2	-	35.6		31.5	-	37.1		32.1	-	41.8									
	T Min. (°C)	12.8	-	16.4		16.5	-	20.2		19.1	-	23.5		19.9	-	26.8									
	T Mean (°C)	21.5	-	24.2		23.8	-	27.9		25.3	-	30.3		26.2	-	34.3									
	Rain (mm)	3.4				14.1				21.1				3.1											
	RH Max. (%)	74.0	-	78.0		65.0	-	73.0		41.0	-	66.0		34.0	-	44.0									
	RH Min. (%)	42.0	-	50.0		36.0	-	44.0		22.0	-	35.0		20.0	-	24.0									
	Evap (mm)	2.5	-	2.9		2.9	-	4.4		4.0	-	5.6		6.3	-	7.5									
	Sshr (hrs)	6.5	-	8.2		6.4	-	7.9		7.1	-	7.7		6.6	-	8.3									
	WS (km/hr)	1.2	-	3.4		1.3	-	4.0		2.0	-	3.2		2.5	-	3.9									
Irrigation (water in mm) to be applied	170-190 mm in 4-5				270-290 mm in 7				220-240 mm in 5-6				190-210 mm in 5												

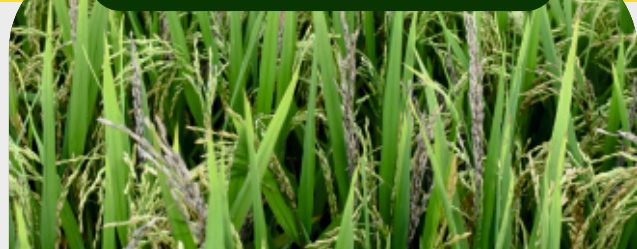
Guide to use Rice Insect Pest and Disease Calendar

Rabi (Yasangi)



Integrated Management Measures for Major Insect Pests and Diseases of Rice

Yellow Stem Borer



IPM Measures

- Follow deep summer ploughing
- Apply carbofuran 3G granules @ 2 kg/ 200 sq. m nursery one week before pulling
- Clip leaf tips before planting (*kharif*).
- Erect pheromone traps @ 3/acre for monitoring.
- Mass trap stem borer adults by erecting pheromone traps @ 8/ acre.
- Go for spraying only when 1 adult or egg mass/ sq. m or 25-30 male moths/trap/week or 10% dead hearts are noticed.
- Harvest close to the ground.

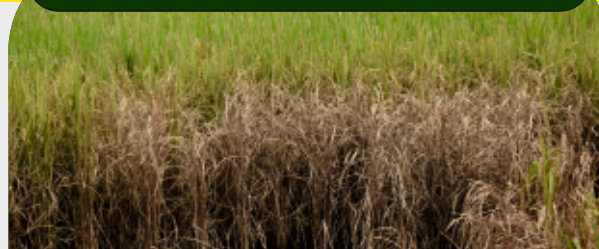
Biological control

- Release *Trichogramma* 5 times at 10 days interval @ 4 egg cards/acre starting from 25 DAT.
- Conserve *Telenomus* and *Tetrastichus* egg parasitoids.

Chemical control

- At tillering stage, apply Carbofuran 3G @ 10 kg or Chlorantraniliprole 0.4% G granules @ 4 kg/acre or spray acephate 50% + imidacloprid 1.8%SP @ 300 g/acre.
- At P.I to booting stage, apply Cartap hydrochloride 4G granules @ 8 kg/acre or spray Cartap hydrochloride 50 SP @ 400 g or Chlorantraniliprole @ 60 ml/acre in 200 litres of spray fluid.

Planthoppers (BPH/WBPH)



IPM Measures

- Use recommended tolerant varieties.
- Provide alleyways @ 20 cm/ every 2 m. Apply optimum doses of nitrogen.
- Refrain from use of Chlorpyrifos or Profenophos or Lambda Cyhalothrin regularly used for management of lepidopteran pests or bios having phyto-hormones during early vegetative stage (upto 50 DAT).
- Spray when 10-15 hoppers at tillering or 20-25 hoppers/hill at reproductive stage are observed

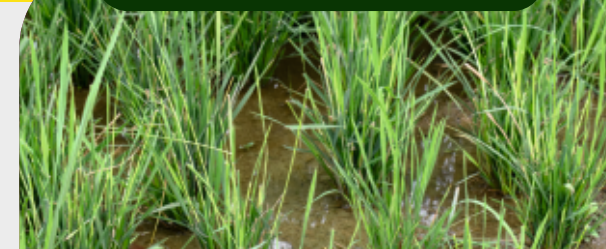
Biological control

- Conserve mirid bugs and spiders

Chemical control

- Spray Acephate @ 1.5 g or Imidacloprid +Ethiprole @ 0.25 g or Dinotefuran @ 0.4 g or Tryflumezopyrim @ 0.485 ml or Pymetrozine @ 0.6 g/l of water.
- Rotate the chemicals to delay resistance development.

Gall Midge



IPM Measures

- Choose location specific resistant varieties like Siddi, Jagtial Mahsuri, Pranahita, Polasa Prabha, Karimnagar Samba, Jagtial Sannalu, Anjana etc.,
- Avoid use of cartap hydrochloride for early stage pest control in GM endemic areas.
- Apply insecticides, if one silver shoot per hill or 5% galls per sq.m are observed during tillering stage only and not beyond 60 DAT.

Chemical control

- In endemic areas where susceptible varieties are cultivated under late planted conditions, apply Carbofuran 3G @ 800 g per 200 m² in nursery.
- Main field application of Carbofuran 3G @ 10 kg/acre or Fipronil 0.3G @8 kg/acre at 15 DAT, particularly under late planted situations.

Integrated Management Measures for Major Insect Pests and Diseases of Rice

Leaf Folder



IPM Measures

- Ensure that no shady areas remain in and around field by cutting down branches.
- Apply optimum doses of nitrogen / balanced fertilizers.
- During tillering stage, pass a rope across the field to open folded leaves or dislodge larvae.
- Apply insecticides at post active tillering stage, if 3 damaged leaves/ hill with live larvae are noticed.

Biological control

- Release *Trichogramma* 5 times at 10 days interval @ 4 egg cards/acre starting from 25 DAT.

Chemical control

- During tillering stage, spray Acephate 50% + Imidacloprid 1.8% @ 1.5 g per liter of water.
- During reproductive phase, spray Cartap hydrochloride 50% SP @ 2 g or Chlorantraniliprole 18.5% SC @ 0.3 ml or Flubendiamide 480% SC @ 0.1 ml or Flubendiamide 20 WDG @ 0.25 g/l of water.

Blast



IDM Measures

- Use of seed from disease free crop. Grow resistant varieties like Krishna, Telangana Sona, MTU 1001, Somnath, NLR 34449 and IR 64.
- Remove and destroy the weed hosts in the field bunds and channels.
- Judiciously apply nitrogenous fertilizers in splits.
- Avoids closer spacing of seedlings in the main field.

Biological control

- Seed treatment with *Trichoderma asprillum* @ 10 g/kg or *Pseudomonas flourescens* @ 10 g/kg of seed.

Chemical control

- Treat the seed with Carbendazim @ 3g/ kg of seed.
- Spray the nursery and main field with Isoprothiolane @ 1.5 ml or Tricyclazole + Mancozeb @ 2.5 or Picoxystrobin + Tricyclazole @ 2 ml or Propiconazole + Tricyclazole @ 1 ml or Kasugamycin @ 2.5 ml/ l or Trifloxystrobin + Tebuconazole @ 0.4 g/l of water.

Sheath Blight



IDM Measures

- Spray the fungicides only when 10% tiller/m² are infected.
- Deep ploughing in summer and burning of stubbles.
- Avoid flow of irrigation water from infected to healthy fields.
- Apply organic amendments viz., neem cake @ 60 kg or FYM @ 5 tons/acre.

Chemical control

- Spray Hexaconazole 5 EC or 5 SC @ 2 ml or Validamycin 3% L @ 2.5 ml or Propiconazole @ 1 ml or Propiconazole 10.7% + Tricyclazole 34.02% SE @ 1 ml or Trifloxystrobin + Tebuconazole @ 0.4 g per litre of water.

Integrated Management Measures for Major Insect Pests and Diseases of Rice

Bacterial Leaf Blight



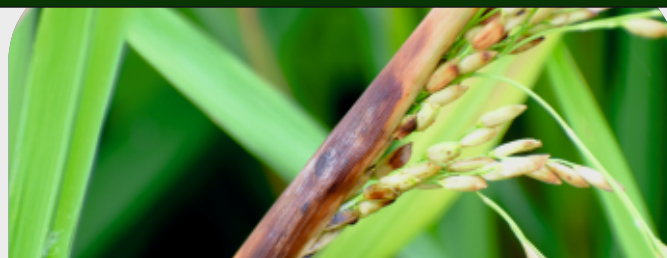
IDM Measures

- Grow the BLB resistant variety like Improved Sambha Mahsuri (RP BIO 226) in BLB endemic areas.
- If incidence is > 5%, stop application of 'N' fertilizer temporarily.
- Avoid clipping of leaf tips at the time of transplanting in BLB endemic areas.
- Avoid flow of irrigation water from infected fields to healthy fields.
- Provide the drainage channel to remove the excess water.
- Apply Murate of potash @ 15-20 kg/acre of booting stage.

Chemical control

- In order to avoid the spread, spray Copper Oxy Chloride @ 3 g and Agrimycin @ 0.4 g or Plantamycin @ 0.5 or Streptomycin sulphate 9% + Tetracycline hydrochloride 1% SP (Streptocycline 9:1 SP) or Pauschamycin @ 0.2-0.3 g/l of water twice in 5-7 days interval. Avoid spraying of COC at flowering stage of the crop.

Sheath Rot and Grain Discolouration



IDM Measures

- Use of healthy seeds and minimize the insect Intestation in the field.
- Adopt optimum spacing.

Chemical control

- Seed treatment with Carbendazim @ 3 g/kg seed.
- Spray Carbendazim 50% WP @ 1 g or Carbendazim + Mancozeb @ 2.5 g or Propiconazole @ 1 ml or Trifloxystrobin + Tebuconazole @ 0.4 g/l twice at booting stage and 25% flowering stage.

Stem Rot



IDM Measures

- Use of recommended dose of fertilizers.
- Deep ploughing in summer and burning of stubbles and infected straw.
- Avoid the flow of irrigation water from infected to healthy field.

Chemical control

- At tillering stage, soil application of Carbendazim 25% + Mancozeb 50% @ 2.5 g/kg of Urea.
- Spray Hexaconazole 5EC or 5 SC @ 2 ml or Validamycin @ 2 ml or Propiconazole @ 1 ml or Tebuconazole @ 1 ml or Carbendazim 50% WP @ 1 g/l of water twice at 5-7 days interval.
- The fungicide spray should be targeted towards the basal portion of the tillers just above the water level.





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