

ALL INDIA COORDINATED RESEARCH PROJECT ON RICE (AICRPR)

Entomology Technical Programme
Kharif 2023 & Rabi 2023-24



ICAR - Indian Institute of Rice Research
Rajendranagar, Hyderabad 500 030

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Trial Allotment Star Sheet - Kharif 2023

Sl.No.	Location	PHS	GMS	LFST	SBST	MRST	NSN-1	NSN-2	NSN-H	NHSN	GMT	PHSS	GMPM	PHPM	OPCT	EIGM	PMRH	IEMP	CSIP	EPBI	PDPNE	EESP	IPMS	LT	TOTAL
1	Aduthurai	*		*	*	*		*			*	*				*		*		*	*		*	*	13
2	Ambikapur		*		*	*	*				*				*	*					*				8
3	Arundhutinagar			*	*																*		*		4
4	Bapatla			*																	*		*		3
5	Brahmavar		*			*	*				*		*								*	*		*	8
6	Chatha			*		*			*								*	*			*	*		*	8
7	Chinsurah			*	*	*		*		*					*			*		*	*			*	10
8	Chiplima		*			*	*	*			*					*		*			*		*	*	10
9	Coimbatore	*				*	*	*	*	*		*		*						*	*	*		*	12
10	Cuttack	*		*							*	*			*						*			*	7
11	Gangavathi	*				*	*	*			*	*	*	*	*	*		*	*		*	*	*	*	16
12	Ghaghrahat				*			*		*								*	*		*			*	7
13	Jagdalpur		*	*		*	*	*			*					*		*		*	*		*	*	12
14	Jagtial	*	*								*		*							*	*			*	7
15	Karaikal			*																*	*			*	4
16	Karjat			*				*											*		*	*	*	*	7
17	Kaul	*		*				*							*		*				*		*	*	8
18	Khudwani								*												*		*	*	4
19	Kurumbapet																				*				1
20	Ludhiana	*		*	*	*	*	*	*	*		*		*	*		*			*	*	*	*	*	17
21	Malan			*		*		*	*									*			*		*	*	8
22	Mandya	*			*	*	*	*		*		*									*	*	*	*	11
23	Maruteru	*	*			*	*	*	*	*	*	*				*				*	*			*	13
24	Masodha			*		*	*														*		*	*	6
25	Moncompu		*		*		*	*		*	*		*					*			*	*		*	11

Contd...

Trial Allotment Star Sheet - Kharif 2023

Sl.No.	Location	PHS	GMS	LFST	SBST	MRST	NSN-1	NSN-2	NSN-H	NHSN	GMT	PHSS	GMPM	PHPM	OPCT	EIGM	PMRH	IEMP	CSIP	EPBI	PDPNE	EESP	IPMS	LT	TOTAL
26	Navsari			*	*	*	*	*												*	*	*	*	*	10
27	Nawagam	*		*		*	*			*								*			*		*	*	9
28	Nellore		*	*	*	*					*		*								*			*	8
29	New Delhi	*										*		*							*				4
30	Pantnagar	*			*	*	*	*	*	*		*		*			*	*			*		*	*	14
31	Pattambi		*	*	*	*				*	*		*		*	*		*			*			*	12
32	Pusa				*	*	*	*										*		*	*		*		8
33	R. Nagar	*		*	*	*	*			*		*						*		*	*		*	*	12
34	Ragolu										*		*							*	*			*	6
35	Raipur	*			*	*	*			*		*			*					*	*	*		*	11
36	Ranchi		*			*				*	*										*	*			6
37	Rewa																				*				1
38	Sakoli	*	*			*	*				*					*				*	*		*	*	10
39	Titabar			*	*	*	*				*				*			*	*	*	*		*	*	12
40	Warangal	*	*			*	*				*	*	*		*	*					*			*	11
Total		16	12	19	16	26	20	17	7	13	17	12	8	5	10	9	4	15	4	15	40	11	20	32	349

\$=PSR and LT Data to be collected for the whole year (January to December)

Rabi 2023-24							
Sl.No.	Location	SBST	MRST	NSN (Boro)	EPBI	IPMS	Total
1	Aduthurai						
2	Arundhutinagar			*			1
3	Bapatla	*	*				2
4	Brahmavar						
5	Chatha						
6	Chinsurah	*	*	*		*	4
7	Chiplima						
8	Coimbatore	*		*			2
9	Cuttack(Gerua)	*					1
10	Gangavathi				*		1
11	Ghaghraghat						
12	Iroishemba						
13	Jagdalpur						
14	Karaikal						
15	Karjat						
16	Kaul						
17	Khudwani		*				1
18	Kurumbapet						
19	Ludhiana						
20	Malan						
21	Mandya						
22	Maruteru	*	*	*		*	4
23	Masodha						
24	Moncompu				*		1
25	Navsari						
26	Nawagam						
27	Nellore						
28	New Delhi						
29	Pantnagar						
30	Pattambi	*		*	*	*	4
31	Pusa						
32	Ragolu						
33	Raipur						
34	R.Nagar						
35	Ranchi						
36	Rewa						
37	Sakoli						
38	Titabar	*		*			2
39	Wangbal						
40	Warangal						
	Locations	7	4	6	3	3	23

Coordinated Entomology Trials, *kharif* 2023

Name of the study	: Pest Survey Reports (PSR)
Objectives	: To monitor and report incidence, buildup and outbreaks of insect pests of rice in the region catered by the AICRIP center. Quantification of affected area and intensity of pest damage and impact on yield.
Method	: Visit, survey and surveillance and interaction with local farmers.
Periodicity	: Once in a fortnight. At least six times in a crop season
Target area	: Covering the district where centre is located and 2-3 adjoining districts. In case of pest outbreaks, affected area may be specifically visited.
Essential information	: <ol style="list-style-type: none">1. Specific site & date visited – District, Mandal (Taluk), village (Give specific GPS coordinates).2. Area covered – in multiples of 10 ha3. No. of fields specifically examined4. Variety grown5. Major pest(s) noticed6. Severity of damage (slight, moderate, severe)7. Any other production constraints noticed <i>viz.</i>, drought, flood, diseases etc.
Desirable additional information in respect of severely damaged field(s)	: <ol style="list-style-type: none">8. Age of crop in severely damaged field(s) (in DAT/DAS). Select ten sites randomly representing the whole area and record observations on 10 hills at each site.9. Plant protection measures adopted by the farmer prior to the visit with name & dates of insecticide application.10. Information on fertilizer/fungicide/weedicide application, if any.11. Advice given to the farmer and follow up report if feasible

Submission of report

As early as possible by e-mail (jhansidrr@gmail.com), not later than 15th and 30th of each month.

Note: 1) Report may also be based on visit of farmers to the centre with samples of affected plants.

2) Submit report even if there is no appreciable pest damage in the region.

3) If required to visit an affected area, expenditure on POL for the purpose may be claimed with prior approval of the Project Director of IIRR- e-mail request may be made for this purpose to seek permission.

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Pest Survey Report

AICRIP Centre:

Site visited/reported:

Date:

GPS Coordinates:

1. Specific site District, Mandal (Taluk), village		
2. Area covered – in multiples of 10 ha		
3. No. of fields specifically examined		
4. Variety grown		
5. Major pest(s) noticed		
6. Severity of damage (slight, moderate, severe) Please mention the average of observation recorded in ten sites for each pest.		
7. Per cent severity of damage (indicate the extent). Per cent Severity is must for reporting outbreak status of the pest.		
8. Any other production constraints noticed viz., drought, flood, diseases etc.		
9. Age of crop in severely damaged field(s) (in DAT/DAS)		
10. Plant protection measures adopted by the farmer prior to the visit with name & dates of insecticide application		
11. Information on fertilizer/ fungicide/ weedicide application, if any.		
12. Advice given to the farmer and follow up report if feasible		

Please send by e-mail to jhansidrr@gmail.com latest by 15th and 30th of every month

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Coordinated Entomology Trials, *Kharif 2023*

1. Host Plant Resistance Studies

Name of the trial	:	Planthopper Screening trial (PHS)
Objectives	:	To study the reaction of cultures against brown plant-hopper and whitebacked planthopper with a view to identify the promising material (PHS).
Entries	:	List to be enclosed along with seed material.
A) Field Screening		
Replications	:	One.
Planting date	:	Sowing and planting should be done so as to obtain high planthopper infestation.
Spacing	:	10 x 10 cm.
Age of seedlings at planting	:	3 - 3 1/2 weeks.
Seedlings/hill	:	One.
Check variety	:	Taichung Native 1 (Susceptible).
Plot size	:	Two rows of 10 hills each. Nine rows of test variety alternating with one row of susceptible check TN 1. All around test entries, plant 4-5 infestor rows of tall, susceptible, long duration varieties like Mahsuri or Jaya or a local susceptible check
Fertilizer	:	Apply fertilizers according to local recommendations to get higher yields (more N may be top-dressed to get higher infestation).
Chemical control	:	1. Nursery should be protected with suitable insecticide spray at 0.5 kg a.i./ha if other pests are in considerable number.
		2. No control measures should be adopted after transplanting.

Observations:

1. Observe and report planthopper population on 10 hills/entry at 10 days interval from 60 days onwards till 10 days before harvest. Report number of BPH and WBPH/hill separately.

2. Report number of dead and surviving plants per variety first at the time of hopper burn in any of the test varieties followed by another observation prior to harvest.
3. If hopper burn is not observed despite high PH population, record percent tiller mortality in 5 random hills per entry.
4. Report overall damage on 0-9 scale for each entry as described below.

0	No damage.
1	Slight yellowing of a few plants
3	Leaves partially yellow but with no hopperburn.
5	Leaves with pronounced yellowing and some stunting or wilting and 10 -25% of plants with hopper burn, remaining plants severely stunted.
7	More than half of the plants wilting or with hopper burn, remaining plants severely stunted.
9	All plants dead.

(N.B: If plant mortality is due to combined populations of BPH and WBPH and/or other causes, specify them clearly).

Special Instructions: It is important to ensure field reaction through following steps.

1. Erect a polythene sheet barrier of 2.5 feet height all around the planting area within 15 days after planting. For better results it is desirable to plant test entries in longitudinal strips not wider than 2 meters and each strip separately covered around with polythene sheet.
2. Collect adults and nymphs of planthoppers from adjacent areas or green house culture and release them uniformly in polythene confined area on 30, 40, 50 and 60 DAT.
3. Spray 0.002 per cent deltamethrin on infestor/feeder rows 35, 45, 55 and 65 DAT to ensure further build up of the pest population.
4. Population structure as ratio of BPH to WBPH may be furnished when mixed populations prevail in the field
5. **Seed should be collected separately from each culture (5 low damaged hills/culture) which shows very low damage. This seed should be sent to the Principal Scientist & Head, Department of Entomology, IIRR, Hyderabad along with an email intimation to jhansidrr@gmail.com.**

Wherever facilities are available, the entries are to be tested under greenhouse conditions by adopting standardized technique of mass screening (three replications).

The procedure for mass screening is as follows:

Mass screening:

- ❖ This method involves growing of the test cultures in screening trays/seed boxes of size (50 X 40 X 7 cm).
- ❖ Fill the Seed boxes with well puddled and manure enriched soil and level. Draw 13 equidistant lines horizontally in the box.
- ❖ Draw two vertical lines in the centre of the box cutting the five lines on either side of the middle horizontal line without touching the two boarder lines and middle horizontal lines.
- ❖ Soak the seed of test entries in the petridishes along with susceptible and resistant checks. Keep the soaked seed in a plastic tray and cover with another tray. Next day, remove the water from the petridishes and allow entries to sprout.
- ❖ Sow 20 test entries in the test entry lines by using forceps. Sow two border rows with susceptible check, TN1 and middle row with resistant check, PTB 33 for BPH and MO1 for WBPH. Sow at least 20 seeds of test entries per each line and 40 seeds of susceptible and resistant checks per line. This layout minimizes the chances of escape of the test entries from insect attack.

- ❖ Keep these seed boxes in big aluminium or fibre trays in the plant growth chambers. 10 days (WBPH) -12 days (BPH) after sowing when the plants are of 3-leaf stage, transfer these seed boxes to the screening chambers and cover with cages made of mylar sheet.
- ❖ Release required number of first instar nymphs on the seedlings so that each seedling gets 6-8 nymphs. Cover these mylar cages with plastic mesh so that the insects cannot escape. This infestation is sufficient to kill the susceptible check in 6-7 days. Monitor plant damage regularly.

When TN1 plants on one side show severe damage, rotate the tray by 180° for even reaction. When 90% of plants in the susceptible check, TN1 on both sides are killed, the damage rating of the entries is to be done. Score all the plants in a test entry and checks and score individually, total and average. Score the entries according to Standard Evaluation System (SES 2013) on 0-9 scale developed by IRRI

Reference: IRRI (International Rice Research Institute). 2013. Standard Evaluation System for rice (SES), 5th edition. Los Baños (Philippines): International Rice Research Institute).

0	None of the leaves yellow or dried
1	One bottom leaf yellow/dried
3	One or two leaves yellow or one leaf dried
5	One or two leaves dried or one leaf healthy
7	All leaves dried/ yellow but stem green
9	Plant dead

Note:

- ❖ If, as in the past years, PH incidence at your location is consistently high during *rabi* than *kharif*, the trial may be conducted during *rabi*
- ❖ If hopper burn evaluated on visual basis– Kindly indicate the same

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Coordinated Entomology Trials, *Kharif* 2023

Name of the trial	: Gall Midge Screening Trial (GMS)
Objectives	: To assess the reaction of advanced cultures/donors against gall midge.
Entries	: As per list to be enclosed along with the seed material.
Replications	: One
Plot size	: one row of 20 hills per variety/culture.
Planting date	: One late planting (4 weeks later than normal planting). The idea is to adjust the time of planting in such a way so as to synchronize the most vulnerable stage of the plant with peak emergence of the insect. Please include your local check also.
Spacing	: 15 x 15 cm.
Age of seedlings	: 3 - 3 1/2 weeks
Seedlings/hill	: One
Fertilizer	: Apply fertilizers according to local recommended practice for obtaining high yields (more N may be top-dressed to get higher infestation).

Observations :

- 1) At 30 and 50 DAT, observe all plants to report total plants (TP) and gall midge damaged plants (DP).
- 2) Also record from a maximum of 10 damaged plants/entry the number of total tillers (TT) and silver shoots (SS).
- 3) If any entry was observed to have nil damage at both 30 and 50 DAT, please check at 75 DAT for gall damage if any and report the same.

Special Instructions:

1. **Seed should be collected separately from each culture (5 damage free hills/culture) which show nil or very low incidence of gall midge. This seed should be sent to the Principal Scientist & Head, Department of Entomology, ICAR-Indian Institute of Rice Research, Rajendranagar, Hyderabad - 500 030, Telangana, along with an email intimation.**
2. No insecticide should be applied in this trial.
3. No weedicide should be applied in this trial.
4. In case, pest population build-up is seen during post-tillering stage, induce fresh tillering in 50% of hills of each entry by cutting the tillers at water level and record the damage at peak periods.

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Name of the trial	: Leaf Folder Screening Trial (LFST)
Objective	: To evaluate entries / breeding lines against leaf folder to identify the promising material.
Entries	: As per the list enclosed along with seed material
Plot size	: 1 row of 20 hills per entry
Planting dates	: Sowing and planting dates should be adjusted so as to coincide with high leaf folder infestation
Spacing	: 20 x 15 cm
Age of seedling	: 3 – 31/2 weeks
Seedlings per hill	: Two
Check varieties	: Taichung Native 1 (Susceptible check) & W 1263 (resistant check)
Fertilizers	: Apply fertilizers according to local recommendations to get higher yields. Also apply additional 40kg Urea/ha on 30, 40 & 50 DAT to get higher leaf folder infestation.
Methodology	: At 25 DAT, cover these entries with nylon net and release leaf folder adults. Collect adults from neighbouring fields or laboratory/glass house culture. Release adults two times, once at 40 DAT and second at 60 DAT @ 100 adults per release. In locations where the leaf folder adult population occurrence is delayed due to climatic variations or other factors, adults may be collected as and when available but preferably release before booting stage. If it gets delayed, releases may be discontinued. Dip cotton in 20% honey solution and place it with a pin inside the net as adult food. Let the adults remain inside the net to lay eggs for a week and then remove the net.
Observations	: Take observations twice, at 60 DAT and 80 DAT preferably. In case of delayed releases, observations are to be taken 20 days after release. In each entry, select 10 plants at random. Count the total number of leaves and damaged leaves (consider as damaged leaf only if one-third of the leaf area is damaged). Calculate per cent damaged leaves in each entry.
Special Instructions	: Do not apply insecticides in the main field.

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Name of the trial	: Stem Borer Screening Trial (SBST)
Objective	: To evaluate entries / breeding lines against stem borer to identify the promising material.
Entries	: As per the list enclosed along with seed material
Replications	: One
Plot size	: 2 rows of 20 hills per entry with one skip row between entries
Planting dates	: Two planting dates One normal planting and the second one 15 days after the normal planting (Accordingly the two sowing dates may be fixed to coincide with peak stem borer incidence of your area)
Spacing	: 20 x 15 cm
Age of seedling	: 3 – 3.5 weeks
Seedlings per hill	: One
Check variety	: PB1, TKM 6, W 1263 and Sasyasree. Please include your local check also.
Fertilizers	: Apply fertilizers according to local recommendations to get higher yields (more N may be top dressed to get higher infestation).
Methodology	: Stem borer infestation may be augmented by pinning of the yellow stem borer egg mass (at black head stage) collected from greenhouse, at maximum tillering stage and at booting stage of crop growth.
Observations	: <ul style="list-style-type: none"> • Immediately after transplanting if there's any stem borer incidence count the number of hills that are affected and also for the recovery of the plants. • Count the total number of tillers and number of dead hearts (DH) on least 10 hills/entry at 30 DAT or 50 DAT. • Also, record total panicle bearing tillers and white ears separately from 10hills/entry at early flowering stage and prior to harvest. • Grain yield from 5 infested hills to be taken separately. • Stubbles – Count the no. of surviving larvae in three individual infested hills, separately.

Special Instructions : Do not apply insecticides in the main field.
Damage in the check varieties is important for the trial to be considered as a valid test.
Zero white ear damage in an entry to be confirmed under sufficient pest pressure and ensure that they are not escapes.
The stem borer species may be indicated.

N.B: Record data separately for each of the stages

Send the seeds from 10 best entries as per your evaluation to the Principal Scientist & Head, Department of Entomology, ICAR-Indian Institute of Rice Research, Rajendranagar, Hyderabad - 500 030, along with an email intimation.

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Coordinated Entomology Trials, *Kharif 2023*

Name of the trial	: Multiple Resistance Screening Trial (MRST)
Objective	: To note the reaction of promising advanced cultures against insect pests with a view to identify multiple resistant cultures.
Entries	: As per list to be enclosed along with seed material.
Replications	: Unreplicated
Planting dates	: Two Staggered sowings and plantings. Planting may be done to coincide with peak pest incidence of your area
Spacing	: 20 x 15 cm
Age of seedlings	: 3 - 3 1/2 weeks.
Seedlings/hill	: One
Check variety	: Taichung Native 1 (Susceptible).
Plot size	: One row of 20 hills each with one skip row between cultures.
Plot arrangements	: Single row of check variety should be included after every 10 varieties/cultures.
Fertilizer	: Apply fertilizers according to local recommendations to get higher yields (more N may be top dressed to get higher infestation).

Observations:

- Record observations **on any two major pests only**.
- Minor pests when above ETL at any stage of crop growth may also be recorded.
- Whorl maggot/leaf folder/hispa/blue beetle/ case worm etc: Count the total number of leaves and number of damaged leaves on at least 10 hills/variety or culture at random at 30 and 45 DAT and at peak infestation.
- Gall midge: Count total number of plants and number of damaged plants (bearing silver shoots) on 30 DAT and 50 DAT. Report percent plant damage and percent silver shoots.
- Stem borer: Count the total number of tillers and number of dead hearts on at least 10 hills/ culture at 30 DAT or 50 DAT. Also, record total panicle bearing tillers and white ear heads from 10 hills/variety **prior to harvest**.

- Planthoppers and leafhoppers: Report average insect population/hill based on 10 hills/ entry along with hopper burn (when observed) and overall plant damage on 0-9 scale as detailed in PHS trial. Greenhouse evaluations wherever feasible are to be done.
- Thrips: Record the damage on 0-9 scale at seedling and tillering stages of crop growth as detailed below:

0	No damage
1	Rolling of terminal 1/3 area of 1 st leaf.
3	Rolling of terminal 1/3 - 1/2 area of 1 st and 2 nd leaves.
5	Rolling of terminal 1/2 area of 1 st , 2 nd and 3 rd leaves, yellowing of leaf tips.
7	Rolling of entire length of all leaves, pronounced yellowing.
9	Complete plant wilting, followed by severe yellowing and scorching.

- Gundhi bug damage: Record the percent grain damage at hard dough stage.
- Any other pests: Record either pest population/plant or percent damage if pest has caused significant damage. Specify the pest.

Special Instructions:

- Do not apply any insecticide either in nursery or in the main field.
- **Efforts may be made to build up the pest populations for better identification of the resistant/tolerant entries.**
- Specify name of the pest causing damage pest for each column or observations **along with the age of the crop.**
- Stem borer infestation may be augmented by pinning of the yellow stem borer egg mass (at black head stage) collected from greenhouse at booting stage of crop growth.
- Similarly, augment other pest populations as indicated in respective pest screening trials.
- Report data only against those pests where pressure was moderate or high.
- The damage units for each pest damage may be clearly specified

N.B: Record data separately for each of the pests.

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Coordinated Entomology Trials, *Kharif 2023*

Name of the trial	: National Screening Nurseries (NSN)
Objective	: To note the reaction of advanced/initial yield trial entries against insect pests.
Entries	: There will be five sets of NSN. NSN-1 , consists of AVT (Advanced Variety Trials) entries. NSN-2 , consists of IVT (Initial Variety Trials) entries. NSN-(Hills) consists of AVT-hills entries NHSN (Hybrids) consists of IHRT entries NSN (Boro) comprising of Boro entries
Replications	: One.
Planting date	: Adjust time of planting so as to catch up with peak pest pressure.
Spacing	: 20 x 15 cm.
Age of seedlings	: 3 - 3 1/2 weeks.
Seedlings/hill	: One.
Check variety	: TN 1. Please include your local susceptible check also.
Plot size	: Each entry one row of 20 hills.
Fertilizer	: Apply fertilizers according to local recommendations to get higher yields (more N may be top dressed to get higher infestation).

Observations :

- 1) Record observations on two major pests only.
- 2) Refer instruction sheets of earlier trials *viz.*, PHS, GMS, LFST, SBST and MRST for detailed guidelines to record pest incidence/damage.
- 3) Entries may be scored on 0-9 scale as per Standard Evaluation System of IRRI, Philippines. **If SES is not followed, please indicate that it's done by visual scoring on a relative basis.**

N.B: Record data separately for each of the pests and indicate clearly units of observation, pest involved and time of recording data.

Special Instructions:

- Do not apply any insecticide either during nursery or in the main field.
- Evaluations may be carried out under greenhouse conditions at the identified centres for the specified pest.

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2. Insect Biotype Studies

Name of the trial	:	Gall Midge Biotype Trial (GMBT)
Objectives	:	To monitor prevalence, distribution and occurrence of gall midge biotypes within the country.
Differentials	:	As per list to be enclosed along with the seeds.
No. of plantings	:	Late planting to catch up the maximum infestation.
Plot size	:	one row of 20 hills per variety.
Spacing	:	15 x 15 cm.
Age of seedlings	:	3 - 3 1/2 weeks
Seedlings/hill	:	One
Fertilizer	:	Apply fertilizers according to local recommended practice for obtaining high yields (more N may be top-dressed to get higher infestation).

Observations : 1) At 30 and 50 DAT, examine all plants to report total number of plants and gall midge damaged plants.

2) Also record from a maximum of 10 damaged plants the number of total tillers and silver shoots.

Special Instructions:

Seed should be collected separately from each culture which showed nil incidence of gall midge. **Seed should be sent to the Principal Scientist & Head, Department of Entomology, Indian Institute of Rice Research, Rajendranagar, Hyderabad - 500 030, Telangana. along with an email intimation**

- No insecticide should be applied in this trial.
- No weedicide should be applied in this trial.
- In case pest population build-up is seen during post-tillering stage, induce fresh tillering in 50% of hills of each entry by cutting the tillers at water level and record the damage at peak damage.

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Coordinated Entomology Trials, Kharif 2023

Name of the trial : **Planthopper Special Screening Trial (PHSS)**
Objectives : To select suitable BPH resistance genes for different locations
Entries : List to be enclosed along with seed material.

Greenhouse Screening

The procedure for mass screening is as follows:

Mass screening:

- ❖ This method involves growing of the test cultures in screening trays/seed boxes of size (50X40X7 cm).
- ❖ Fill the Seed boxes with well puddled and manure enriched soil and level. Draw 13 equidistant lines horizontally in the box.
- ❖ Draw two vertical lines in the centre of the box cutting the five lines on either side of the middle horizontal line without touching the two boarder lines and middle horizontal lines.
- ❖ Soak the seed of test entries in the petridishes along with susceptible and resistant checks. Keep the soaked seed in a plastic tray and cover with another tray. Next day, remove the water from the petridishes and allow entries to sprout.
- ❖ Sow 20 test entries in the test entry lines by using forceps. Sow two border rows with susceptible check, TN1 and middle row with resistant check, PTB 33 for BPH and MO1 for WBPH. Sow at least 20 seeds of test entries per each line and 40 seeds of susceptible and resistant checks per line. This layout minimizes the chances of escape of the test entries from insect attack.
- ❖ Keep these seed boxes in big aluminium or fibre trays in the plant growth chambers. 10 days (WBPH) -12 days (BPH) after sowing when the plants are of 3-leaf stage, transfer these seed boxes to the screening chambers and cover with cages made of mylar sheet.
- ❖ Release required number of first instar nymphs on the seedlings so that each seedling gets 6-8 nymphs. Cover these mylar cages with plastic mesh so that the insects cannot escape. This infestation is sufficient to kill the susceptible check in 6-7 days. Monitor plant damage regularly. When TN1 plants on one side show severe damage, rotate the tray by 180° for even reaction. When 90% of plants in the susceptible check, TN1 on both sides are killed, the damage rating of the entries is to be done. Score all the plants in a test entry and checks and score individually, total and average. Score the entries according to Standard Evaluation System (SES 2013) on 0-9 scale developed by IRRI

Reference: IRRI (International Rice Research Institute). 2013. Standard Evaluation System for rice (SES), 5th edition. Los Baños (Philippines): International Rice Research Institute

0	None of the leaves yellow or dried
1	One bottom leaf yellow/dried
3	One or two leaves yellow or one leaf dried
5	One or two leaves dried or one leaf healthy
7	All leaves dried/ yellow but stem green
9	Plant dead

Additional studies for PHSS trial:

- ❖ Honeydew test with 30 day old plants – 5 replications
- ❖ Nymphal survival on 30 day old plants – 5 replications
- ❖ Days to wilt on 30 day old plants – 5 replications

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Name of the trial	:	Gall Midge Population Monitoring Trial (GMPM)
Objectives	:	To monitor the virulence pattern of gall midge population against select donors.
Differentials	:	<ol style="list-style-type: none">1. Purple variety (S. Check)2. Aganni with <i>Gm8</i> gene for resistance3. W1263 with <i>Gm1</i> gene for resistance4. Akshaydhan (<i>Gm4+Gm8 genes</i>)

Experimental Procedure

- Raise nurseries of the differentials (in plastic/GI trays of suitable size) 2 weeks prior to anticipated peak population of gall midge at your location.
- When seedlings are one week old transplant them to about 250 small plastic/clay pots of about 10 cm diameter and 8-10 cm height holding 500 gm soil. Each pot should have 4 hills and each hill with 5 seedlings. Each hill in a pot represents one variety. Label each hill in all the 250 pots. You need 1000 labels. Plant each variety – at predetermined equidistance spots in clockwise order of Purple, Akshaydhan (*Gm4+Gm8*), Aganni and W1263 (Fig. 1)
- Take precautions to protect the plants from natural infestation by gall midge by keeping the pots in a net house or in well lighted cages. Avoid exposing plants to electric light source during night times.
- On the day of infestation, cover each pot with a clear plastic bag (available in any general store). Each bag should just fit the pot at the upper rim. You may use a rubber band or thread to tie, if necessary. Height of bag should be at least 15-20 cm to leave enough space above the plants.
- Plants should be at least 2 week old and/or of three leaf stage on the day of infestation.
- To infest each pot, collect female insects at a light point located near any GM infested plot on the farm. Insects can be collected more easily during peak infestation period between 7.00 and 9.00 pm. Release the insect on to the pot in the bag through a small slit. Care must be taken **to infest each pot with one female only** and seal the slit to prevent escape of the insect.
- To facilitate infestation of all 250 pots on one day, transport the pots covered with transparent plastic bags to the collection site in the evening itself. Use an appropriate aspirator to collect insect by gently sucking into the tube and then release it through the slit into the bag by gently blowing out.

- Keep the infested pots covered with plastic bag back in the net house/cage for two days. On third day, remove the bags, water the plants and provide extra humidity for two more days for egg hatching and maggot establishment. This can be done by a humidifier or by periodic (every 30 mins.) spraying of water using a clean plastic atomizer. Alternatively, keep the pots covered with new plastic bag for one more day after watering the pots.
- Plants are taken care for 3 more weeks until galls develop.

Data recording:

1. When differentials in all the pots show galls, record for each pot, number of gall midge damaged plants for each of the differentials. Record number of galls in Purple variety, Aganni, W1263 and Akshaydhan (*Gm4+Gm8*). At least in 2 to 3 plants record the hypersensitive reaction.
2. Record sex of the insect emerging from galls for each pot. This can be best done by again covering the pots having silver shoots with the polythene sheet prior to adult emergence and noting the sex of emerging insect. Alternative is to examine the puparium left in the exit hole of the gall under binocular microscope. Female puparium is slightly larger than the male puparium Fig. 2. Generally, if each pot is infested by a
3. single female, all the emerging insects from a pot will be of same sex. Hence, noting the sex for the first few emerging insects will be good enough.
4. Report data in the following format :

Pot N o.	No. of galls in				Sex of emerging adults	
	Purple variety	Aganni	W1263	Akshaydhan (<i>Gm4+Gm8</i>)	Male	Female
1						
2						
.						
.						
250						

Seed supply: 100 gm of seeds of each differential is being supplied to the concerned centres viz., Brahmavar, Gangavathi, Jagtial, Moncompu, Nellore, Pattambi, Ragolu, and Warangal.

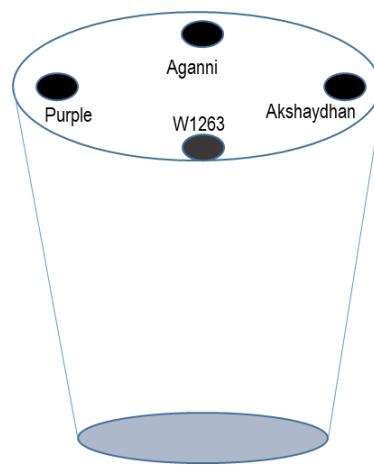


Fig:1 Picture depicting planting of differentials for evaluation in GMPM trial

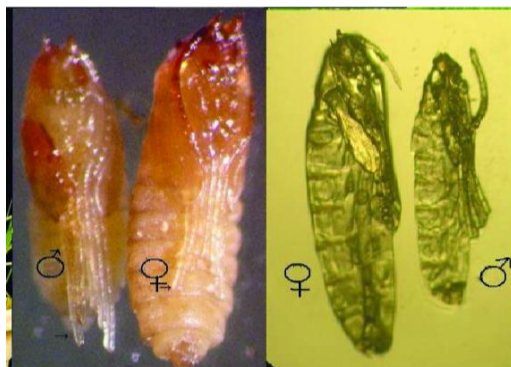


Fig2: Pupa and Puparia of gall midge

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Name of the trial	:	Planthopper Population Monitoring Trial (PHPM)
Objectives	:	To monitor the virulence pattern of brown planthopper populations against selected donors.
Differentials	:	1. TN1 (S. Check) 2. RP2068-18-3-5 with <i>Bph33t</i> resistance gene 3. PTB 33 with bph2, bph3 and bph32 resistance genes 4. RPBio4918-230S with bph39 and bph40 resistance genes 5. Salkathi with two QTLs qBph4.3 and qBph4.4.

Experimental Procedure :

1. Raise nurseries of the differentials (in plastic trays of suitable size) 2 months prior to anticipated peak population of brown planthopper at your location.
2. When seedlings are 15 days old, transplant the seedlings in about 50 big earthen pots of about 5 litres capacity filled with fertilizer enriched puddled soil. In each pot, transplant all 5 gene differentials at equal distance so that atleast 6-7 seedlings should be there for each differential hill. Each hill in a pot represents one differential. Label all the differentials in all the 50 pots. Make the 50 pots into 2 sets of 25 pots each and designate them as SET 1 (25 pots) and SET 2 (25 pots).
3. Take precautions to protect the plants from natural infestation by brown planthopper and other insect pests by keeping the pots in a protected place.
4. 1st set of 25 pots only will be used for BPH infestation and 2nd SET of 25 pots will be used for population development/nymphal survival studies. When the transplanted plants are 45 days old, on the day of infestation, in the 1st SET cover all the 5 differentials together in a pot with a single big ventilated mylar tube made of mylar sheet.
5. To infest each pot, with the help of aspirator, collect one gravid BPH female with bulged abdomen from the field and release carefully onto the plants covered with mylar tube in the 1st SET. Care must be taken to infest each pot with one female only. The open end of the mylar tube should be covered with muslin cloth tied with a rubber band to prevent the escape of the insect.
6. In the 1st set of pots, keep the infested pots covered with mylar tubes in the glasshouse/net house for three days. On third day, remove the mylar tube, collect the brown planthopper females from the plants. Now in each pot, cover each gene differential separately with mylar tubes (5 gene differentials with 5 separate tubes). Water the plants whenever necessary.

Observations to be recorded:

1. After 8-9 days of the release of BPH females, observe the plants in 1st SET of pots for

nymphal hatching. If the nymphal hatching is there in the plants, collect the nymphs present on each differential separately with the help of aspirator, count the number of nymphs present on each differential separately and record in a note book date wise. Meanwhile, take the second set of 25 pots and cover each gene differential separately with a mylar tube. Release the counted nymphs in the aspirator from a gene differential from the first SET (ex PTB 33 in pot 1) onto PTB 33 covered with mylar tube in pot 1 of second SET of gene differentials. Count the nymphs in the first SET of pots at 2 days interval and continue the counting till the nymphs stop hatching. Record the number of nymphs with date whenever they are counted. Release 20 nymphs per replication for nymphal survival in the second set of experiment.

2. In the second SET of pots where the counted nymphs are released, wait for 12-13 days after the first date of release and observe for BPH adult emergence. Count the number of females and males and different winged forms on alternate days pot wise and differential wise and record in a note book date wise.
3. Count all the adults that emerge.
4. Report the data in the following format:

Table 1. No. of nymphs hatched on different gene differentials in 1st SET of pots

Set 1	No. of nymphs																			
Pot No.	TN1				PTB 33				RP2068-18-3-5				RP Bio 4918-230S				Salkathi			
	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt
1																				
2																				
.																				
.																				
25																				

Table 2. No of adults, females and males emerged on different gene differentials in Set 2 pots

Set 2		No. of adults																			
Pot No.		TN1				PTB 33				RP2068-18-3-5				RP Bio 4918-230S				Salkathi			
		dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt	dt
1																					
	F																				
	M																				
	Total adults																				
	Winged females																				
	Winged males																				
	Wingless females																				
	Wingless males																				
2																					
	F																				
	M																				
	Total adults																				

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Coordinated Entomology Trials, *Kharif* 2023

Name of the trial : Evaluation of Insecticides for Gall Midge Management (EIGM)

Objectives : To evaluate insecticides for the management of rice gall midge.
 Variety : Any susceptible high yielding variety leading in that zone.
 Layout : Randomized Block Design.
 Treatments : 14
 Replications : Three
 Plot size : 20 – 25 m²
 Spacing : 20 x 15 cm.
 Seedlings/hill : Two.
 Age of seedlings at planting : 3 1/2 – 4 weeks
 Time of planting : Adjust planting time so as to catch peak incidence of insect pests for exposure to treatment application.
 Fertilizer: : As per the recommendations for specific area to obtain maximum yields.
 Insecticides and application schedule : As per the list given in table below.

Treatment Details:

Crop Stage	Trt. No.	Insecticide	Dosage (formulation)
Seed Treatment alone	T ₁	Thiamethoxam 25% WG	4 g/kg seed
Nursery alone (15 DAS/one week before transplantation)	T ₂	Carbofuran 3% CG (Check1)	33 Kg per ha (3.3 g/m ²)
	T ₃	Fipronil 0.3 GR	25 Kg per ha (2.5 g/m ²)
	T ₄	Chlorantraniliprole 0.4 GR	10 Kg per ha (1.0 g/m ²)
Main field alone (20-25 DAT)	T ₅	Carbofuran 3% CG (Check2)	33 Kg per ha (3.3 g/m ²)
	T ₆	Fipronil 0.3 GR	25 Kg per ha (2.5 g/m ²)
	T ₇	Chlorantraniliprole 0.4 GR	10 Kg per ha (1.0 g/m ²)
	T ₈	Cartap hydrochloride 4% GR	18.75 kg per ha (1.9g/m ²)
Seed Treatment + Main field	T ₉	T ₁ + T ₆	
	T ₁₀	T ₁ + T ₇	
	T ₁₁	T ₁ + T ₈	
Nursery + Main field	T ₁₂	T ₃ + T ₇	
	T ₁₃	T ₃ + T ₈	
Untreated control	T ₁₄	Untreated Control	

Seed Treatment Method:

Soak required quantity of rice seeds in 0.1 per cent (a.i.) Thiamethoxam 25 % WG solution (i.e., 4 g Thiamethoxam 25% WG formulation in one litre of water) on 1:1 W/V basis in a bucket. Remove floating chaff if any. Stir seeds in the solution with the help of a clean bamboo peg or stick for uniform coverage. Leave the seeds in the solution for 24 hours. After 24 hours, decant the insecticide solution and put the soaked seeds in a clean wet cloth bag and tie properly. Incubate the cloth bag containing seed soaked in insecticide solution in a closed chamber (like cement tank) and cover fully with paddy straw. Use sprouted seed after 24 to 48 hours for nursery sowing. Wear hand gloves to avoid contact with insecticide solution and treated seed.

Eg: For treating 1 kg of seed, soak the 1 kg seed in 1 litre of 0.1 per cent Thiamethoxam solution. (0.1 per cent Thiamethoxam solution is prepared by dissolving 4 grams of Thiamethoxam 25% WG formulation in one litre of water).

Observations:**1. Nursery: (per square meter area at the time of transplanting)**

- i. Number of seedlings
- ii. Number of seedlings infested by gall midge/silver shoots.
- iii. Number of dead hearts (DH),
- iv. Number of seedlings damaged by i) Whorl maggot ii) Rice hispa iii) Caseworm iv) other early season insect pests.

2. Main field at 35, 50, and 65 DAT: (per hill, in 10 hills at random in each replication)

- i. Number of tillers
- ii. Number of silver shoots
- iii. Number of leaves and the number of damaged leaves for i) Leaf folder ii) Whorl maggot iii) Rice hispa iv) Caseworm v) Other early season insect pests
- iv. Number of external feeders like leafhoppers, planthoppers, hispa etc.
- v. Number of dead hearts (DH) at 35 DAT.

3. Main field at maturity: (per hill, in 10 hills at random in each replication)

- i. Number of panicle bearing tillers
- ii. Number of white ears

4. Number of natural enemies per hill, in 10 hills at random at 35, 50, and 65 DAT.**5. Grain yield per plot. Exclude 2 border rows on all sides. Mention net plot size and report the yields as Kg/plot.****Special Instructions:**

- Individual plots should be separated by double bunds and channels to regulate water flow and prevent water movement from one plot to other. Maintain not more than 5-7 cm of water in experimental plots.

- Immediately after application of granules, do not drain out water from the plots and impound for 2-3 days.

Experimental Field Plan:

T10	T4	T8
T6	T12	T14
T1	T3	T6
T14	T5	T10
T8	T13	T3
T5	T10	T7
T11	T1	T12
T2	T14	T4
T9	T11	T2
T13	T7	T1
T4	T9	T11
T7	T2	T5
T12	T6	T9
T3	T8	T13

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Coordinated Entomology Trials, *Kharif* 2023

Name of the trial: Prophylactic management of riceoppers in southern black streak virus disease affected areas

Objectives	:	Prophylactic management of riceoppers in southern black streak virus disease affected areas
Variety	:	Leading variety in that zone.
Layout	:	Randomized Block Design.
Treatments	:	3
Replications	:	Four
Plot size	:	20 – 25 m ²
Spacing	:	20 x 15 cm.
Seedlings/hill	:	Two.
Age of seedlings at planting	:	3 1/2 – 4 weeks
Time of planting	:	As per local practice
Fertilizer:	:	As per the recommendations for specific area to realize optimum yields.
Insecticides and application schedule	:	As per the list given in table below.
Centres	:	Ludhiana, Kaul, Chatha, Pantnagar

Treatment Details:

Treatment1: Protected (Module 1)

Seed treatment	Thiamethoxam 25% WG @4g/kg seed
One week before transplanting in nursery	Neem Azal 1% EC @ 2 ml/litre of water
15-20 days after transplanting	Flupyrimin 2% GR @ 6.25 kg/ha
50-55 days after transplanting	Dinotefuran 20% SG @ 200 g/ha

Treatment 2: Protected (Module 2)

One week before transplanting in nursery	Flupyrimin 2% GR @ 6.25 kg/ha
15-20 days after transplanting	Pymetrozine 50% WG @ 300 g/ha
50-55 days after transplanting	Triflumezopyrim 10% SC @ 236 ml/ha

Treatment 3: Untreated (Water spray)

Seed Treatment Method:

Soak required quantity of rice seeds in 0.1 per cent (a.i.) thiamethoxam 25 % WG solution (i.e., 4 g of thiamethoxam 25% WG formulation in one litre of water) on 1:1 W/V basis in a bucket. Remove floating chaff if any. Stir seeds in the solution with the help of a clean bamboo peg or stick for uniform coverage. Leave the seeds in the solution for 24 hours. After 24 hours, decant the insecticide solution and put the soaked seeds in a clean wet cloth bag and tie properly. Incubate the cloth bag containing seed soaked in insecticide solution in a closed chamber (like cement tank) and cover fully with paddy straw. Use sprouted seed after 24 to 48 hours for nursery sowing. Wear handgloves to avoid contact with insecticide solution and treated seed.

Eg: For treating 1 kg of seed, soak the 1 kg seed in 1 litre of 0.1 per cent thiamethoxam solution. (0.1 per cent thiamethoxam solution is prepared by dissolving 4 grams of thiamethoxam 25% WG formulation in one litre of water).

Observations to be recorded:

I. Nursery: (per square meter area at the time of transplanting)

- Number of seedlings
- Number of sucking pests (BPH, WBPH and GLH), if any.
- Number of dead hearts (DH)

II. Main field

For hoppers (BPH, WBPH and GLH):

- Numbers (adults and nymphs) per hill in 10 hills at random in each replication at one day before application of insecticide and 1, 2, & 3 weeks after application of insecticide.
- Numbers of mirid bugs per hill in 10 hills at random in each replication at one day before application of insecticide and 1, 2, & 3 weeks after application of insecticide.
- Numbers of spiders per hill in 10 hills at random in each replication at one day before application of insecticide and 1, 2, & 3 weeks after application of insecticide.

For other major insect pests:

- Number of tillers and number of dead hearts (DH) at 35 DAT.

III. Main field at maturity: (per hill, in 10 hills at random in each replication)

- Number of tillers per hill
- Number of panicle bearing tillers
- Number of white ears

IV. Grain yield per plot. Exclude two border rows on all sides. Mention net plot size and report the yields as Kg/plot.

Special Instructions:

- Individual plots should be separated by double bunds and channels to regulate water flow and prevent water movement from one plot to other. Maintain not more than 5-7 cm of water in experimental plots.
- Immediately after application of granules, do not drain out water from the plots and impound for 2-3 days.

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Coordinated Entomology Trials, Kharif 2023

Name of the trial	:	Optimum Pest Control Trial (OPCT)
Objectives	:	To evaluate the insect pest reaction and yield potential of the most promising cultures with pest tolerance under need based protection and unprotected conditions
Layout	:	Two way Randomized block design
Plot size	:	Minimum 20 - 25 Sq. m.
Spacing	:	20 x 15 cm.
Seedlings/hill	:	Two.
Age of seedlings at planting	:	3 1/2 - 4 weeks
Time of planting	:	Adjust planting time so as to catch up with peak incidence of insect pests.
Fertilizer	:	As per the recommendations for specific area to obtain maximum yields.
Design	:	10 test cultures, 3 replications each, 2 conditions - Protected and unprotected.
Need based protection includes :		<p>a) Protection of nursery from insect pests by applying suitable granules (Fipronil 0.3GR @ 25kg/ha) or spray suitable insecticide on need basis.</p> <p>b) Survey of insect populations in a susceptible variety at 10 days interval to decide on the time of insecticide application.</p> <p>c) Application of suitable insecticide at recommended dosage in all the test cultures as soon as the insect population reaches economic threshold level in the susceptible check, TN1. Report the details of insecticide applications, viz., name of the insecticide, dosage, number and time of insecticide applications and the cost of application.</p> <p>d) In case, stem borer damage is expected at heading stage, one application of insecticide (preferably Cartap hydrochloride 50 WP @1kg/ha</p>

(or) Chlorantraniliprole (Rynaxypyr) 18.5 SC @ 150 ml/ ha should be sprayed just before or at boot leaf stage. In case of planthoppers infestation apply dinotefuran 20SG@200g /ha or Triflumezopyrim 10% SC @235ml/ha (only one spray between 45 – 60 DAT)

No protection treatment : Do not apply any insecticide either in nursery or main field.

Observations:

1. Survey for insect population build up in experimental plots as well as in light traps at 10 days intervals or pheromone traps or any other monitoring system available at your location to decide on the time of insecticide application.
2. Observation on pest damage or population counts should be recorded on 20 plants based on stratified random sampling. Record silver shoot/dead heart counts at 30 and 50 DAT along with total tillers, and white ears at the time of harvest along with total productive tillers. Record population counts per hill for planthoppers at 50, 75 and 100 DAT. Record insect population on 10 hills if ear head bug (gundhi bug) appears in considerable numbers after panicle emergence. Record percent damaged grains also.
3. Data on prevalence of natural enemies in 5 damaged hills may be recorded and reported. Important natural enemies like viz., *Platygaster oryzae*, *Neanastatus* sp and *Paederus* sp for gall midge-; Egg parasitoids and larval parasitoids for Stem borer and leaf folder; mirid bugs; Egg parasitoids like *Anagrus*, *Oligosita* for Planthoppers etc.
4. In Need based protection treatments:
 - a) Record populations one day before for any pest. Observations on plant population or damage may be recorded one day before treatment and 3 days after each application in case of external feeders like leafhoppers, planthoppers, leaf feeding insects. Damage for gall midge and stem borers may be recorded 15 days after each application along with total tillers. Follow the same method for white ears **at the time of harvest along with total productive tillers**. Record damage in the unprotected treatments also at the same time.
 - b) In each replication select 10 random plants and record damaged leaves and total leaves one day before and 10 days after each application for pests like leaf folder, whorl maggot, rice hispa, and other leaf feeding insect pests.

Yield data:

Grain yields should be collected from each replicated plot. Exclude two border rows on all sides. Mention net plot size and report the yields as kg/plot.

Special Instructions :

1. Nursery should be protected from insect pests by applying suitable insecticide.
2. Individual plots should be separated by bunds and channels to regulate water flow and prevent water movement from one plot to other. Maintain not more than 5-7 cm of water in experimental plots.

3. Efforts should be made to prevent drift between treatments while spraying.
 4. Spraying should be done to provide full coverage.
- Please harvest the seed of individual varieties and the seed made be sent to the headquarters.

Optimum Pest control Trial (OPCT) *kharif* 2023

Layout for planting : 10 cultures , 3 replications each, 2 conditions- Protected and unprotected.

R1

With Protection		No Protection
V1		V1
V2		V2
V3		V3
V4		V4
V5		V5
V6		V6
V7		V7
V8		V8
V9		V9
V10		V10

R2

No Protection		With Protection
V3		V3
V6		V6
V7		V7
V1		V1
V8		V8
V5		V5
V4		V4
V2		V2
V9		V9
V10		V10

R3

With Protection		No Protection
V4		V4
V8		V8
V2		V2
V3		V3
V7		V7
V9		V9
V10		V10
V5		V5
V1		V1
V6		V6

Coordinated Entomology Trials, *Kharif 2023 & Rabi 2023-24*

- Name of the trial** : **Influence of Establishment Methods on Pest incidence (IEMP)**
Collaborative trial with Agronomy (WMT 1- Long term weed dynamics in mono/double cropped rice system under different establishment methods)
- Objective** : To assess the influence of different rice establishment methods and weed management practices on insect pest incidence
- Treatments** : Main plot treatments include 3 establishment methods [M1 = Mechanized transplanting/manual transplanting; M2 = Puddled direct seeding (preferably line sowing by drum seeder; M3 = Unpuddled direct seeding (line sowing)]. Sub-plot treatments include S1 (weedy check), S2 (mechanical weeding using weeder), S3 (chemical weed control).
- Locations (19)** : Aduthurai, Chatha, Chinsurah, Chiplima, Gangavathi, Ghaghraghat, Jagdalpur, Malan, Moncompu, Nawagam, Pantnagar, Pattambi, Pusa, Rajendranagar, Titabar

Treatments, replications, design, plot size, variety and layout are as per the Agronomy technical program.

Please consult Agronomist of your centre.

Entomologists will record observations in all the plots

Observations will be taken in 3 establishment methods in all the sub-plots

In three replications of all the establishment methods and sub-plot treatments, record observations at 15-day interval starting from 15 days of planting/sowing.

At each observation, in each replication, select 5 plants at random and record the following:

- 1) Total number of tillers / plant; 2) Total number of leaves/ plant
- 2) Number of dead hearts/ plant; 4) Number of galls/ plant
- 3) Number of damaged leaves (indicate the pest- hispa, leaf folder, whorl maggot, thrips, case worm etc./ plant)
- 4) Panicle bearing tillers / plant; White ears/ plant
- 5) Number of BPH/WBPH/GLH per plant
- 6) Any other pest observed; Natural enemy count

Coordinated Entomology Trials, *Kharif* 2023 & *Rabi* 2023-24

Name of the trial : **Cropping Systems influence on pest incidence (CSIP)**
Collaborative trial with Agronomy (CA/SM 1 – Conservation Agriculture/
System based management practices in rice and rice based cropping
systems (Crop diversification) to utilize resources and enhance the
productivity and profitability).

Objectives : i) To study the effect of cropping systems on carryover of insect pests in
rice
ii) To assess the effect of *rabi* crops on carryover of the pest on next
Kharif rice

Locations (6) : Gangavathi, Ghaghraghat, Karjat, Titabar

Treatments, design, plot size, variety and layout are as per the Agronomy technical program

Entomologists will be taking only observations.

Observations will be taken in all the establishment methods & tillage managements & cropping sequences plots

In three replications of all the establishment methods with residue management and cropping sequences, record observations at 10-day interval starting from 15 days of planting/sowing.

At each observation, in each replication, select 5 plants at random and record the following:

- 1) Total number of tillers / plant
- 2) Total number of leaves/ plant
- 3) Number of dead hearts/ plant
- 4) Number of galls/ plant
- 5) Number of damaged leaves (indicate the pest- hispa, leaf folder, whorl maggot, thrips, case worm etc./ plant)
- 6) Panicle bearing tillers / plant
- 7) White ears/ plant
- 8) Number of BPH/WBPH/GLH per plant
- 9) Any other pest observed
- 10) Natural enemy count
- 11) Record yield
- 12) Also record the carryover of the pest in the cropping sequences (CS1 to CS 4)

Coordinated Entomology Trials, *Kharif 2023 & Rabi 2023-24*

Name of the trial	: Evaluation of pheromone blends for insect pests of rice (EPBI)
Objective	: To evaluate various blends and doses of pheromone compounds for monitoring rice leaf folder and pink and yellow stem borers
Replications	: 3
Plot size	: 1-acre area (these can be placed in any field in the station, seed production plots/ general exhibition plots)
Treatments	: Lures will be sent along with installation details
Locations	: Aduthurai, Coimbatore, Pattambi, Jagdalpur, Navsari, Raipur, Sakoli, Titabar (Leaf folder- 8) Ludhiana, Pattambi, Raipur, Jagtial, Pusa, Chinsurah (Pink and stem borer – 6)
Observations	: 1) Observe number of moths caught in each trap at weekly interval 2) Observe the sex of the moths caught in the trap at each observation 3) Also record field damage caused by rice leaf folder and pink stem borer in the field in which traps were installed

Precautions to be taken:

- 1) Always check the trap after heavy rain/ wind and it should be kept erect
- 2) Place it above the crop canopy for pink stem borer (1 ft above the canopy) and canopy level for rice leaf folder.
- 3) Keep recording the adult catches every week and remove the adults
- 4) Tie the trap with a thread to the bamboo peg for good collection of adults

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Coordinated Entomology Trials, *Kharif 2023 & Rabi 2023-2024*

Name of the Trial: Population dynamics of insect pests and natural enemies in rice ecosystem

Objective: To monitor the populations of insect pests and their natural enemies in rice ecosystem on weekly basis along with weather parameters.

Variety: local popular Susceptible variety

Plot size: 20-25 Sq.m

Spacing: 20 x 15 cm.

Seasons: Kharif and Rabi

No protection in plot: Do not apply any insecticide either in nursery or main field.

Observations:

1. Incidence of different insect pests on 25 random hills at weekly intervals will be recorded along with parasitoid and predatory fauna.
2. Data on stem borer incidence will be recorded from 25 randomly selected hills by counting the total number of tillers, dead hearts and white ears and will be expressed as per cent dead hearts on tiller basis.
3. Data on gall midge incidence will be recorded from 25 randomly selected hills by counting the total number of hills and gall midge damaged plants and total number of tillers and gall midge damaged tillers and will be expressed as per cent plant damage and per cent silver shoot incidence, respectively.
4. Data on Leaf folder incidence or whorl maggot or hispa incidence will be recorded in 25 randomly selected hills by counting the total no. of leaves and leaf folder, whorl maggot, hispa damaged leaves and will be expressed as per cent pest incidence.
5. Data on brown planthopper/WBPH population on 25 hills will be recorded separately. Number of hopper burnt plants in a square meter area prior to harvest will be recorded.
6. Data on natural enemy population will be collected on 25 randomly selected hills per plot
7. **Yield data:** Grain yields will be collected from total plot excluding 2 border rows on all sides in terms of kg/ha.
8. Meteorological data will be collected on day to day basis.

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Coordinated Entomology Trials, *Kharif* 2023 & *Rabi* 2023-24

Name of the trial	: Evaluation of entomopathogens against sucking pests of rice with special emphasis on ear head bugs
Objectives	: To evaluate the entomopathogens against sucking pests of rice
Variety	: Any susceptible high yielding variety.
Layout	: Randomized Block Design.
Treatments	: Five
Replications	: Four
Plot size	: 40 -50 Sq.m
Spacing	: 20 x 15 cm.
Seedlings/hill	: Two.
Age of seedlings at planting	: 3 1/2 – 4 weeks

Observations

1. Survey insect populations in experimental plots as well as at light trap at 10 days intervals to judge the time of insecticide application.
2. Record populations one day before and 3 days after each
3. The population of bugs and plant hoppers will be recorded from 25 hills selected at random at weekly interval starting from 20 days after transplanting
4. Record percent damaged panicles by ear head bugs (Difference between white ears by stem borer and grayish white panicles by ear head bug is that they will not come out easily when pulled).
5. Data on natural enemies in 10 hills may be recorded and reported in appropriate format.

Yield data:

Grain yields should be collected from each plot. Exclude 2 border rows on all sides. Mention net plot size and report the yields as Kg/plot. Or kg/ ha

Treatments	:	T1- <i>Lecanicillium saksenae</i> (1x10⁸ spores/g) @ 5 g/l
	:	T2- <i>Beauveria bassiana</i> (1x10⁸ spores/g) @ 5 g/l
	:	T3- <i>Metarhizium anisopliae</i> (1x10⁸ spores/g) @ 5 g/l
	:	T4- Thiamethoxam 0.2 g/l
	:	T5- Untreated

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Coordinated Entomology Trials, *Kharif 2023 & Rabi 2023-24*

Name of the Trial	Integrated Pest Management (Special)
Objective	To validate location-specific IPM practices from a basket of options available and demonstrate to farmers the management of pests in a holistic way (including insects, diseases and weeds).
Variety	Local popular variety of the region
Plot size	One-acre area. Each acre is to be divided into 5 equal sized units (each unit = one replication) 5 replications.
Replications	
Treatments	Take 3-5 farmers in each centre/location, each farmer representing a replication with at least 1acre area /farmer as IPM plots. Farmers can be selected from same village or different villages

Zone	Locations	Number
Zone I – Hilly areas	1) Khudwani (J&K) 2) Malan (HP) 3) Umiam (Barapani) (ML)	3
Zone II - Northern	4) Pantnagar (Uttarakhand) 5) Ludhiana (Punjab) 6) Kaul (Haryana)	3
Zone III - Eastern	7) Chiplima (Odisha) 8) Chinsurah (WB) 9) NRRI (Cuttack) (OD) 10) Pusa (Bihar) 11) Ghaghraghat/ Masodha (UP)	5
Zone IV – North Eastern	12) Titabar (Assam) 13) Imphal (Lamphalpat), (MN) 14) Arundhutinagar (Tripura)	3
Zone V - Central	15) Rewa (MP) 16) Raipur(CG) 17) Jagadapur (CG)	3
Zone VI - Western	18) Karjat (MH) 19) Sakoli (MH) 20) Nawagam (GJ) 21) Navsari (GJ)	4
Zone VII - Southern	22) Maruteru (AP) 23) Rajendranagar (TS) 24) Aduthurai (TN) 25) Coimbatore (TN) 26) Pattambi (Kerala) 27) Gangavati (KN) 28) Mandya (KN)	7
Total locations		28

Details of the treatments The package of practices to be followed in IPM module in each zone is given below

Zone 1 – Hilly areas

Locations (3): 1) Khudwani (J&K)
2) Malan (HP)
3) Umiam (Barapani) (ML)

Major Insect Pests: Grasshopper, rice hispa, caseworm, stem borers

Major Diseases: Leaf blast, Sheath blight, brown spot, false smut

Major weeds: **Grasses:** *Echinochloa colona*, *Echinochloa crusgalli*, *Panicum sp.* **Sedges:** *Cyperus iria*, *Eleocharis sp.* **BLW:** *Alternanthera sp*, *Monochoria sp*

IPM module for Zone I		
	IPM	FP
Nursery	<ul style="list-style-type: none"> •Seed treatment with Trichoderma (Commercial formulation) @ 10g/kg. Pre-soak the seeds in water for 12 hrs. Take the seeds in a container and add the Trichoderma, coat the seeds with Trichoderma, later allow it for germination in gunny/cloth bag. •Slurry Dry seed treatment: Dissolve the required quantity of fungicide in water to make a slurry. Coat the seeds manually with the prepared fungicide slurry and shade dry for one hour. •Use of resistant or moderately resistant variety •Need based application of bispyribacsodium <u>10% SC @ 0.5ml/L</u> water at 15 days of nursery. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers' whenever you go for observation/visit.</p>
Main field Up to 30 DAT	<ul style="list-style-type: none"> •Transplant seedlings at a spacing of 20 x 15 cm. •Apply balanced fertilizers as per the local recommended dose. •Apply Pretilachlor 500 g ai/ha (or) Anilophos 300 g ai/ha (or) Pyrazosulfuron ethyl 20 g ai/ha (or) Oxadiargyl 80-100 g ai/ha mix with fine sand (50kg/ha) and broadcast it. •Survey for pest incidence and level of damage at weekly interval starting from 15 DAT. •Trimming of bunds for grasshopper management. •Cleaning of bunds to eliminate the alternate hosts for off-season survival of pests and diseases. • If blast/brown spot symptoms seen between 20 to 30 DAT, need based application of carbendazim+ mancozeb combination fungicide. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers' whenever you go for observation/visit.</p>
30 – 60 DAT	<ul style="list-style-type: none"> •Mechanical weeding using conoweeder. •Depending on weed intensity, spray post emergence herbicide triafamone + ethoxysulfuron @ 67.5 g a.i. /ha for 2nd flush of weeds. If only Broad leaf weeds predominate, apply ethoxysulfuron @ 20 g a.i./ha. For herbicide spraying, mix in 500 liters' water/ha and spray by 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers when- ever you go for</p>

	flat Z type nozzle uniformly. It is necessary to maintain standing water (2-3 cm water) in the field. Water should not be let in or let out for 2 days. <ul style="list-style-type: none"> • N top dressing to be taken up as given in protocol using Leaf Color Chart • Blanket spray of NeemAzal @ 3 ml/ liter water and repeat after 10 days' interval • Need based application of Fipronil 0.3G @ 10 kg/ acre depending on the severity of caseworm, hispa and stem borers 	observation/visit
61 – 90 DAT	<ul style="list-style-type: none"> • One prophylactic spray of cartap hydrochloride 50 WP/SP @ 400 g/ acre (or) chlorantraniliprole (Rynaxypyr) 18.5 SC @ 60 ml/ acre (against lepidopterous pests, if incidence crosses ETL value). • Need based application of Propiconazole (1 ml/lit). 	As per the local farmers practice. Please record the practices followed by farmers when- ever you go for observation/visit
> 90 DAT up to harvest	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (1 from each repl.) in this IPM block • Also record the cost involved for each practice/ operation taken in IPM starting from nursery to harvest to estimate cost of cultivation as given in data sheet 	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (5 repl.) in FP field • Also record the cost involved for each practice/ operation taken in FP starting from nursery to harvest to estimate cost of cultivation as given in data sheet

Zone II – Northern

Locations (3): 1) Pantnagar (Uttarakhand)
 2) Ludhiana (Punjab)
 3) Kaul (Haryana)

Major Insect Pests: Planthoppers, stem borers, leaf folder

Major Diseases: Leaf blast, sheath blight, bacterial blight, False smut, brown spot

Major weeds: Grasses, sedges and broad-leaved weeds

IPM module for Zone II		
	IPM	FP
Nursery	<ul style="list-style-type: none"> • Seed treatment with Trichoderma @ 10g/kg. Pre-soak the seeds in water for 12 hrs, take the seeds in a container and add the Trichoderma, coat the seeds with Trichoderma later allow it for germination in gunny/cloth bag • Slurry Dry seed treatment: Dissolve the required quantity of fungicide in water to make a slurry. Coat the seeds manually with the prepared fungicide slurry and shade dry for one hour. 	As per the local farmers practice. Please record the practices followed by farmers' whenever you go for observation/visit.

	<ul style="list-style-type: none"> • Use of resistant or moderately resistant variety • Need based application of bispyribacsodium <u>10% SC @ 0.5ml/L</u> water at 15 days of nursery. 	
Main field Up to 30 DAT	<ul style="list-style-type: none"> • Transplant seedlings at a spacing of 20 x 15 cm. • Cut the tips of leaf blades after removing seedlings from nursery for transplanting in the main field (this practice can be avoided in bacterial blight endemic areas). • Leave alleyways 30 cm after every 2 m or 10 rows • Apply balanced fertilizers as per the local recommended dose. • Apply Pretilachlor 500 g ai/ha (or) Anilophos 300 g ai/ha (or) Pyrazosulfuron ethyl 20 g ai/ha (or) Oxadiargyl 80-100 g ai/ha, mix with fine sand (50kg/ha) and broadcast it. • Grow cowpea, marigold, soybean, green gram or any flowering plant on bunds to attract natural enemies. • Survey for pest incidence and level of damage at weekly interval starting from 15 DAT. • Cleaning of bunds to eliminate the alternate hosts for off-season survival of pests and diseases. • At 15 DAT, install pheromone traps with 5 mg lure @ 3 traps/acre for stem borer monitoring. While installing, make sure that the trap remains 5 inches above the crop canopy. Change the lure after 3 weeks. If the trap catches exceed 30 – 35 adults/trap/week, go for the pesticide application. • Release of <i>Trichogramma japonicum</i> adults against yellow stem borer and <i>Trichogramma chilonis</i> against leaffolder. Release 5 - 6 times @ 40, 000/ acre, starting from 15 days after transplanting. Tricho cards containing 1000 parasitised eggs to be stapled to the underside of leaves at 40 points uniformly distributed across 1-acre area. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers' whenever you go for observation/visit.</p>
30 – 60 DAT	<ul style="list-style-type: none"> • Mechanical weeding using conoweeder. • Depending on weed intensity, spray post emergence herbicide triafamone + ethoxysulfuron @ 67.5 g a.i. /ha for 2nd flush of weeds. If only Broad leaf weeds predominate, apply ethoxysulfuron @ 20 g a.i./ha. For herbicide spraying, mix in 500 liters' water/ha and spray by flat Z type nozzle uniformly. It is necessary to maintain standing water (2-3 cm water) in the field. Water should not be let in or let out for 2 days. • N top dressing to be taken up as given in protocol using Leaf Color Chart. • Blanket Spray NeemAzal @ 3 ml/ liter water and 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers when- ever you go for observation/visit</p>

	<p>repeat after 10 days' interval.</p> <ul style="list-style-type: none"> • Installation of bamboo perches of 2-3 ft height in the field @ 15 to 20 per acre at vegetative stage serve as resting/ landing sites for birds. • Mid season drainage of the field to mitigate planthopper multiplication. • If the stem borer incidence is high, install pheromone traps with 5 mg lure @ 8 traps/acre for mass trapping. Change the lure after 3 weeks. • If sheath blight occurs in more than threshold level, then apply hexaconazole 5 EC (2 ml/lit) or propiconazole 25EC (1 ml/lit) or difenoconazole 25EC (0.5ml/lit) • When the hopper population exceeds 10 – 15 hoppers/hill, apply Triflumezopyrim 10% SC @ 94 ml/ acre between 45 – 60 DAT only once. 	
61 – 90 DAT	<ul style="list-style-type: none"> • One prophylactic spray of cartap hydrochloride 50 WP/SP @ 400 g/ acre (or) Chlorantraniliprole (Rynaxypyr) 18.5 SC @ 60 ml/ acre (against stem borer/leaf folder, if incidence crosses ETL). • In case of severe incidence of planthoppers, apply Pymetrozine 50 WP @ 120 g/ acre (or) Dinotefuran 20 SG @ 80 g/ acre. Do not repeat or use the same insecticide. While spraying, nozzle should be directed to the basal portion of the plants. • For managing post flowering disease, apply propiconazole @ 1 ml/lit • In the false smut endemic areas, if a cool climate prevails at the time of booting/flowering, one prophylactic spray of propiconazole @ 1 ml/lit can be applied. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers when- ever you go for observation/visit</p>
> 90 DAT up to harvest	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (5 repl.) in this IPM block • Also record the cost involved for each practice/ operation taken in IPM starting from nursery to harvest to estimate cost of cultivation as given in data sheet 	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (5 repl.) in this block. • Also record the cost involved for each practice/ operation taken in FP starting from nursery to harvest to estimate cost of cultivation as given in data sheet

Zone III – Eastern

Locations (3): 1) Chiplima (Odisha)
2) Chinsurah (WB)
3) NRRI (Cuttack) (OD)
4) Pusa (Bihar)

5) Ghaghraghat/ Masodha (UP)

Major Insect Pests: Planthoppers, stem borer, gall midge, leaf folder, caseworm, cutworm, panicle mite

Major Diseases: Leaf blast, neck blast, sheath blight, sheath rot, bacterial blight, brown spot, false smut

Major weeds: Grasses, sedges and broad leaved weeds

IPM module for Zone III		
	IPM	FP
Nursery	<ul style="list-style-type: none"> • Seed treatment with Trichoderma @ 10g/kg. Pre-soak the seeds in water for 12 hrs. Take the seeds in a container and add the Trichoderma, coat the seeds with Trichoderma, later allow it for germination in gunny/cloth bag. • Slurry Dry seed treatment: Dissolve the required quantity of fungicide in water to make a slurry. Coat the seeds manually with the prepared fungicide slurry and shade dry for one hour. • Use of resistant or moderately resistant variety • Apply fipronil 0.3 G @ 10 kg/ acre, 5 days before pulling seedlings from nursery for transplantation (in gall midge endemic areas) 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers' whenever you go for observation/visit.</p>
Main field Up to 30 DAT	<ul style="list-style-type: none"> • Transplant seedlings at a spacing of 20 x 15 cm. • Cut the tips of leaf blades after removing seedlings from nursery for transplanting in the main field (this practice can be avoided in bacterial blight endemic areas). • Leave alleyways 30 cm after every 2 m or 10 rows • Apply balanced fertilizers as per the local recommended dose. • Apply Pretilachlor 500 g ai/ha (or) Anilophos 300 g ai/ha (or) Pyrazosulfuron ethyl 20 g ai/ha (or) Oxadiargyl 80-100 g ai/ha, mix with fine sand (50kg/ha) and broadcast it. • Grow cowpea, marigold, soybean, green gram or any flowering plant on bunds to attract natural enemies • Survey for pest incidence and level of damage at weekly interval starting from 15 DAT. • Cleaning of bunds to eliminate the alternate hosts for off-season survival of pests and diseases. • At 15 DAT, install pheromone traps with 5 mg lure @ 3 traps/acre for stem borer monitoring. While installing, make sure that the trap remains 5 inches above the crop canopy. Change the lure after 3 weeks. If the trap catches exceed 30 – 35 adults/trap/week, go for the pesticide application. • Release of <i>Trichogramma japonicum</i> adults against yellow stem borer and <i>Trichogramma chilonis</i> against leaf folder. Release 5 - 6 times @ 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers' whenever you go for observation/visit.</p>

	<p>40, 000/ acre, starting from 15 days after transplanting. Tricho cards containing 1000 parasitised eggs to be stapled to the underside of leaves at 40 points uniformly distributed across 1-acre area.</p> <ul style="list-style-type: none"> • In case leaf blast or brown spot appears in early stage, then apply combination fungicide i.e. carbendazim + mancozeb (@ 2-2.5 gm/lit) 	
30 – 60 DAT	<ul style="list-style-type: none"> • Mechanical weeding using conoweeder • Depending on weed intensity, spray post emergence herbicide triafamone + ethoxysulfuron @ 67.5 g a.i./ha for 2nd flush of weeds. If only Broad leaf weeds predominate, apply ethoxysulfuron @ 20 g a.i./ha. For herbicide spraying mix in 500 liters' water/ha and spray by flat Z type nozzle uniformly. It is necessary to maintain standing water (2-3 cm water) in the field. Water should not be let in or let out for 2 days. • N top dressing to be taken up as given in protocol using Leaf Color Chart. • Blanket spray of NeemAzal @ 3 ml/ liter water at 40 – 45 DAT and repeat after 10 days' interval • Installation of bamboo perches of 2-3 ft height in the field @ 15 to 20 per acre at vegetative stage serve as resting/ landing sites for birds • Mid season drainage of the field to mitigate planthopper multiplication. • If the stem borer incidence is high, install pheromone traps with 5 mg lure @ 8 traps/acre for mass trapping. Change the lure after 3 weeks. • If sheath blight occurs in more than threshold level, then apply hexaconazole 5 EC (2 ml/lit) • If the planthopper population exceeds 10 – 15 hoppers/hill, apply Triflumezopyrim 10% SC @ 94 ml/ acre between 45 – 60 DAT only once. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers when- ever you go for observation/visit</p>
61 – 90 DAT	<ul style="list-style-type: none"> • One prophylactic spray of cartap hydrochloride 50 WP/SP @ 400 g/ acre (or) Chlorantraniliprole (Rynaxypyr) 18.5 SC @ 60 ml/ acre (against lepidopterous pests, if incidence crosses ETL). • In case of severe incidence of planthoppers, apply Pymetrozine 50 WP @ 120 g/ acre (or) Dinotefuran 20 SG @ 80 g/ acre. Do not repeat or use the same insecticide. While spraying, nozzle should be directed to the basal portion of the plants. Application with power sprayer is preferable. • Need based spray of Spiromesifen 240 SC @ 2 ml/ liter in case of severe incidence of panicle mite 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers when- ever you go for observation/visit</p>

	<ul style="list-style-type: none"> • For managing post flowering disease, apply propiconazole @ 1 ml/lit. • In the false smut endemic areas, if a cool climate prevails at the time of booting/flowering, one prophylactic spray of propiconazole @ 1 ml/lit can be applied. 	
> 90 DAT up to harvest	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (1 place in each repl.) in this IPM field • Also record the cost involved for each practice/operation taken in IPM starting from nursery to harvest to estimate cost of cultivation as given in data sheet 	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (5 repl.) in this FP field • Also record the cost involved for each practice/operation taken in FP starting from nursery to harvest to estimate cost of cultivation

Zone IV – North -Eastern

Locations (3): 1) Titabar (Assam)
 2) Imphal (Lamphalpat), (MN)
 3) Arundhutinagar (Tripura)

Major Insect Pests: Stem borer, leaf folder, rice hispa, case worm, cut worm in flooded areas, gundhi bug

Major Diseases: Leaf blast, neck blast, false smut, sheath blight, bacterial blight (Arundhutinagar and Titabar)

Major weeds: Grasses: *Echinochloa crusgalli*, *Hymenachne sp*; **Sedges:** *Cyperus iria*, *Eleocharis sp*; **BLW:** *Alternanthera sp*, *Monochoria sp*

IPM Module for Zone IV		
	IPM	FP
Nursery	<ul style="list-style-type: none"> • Seed treatment with Trichoderma @ 10g/kg. Pre-soak the seeds in water for 12 hrs, take the seeds in a container and add the Trichoderma, coat the seeds with Trichoderma later allow it for germination in gunny/cloth bag • Slurry Dry seed treatment: Dissolve the required quantity of fungicide in water to make a slurry. Coat the seeds manually with the prepared fungicide slurry and shade dry for one hour. • Use of resistant or moderately resistant variety • Need based application of bispyribacsodium 10% SC @ 0.4ml/L water at 15 days of nursery. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers' whenever you go for observation/visit.</p>
Main field Up to 30 DAT	<ul style="list-style-type: none"> • Transplant seedlings at a spacing of 20 x 15 cm. • Cut the tips of leaf blades after removing seedlings from nursery for transplanting in the main field (this practice can be avoided in bacterial blight endemic areas). • Leave alleyways of 30 cm after every 2 m or 10 rows 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by</p>

	<ul style="list-style-type: none"> •Fertilizers should be applied as per the local recommended fertilizer dose. •Apply Pretilachlor 500 g ai/ha (or) Anilophos 300 g ai/ha (or) Pyrazosulfuron ethyl 20 g ai/ha (or) Oxadiargyl 80-100 g ai/ha, mix with fine sand (50kg/ha) and broadcast it. •Grow cowpea, marigold, soybean, green gram or any flowering plant on bunds to attract natural enemies. •Survey for pest incidence and level of damage at weekly interval starting from 15 DAT. •Cleaning of bunds to eliminate the alternate hosts for off-season survival of pests and diseases. •At 15 DAT, install pheromone traps with 5 mg lure @ 3 traps/acre for stem borer monitoring. While installing, make sure that the trap remains above the crop canopy. Change the lure after 3 weeks. If the trap catches exceed 30 – 35 adults/trap/week, go for pesticide application. •Release of <i>Trichogramma japonicum</i> adults against yellow stem borer and <i>Trichogramma chilonis</i> against leaf folder. Release 5 - 6 times @ 40, 000/acre, starting from 15 days after transplanting. Tricho cards containing 1000 parasitised eggs to be stapled to the underside of leaves at 40 points uniformly distributed across 1-acre area. •In case leaf blast or brown spot appears in early stage, then apply combination fungicide i.e. carbendazim + mancozeb (@ 2-2.5 gm/lit) 	<p>farmers' whenever you go for observation/visit.</p>
30 – 60 DAT	<ul style="list-style-type: none"> •Mechanical weeding using conoweeder. •Depending on weed intensity, spray post emergence herbicide triafamone + ethoxysulfuron @ 67.5 g a.i. /ha for 2nd flush of weeds. If only Broad leaf weeds predominate, apply ethoxysulfuron @ 20 g a.i./ha. For herbicide spraying, mix in 500 liters' water/ha and spray by flat Z type nozzle uniformly. It is necessary to maintain standing water (2-3 cm water) in the field. Water should not be let in or let out for 2 days. •N top dressing to be taken up as given in protocol using Leaf Color Chart •Blanket spray of NeemAzal @ 3 ml/ liter water at 40 – 45 DAT and repeat after 10 days' interval •Installation of bamboo perches of 2-3 ft height in the field @ 15 to 20 per acre at vegetative stage serve as resting/ landing sites for birds •If the stem borer incidence is high, install pheromone traps with 5 mg lure @ 8 traps/acre for mass trapping. Change the lure after 3 weeks. •If sheath blight occurs in more than threshold level, 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers when- ever you go for observation/visit</p>

	then apply hexaconazole 5 EC (2 ml/lit)	
61 – 90 DAT	<ul style="list-style-type: none"> • One spray of cartap hydrochloride 50 WP/SP @ 400 g/ acre (or) Chlorantraniliprole (Rynaxypyr) 18.5 SC @ 60 ml/ acre (against stem borer/leaf folder, if incidence crosses ETL). • For managing post flowering disease, apply propiconazole @ 1 ml/lit • Use of decomposing crabs as bait - As the filling of paddy grain starts, locally available crabs can be smashed and put on pointed bamboo sticks in paddy fields as bait to attract gundhi bugs. • In the false smut endemic areas, if a cool climate prevails at the time of booting/flowering, one prophylactic spray of propiconazole @ 1 ml/lit can be applied. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers when- ever you go for observation/visit</p>
> 90 DAT up to harvest	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (1 place in each repl.) in this IPM field • Also record the cost involved for each practice/ operation taken in IPM starting from nursery to harvest to estimate cost of cultivation as given in data sheet 	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (5 repl.) in this FP field • Also record the cost involved for each practice/ operation taken in FP starting from nursery to harvest to estimate cost of cultivation

Zone V – Central

Locations (3): 1) Rewa (MP)
2) Raipur (CG)
3) Jagdalpur (CG)

Major Insect Pests: Stem borer, leaf folder, gall midge, Planthoppers, gundhi bug, panicle mite

Major Diseases: Leaf blast, neck blast, brown spot, sheath blight, sheath rot, false smut, bacterial blight

Major weeds: Grasses, sedges and broad leaved weeds

IPM Module for Zone V		
	IPM	FP
Nursery	<ul style="list-style-type: none"> • Seed treatment with Trichoderma @ 10g/kg. Pre-soak the seeds in water for 12 hrs, take the seeds in a container and add the Trichoderma, coat the seeds with Trichoderma later allow it for germination in gunny/cloth bag. • Slurry Dry seed treatment: Dissolve the required quantity of fungicide in water to make a slurry. Coat the seeds manually with the prepared fungicide slurry and shade dry for one hour. • Use of resistant or moderately resistant variety • Apply fipronil 0.3 G @ 10 kg/ acre, 5 days before pulling seedlings from nursery for transplantation. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers' whenever you go for observation/visit.</p>

	<p>(in gall midge endemic areas)</p> <ul style="list-style-type: none"> •Need based application of bispyribacsodium 10% SC @ 0.5ml/L water at 15 days of nursery. 	
Main field Up to 30 DAT	<ul style="list-style-type: none"> •Transplant seedlings at a spacing of 20 x 15 cm. •Cut the tips of leaf blades after removing seedlings from nursery for transplanting in the main field (this practice can be avoided in bacterial blight endemic areas). •Leave alleyways of 30 cm after every 2 m or 10 rows •Fertilizers should be applied as per the local recommended fertilizer dose. •Apply Pretilachlor 500 g ai/ha (or) Anilophos 300 g ai/ha (or) Pyrazosulfuron ethyl 20 g ai/ha (or) Oxadiargyl 80-100 g ai/ha, mix with fine sand (50kg/ha) and broadcast it. •Grow cowpea, marigold, soybean, green gram or any flowering plant on bunds to attract natural enemies •Survey for pest incidence and level of damage at weekly interval starting from 15 DAT. •Cleaning of bunds to eliminate the alternate hosts for off-season survival of pests and diseases. •At 15 DAT, install pheromone traps with 5 mg lure @ 3 traps/acre for stem borer monitoring. While installing, make sure that the trap remains 5 inches above the crop canopy. Change the lure after 3 weeks. If the trap catches exceed 30 – 35 adults/trap/week, go for the pesticide application. •Release of <i>Trichogramma japonicum</i> adults against yellow stem borer and <i>Trichogramma chilonis</i> against leaffolder. Release 5 - 6 times @ 40, 000/acre, starting from 15 days after transplanting. Tricho cards containing 1000 parasitised eggs to be stapled to the underside of leaves at 40 points uniformly distributed across 1-acre area. •In case leaf blast or brown spot appears in early stage, then apply combination fungicide i.e. carbendazim + mancozeb (@ 2-2.5 gm/lit) 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers' whenever you go for observation/visit.</p>
30 – 60 DAT	<ul style="list-style-type: none"> •Mechanical weeding using conoweeder. •Depending on weed intensity, spray post emergence herbicide triafamone + ethoxysulfuron @ 67.5 g a.i. /ha for 2nd flush of weeds. If only Broad leaf weeds predominate, apply ethoxysulfuron @ 20 g a.i./ha. For herbicide spraying, mix in 500 liters' water/ha and spray by flat Z type nozzle uniformly. It is necessary to maintain standing water (2-3 cm water) in the field. Water should not be let in or let out for 2 days. •N top dressing to be taken up as given in protocol 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers when- ever you go for observation/visit</p>

	<p>using Leaf Color Chart.</p> <ul style="list-style-type: none"> • Blanket spray of NeemAzal @ 3 ml/ liter water at 40 – 45 DAT and repeat after 10 days' interval. • Installation of bamboo perches of 2-3 ft height in the field @ 15 to 20 per acre at vegetative stage serve as resting/ landing sites for birds • Mid-season drainage of the field to mitigate planthopper multiplication. • If the stem borer incidence is high, install pheromone traps with 5 mg lure @ 8 traps/acre for mass trapping. • If sheath blight occurs in more than threshold level, then apply hexaconazole 5 EC (2 ml/lit) • If the planthopper population exceeds 10 – 15 hoppers/hill, apply Triflumezopyrim 10% SC @ 94 ml/ acre between 45 – 60 DAT only once 	
61 – 90 DAT	<ul style="list-style-type: none"> • One prophylactic spray of cartap hydrochloride 50 WP/SP @ 400 g/ acre (or) Chlorantraniliprole (Rynaxypyr) 18.5 SC @ 60 ml/ acre (against stem borer/leaf folder, if incidence crosses ET value). • In case of severe incidence of planthoppers, apply Pymetrozine 50 WP @ 120 g/ acre (or) Dinotefuran 20 SG @ 80 g/ acre. Do not repeat or use the same insecticide. While spraying, nozzle should be directed to the basal portion of the plants. Application with power sprayer is preferable. • Use of decomposing crabs as bait - As the filling of paddy grain starts, locally available crabs can be smashed and put on pointed bamboo sticks in paddy fields as bait to attract gundhi bugs. • For managing post flowering disease, apply propiconazole @ 1 ml/lit • In the false smut endemic areas, if a cool climate prevails at the time of booting/flowering, one prophylactic spray of propiconazole @ 1 ml/lit can be applied. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers whenever you go for observation/visit</p>
> 90 DAT up to harvest	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (1 place in each repl.) in this IPM field • Also record the cost involved for each practice/ operation taken in IPM starting from nursery to harvest to estimate cost of cultivation as given in data sheet 	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (5 repl.) in this FP field • Also record the cost involved for each practice/ operation taken in FP starting from nursery to harvest to estimate cost of cultivation as given in data sheet

Locations (3): 1) Karjat (MH)
 2) Sakoli (MH)
 3) Nawagam (GJ)
 4) Navsari (GJ)

Major Insect Pests: Stem borer, leaf folder, gall midge, planthoppers, cutworm, panicle mite

Major Diseases: Sheath blight, sheath rot, leaf blast, grain discolouration, brown spot

Major weeds: Grasses: *Dactyloctenium sp*, *Echinochloa colona*, *Echinochloa crusgalli*; **Sedges:** *Cyperus difformis*, *Cyperus iridea*; **BLW :** *Alternanthera philoxeroides*, *Bergia capensis*, *Eclipta alba*, *Marsilea quadrifolia*, *Rotala densiflora*, *Sphenoclea zeylanica*

IPM Module for Zone VI		
	IPM	FP
Nursery	<ul style="list-style-type: none"> • Seed treatment with Trichoderma @ 10g/kg. Pre-soak the seeds in water for 12 hrs. Take the seeds in a container and add the Trichoderma, coat the seeds with Trichoderma later allow it for germination in gunny/cloth bag. • Slurry Dry seed treatment: Dissolve the required quantity of fungicide in water to make a slurry. Coat the seeds manually with the prepared fungicide slurry and shade dry for one hour. • Need based application of bispyribacsodium 10% SC @ 0.4ml/L water at 15 days of nursery. • Apply fipronil 0.3 G @ 10 kg/ acre, 5 days before pulling seedlings from nursery for transplantation (in gall midge endemic areas). 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers' whenever you go for observation/visit.</p>
Main field Up to 30 DAT	<ul style="list-style-type: none"> • Transplant seedlings at a spacing of 20 x 15 cm. • Cut the tips of leaf blades after removing seedlings from nursery for transplanting in the main field (this practice can be avoided in bacterial blight endemic areas). • Leave alleyways of 30 cm after every 2 m or 10 rows • Fertilizers should be applied as per the local recommended fertilizer dose. • Apply Pretilachlor 500 g ai/ha (or) Anilophos 300 g ai/ha (or) Pyrazosulfuron ethyl 20 g ai/ha (or) Oxadiargyl 80-100 g ai/ha, mix with fine sand (50kg/ha) and broadcast it. • Grow cowpea, marigold, soybean, green gram or any flowering plant on bunds to attract natural enemies • Survey for pest incidence and level of damage at weekly interval starting from 15 DAT. • Cleaning of bunds to eliminate the alternate hosts for off-season survival of pests and diseases. • At 15 DAT, install pheromone traps with 5 mg lure @ 3 traps/acre for stem borer monitoring. While installing, make sure that the trap remains above 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers' whenever you go for observation/visit.</p>

	<p>the crop canopy. Change the lure after 3 weeks. If the trap catches exceed 30 – 35 adults/trap/week, go for pesticide application.</p> <ul style="list-style-type: none"> • Release of <i>Trichogramma japonicum</i> adults against yellow stem borer and <i>Trichogramma chilonis</i> against leaf folder. Release 5 - 6 times @ 40, 000/acre, starting from 15 days after transplanting. Tricho cards containing 1000 parasitised eggs to be stapled to the underside of leaves at 40 points uniformly distributed across 1-acre area. • In case leaf blast or brown spot appears in early stage, then apply combination fungicide i.e. carbendazim + mancozeb (@ 2-2.5 gm/lit) 	
30 – 60 DAT	<ul style="list-style-type: none"> • Mechanical weeding using conoweeder. • Depending on weed intensity, spray post emergence herbicide triafamone + ethoxysulfuron @ 67.5 g a.i. /ha for 2nd flush of weeds. If only Broad leaf weeds predominate, apply ethoxysulfuron @ 20 g a.i./ha. For herbicide spraying, mix in 500 liters' water/ha and spray by flat Z type nozzle uniformly. It is necessary to maintain standing water (2-3 cm water) in the field. Water should not be let in or let out for 2 days. • N top dressing to be taken up as given in protocol using Leaf Color Chart • Blanket spray of NeemAzal @ 3 ml/ liter water at 40 – 45 DAT and repeat after 10 days' interval. • Installation of bamboo perches of 2-3 ft height in the field @ 15 to 20 per acre at vegetative stage serve as resting/ landing sites for birds. • Mid season drainage of the field to mitigate planthopper multiplication. • If the stem borer incidence is high, install pheromone traps with 5 mg lure @ 8 traps/acre for mass trapping. Change the lure after 3 weeks. • If sheath blight occurs in more than threshold level, then apply hexaconazole 5 EC (2 ml/lit) • If the planthopper population exceeds 10 – 15 hoppers/hill, apply Triflumezopyrim 10% SC @ 94 ml/ acre between 45 – 60 DAT only once. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers whenever you go for observation/visit</p>
61 – 90 DAT	<ul style="list-style-type: none"> • One spray of cartap hydrochloride 50 WP/SP @ 400 g/ acre (or) Chlorantraniliprole (Rynaxypyr) 18.5 SC @ 60 ml/ acre (against stem borer/leaf folder, if incidence crosses ET value). • In case of severe incidence of planthoppers, apply Pymetrozine 50 WP @ 120 g/ acre (or) Dinotefuran 20 SG @ 80 g/ acre. Do not repeat or use the same insecticide. While spraying, nozzle should be directed to the basal portion of the plants. Application with power sprayer is preferable. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers whenever you go for observation/visit</p>

	<ul style="list-style-type: none"> • Need based spray of Spiromesifen 240 SC @ 2 ml/liter in case of severe incidence of panicle mite • For managing post flowering disease, apply propiconazole @ 1 ml/lit 	
> 90 DAT up to harvest	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (1 place in each repl.) in this IPM block • Also record the cost involved for each practice/operation taken in IPM starting from nursery to harvest to estimate cost of cultivation as given in data sheet 	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (5 repl.) in this block • Also record the cost involved for each practice/operation taken in FP starting from nursery to harvest to estimate cost of cultivation as given in data sheet

Zone VII – Southern

Locations (7): 1) Maruteru (AP)
 2) Rajendranagar (TS)
 3) Aduthurai (TN)
 4) Coimbatore (TN)
 5) Pattambi (Kerala)
 6) Gangavati (KN)
 7) Mandya (Karnataka)

Major Insect Pests: Planthoppers, stem borer, leaf folder, gall midge, panicle mite

Major Diseases: Leaf blast, sheath blight, bacterial blight, brown spot, stem rot, neck blast, false smut

Major weeds: Grasses: *Cynodon dactylon*, *Echinochloa colona*, *Echinochloa crusgalli*, *Leptochloa chinensis*, *Panicum repense*, *Panicum tripheron*; **Sedges:** *Cyperus difformis*, *Cyperus iria*, *Cyperus procerus*, *Fimbristylis miliacea*, *Scirpus spp*; **BLW:** *Ammania baccifera*, *Eclipta alba*, *Eclipta prostrate*, *Glinus oppositifolia*, *Lindernia veronicifolia*, *Ludwigia parviflora*, *Spilanthus acmella*.

IPM Module for Zone VII		
	IPM	FP
Nursery	<ul style="list-style-type: none"> • Seed treatment with Trichoderma @ 10g/kg. Pre-soak the seeds in water for 12 hrs take the seeds in a container and add the Trichoderma, coat the seeds with Trichoderma, later allow it for germination in gunny/cloth bag. • Slurry Dry seed treatment: Dissolve the required quantity of fungicide in water to make a slurry. Coat the seeds manually with the prepared fungicide slurry and shade dry for one hour. • Use of resistant or moderately resistant variety • Need based application of bispyribacsodium 10% SC @ 0.5ml/L water at 15 days of nursery. • Apply fipronil 0.3 G @ 10 kg/ acre, 5 days before pulling seedlings from nursery for transplantation. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers' whenever you go for observation/visit.</p>

Main field Up to 30 DAT	<ul style="list-style-type: none"> • Transplant seedlings at a spacing of 20 x 15 cm. • Cut the tips of leaf blades after removing seedlings from nursery for transplanting in the main field (this practice can be avoided in bacterial blight endemic areas). • Leave alleyways 30 cm after every 2 m or 10 rows • Fertilizers should be applied as per the local recommended fertilizer dose. • Apply Pretilachlor 500 g ai/ha (or) Anilophos 300 g ai/ha (or) Pyrazosulfuron ethyl 20 g ai/ha (or) Oxadiargyl 80-100 g ai/ha mix with fine sand (50kg/ha) and broadcast it. • Grow cowpea, marigold, soybean, green gram or any flowering plant on bunds to attract natural enemies • Survey for pest incidence and level of damage at weekly interval starting from 15 DAT. • Cleaning of bunds to eliminate the alternate hosts for off-season survival of pests and diseases. • At 15 DAT, install pheromone traps with 5 mg lure @ 3 traps/acre for stem borer monitoring. While installing, make sure that the trap remains above the crop canopy. Change the lure after 3 weeks. If the trap catches exceed 30 – 35 adults/trap/week, go for pesticide application. • Release of <i>Trichogramma japonicum</i> adults against yellow stem borer and <i>Trichogramma chilonis</i> against leaf folder. Release 5 - 6 times @ 40, 000/acre, starting from 15 days after transplanting. Tricho cards containing 1000 parasitised eggs to be stapled to the underside of leaves at 40 points uniformly distributed across 1-acre area. • In case leaf blast or brown spot appears in early stage, then apply combination fungicide i.e. carbendazim + mancozeb (@ 2-2.5 gm/lit) 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers' whenever you go for observation/visit.</p>
30 – 60 DAT	<ul style="list-style-type: none"> • Mechanical weeding using conoweeder • Depending on weed intensity spray post emergence herbicide triafamone + ethoxysulfuron @ 67.5 g a.i./ha for 2nd flush of weeds. If only Broad leaf weeds predominate, apply ethoxysulfuron @ 20 g a.i./ha. For herbicide spraying mix in 500 liters' water/ha and spray by flat Z type nozzle uniformly. It is necessary to maintain standing water (2-3 cm water) in the field. Water should not be let in or let out for 2 days. • N top dressing to be taken up as given in protocol using Leaf Color Chart • Blanket spray of NeemAzal @ 3 ml/ liter water at 40 – 45 DAT and repeat after 10 days' interval • Installation of bamboo perches of 2-3 ft height in 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers when- ever you go for observation/visit</p>

	<p>the field @ 15 to 20 per acre at vegetative stage serve as resting/ landing sites for birds</p> <ul style="list-style-type: none"> • If the planthopper population exceeds 10 – 15 hoppers/hill, apply Triflumezopyrim 10% SC @ 94 ml/ acre between 45 – 60 DAT only once • If the stem borer incidence is high, install pheromone traps with 5 mg lure @ 8 traps/acre for mass trapping. Change the lure after 3 weeks. • If sheath blight occurs in more than threshold level, then apply hexaconazole 5 EC (2 ml/lit) 	
61 – 90 DAT	<ul style="list-style-type: none"> • One prophylactic spray of cartap hydrochloride 50 WP/SP @ 400 g/ acre (or) Chlorantraniliprole (Rynaxypyr) 18.5 SC @ 60 ml/ acre (against stem borer/leaf folder, if incidence crosses ETL). • In case of severe incidence of planthoppers, apply Pymetrozine 50 WP @ 120 g/ acre (or) Dinotefuran 20 SG @ 80 g/ acre. Do not repeat or use the same insecticide. While spraying, nozzle should be directed to the basal portion of the plants. Application with power sprayer is preferable. • Need-based spray of Spiromesifen 240 SC @ 2 ml/ liter in case of severe incidence of panicle mite • For managing post-flowering disease, apply propiconazole @ 1 ml/lit • In the false smut endemic areas, if a cool climate prevails at the time of booting/flowering, one prophylactic spray of propiconazole @ 1 ml/lit can be applied. 	<p>As per the local farmers practice.</p> <p>Please record the practices followed by farmers when- ever you go for observation/visit</p>
> 90 DAT up to harvest	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (1 place in each repl.) in this IPM field • Also record the cost involved for each practice/ operation taken in IPM starting from nursery to harvest to estimate cost of cultivation as given in data sheet 	<ul style="list-style-type: none"> • Mark 5 X 5 m² area and take yield, at 5 places (5 repl.) in this FP field • Also record the cost involved for each practice/ operation taken in FP starting from nursery to harvest to estimate cost of cultivation as given in data sheet

Observations to be recorded:

- Starting from 15 DAT, observations on pest incidence should be recorded on 5 randomly selected hills (each time hills are selected randomly) in each replication (25 hills/ acre) at weekly interval. (Total of 25 hills in IPM & 25 hills in FP at each observation).
- At each observation, record total tillers, dead hearts, silver shoots, total leaves, damaged leaves, number of planthoppers/ hill as per the data sheet given.
- Also record disease incidence (% disease severity) against Blast (leaf/neck), bacterial blight and other major diseases.
- Also record the following weed observations:

- ✓ Weed population(number/m²) 30, 45 DAT
- ✓ Weed Dry matter production (gm/ m²) of weeds at 30, 45 DAT

Grain yield: Record the yield from 5 places of 5 x 5 m² area from each replication.

Note: In case of insect/ disease infestation, please follow ETL's and control measures should be taken as per the IPM guidelines/protocol given below. Inform/consult concerned PI/scientist in case of severe infestation or when in doubt about action to be taken.

IIRR IPM team (Note: You can contact anyone at any time)

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A. Protocol for effective weed management in IPM Special trial (in IPM treatment)

Since the trial is being laid out in irrigated ecology, weed management both in nursery and main field are equally important.

1) Nursery

- i. Maintain water level to avoid weeds
- ii. In weed intense areas, apply Butachlor @25ml/250 m² nursery area or Pretilachlor+ safener @ 60ml/250 m² nursery area at 8-10 days after sowing seed in nursery beds
- iii. Raising nursery in strips of 1 m wide and leaving water canal of 0.25 m in between will help in intercultural operations

2) Main field: Immediately after transplanting within a week

* Liquid formulation of new herbicides can be applied by mixing with sand or by foliar spray, respectively, within first week after transplanting by following the procedure outlined hereunder.

* Required quantity of herbicide (Butachlor @3 liters/ha or Pretilachlor @1250-1500 ml/ha or Anilophos 1250-1500 ml/ha or Metsulfuron methyl+chlorimuronethyl (Almix)@20g/ha) mixed with fine sand (50kg/ha) and broad casted. Or mixed in 500 liters' water/ha and spray by flat Z type nozzle uniformly within 3 to 7 days after transplanting. It is necessary to maintain standing water (2-3 cm water) in the field.

Do not remove or let in water at least 48 hours after application of herbicide.

* **Note** that under thorough land preparation and proper water management conditions this step may not be required. Take a decision on 2nd day after transplanting based on land levelling and water supply status.

Post-emergence application:

*Broad spectrum weed control – Bispyribasodium @ 250ml/ha after 1 month of planting at 2-3 leaf stage of weeds- spot application or Chlorimuron + Metsulfuron-methyl (Grasses, Sedges and Annual BLW) @ 20 gm/ha

* If Broad leaf weeds predominate, apply 2, 4-D Na salt @ 1250-1500 g/ha after 1 month of planting

* If grasses predominate, apply Cyhalofopryl @1000 m/ha at 15-20 DAT or Fenoxaprop p ethyl @ 800-1000ml/ ha after 1 month of planting.

Fertilizer management: Apply top dressing nitrogen based on Leaf Color Chart (modified IIRR - LCC) supplied by IIRR. The instructions to use LCC are given on backside of LCC.

Observation to be recorded under IPM plot as well as in Farmers Practice plots:

Monitor at regular interval weed growth (Group wise no. of weeds i.e., grasses, sedges and broad leaves weeds) in 1 m² area in each replication with the help of a quadrat. Collect all the weeds, dry them in oven at 60⁰ C for constant dry weight and record dry weight at 20, 40, 60 DAT.

- Weed population (number/m²) 30, 45 DAT
- Weed Dry matter production (gm/ m²) of weeds at 30, 45 DAT
- Observe the changes in weed flora

B. Protocol for effective disease management in IPM Special trial (in IPM treatment)

1. Seed Treatment: (can be taken up as prophylactic)

- Seed treatment with Trichoderma @ 10g/kg. Pre-soak the seeds in water for 12 hrs, take the seeds in a container and add the Trichoderma, coat the seeds with Trichoderma later allow it for germination in gunny/cloth bag.

The cloth bag should then be incubated in closed chamber (like cement tank) and should fully covered with paddy straw. After 24 to 48 hours, the seeds will germinate and the germinated seeds can be used for nursery sowing. Use of hand gloves is must at the time of seed treatment and transfer of seeds from bucket to cloth bags.

Most of the diseases appear in the maximum tillering stage onwards

Blast: If still there is incidence of blast in the nursery, then give one spraying with tricyclazole 75 WP @ 0.6 g/l or iprobenphos 48 EC @ 2g/l or isoprothiolane 40 EC @ 1.5 ml/l or carpropamid 30 SC @ 1 ml/l or carbendazim 50 WP @ 1 g/l or kasugamycin 3 SL @ 2.5 g/l or Epoxyconazole 125 g/l + carbendazim 125 g/l @ 0.5 ml/l.

Sheath blight: Sheath blight in general starts at the tillering to maximum tillering stage. Many cases, it has been noticed that the disease appears near the bund (probably from the infected weed hosts or inoculum present in the infected straw kept in the bunds or the sclerotia floating on water and accumulated near the bunds) and then progresses inwards. Regular surveillance is must and if the initiation of the disease is seen in any parts especially near the bunds, then one spraying can be given especially in the affected area. The sprayings can be done with the chemicals like validamycin 3L @2.5 ml/l or propiconazole 25 EC @ 1 ml/l or hexaconazole 5 EC @ 2 ml/l or carbendazim 50 WP @ 1g/l or thifluzamide 24 SC @ 30 g a.i/ ha.

Bacterial blight : The disease appears initially in patches and near the shades. If bacterial blight symptoms are noticed, delay the next top dressing.

Brown spot: Under irrigated ecosystem, if the fields are well managed and if fertilizer application is balance, then brown spot will not be a big problem. Moreover, seed treatment with carbendazim will take care of brown spot. However, still if it comes in some of the pockets in plots then, sprayings with chemicals like carbendazim 50 WP @ 1g/l or chlorothalonil 75 WP @ 2g/l or combination of carbendazim (12%) and mancozeb (63%) @ 1.5-2 g/l or mancozeb 75 WP @ 2g/l can be done.

Foot Rot (Bakanae): Generally, seed treatment will take care of the seed borne inoculum of the fungus. However, if it is observed then one spraying with carbendazim (0.1%) will take care of the disease.

Stem Rot: Though it is minor disease, it can cause havoc in association with the BPH infestation. If stem rot symptoms are seen, then one spraying with Iprobenphos 48 EC @ 2g/l or thiophanate methyl 70 WP @ 1 g/l or isoprothiolane 40 EC @ 1.5 ml/l can be done.

One need based application (based on the disease history of the location) with 0.1% propiconazole or Nativo (0.4 g/l) around flowering will take care of false smut, grain discolouration and sheath rot diseases.

Economic Thresholds Suggested for application of fungicides

S.No	Disease	ETL
1	Foliar blast	3-5 lesions/leaf
2	Brown spot	2-3 spots/leaf & 2-3 infected plants/ m ²
3	Sheath blight	Lesions of 5-6 mm in length & 2-3-infected plants/m ²
4	Sheath-rot	Lesion length 2-3 mm on sheath & 3-5 infected plants/m ²
5	Bacterial blight	2-3 infected leaves/m ²
6	Tungro	1 tungro infected plants/m ² & 2 GLH/hill (in fungus endemic areas)
7	Neck blast	2-5 neck infected plants/m ²

C. Protocol for effective insect pest management in IPM Special trial (in IPM treatment)

Following information on major pests will help to decide on appropriate IPM interventions

Planthoppers

The pest generally appears 45 to 50 days after planting. Adults and nymphs suck the sap at the base of the tillers, resulting in yellowing and drying of the plants. Infestation spreads in concentric circles and in severe cases the affected field gives a burnt appearance. Provision of alley ways leads to change in micro-climate and helps in monitoring pest population and pesticide application. Regular surveillance is a must starting from 40 DAT. Walk along the alleyways and observe on either side at the base of plants for planthoppers. If the population exceeds ETL, go for suggested measures given. In BPH endemic areas, go for mid-season drainage to prevent population build-up.

Stem borers

This pest may appear even in nursery and in main field during any stage of the crop. Adult moths are seen resting on the leaf tip during early hours of the day or egg masses are seen on the stem and leaf. The pest has a patchy distribution resulting in a patch of dead hearts/ white ears depending on the stage of the crop. Installing pheromone traps for monitoring the pest is effective way of tracking the pest. Install 8 traps/ha with 5 mg lure such that trap remains above crop canopy. The trap catches are monitored at weekly interval to know the pest build-up. When trap catches exceed 30-35 moths/trap/week, go for suggested measures. Change the lure after 25 days as it loses its effectiveness. If the stem borer incidence is high, mass trapping can also be done by the installation of 20 traps / ha.

Gall midge

The pest may appear in the nursery or in the main field up to active tillering stage. Galls or silver shoots appear after 4 weeks of adult appearance and egg laying. If pest damage exceeds ETL, resort to control measures as suggested.

Defoliators

Most of the defoliators like leaf folder, case worm, green horned caterpillar, skipper, semi-looper appear immediately after transplanting. Go for regular scouting and only if pest damage exceeds ETL, go for suggested control measures.

Based on the periodic observation compute average pest damage in IPM plot and determine if the damage has crossed Economic threshold level.

Economic Thresholds Suggested for application of insecticides

S.No	Insect pest	ETL	Recommended Insecticides
1	Stem borer	10 % dead hearts or one adult moth or one egg mass per sq. m or >30 moths/pheromone trap/week	Cartap hydrochloride 4G @ 8 kg/ acre (or) Chlorantraniliprole (Rynaxypyr) 0.4 G @ 4 kg/ acre (or) Spray any of the following chemicals: cartap hydrochloride 50 WP/SP @ 400 g/ acre (or) Chlorantraniliprole (Rynaxypyr) 18.5 SC @ 60 ml/ acre
2	Leaf folder	2 damaged leaves per hill with a live larva.	
3	Gall midge	5 % silver shoots	Fipronil 0.3 G @ 10 kg/ acre
4	Planthoppers	10 -15 insects/hill at vegetative stage; 20 insects/hill at later stage.	Apply Triflumezopyrim 10% SC @ 94 ml/ acre between 45 – 60 DAT only once. Apply Dinotefuran 20 SG @ 80 g/ acre (or) Pymetrozine 50 WP @ 120 g/ acre. Do not repeat or use the same insecticide. While spraying, nozzle should be directed at the basal portion of the plants. Application with power sprayer is preferable.

Note: Do not apply synthetic pyrethroids like deltamethrin, cypermethrin, lambda cyhalothrin, either alone or in combination of other insecticides in rice crop as they cause resurgence of planthoppers

D. Operational guidelines for implementing IPM (Special) trial

It is envisaged that IPM (special) trial may be implemented in ‘On-line real-time’ mode. Hence it is essential that all the team leaders of the concerned AICRIP centre’s are in touch with IIRR team and coordination unit on almost daily basis.

IPM is obviously a knowledge intensive technology and its impact depends on timely and informed decisions. Periodic surveillance at weekly interval is the core activity of the Trail and needs to be religiously followed. It is desirable that entire team of scientists visit the experiment site together, as often as possible, during this surveillance. If not, at least a representative of the scientist may accompany the team.

During any of the surveillance, if the pest damage crosses threshold, IPM interventions need to be decided within 24 h in consultation with the IIRR team. If response is not available from IIRR within this time, local decision may be taken and IIRR be informed of this. Impact of such specific intervention needs to be monitored through subsequent surveillance visit.

It is also important to timely record and report farmer's practices being followed in FP plots. This information may also be forwarded to IIRR unit.

Coordinated Entomology Trials, *Kharif 2023 & Rabi 2023-24*

LIGHT TRAP COLLECTION OF INSECTS (LT)

Objective	: To monitor on long term basis fluctuations in the populations of insect pests and their natural enemies.
Light Trap Design	: Old light trap of the centre to be continued (Mention the type of light trap installed, type of bulb and wattage of bulb used) – Please note, ❖ 200 W incandescent bulb should be used
Reporting data:	<ul style="list-style-type: none">• No. of insects collected in each trap be recorded separately daily, focusing on major insect pests and natural enemies of your region.• Send raw data for entire year using MS Excel Data sheet template for light trap data for processing at DRR• Light trap data are needed for the entire year though there may be a single rice crop at your centre.• Mention the prevailing cropping system in the area
Additional Information	Report the date of planting of rice crop in the adjacent area of the light trap, specify variety and growth stage for each month.

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Coordinated Entomology Trials, *Rabi* 2023-24

Name of the trial	National Screening Nurseries (NSN) Boro
Objective	To note the reaction of boro entries in initial /advanced yield trials against insect pests.
Entries	NSN(Boro) consists of IVT and AVT entries for Boro region (Rabi 2023-24)
Replications	One.
Planting date	Adjust time of planting so as to catch up with peak pest pressure.
Spacing	20 x 15 cm.
Age of seedlings	3 - 3 1/2 weeks.
Seedlings/hill	One.
Check variety	TN 1
Plot size	Each entry one row of 20 hills.
Fertilizer	Apply fertilizers according to local recommendations to get higher yields (more N may be top dressed to get higher infestation).

Observations:

- 1) Record observations on two major pests only.
- 2) Refer instruction sheets of earlier trials *viz.*, PHS, GMS, LFST, SBST and MRST for detailed guidelines to record pest incidence/damage.
- 3) Entries may be scored on 0-9 scale as per Standard Evaluation System of IRRI, Philippines. **If SES is not followed, please indicate that it's done by visual scoring on a relative basis.**

N.B: Record data separately for each of the pests and indicate clearly units of observation, pest involved and time of recording data.

Special Instructions:

- Do not apply any insecticide either during nursery or in the main field.
- Evaluations may be carried out under greenhouse conditions at the identified centres for the specified pest.



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