ALL INDIA COORDINATED RESEARCH PROJECT ON RICE (AICRPR)

Entomology Technical Programme
Kharif 2024 *& Rabi* 2024-25

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

Contents

Trial Allottment Star Sheet - *Kharif* 2024

Sl.No.	Location	PHS	GMS	LFST	SBST	MRST	NSN-1	NSN-2	NSN-H	NHSN	GMBT	PHSS	GMPM	PHPM	STEP	PMRH	EDAPM	BIPH	IEMP	PINF	EPBI	EELP	IPMDSR	PDPNE	LT	TOTAL
1	Aduthurai	*		*	*	*		*			*	*			*			*	*		*		*	*	*	14
2	Ambikapur		*		*	*	*				*				*											6
3	Arundhutinagar			*	*																		*			3
4	Bapatla			*																			*	*		3
5	Brahmavar		*	*		*	*				*		*				*					*			*	8
6	Chatha			*		*			*						*	*			*	*					*	8
7	Chinsurah			*	*	*		*		*									*	*	*	*		*	*	11
8	Chiplima		*		*	*	*	*			*				*				*	*		*		*	*	12
9	Coimbatore	*				*	*	*	*	*		*		*	*		*				*	*	*	*	*	14
10	Cuttack	*		*							*	*										*				5
11	Gangavathi	*	*			*	*	*			*	*	*	*	*		*	*	*	*		*	*	*	*	18
12	Ghaghraghat				*			*		*									*	*				*	*	7
	Hazaribagh(CTC)					*																				1
13	Jagdalpur		*	*		*	*	*			*				*				*		*			*	*	11
14	Jagtial	*	*								*		*								*			*	*	7
15	Karaikal			*																	*			*	*	4
16	Karjat			*				*												*		*	*	*	*	7
17	Kaul			*				*								*				*		*	*	*	*	8
18	Khudwani					*			*											*				*	*	5
19	Kurumbapet																									0
20	Ludhiana	*		*	*	*	*	*	*	*		*		*		*	*	*			*	*	*	*	*	17
21	Malan			*		*		*	*										*					*	*	7
22	Mandya	*			*	*	*	*		*		*					*			*		*	*	*	*	12
23	Maruteru	*	*			*	*	*	*	*	*	*			*					*	*			*	*	14
24	Masodha			*		*	*																	*	*	5

Trial Allottment Star Sheet - *Kharif* 2024

Sl.No.	Location	PHS	GMS	LFST	SBST	MRST	NSN-1	NSN-2	NSN-H	NHSN	GMBT	PHSS	GMPM	PHPM	STEP	PMRH	EDAPM	BIPH	IEMP	PINF	EPBI	EELP	IPMDSR	PDPNE	LT	TOTAL
25	Moncompu		*	*	*		*	*		*	*		*						*	*	*	*		*	*	14
26	Navsari			*	*	*	*	*									*				*	*	*	*	*	11
27	Nawagam	*		*	*	*	*			*						*	*		*					*	*	11
28	Nellore		*	*	*	*					*		*											*	*	8
29	New Delhi	*										*		*				*						*		5
30	Pantnagar	*			*	*	*	*	*	*		*		*		*	*		*	*				*	*	14
31	Pattambi		*	*	*	*				*	*		*		*				*	*				*	*	12
32	Pusa				*	*	*	*											*		*			*		7
33	R. Nagar	*		*	*	*	*			*		*			*		*		*		*		*	*	*	14
34	Ragolu										*		*								*		*	*	*	6
35	Raipur	*			*	*	*			*		*				*	*			*	*	*		*	*	13
36	Ranchi		*			*				*	*											*		*		6
37	Rewa			*		*				*					*									*	*	6
38	Sakoli	*	*			*	*				*										*					6
39	Titabar			*	*		*				*								*	*	*			*	*	9
40	Warangal	*	*			*	*				*	*	*		*									*	*	10
Total		15	13	22	18	28	20	17	7	14	17	12	8	5	12	6	10	4	15	15	16	14	12	33	31	364

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

Rabi 2024-25								
Sl.No.	**Location**	**SBST**	**MRST**	**NSN (Boro)**	**EPBI**	**EELP**	**IPMDSR**	Total
1	Aduthurai							
2	Arundhutinagar			*				1
3	Bapatla	*						1
4	Brahmavar							
5	Chatha							
6	Chinsurah	*		*				2
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	*		*			*	3
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	1	6	3	1	1	19

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Coordinated Entomology Trials, *kharif* 2024

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	:	1. Specific site & date visited – District, Mandal (Taluk), village (Give specific GPS coordinates). 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) 7. Any other production constraints noticed *viz*., drought, flood, diseases etc.
Desirable additional information in respect of severely damaged field(s)	:	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 intimate Pr. Scientist & Head, Entomology through e-mail, 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 to Pr. Scientist & Head, Entomology through e-mail latest by 15th and 30th of every month

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 buildup 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.** 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^{O} 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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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, SM92 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	:	• 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. be indicated

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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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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. If nil damage observed record at 75 DAT.

- 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 1st leaf.
3	Rolling of terminal 1/3 - 1/2 area of 1st and 2nd leaves.
5	Rolling of terminal 1/2 area of 1st, 2nd and 3rd 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 for each column or observations **along with the age of the crop and date of observations.**
- 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.

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 2024*

Name of the trial	:	**National Screening Nurseries (NSN)**
Objective	:	To note the reaction of entries in initial/advanced yield trial 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
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.

2. Insect Biotype Studies

Name of the trial	:	**Gall Midge Biotype Trial (GMBT)**
Objectives	:	To monitor prevalence, distribution and occurrence of gall midge populations 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 DAT, 50 DAT and 75 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.
- Please record observations from same plants both percent damaged plants and silver shoots
- 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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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^{O} 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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Coordinated Entomology Trials, *Kharif* 2024

Name of the trial : **Gall Midge Population Monitoring Trial (GMPM)**

Objectives : To monitor the virulence pattern of gall midge populations against select donors.

Differentials :
1. Purple variety (S. Check)
2. Aganni with *Gm8* gene for resistance
3. W1263 with *Gm1* gene for resistance
4. IBT WGL 2 (*Gm4+Gm8 genes)*

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 one 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 IBTWGL 2 (*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 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.
3. Report data in the following format:

	AGANNI (1)					IBT WGL2 (2)					W 1263 (3)					PURPLE (4)			
Pot #	No. of plant	No. with Silver	Sex of the emerging insect			No. of plants tested	No. with Silver	Sex of the emerging			No. of plants	No. with Silver	Sex of the emerging			No. of plants tested	No. with Silver Shoots	Sex of the emerging	
			Male	Female				Male	Female				Male	Female				Male	Female
1																			
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**.**

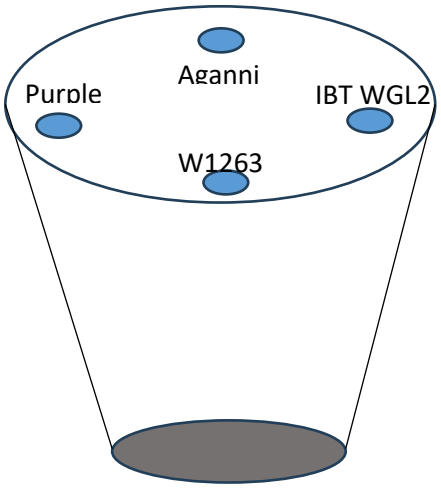

Fig:1 Picture depicting planting of differentials for evaluation in GMPM trial

Fig2: Pupa and Puparia of gall midge

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Coordinated Entomology Trials, *Kharif* 2024

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 *Bph33t* 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																			
-	Winged females																			
-	Winged males																			
	Wingless females																			
	Wingless males																			
25																				

Seed supply: Seed material of each differential is being supplied to the concerned centres *viz*., Pantnagar, PAU Ludhiana and Gangavathi.

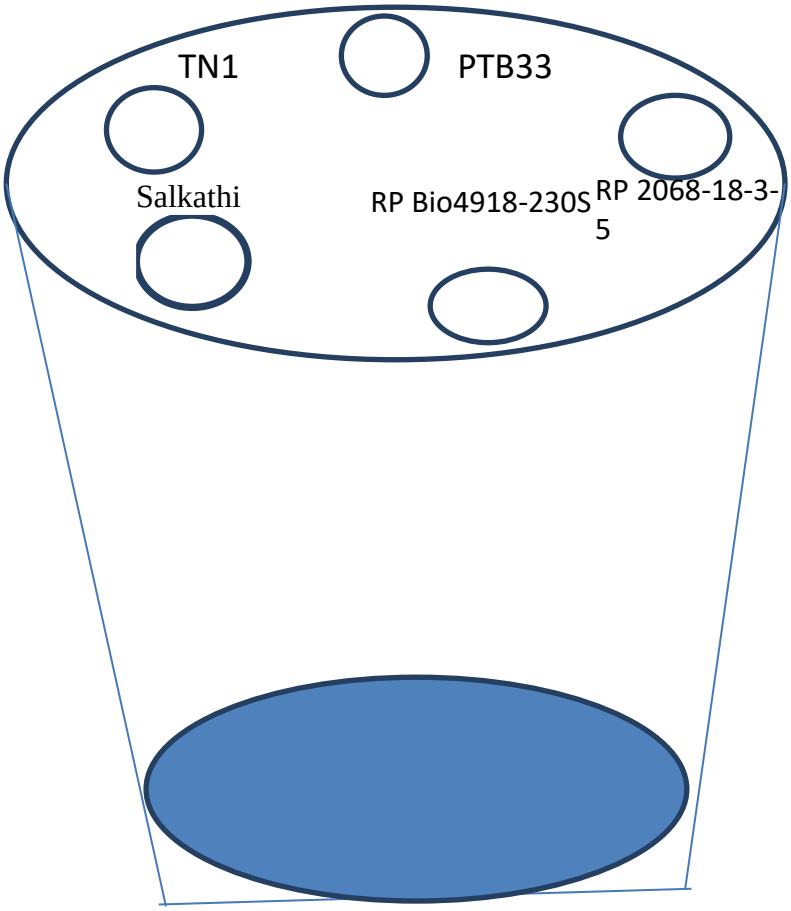

Fig:1 Picture depicting planting of differentials in PHPM trial

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Coordinated Entomology Trials, *Kharif* 2024

Name of the trial: Seed Treatment for management of early season insect pests of rice (STEP)

Objectives	:	To evaluate the efficacy of seed treatment with insecticides for the management of early season insect pests of rice.
Variety	:	Locally preferred variety
Layout	:	Randomized Block Design.
Treatments	:	5
Replications		4
Plot size	:	20 to 25 m^2
Spacing	:	20 cm x 15 cm.
Age of seedlings at planting	:	3 1/2 – 4 weeks
Fertilizer:	:	As per the recommended package of practices.
Insecticides and application schedule	:	As per the list given in table below.
Target pests	:	Early season pests (hispa, whorl maggot, caseworm, thrips, gall midge, stem borer and any other early season pests)

Treatments:

Trt. No.	Insecticide	Dosage (formulation)
T1	Carbosulfan 25 %DS	60g/kg seed
T2	Chlorantraniliprole 50% W/w FS	6 ml/kg seed
T3	Thiamethoxam 70 % WS	7.5 g/kg seed
T4	Imidacloprid 18.50 % + Hexaconazole 01.50 % FS	10g/kg seed
T5	Untreated Control	

Observations:

1. **Nursery (per square meter area before 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 3 and 5 weeks after transplanting (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 a) Leaf folder b) Whorl maggot c) Rice hispa d) Caseworm e) Other early season insect pests
iv. Number of external feeders like leafhoppers, planthoppers, hispa, etc.
v. Number of dead hearts (DH) at 3 and 5 weeks after transplanting.

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 3 and 5 weeks after transplanting.

5. Grain yield per plot. Exclude 2 border rows on all sides. Mention net plot size and report the yields as Kg/plot.

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Coordinated Entomology Trials, *Kharif* 2024
Name of the trial: Prophylactic management of rice hoppers

Objectives	:	Prophylactic management of rice hoppers 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 on 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 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 45 days after transplanting.

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 theyields 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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Name of the trial	**:**	**Evaluation of drones for spraying of agrochemicals (herbicides, insecticides, and fungicides) in rice pest management (EDAPM)- *Kharif*, 2024 (Multi-disciplinary trial –Agronomy, Entomology and Pathology)**

Objectives:

- To evaluate the efficacy and economics of drone based spraying of herbicides, insecticides and fungicides for the management of weeds, major insect pests and diseases of rice.

Locations (11):

Pantnagar	Ludhiana	Raipur	Coimbatore	ICAR-IIRR	Gangavathi
Mandya	R.Nagar	Navsari	Nawagam	Brahmavar	

Experimental Details:

Variety	:	Local susceptible variety
Layout	:	Randomized Block Design.
Treatments	:	3
Plot size	:	Minimum 1000 m^2 for each treatment (more is better)
Spacing	:	20 cm x 15 cm.
Age of seedlings at planting	:	3 1/2 – 4 weeks
Time of planting	:	Adjust planting time so as to coincide with the peak incidence of pests (weeds, insect-pests and diseases).
Fertilizer:	:	As per the recommended package of practices.
Pesticides and application schedule	:	As per the list given in table below.
Target pests	:	**Insects: Yellow stem borer** **Diseases: Sheath blight and blast** **Weeds: All weeds**

Spray parameters:

1. Drone type: Hexacopter

2. No. of spray nozzles: Four

3. Spray nozzle type: Flat fan

Spray angle of nozzle tip: 110º angle

4. Spray rate: 10 liters spray solution per acre at maximum tillering stage, whereas, 16 liters at PI to booting stage.

5. Drone speed:5 m/s

6. Spraying height: 2.5meters above crop canopy

7. Spray timing: 6.00 to 9.00 a.m. and 3.00 to 6.00 p.m.

8. Wind velocity at the time of spraying should be less than 3 m/s

9. Do not spray during the time of flowering (9-00 to 11-00 a.m.).

Note: Before taking up spraying in the research plot, calibrate the drone to deposit 10 litres of spray solution in the one acre of cropped area within the above mentioned spray parameters. Preferably select the plots with more length (minimum 25 m) in order to achieve the drone speed of 5 m/sec and at least 3-4 loops of drone spraying in each treatment. Initially, map each treatment and spray in autonomous mode. Type certified (DGCA) agri-drone should be used for conducting the experiment as respective location.

Treatment Details:

Treatment	**Spraying Method**	**Crop Stage**		**Insecticide (formulation per acre)**	**Dilution per acre**
T1	Drone	Within 5 DAT	Herbicide	Pretilachlor @600 - 750 l/acre	10 litres of water at maximum tillering stage, 16 liters at PI to booting stage
		Maximum tillering stage	Herbicide	Triafamone 20%+ethoxy-sulfuron l0% WG @90 g/acre	
			Fungicide +insecticide (Tank mix)	Tebuconazole 50% + trifloxystrobin 25% WG @ 80 g/acre	
				+Isocycloseram 18.1% W/W SC @ 120 ml/acre	
		Booting stage	Fungicide +insecticide (Tank mix)	Picoxystrobin 7.05% + propiconazole 11.7% SC @400 ml/acre	
				Chlorantraniliprole 18.50 % SC @60ml/acre	
T2	Battery operated Knapsack sprayer	Within 5 DAT	Herbicide	Pretilachlor @600 - 750 l/acre	500 litres of water depending on the crop canopy
		Maximum tillering stage	Herbicide	Triafamone 20% + ethoxysulfuron l0% WG @90 g/acre	
			Fungicide +insecticide (Tank mix)	Tebuconazole 50% + trifloxystrobin 25% WG @ 80g/acre	
				+Isocycloseram 18.1% W/W SC @ 120 ml/acre	
		Booting stage	Fungicide +insecticide (Tank mix)	Picoxystrobin 7.05% + propiconazole 11.7% SC @400 ml/acre /ha	
				Chlorantraniliprole 18.50 % SC @60 ml/acre	
T3	Untreated control			Untreated control (water spray with drone	10 litres of water at maximum tillering stage, 16 liters at PI to booting stage

Experimental Design:

- Total Experimental area: 3000m^2 (Minimum)
- Divide total area into three equal plots of (approximately 1000m^2), each representing a treatment.
- Divide each treatment plot into 10 equal sized blocks (approximately100 m^2/each), and each block is considered as a replication.
- Record data from 10 randomly selected plants in each block (i.e. 100 plants per treatment), leaving the border rows on all four sides of the plot.

Experimental Field Design

R_1	R_2	R_3	R_4	R_5
R_6	R_7	R_8	R_9	R_{10}
R_1	R_2	R_3	R_4	R_5
R_6	R_7	R_8	R_9	R_{10}
R_1	R_2	R_3	R_4	R_5
R_6	R_7	R_8	R_9	R_{10}

Imposition of the treatments:
Herbicides application by drone/knapsack sprayer:

- Pre-emergence application of Pretilachlor 50%EC @ 600 – 750 ml/acre at 0-3 days after transplanting.
- At the time of drone spraying, field water level of thin film. Water should not be let out or let in up to 48 hours of application.
- Post emergence application of triafamone (20%) + ethoxysulfuron (10%) @ 90 g/acre at 20-25 days after transplanting.

Note: Spray fluid volume changes with drone/knapsack.

Observations to be recorded:

1. Weed population (Group wise) /m^2 at 2 weeks after pre-emergence herbicide application
2. Weed Dry Biomass (Group wise) /m^2 at 2 weeks after pre-emergence herbicide application
3. Weed population (Group wise) /m^2 at 2 weeks after pre-emergence herbicide application
4. Weed Dry Biomass (Group wise) /m^2 at 2 weeks after pre-emergence herbicide application.

Observations will be same for drone, battery operated knapsack sprayer and untreated control.

Insecticides:

1. First Spray: Observations will be recorded before spraying (Pre-count) followed by 7 and 15 after spraying (per hill, in 10 hills at random in each replication).
   - Number of tillers
   - Number of silver shoots
   - Number of total leaves and the number of damaged leaves for i) Leaf folder ii) Whorl maggot iii) Rice hispa iv) Caseworm
   - Any other insect pests which are dominant in the experimental location
   - Number of dead hearts (DH) once three weeks after treatment.
2. Second spray: At one and two weeks after spraying (per hill, in 10 hills at random in each replication)
   - Number of tillers.
   - Number of silver shoots (if present in booting stage and beyond).
   - Number of total leaves and the number of damaged leaves for Leaf folder.
   - Any other insect pests such as gundhi bug, which are dominant in the experimental location.
   - No. of BPH nymphs and adults.
   - No. of WBPH nymphs and adults.
3. Main field at maturity: (per hill, in 10 hills at random in each replication)
   - Number of panicle bearing tillers.
   - Number of white ears.
4. Number of natural enemies per hill, in 10 hills at random at one, two and three weeks after treatment.
5. Record the observations on phytotoxicity at 1, 3, 5, 10, 15 and 20 days after first spray using 0-10 rating scale.

Phytotoxicity rating scale (PRS):

S. No.	Crop injury/ response	Rating	Necrosis	Epinasty	Hyponasty	Yellowing	Stunting	Others
1	0-00	0						
2	1-10%	1						
3	11-20%	2						
4	21-30%	3						
5	31-40%	4						
6	41-50%	5						
7	51-60%	6						
8	61-70%	7						
9	71-80%	8						
10	81-90%	9						
11	91-100%	10						

Fungicides:

1. First spray: The observations on incidence of diseases will be recorded using SES scales (IRRI, 2024) at before spraying (Pre count) followed by 7 and 15 days after first spray of treatments. (per hill, in 10 hills at random in each replication)
2. Second spray: The observations on occurrence of diseases will be recorded using SES scales (IRRI, 2014) at before spray of treatments (pre count), 7 and 15 days after second spray of treatments. (per hill, in 10 hills at random in each replication)

Disease Rating Scale:
SES scale (2014) for leaf blast

DESCRIPTION
0= no lesions
1=Small brown specks of pinhead size without sporulating centre.
2=Small roundish to slightly elongated, necrotic grey spots, about 1-2 mm in diameter with a distinct brown margin, lesions are mostly found on the lower leaves
3=Lesion type is the same as in scale 2, but significant number lesions are on the upper leaves
4=Typical sporulating blast lesions, 3 mm or longer, infecting less than 2% of the leaf area
5=Typical blast lesions infecting 2-10% of the leaf area.
6=Blast lesions infecting 11-25% leaf area
7=Blast lesions infecting 26-50% leaf area
8=Blast lesions infecting 51-75% leaf area
9=More than 75% leaf area

SES Scale (2014) sheath blight disease

Description
0= No infection
1= Vertical spread of the lesions up to 20% of plant height
3= Vertical spread of the lesions up to 21-30% of plant height
5= Vertical spread of the lesions up to 31-45% of plant height
7= Vertical spread of the lesions up to 46-65% of plant height
9= Vertical spread of the lesions up to 66 100% of plant height

Grain yield: Randomly select the 5x5 m^2 in each replication and record grain yield per each replication. Exclude 2 border rows on all sides. Mention net plot size and report the yield as kg/ha.

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Coordinated Entomology Trials, Kharif 2024

Name of the trial : Bio -efficacy of Insecticides against planthoppers (BIPH)

Objective : Monitoring of newer Insecticides against planthoppers in Rice

Methodology :

Bioassay for generating baseline data on susceptibility: Standard protocol suggested by Insecticide Resistance committee (IRAC) will be followed for assessing the susceptibility status of field population of BPH population against major insecticides in across the three major rice growing in India.

Name of Insecticides: Dinotefuran, Triflumezopyrim, Pymetrozine, acephate

Procedure:

Field populations of *N. lugens* will be collected from various paddy-growing regions in India to assess their susceptibility to different insecticides. Insects, both nymphs and adults, will be collected during rice growing seasons from different locations using polythene covers to enclose entire rice hills. Short-winged adult plant hoppers will be collected from the base of rice plants using an aspirator and transferred to polythene-covered plants. These covered plants will then be transported to the research laboratory, where they will be transplanted into empty pots (15 cm radius) placed inside rearing cages (2×2 sq. ft). Each cage will be labelled according to the collection location. Additionally, 40-day-old TN1 seedlings in pots will also be placed in the rearing cages for the insects' sustenance.

The insects will be reared up to the F1 generation, which will be utilized for subsequent bioassay studies. For the bioassays, nymphs of approximately five days old from the F1 generation will be used. The bioassay procedure involves determining the median lethal dose (LD50) of various insecticides against field populations of *N. lugens.*

The susceptibility of *N. lugens* to different concentrations of insecticides will be assessed using the IRAC Susceptibility Test #05 method (Heong et al., 2013). Rice seeds will be sown in 5-centimeter diameter plastic cups, and germinated plants at the four-leaf stage will be used for the bioassays. 2% agar solution (Himedia) will be prepared according to the manufacturer's instructions, cooled to 37 °C, and poured at the base of the rice seedlings to cover the soil surface. Subsequently, these seedlings will be dipped into different concentrations of insecticide solutions for 30 seconds and air-dried at room temperature for 15±1 minutes. Each treated seedling will then be covered with a plastic tube topped with muslin cloth, and 20 third instar nymphs from a uniform culture will be released onto each seedling. Sixty nymphs will be exposed per concentration of insecticide.

Mortality counts of nymphs will be recorded at 24, 48, and 72-hour intervals for all insecticides tested. The percentage mortality for each insecticide concentration, as well as the control, will be calculated. Corrected percent mortality will be determined using Abbot's formula (Abbot, 1925). Mortality data from the bioassays will undergo Probit analysis using the POLO plus program (LeOra Software, 2002, Berkeley, CA, USA) to determine lethal concentration values (LD50). Resistance ratios (RR) for each insecticide will be calculated using the following formula:

References & Acknowledgements:

A video of the full method is available on the IRAC website and can be viewed via the IRAC Method Team page (http://www.irac-online.org/teams/methods/) or directly on YouTube via the link http://www.youtube.com/watch?v=Pazc28TzHhM

Data sheets:

Bio -efficacy of Insecticides against planthoppers (BIPH)

Insecticide: **Location:**

Date of Experiment:

Note:N=Number, D= Dead, E= Escape, A= Alive

Conc. (ppm)		24Hrs			48Hrs			72Hrs			96Hrs			120Hrs			144Hrs		
	N	D	E	A	D	E	A	D	E	A	D	E	A	D	E	A	D	E	A
	R_1																		
	R_2																		
	R_3																		
	R_1																		
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	R_2																		
	R_3																		

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Coordinated Entomology Trials, *Kharif* 2024 & *Rabi* 2024-25

Name of the trial	:	**Evaluation of entomopathogens against lepidopteran pests of rice**
Objectives	:	To evaluate the entomopathogens against stem borer, leaffolder and other lepidopteran pests of rice.
Variety	:	Any susceptible high yielding variety.
Layout	:	Randomized Block Design.
Treatments	:	Eight
Replications	:	three
Plot size	:	25 Sq.m
Spacing	:	20 x 15 cm.
Seedlings/hill	:	Two.
Age of seedlings at planting	:	3 1/2 – 4 weeks
Fertilizers	:	Recommended
Treatments	:	T1. *Bacillus albus* NBAIR-BATP (1 x 10^8cfu/ml) @ 10ml/L T2. *Metarhizium anisopliae* NBAIR-Ma35 (1 x 10^8 cfu/ml) @ 10ml/L T3. *Beauveria bassiana* NBAIR-Bb5a (1 x 10^8cfu/ml) T4. *Bacillus thuringiensis* NRRI TB 261 (1 x 10^8cfu/ml) T5. *Metarhizium anisopliae* NRRI TF 9 (1 x 10^8cfu/ml) 20ml/L T6. *Beauveria bassiana* NRRI TF 6 (1 x 10^8cfu/ml) 20ml/L T7. Cartap hydrochloride 4G granules @ 25kg /ha at the vegetative phase and /or Chlorantraniliprole 18 SC at booting stage @150 ml/ha based on ETL T8. Control (Untreated) Three rounds of foliar sprays of liquid formulations of entomopathogens has to be given at 14 days' interval
Observations		• No. of dead heart/white ear/10 hills • No. of damaged leaves per/ 10 hills • The population of natural enemies – coccinellids/ spiders/ 10 hills • Egg parasitisation of stem borer egg mass (minimum 5 egg masses per treatment) • Growth promotion character *viz*., plant height (cm) sampled from 10 plants per replication • Yield (kg/plot)

General Instructions

- Three rounds of foliar sprays of liquid formulations of entomopathogens has to be given at 14 days interval starting from the appearance of brood (1 stem borer moth / m^2 or two damaged leaves by Leaffolder).
- Insecticide application should be timed based on insect population level (ETL of stem borer 10% dead hearts or 1 egg mass/ m^2 or 1 adult moth/ m^2 or >30 moths/pheromone trap/week; leaffolder - 2 damaged leaves per hill with a live larva).
- The dead heart and white ear damage by stem borers, leaves damaged by Leaffolder /10 hills selected at randomly will be recorded
- If there is conspicuous damage by minor lepidopterans such as skipper, horned caterpillar and others, observations will also be taken on population per unit area

- The egg masses of stem borer should be collected and observed for parasitisation in different treatments
- Observations on number of diseased larvae observed per unit area (m^2) should be noted.
- For stem borer, dead hearts/ panicles should be dissected and observed for diseased larvae within
- Data on natural enemies counts (spiders and coccinellids) in 10 hills
- 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
- Actual species name for stem borer/ other pests to be mentioned in the report.

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Coordinated Entomology Trials, *Kharif* 2024 & *Rabi* 2024-25

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 (15) : 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 intervals 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
7) Natural enemy count

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Coordinated Entomology Trials, *Kharif* 2024 & *Rabi* 2024-25

Name of the trial : Pest Incidence in Natural Farming (PINF)
A Collaborative Trial with Agronomy

Objective : To assess the influence of natural farming (NF) practices on insect pest incidence

Treatments : 5

Treatments	Details
T1	Control (No addition of any inputs except labour for operations including weeding)
T2	Complete NF (1. Beejamrit + Ghanjeevamrit + Jeevamrit; 2. Crop residue mulching; 3 Intercropping) [Pre-monsoon dry sowing (PMDS) / Muti-variate cropping (MVC) with multiple crops during fallow + Prophylactic/preventive method of application of Neemaster, Dashparni ark, Brahmaster, Neem seed kernel extract, border crop, trap crop, seed treatment with Trichoderma, Pseudomonas and Curative application of leaf extracts of Datura, vitex, Agniaster, sour buttermilk, 2 G/3G extract and use of bio-control agents and mechanical traps]
T3	AI-NPOF package- State-wise package can be adopted (Link is provided) **(https://iifsr.icar.gov.in/icar-iifsr/npof/index.php?id=package_of_practices)**
T4	Integrated Crop Management (50 % nutrient application through organic manures and 50% nutrient application through inorganic sources with pre-monsoon dry sowing / *Muti-variate cropping (MVC)* with multiple crops during fallow + Prophylactic/preventive method of application of Neemaster, Dashparni ark, Brahmaster, Neem seed kernel extract, border crop, trap crop, seed treatment with Trichoderma, Pesudomonas and Curative application of leaf extracts of Datura, vitex, Agniaster, sour buttermilk, 2 G/3G extract and use of bio-control agents and mechanical traps]
T5	Integrated Crop Management (50 % nutrient application through organic manures and 50% nutrient application through inorganic sources with application of need-based pesticides for pest management)

Design: Randomized Block design
Replications: 4
Variety: Any high-yielding variety
Seed rate: 20-25 kg/ ha (20 x 15 cm spacing)

Basic Principles of Natural Farming
The nine agroecological principles of natural farming are

1. Soil to be covered with diverse crops throughout the year
2. Minimal disturbance to soil
3. Use of Bio-stimulants as necessary catalysts
4. Diverse crops or trees of 15-20 crops
5. Use of indigenous seed

6. Integrate animals into farming
7. Increase organic residues on the soil
8. Pest and disease management through IPM methods as non-negotiables and the use of botanical extracts as a last resort
9. No synthetic fertilizers, pesticides and herbicides

Note: Natural farming is different from organic farming

Package of practices

1) Before *Kharif*, raising of Pre Monsoon Dry Sowing (PMDS) with 18 varieties of crops, sown in May and continued up to July 2nd week to get a good crop stand and biomass. After using different crops as leafy vegetables, and fodder, some biomass is used as mulch or incorporated into the soil before *Kharif* planting.

2) Seed and seedling treatment with *Beejamrutham* (BJM) @ 5 liters/ 25-30 kg seed.

3) Promote line sowing, drum seeding, SRI and direct seeding which allows minimum disturbance to the soil.

4) *Ghanajeevamrutham* (GJM) – Type 2 GJM @ 1000-1500 kg/ acre during last ploughing or puddling and Type 1 GJM @ 400 kg/ acre in two equal splits at 20 DAT, 40 DAT at 20 days intervals.

5) Farmyard manure (FYM) should not be added as it is to the soil. Treat FYM with DJM for conversion to Type 2 GJM and only apply.

6) *Dravajeevamrutham* (DJM) – Soil application @ 800 litres/ acre, four times at 35 DAT, 50 DAT, 65 DAT, and 80 DAT @ 200 litres each time. Foliar application @ 50 litres DJM in 100 litres of water at each spray, four times, at 25 DAT, 45 DAT, 55 DAT, and 70 DAT.

7) Application of Azolla @ 10-15 kg/ acre after 7 DAT which acts as living organic mulch.

8) Practise all the non-negotiables. These include, i) Clipping of leaf tips, ii) formation of alleyways, iii) Growing border/bund/peripheral plantation with marigold/red gram/maize/vegetables/Glyrcidia/Sesbania, iv) Installation of pheromone traps for yellow stem borer, v) Erecting bird perches and vi) light traps/bonfires.

9) Growth promoters – Use i) *Panchagavya* @ 4 liters/ acre, one time at the tillering stage, ii) Egg aminoacid @ 200 ml in 100 litres of water, one time at the panicle initiation stage, iii) *Sapthadhanyakura* tonic 250 ml in 100 litres of water, one time at milking and grain filling stage.

Non-pesticide management practices for pest management in paddy

S.No	Insect Pest	Management practices
1	Yellow Stem borer	1) Clipping of leaf tips during transplantation 2) Installation of pheromone traps for monitoring @ 3/ acre 3) Release of *Trichogramma japonicum* 4) Spraying of *Neemastram* @ 200 litre/ acre (10 kg of neem leaves ground in 200 litres of water/ acre) 5) Installation of Pheromone traps for mass trapping @ 12 traps/ acre 6) Spraying of 5% NSKE or *Neemastram* during the initial stage @ 5kg neem seed in 100 litres of water

		7) Spraying of *Agnastram* @ 3 litres in 100 litres of water during tillering and booting stages.
2	Brown planthopper	1) Formation of alleyways of 30 cm at every 2 meters 2) Planting of marigold/cowpea/peas on bunds 3) Erecting of white/ yellow sticky traps @ 20-25/ acre 4) Spraying of *Ipomea* leaf extract (*Thootikaada kashayam*) – 5-6 litres in 100 litres of water by mixing with soap water and spraying should be towards the base of the plant
3	Leaf folder	1) Dragging of twisted rope 2) Erecting of light trap @ 1/acre 3) Spraying 5% NSKE or *Neemastram* during the initial stage
4	Gall midge	1) Spraying of *Agnastram* @ 5 litres in 200 litres of water/ acre
5	Rice hispa	1) Clipping the leaf tips while transplanting 2) Spraying of *Neemastram* at early stage 3) Applying *Brahmastram* at later stages @ 6 litres in 100 litres of water/ acre
6	Green leafhoppers	1) Placing of white/ yellow sticky traps @ 20-25/ acre 2) Erecting of light trap @ 1 trap/ acre 3) Spraying of *Vavilaku kashayam* @ 5 litres in 100 litres of water/ acre
7	Rice gundhi bug	1) Spraying of 5% NSKE before 9 am @ 5 kg neem seed in 100 litres of water 2) Spraying of *Agnastram* before 9 am @ 3 litres in 100 litres of water/ acre
8	Panicle Mite	1) Spraying of Dung + Urine + Asafoetida solution @ 5 litres solution in 100 litres of water/ acre

AI-NPOF package of practices for pest management

- *Pseudomonas fluorescence* @ 10 g/litre of water + Trichocard @ 8 nos/ha (twice) + Neem or Kankraj oil cake @ 500 kg/ha at the time of transplanting + Bael + black tulsi @ 25 g/litre of water + Neem seed kernel extract or Neem oil @ 3-5 ml/litre of water (foliar spray)
- Use of pheromone traps @20 nos./ha; Release of *Trichogramma* @ 50,000 / ha for 4 times for stem borer management
- PestoNeem @ 3 ml/litre of water & Derisom @ 2 ml/litre of water along with soil application of Neem cake @100kg/ ha to manage common insect-pests and disease
- *Pseudomonas* @ 500 g/ha + Neem oil 0.5% @ 2.5 litre/ ha + Cow urine (2.5%) @ 12.5 litre/ha
- Pheromone traps @ 20 traps/ha and Cow urine fortified with Neem leaves (one kg green leaves/ 10 litres of urine) or Cow urine + Neem oil (50 litre Cow urine + 5 litre Neem oil/ha) for control of Yellow stem borer, Leaf folder, Brown plant hopper
- *Trichogramma@50,000 (nos.) eggs/ha in* 5-6 releases to manage the stem borer and leaf folder. Ginger-chilli-garlic extract (10 kg Garlic + 5 kg Ginger + 5 kg Green chilli in 70 l water) @ 60.0 litre/ha to manage caterpillars/leaf folders and gundhi bug
- *Panchaparni* @ 300 litre/ha at 15 day intervals to manage the Rice leaf folder.

Instructions: Agronomists will take up the trial and Entomologists are requested to take up the observations. However, if any pest is about to reach ETL, please follow the above management practices given in the Table in Natural Farming.

Observations

Record observations at 15-day intervals 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

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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, 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

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 stem borers 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 stem borers (1 ft above the canopy) and canopy level for the 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 a good collection of adults

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Coordinated Entomology Trials, *Kharif* 2024 & *Rabi* 2024-25

Name of the Trial: **IPM in DSR**

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) in Direct Seeded Rice (DSR).

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)

Replications: 5 replications.

Treatments: Take 3-5 farmers in each centre/location, each farmer representing a replication with at least 1-acre area /farmer as IPM plots. Farmers can be selected from the same village or different villages

Major Insects: Yellow stem borer, leaf folder, gall midge, leaf folder, whorl maggot, hispa, BPH and WBPH

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

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

DAS	IPM practices	Farmer Practices
Before sowing	• Use resistant or moderately resistant variety • Seed Coating with Trichoderma @ 10g/ kg seed. Dissolve the required quantity of Trichoderma formulation in water to make a slurry. Coat the seeds manually with the prepared slurry and shade dry for one hour.	As per the local farmers practice. **Please record the practices farmers follow whenever you go for observation/visit.**
Up to 30 DAS	• Within 3 – 5 DAS, apply Pyrazosulfuron ethyl 20 g ai/ha (or) Oxadiargyl 80-100 g ai/ha. Mix with fine sand (50kg/ha) and broadcast it. • Leave alleyways 30 cm after every 2 m or 10 rows • Fertilizers should be applied as per the local recommended fertilizer dose.	As per the local farmers practice. **Please record the practices followed by farmers' whenever you go for observation/visit.**

	• 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 intervals starting from 15 DAT. • Cleaning of bunds to eliminate the alternate hosts for off-season survival of pests and diseases. • At 20 DAS, install pheromone traps with 5 mg lure @ 3 traps/acre for yellow 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 *Trichogramma japonicum* adults against yellow stem borer and *Trichogramm chilonis* 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. • At 25 DAS, need based application of Fipronil 0.3G @ 10 kg/ acre depending on the severity of early season pests like thrips, whorl maggot, hispa etc • At 25-30 DAS, 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. • At 30 DAS, in case leaf blast or brown spot appears, then apply combination fungicide i.e. carbendazim + mancozeb (@ 2-2.5 gm/lit)	As per the local farmers practice. **Please record the practices followed by farmers' whenever you go for observation/visit.**
30 – 60 DAS	• Mechanical weeding using conoweeder • 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 the vegetative stage to serve as resting/ landing sites for birds • 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.	As per the local farmers practice. **Please record the practices followed by farmers whenever you go for observation/visit**

	• If sheath blight occurs at more than threshold level, then apply hexaconazole 5 EC (2 ml/lit)	
61 – 90 DAS	• 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 • As a prophylactic spray for post-flowering diseases, apply propiconazole @ 1 ml/lit or tebuconazole 50%+ trifloxystrobin 25% w/w WG @4 g/10 lit.	As per the local farmers practice. **Please record the practices followed by farmers when-ever you go for observation/visit**
> 90 DAS up to harvest	• Mark 5 X 5 m^2 area and take yield, at 5 places (one 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	• Mark 5 X 5 m^2 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 20 DAS, observations on pest incidence should be recorded on 5 randomly selected hills (each time hills are selected randomly) in each replication (25hills/ 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/m^2) at 30, 45 DAS
  - Weed Dry matter production (gm/ m^2) at 30, 45 DAS

Grain yield: Record the yield from 5 places of 5 x 5 m^2 area from each replication.

Note: This module is for all the zones. In case of insect/ disease infestation, please follow ETL's and control measures should be taken as per the IPM guidelines. 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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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

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	Carbofuran 3 CG @ 33kg/ha or 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	Carbofuran 3 CG @ 12kg/ha or 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, lamda cyhalothrin, either alone or in combination of other insecticides in rice crop as they cause resurgence of planthoppers.

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Coordinated Entomology Trials, *Kharif* 2024 & *Rabi* 2024-2025

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 2024* & *Rabi 2024-25*

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:

- 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* 2024-25

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 2024-25)
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.