ALL INDIA COORDINATED RICE IMPROVEMENT PROJECT
(AICRIP)

Entomology Technical Programme
Kharif 2017 *& Rabi* 2017-18

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

Contents

3. Coordinated Entomology Trials *Rabi* 2017-18

Trial Star Sheet - *Kharif 2017*

Sl.No.	Location	PSR$	PHS	GMS	GMSS	LFST	SBST	MRST	NSN-1	NSN-2	NSN-H	NHSN	GMBT	PHSS	GMPM	PCT	BIET	IRMP	EPDP	EEPM	YLET	IPMS	BIPM	LT$	Total
1	Aduthurai	*	*											*										*	3
2	Arundhutinagar	*				*										*	*		*			*			5
3	Brahmavar	*		*		*		*		*			*		*	*			*						8
4	Bapatla					*	*									*	*		*						5
5	Chatha	*				*		*			*						*		*				*	*	7
6	Chinsurah	*				*	*	*		*		*				*	*		*		*	*	*	*	12
7	Chiplima	*		*	*			*	*	*			*			*	*		*			*		*	11
8	Coimbatore	*	*				*	*	*	*	*	*		*		*	*		*		*	*		*	14
9	Cuttack	*	*	*	*			*					*	*		*					*		*		9
10	Gangavathi	*	*			*		*	*	*				*		*	*	*	*	*		*		*	13
11	Ghaghraghat	*					*	*	*	*									*						5
12	IIRR		*	*	*	*	*	*	*	*	*	*	*	*						*			*		14
13	Iroishemba	*				*							*			*	*		*					*	6
14	Jagdalpur	*		*	*	*		*	*	*			*				*		*		*	*	*	*	13
15	Jagtial	*	*	*	*								*											*	5
16	Karaikal	*				*										*	*		*		*			*	6
17	Karjat	*				*		*								*	*		*			*	*	*	8
18	Kaul	*	*			*		*	*			*				*	*		*					*	9
19	Khudwani	*				*		*			*						*		*					*	6
20	Kurumbapet	*				*		*								*	*		*			*	*	*	8
21	Ludhiana	*	*			*		*	*	*	*	*		*		*	*			*	*	*	*	*	15
22	Malan	*				*		*		*	*					*	*		*		*	*		*	10
23	Mandya	*	*					*		*		*		*		*				*		*		*	9
24	Maruteru	*	*	*				*	*	*	*	*	*	*		*	*			*				*	13

Trial Star Sheet - *Kharif* 2017 contd…

Sl.No.	Location	PSR$	PHS	GMS	GMSS	LFST	SBST	MRST	NSN-1	NSN-2	NSN-H	NHSN	GMBT	PHSS	GMPM	PCT	BIET	IRMP	EPDP	EEPM	YLET	IPMS	BIPM	LT$	Total
25	Masodha	*				*	*	*	*							*	*		*			*		*	9
26	Moncompu	*		*	*		*		*	*		*	*		*		*	*		*			*	*	13
27	Navsari	*				*	*	*		*						*	*		*					*	8
28	Nawagam	*	*			*		*	*			*				*			*					*	8
29	Nellore	*		*		*		*					*			*	*					*		*	8
30	New Delhi	*												*		*	*		*						4
31	Pantnagar	*	*				*	*	*	*	*	*		*		*		*		*	*	*		*	14
32	Pattambi	*		*	*	*		*				*	*			*	*				*		*	*	11
33	Pusa	*						*	*							*	*		*		*	*			7
34	Rajendra Nagar	*	*			*	*	*	*			*		*		*				*		*		*	11
35	Ragolu	*		*	*			*	*				*		*	*	*		*					*	10
36	Raipur	*					*	*	*			*				*	*		*		*	*	*	*	11
37	Ranchi	*		*	*			*					*			*	*		*				*		8
38	Rewa	*						*				*				*	*		*					*	6
39	Sakoli	*		*	*			*	*				*		*	*	*		*			*		*	11
40	Titabar	*						*	*							*	*		*			*	*	*	8
41	Wangbal															*			*					*	3
42	Warangal	*	*	*	*			*	*				*	*	*	*		*		*		*		*	13
	Locations	39	14	14	11	22	11	33	20	15	8	14	15	12	5	34	30	4	29	9	11	20	13	33	377

Sl.No.	Location	LFST	SBST	MRST	NSN2	PCT	BIET	EPDP	YLET	EEPM	IPMS	Total
1	Aduthurai	*	*	*	*	*	*	*	*		*	**9**
2	Brahmavar											
3	Chatha											
4	Chinsurah		*			*	*	*	*		*	**6**
5	Coimbatore					*						**1**
6	Cuttack					*	*					**2**
7	Faizabad											
8	Gangavathi					*	*					**2**
9	Ghaghraghat											
10	Iroishemba											
11	Jagdalpur											
12	Karaikal											
13	Karjat					*						**1**
14	Kaul											
15	Khudwani											
16	Ludhiana											
17	Madurai											
18	Malan											
19	Mandya											
20	Maruteru		*			*				*	*	**4**
21	Moncompu					*				*		**2**
22	Navsari											
23	Nawagam											
24	New Delhi											
25	Pantnagar											
26	Pattambi					*			*			**2**
27	Puducherry					*	*					**2**
28	Pusa											
29	Ragolu					*						**1**
30	Raipur					*						**1**
31	R.Nagar		*			*						**2**
32	Ranchi											
33	Rewa											
34	Sakoli											
35	Sambalpur					*						**1**
36	Titabar		*									**1**
37	Wangbal											
38	Warangal					*						**1**
39	IIRR		*									**1**
	Locations	1	6	1	1	15	5	2	3	2	3	**39**

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

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030.

Coordinated Entomology Trials, *kharif* 2017

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 by e-mail (**gururajkatti@yahoo.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.

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030
Coordinated Entomology Trials, *Kharif* 2017

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 **gururajkatti@yahoo.com** latest by 15th and 30th of every month

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030
Coordinated Entomology Trials, *Kharif* 2017

1. Host Plant Resistance Studies

Name of the trial	:	**Planthopper Screening (PHS)**
Objectives	:	I. To study the reaction of cultures against brown plant-hopper and whitebacked planthopper with a view to identify the promising material (PHS). II. To monitor virulence in BPH populations (PHSS)
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 variety 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 plants/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 variety.

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.
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 gururajkatti@yahoo.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 susceptible varieties 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 Scale (SES 2002) on 0-9 scale developed by IRRI Reference).

0	No damage.
1	Very slight damage.
3	First and second leaves of most plants partially yellowing.
5	Pronounced yellowing and stunting or about half of the plants wilting or dead.
7	More than half of the plants wilting or dead and remaining plants severely stunted or dying.
9	All plants 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

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030
Coordinated Entomology Trials, *Kharif* 2017

Name of the trial	:	**Gall Midge Screening (GMS) / Gall Midge Special Screening (GMSS).**
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	:	1 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.
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).

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, Indian Institute of Rice Research, Rajendranagar, Hyderabad - 500 030, Telangana, along with an email intimation to gururajkatti@yahoo.com.**
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.

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030
Coordinated Entomology Trials, *Kharif* 2017

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.

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030
Coordinated Entomology Trials, *Kharif* 2017

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 – 31/2 weeks
Seedlings per hill	:	One
Check variety	:	TN1, PB1, TKM 6, W 1263 and Sasyasree
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 phase 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 are not escapes.

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, Indian Institute of Rice Research, Rajendranagar, Hyderabad - 500 030, along with an email intimation to gururajkatti@yahoo.com.

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030
Coordinated Entomology Trials, *Kharif* 2017

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 : 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.
- 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.**

bearing tillers and white ear heads from 10 hills/variety **prior to harvest.**
6) 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. Green house evaluations wherever feasible are to be done.
7) 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.

8) 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.
- Specify damage causing 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.

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030
Coordinated Entomology Trials, *Kharif* 2017

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 four 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
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.

INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030.
Coordinated Entomology Trials, *Kharif* 2017

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	:	1 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 to gururajkatti@yahoo.com.**

- 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.

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030
Coordinated Entomology Trials, *Kharif* 2017

Name of the trial	:	**Gall Midge Population Monitoring Trial (GMPM)**
Objectives	:	To monitor the virulence pattern of gall midge population against select donors.
Differentials	:	1. Purple variety (S. Check) 2. RP 2068-18- 3-5 with *gm3* gene for resistance 3. Aganni with *Gm8* gene for resistance 4. W1263 with *Gm1* gene for resistance
Experimental Procedure	:	

1. 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.

2. When seedlings are 1 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, RP 2068-18-3-5, Aganni and W1263 (Fig. 1)

3. 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.

4. 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.

5. Plants should be at least 2 week old and/or of three leaf stage on the day of infestation.

6. To infest each pot, collect one female insect 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.

7. 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.

8. 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.

9. 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, RP 2068-18-3-5, Aganni, and W1263.
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 gall exit hole 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 one sex. Hence, noting the sex for the first few emerging insects will be good enough.
3. Report data in the following format :

Pot No.	No. of galls in				Sex of emerging adults
	Purple variety	RP 2068-18-3-5	Aganni	W1263	
1					
2					
.					
.					
250					

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

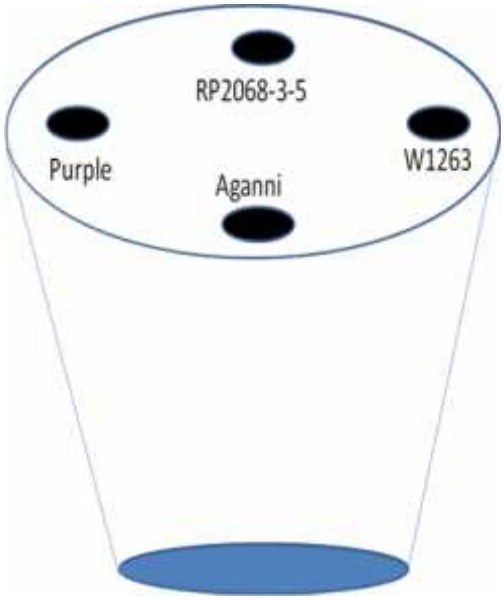


Fig:1 Picture depicting planting of differentials for evaluation in GMPM trial

Fig2: Puparia of gall midge

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030
Coordinated Entomology Trials, *Kharif* 2017

Name of the trial	:	**Planthopper Special Screening (PHSS)Trial**
Objectives	:	To monitor virulence in BPH populations (PHSS)
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 variety 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 plants/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 variety.

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.
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.

6. 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.
7. 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.
8. 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.
9. Population structure as ratio of BPH to WBPH may be furnished when mixed populations prevail in the field
10. **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 gururajkatti@yahoo.com.**

Greenhouse Screening (for PHSS conduct only greenhouse screening test)

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 susceptible varieties 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 Scale (SES 2002) on 0-9 scale developed by IRRI Reference).

0	No damage.
1	Very slight damage.
3	First and second leaves of most plants partially yellowing.
5	Pronounced yellowing and stunting or about half of the plants wilting or dead.
7	More than half of the plants wilting or dead and remaining plants severely stunted or dying.
9	All plants 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

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

3. Chemical Control Studies

Name of the trial	:	**Pesticide Compatibility Trial(PCT).**
Objectives	:	To evaluate the compatibility of selected insecticides and fungicides as tank mix as reflected by their effectiveness against target pests under field conditions.
Variety	:	Any susceptible high yielding variety.
Layout	:	Randomized Block Design
Treatments	:	Nine
Replications	:	Three
Plot size	:	20 – 25 sq.m.
Spacing	:	20 x 15 cm.
Seedling/hill	:	Two.
Age of seedlings at planting	:	3½ - 4 weeks
Time of planting	:	Adjust planting time so as to catch peak incidence of target insect pests and diseases to judge the effectiveness of the treatments.
Target insect pests and diseases	:	Leaf folder, stem borer, planthoppers, blast and sheath blight
Fertilizer	:	As per recommendations for specific area to obtain maximum yields.
Treatments	:	As per the list attached.
Spray volume	:	Spray fluid @ 500 litres/ha is to be used for all the treatments.
Time of pesticidal applications	:	In areas where leaf folder / stem borer and blast are problems, one application of T1, T3, T4, T5 and T6 treatments should be given at 15 DAT. Subsequently, one or two applications of these treatments should be made at 15 days interval when leaf folder / stem borer reach ETL (5% DH

or 2 damaged leaves/hill) and / or blast appears initially or at 1% disease severity level.
Similarly, one application of these treatments should be made at panicle formation stage to judge their effectiveness against white ear and neck blast damage.

In areas where BPH and sheath blight are problems, T2, T3, T4, T7 and T8 treatments should be applied **once** during 45-60 DAT when BPH/WBPH reach ETL (5-10 insects/hill) and/or sheath blight appears at 5% disease severity level.

If the infestation of leaf folder / stem borer and blast **OR** planthoppers and sheath blight persist in high intensity, additional application of the relevant treatments can be made depending on the necessity.

Observations:

1. Survey insect populations and / or disease incidence in experimental plots at weekly intervals from 10 DAT to judge proper time of application of the treatments.
2. Record damage by leaf folder on 10 randomly selected hills/plot at 1 day before and 8 days after application of the treatments each time.
3. Record total tillers and dead hearts on 10 random hills/plot to assess stem borer damage.
4. Record population of BPH/WBPH on 10 randomly selected hills/plot at 1 day and 5 days after application of the treatments each time.
5. Percentage disease severity of blast has to be recorded 1 day before and 10 days after each application of treatments.
6. Percentage disease severity of sheath blight has to be recorded 1 day before and 10 days after each application of the treatments.
7. Observations on white ears and panicle bearing tillers on 10 random hills can be recorded prior to harvest.
8. If other insect pests and / or diseases are prevalent in high magnitude then, suitable observations may be recorded and intimated.

Yield data:

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

Special instructions:

1. Individual plots should be separated by bunds and channels to regulate water flow and prevent water movement from one plot to other.

2. Efforts should be made to prevent drift between treatments while spraying.
3. Spraying should be done to provide full coverage.
4. In case of direct seeding, the experimental plot may be laid out according to the design before seeding. Ensure uniform plant population in all plots.
5. Help of local plant pathologist can be sought while recording disease severity observations.

Details of treatments in Pesticide Compatibility trial (PCT), *Kharif* 2017 and *Rabi* 2017 -18.

Treatment	Trade Name	Common Name	% a.i. formulation	g or ml per litre of spray fluid
T1	Spinetoram 6% + methoxyfenozide 30%	Spinetoram 6% + methoxy-fenozide 30%	36	0.75
T2	DPX-RAB 55	Triflumezopyrim	106	0.48
T3	Contaf Plus	Hexaconazole	5	2.0
T4	Mantis 75 WP	Tricyclazole	75	0.6
T5	Spinetoram 6% + methoxy-fenozide 30%+Contaf	Spinetoram 6% + methoxy-fenozide 30%+ Hexaconazole	-	0.75+2.0
T6	Spinetoram 6% + methoxyfenozide 30%+ Baan	Spinetoram 6% + methoxy-fenozide 30%+ Tricyclazole	-	0.75+0.6
T7	DPX-RAB 55 + Contaf	Triflumezopyrim +Hexaconazole	-	0.48+2.0
T8	DPX-RAB 55 + Baan	Triflumezopyrim + Tricyclazole	-	0.48+0.6
T9	Untreated control		-	Water spray

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030

Coordinated Entomology Trials, *Kharif* 2017 & *Rabi* 2017-18

Name of the trial	:	**Botanical insecticide evaluation trial (BIET)**
Objectives	:	To screen botanical insecticides for efficacy against major insect pests.
Variety	:	Any susceptible high yielding variety.
Layout	:	Randomized Block Design.
Treatments	:	**Eight**
Replications	:	Three
Plot size	:	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 peak incidence of insect pests for exposure to insecticide application.
Fertilizer	:	As per the recommendations for specific area to obtain maximum yields.
Botanicals	:	As per the list.
Botanical applications	:	1. At all locations one blanket application of chemicals should be made at 15 DAT. Subsequent applications of botanicals should be given at 10 days interval while insecticides treatments should be given at 20 days interval.

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. Silver shoot/dead heart counts on 20 plants based on stratified random sampling should be recorded at 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.

3. a) Record populations one day before and 3 days after each application in case of external feeders like leafhoppers, planthoppers and hispa on ten random plants.

   b) In each plot select 10 random plants and record damaged leaves and total leaves one day before and 7 days after each application.
   i) Leaf folder, ii) Whorl maggot, iii) Rice hispa, iv) Other insect pests.

   c) Record insect population on 10 hills if ear head bug (gundhi bug) appears in considerable numbers. Also record percent damaged grains.

4. Phytotoxicity, if any, may be recorded and intimated.

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.

Special Instructions :

1. Nursery should be protected from insect pests by applying suitable insecticidal spray at 0.5 kg a.i. /ha as and when needed.
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 invariably in the afternoon (after 2pm)
5. In case of direct seeding the experimental plot may be laid out according to the design before seeding. Ensure uniform plant population in all plots.
6. Aromatic oils should be thoroughly emulsified with any agricultural adjuvant before spray.

<u>Note :</u> Details of treatments in Botanical insecticide evaluation trial (BIET), *Kharif* 2017 and *Rabi* 2017-18 are given below.

Sl.No	Trade Name	a.i in formulation	Rate of formulation/ha	Dose/l
1.	Camphor oil	1.0	1000 ml	2.0 ml/l
2.	Cedarwood oil	1.0	1000 ml	2.0 ml/l
3.	Eucalyptus oil		1000 ml	2.0 ml/l
4.	Lemongrass oil		1000 ml	2.0 ml/l
5.	Neemazal		1000 ml	5.0ml
6.	Token (Dinotefuran)	20 SG	200 g	0.50g
7	Coragen (Rynaxypyr)	20SC	150 ml	0.3 ml/l
8	Untreated Control	Water spray		

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030

Coordinated Entomology Trials, *Kharif* 2017 & *Rabi* 2017-18

Name of the trial	:	**Insecticide Resistance Monitoring in Planthoppers (IRMP)**
Objectives	:	i.To generate the baseline toxicity data for the insecticides commonly used in planthopper management. ii.To monitor the development of insecticide resistance in the field populations to commonly used insecticides for planthopper management
Treatments/Insecticides		Commonly used insecticides for planthopper management (As per the list)
Type of study		Laboratory or greenhouse studies
Replications		4
Method of treatment		foliar spraying of TN1 plants for insecticidal formulation
Insect stage		third instar nymphs (7-9 days old)
Number of insects per replication		20
Methodology		❖ Plant rice seedlings in 3 litre capacity pots and grow upto 45 days. ❖ Prepare the stock solution of the formulated insecticide and dilute it to required concentrations. ❖ Spray the 45 day old potted plants with insecticide solution upto runoff stage and dry the plants in the shade. ❖ Cover the pot with mylar tube and release 20 third instar nymphs (7-9 days old). ❖ Take the observations on mortality of insect at specified intervals. ❖ Calculate the LC 50 values. (Detailed methodology will be provided along with insecticides)
Observations to be recorded		No of insects dead/ mortality of insects at different intervals like 24h, 48h, 72h, 96h and 120h after release
Calculation of LC 50/LD50		By standard software for Probit analysis

4. Ecological Studies

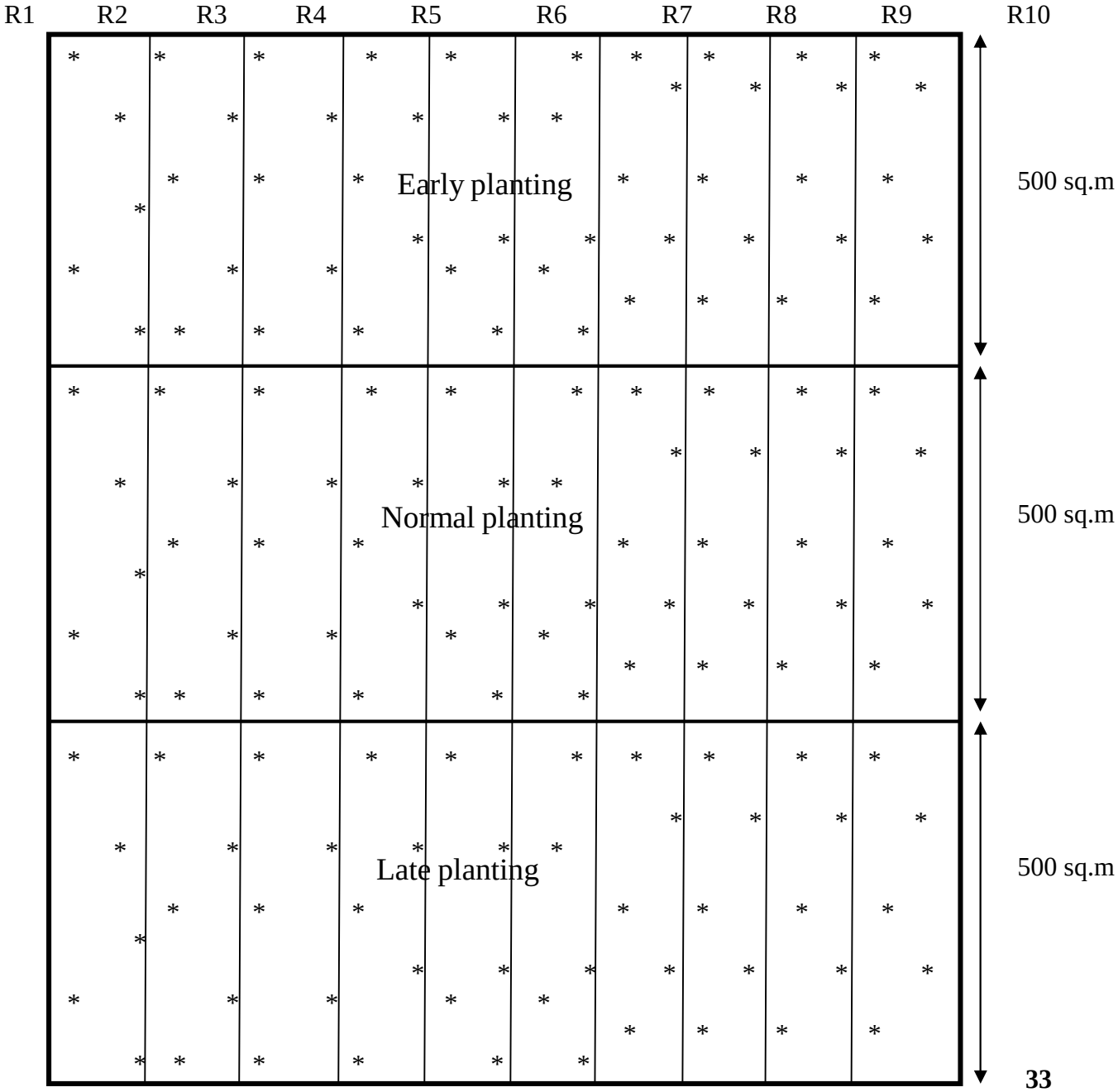
Name of the trial	:	**Effect of Planting Dates on Pest Incidence (EPDP)**
Objectives	:	To study the influence of date of planting on insect pest incidence and their population dynamics
Variety	:	Any popular high yielding variety
Layout	:	Randomized Block Design
Treatments	:	Three
Replications	:	Ten
Plot size	:	1500 sq.m
Spacing	:	20 x 15 cm.
Seedling/hill	:	Two.
Age of seedlings at planting	:	3½ - 4 weeks
Layout	:	1500 sq.m area is divided into 3 plots of 500 sq.m At each date, planting is to be done in 500 sq.m
Time of planting	:	3 dates of planting 1) Early planting 2) Normal planting 3) Late planting 20 days interval to be kept between the plantings **Please note:** For each planting, nursery is to be raised separately and transplant same age seedlings on different dates of planting (for example, if 24 day old seedlings were transplanted in early planting, please try to follow the same age i.e., 24 day old seedlings only in normal and late plantings also).
Fertilizer	:	As per the recommendations of specific location
Installation of Data logger	:	Install the data logger at the center of the 500 sq.m field in any date of planting with high pest incidence. Keep it above the water level starting from one week after planting and follow the steps for installation.

Note: Need based application of fungicides and herbicides can be done

No application of insecticides at any stage of the crop
Observations:

- Divide each plot in each planting date (500 sq. m area) into 10 sub-plots of 50 square meter area.
- In each sub-plot, mark **5 hills at random** and record observations on insect pests on **these marked hills** starting from the first appearance of the pest at 10 day interval. At each observation, in **marked hills, co**unt total number of tillers per hill, number **of dead hearts pe**r hill, number of **silver shoots**, number of **damaged leaves (specify the pest)**, number of total leaves, total number of panicle bearing tillers and white ears per hill.
- Also record the first appearance of the pest in each date of planting.

LAYOUT FOR EFFECT OF PLANTING DATES ON PEST INCIDENCE (EPDP)



*= hill

Data logger’s data recording:

i) Please take a photograph after installation of the data logger and send it immediately to confirm the method of installation.
ii) Keep logger interval as one hour and after one month of installation, download the data and send the data for verifying the correct recording.
iii) Keep the logger till harvest and download the data and send it immediately

Precautions to be taken:

i) After a heavy shower or wind, please check the data logger and place them straight and in proper position
ii) Sensor should always be above the water level. If it gets flooded due to heavy rain, please remove immediately, clean with a dry cloth and place them in the field again.
iii) Don’t place them near the irrigation water channels or drainage channels.

Note: Step wise installation procedure sent separately

5. Biocontrol and Biodiversity Studies

Name of the trial	:	**Ecological Engineering for Planthopper Management (EEPM)**
Objectives	:	To use ecological methods to manage planthopper pests
Variety	:	Any susceptible high yielding variety
Treatments		1) Ecologically Engineered Plot (EEP) 2) Farmers Practice
Plot Size:		A compact block of 1000 Sq.m. area. for each treatment
Spacing	:	20X20 cm for EEP and 15 X 15 for FP
Seedlings/hill	:	Two
Age of seedlings at planting	:	3 1/2 to 4 weeks
Time of planting	:	Adjust planting time so as to catch peak incidence of insect pests
Fertilizer	:	For FP: As per recommended package of practices specific to each location For EEPM : Addition of vermicompost or any other organic manure Not to exceed 100 Kg N, others as above
Insecticides	:	For EEP: Application of granular insecticides in nursery 7 days before transplanting and one granular application at 45 DAT For FP: Farmers practice which should be recorded.
Methodology for layout	:	Divide the entire block into 5 sub-blocks of equal size and demarcate the EEP blocks with alley ways (one skip row) at every 2 m distance. For FP, sub-blocks are demarked by pegs. Each sub-block will be one replication for observations. **There will be a total of 10 blocks**
EE interventions		A. Increasing floral diversity • Increasing floral diversity through locally available flowering weeds/ bund crops that can be a good nectar source. White and Yellow flowers of compositae are reported to attract more wasps. Some plant species recommended are Weeds: *Tridax procumbens*, *Aster* sp., or any Asteraceae locally available Crops: (*Coriandrum sativum*), sesamum (*Sesamum indicum*), greengram, blackgram, cowpea, marigold, Gaillardia or any bund crop suitable to your region and farmers • Monitor stem borer brood through pheromone traps **YOU CAN PLANT ANY FLOWERING SPECIES SUITABLE TO YOUR REGION**

B. Cultural methods

1. Follow line planting with alleyways at every 2 -2.5m
2. Application of vermicompost or any organic manures
3. Mid season draining of water
4. Avoid insecticide spray up to 45 DAT following which 1-2 need based applications may be given

C. Augmenting natural enemies

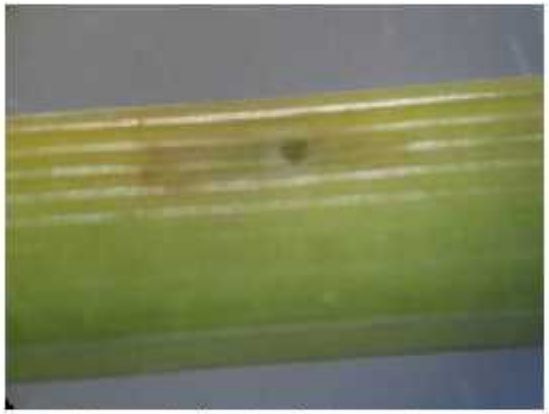
- Place left over seedlings from nursery , in a small bucket covered with mesh . This prevents hoppers moving out while letting egg parasitoids move into field
- Augment mirids from adjoining area or from glasshouse cultures where available
- Release *Trichogramma japonicum / T chilonis* separately or in combination based on presence of stemborer or leaffolder incidence respectively
- Time the release of Trichogramma for stemborer based on pheromone catches

Farmers Practice plots : Location specific practices as followed by farmers

Observations

1. Visual counts of hoppers, and any other pest observed on 10 hills/sub-block at 15 days interval
2. Counts of predators such as mirids, spiders coccinellids on these hills simultaneously
3. Drynid parasitisation based on cocoon count.
4. Count other parasitoids such as stem borer egg parasitoids, larval parasitoids such as *Charops* which can be easily seen in the field
5. Egg baiting for studying egg parasitisation: Potted plant with one or two tillers are exposed to 5 pairs of hoppers for 24 hrs. The adults are then removed and the oviposited plants containing freshly laid planthopper eggs are placed in field for three days near flowering borders. The pots are then brought back to the laboratory for noting egg parasitoids. Dissect the tillers under a microscope for observing parasitized eggs. Unparasitised eggs are creamy white while parasitised eggs are lemon yellow or orange red in colour based on the species of parasitoid. (Fig.)The tillers with eggs should be placed on moist filter paper in petri plates for parasitoid emergence or alternatively, examine one tiller per hill for egg parasite emergence hole and report number per tiller per replication.
6. If hopper damage is seen, score each sub block on 0-9 scale or report per cent plant mortality.
7. Please record cost of cultivation for various practices in the two plots in order to calculate the benefit: cost ratio

- **Please send specimens preserved in alcohol of all parasitoids collected to Dr. Chitra Shanker, Principal Scientist, IIRR, Hyderabad for confirmation and identification.**
- **It is mandatory that you send all egg parasitoids collected from stem borer egg masses pooled into one sample for maintaining a repository at IIRR.**
- **Centres reporting on stem borer species other than YSB and PSB are also required to send specimens of the collected stem borer species.**
- **Refer to: http://agropedialabs.iitk.ac.in/i3r/sites/default/files/bc_11sept%20%5BCompatibility%20Mode%5D.pdf for images of various natural enemies**



a. White patch showing hopper oviposition

b. Parasitoid emergence holes

c. Healthy eggs d. Anagrus parasitised eggs e. Oligosita parasitised eggs

You should compulsorily send

- **a minimum of 20 parasitised egg masses in individual vials.**
- All drynid cocoons and emerging parasitoids
- Coccinellid adults
- Any other larval parasitoids observed

The vials should be forwarded during monitoring visits for species identification and inclusion in the report and to be handed over to Dr. Chitra Shanker, Principal Scientist, IIRR, Hyderabad for identification. The vials should be labeled with location, stage of the crop, season, variety and date of collection.

INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030.

Coordinated Entomology Trials, *Kharif* 2017 and *Rabi* 2017-18

Name of the Trial **Bio-intensive pest management trial (BIPM)**

Objective

Locations (**13**): **Chatha, Chinsurah, Cuttack, Jagdalpur, Karjat, Kurumbapet, Ludhiana – *Kharif***
Moncompu, Raipur, Ranchi, Titabar, IIRR-*Kharif* and *Rabi* Pattambi-*Rabi*

Details of treatments	BIPM block	FP block
Seed	Seed treatment with *Psuedomonas flourescnes* Dry seed treatment - Dress the seeds with the talc based formulation of *Pseudomonas fluorescens* (@ 10 g / kg seed at the time of sowing or Wet seed treatment – Soak the seeds for 12 to 16 hours in a solution of *P.fluorescens* prepared @ 10 g / litres of water / kg seed • Seed treatment with Azospirillum and/or phosphorus solubilizing bacteria (PSB) or phosphorus solubilizing microorganisms (PSM) @10 g / kg seed (or) • Seedling root dipping in Azospirillum and/or PSB PSM suspension @ 600g culture for one ha land.	General POP with RFD and need based application of insecticides
Nursery	Apply vermicompost @ 500g/ m2 and rice husk ash @ 100g/ m^2 of the nursery bed and mix well with the soil at the time of preparation of the field. If vermicompost is not available, apply FYM @ 1 kg/m^2 and 100g of rice husk ash/m^2 of the nursery bed and mix well with the soil at the time of preparation of the field.	
Preparation of land	Plough the field thoroughly to incorporate the weeds and straw into the soil. Ensure a smooth, level field for transplanting the seedlings. It would be better to transplant 10-15 days after incorporating organic manure	

Fertilization	Apply 5 tonnes of FYM/ compost/ green leaf manure or 2.5 tonnes of vermicompost as basal + 300-500 kg oil cakes (ground nut cake, neem cake etc.)/ha half as basal and half as top dressing at active tillering stage.	
Pest Management	1. Clipping of rice seedlings before transplating to remove stem borer egg mass. Avoid clipping of leaf tips at the time of transplanting in bacterial blight endemic areas 2. Mass trapping of stem borer by installing pheromone traps @ 20 numbers / ha can effectively reduce the stem borer damage. The pheromone trap is retained throughout the crop stage by replacing 3-4 times the 5 mg lure at 20 day intervals. Pheromone traps can be installed in the nursery also. 3. Growing flower borders to conserve natural enemies 4. *Trichogramma japonicum* 5 cc egg cards/ha, six times weekly from first week after transplanting 5. *T. chilonis* for leaf folder management at weekly intervals from 20 days after transplanting or when the moths of these pests are observed in large numbers in the field 6. Need based application of neem formulations/ biopesticides for other defoliating pests 7. Foliar spray of *P. fluorescens* on the foliage @ 20 g / litre of water. Spraying can be repeated depending on the disease severity. The application of *P. fluorescens* for a minimum of three times like seed treatment, seedling root dip and one foliar spray for protection from disease incidence.	

Average nutrient composition (%) of major nutrients of some organic manures

Source	N	P_2O_5	K_2O
FYM	**0.5-0.8**	**0.4-0.8**	**0.5-0.9**
Compost	**0.5-1.5**	**0.5-1.4**	**1.4-1.6**
Vermicompost	**1.00-2.05**	**0.70-1.90**	**1.5-2.5**
Poultry litter, fresh	**1.0-1.8**	**1.4-1.8**	**0.8-0.9**
Poultry litter, very dry	**3.0-4.5**	**4.0-5.0**	**2.0-2.5**
Groundnut cake	**7.3**	**1.5**	**1.3**
Castor cake	**4.3**	**1.8**	**1.3**
Neem cake	**5.2**	**1.0**	**1.4**
Green manure (on dry weight basis). Moisture % will be 80-85	**2.0-2.5**	**0.4-0.8**	**0.5-1.0**

Note: Based on the average nutrient composition of the organic source used, the Soil Scientists can calculate the quantity of organic manures **based on the N equivalent basis**.

Observations to be recorded:

- Divide each Treatment block into 6 smaller blocks for observation purpose. Observations on pest incidence should be recorded on 10 randomly selected hills in each replication (60 hills/ each treatment) at fortnightly interval.
- At each observation, record total tillers, dead hearts, silver shoots, total leaves, damaged leaves, number of planthoppers/ hill.
- At harvest record yield/m^2 randomly at 20 points in each treatment.

Observations to be recorded by Soil Scientists:

Soil analysis:

- Initial soil analysis of two blocks separately for all Soil Characteristics like pH, EC, Organic carbon, available NPK status, micronutrient status and important physical properties.

- Final analysis of soils after harvest for all important properties in smaller blocks of each block.

Plant analysis:

- Grain and straw yields at harvest

- Grain analysis for quality parameters (in brown rice and polished rice) along with hulling, milling and head rice recovery.

  Note: If quality analysis is not available at the centres, send grain samples to the PI, (Soil Science), IIRR (DRR) immediately after harvesting.

- Grain and straw analysis for nutrient concentration of major nutrients and Zn and Fe

Number of samples: 2 samples in each small block of 6 in two big blocks (2 X 6 X 2=24)
Total number of samples=24 (soil and plant samples).

6. Integrated Pest Management

Name of the trial :	**Yield loss estimation trial (YLET)**
Objective :	To study the effect of different damage/ pest levels at different stages of crop growth on grain yield.
Variety :	Any high yielding susceptible medium duration (135-140 days) variety
Total area:	500 sq.m
Spacing :	20 x 15 cm
Seedlings per hill :	Two
Age of seedlings at planting:	3½ - 4 weeks
Time of planting :	Adjust planting time to catch peak incidence of insect pest incidence in the area
Treatments :	T1 = Natural infestation T2 = Augmentation/artificial release
Replications :	20
Target insects :	Yellow stem borer and leaf folder

Procedure to be followed:

Yellow stem borer

- Grow the rice crop with less N (apply 50% less than the recommended dose)
- Divide the whole area (500 sq.m) into 2 equal plots (as in the lay out) as Natural infestation plot and augmentation plot (each plot will be 250 sq.m).
- Divide each 250 sq.m area into 3 equal sized plots (≈ 80 sq.m area plots of 3) and mark them as Range 1, Range 2 and Range 3.
- ***Natural infestation plot*** – In each range, mark 35 hills with white ears at random and take observations prior to harvest. Thus, natural infestation will have data from 105 hills.
- ***Augmentation / artificial release plot*** - In each range, mark 9 areas (on four sides and in the center of the range) as in the layout. At each marked area, cover 4 hills with a mylar cage and release as follows:
  Range 1 = 1 egg mass per cage **(OR)** 2 neonate larvae per tiller at booting stage.
  Range 2 = 2 egg masses per cage **(OR)** 4 neonate larvae per tiller at booting stage
  Range 3 = 3 egg masses per cage **(OR)** 6 neonate larvae per tiller at booting stage
  Record data on these 36 hills per range (9 marked areas x 4 hills) and thus a total of 108 hills data from 3 ranges in augmented field.

Record observations on white ears twice during ear head stage (including one at harvest)

Leaf folder

- Grow the rice crop with high N (apply 50% more than the recommended dose)
- Take 500 square meter plot and divide into 2 equal plots as in the lay out as Natural infestation plot and augmentation plot (each plot will be 250 sq.m).
- Divide each 250 sq.m area into 3 equal sized plots (≈ 80 sq.m area plots of 3) and mark them as Range 1, Range 2 and Range 3.
- ***Natural infestation plot*** – In each range, mark 35 hills at random and take observations 2 times i.e., at 65 DAT and after the panicle emergence. Thus, natural infestation will have data from 105 hills.
- ***Augmentation / artificial release plot*** - In each range, mark 9 areas (on four sides and in the center of the range) as in the layout. At each marked area, cover 4 hills with a mylar cage and release as follows:

  Range 1 = 2 third instar larvae per hill at panicle initiation stage.
  Range 2 = 4 third instar larvae per hill at panicle initiation stage
  Range 3 = 6 third instar larvae per hill at panicle initiation stage

  (OR)

  Range 1 = Cover each marked area of 4 hills with a nylon net and **release 5 pairs of leaf folder adults**. Allow them to lay eggs and remove the net for further development.
  Range 2 = Cover each marked area of 4 hills with a nylon net and **release 10 pairs of leaf folder adults**. Allow them to lay eggs and remove the net for further development.
  Range 3 = Cover each marked area of 4 hills with a nylon net and **release 15 pairs of leaf folder adults**. Allow them to lay eggs and remove the net for further development.

Record observations 2 times i.e., before the release of larvae and after the panicle emergence in these 108 hills from 3 ranges (each range has 9 marked areas x 4 hills = 36).

Observations

Yellow stem borer - At each observation, in marked hills, count total number of tillers per hill, total number of dead hearts per hill, total number of panicle bearing tillers and total white ears per hill. Also record grain yield and grain weight per hill.

Leaf folder - At each observation, in marked hills, count total number of leaves per hill, total number of leaf folder damaged leaves per hill, total number of larvae/ pupae present per hill. Also record total number of damaged flag leaves in each hill. Finally record grain yield and grain weight per hill.

Yield:

Record yield from each hill on which observations were recorded. Thus yield from 105 hills from natural infestation plot and yield from 108 hills from augmentation plot has to be recorded.

Yield of whole Plot:

At harvest, after taking samples, record total WE in the plot (in all replications in 80 sq.m) and record total plot yield also.

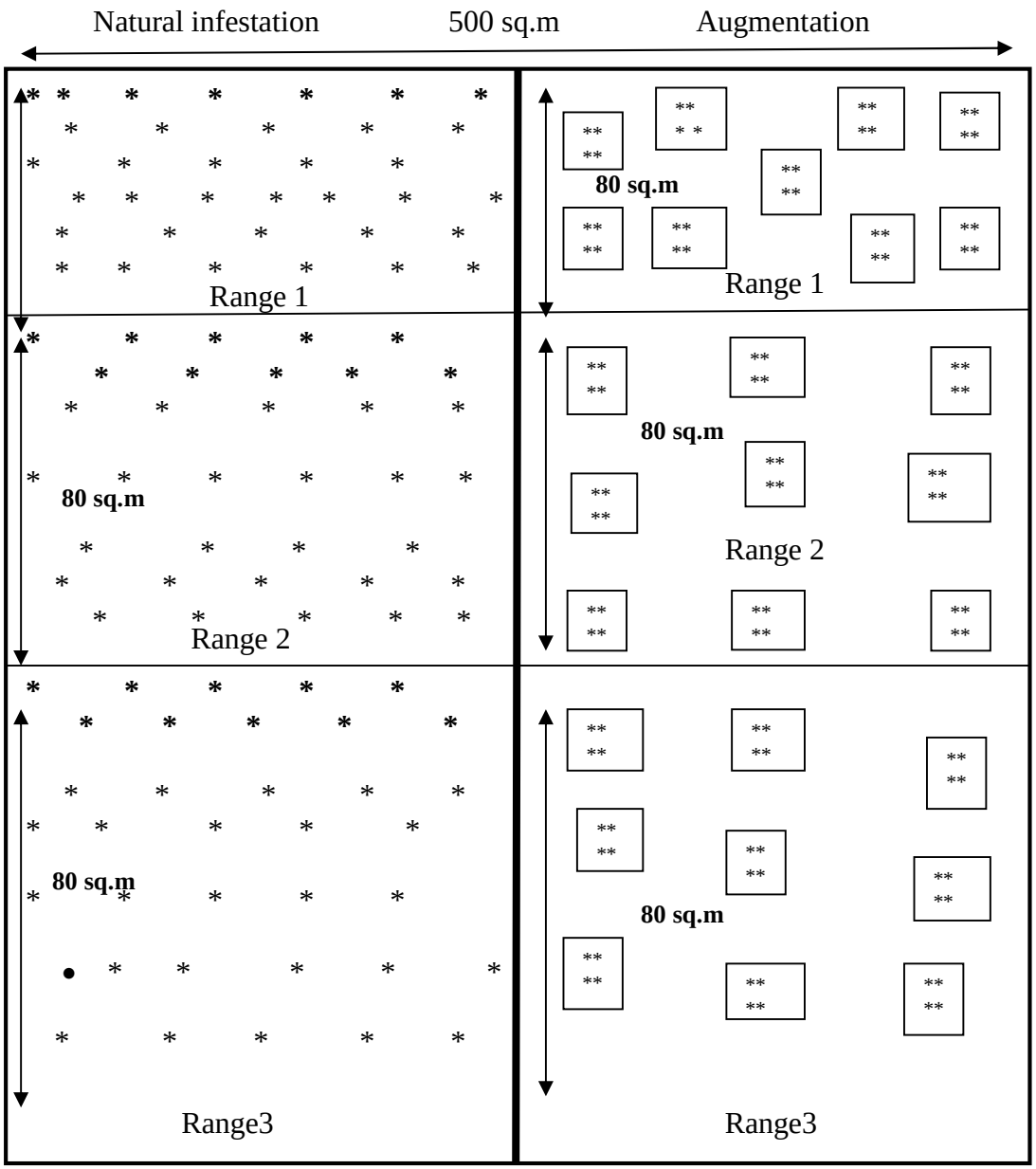
Validation of the model: Mark 3 m X 3 m area at three places in both natural infestation plot and augmentation plot in all the 3 ranges. Record total number of panicle bearing tillers

and white ears in the marked area and record the yield. Thus yield from 18 marked areas (9 from natural infestation plot & 9 from augmented plot) will be recorded at the time of harvest.

Note:

i) **No insecticide should be applied in the main field.**
ii) **Need based application of fungicide/ herbicide may be done and recorded**

LAYOUT PLAN FOR ESTIMATION OF YIELD LOSSES DUE TO INSECT PESTS (YLET), *KHARIF* 2016



***= hill**

ICAR - INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030

Coordinated Entomology Trials, *Kharif* 2017 & *Rabi* 2017-18

Name of the Trial	**Integrated Pest Management (Special)**
Objective	To validate 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).
Locations	**NICRA locations (6)** – Raipur, Chinsurah, Mandya, Karjat, Aduthurai & IIRR **Other locations(14)** – Arundhutinagar, Chiplima, Coimbatore, Gangavathi, Jagdalpur, Kurumbapet, Ludhiana, Malan, Masodha, Nellore, Pantnagar, Pusa, Rajendranagar, Sakoli, Titabar, Warangal
Variety	Local popular variety of the region
Plot size	Two blocks of not less than 1 acre for each block.
Replications	5 replications. Divide each block into 5 equal sized units (each unit = one replication)
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
Details of the treatments	The package of practices to be followed in each block are given below:

Details of treatments	**IPM block**	**FP block**
Nursery	• Seed treatment with Carbandezim @ 2 g for kg seed. Soak these treated seed overnight in 10 liter water and keep in gunny bag for germination (see attached detailed instructions) • Apply Carbofuran @ 1.1 kg a.i./ ha, 5 days before pulling seedlings from nursery for transplantation. (In gall midge endemic areas)	As per the local farmers practice. **Please record the practices followed by farmers whenever you go for observation/visit.**

Main field	• Transplant seedlings at a spacing of 20 x 15 cm. • Leave alleyways of 30 cm after every 2 m or 10 rows. • Fertilizers should be applied as per local recommended fertilizer dose. • Apply Butachlor 1.5 kg a.i./ ha within one week after transplanting the crop . • Survey for pest incidence and level of damage at weekly interval starting from 15 DAT. • If BLB symptoms seen between 20 to 30 DAT, split doses of nitrogen may be delayed, particularly the second dose. • At 15 DAT, install pheromone traps with 5 mg lure @ 8 traps/ ha for stem borer monitoring. While installing make sure that the trap remains above the crop canopy.	As per the local farmers practice **Please record the practices followed by farmers whenever you go for observation / visit**
30 – 59 DAT	• Depending on weed intensity spray post emergence herbicide as given (Pg. No. 5) • Observe bund area and if sheath blight is observed on weeds, go for spray (as given in Pg.No. 6). • N top dressing to be taken up as given in protocol using Leaf Color Chart • Mid season drainage.	As per the local farmers practice (mention the quantities) **Please record the practices followed by farmers when- ever you go for observation/visit**
60 – 90 DAT	• One spray of Cartap hydrochloride 50 WP @ 600 g / ha at 60 DAT (against stem borer/leaf folder, if incidence crosses ET value). • Need based application of Propiconazole (Pl see Pg No. 6). • Mid season drainage should be followed in case of BPH incidence.	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	• Mark 5 X 5 m^2 area and take yield, at 5 places (5 repl.) in this block	• Mark 5 X 5 m^2 and take yield, at 5 places (5 repl.) in this 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	• Also record the cost involved for each practice/ operation taken up by farmers 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 (25hills/ each block) at weekly interval. (Total of 25 hills in IPM block & 25 hills in FP block 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.

Record disease incidence (% disease severity) against Blast (leaf/neck), bacterial blight and other major diseases.

Record the following weed observations:

- Weed population (number/m^2) 30, 60 DAT
- Dry weight (gm/ m^2)of weeds at 30, 60 DAT

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

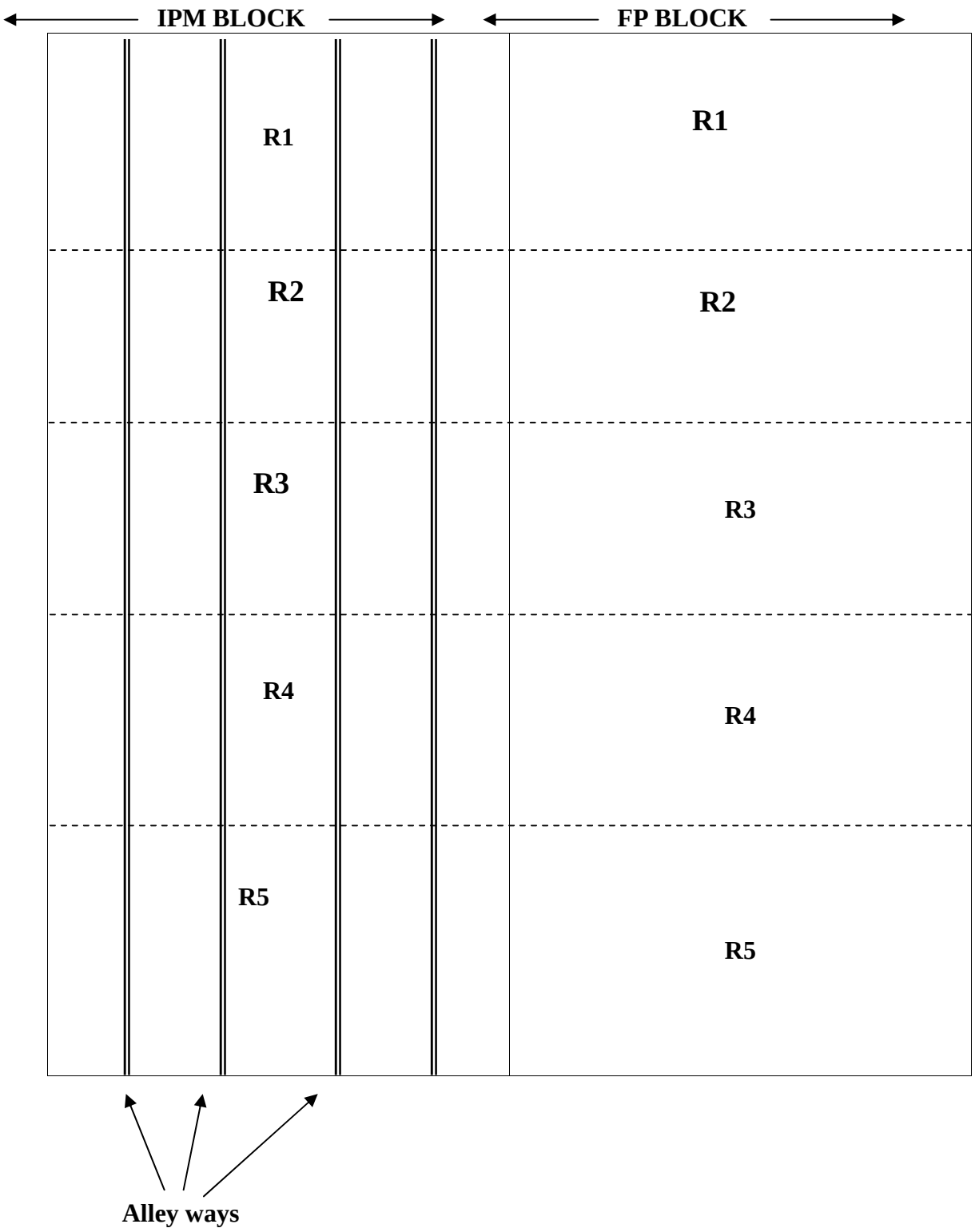
Note: In case of insect/ disease infestation, please follow ETL's and control measures should be taken as per the IPM guidelines/protocol given below. Inform/consult concerned PI/scientist in case of severe infestation or when in doubt about action to be taken.

DRR IPM team

Dr. G Katti, PI, Entomology - gururajkatti@yahoo.com; 09490312860
Dr. M. Srinivas Prasad – PI, Plant Pathology, data.msprasad@gmail.com; 09849291553
Dr. R Mahender Kumar, PI, Agronomy - kumarrm213@gmail.com; 09440476493
Dr. Ch. Padmavathi, PS, Entomology – paddi68@rediffmail.com ; 09440469070
Dr D Krishnaveni, PS, Plant Pathology - krishnavenid4@gmail.com; 09949345754
Dr. B Sreedevi, PS, Agronomy - sreedevi.palakolanu@gmail.com; 09440089607

Note: You can contact anyone at any time

LAYOUT PLAN FOR INTEGRATED PEST MANAGEMENT (SPECIAL) *KHARIF* 2017



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 m^2 nursery area or Pretilachlor+ safener @ 60ml/250 m^2 nursery area application 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 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 2^{nd} day after transplanting based on land leveling and water supply status.

Post-emergence application:

*Broad spectrum weed control – Bispyribasodium @ 250ml/ha at 2-3 leaf stage of weeds- spot application or Chlorimuron + Metsulfuron-methyl (Grasses, Sedges and Annual BLW) at 20-25 DAT @ 20 gm/ha

***** If Broad leaf weeds predominate, apply 2, 4-D Na salt @ 1250-1500 g/ha at 20-25 DAT

* If grasses predominate, apply Cyhalofbutyl @1000 m/ha at 15-20 DAT or Fenoxaprop p ethyl @ 800-100ml/ ha at 25-30 DAT.

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 m^2 area in each replication with the help of a quadrate. Collect all the weeds, dry them in oven at 60^0 C for constant dry wet and record dry weight at 20, 40, 60 DAT.

- Weed population (number/m^2) 30, 60 DAT
- Dry weight (gm/ m^2)of weeds at 30, 60 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 should be treated with carbendazim @ 2 gm/kg seeds (wet seed treatment)

Method: 10 gm of Bavistin should be mixed with 10 litres of water in a bucket and 10 kg cleaned rice seeds should be put in that solution. The chaffs which will float should be removed by hand. Seeds should be mixed with the solution properly with the help of a clean bamboo peg or stick. The seeds should be left in the solution for 24 hours. After 24 hours, the fungicide solution should be decanted and the seeds should be put in a clean and wet cloth bag and should be tied properly. 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 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.

BLB: BLB appears initially in patches and near the shades. If BLB 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 chlorothalonil75 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 carbendazim

50 WP @ 1g/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	BLB	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)

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
1	Stem borer	10 % dead hearts or one adult moth or one egg mass per sq. m or >30 moths/pheromone trap/week
2	Gall midge	5 percent silver shoots
3	Leaf folder	2 damaged leaves per hill with a live larva.
4	Planthoppers	10 insects/hill at vegetative stage; 20 insects/hill at later stage.

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 buildup.

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 deadhearts/ whiteears 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 buildup. When trap catches exceed 30-35 moths/trap/week, go for suggested measures. Change the lure after 25 days as it loses its effectiveness.

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.

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. Part-time skilled/semi skilled help may be hired for recording the pest damage. Data recorded may be sent to IIRR IPM team.

During any of the surveillance, if the pest damage crosses threshold, IPM interventions need to be decided within 24 h in consulation 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 practice being followed in FP plots. This information may also be forwarded to IIRR unit.

INDIAN INSTITUTE OF RICE RESEARCH
RAJENDRANAGAR, HYDERABAD - 500 030.

Coordinated Entomology Trials, *Kharif* 2017 & Rabi 2017-18

7. 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 : **Two light traps are to be installed**:
1. **Light trap1** – Old light trap of the centre to be continued (Mention the type of light trap installed, type of bulb and wattage of bulb used)
2. **Light trap 2*** – Light trap supplied by Fine Trap (India) Co. to be installed with an isolation distance of at least 500 m and wherever feasible the distance may be maintained at 1-2 km from light trap1.

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
- **Two separate data sheets** i.e. one for Light trap1 (old trap) and the other for Light trap 2 (supplied by Fine trap) are to be sent. Mention the insect species clearly.
- 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.

INDIAN INSTITUTE OF RICE RESEARCH

Rajendranagar, Hyderabad 500030

For more details contact

gururajkatti@yahoo.com