

Proceedings of the Concurrent Session of Entomology for formulation of Technical Program (2014-15)

Date: 7th & 8th April, 2014 in the seminar hall of Department of Entomology, PAU, Ludhiana.

Chairman: Dr (Mrs) Sandhya Kranthi, Head, Division of Crop Protection, CICR, Nagpur

Convener: Dr (Mrs) Dhara Jothi, Principal Investigator(Entomology), AICCIP

Rapporteurs: Dr Satnam Singh, Assistant Entomologist, PAU, RS, Faridkot

Dr Vijay Kumar, Entomologist, Department of Entomology, PAU

The convener and PI of the project, Dr. B Dhara Jothi stated the importance of historical pest data and its use for developing pest prediction model. The session started with centre wise presentations of the historical data and the prominent findings during 2013-14. Dr. Sandhya Kranthi, Chairperson of the session emphasized that the resistant and tolerant entries from the breeding material should be used to develop the live repository. Besides this the chairperson also highlighted some important issues such as monitoring of bollworms and *Spodoptera* sp through pheromone traps on cotton and on other alternate hosts during the cotton season, so as to have an overview of the pest populations throughout the season. She also emphasized about the monitoring of endoparasitoids in PBW and whitefly. Dr. K R Kranthi, Director, CICR also joined the session and advised the entomologists to come together and make use of the pest population data which was collected by the entomologists over the years. The Director also emphasized on product development through the screening of breeding material. Dr Kranthi also urged the entomologists to give the weekly advisory based on the pest status at the farmer's fields for its best utilization at the end-user and to create a wider impact. Dr B. Dhara Jothi assured the chairperson and Director CICR for completion of the proposed activities during this year. The Principal investigator appreciated the entomologists for the timely supply of the entomological data and proposed the vote of thanks.

ENTOMOLOGY PANEL: TECHNICAL PROGRAMME FOR 2014-15

Ent. 1 (a): Screening of breeding material for resistance to insect pests (Zonal Trials Only):

All Centres :

The screening of all the breeding materials of the respective centres should be carried out under unprotected conditions as per the established standard protocol of AICCIP.

- Include **check entries without seed treatment** as that of coded entries
- Find out resistant/tolerant entries (reference to varieties)
- Shortlist resistant/tolerant entries
- Collect seeds for advanced screening trial

Check entries for the different zones:

North Zone: RS2013 (resistant to jassid & whitefly); GA (susceptible) MRC 7017 BGII (bollworm resistant); MRC 7017 NBt (bollworm susceptible)

(Action: Dr P L Nehra/ Dr P Pundhir, Sriganaganagar, to provide seeds of RS2013 and GA to all concerned)

Central Zone: DHY286 (jassid resistant); DCH32 (susceptible) Bunny BGII (bollworm resistant); Bunny non Bt (bollworm susceptible)

(Action: Seeds supply – Sr Cotton breeders of their respective centres, Dr. S.B. Patil, Dharwad, Bunny Non Bt –PI, Entomology)

South Zone: Bunny (Jassid tolerant); DCH32 (susceptible) Bunny BGII (bollworm resistant); Bunny Non Bt (bollworm susceptible)

(Action: Dr. S.B. Patil, Dharwad to provide seeds to all concerned, & Bunny Non Bt –PI, Entomology)

Besides the zonal trials, entomologists of all centres should observe the National Trials (Breeding/Pathology) for healthy plants from point of sucking pests up to 70 DAS and at harvest and tag them, report them and collect seeds for further screening in the next year.

Ent. 1 (b): Advanced screening of promising entries:

The large scale testing (6 rows) and then caging 4 plants with mosquito net and artificial release of the leafhoppers was proposed; the biochemical and biophysical basis of resistance will be studied under laboratory conditions.

The centers identified the following entries for leafhopper/ whitefly advanced screening:

Pests	North Zone	Central Zone	South Zone
Leafhopper	Bhatinda, Faridkot, Hisar, CICR (Sirsa), Srignanganagar	Khandwa, Surat, Akola, Rahuri, Bhavanipatna, Banswara, Junagadh, Nanded	Nandyal, Guntur, Dharwad, Raichur, TNAU- Coimbatore and Srivalliputhur
	CSH 3129, FHH200, RS 2711, HS 286, CA 105, PUSA 5760, LH 2220, F2337, FHH209, F2381, P131	BGDS 1063, GSHV 162, GSHH 2646, RHH 0707, SHH 801, GTHH 193, SHH 802, DHH 1252, GSHH 2646, DHH 1251, GSHH 2639, GTHV 04/13	SCS 1062, ADB 542, CSH 1110, GBHV 180, NDHL 1943, BGDS 1063, GJHV 500, CNH 281, AKH 2006-2, NH 630, ARBC 64

Ent 1 .C. Development of the sucking pest resistant repository (all centres)

Based on the previous 5 years screening data the top 2 entries under different trials screening trials will be identified on the basis of JIG and whitefly population. The availability of the seed will be ensured from the respective centers from where the entry was proposed/ developed. The identified entries will be screened under field conditions.

Action : Dr Satnam Singh for North zone,

Dr H R Desai for Central zone,

Dr G M V Prasad Rao for South zone

to shortlist the entries and confirm the availability of the seeds and further communicate to PI. The large scale testing (3 rows) will be carried out in two replications along with the susceptible and resistant checks.

North Zone: RS2013 (resistant to jassid & whitefly); GA (susceptible)

Central Zone: DHY286 (jassid resistant); DCH32 (susceptible)

South Zone: Bunny (Jassid tolerant); DCH32 (susceptible)

Ent. 2: Population dynamics to develop suitable forecasting model: All centres

Data should be taken for both sucking pests and bollworms from RS 2013, Ganganagar Ageti, HS-6, BG and BG-II respectively for North India and DCH32, BG and BG-II for Central and South India.

S. No	State	Variety/Hybrid/Bt hybrid				Centres
		Sucking pest	Bollworm	BG hybrids	BG-II hybrids	
			Non BG			
1	Rajasthan	Ganganagar Ageti, RS2013	HS6	RCH134BG	RCH-134BG-II	Sriganganagar, Banswara
2	Punjab	Ganganagar Ageti, RS2013	HS6	RCH134BG	RCH-134BG-II	Faridkot, Bhatinda
3	Haryana	Ganganagar Ageti, RS2013	HS6	RCH134BG	RCH-134BG-II	Hisar, CICR, Sirsa
4	Gujarat	DCH32	DCH32	RCH 2 Bt	RCH-2BG-II	Surat (I), Junagarh,
5	MP	DCH32	DCH32		RCH-2 BG-II	Khandwa
6	Maharashtra	DCH32	DCH32		RCH-2BG-II	Nanded, Akola, Rahuri
7	Karnataka	DCH32	DCH32		RCH-2BG-II	Dharwad, Raichur
8	AP	DCH32	DCH32		RCH-2BG-II	Guntur, Nandyal
9	Tamil Nadu	DCH32	DCH32		RCH-2BG-II	TNAU-Coimbatore, Srivilliputhur
10	Odisha*	DCH 32	DCH 32		Nil	Nil

*No Bt entries will be evaluated in Odisha

- **Experimental layout:** At least 3000-4000 sq. meter plots (as per availability) be sown for the studies on population dynamics. Divide the plot into 2 half each (both under protected and unprotected condition). In North Zone, division of area will be according to the varieties/hybrids sown. Keep one half untreated (for sucking pests) and apply required sprays of neonicotinoids (imidacloprid/acetamiprid/thiamethoxam/clothianidin)

in the other half as per requirement to keep the population of leafhopper under control, along with Gaucho seed treatment so that the observations for the bollworm can be taken. Collect 150 bolls from each variety and hybrid at 120, 140 and 160 DAS and send the bolls to CICR, Sirsa (North), CICR, Nagpur (Central) and CICR Coimbatore (South) for further recovery of bollworms, particularly the PBW.

- Monitor for the presence of dead pink bollworm larvae beginning 90 DAS to 150 DAS and observe for the emergence of endoparasitoids at each centre.
- **Observations to be recorded:** Weekly observations for aphid, jassid, whitefly, thrips (3 leaves/plant), mealy bug, ABW, SBW, PBW and associated natural enemies after one **month of sowing** (Natural enemies to be recorded species wise).
- Any unusual survival and higher levels of infestation must be notified to Dr. B.Dhara jothi and Dr. K. R. Kranthi immediately by mail and phone. The surviving bollworms (*Helicoverpa armigera* and *Pectinophora gossypiella*) larvae both from Bt and conventional cotton will be brought to the laboratory. From North Zone the larvae shall be sent to Dr. Rishi, Sirsa, Central Zone to Dr. Sandhya Kranthi, Nagpur and for South Zone to Dr. B. Dhara Jothi for carrying out resistance monitoring bioassays.
- Dr. P.L.Nehra/ Dr P Pundir will supply the seed of Ganganagar Ageti and RS2013 to all the concerned centres. Dr. K.K. Dahiya, Professor, Entomology, HAU, HISAR will arrange for the seed of HS-6. Dr. S.B. Patil, Dharwad will supply the untreated seed of DCH 32 to the concerned centres directly. The mentioned BG-II hybrid can be obtained directly from the market.
- Monitoring of bollworms across the country, through pheromone traps and lures uniformly sourced from a single best source may be carried out during the season and off season and data may be recorded. Care must be taken to change lures at recommended frequency.
- Monitoring of insect fauna in protected and unprotected plots: Apart from the regular 6 plant scouting, yellow sticky traps from standard companies (uniform source across centres) may be installed at recommended rates in the protected and unprotected plots to monitor the insect fauna (pest and natural enemies both diversity and numbers) to understand seasonal dynamics. Care must be taken to replace installation of yellow sticky traps at recommended frequency during the season.

Action --- All Centres

Ent 3 Compilation of last 10 years data on insect pests of cotton collected by AICCCIP Entomologists

- Digitalization and Compilation of historical data in XL Sheet and also graphical representation for further publication.
- **Action: Dr. Rishi Kumar and Dr Satnam Singh** ----- **North Zone**
Dr. H .R .Desai and Dr Uttam Hole ----- **Central Zone**
Dr .Beemanna, Dr G M V Rao ----- **South Zone**

Ent. 4: Survey for key and emerging pests in cotton in Farmers Field for weekly advisory

All the centre are requested to collect weekly information on the incidence of the pest and inform **through mail to the PI , Entomology** for further publishing the information through weekly advisory.

Action : All centres

Ent 5 a : To study the efficacy of insecticides and biopesticides as a module and in isolation against whitefly- **All Centers of North Zone.**

Name of the hybrid: **MRC 7017BG II**, No of treatments: **9**,

S. N	20 DAS	45 DAS*	60DAS	75 DAS	90 DAS	105 DAS	120 DAS
T1	Nimbecidine	<i>V. lacanii</i>	<i>Metarhizium anisopliae</i>	Difenthiuron	Hort. Mineral oil	Triazophos 40%EC	*Spiromesifen/ <i>M. anisopliae</i>
T2	Nimbecidine	-----	-----	-----	-----	-----	-----
T3	-----	<i>V. lacanii*</i>	-----	-----	-----	-----	-----
T4	-----	-----	<i>Metarhizium* anisopliae</i>	-----	-----	-----	-----
T5	-----	-----	-----	Difenthiuron	-----	-----	-----
T6	-----	-----	-----	-----	Hort. Mineral oil	-----	-----
T7	-----	-----	-----	-----	-----	Triazophos40% EC	-----
T8	-----	-----	-----	-----	-----	-----	*Spiromesifen (Oberon 200ml/acre/ <i>Metarhizium anisopliae</i> @10gms/lit

T9	Control
❖	<i>V. lacanii</i> *, <i>Metarhizium</i> * <i>anisopliae</i> will be repeated after 15 days interval in T3&T4 Sirsa and Faridkot will be conducting separate trial with Neemazal Sirsa -Neemazal- 1%WSC-3ml/lit, Faridkot – Neemazal 5%WSC -1ml/lit as a continuation of last year(Experiment -Ent 5b)

Design: **RBD**

Action : Sirsa/Faridkot/Hisar/Sriganganagar

Observations: Populations of White fly, natural enemies will be recorded from 5 tagged plants in each plot at Pre and 3rd, 7th day after insecticidal spray. **Observations on the leaf curl virus incidence also will be recorded.**

Doses: Nimbecidine @ 5ml/litre, Triazophos 600g a.i/ha, Diafenthiuron @ 325g ai /ha, Mineral oil 0.5 % (as per the availability and specification provided, Dr Satnam will arrange), *V.lacanii* @5 gm/lit (Common source), *Metarhizium anisopliae* -5gms/lit (Common source) (YST as per recommendation and from common source).

- ❖ Whiteflies will also be brought to the lab and observed for emergence of parasitoids atleast at 2 centres.
- ❖ Populations of leaf hoppers and thrips will also be recorded to see if these insecticides cause their flare up.
- ❖ Use yellow sticky traps at recommended rates (20 days interval) starting from 20DAS to monitor for whitefly activity in all plots . This will be helpful for those periods we are not recording observations. Replace at recommended frequency and record observations off the trap.
- ❖ *The intervention at 120 days will be done depending on the whitefly population and availability of the product

Ent 5.b.To study the efficacy of insecticides against sucking pests .

Action : All Centers of Central and South Zone.

Name of the hybrid: RCH 2Bt (*RCH 2 NBt @ OUAT, Bhavanipatna)

No of treatments: Design: RBD

Locations: All centres of Central and South Zone

Observations: Record the incidence of all the sucking pests and their natural enemies (predators and parasites) before and one week after application of insecticides, which will be done at the moderate level of incidence noticed. The natural enemy's population will be recorded individually.

S. No.	Insecticide	Dose (g ai/ha)
1	Buprofezin 25% SC	250
2	Flonicamid 50%WG	75
3	Flonicamid 50%WG	100
4	Fipronil 5% SC	87.5
5	Fipronil 5% SC	50
6	NSKE	5 %
7	Diafenthuron 50%WP	300
8	<i>V.lacanii</i>	5 gms/lit
9	<i>Metarhizium anisopliae</i>	3gms/lit
10	Untreated control	----
•	TNAU-Coimbatore and Guntur will have one extra treatment with Neemazal 1%EC	3ml/lit
•	Akola and Junagadh will be testing one extra treatment with Neemazal 5%WSC	1ml/lit

**V.lacanii*, *Metarhizium anisopliae* will be supplied by Dr.J.Gulsar Banu, Principal Scientist, Nematology from CICR,RS,COIMBATORE.

**LIST OF SCIENTISTS AND PRIVATE COMPANY REPRESENTATIVES DURING
ENTOMOLOGY SESSION (2014-15) HELD AT PAU: Ludhiana**

1. Dr. K. R. Kranthi, Director, Central Institute for Cotton Research, Nagpur
2. Dr (Mrs)Sandhya Kranthi, Head, Division of Crop Protection, Central Institute for Cotton Research, Nagpur
2. Dr.(Mrs).B.Dhara Jothi, Principal Investigator, Entomology, AICCIP

North Zone

S. No.	Name	Designation & Association	E-mail address	Mobile No.
1	Dr. K. K. Dahiya	HAU, Hisar		
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4	Dr Roop Singh Meena	SKRAU, ARS Sriganganagar		

Central Zone

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3	Dr Nirayan Mans	OUAT, Bhawanipatna, Odisha		
4	Dr. S.K. Parsai	Entomologist (Cotton) Regional Agricultural Research Station, Khandwa-450001(MP)	skparsai@gmail.com	09406677601
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4	Dr. V Surekha Devi	Scientist (Ento.) RARS, RARS, Nandyal		
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10	Dr. S S Udikeri	Assoc. Professor (Entomology), UAS Dharwad		
11	Dr M Sabesh	Scientist, CICR, Regional Station, Coimbatore-641003.		

Private Sector Representatives

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3	Girish Kamble	Mahyco Seeds Company, Jalna (MS)		