Proceedings of the Concurrent Session on Entomology for formulation of Technical Program (2013-14)

The Entomology session was chaired by Dr K. R. Kranthi, Director, Central Institute for Cotton Research, Nagpur; Dr O. P. Ameta, University Head, Department of Entomology, was Co–chairman of the session; Dr. S. Mohan, Professor and Principal Investigator, AICCIP Entomology was convener of the session; Dr Rishi Kumar, Senior Scientist (Entomology), CICR, RS, Sirsa and Professor Swaminathan, Department of Entomology, MPUAT, Udaipur were the rapporteurs for the session. In all 31 research scientists from the University, ICAR institutes and the representatives from private companies attended the session.

The convener and PI of the project, Dr. S. Mohan, stating the importance some basic/fundamental research emphasized the need for advancing 10 entries for registration during this year from the entomological screening trials. Dr. O. P. Ameta suggested comparative analysis of entries for resistance, as resistance breeding happens to be economical and is an ecologically viable method of pest management. Dr. Mohan also apprised the house about the QRT recommendation where a location-specific trial regarding the Integrated Management of cotton was suggested. Dr. Kranthi, Chairman of the session while commenting on this advised the use of recommended package of practices including the use of resistant variety (most popular hybrid) and best molecule available in terms of ecology for a sustainable management program. He informed the house that if a label claim dosage is not giving the desired results and higher dosage is required it indicates the beginning of resistance. Besides, experimental trials on leaf hopper and whitefly, Dr. Ameta suggested for emphasis on thrips because of its increasing population year after year. Dr. Srinivasan from Mahyco suggested studying the bio-efficacy of the chemical molecules through AICCIP followed by its recommendation. Dr. Dhara Jothi informed the house that in the event of increased numbers of sprays to curb sucking pests, a useful module would become necessary for the management of sucking pests. Dr. Kranthi also advised regular monitoring of the resistance in insects to insecticides and *cry* toxins and formulate appropriate IRM strategy. Dr. K. Mohan from Monsanto suggested for the development of resistance monitoring infrastructure. Chairman also suggested that from national screening trial of breeders material healthy plants should be selected at 45, 60, 75 and 90 DAS and forwarded for further screening in Ent1(b). The chairman also suggested that based on agro-ecological zone the data generated through AICCIP system regarding the incidence of insect - pests from last 5-10 years can be compiled and individual pest-wise peak can be plotted through a graph and can be correlated with the weather parameters. The Principal investigator assured the chairman for completion of the proposed activities during this year.

ENTOMOLOGY PANEL: TECHNICAL PROGRAMME FOR 2013-14

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 centre should be carried out under unprotected condition 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) MRC6304 Bt (bollworm resistant); HS6 (bollworm susceptible)
(Action: Dr.C.J.Kapoor, Sri Ganganagar, to provide seeds to all concerned)

Central Zone: DHY286 (jassid resistant); DCH32 (susceptible) Bunny Bt (bollworm resistant); RCH 2 NBt (bollworm susceptible)
(Action: Seeds supply – Sr Cotton breeders of their respective centres)

South Zone: Bunny (Jassid tolerant); DCH32 (susceptible) Bunny Bt (bollworm resistant); DCH 32 (bollworm susceptible)
(Action: Dr. S.B. Patil, Dharwad to provide seeds to all concerned)

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; entomologists testing this would be acknowledged. It was proposed that the standard methodology will be circulated for artificial screening by P.I. In large scale testing a susceptible check may be included.

The centers identified for leafhopper advanced screening:

Pests	North Zone	Central Zone	South Zone
Leafhopper	Faridkot, Hisar, CICR (Sirsa)	Khandwa, Surat, Akola,Rahuri	Guntur, Dharwad, Raichur, Srivilliputur, CICR (CBE)
	LH2220, LH2256, H1442, CA105, Pusa5760, F 2228, LH 2152, F 2276, LHH 1403, RAJHH 844, LHH 1411, FHH 200	GJHV 440, GSHV 162, RHCO 717, GSHV 159, GTHH 193, RHH 0707, GTHH 194, GSHH 2729, TSHH 0629	TSHH 0629

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

Data should be taken for both sucking pests and bollworms from 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			
			Non BG	BG hybrids	BG-II hybrids	
1	Rajasthan	Ganganagar Ageti	HS6	RCH134BG	RCH-134BG-II	Sri Ganganagar
2	Punjab	Ganganagar Ageti	HS6	RCH134BG	RCH-134BG-II	Faridkot, Bhatinda
3	Haryana	Ganganagar Ageti	HS6	RCH134BG	RCH-134BG-II	Hisar
4	Gujrat	DCH32	DCH32*	Any popular BG hybrid	RCH-2BG-II	Surat (I), Junagarh, Bharuch
5	MP	DCH32	DCH32*		RCH-2 BG-II	Khandwa
6	Maharastra	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, Raichur
9	Tamil Nadu	DCH32	DCH32*		RCH-2BG-II	Coimbatore, Srivilliputhur

- **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 jassid under control 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.

- **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. Mohan 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 will supply the seed of Ganganagar Ageti 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 through pheromone traps may be carried out and data may be recorded.

Compilation of last 10 years data on insect pests of cotton collected by AICCIP Entomologists

Compilation of last 10 years' AICCIP insect pest data and plotting of peak and their correlation with weather parameters. If any centre has data less than this stipulated 10years those centres compile the data available with them.

Ent. 3 (b): Revalidation of existing recommendation of insecticides against sucking pests in cotton ecosystem. (All centres)

This experiment is proposed to test if the existing recommended doses of popular insecticides in cotton ecosystem are in accordance with label claim.

Hybrid: Popular Bt cotton hybrid of the region: RCH-134BG-II for North and RCH2BG-II for south and central 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.

Design of Experiment: **Two Factorial RBD**

Treatments: 11 **Replications**: **3**

S. N.	Treatment	Label Claim Dose (g. a.i./ha)	University Recommended Dose (g. a.i./ha)
1	Acephate 75% SP	**292**	**Respective university recommendations may be followed for individual treatments**
2	Acetamiprid 20% SP	**10**	
3	Acetamiprid 20% SP **(Whitefly only)**	**20**	
4	Buprofezin (IGR) 25% SC	**250**	
5	Imidacloprid 17.8% SL	**22.5**	
6	Thiamethoxam 25% WG	**25**	
7	Thiamethoxam 25% WG **(White fly only)**	**50**	
8	Fipronil 5% SC	**87.5**	
9	Diafenthiuron 50% WP	**300**	
10	Flonicamid 50% WG	**75**	
11	Control	**-**	

Note: *For any insecticides other than above recommended by SAU-s, take the label claim dose from CIB website and compare*.

Ent. 4: Integrated cotton crop management with emphasis on biotic stress (All centres)

S. No.	Particulars	Purpose
	Hybrid	Sucking pest resistant/tolerant, popular Bt cotton hybrid as per University recommendation
	Seed treatment	Thiram/Carbendazim 2g/Kg of seed, *Trichodermma viridae* or *Pseudomonas florescence* @5-10g/kg of seed
	Trap crop	Castor as a trap for *Spodoptera litura*
	Border crop/row	Two rows of Maize/Jowar
	Intercrop	Cowpea/black gram or any other intercrop as per the zonal requirement
	Fertilizer application	Organic + 75% RDF in three splits
	Herbicide application	For management of location specific weeds
	Insecticidal application	Need based application of insecticides based on IRAC/WHO ranking based mode of action can be applied Acephate/Flonicamid/Fipronil/Buprofezin/Spiromesifen/Spinosys **Start need based application with botanical insecticides.**
	Yellow Sticky Traps	For monitoring of whitefly
	Pheromone traps	For monitoring of bollworms
	IDM	Need based disease management as per University recommendations
	Harvest	Record the number of pickings and the quantity of kapas harvested at each picking. Give the total yield of the trial plot.

Note:

- Local specific problems like para-wilt, leaf reddening, shoot weevil, stem weevil should be taken care by the concerned centres besides the above.
- University recommendation should be followed by the respective centre with reference to nutrient/ pest management.
- Help of pathologist/ agronomist should be taken and due recognition will be given while publishing papers.
- Area to be covered: **½ to 1.0 acre** (Farmers field **OR** on farm).
- Observations on incidence of insect pests have to be recorded once during the peak period of infestation (atleast two observations for each peak). Mean incidence with standard deviation and standard error may be reported for all pests separately.
- For disease intensity observation and any deficiency diseases the AICCIP pathologists and agronomists may be consulted and observations may be recorded during the peak incidence.

LIST OF SCIENTISTS AND PRIVATE COMPANY REPRESENTATIVES DURING ENTOMOLOGY SESSION (2012-13) HELD AT MPUAT: UDAIPUR

1. Dr. K. R. Kranthi, Director, Central Institute for Cotton Research, Nagpur
2. Dr. S. Mohan, Principal Investigator, AICCIP
3. Dr. Dr. O. P. Ameta, Head, Department of Entomology, MPUAT, Udaipur
4. Dr. K. K. Dahiya, Director R. D. S. Seed Farm, CCSHAU, Hisar

North Zone

S. No.	Name	Designation & Association	E-mail address	Mobile No.
1	Dr. Rishi Kumar	CICR, RS, Sirsa	rishipareek70@yahoo.co.in	9466375285
2	Dr. Satnam Singh	PAU. Faridkot	satnam@pau.edu.	9876962774
3	Dr. Suneet Pandher	PAU. Faridkot	suneet@pau.edu.	9814513681
4	Dr. Krishna Rolania	CCSHAU, Hisar	krishnarolania@rediffmail.com	9468192822
5	Dr. Sanjeev Kumar	PAU, Bhatinda	k.sanjeev@pau.edu	9463350058

Central Zone

S. No.	Name	Designation & Association	E-mail address	Mobile No.
1	R. K Kalyan	ARS,Banswara	rkkalyan@rediffmail.com	9414319459
2	Dr. U.B. Hole	Cotton Entomologist, Cotton Improvement Project, MPKV, Rahuri-413722 Distt. Ahmednagar (M.S)	uttamhole@gmail.com	09960052852
3	Dr. P. W. Nemade	Assoc. Professor AICCIP, Dr. PKDV, Akola-444104 (M.S.)	prashan_wn@yahoo.co.in	09850208111
4	Dr. S.K. Parsai	Entomologist (Cotton) Regional Agricultural Research Station, Khandwa-450001(MP)	skparsai@gmail.com	09406677601
5	Dr. P. R. Zanwar	Asstt.Entomologist CRS Nanded	pr_zanwar@rediffmail. com	09420848483
6	Dr. H. R. Desai	Associate Research Scientist, NAU, Surat	cottonist@nau.in	00925808694
7	R. K. Vekaria	Asstt. Research Scientist Junagarh Agril. University Junagarh-362001.	rkvekaria.jau.in	09824592133
8	Prof. D. N. Tejani	Assistant Research Scientist, ARS, Talod, Gujarat		

South Zone

S. No.	Name	Designation &Association	E-mail address	Mobile No.
1	Dr. N.V.V.S. Durga Prasad	Scientist (Ento.) Regional Agril. Res. Station, Lam, Guntur-522034	nemanidp@yahoo.com	09849176527
2	Dr. B. Dhara Jothi	Sr. Scientist Central Institute for Cotton Research, Regional Station, Coimbatore-641003.	bdhara.jothi@gmail.com	09443379355
3	Dr. S. Mohan	Professor (Ento.) Deptt. of Cotton TNAU	sarmamahan@hotmail.com	09488458006
4	Dr. A.S.R. Sarma	Scientist (Ento.) RARS, Nandyal	sharmarars@gmail.com	09966805948
5	Dr. M. Bheemanna	Sr. Scientist (Ento.) Main Agricultural Research Station, UAS, Raichur-584102, Karnataka.	bheemuent@rediffmail.com	09448633232
6	Dr. G.M.V. Prasada Rao	Sr. Scientist (Ento.) RARS, Lam, Guntur.	gmvprasadarao@rediff mail.com	09440092925
7	Dr. S.B. Patil	Sr. Scientist Agril. Research Station Dharwad, Karnataka.	patilsb_ent@yahoo.com	09448981533
8	Dr. M. Shanthi	Professor (Ento.) Cotton Research Station Srivalliputtur - 626125	cshantiento07@gmail.com	098424381322
9	Dr. B. S. Nandihalli	Principal Scientist (cotton Entomology) ARS, Dharwad-580007	b_nandihalli@rediffmail.com	09483749762
10	Dr. J. Gulsar Banu	Nematologist, CICR, Coimbatore		

COMPANY REPRESENTATIVES

S. No.	Name	Designation &Association	E-mail address	Mobile No.
1	P. Srinivas	MAYHCO, Jalna	srinivas.parimi@mahyco.com	09871182522
2	Dr. K. S. Mohan	Monsanto Research center	k.s.mohan@monsanto.com ksmohan775c@gmail.com	09845014856
3	Sushil Kadu	Mahyco Monsanto Biotech, Mumbai	sskadu@monsanto.com	
4	Dr. Ranjesh Kr. Singh	United Phosphorus Ltd., Delhi	ranjesh.singh@uniphos.com	09910041340
5	Dr. Vinod Singh Mehra	DOW Agro-India Pvt. Ltd., Karnal	vmehra@dow.com	09996012240