

PROCEEDINGS OF AICCIP ANNUAL GROUP MEETING: 2007-08
ENTOMOLOGY PANEL

The entomology panel meetings were held on the 9th and 10th April 2008, under the chairmanship of Dr T. P. Rajendran, ADG, (PP), ICAR, New Delhi and Dr N. S. Butter, Head, Entomology Department PAU, Ludhiana. Dr K. R. Kranthi, Head, Crop Protection, CICR, Nagpur acted as the co-chairman with Dr T. Surulivelu, Principal Investigator (Entomology) , CICR, Coimbatore as the convenor. Dr B. Dhara Jothi, Senior Scientist, CICR, Coimbatore, Dr Rishi Kumar, Senior Scientist, CICR, Sirsa and Dr Vikas Jindal, Assistant Entomologist, PAU, Ludhiana, were rapporteurs for the sessions. A total number of 33 participants comprising of entomologists and representatives from the pesticide and seed industry actively participated in the deliberations to discuss the results and formulation of technical programme for the year 2008-09.

A special combined session of entomology and pathology groups was convened in the panel meeting on the 10th April 2008, to review the changing pest and disease scenario all over the country in light of the recent changes in input management which includes extensive cultivation of Bt-cotton and introduction of new pesticides. Dr T. P. Rajendran requested all the participants to make an objective assessment of the changing dynamics to be able to draw inferences on the possible causes for the changes in pestilence, so that appropriate research programmes can developed to mitigate the emerging and impending pest problems. He emphasized on the need to make the projects more vibrant by including basic, strategic research and applied approaches at the stage of programme planning. He stressed the need to digitize data on population dynamics in consonance with the protocols developed by NCIPM so that the data could be utilized to harmonize seasonal dynamics data and derive a broader perspective of pest infestation at the national level. He suggested that the testing of new pesticides under field conditions should be preceded with toxicological data on target pests and non-target beneficial fauna, which are predominant in the Indian conditions. Dr T. P. Rajendran expressed his concern on the Bt-seed purity and the quality of imidacloprid used for seed treatment. The house felt the incidence of sucking pests during the intial period of crop phase in the North zone was below threshold level almost in all the centres, the seed treatment has to be relooked in the light of *Bt* cotton. Dr.K.R.Kranthi mentioned that the mealy bug, *Phenacoccus solenopsis* found throughout India is a homogenous population based on the molecular marker analysis and informed that this is an exotic pest. A manual will be brought out for the total protocol and data reporting set up for all the experiments of AICCIP and will be supplied to all the entomologists by PI.

The following suggestions were made by the PI Entomology, for improvement of the reporting system.

- Annual report from the centres should reach the PI by the 1st February (North zone), 15th February (Central and South zone).
- The soft (CD-ROM) as well as hard copy of the report by post in addition to the email copy should be submitted.
- The susceptible check should be included in the screening trials.

Salient findings from the entomological experiments conducted during 2007-2008.

- Cultures tolerant to jassid and bollworms were identified from breeder's material from three cotton growing zones of India.
- In North Zone, among the sucking pests, jassid alone severe in Ludhiana, while other sucking pests were very low in all the centres. Spotted bollworm was at moderate level (1.4 to 5.1/ 5 plants) and pink bollworm was high (2.2 to 7.0/ 20 green bolls) in Sriganaganagar, while *Heliothis* and pink bollworm were almost nil in all the centres.
- Except Nanded all the centres in Central zone recorded moderately higher level of jassid population, 6.3 to 18.7 / 3leaves in Banswara, 6.2 to 15.4 in Surat and 6.8 to 10.9 in Rahuri. Nanded recorded higher population of thrips (36 to 90 / 3 leaves) followed by Rahuri (30 to 39). Junagadh recorded higher population of whitefly (39 to 62 / 3 leaves), while it was very low in other centres.
- Spotted bollworm was at moderate level in Khandwa (2.1 to 5.9 / 5 plants), Bhawanipatna (5.0 to 9.2) and Akola (3.5 to 10.5). Very high population of pink bollworm recorded in Akola (7.3 to 45.3 / 20 green bolls) followed by Khandwa (1.7 to 8.3), Rahuri (2 to 10), while it was almost nil in other centres.
- In South zone, Dharwad recorded higher population of aphid (34 to 128 / 3 leaves), Jassid (6.1 to 7.8) and thrips (30 to 56), while all other centres recorded very low population of sucking pests.
- Mealybug which was originally considered as minor pest emerged as a major key pest and poses severe threat to cotton crop. Mealybug was found almost in all the centres of the three zones. Low temperature and high humidity favours the build up of pest. Discarding the uprooted infested plants, unnoticed infestation in the border rows, weed host and extended duration of cotton crop with irrigation and fertilizer, unfavourable abiotic factors etc. helped faster development and spread of the pest.

- New insecticides BYI 08330, SYN 13623 and spinosad at 187.5 ml were effective against sucking pests and recorded higher yield 55.8, 55.2 and 48.5 per cent, respectively over check.
- The treatments spirotetramat and spirotetramat + imidacloprid were found effective against mealy bug and recorded significantly higher yield of 11.78 and 10.59 q/ha as compared to 6.08 q/ha in control.
- Spinosad and Bt cotton treatments were effective against bollworms and recorded 46.0 and 39.0% higher yield over control, respectively.
- Adoption of IPM with Bt cotton hybrids revealed an increase of 12.7 % net returns viz., Rs. 37,097/ha as compared to Rs. 32,911/ha in non IPM with the same Bt hybrids.

TECHNICAL PROGRAMME FOR 2008-09

Ent 1a. Screening of breeding material for resistance to insect pests : All centers

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.

- The seeds of consistently tolerant entry of the respective centre should be collected from the respective Senior Cotton Breeder.
- Include **check entries without seed treatment** as that of coded entries
- Find out resistant/tolerant entries (reference to varieties)
- Collect seeds
- Grow second season
- Short list resistant/tolerant entries – observe mechanism of resistance/tolerance
- Send one set of seeds to Dr. K.R. Kranthi, CICR, Nagpur for cage studies with artificial bombardment. The second set of seeds should be carried forward for Ent1b advanced screening trial.

Check entries for the different zones.

North zone: RS2013 (resistant to jassid&whitefly); GA (susceptible)
RCH 134*Bt* (bollworm resistant); HS6 (bollworm susceptible)
(Action:Dr Vichiter Singh, Sri Ganganagar, to provide seeds to all concerned)

Central zone: DHY286 (jassid resistant); DCH32 (susceptible)
Bunny *Bt* (bollworm resistant); RCH 2 NB*t* (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 to provide seeds to all concerned)

Ent 1b. Advanced screening of promising entries :

The promising lines should be screened under artificial bombardment conditions in the concerned centres to investigate the mechanism of resistance/tolerance with specific reference to antixenosis and antibiosis.

The centers and the respective pests are

Pests	North zone	Central zone	South zone
Jassid		Khandwa, Surat, Nanded, Banswara	Lam, Coimbatore, Dharwad, Raichur
Whitefly	Faridkot	Banswara	
Spotted bollworms	Faridkot		
Pink bollworm	Sri Ganganagar	Akola	Dharwad
Stem weevil			Srivilliputtur

Ent 2. Population dynamics to develop suitable forecasting model: All AICCIP Centres, RRS, Aruppukottai and ARS, Raichur

Data should be taken for both sucking pests and bollworms from unprotected Bt and popular conventional hybrid/variety. The data should be collected in the format (Annexure I). The weekly data should be submitted at the end of **every month through email** to NCIPM with a copy to PI-Entomology (ipmnet@bol.net.in, pjkumar_ento@rediffmail.com, surulivelu@gmail.com).

Sr No	State	Bt	Variety/hybrid	Conditions	Centres
1.	Rajasthan	RCH 134 Bt	RS 2013	Irrigated	Sri Ganganagar
2.	Punjab	RCH 134 Bt	F 1861	Irrigated	Faridkot, Ludhiana
3.	Haryana	RCH 134 Bt	H 1117	Irrigated	Hisar
4.	Gujarat	RCH 2 Bt RCH 138 Bt	G Cot Hybrid 10 Hybrid 8	Irrigated & Rainfed	Surat (I), Junagadh Bharuch
5.	MP	RCH 2 Bt	LRA 5166	Irrigated	Khandwa
6.	Maharashtra	RCH 2 Bt RCH 138 Bt	LRA 5166	Rainfed Irrigated	Nanded, Akola, Rahuri
7.	Karnatka	Bunny Bt	Bunny N bt	Rainfed & Irrigated	Dharwad Raichur
8.	AP	Bunny Bt	Bunny N bt	Rainfed	Guntur, Nandyal Raichur
9.	Tamil Nadu	Bunny Bt	Bunny N bt	Irrigated	Coimbatore, Srivilliputhur

Ent 3. Evaluation of new insecticides for the management of cotton pests and their impact on non target organisms

Ent 3(a). New insecticides for the management of mealy bug the sucking pests.

The trial shall be undertaken with artificial inoculation of mealy bug in the research station.

A total number of eight treatments which include two combination products along with each of the individual insecticides, one standard check and control.

Treatments – 8, Replications – 3

Treatment No.	Chemical	Dose /ha
1.	Spirotetramat 15% OD @75 g a.i./ha	500ml
2.	Spirotetramat 15% OD @90 g a.i./ha	600ml
3.	Spirotetramat 12% + Imidacloprid 36% 480 SC (75 + 225 g a.i./ha)	625ml
4.	Spirotetramat 12% + Imidacloprid 36% 480 SC (90 + 270 g a.i./ha)	750ml
5.	Imidacloprid 70WG @225 g a.i./ha	321 g
6.	Imidacloprid 70WG @270 g a.i./ha	386 g
7.	Thiodicarb 75 WP (Std check) 750a.i./ha (Larvin 75 WP)	1Kg
8.	Untreated control	

Centres North: Faridkot, Hisar
Central: Akola, Surat

Target pests: mealy bugs, mirid bugs, aphid, jassids, thrips and mites

Application: 2-3 sprays, 1st spray as soon as the above pest starts and subsequent sprays at 8-12 days interval depending upon the pest pressure.

Ent 3b : Evaluation of buprofezin (IGR) and chlorpyrifos against mealy bug in cotton

Sl. No.	Treatments	Dosage (ml/ha)	Centres
1.	Buprofezin 25% SC (Applaud25%SC)	1000 ml	Sriganganagar, Hisar, Akola, Raichur
2.	Buprofezin 25% SC (Applaud25%SC)	1250 ml	
3.	Chlorpyrifos 50 EC @ 500 g a.i./ha	1000 ml	Faridkot, Surat, Sriganganagar, Akola, Raichur
4.	Chlorpyrifos 50 EC @ 1000 g a.i./ha	2000 ml	
5.	Profenophos	1500ml	All above centres
6.	Thiodicarb 75 WP (Std check) 750 g a.i./ha	1 kg/ha	
7.	Control		

Ent 3(c). Chemical control of sucking pests

Treatments:6, Replications:4

Treatment	Chemical	Dose (ml/g/ha)
1.	Fipronil 40% + Imidacloprid 40%-80WG (40+40 g ai./ha)	100g
2.	Fipronil 5% SC 40g ai./ha (Regent)	800ml
3.	Imidacloprid 200SL (40gai/ha)(Confidor)	200ml
4.	Acetamiprid 20SP (std check) 20g ai/ha (Pride 20SP)	100g
5.	Triazophos 40EC (std check) 600g ai/ha (Hostathion 40%EC)	1500ml
6.	Untreated control	

Target pests: mirid bugs, aphid, jassids and thrips

Application: 2-3 sprays, 1st spray as soon as the above pest starts and subsequent sprays at 8-12 days interval depending upon the pest pressure.

Genotypes: RCH2 *Bt* in all centres except north zone (RCH134*Bt*)

Centres: North : Sri Ganganagar, Ludhiana

Central: Nanded, Akola

South: Guntur, Dharwad, Srivilliputtur

Ent 4. Assessment of the influence of seed treatment / border crop in *Bt* sucking pests management

To assess the influence of seed treatment and border crop / barrier crop (pigeonpea/cowpea/maize) in *Bt* cotton sucking pest management, a trial has been laid out as indicated below.

Treatments: 4, Replications: 5, Plot size: 100 sq. m.

Treatment details

1. *Bt* without seed treatment
2. *Bt* without seed treatment + border / barrier crop
3. *Bt* with seed treatment
4. *Bt* with seed treatment + border /barrier crop

(**South**-RCH 2 *Bt*; **Central**: RCH 2 *Bt*, **North**-RCH 134 *Bt*)

Centres: North – Hisar, Sriganaganagar, Faridkot, Ludhiana

Central: Surat

South: Dharwad

Seeds will be provided by PC/PI getting from the concerned industry

Observations

1. Influence of seed treatment and border crop on prey and predators
2. Effect on emerging pests mealy bug and mirid bug
3. Yield

Note

ETL based plant protection for sucking pests/boll worms to be followed for all the treatments

Population dynamics data format

Sucking Pests

- Jassids : No. / 3 leaves
- Whitefly : No. of adults / 3 leaves
- Thrips : No. / 3 leaves
- Aphids : No. / 3 leaves
- Mirid bug : No. / 100 squares (10 top squares / plant, from 10 plants)
- Mealy bug : Grade 0-4
 - 0 – No damage
 - I – Scattered appearance of mealy bug
 - II – Fully infested on any one of the branch of plant
 - III – Infestation on more than one branch / half portion of the plant
 - IV – Heavy infestation in total plant

Bollworms

- American bollworm : No. of eggs / 5 plants
No. of larvae / 5 plants
- Spotted bollworm : No. of larvae / 5 plants
- Pink bollworm : No. of larvae / 20 green bolls
- Spodoptera : No. of larvae / 5 plants

Pheromone trap catches :

All bollworms including Spodoptera (individually) : No. of adults / trap / night

Predators

- Coccinellids (A) : Grubs + Adults / 5 plants
- Chrysoperla (B) : Eggs / 5 plants, Grubs / 5 plants
- Spiders (C) : No. / 5 plants
- A+B+C : All predators/5plants

Weather Parameters (Weekly Standard week wise)

- Maximum Temperature in degree celcius
- Minimum Temperature in degree celcius
- Morning RH in %
- Evening RH in %
- Rainfall in mm
- Number of rainy days in a week
- Bright sunshine in hours
- Wind speed
- Wind direction (Morning)
- Wind direction (Evening)

*Note : All pest and weather data should be based on the Standard Meteorological week.

List of Participants

Sr. No.	Name & Designation	Address
1	Dr. TP Rajendran, ADG (Plant Protection)	ICAR, New Delhi
2	Dr. NS Butter, Head	Deptt. of Entomology, PAU, Ludhiana
3	Dr KR Kranthi	Head, Division of Crop Protection, CICR, Nagpur
4	Dr T. Surulivelu	Principal Investigator, CICR, Coimbatore
5	Dr NVVS Durga Prasad	RARS, Lam, Guntur
6	Dr GMV Prasad Rao	RARS, Lam, Guntur
7	Dr SK Parsai	RARS, Khandwa
8	Dr SB Patel	UAS, Dharwad
9	Dr PR Zanwar	CRS, Nanded
10	Dr Vinod Sunalkar	SRS, Akola
11	Dr SMA Mandal	RRTTS, Bhawanipatna
12	Dr SB Kharbade	PDKV, Rahuri
13	Dr Dr Bhemanna	RARS, Raichur
14	Dr ASR Sarma	RARS, Nandyal
15	Dr SS Udikeri	UAS, Dharwad
16	Dr IM Mansuria	NAU, Surat
17	Dr BV Sureja	CRS, Junagarh
18	Dr B Dhara Jyothi	CICR Coimbatore
19	Mr. M. Sabesh	CICR Coimbatore
20	Dr S Mohan	TNAU, Coimbatore
21	Dr N Murugesan	CRS, Srivilliputhur
22	Dr RK Kalyan	ARS, Banswara
23	Dr Vichitter Singh	ARS, Sri Ganganagar
24	Dr Rishi Kumar	CICR, Sirsa
25	Dr Jeya kumar	NCIPM, New Delhi
26	Mr Satya kumar	NCIPM, New Delhi
27	Dr Vikas Jindal	PAU, Faridkot
28	Dr PS Shera	PAU, Ludhiana
29	Dr Naveen Aggarwal	PAU, Faridkot
30	Dr AK Dhawan	PAU, Ludhiana
31	Dr R Mudgal	Dow Agro Scinces
32	Dr Yashpal	Excel Crop care Ltd
33	DR DRC Bakkhetia	PI Industries
34	Dr Murali Mohan K	Mosanto India Ltd