

PROCEEDINGS OF AICCIP ANNUAL GROUP MEETING: 2013-14
PLANT PATHOLOGY PANEL: TECHNICAL PROGRAMME FOR 2013-14.

The Plant Pathology Panel meeting was held from 8th to 10th April, 2013 in the Maharana Pratap University of Agriculture and Technology (MPUAT) under the Chairmanship of Dr.Kusum Mathur, Professor of Plant Pathology, RCA, Udaipur, and convened by Dr. Dilip Monga, Principal Investigator, (Plant Pathology) and Head, CICR, Regional Station, Sirsa. B. Sree Lakshmi, Principle Scientist (Plant Pathology) ANGRAU and Dr.R.K. Shah, Professor (Plant Pathology) served as rapporteurs. The following scientists from different AICCIP Centres attended the meeting and presented the results of 2012-13 trials. The technical programme for the year 2013-14 was finalized.

1. Dr. B. Sree Lakshmi, RARS, ANGRAU, LAM, Guntur
2. Dr. S. Nakkeeran, TNAU, Coimbatore
3. Dr. Daljeet Singh, PAU, Faridkot
4. Dr. Niranjana Chinara, Bhawanipatnam, OUAT
5. Dr. Jagadish Beniwal, HAU, Hisar
6. Dr. M.S.L. Rao, ARS, Dharwad Farm, Dharwad
7. Dr. K.B. Pawar, AICCIP, Pune
8. Dr. O.V. Ingole, PDKV, Akola
9. Dr. P.K. Dhoke, CRS, MAU, Nanded
10. Dr. R.R. Perane, MPKV, Rahuri
11. Dr. G.K. Kataria, JAU, Junagadh
12. Dr. Pardeep Kumar, SKRAU, Sriganga Nagar.

Technical Programme: 2013 – 14.

Path.1: Epidemiological studies on cotton diseases-(cont.....)

1(a): Observations on the occurrence of the diseases (in farmer's field and research farms) - (At all centers except Pune and CICR Sirsa).

All Information regarding major / minor / new (e.g. Tobacco streak virus disease, *Helminthosporium* Leaf spot, *Cercospora* leaf spot etc) disease have to be reported. The participating centers were informed to record the data in per cent disease index in 10 locations in farmer field and research farm during early, middle and late in the season as per the earlier finalized AICCIP standardized protocols. The disease occurrence in organic cotton and high density planting trials conducted at different centres will be recorded and reported by the concerned Pathologists. (Conduct survey in representative areas and record the name of the varieties or hybrids raised under farmers holdings).

1(b): Disease progress in relation to weather factors (All centers expect Pune)

The experiment will continue as per the earlier procedure suggested during 2007-08. The regression equations developed for Alternaria by Rahuri center will be validated by other centers (TNAU, CBE., Nanded, Junagrah, Dharwad, and Faridkot). Similarly the equations developed for CLCuD and other diseases will be validated by other centres where the diseases are prevalent. Each center will focus on most important disease on a susceptible variety/hybrid or Bt hybrid for correlation. Further it was decided,

1. North Zone - Pool the existing data on CLCUV and prediction models has to be developed for the region.
2. Central Zone - Develop prediction models for Grey Mildew and validate the data on Alternaria leaf spot (All Centres). In addition Nanded will develop data on grey mildew.
3. South Zone - All the Centres have to validate the data for ALS. In addition Dharwad has to validate the existing data for Grey.Mildew. Further LAM and Dharwad centre will initiate data collection for the rust disease. The hybrid RCHII BGII may be used for recording data on above mentioned diseases.

1(c): Studies on the variability of Myrothecium leaf spot (Khandwa) and Alternaria leaf spot (other centres). 1. Myrothecium leaf spot. 2. Alternaria leaf spot.

- The *Myrothecium* leaf spot – Concluded.
- Association of *Alternaria dianthi* and *A. chlamydospora* needs to be confirmed by conducting pathogenicity studies (Dharwad Centre). Studies on symptomatology in different genotypes has to be documented and reported. Besides morphological and physiological variations has to be studied. Similarly, TNAU, Coimbatore may also conduct studies on symptomatology and morphological characters of *Alternaria* spp., infecting cotton genotypes.
- Seed- borne nature of *Alternaria* spp., has to be studied using blotter technique and component plating method (Dharwad and Coimbatore).
- All the scientists from different centres should send the cultures of *Alternaria* leaf Blight for diversity analysis of *Alternaria* at species level to Dr.S.Nakkeeran, Professor (Plant Pathology), Department of Plant Pathology, Tamil Nadu Agricultural University, Coimbatore – 641 003.

1(d) Survey and Epidemiology of TSV (Lam, Guntur and TNAU, Coimbatore).

- Survey for occurrence of TSV from major cotton growing tracts of different districts in the state will be carried out.
- Area wide TSV incidence may be recorded to have idea on threat perception.
- Occurrence of TSV will be confirmed through Sero diagnosis, PCR, and through local lesion hosts assay. Besides yield loss assessment may be carried out.

Path.2: Screening of AICCIP entries for disease reaction - cont.....

Path.2: (a) Screening of breeding lines for disease reaction (all centers)

North Zone Centers : Both National and Zonal entries*

Central and South zones centres : - do –

*Only National entries at CICR,RS,Sirsa

Susceptible check for each important disease (Common or individual) should be maintained in each screening trial at all the centres.

Path.2 (b) Confirmation and maintenance of disease resistant lines

At all centre's, scientists will keep the resistant entries (few bolls of selfed seed) from the initial evaluation trials (National trials) like Br02a or b for *G. hirsutum* Varieties, Br 22 a/b for *G. arborum*, Br 34 b for *G. herbaceum* and Br 14a for *G. barbadense* after screening against important diseases.

A maximum of 2-3 important diseases prevailing in the area will be considered.

A maximum of five entries will be kept from each trial.

Seed cotton yield and quality aspects will also be recorded keeping resistance as first priority. Those lines will be evaluated again for one more year i.e. tested at hot spot for that particular disease under nursery/ artificial inoculation condition at below mentioned centres to have confirmed final reaction.

Artificial Screening Centres:

1 Cotton leaf curl virus PAU, Abohar / Ludhiana

2 Bacterial leaf blight PDKV, Akola

3 Alternaria leaf spot MPKV,Rahuri

4 Myrothecium leaf spot Khandwa

5 Grey mildew Dharwad

6 Root rot CICR,RS,Sirsa

7 Fusarial wilt PAU/Pune

The process will be continuous one and within 5-6 years each centre will have their collection of resistant entries for use in developing resistant varieties / hybrid by that centre.

Path.3: Management of Disease (Junagadh, Dharwad, Guntur and Coimbatore)

Path 3(a.1): Validation of seed dressing chemicals against seed and soil borne diseases of cotton. Susceptible varieties in the respective regions will be used. Each centres has to record the pathogen associated with the seedling mortality through isolation and confirmation.

Thiram 75 WS – Seed Treatment @ 20g, 30g, 40g/ha

Carboxin 75% WP – Seed Treatment @ 1g, 2g, 3g/Kg of seed

Carboxin 37.5% + Thiram37.5% DS - Seed Treatment @ 2.5g, 3.5g and 4.5g/Kg of seed.

Untreated control.

Replication: 3

Design RBD.

Observation: The incidence of seedling rot, anthracnose, BLB and Root rot will be recorded up to 1 month. Final yield parameters will be also recorded.

Path 3 (a.2): Testing of botanical product EZEE Cotton (Kraft Foundation) against viral and fungal diseases.(Faridkot, Junagadh and Guntur)

Treatments:

- T1: 1ml/Litre
- T2: 2ml/Litre
- T3:Control (Acephate 2g/Litre)
- T4: Control (Propiconazole 0.1%)
- T5: Untreated control.

Replications – 4

Design – RBD

Observations:

- The fungal foliar spots and CLCUD, TSV, Whitefly and Thrips. Additional observations on leaf reddening, yield and quality parameters may be recorded.
- Three sprays has to be given. First spray has to be given during disease appearance followed by two sprays at 15 days interval.

3(b) Management of foliar pathogens through SAR inducing chemicals.

Pooled analysis should be done for the past three year data generated through the above experiment.

New Experiment:

Evaluation of TrichoCASH (*Trichoderma harzianum*) CICR-G 1% WP for cotton root diseases.

Treatments:

- T1. Control (No seed treatment)
- T2. TrichoCASH (*Trichoderma harzianum*) CICR-G 1% WP – Seed treatment (5g/Kg seed)
- T3. TrichoCASH (*Trichoderma harzianum*) CICR-G 1% WP – Seed treatment (10g/Kg seed)
- T4. Standard chemical seed treatment – Thiram @ 3g/Kg seed)
- T5. TrichoCASH (*Trichoderma harzianum*) CICR-G 1% WP – Seed treatment (5g/Kg seed)+ Thiram @ 3g/Kg seed.
- T6. TrichoCASH (*Trichoderma harzianum*) CICR-G 1% WP – Seed treatment (10g/Kg seed)+ Thiram @3g/Kg seed.
- T7. Any locally available Trichoderma commercial formulation (5g/Kg seed)
- T8. Any locally available Trichoderma commercial formulation – Seed treatment (10g/Kg seed)

Replications: Three

Design: RBD.

Susceptible variety should be used

Please store the formulation product in a cool dry place away from direct sun light (preferably at 4to 10°C but do not store below 0°C).

For seed treatment - take 5 to 10g Tricho CASH powder, mix with 25ml water and make it a slurry. Treat one Kg seed with the slurry in a poly bag and dry the seeds before sowing.

Observations:

Germination %; Final Plant stand; Seedling root rot /Root rot/Wilt incidence

Yield parameters

C:B ratio

Record the rhizosphere population of *Trichoderma* and *Rhizoctonia solani* (SIRSA) /*Fusarium* (Punei) in the treated and untreated pots/field.

Centres: Pune and Sirsa.

Path 3 (c): Developing IDM modules for the management of cotton diseases

Treatment details:

1. Bt Hybrid 1 + Module 1
2. Bt Hybrid 1 + Module 2
3. Bt Hybrid 1 + Module 3
4. Bt Hybrid 2 + Module 1
5. Bt Hybrid 2 + Module 2
6. Bt Hybrid 2 + Module 3
7. Farmers Practice with Bt Hybrid1
8. Farmer Pracctice with Bt Hybrid2

Bt cotton hybrids will be selected based on tolerance to one or the other disease. Modules may be prepared depending upon the severity of the diseases occurring indifferent zones.

Design: RBD

Replications: 3

Plot size: 50sq.m

Centres: Guntur, Rahuri and TNAU, Coimbatore

Module 1	Module 2	Module 3
Seed Treatment - PF TNAU1 @ 10g/Kg of seed	Seed Treatment - PF TNAU1 @ 10g/Kg of seed	Seed Treatment - PF TNAU1 @ 10g/Kg of seed
Soil Application - <i>Pseudomonas fluorescens</i> – PF TNAU1 @ 2.5 Kg/ha in 250 KG of Compost or FYM.	-	Soil Application of <i>Trichoderma viride</i> @ 2.5 KG/ha TV- TNAU1 in 250 KG of Compost or FYM.
Foliar Spray with <i>Pseudomonas fluorescens</i> - 1% PF TNAU1 60,90 and 120 DAS	FS with propiconazole 0.1% for foliar diseases and COC (0.3%) + Streptocycline (0.01%) for BLB or Carbendazim 0.1% for grey mildew on need basis	Foliar spray with Ergon @ 1ml/Litre @ 60 DAS and Taqat @ 1.5g/Litre @ 90 and 120 DAS for fungal diseases or COC (0.3%) + Streptocycline (0.01%) for BLB

** - Need based application may be given based on the disease severity observed in the respective places. Formulations of *Trichoderma viride* and *Pseudomonas fluorescens* will be supplied by TNAU, Coimbatore Centre.

- The interventions within a module can be modified based on location needs.

Observation:

Germination %, Plant Height, Days taken for First flowering, soil borne and foliar diseases and Yield Parameters.

Path 3 (d): Management of cotton leaf curl virus through its vector (New) – Hisar, Faridkot and Sriganagar

The experiment will be continued for one more year with slight modification **.

Module	30 DAS	45 DAS*	60DAS	75 DAS	90 DAS
1	Nimbecidene	Acephate 75 SP	Nimbecidene	<i>V. lecanii</i>	Triazophos 40%EC
2	Nimbecidene	Acephate 75 SP	Nimbecidene	<i>V. lecanii</i>	Buprofezin 25%SC
3	Nimbecidene	Clothianidin	Nimbecidene	<i>V. lecanii</i>	Triazophos 40%EC
4	Nimbecidene	Clothianidin	Nimbecidene	<i>V. lecanii</i>	Acephate 95 SG
5	Nimbecidene	Admire	Nimbecidene	<i>V. lecanii</i>	Triazophos 40%EC
6	Nimbecidene	Admire	Nimbecidene	<i>V. lecanii</i>	Acephate 95 SG
7	Nimbecidene	Nimbecidene	Nimbecidene	<i>V. lecanii</i>	Triazophos 40%EC
8	Nimbecidene	Nimbecidene	-	<i>V.lecanii</i>	-
9	Nimbecidene	Confidor	Nimbecidene	<i>V.lecanii</i>	-
10	-	Confidor	-	Aceta	Triazophos 40%EC
11	Check				

** First intervention at 15 DAS with nimbecidin and record the presence of *Verticillium lecanii* on leaf surface by plating in PDA medium.

CLCuD susceptible Hybrid RCH-134 BG II, Design-RBD, Replications-3

Observations on CLCuD and white fly population will be recorded by pathologists and entomologists respectively.

Path.4 (e) Crop loss estimation due to CLCuD and distribution pattern of CLCuD in north zone-3rd year.**Experiment 1: To work out relationship between Disease index and yield reduction due to cotton leaf curl virus disease**

Location: Hisar (Sirsa - Sub Centre), Faridkot, Ganganagar

Variety /hybrid : Local Popular Bt Hybrids

Treatment details and observations:

One research farm on 4 local popular hybrids will be sown in half an acre area and 10 sets each (50 plants/set) of diseased and healthy plants will be tagged and data on Disease Index, yield loss and quality parameters will be recorded and analyzed.

Experiment 2: Study on distribution pattern of cotton leaf curl virus disease on local popular Bt hybrid at farmer's field.

Observations of CLCuD occurrence (DI) on two villages in each block (district wise) will be recorded during the cropping season for four popular hybrids. The locations will be evenly spread over the entire state. At each location, 4 set of observations (25 plants each totaling 100 plants) will be recorded in a field.

The data recording should be uniform at all the centres.

Location: Hisar, (Sirsa – Voluntary Centre), Faridkot and Sriganganagar

Path. 7 Fusarium wilt of cotton (Pune Centre) - cont.....

The Pune Center will screen all Desi cotton genotypes (*G arboreum* and *G herbaceum*) in combined Fusarial cultures at sick plot. The seeds (25 gm of each entry) of all desi cotton trials may be sent to Pune centre from CICR Regional station, Coimbatore while distributing seeds, for screening Fusarium wilt (Action: Project Coordinator). For confirmation and verification of resistance, the resistant materials has to be sent to the Plant Pathologist, PAU, Ludhiana.

The centre will also conduct the following studies

1. The seed borne nature of Indian isolates
2. The effect of available isolates on *G.hirsutum* and *G. barbadense*
3. Confirmation of available races in India by using race specific primers

New Program:

Monitoring of breakdown of resistance against CLCuD in cotton.

Entries: 8

Replication: 3

Design: RBD

Plot Size: 5.4m x 3.75m

Spacing: 67.5 x 30 cm (114 Plants) – For Varieties

67.5 x 60cm (60 Plants) – For Hybrids

Observation: Incidence and severity of CLCuD

Varieties:

HS6, F346, RST-9 (Susceptible)

H1236, LH 2076, RS 2013 – Resistant

Hybrids:

RCH134 BGII (Susceptible), RCH 65 (Resistant)

Seed to be supplied by respective centres @ 500g for each variety.

Centres: HISAR, Sriganganagar, Bhatinda

Finally, Dr. Monga concluded the session with vote of thanks.