11. Monitoring of *kharif* AICSIP trials – A report

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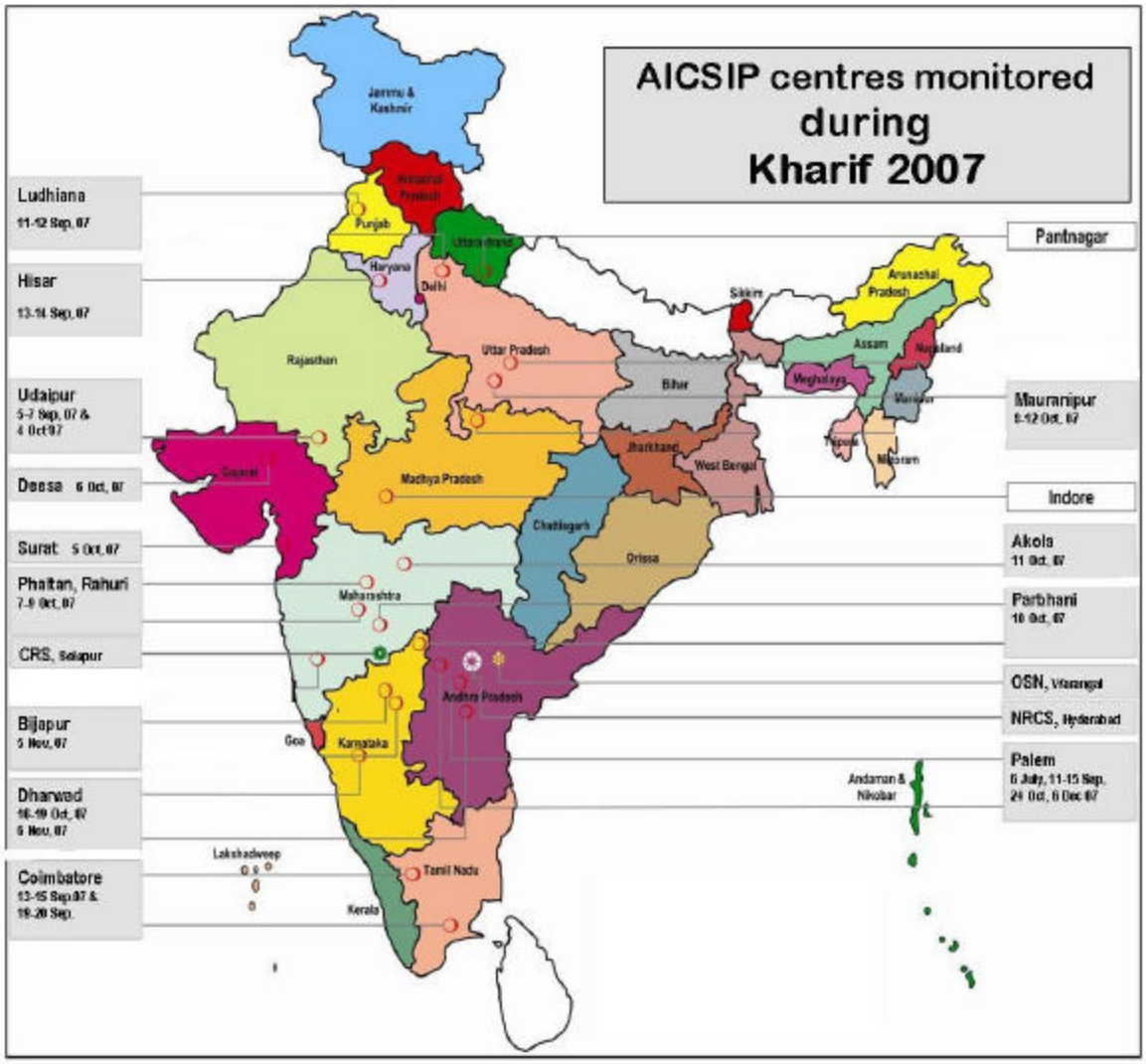

General observations over the centres

Discipline	Observations	Recommendations
Pathology	1. Grain moulds trials sown late. 2. Disease scoring 1-5 is still continuing at Udaipur. 3. Ergot appeared a major disease in Dharwad region	1. To be sown early (around 10th June). 2. Should be converted and followed scale (1-9)
Entomology	1. Trials did plant at proper time in Parbhani.	1. Trials should be planted at proper time to get pest expression at desired level. Resistant check >30%, Susceptible check < 70 % in case of shoot fly deadhearts)
Breeding	1. Non-uniform fodder type germplasm lines in grain sorghum trials will reduce the mean performance of the trial. 2. No recommendation to protect trials for yields.	1. Should be separate trials for fodder type and grain type germplasm to reduce mean performance. 2. Need to raise this issue in agm08 for protection of breeding trials.
Sweet Sorghum	1. There was no proper planning for sorghum programme at NARI for funds.	1. The sweet sorghum programme should be planned during the annual workshop for funds availability.
FLDs	1. Did not monitor as desired at Akola.	1. FLDs to be monitored by Agronomist within one month of sowing so as to maintain recommended plant stand.
General	1. Scientist was not available during monitoring at Dharwad. 2. Subsequent cultivation of sorghum experiments in the same land did serve the purpose of experiments. 3. Care did not taken for quality seeds during sending trials. 4. Fish net used to protect crop from bird damage at Coimbatore.	1. All scientists should be available during monitoring visit. 2. As far as possible, the utilization of same land for sorghum experiments should be avoided. 3. Upmost care should be taken to send good quality of seeds for AICSIP trials. 4. This practice can be adopted by other centres.

Monitoring at glance

Centre	Team members	Tour Date 2007	Remarks
Coimbatore	1. SS.Rao, Pushpendra Singh and T. Hussain 2. G. Shyam Prasad	13-15 Sep 19-20 Sep	1. A spacing of 60 x 15 cm must be adopted for sweet sorghum trials. 2. Early planting for stem borer and late planting for shoot fly 3. Fishmeal need to be applied for uniform and heavy infestation of shoot fly. 4. The crop was well protected from birds using fish net.
Dharwad	S. Audilakshmi, Ganesh Murthy, RA, Balkai, IK Das	16-19 Oct	1. Pathology trials especially on grain moulds to be sown around 10th June. 2. The trials were planted on 5th July; hence, there were no molds in the trials.
Bijapur and Dharwad	AV Gadewar	5-6 Nov	1. Treatment of Boric acid & bleaching powder need confirmation of results in Bijapur pathology trials. 2. Ergot appeared a major disease in Dharwad region. 3. PPP trial was planted late resulting heavy shoot fly infestation.
Palem	1. TG Nageshwar Rao, Chari Appaji and VR Bhagwat 2. Ravi Kumar and TGN Rao 3. Chari Appaji, Subhankar and Joseph 4. TG Nageshwar Rao, Chari Appaji and VR Bhagwat	6 July 11-12 Sep 24 Oct 6 Dec	1. Improvement in yellow Jowar should be research priority. 2. Detailed list of position status of scientist to be sent by the Centre. 3. Sowing of CAT trial was delayed, as a result, severe infestation of shoot fly and poor plant growth. 4. Out of 35 sanctioned strength of scientific staff, only eight members are in position
Phaltan Rahuri	S Audilakshmi, SS Rao, and TGN Rao	7-9 Oct	1. Sowing timings and shoot fly screening technique to be followed strictly.

Centre	Team members	Tour Date 2007	Remarks
			2. Phaltan Centre requires operational funds for conducting evaluations of sweet sorghum. 3. At Rahuri, the sweet sorghum trials should be planted with minimal plant protection for shoot fly control as has been done at other locations. 4. NRCS need to register the sweet sorghum MS lines given to 4-5 centres by Dr Balaravi. 5. Rahuri centre to evaluate Rabi locals having high biomass and high brix in kharif and rabi to develop photo-insensitive lines.
Parbhani Akola	S Audilakshmi, TGN Rao, VR Bhagwat and IK Das	10-11 Oct	1. PPP trial was poorly maintained at Parbhani and need of monitoring of SF trials by 30 to 35 days of sowing. 2. At Akola, expression of AICSIP trial was not impressive due to utilization of same land for the experiments over many years. 3. FLDs to be monitored by Agronomist within one month of sowing so as to maintain recommended plant stand.
Surat	Umakanth, Vittal Sharma, Kusum Mathur, and HR Mahla	5 Oct	1. Due to heavy rainfall (up to 1800 mm) till September, the crop suffered much under water logging. 2. Good for shoot fly and stem borer screening.
Deesa Ludhiana	AV Umakanth, Vittal Sharma and Kusum Mathur HS Talwar, Venketesh. Bhat, and SK Pahuja	6 Oct 11-12 Sep	1. Most of the germplasm lines (sent by NRCS) were severely affected by blight, target leaf spot, anthracnose and zonate leaf spot. 2. Entries from Hisar (356 & 357 in IVHT had poor germinations. 1. In DP trial, entry no 402 looks promising 2. In station trial, the variety HC 308 was promising as compared to SL 44. 3. Needs additional funds or positions under XI plan.
Hisar	HS Talwar, Venketesh. Bhat, HR Mahla	13-14 Sep	1. Hisar location for salinity and stem borer research will be useful. 2. Position for breeding and Entomology will be helpful. 3. HC 308 and HJ 513 showed less stem borer attack.
Mauranipur and Jhansi	Chari Appaji, Raghavendra Rao and HS Gawali	8-12 Oct	1. Developing a white seeded sorghum with high yielding background variety for Bhundelkhand region (PI breeding, AICSIP. 2. Making available of seed of CSV 17 and CSV 20 to farmers during ensuing Kharif season.
Udaipur	1. VR Bhagwat, C. Aruna, and AV Gadewar 2. AV Umakanth, Sheela Verma, Usha Saxena and HR Mahla.	5-7 Sep 4 Oct	1. 1-9 scoring was suggested in Pathology trial since they are following 1-5 scoring. 2. Entry no S-541 (Hisar line) was not germinated in Agronomy trial. 3. The plots were weed free but thinning could not be attended properly in some of the expts. 4. Notification number for CSV 17 is required.

Highlights

Centre: Coimbatore

1. In general, this rainfall was not adequate to grow a successful dry land *Kharif* sorghum crop at Coimbatore without supplemental irrigation. The rainfall situation at Coimbatore is different from rest of the dryland locations in Kharif
2. Promising entries for high biomass, agronomic superiority and tall plant stature (1.8 - 2.0 m) were 601, 602, 604, 606, and 606 in IHT; 266, 267, 275, 276 and 345 in IVT; 1, 2, 9, 14, 19, and 22 in AVHT; 355 and 352 in IVT (DP); 404, 413, 412, 409, 408, 405 in AVHT (DP).
3. Promising entries in entomology trials are AVHT-I (1, 2, 6 for shoot fly), AVHT-II: 76 for shoot fly - but susceptible to stem borer, AVHT-III (172 for shoot fly), IVHT (DP): 353 (shoot fly), AVHT (DP): Entry 408 (shoot fly), IVT: 277 & 345 (shoot fly - but susceptible to spotted stem borer & foliar diseases), IHT: 606 &613 (shoot fly)

4. For AICSIP (Ento) trials it is recommended to go for early planting for stem borer and late planting for shoot fly (1st-2nd week of July). Fishmeal need to be applied for uniform and heavy infestation of shoot fly.
5. The team recommended a spacing of 60 x 15 cm must be adopted for sweet sorghum trials to derive reliable results. Moderate level of downy mildew in pathology trials.

Centre: Bijapur

1. In eco-friendly management of charcoal rot trial, there was uneven growth in different treatments due to water scarcity although entire trial was sown on the same date. The growth variation was more apparent in replications 3 & 4.
2. Trial needs plant protection measure for pests & has been advised to protect the plant population.
3. There was heavy incidence of Stripe virus & incidence could be over 5%.
4. The plant growth in RIL for charcoal rot trial was 6-10" and the crop condition was good.

Centre: Dharwad – Kharif

1. AICSIP breeding trials were in good condition
2. Stem borer infestation at later stages (60-100days) is becoming predominant in all trials including FLDs
3. Entry nos 72, 75, 82, 281, 372, 607, 610, 621 were superior in agronomic performance
4. In general, agronomy trials were good except in one trial, in spite of high dose of fertilizer plants were weak due to high plant population (more than recommended)
5. Pathologist was not present in spite of information regarding monitoring team visit.
6. Entomology trials few entries showed only 11-40% damage.
7. FLD of SPV 1616 and CSH 18 were impressive
8. Pathology trials especially on grain molds to be sown around 10th June. The trials were planted on 5th July; hence, there were no molds in the trials.

Centre: Dharwad- Rabi

1. Plant health & growth was excellent in eco-friendly management of Charcoal rot trial.
2. Visually in some of replication(s) treatments with boric acid & bleaching powder gave better effect on growth, but need confirmation of results.
3. Moderate incidences of shoot fly & bug, downy mildew & grain at many places.
4. Ergot appeared as a major disease in Dharwad region.

Centre: Palem

1. The entomology trials had low attack of shoot fly (<15%). The stem borer incidence was moderate (10%). The incidence of *Mythmina* (5%) was observed in breeding trial.
2. The CAT (public-private varieties, hybrids) had poor plant population due to poor soil and late planting resulted in moderate shoot fly attack (45-60%).
3. The on-farm trial at Mahboobnagar has 10 cultivars laid out in two replications. The crop was sown on 8th July and most genotypes were at flag leaf or flowering stage.
4. Plans for conduct of field day in terms of popularizing the cultivar performance and as well long term measure of linking the institutions and personnel in the seed chain will be attempted.
5. ADR, RARS, Palem was requested to inform PC, AICSIP about the latest staff status through official letter.
6. It was noticed that cultivation of sorghum is decreased in the region. The farmers are shifting towards more remunerative crop like cotton and maize. Most of the farmers cultivating Yellow Jowar in the region.
7. Improvement in yellow Jowar should be priority of the centre looking into the need of the region.

Centre: Phaltan

1. Seen the activities of NARI on sweet sorghum research, development of first non-spiny safflower hybrid, herbal health tea from safflower petals and renewable energy activities.
2. One sweet sorghum coordinated trial (Initial-cum-advanced) was planted at Phaltan on medium deep vertisols. The crop was raised with one post sowing irrigation and the rest of the period received the adequate rainfall.
3. The crop grew to height of about 3.5-4.0 m and its condition, growth, biomass production are good. Crop lodging (10%) in some entries, and incidence of rust in many entries especially on purple background was observed. Entries IASSH12, IASSH6, IASSH9 were observed promising for crop stand, stalk yield, brix and biomass.
4. At Phaltan, the sweet sorghum programme should be planned during the annual workshop as there is proposal to fund for some positions.
5. NARI is developing sweet sorghum hybrids on MS lines given by Dr. Bala Ravi under NATP project RNPS 24

Centre: Rahuri

1. The sweet sorghum coordinated trial (Initial-cum-advanced) was raised with two irrigations. The crop was raised with out any minimal shoot fly protection. Consequently, the crop stand was less in many entries due to loss in plant population due to shoot fly.
2. The entries such as IASSH16, IASSH6 and IASSH2 were observed promising for crop stand, stalk yield, brix and biomass.
3. The sweet sorghum F_3 population is also under evaluation. In a trial on effect of stage of harvesting on stalk yield and quality, crops harvested at hard dough stage gave higher juice yield and quality.
4. At Rahuri, the sweet sorghum trials should be planted with minimal plant protection for shoot fly control as done by other locations.
5. Important germplasm lines for sweet sorghum breeding were PAB 53 (a bloomless line) and RSSV 135 and 134 with high biomass.

Centre: Parbhani

1. Sowing timing was not followed in trials for shoot fly evaluation, as a result wide variation of shoot fly incidence was observed (example: shoot fly dead hearts % in AVHT-2 trial was ranged from 2 to 93 %).
2. In MAS trial, shoot fly trial infestation was from 47 to 100 % which was planted on 16th July, 2007 as per entomological recommendation.
3. In IPM trial, the seed treated plots with Thiomethoxam followed by carbofuran @7.5 kg/ha or NSKE 5% or endosulfan @ 0.07% was found effective against shoot pests.
4. In pest survey on farmer's field, the shoot fly dead hearts (30%), stem borer dead hearts (3.5 %) and shoot bug incidence (2 %) was recorded.
5. Low to moderate grain mould incidence due to no rainfall in October. However in entry no 646 grain incidence was relatively severe.
6. Entry No 75, 51, 68, 46 in pathology trials seemed tolerant to grain mould.
7. Positive effect of seed treatment with nitrogen fixing bacteria (*Acetobacter*) was apparent in leaf colour and head size in SPH 1567.
8. In breeding trial, IHT trial, entry no 636, 623, 654, 657 - stem borer damage was moderate; Entry no 641, 621, 642 was highly prone to lodging. Entry no 645 was very early prone to grain mould. Entry no 610, 627, 640, 647 found better entries.
9. In AVHTand IVT early maturing entries had grain mould incidence.
10. Upper tillering (at upper nodes of stem) was observed in many trials probably due to stem borer attack.
11. Due to late sown CAT trial, noticed heavy attack of shoot fly, poor plant stands & poor weed management in trial. The trial was vitiated due to heavy attack of shoot fly.

Centre: Akola

1. Shoot fly infestation was (15-75%). The phenotypic expression in RIL for shoot fly was good. The entries 22, 237, 238, 251, 275, 276, 297, 299, 300, 402, 407, 415 and 417 were recorded low to medium shoot fly infestation (dead heart 25-45 %) and good vigour (rating 2-4) in RIL trial.
2. Moderate incidence of peduncle stem borer in entries of many trials.
3. Phenotypic expression in RILs (296b x B58586) for grain mould was good. incidence at physiological maturity was moderate. Entry No 131 found susceptible to sooty stripe. Entry No 75, 51, 68, 46 in pathology trials seemed tolerant to grain mould.
4. No rainfall in October, resulting in low to moderate incidence of grain mould.
5. Positive effect of seed treatment with nitrogen fixing bacteria (*Acetobacter*) was apparent in leaf colour and head size in SPH 1567
6. General incidence of foliar diseases (rust, leaf blight, Zonate leaf spot and sooty stripe) was low.
7. Moderate to high incidence of leaf diseases in sweet sorghum entries.
8. In breeding trial, entry 642 in IHT, is dual purpose type and highly prone to lodging.
9. Entry No 75, 51, 68, 46 in pathology trials seemed tolerant to grain mould.
10. CAT trial was sown late (21th July) and not managed properly, poor plant stand & weed management.
11. Good breeding material with this centre and is developing GM resistant B lines and agronomicaly superior B lines. About 84 B x R derivatives in early generation with this centre
12. Expression of AICSIP trial was not impressive due to utilization of same land for the experiments over many years.
13. In one FLD, farmer had grown two private hybrids, two public hybrids CSH 18, CSH 16 and two varieties, CSV 15 and SPV 1616 in same field. The population was vary high and it appeared to be fodder trial rather than grain trial

Centre: Surat

1. Due to heavy rainfall (up to 1800 mm) till September, the crop suffered much under water logging. Under this stress condition the entry numbers 73 and 85 in AVHT (Zone II) and 601, 602, 611, 617 in IHT performed well. The

entries: 268, 270 and 340 were promising under IVT while entry No`s 272 and 273 were dwarf types resembling B lines

2. In AVHT (DP), the entries 402, 404 and 413 were dual-purpose types. In general it appeared that dual-types were more tolerant to water logging stress compared to the grain types. In IVT (DP), the entries 355, 356 and 357 performed poorly while 350 was reasonably good. In IVT (MC), Entry Nos MIT-6 was the earliest while MIT-5 was highly susceptible to leaf diseases.
3. There was no susceptible check, nor any infector or indicator rows sown in pathology trials.
4. Zonate leaf spot, *Cercospora* leaf spot and anthracnose could be seen infrequently in all the trials. However perceptible/scorable incidence of *Cercospora* leaf spot on 14332 (AVHT zone II) and 177 (AVHT Zone III), Zonate on 415 (AVHT dual) and 375 (IVT) was noticed, Entry 412 in AVHT dual and IVT dual entry 352 had poor germination.
5. In Dual purpose trial (breeding) stray incidence of Stripe virus could be observed in entry number 405 but no incidence of vector shoot bug (accompanied by Dr NB Rote, Entomologist), suggested it might have come through seed.
6. In initial hybrid (entomology) trials satisfactory infestation of shoot fly and stem borer was observed; in survey & surveillance trial damage due to both the pests was very heavy that indicated screening for insects will have sufficient insect load.

Centre: Deesa

1. Severe terminal drought was observed at this Centre and the crop is stressed. Under this stress condition, entries suitable for such condition have been identified.
2. CSV 17 performed well under this situation. The entry numbers 268, 276, 277 and 278 performed well under IVT while in AVHT, entries 186, 187, 230, 240 and 245 were promising. The entries: 350 and 373 in IVT (D.P) and 402, 414, 422 and 434 in AVHT (DP) were promising.
3. Most of the germplasm lines (sent by NRCS) were severely affected by blight, target leaf spot, anthracnose and zonate leaf spot.
4. IVHT-16 genotypes, all tall with high biomass with slight differences comparable to SPV1730. Excellent crop condition best laid experiments, crop stages: flag leaf to grain. CSV 17- early matured over the others; but dwarf IHT-I had 22 entries. Entry 603 had low to moderate infection of zonate leaf spot. Entry 613 had very good biomass; broad leaves with deep green colour. In entry nos. 614, 618 & 615 the height was not uniform. Entry 616 had big ear head as compared to others. Var 1774 & 1775 had slightly more foliar diseases. Entry 641 had lodging in replication II but no charcoal rot. AVHT-19 entries, dwarf entry 177 & 163 had foliar disease limited to lower leaves. The entries (IVHT-356,357) from Hisar had poor germination.
5. Trials have been provided by Infector lines and found heavily infected by foliar diseases, test lines inoculated in whorl; screening methodology has been robust and followed in excellent way.
6. No inoculation for rust (not problem in area) but naturally it appears late in Sept.-says pathologist. Downy mildew like symptoms in 401, but corrected as Research reaction by Ms Kusum Mathur, Pathologist.
7. Trials AVT, IVT- DP, IHT, PDRN, PLT, RIL had degree of various foliar diseases but susceptible checks had more. Most prevalent diseases- anthracnose, but also zonate leaf spot followed by other leaf spots
8. The major pest was shoot fly. Incidence of shoot fly and stem borer was observed to some extent in all the trials.
9. RIL trial had 432 entries with good plant stand & had also dead heart at some places; number of entries had foliar disease(s). Found heavy shoot fly infestation in entry 6514 (AVHT I)
10. IHT for grain had 24 entries, the entry 602 had good biomass as well as resistance to shoot fly. Entry 606 had been slightly infected by foliar diseases – anthracnose & zonate leaf spot.
11. IVHT (dual purpose) the germination in 356 & 357 was very poor. Minor incidence of shoot bug was noticed - it was more in Coded 658 but no stripe virus disease
12. Remarkable differences in height & biomass in trial to compare private and public sector seeds (64 entries)
13. It was told that multicut variety could gives 800 tones of fodder. Harvesting in single cut was in progress.

Centre: Udaipur

1. All the trials were maintained in good conditions. CSV 17 is earliest maturing variety among the entries and noticed dwarf. The entries: 600, 610, 620 and 640 in IHT, 276 in IVT. Foliar disease was observed in entry no 297, 304, 327,345,375 and 405 in IVT performed well.
2. Entry no 177 and 183 noted as early maturing lines and 165 was noted late maturing in AVHT trial. SPV 1730 was used as local check and has good biomass.
3. Lodging was observed in entry no 621 (IHT). Germination was poor in entry no: 356, 357, 367, 376, 366 and 377 in IVHT (DP). The entries: 613, 633 and 651 in IHT and 311 in IVT seemed to be very good. In IVT, the entries 341, 345, 375 and 405 were very late and partial sterility was noted and some of the entries have lodged. In AVHT, Entry No`s 185, 249, 215 and 245 were quite promising.

4. In the DP trials, the entries 400, 409 and 424 were mixtures and were segregating for height and maturity. In the same trial, entry 414, 427, 434 and 450 were promising for dual-purpose types. In the dual-purpose IVT, entries 354, 364, 371 and 374 were promising dual-purpose types while the numbers viz., 365, 366, 367, 377 and 377 were poor in germination and were photoperiod sensitive.
5. Shoot fly infestation was 25-28 % in IS 2312 and IS 18551 and 75 % in DJ 6514. The plant stand was good in the RIL trial. The entries 15, 22, 65,70,71,80, 81, 215, 217, 293, 295, 368, 376, 388, 389, 340, 351 and 421 were recorded low to medium shoot fly infestation (deadheart 25-45 %) and good vigour (rating 2-4) in RIL trial.
6. IPM trial particularly intercropping sorghum with mung was found profitable, since mung prices are very much higher than sorghum. Good spot for evaluation trials particularly for shoot fly & diseases. A few entries have army worm (*Mythymna seperata*) infestation.
7. Mainly anthracnose, leaf blight, zonate leaf spot, target leaf and rust foliar diseases were observed. Most of the test entries were moderately resistant to target leaf spot, zonate, blight as compared to the checks. The inoculum of desired pathogens was uniformly spread during 8-12 August for expressing disease symptoms.
8. Downy mildew disease was found occasionally. This year it was noted on few plants on border rows. Downy mildew disease was found this year after 2003 on few plants on border rows.
9. White seed sorghum trials have good material. Sweet sorghum trial (IASSVHT) has only 16 entries and planted in single row with single replication. RIL materials for evaluating foliar diseases were found in good condition.
10. Harvesting of single cut trials were under progress during visit. Entry no S-541(line from Hisar) was not germinated. In general, Hisar material had poor germination
11. The other trials 1KC, 1KE, Quality, nutrient management were uniformly maintained. Green fodder from trials was sold @ Rs 90/quintal and the Centre has earned revenue through sale of fodder.
12. CAT trial was maintained properly and the entries 24, 36, 47 and 61 didn't flower at all.

Centre: Ludhiana

1. Six breeding trials were conducted [Multicut (two), Single cut (two), Seed trial and Dual purpose]. In general trials were well maintained, the crop was free from pests and diseases.
2. MIT 1 produced highest (965.6 q/ha) fodder yield. MAT 4 and MAT 1 produced the highest (1019.4 q/ha) fodder yield. In single cut AVT (SC), AVT 5 found the best varieties. AVT (SC), AVT 1 and in IVT (SC) trial, IVT 5 looks promising.
3. In DP trials the entries viz. 407, 416, 412, 408, 424, 440, 452, 450 and 428 were not sown due to mixed seed which might have happened during transport. In dual purpose trial the genotype 402 looks promising.
4. In Agronomy trials, that all the genotypes responded to nitrogen levels, no significant variations were noticed. UPMCH 1302 and CSH 20 MF produced highest fodder yields, whereas the variety SSG 59-3 was almost at par to these hybrids and have good regeneration potential.
5. Singlecut forage sorghum trial on N levels failed due to poor seed germination in both entries. In Singlecut forage sorghum trial on organic fertilizer levels, the treatment 20 kg Zn was observed to be most appropriate.
6. In station trial, the variety HC 308 was promising as compared to SL 44 (purple type) and other local varieties.
7. There was a discussion with Head, Plant breeding to upgrade the PAU sorghum centre as the AICSIP main centre from the volunteer centre and provide two scientist positions during XI plan. We suggested that let university authority (VC or DR) write to project coordinator for the same.

Centre: Hisar

1. Seven breeding trials were conducted [multicut (two), single cut (two), seed trial and dual purpose (two)]. Earlier, there was heavy infestation of stem borer, particularly in single cut forage trials. Entries of all the trials were scored for stem borer infestation.
2. MAT-2 toped for green fodder yield in AVT (MC) followed by MAT-3, MAT-8 and MAT-4. In IVT (MC), MIT-1 yielded maximum green fodder in the first cut followed by MIT-3 and MIT-8. During the first cut stem borer attack was very low; however, the crop was affected by stem borer attack after first cut. MAT-3, MAT-4 and MAT-5 and MIT-4, MIT-3 and MIT-2 were most affected by the stem borer in the AVT (MC) and IVT (MC), respectively.
3. ATS-4, ATS-8 and ATS-10 in AVT (SC) and ITS-1 and ITS-3 in IVT (SC) were badly damaged by stem borer and did not show much recovery.
4. In AVT (DP) plot numbers 402, 427, 450, 404, 430, 448, 414 and 428, plant populations was affected due to stem borer attack. Similarly in IVT (DP) plant stand was affected by stem borer in plot numbers 356, 367, 354, 366, 375, 357 and 364.
5. Most of the varieties under station seed production programme showed resistance to stem borer and HC 308 was least affected. However, HJ 513 was attacked by the stem borer but it showed good recovery.
6. Four agronomy trials were conducted (singlecut forage on N levels, multicut forage on N levels). In trial on "INM studies in forage sorghum based cropping system" the best treatment response was obtained when 25% of RDF was replaced by FYM.

7. This group has good facility for salinity screening in the form of micro plots maintained at different salinity levels. Further their research farm also salinity patches, which can be characterized and used for field screening.

Centre: Mauranipur and Jhansi

1. Four sorghum varieties for Rabi have been given to IGFRI, Jhansi for conducting FLD trials.
2. Organized visit to the demonstration plot of sorghum at FD block of IGFRI where 8 released sorghum cultivars were demonstrated to farmers and senior officials of IGFRI, Jhansi.
3. Organized visit to FLD at farmers' field in villages of Karare, Rudrakrari. Dr. KA Singh, Director, IGFRI and HoDs, IGFRI explained the sorghum production technology and value added products of sorghum.
4. Organized Kisan Diwas and Kisan Goshthi at Village Sanora, Dist. Datia (M.P.) Dr. KA Singh, chaired the session along with Dr. Tripathi, Head CPU, IGFRI, Mr. Pateria, farmer, Dr. Dwadi and Self.
5. Released one booklet on *Jowar Evam Makke Ki Unnat Kheti* by Drs RN Diwadi, Chari Appaji, Maharaj Singh, RK Sharma, BS Meena and JP Upadhyaya and two pamphlets 1). *Sorghum production technology prepared* by Chari Appaji, HS Talwar and Gawali and 2) *CSV 20 (SPV 1616)* by Drs. Chari Appaji, S. Ravi Kumar, K. Raghavendra Rao, and HS Gawali.
6. Farmer expressed his satisfaction on the performance of the new variety CSV 20 (SPV 1616) as compared to local in the same farm.
7. Visited FLD organized by IGFRI in Jaman and Gopsi villages. Demonstrated. SPV 1616 and CSH 18.
8. Farmer and farm women visited the AICSIP trials and demonstration laid down. Farmers were requested to identify suitable cultivar for the region. They preferred early maturing variety CSV 17 and the dual purpose variety CSV 20 for its grain and fodder yielding characteristics.
9. Farmers wanted chacky white grain type variety since it was fetching higher market price.
10. Organised *Jowar Diwas* and *Krishak Goshthi*, in association with AICSIP, Mauranipur centre, Jhansi. Dr. KA Singh Director IGFRI released publication by NRCS. "Sorghum in Bundelkhand region of Uttar Pradesh" by N. Seetharama and Chari Appaji, Published by Director, NRCS, Hyderabad.

Detailed report

Zone I-Centre: Coimbatore

I. Team: Drs SS. Rao, Pushpendra Singh, T. Hussain (13-15 September, 2007)
II. Team: Dr G. Shyam Prasad (23 September, 2007)

Main Observations

Grain, and dual-purpose (DP) sorghum trials & nurseries: Five trials in breeding, one trial in sweet sorghum were conducted. Entries in all the trials were between flowerings to soft-dough stage. Promising entries for high biomass, agronomic superiority and tall plant stature (1.8 - 2.0 m) were 601, 602, 604, 606, and 606 in IHT; 266, 267, 275, 276, and 345 in IVT; 1, 2, 9, 14, 19, and 22 in AVHT; 355 and 352 in IVT (DP); 404, 413, 412, 409, 408, 405 in AVHT (DP).

Network breeding program: Three experiments [selections of F_4 derivatives of crosses (elite x drought resistance source) for drought tolerance under natural screening; F_2s derived with crosses of new germplasm accessions for agronomic superiority; and selected progenies of F_5 (GMN 41 to GMN 70) for resistance to grain mould were also planted. The crop growth and expression was good. In view of apparent absence of drought symptoms, the trial on selections for drought tolerance will be repeated in late *Rabi* season.

Sweet sorghum: The trial on Initial-cum-Advanced Sweet Sorghum Varietal & Hybrid trial with 16 entries was planted during 2-week June. Most of the entries grew to height of 3.0 - 3.5 m. The spacing adopted in the trial was 45 x15 cm, which resulted in thin stalks due to competition for resources. The entries characterized with agronomic score, biomass and stalk yield include: Nos.13, 8, 10, 2, 12, 16, 3, & 9. Entry 15 (non-tan) displayed the symptoms of rust and foliar diseases (20-30%).

Entomology trials: The infestation level of shoot fly was low because fish meal was not applied and crop was planted earlier. In general there was infestation of rust and aphid. The crop is nearing harvest. The crop was well protected from birds using fish net. The incidence of shoot fly in all the trials ranged from 25-35% and 60-65% infestation by the susceptible check, DJ 6514. This reflects low level of infestation than expected/recommended (70%) for inclusion in State/All India averages. The resistant checks (IS 18551, IS 2205, and IS 2312) have exhibited high degree of resistance (<20.0%). The symptoms of spotted stem borer damage observed among the entries varied for foliar damage (20-30%) and deadhearts (12 to 15%). The midge incidence was negligible. In respect of homopterous pests (aphids and shoot bug), their level of incidence was moderate to high at soft-dough stage. Symptoms due to damage by head bug were moderate in all the trials. Promising entries identified based on symptoms for different pests are: AVHT-I (1, 2, 6 for shoot fly), AVHT-II: Entry 76 for shoot fly - but susceptible to stem borer), AVHT-III (Entry 172 for shoot fly), IVHT

(DP): Entry 353 (shoot fly), AVHT (DP): Entry 408 (shoot fly), IVT: Entry nos. 277 & 345 (shoot fly - but susceptible to spotted stem borer & foliar diseases)., IHT: Entry nos. 606 &613 (shoot fly).

Pathology trials: In view of late planting, the entries showed stunted growth (<1.0 m) at 45-day after sowing, and are exposed to moderate to high infestation of shoot fly and spotted stem borer, and moderate level of downy mildew. Grain mould evaluation will be done only during October-November. Another trial on sorghum grain mould screening (SGMRSN) under ICAR-ICRISAT collaborative programme was planted on July 24.

Agronomy trials: The trials on sweet and grain sorghums were planted in alfisols [organic carbon (OC): 0.4%] between June (4-wk) and July (1-wk). In view of sowing in alfisol, the germination of some entries was <80% due uneven soil moisture as well as the seed quantum received for some entries was meager. As a result, the trials recorded a low plant stand of less than optimum. Two trials on public vs. private seeds were planted during 2nd week of August. The crop reached to stage just 50 cm tall. Detailed evaluation will be done only after flowering.

FLDs: Thirty FLDs were planted in 1st week of August and September. Since the crop is at knee high stage no evaluation was done.

Recommendations

1. The rainfall situation at Coimbatore is different from rest of the dryland locations in Kharif. Since all the trials, except grain sorghum agronomy, were raised with 3 to 4 supplemental irrigations, the trial data interpretation should be on location specific basis in relation to other dry land locations.
2. In Pathology and Agronomy trials observations continue till September, the concerned scientists were requested to relax the deadline of submission of data booklets by mid-December.
3. In Entomology, the planti ng of trials should be taken up 15 days later than the breeding trials to simulate increased infestation of shoot fly and other pests.
4. The Centre scientists requested that all the PIs should decide the number of genotypes and treatments at the workshop so as to make necessary indents for resources to the university authorities.
5. For AICSIP (Entomology) trials it is recommended to go for early planting for stem borer and late planting for shoot fly (1st–2nd week of July). Fish meal need to be applied for uniform and heavy infestation of shoot RIL
6. The team recommended a spacing of 60 x 15 cm must be adopted for sweet sorghum trials to derive reliable results

Zone II-Centre: Bijapur and Dharwad

I. Team: Drs S. Audilakshmi, Ganesh Murthy, RA, Balkai and IK Das (16-19 October, 2007)-Dharwad
II. Team: Dr AV Gadewar (5-6 November 2007)-Dharwad and Bijapur

Main Observations

Bijapur: The trial on eco-friendly management of charcoal rot has been laid orderly with 7 treatments There has been uneven growth in differ ent treatments and has been due to scarce water although entire trial was sown on the same date. The growth variation was more apparent in replications 3 & 4. Trial needs plant protection measure for pests & has been advised to protect the plant population. This would not interfere in our main objective on charcoal rot. There has been lot of incidence of Stripe virus & incidence could be over 5%.The plant growth in RIL for charcoal rot trial was about one feet and the crop condition was good.

Dharwad: The trial on eco friendly management of Charcoal rot has been laid orderly with 7 treatments Plant health & growth is excellent visually in some of replication(s) treatments with boric acid & bleaching powder gave better effect on growth. Low range of rust infection in Kharif trials, I was told that rust appears late in season. Also seen Shoot fly & bug, Downy mildew & grain mould at many places. Ergot appeared a major disease in Dharwad region.

Recommendations

1. Trials on Charcoal rots should be protected from insects at all places. However it would also intercepts observations on Stripe virus vectors.
2. Treatments with boric acid & bleaching powder need reconfirmation after some time.

Zone I-Centre: Palem

1. Team: Drs TG Nageshwar Rao, Chari Appjai & VR Bhagwat (6 July, 2007)
2. Team: Drs. S.Ravikumar & TG Nageshwar Rao (11-12 September, 2007)
3. Team : Dr Chari Appaji, Mr Subhakar & Mr Joseph (24 October, 2007)
4. Team: Drs. TG Nageshwar Rao, Chari Appjai & VR Bhagwat (6 December, 2007)

Main observations: The entomology trials had low attack of shoot fly (<15%). The stem borer incidence was moderate (10%). The incidence of *Mythmina* (5%) was observed in breeding trial. The CAT (public-private varieties, hybrids) had poor plant population due to poor soil and late planting resulted in moderate shoot fly attack (45-60%). The on-farm trial at Mahboobnagar has 10 cultivars laid out in two replications. The crop was sown on 8th July and most genotypes were at flag leaf or flowering stage. On the way from Mahboobnagr to Palem we observed one farmers field (facing road side) fully infested with mites, the reddening attracted our attention to stop and diagnose.

The field which had three strips (local, no-input SPV 1616, with-input SPV 1616) was selected for the filed day located on the Bijinipally – Wanparthy road. Plans for conducting field day in terms of popularizing the cultivar performance and as well long term measure of linking the institutions and personnel in the seed chain will be attempted. In Kalwakurthy and Karkalpahad villages CSH 9 performed better than check. At Palem, visited the private –public sector trial laid at AICSIP centre Palem and monitored the performance of the cultivars. The cultivars were at the stage of harvest, Dr. Poornachand was advised to harvest the field and send the data collected. At Mahboobnagar, monitored the trial laid down in association with BAIF and observed that the cultivars were damaged by wild bores. The sample were drawn of different cultivars for grain and fodder yield, the officials did not have the weighing machine at the time; they were requested to thresh the grain and collect the information and send the same at earliest.

Recommendations

1. Suggested observations on shoot fly dead hearts in CAT trial.
2. Field day has to organize (last week of September) – Drs. Ramanjaneyulu & Ravi Kumar
3. Post harvest observations at M'bubnagar (2nd Fortnight of October) – Drs. Ravi Kumar & Ramanjaneyulu.
4. Results of trials to reach NRCS by 10th November (Dr. Poornachand and Dr. Hiremath).
5. Analysis and reporting of data to be done (Dr. Ravi Kumar and Chari)
6. Dr Nageshwar Rao, ADR, RARS, Palem was requested to inform PC, AICSIP about the latest staff status through letter.
7. The remaining data on ear head bug and plant yield should reach by 15th December, 2007 (Action: Newly recruited Entomologist: Dr Kavitha).
8. Improvement in yellow Jowar should be priority of the centre looking into the need of the region.
9. Dr.Ramana Rao is in charge of sorghum breeding AICISP, who will send all the data sheets.
10. It was noticed that cultivation of sorghum is decreased in their region. The farmers are shifting towards more remunerative crops like cotton and maize. Most of the farmers cultivating Yellow Jowar in the region.
11. Out of 35 sanctioned strength, only eight scientists are in position.

Zone II-Centre: Phaltan, Rahuri, Parbhani and Akola

Team : Drs S. Audilakshmi, S.S.Rao, TG Nageshwar Rao, I.K.Das and V.R.Bhagwat (7-12th October 2007)

Phaltan

Main observations: The team was apprised about the activities of NARI on sweet sorghum research, development of first non-spiny safflower hybrid, herbal health tea from safflower petals and renewable energy activities. One sweet sorghum coordinated trial (Initial-cum-advanced) was panted at Phaltan on medium deep vertisols in June middle 2007. The crop was raised with one post sowing irrigation and the rest of the period received the adequate rainfall.The crop grew to height of about 3.5-4.0m and its condition, growth, biomass production are good. Crop lodging (10%) in some entries, and incidence of rust in many entries especially on purple background was observed. Entries IASSH12, IASSH6, IASSH9 were observed promising for crop stand, stalk yield, brix and biomass. In a trial on effect of planting date on stalk yield, June second week planting gave higher stalk yield and biomass. The Centre also planted breeding materials and segregating population.

AICSIP sweet sorghum trials were in good condition. Heavy infestation of leaf diseases in sweet sorghum entries was observed. Entry nos 5 10, 9 and 16 were free of diseases and were with high biomass. Lot of peduncle stem borer damage in most of genotypes was observed. NARI is developing sweet sorghum hybrids on MS lines given by Dr. Bala Ravi under NATP project RNPS 24. The breeding nursery from F_2 to F_5 was based on B derivatives.

Recommendation

1. The sweet sorghum programme should be planned during the annual workshop as there is proposal to fund for some positions.
2. NRCS need to register the sweet sorghum MS lines given to 4-5 centres by Dr Balaravi.
3. 3.Theis, a sweet sorghum bloomless germplasm line and AN 103 sweet sorghum MS line may be used in breeding programme at NRCS

Rahuri

Main observations: The sweet sorghum coordinated trial (Initial-cum-advanced) was raised with two irrigations. The crop was raised with out any minimal shoot fly protection. Consequently, the crop stand was less in many entries due to loss in plant population due to shoot fly. The entries such as IASSH16, IASSH6, and IASSH2 were observed promising for crop stand, stalk yield, brix and biomass. The sweet sorghum F_3 population is also under evaluation. In a trial on effect of stage of harvesting on stalk yield and quality, crops harvested at hard dough stage gave higher juice yield and quality.

Recommendation: The sweet sorghum trials should be planted with minimal plant protection for shoot fly control as has been done at other locations.

Parbhani

Main Observations

Entomology trials: The trials were sown on 22nd June, 2007. Late sowing for shoot fly infestation was not followed in trials, as a result wide variation of shoot fly incidence was observed (example: shoot fly deadhearts % in AVHT-2 trial was ranged from 2 to 93 %). In MAS trial, shoot fly trial infestation was from 47 to100 % which was planted on 16th July, 2007 as per entomological recommendation. Pest and disease resistant trial (PDRN) was sown on 5th July, 2007 and had 17 to 100 % dead hearts due to shoot fly. Moderate incidence of peduncle stem borer (0 -15%) in many trials were observed. Shoot bug and head bugs incidence was recorded low to moderate (0 to 20%) in the trials.
In IPM trial, the seed treated plots with Thiomethoxam followed by carbofuran @7.5 kg/ha or NSKE 5% or endosulfan @ 0.07% was found effective against shoot pests. No significant differences in shoot pest incidence were found when sorghum was intercropped with soybean. In pest survey on farmer's field, the shoot fly dead hearts (30%) stem borer dead hearts (3.5 %) and shoot bug incidence (2 %) was recorded.

Pathology trials: Low to moderate grain mould incidence due to no rainfall in October. However in entry no 646 grain mould incidence was relatively severe. Incidence of foliar diseases (rust, leaf blight, zonate leaf spot and sooty stripe), was low. Moderate to high incidence of leaf diseases in sweet sorghum entries was recorded. Entry No 75, 51, 68, 46 in pathology trials seemed tolerant to grain mould. Positive effect of seed treatment with nitrogen fixing bacteria (*Acetobacter*) was apparent in leaf colour and head size in SPH 1567.

Breeding trials: Total rainfall till September end was 822 mm. In IHT trial, entry no 636, 623, 654, 657- stem borer damage was moderate; Entry no 641, 621, 642 was highly prone to lodging. Entry no 645 was very early prone to grain mould. Entry no 610, 627, 640, 647 performed well. In AVHT and IVT early maturing entries had grain mould incidence. Upper tillering (at upper nodes of stem) was observed in many trials.

CAT trial: The trial was sown late on 21 July, 2007. Noticed heavy attack of shoot fly, poor plant stands and poor weed management. Trial was vitiated due to heavy attack of shoot fly.

Recommendations

1. Trials for grain mould screening should be sown by 10th June (Dr Salunke).
2. Recommended sowing time(In July second week) should be followed in entomology trials (Dr Daware).
3. Scoring (1-9) should be followed while taking observations on abiotic and biotic stress (Drs Daware and Salunke).
4. No fertilizer dose as one of the treatments should be include in Agronomy trial (Dr Lokhande)
5. Very advanced trial of Agronomy should be tested on farmer's fields (Dr Lokhande).
6. The stem should be dissected at harvest in upper tillering and no tillering plants to find out the possibilities of stem borer infestation (Dr Daware).

Akola

Main observations

Entomology trials: The entomology trials on 3rd August, 2007. A few entries have army worm (*Mythymna seperata*) infestation. Shoot fly infestation was (> 70%) observed in the shoot fly nursery with infestation in the susceptible check, DJ 6514 and about 25-28 % infestation in the resistant checks, IS 2312 and IS 18551. The infestation range was 15-75%. The plant stand was good in the RILs (27B x IS2122) for shoot fly. The phenotypic expression in RIL for shoot fly was good. The entries 22, 237, 238, 251, 275, 276, 297, 299, 300, 402, 407, 415 and 417 were recorded as low to medium shoot fly infestation (dead heart 25-45 %) and good vigour (rating 2-4) in RIL trial. There was moderate infestation of aphids during August. Recommended sowing time was not followed in entomology trials, resulting in inadequate pest pressure.

Pathology trials: Phenotypic expression in RILs (296b x B58586) for grain mould was good (sown on 18th June). Mold incidence at physiological maturity was moderate. Other pathology trials were sown late (3rd July), and escaped from

grain mold. Low incidence of leaf diseases in almost all trials. Entry No 131 found susceptible to sooty stripe. No rainfall in October, resulting in low to moderate incidence of grain mould. General incidence of foliar diseases (rust, leaf blight, Zonate leaf spot and sooty stripe), was low. Moderate to high incidence of leaf diseases in sweet sorghum entries. In breeding trial, entry 642 in IHT, is dual purpose type and highly prone to lodging. Entry No 75, 51, 68, 46 in pathology trials seemed tolerant to grain mould. Positive effect of seed treatment with nitrogen fixing bacteria (*Acetobacter*) was apparent in leaf colour and head size in SPH 1567. Moderate incidence of peduncle stem borer was observed in entries of many trials. CAT trial was sown late (21 July) and not managed properly, poor plant stand & weed management. Entry No 75, 51, 68, 46 in pathology trials seemed tolerant to grain mould. Phenotypic expression in RILs (296b x B58586) for grain mould was good (sown on 18 June). The mold incidence at physiological maturity was moderate. Other pathology trials were sown late (3rd July), and escaped grain mold.

Breeding trials: Total rainfall till September end was recorded about 749 mm. Good plant stand and good ear heads in AVHT trial (entry no 72, 79 and 84). Entry no 645 was very early and prone to grain mold . Entry no 610, 627, 640, 647 found good. In IVT entry no 343 was good. 276 was purple and non tan. No plant protection measure was followed in breeding trials as a result; there was moderate incidence of stem borer and army worms. The plots were neatly maintained and bearded good breeding materials. In breeding trial, entry 642 in IHT, is dual purpose type and highly prone to lodging.

FLD trials: Forty FLDs were conduced by Akola centre under Kharif season on CSH 14, CSH 16, SPV 669, CSV 15, CSH 18 and SPV 1616. Visited one FLD trial at Shiloda village 10 km from Akola where CSV15, SPV1616, CSH16, CSH18 were planted along with private hybrids (sown during first week of July).The FLD was not managed and monitored properly. High plant density resulted in reduced ear head size

Recommendations

Entomology trials

1. Recommended sowing time should be followed in entomology trials.
2. Training of selected AICSIP staff especially on recording data for plant protection parameters.
3. Must follow fish meal technique in trials where shoot fly studies are taken.
4. The stem should be dissected at harvest in upper tillering and no tillering plants to find out the cause of damage to meristem resulting in stunted growth and formation of stem tillering

Pathology trials

1. Trials for grain mold screening should be sown by 10th June.
2. Scoring in the scale of 1-9 scoring to be followed.
3. Spraying water on the panicles for inducing grain s is suggested

Breeding trials: Plant protection measures should be followed in breeding trials for preventing biotic stress

FLD trials

1. Maintenance of optimum plant stands in FLD trials.
2. Training for farmers on objective and concept of conducting FLD trials before sowing.

Zone II-Centre: Surat

Team: Drs. AV Umakanth, AV Gadewar, Vittal, Sharma, Kusum Mathur (5 Oct, 2007)

Main Observations

Breeding trials: The breeding trials were sown on 27th June. Most of the test entries have reached soft dough stage. At this Centre, due to heavy rainfall (up to 1800 mm) till September, the crop suffered much under water logging. Under this stress condition, efforts were made to manage the trial and entries suitable for such condition have been identified. The entry numbers 73 and 85 in AVHT (Zone II) and 601, 602, 611, 617 in IHT performed well. The entries: 268, 270 and 340 were promising under IVT while entry No`s 272 and 273 were dwarf types resembling B lines. In AVHT (DP), the entries 402, 404 and 413 were dual-purpose types. In general it appeared that dual-types were more tolerant to water logging stress compared to the grain types. In IVT (DP), the entries 355, 356 and 357 performed poorly while 350 was reasonably good. In IVT (MC), Entry Nos MIT-6 was the earliest while MIT-5 was highly susceptible to leaf diseases while in AVT (SC), it was reported that only powder of seed was sent.

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Agronomy trials: The trials were highly affected by heavy rains resulting in poor growth.

Pathology trials: Traces of zonate leaf spot and anthracnose were the only diseases present. The aim of pathology monitoring was not met as there was no susceptible check, nor any infector or indicator rows sown. No pressure was

seen. In general (all over in fields) could see primary stages/sign (water soaked/pale coloured) of disease (likely to be of rust) when leaves were held against light. These symptoms would convert in to pustules in a week or so. Zonate leaf spot, *Cercospora* leaf spot and anthracnose could be seen infrequently in all the trials. However perceptible/scorable incidence of *Cercospora* leaf spot on 14332 (AVHT zone II) and 177 (AVHT Zone III), Zonate on 415 (AVHT dual) and 375 (IVT) was noticed. Entry 412 in AVHT dual and IVT dual entry 352 had poor germination. There were neither infector rows of susceptible (s) nor inoculations therefore any proper inoculum build up & results obtained may be deceptive & erroneous. Grain mold nursery (sowing- 29/07/07) had 47 entries. Few lines showed emerging of ear heads therefore was not in stage for any observations on grain mold. It was told CSV 17, though early in Surat Conditions but highly susceptible to Ergot (however could not see ergot).

Entomology trials: In Dual purpose trial (breeding) stray incidence of Stripe virus could be observed in entry number 405 but no incidence of vector shoot bug (accompanied by Dr NB Rote, Entomologist), suggested it might have come through seed. In initial hybrid (entomology) trials satisfactory infestation of shoot fly and stem borer was observed; in survey & surveillance trial damage due to both the pests was very heavy that indicated screening for insects will have sufficient insect load.

Recommendations

1. It is good Centre for Grain mold studies and also otherwise Pathologist is required.
2. Electronic means are required at Centre
3. This season crop conditions at Surat Centre could be beneficial to identify entries susceptible to water lodging.
4. Direct contribution of germplasm into AICSIP trials should be stopped
5. The shoot fly data may be sent as early as possible.
6. 1-9 scoring was suggested in Pathology trial since they are following 1-5 scoring.
7. Training is needed in recording glossiness and trichomes studies. During entomology training this aspect will be included.

Zone III-Centre: Deesa

Team: Drs AV Umakanth, Vittal Sharma, Kusum Mathur (6 October, 2007)

Main Observations

Breeding trials: The breeding trials were sown on 7th July. Severe terminal drought was observed at this Centre and the crop is stressed. Under this stress condition, entries suitable for such condition have been identified. CSV 17 performed well under this situation. The entry numbers 268, 276, 277 and 278 performed well under IVT while in AVHT, entries 186, 187, 230, 240 and 245 were promising. The entries: 350 and 373 in IVT (D.P) and 402, 414, 422 and 434 in AVHT (DP) were promising. Most of the germplasm lines (sent by NRCS) were severely affected by blight, target leaf spot, anthracnose and zonate leaf spot). IVHT – 16 genotypes, all tall with high biomass with slight differences comparable to SPV1730. Excellent crop condition best laid experiments, crop stages: flag leaf to grain 2. CSV 17- early matured over the others; but dwarf. IHT-I. 22 entries : Entry 603 had low to moderate infection of zonate leaf spot, entry 613 had very good biomass; broad leaves with deep green colour. In entry nos. 614, 618 and 615 the height was not uniform. Entry 616 had big ear head as compared to others. Var 1774 & 1775 had slightly more foliar diseases. Entry 641 had lodging in replication II but no charcoal rot. AVHT-19 entries, dwarf entry 177 & 163 had foliar disease limited to lower leaves. Very poor germination had in entry 356 & 357 (IVHT,). These entries were from Hisar.

Pathology trials: Trials have been provided by Infector lines, and found heavily infected by foliar diseases, test lines inoculated in whorl; screening methodology has been robust and followed in excellent way. No inoculation for rust (not problem in area) but naturally it appears late in Sept.-says pathologist. Downy mildew like symptoms in 401, but corrected as Res. reaction by Ms Mathur, Pathologist. Trials AVT, IVT- DP, IHT, PDRN, PLT, RIL had degree of various foliar diseases but susceptible checks had more. Most prevalent diseases - anthracnose, but also zonate leaf spot followed by other leaf spots

Entomology trials : The major pest was shoot fly. Incidence of shoot fly and stem borer was observed to some extent in all the trials. RIL trial had 432 entries with good plant stand & had also dead heart at some places; number of entries had foliar disease(s). Found heavy shoot fly infestation in entry 6514 (AVHT I). IHT for grain had 24 entries, the entry 602 had good biomass as well as resistance to shoot fly. Entry 606 had been slightly infected by foliar diseases – anthracnose & zonate leaf spot. In IPM trial seed treatment appeared beneficial than intercropping to manage shoot fly. IVHT (dual purpose) the germination in 356 & 357 was very poor. Minor incidence of shoot bug was noticed - it was more in Coded 658 but no stripe virus disease

Agronomy trials: Remarkable differences were noticed in height and biomass in trial for comparing private and public sector seeds (64 entries). It was told that the multicut variety could give 800 tonnes of fodder. Harvesting in single cut was in progress. The trials were highly affected by severe terminal drought and CSV 17 performed well.

Recommendations

1. Electronic means are required at Centre
2. Direct contribution of germplasm into All India trials should be stopped
3. NRCS and other AICSIP centres can give indent for CSV 17 so that it can be multiplied under OSN.

Zone III-Centre: Udaipur

Udaipur Team: 1. Drs VR Bhagwat, C. Aruna and AV Gadewar (4-6 September, 07).
Team: 2. Drs. AV Umakanth, Sheela Verma, Usha Saxena and HR Mahla (4 Oct, 07)

Main Observations

Breeding trials : All the trials were maintained in good conditions. The breeding trials were sown on 3rd July. Most of the testing entries were in flowering stage. CSV 17 is earliest maturing variety among the entries and noticed dwarf. The entries: 600, 610, 620 and 640 in IHT, 276 in IVT. Foliar disease was observed in entry no 297, 304, 327,345,375 and 405 in IVT performed well. Entry no 177 and 183 noted as early maturing lines and 165 was noted late maturing in AVHT trial. SPV 1730 was used as local check and has good biomass. Lodging was observed in entry no 621 (IHT). Germination was poor in entry no: 356, 357, 367, 376, 366 and 377 in IVHT (DP). The entries: 613, 633 and 651 in IHT and 311 in IVT seemed to be very good. In IVT, the entries 341, 345, 375 and 405 were very late and partial sterility was noted and some of the entries have lodged. In AVHT, Entry No`s 185, 249, 215 and 245 were quite promising. In the DP trials, the entries 400, 409 and 424 were mixtures and were segregating for height and maturity. In the same trial, entry 414, 427, 434 and 450 were promising for dual-purpose types. In the dual-purpose IVT, entries 354, 364, 371 and 374 were promising dual-purpose types while the numbers viz., 365, 366, 367, 377 and 377 were poor in germination and were photoperiod sensitive.

Entomology trials: Shoot fly infestation was 25- 28 % in IS 2312 and IS 18551 and 75 % in DJ 6514. The plant stand was good in the RIL trial. The entries 15, 22, 65,70,71,80, 81, 215, 217, 293, 295, 368, 376, 388, 389, 340, 351 and 421 were recorded low to medium shoot fly infestation (deadheart 25-45 %) and good vigour (rating 2-4) in RIL trial. IPM trial particularly intercropping sorghum with mung was found profitable, since mung prices are very much higher than sorghum. Good spot for evaluation trials particularly for shoot fly & diseases. A few entries have army worm (*Mythymna seperata*) infestation.

Pathology trials: The trials were planted on 12-13 July, 2007 with objective to evaluate against foliar diseases. Mainly anthracnose, leaf blight, zonate leaf spot, target leaf and rust foliar diseases were observed. Most of the test entries were moderately resistant to target leaf spot, zonate, blight as compared to the checks. The inoculums of desired pathogens were uniformly spread during 8-12 August for expressing disease symptoms. Downy mildew disease was found occasionally. This year it was noted on few plants on border rows. Downy mildew disease was found this year after 2003, on few plants on border rows. White seed sorghum trials have good material. Sweet sorghum trial (IASSVHT) has only 16 entries and planted in single row with single replication. RIL materials for evaluating foliar diseases were found in good condition.

Agronomy trials: Harvesting of single cut trials were under progress during visit. Entry no S-541(line from Hisar) was not germinated. In general, Hisar material had poor germination. The others trials 1KC, 1KE, Quality, nutrient management were uniformly maintained. Harvesting of all fodder trials was completed. The others trials 1KC, 1KE, Quality, nutrient management were uniformly maintained. Green fodder from trials was sold @ Rs 90/quintal and the Centre has earned revenue through sale of fodder.

FLDs and CAT trials: The monitoring team also attended the *kisan divas* at vill: Changari (Fatehnagar), P.S- Mavali, Dist: Udaipur. There was a misconception in this village that sorghum exhausts all the nutrients and they were educated on this issue by the team. CAT trial was maintained properly and the entries 24, 36, 47 and 61 didn't flower at all. CAT trial was sown on 10th July, 2007 (55 days old as on 5th Sep). Germination was good in all entries. The entries 39, 40, 60, and 64 were noted as early maturing.

Recommendations

1. The team felt that conscious breeding efforts were not being made at certain Centre and only germplasm is being directly contributed for testing.
2. The plots were weed free but thinning could not be attended properly in some of the expts.

3. Notification number for CSV 17 and testing fee and development grant for Udaipur
4. Release of funds to Kota Centre under Udaipur
5. Good spot for evaluation trials particularly for shoot fly & diseases.
6. NRCS and other AICSIP centres can give indent for CSV 17 so that it can be multiplied under OSN.
7. Dr Vittal Sharma told that CSV 17 has notification problem and hence could commercialized. Udaipur Centre requires 0.5 ha land for multiplying CSV 17 under OSN.
8. 1-9 scoring was suggested in Pathology trial since they are following 1-5 scoring.
9. Training is needed in recording glossiness and trichomes studies. During entomology training this aspect will be included.

Zone III-Centre: Ludhiana and Hisar

Ludhiana : Team : Drs.H.S.Talwar, Venkatesh Bhat, HR Mahla and Pahuja (11-12 Sep, 2007).

Main Observations

Breeding trials: Six breeding trials were conducted [Multicut (two), Single cut (two), Seed trial and Dual purpose]. In general trials were well maintained, the crop was free from pests and diseases. Multicut forage trials were already terminated after taking two cuts. In MIT trial, entry no. MIT 1 and MIT 7 produced the highest (965.6 q/ha) and lowest (618.8 q/ha) fodder yield, respectively. Similarly in MAT trial, entry no. MAT 4 and MAT 1 produced the highest (1019.4 q/ha) and lowest (579.7 q/ha) fodder yield, respectively. In single cut AVT (SC), AVT 5 seemed to be the best amongst all varieties the genotype seemed to be very good whereas in AVT (SC), In IVT (SC) trial, entry no. IVT 1 and 5 looks promising in all the replications. In dual purpose trials it was informed that entries viz. 407, 416, 412, 408, 424, 440, 452, 450 and 428 were not sown due to mixed seed which might have happened during transport. In dual purpose trial the genotype 402 looks promising.

Agronomy trials: Three agronomy trials were conducted (Multicut forage sorghum trial on N levels, Singlecut forage sorghum trial on N levels, and Singlecut forage sorghum trial on organic fertilizer levels). Multicut forage sorghum trial on N levels was already harvested. It was informed that all the genotypes responded to nitrogen levels, no significant variations are noticed. UPMCH 1302 and CSH 20 MF produced highest fodder yields, whereas the variety SSG 59-3 was almost at par to these hybrids and have good regeneration potential. Singlecut forage sorghum trial on N levels failed due to poor seed germination in both entries. In Singlecut forage sorghum trial on organic fertilizer levels, the treatment 20 kg Zn was observed to be most appropriate. In station trial, the variety HC 308 was promising as compared to SL 44 (purple type) and other local varieties. Amongst male sterile lines 94012A and AKMS 14A seemed to be promising, lush green and in good condition. No stem borer attack was seen.

Meeting with Head plant breeding, genetics and plant biotechnology: There was a discussion with Head, plant breeding, genetics and plant biotechnology PAU, Ludhiana to upgrade the PAU sorghum centre as the AICSIP main centre. We suggested that let university authority (VC or DR) write to PC for the same. Before leaving Ludhiana, we were informed that it was discussed with DR and a letter will be faxed next day to PC and Director NRCS.

Recommendations

1. Breeder and Nutritionist positions at Ludhiana -if upgraded to AICSIP cooperative centre or budget provisions to take up screening programme.

Zone III-Centre: Hisar

Team: Drs.H.S.Talwar, Venkatesh Bhat, and HR Mahla (13-14 September, 2007)

Main Observations

Breeding trials: Seven breeding trials were conducted [multicut (two), single cut (two), seed trial and dual purpose (two)]. Plant stand was satisfactory. Crop may take 10-15 days to flower. Crop was free from pests and diseases except there was previously there was heavy infestation of stem borer, particularly in single cut forage trials. Entries of all the trials were scored for stem borer infestation Border effect was clearly seen in almost all the trials. The prolonging of dry weather during the months of July-August forced to irrigate the crop twice; this has probably resulted in the seepage of water to the boarder rows/plots. In advance and initial multicut trials, first cut was taken on 8th July. MAT-2 toped for green fodder yield in AVT (MC) followed by MAT-3, MAT-8 and MAT-4. In IVT (MC), MIT-1 gave maximum green fodder yield in the first cut followed by MIT-3 and MIT-8. During the first cut stem borer attack was very low; however, the crop was affected by stem borer attack after first cut. MAT-3, MAT-4 and MAT-5 and MIT-4, MIT-3 and MIT-2 were most affected by the stem borer in the AVT (MC) and IVT (MC), respectively. In single cut trials, ATS-4, ATS-8 and ATS-10 in AVT (SC) and ITS-1 and ITS-3 in IVT (SC) were badly damaged by stem borer and did not show much recovery. In AVT (DP) plot numbers 402, 427, 450, 404, 430, 448, 414 and 428, plant populations was affected due to stem borer attack. Similarly in IVT (DP) plant stand was affected by stem borer in plot numbers 356, 367, 354, 366, 375, 357 and

364. Seed trial and local station trial were comparatively less affected by stem borer. Line SSG 59-3 was particular conspicuous by its higher regeneration potential after the cut. Most of the varieties under seed production programme showed resistance to stem borer and HC 308 was least affected. However, HJ 513 was attacked by the stem borer but it showed good recovery. The team also visited the animal science college where *in vivo* experiments being done on livestock were seen.

Agronomy trials: Four agronomy trials were conducted (singlecut forage on N levels, multicut forage on N levels). In trial on "INM studies in forage sorghum based cropping system" the best treatment response was obtained when 25% of RDF was replaced by FYM.

Visit to Department of Botany and Plant physiology, CCS HAU Hisar: Visited Dr Ajit Nandwal (One of partner in salinity subproject of DBT Forage biotechnology project) and discussed the salinity screening facility at Hisar. This group has also reasonably good facility for salinity screening in the form of micro plots maintained at different salinity levels. Further their research farm also salinity patches, which can be characterized and used for field screening.

Recommendations

1. Entomologist position at Hisar is essential for stem borer evaluation being a hot spot.
2. Hisar location for Salinity research will be useful.

Zone III-Centre: Mauranipur and Jhansi

Team: Drs Chari Appaji, Raghavendra Rao and Mr. HS Gawali (8-12 October 2007)

Main Observations: Visited FLD block of IGFRI for preparation of *Kisan Diwas* at IGFRI, discussed with Dr. Dwadhi, Head, TOT division and Staff for arrangements of *Kisan Diwas* and *Kisan Ghosti*. Dr. Singh was informed that seed of 4 Rabi sorghum varieties as desired by IGFRI have been given to Dr. Diwaidhi for conducting FLD trials at IGFRI and in farmers' field. Organized visit to the demonstration plot of sorghum at FD block of IGFRI where 8 released sorghum cultivars were demonstrated to farmers and senior officials (HoDs of IGFRI , Jhansi). Organized visit to FLD farmer's field in villages of Karare, Rudrakrari villages of Dr. KA Singh, Director, IGFRI and Heads of department, IGFRI and farmers explained the sorghum production technology and value added products of sorghum. Visited FLDs with farmers. Dr. Dwadhi explained the variety demonstrated (SPV 1616, CSH 18 and local). Dr. KA Singh, Director, IGFRI and Heads of department, IGFRI and farmers and explained the sorghum production technology and value added products of sorghum.

Organized Kisan Diwas and Kisan Ghositi at Village Sanora, Dist. Datia (M.P.) Dr. KA Singh, chaired the session along with Dr. Tripathi, Head CPU, IGFRI, Mr. Pateria, farmer, Dr. Dwadi and Self. On the occasion of the function one booklet on *Jowar evam Makke Ki Unnat Kheti* by Drs RN Diwadi, Chari Appaji, Maharaj Singh, RK Sharma, BS Meena and JP Upadhyaya and published by Director, IGFRI Jhansi) (in Hindi) and two pamphlets 1). Sorghum production technology prepared by Chari Appaji, HS Talwar and Gawali published by Director, NRCS, Hyderabad (in English) and 2) CSV 20 (SPV 1616) by Prepared by Drs. Chari Appaji, S. Ravi Kumar, K. Raghavenderrao, and HS Gawali., Published by Director NRCS, Hyderabad (in English) Mr. Chatrapal Pateria, farmer expressed his satisfaction on the performance of the new variety CSV 20 (SPV 1616) as compared to local in the same farm. Director, IGFRI distributed seed of rabi sorghum (4 released varieties for adaptive trial in farmers field to 4 farmers. Dr. N. Seetharama, Director, NRCS requested farmers to grow sorghum for enhancing the livelihood and increase in milk yield. Visited FLD organized by IGFRI in Jaman and Gopsi villages. SPV 1616 and CSH 18 were demonstrated. Farm walk with participating farmer and few non participating farmers organized. Visit to AICSIP farm for farmers and dignitaries organized. Farmer and farm women visited the trials and demonstration laid down. Farmers were requested to identify suitable cultivar for the region. Farmer women and farmers preferred the early maturing variety CSV 17 since it was able to yield grain. The dual purpose variety CSV 20 was preferred for its grain and fodder yielding characteristics.

Farmers wanted chalky white grain type variety since it was fetching higher market price. Organised *Jowar Diwas* and *Krishak Ghosthi*, in association with AICSIP, Mauranipur centre, Jhansi Dr. KA Singh Director IGFRI released publication by NRCS ."Sorghum in Bundelkhand region of Uttar Pradesh" by N. Seetarama and Chari Appaji, Published by Director, NRCS, Hyderabad.Dr. Sachan read out his poem on, "Tum bhi Jowar Uga sakte ho - Jowar ki Unnat kheti and requested the farmers to take up sorghum cultivation during kharif season under the prevailing climatic situation. Dr. N. Seetharama, Director, assured all necessary help to the farming community in developing suitable farmer preferred varieties for the region. Development of women as entrepreneurs for developing and marketing value added products of sorghum is a key to enhance livelihood of farmers.

Recommendations

1. Making available of seeds of CSV 17 and CSV 20 to farmers during ensuing Kharif season
2. Release of funds of FLD to Jhansi (AF&AO, Chari, Director).
3. Developing a white seeded sorghum with high yielding background variety for Bhundelkhand region (PI breeding, AICSIP).