Sorghum Genetic Resources Management

Directorate of Sorghum Research (DSR) is one of the National Active Germplasm Sites (NAGS) with the responsibility to collect, conserve, evaluate, document, and distribute the sorghum germplasm to the bonafied user within the country. The following progress has been made during the reporting period 2009 – 10.

A: Collection
- 107 acc. collected from Bundelkhand regions of Madhya Pradesh & Uttar Pradesh (35), North and Kutch regions in Gujarat (36) and South Tamil Nadu (36). Apart from the collections by the DSR, a total of 1438 acc. assembled from other sources.

B: Characterization
- 102 acc. (70 acc. from MP & 32 acc. from GJ) were characterized. Out of 15 essential DUS traits, data for 13 traits were collected. 12 accessions were early, 1 plant was short in height, 6 was long panicle, and 1 showed lustrous caryopsis colour.

C: Utilization
- Sweet sorghum: 39 sweet sorghum F9s were evaluated. The juice volume (178-910ml/3pt) and plant height (295 – 414 cm) were most variable characters. The field brix (14-20%) and juice brix (14-20%) were same. The sucrose percentage ranges 9.2-17.5% and the reducing sugar ranges 0.2-2.3%. Nineteen entries were found good for total biomass (1.8-2.4 kg/3 pt) at the rate of 600g/plant and brix 17-21%.
- Scented sorghum: Twenty-four fertile hybrids were observed in the scented sorghum. Among these E 212, E 213, E 220, E 240, and E 254 were very good restorers. Eight complete sterile also observed and BC1 is made.
- Out of 127 scented sorghum F1s evaluated scented smell observed in 30 F1s. Scented sorghum is non-tan plant colour, has very late (96 days) panicle emergence. The stem is medium thick (2.3 cm), very long plant (393 cm). Leaves have dull green midrib colour. The panicle is symmetric shaped with greyed purple coloured glumes, white caryopsis and elliptic shaped grain having greyed yellow coloured endosperm colour. Typical scented smell like fragrance from flowering stage till the maturity of the caryopsis.
- Grain sorghum: Out of 207 grain sorghum hybrids evaluated 148 were fertile, 25 sterile and 21 partially sterile. 35 male parents were identified as good restorers.

D: Conservation
- A total of 23,612 accessions are being conserved which includes 1,280 accessions as duplicate samples. The maximum contribution was from repatriation material (11,113 accessions).
- During the reporting period, 1590 accessions were added to the MTS as new material.

D: Multiplication
- A total of 236 accession of mini-core sorghum collections, 211 trait specific germplasm, and 50 frequently requisitioned resistant germplasm sources are being multiplied during rabi (09–10).
E: Distribution
- 3564 accessions were distributed to the sorghum researchers in the country and
- 697 accessions were supplied for trials at DSR and AICSIP centres.

F: Registration
- **PVPFRA**: Two applications (Scented sorghum and Malwan) have been submitted as farmers variety with the Plant Authority
- **NBPGN**: Following applications were submitted to Plant Germplasm Registration Committee, NBPGN, New Delhi, one high fodder yielding (SPV 1856), one high grain yield with high brix (EP 61) and fourteen shoot fly resistant germplasm lines.
- **Registered genetic stocks**: One superior roti quality genotype SPV 1742 (INGR 09017), one high biomass & high grain yielding & drought tolerant (PEC 17) with INGR 09089, four multiple foliar disease resistant with INGR 09103, INGR 09104, INGR 09105 and INGR 09106 were registered with NBPGN.

G: Product developed for testing
- Seven varieties and one hybrid contributed to the AICSIP trial.
- **Sweet sorghum**: Three sweet sorghum varieties (SSS 22, SSS 42, SSS 60), one sweet sorghum hybrid (27A x SSS 53), two single-cut forage variety (SSS 42, SSS 53) during kharif 2009.
  - The sweet sorghum varieties SSS 22 (SPSSV 41) and SSS 60 (SPSSV 43) have ranked first and second for brix percentage as 18.1 and 17.4 respectively.
  - The single-cut forage variety SSS 53 (SPV 2009 is better for brix percent, shooty stripe resistant, and IVDMD (%),) and SSS 42 (SPV 2010) is better for the leaf-stem ratio and zonate leaf spot resistant
- Two rabi varieties (EP 87, EP 92) during rabi 2009-10 contributed to AICSIP trials

H: Management/Coordination
- Crosses were made among the rabi landraces at DSR, 135 F3s of these crosses were shared with CRS Solapur and AICSIP–Tandur, Akola and Kovilpatti
- 102 new germplasm characterized and used by AICSIP–Coimbatore, Indore, Mauranipur, and Udaipur. The grain yield was more than 100g/plant in 43 acc. at Indore and 17 acc. at Mauranipur.
- 168 grain sorghum hybrids and 39 F9s and 75 F6s of sweet sorghum evaluated at AICSIP–Akola and Coimbatore. 5 grain hybrids were recorded more than 90 percent fertility at Coimbatore.
- 29 F1 scented sorghum hybrids tested at AICSIP–Indore and Mauranipur as they are the hot-spot locations for the expressions of the scented smell. Scented smell was found in four hybrids at Mauranipur. At Indore, 12 hybrids were identified with high grain yield of more than 100 g per plant
- 28 sweet sorghum, dual-purpose and forage hybrids evaluated at AICSIP–Coimbatore, Udaipur and Akola. Five sweet sorghum hybrids were identified with high biomass and 18 and above brix percentage.
- 41 F6s of dual-purpose and forage segregation material evaluated at AICSIP–Deesa, Pantnagar and Udaipur.