Characterization of Sorghum Germplasm Introduced from Brazil

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Sorghum is of African origin (Kimber 2003) and largest diversity of cultivated and wild sorghum is in Africa (deWet 1977). More than 11,000 exotic germplasm have been introduced in India from 46 countries of the world.

A total of 60 accessions of sorghum exotic collections introduced from Brazil and supplied by NBPGR (Regional Station), Hyderabad is characterized at National Research Centre for Sorghum (NRCS), Hyderabad to identify the promising lines to acclimatize with Indian conditions. The accessions were sown in 3 m single row with 60 cm width and plant-to-plant 10 cm distance in augmented block with 3 checks (CSV 16, M 35-1 and EP 47) during *rabi* (2003–04). The important 13 agro-morphological characters were studied. The first step in the exploitation of genetic variability is the characterization of the germplasm for morpho-agronomical traits, resistance to biotic/ abiotic stresses, etc. based on the list of sorghum descriptors released by IBPGR and ICRISAT (1980, 1993), and Mahajan *et al.* (2000).

The results showed maximum variability on days to flowering, leaf length, plant height, earhead length, stem fresh weight, stem dry weight, and grain yield. The descriptive statistics on quantitative characters of new *rabi* sorghum germplasm is presented in Table 1.

The qualitative characters on exotic collections introduced from Brazil characterized at Hyderabad showed maximum frequency observed on good seedling vigour (48 acc.), semi compact earhead (21 acc.), loose earhead shape (23 acc.), brown seed colour (37 acc.), small seed size (23 acc.), straw glume colour (22 acc.), all non-lustrous seed, bicolor race (37 acc.), awn absent (49 acc.) and above 100 percent glume coverage (46 acc.).

In these collections, about 50 percent of the accessions were resistant to aphids. It is also observed that complete *ms* line in 4 acc., fertile and sterile lines in 29 acc. (two types) and fodder type–36 acc.

A total of 6 accessions have been rated as very good based on all characters viz., EC-507650, EC-507651, EC-507653, EC-507656, EC-507682, EC-507860. A total of 25 lines have been identified as potential donor for longer and wider leaves for high biomass, longer and wider earhead and 100-seed weight for high yield (Table 2).

Table 1. Descriptive statistics on quantitative characters of exotic collections introduced from Brazil (60 accessions)

Characters	Range	Minimum	Maximum	Mean	SE	SD
Days to 50% flowering (days)	22	69	91	77.00	0.78	6.20
Number of leaves	7	4	11	7.00	0.23	1.86
Leaf length (cm)	174	42	216	80.18	5.63	44.67
Leaf width (cm)	6	4	10	6.13	0.24	1.89
Plant height (cm)	177	68	245	151.00	5.63	44.71
Stem thickness (cm)	1	1	2	1.33	0.04	0.29
Earhead length (cm)	23	17	40	26.98	0.66	5.24
Earhead width (cm)	7	4	11	7.89	0.22	1.74
Brix (°)	12	2	14	8.00	0.37	2.91
Stem fresh weight (g)	1250	250	1500	693.81	37.27	295.82
Stem dry weight (g)	800	200	1000	423.98	23.13	183.59
Grain yield (g)	54	13	67	29.87	2.45	14.91
100-seed weight (g)	3	1	4	1.94	0.10	0.71

Table 2. Promising lines identified from exotic collections introduced from Brazil (60 accessions)

S.No.	Character	Collector number	No. of acc.
1	Longer leaves (>200cm)	EC-507678, EC-507679, EC-507680, EC-507685	4
2	Wider leaves (>9cm)	EC-507653, EC-507671, EC-507675, CSV 16 (check)	3
3	Longer earhead (>35cm)	EC-507677, EC-507678, EC-507685, EC-507803, EC-507835	5
4	Wider earhead (>10cm)	EC-507601, EC-507650, EC-507652, EC-507653, EC-507800, EC-507803, EC-507860, EC-507865	8
5	High yield (>60g/ plant)	EC-507601, EC-507860, EC-507878	3
6	> 100-seed weight (>4g)	EC-507671, EC-507675, CSV 16 (check)	2
		Total	25

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Potential Quarantine Pests of Cereals for India

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The international exchange of seed in agricultural trade is more extensive now than ever before. But this has also increased the probability of introducing new and dangerous pests or their virulent races along with the movement of plant genetic resources. Internationally there are several examples of spread of important pests, causing havoc with profound political and social impacts. These include: introduction of flag smut (*Urocystis agropyri*) from Australia to Mexico with wheat intended for milling and used for sowing, loose smut of wheat (*Ustilago tritici*) detected for the first time in Laos on wheat imported from Israel and in all probability, bunt of wheat (*Tilletia caries*) introduced into USA from Australia and the Karnal bunt (*Neovossia indica*) first reported in USA in 1996. India also had more than its share of pests introductions causing huge economic losses. The introduction of exotic weeds such as *Lantana camara* from Central America in the 19th century, *Parthenium hysterophorus* from Central and South America and *Phalaris minor* from Mexico in mid 20th century have become a threat to the crop production, environment and the human health.

The National Bureau of Plant Genetic Resources (NBPGR), New Delhi, India is a nodal institution, which has a mandate of germplasm exchange for research and its quarantine processing. When measured in terms of total weight, germplasm material is relatively much smaller compared with commercial shipments. However, the diversity of germplasm poses special problems. For example, different lines are expected to have different levels of resistance to pests and pathogens. Ever since its inception a large number of pests viz., insects, nematodes, fungi, bacteria, viruses and weeds have been intercepted during quarantine processing of introduced material.

Phytosanitary measures are extremely important to facilitate safe import of plants and plant products while protecting them from the ravages of destructive pests. These are also essential as part of risk management strategies adopted during pest risk analysis (PRA), preparation as per the Sanitary and Phytosanitary Agreement of WTO. The International Plant Protection Convention (IPPC) which develops standards has divided PRA preparation in 3 stages viz., initiation, risk assessment and risk management, the compilation of which should be fully documented in the event of a review or dispute arises.

The Division of Plant Quarantine has planned to bring out a series of publications on the potential quarantine pests in various crop groups. In this context, the present publication is an attempt on potential quarantine pests of cereals comprising the species and wild relatives of *Avena, Hordeum, Oryza, Triticum, Zea* and Triticale. The various parameters taken into account were pest/