

Extent of heterosis for green fodder yield and its components traits in sorghum [*Sorghum bicolor* (L.) Moench]

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SUMMARY

Sorghum having ability to grow in poor soil, faster growth habit, high yielding, palatable, nutritious quality and uniform green forage yield through out the year. The experimental material comprised of three male sterile lines used as female parents, 16 genotypes used as male parents, one standard check variety and 48 F_1 hybrids in a line x tester fashion. All sixty eight entries were studied in randomized complete block design with three replications. The results revealed that the degree of heterosis varied from cross to cross for all the traits under study. The expression of heterosis in the positive direction was in maximum number of hybrids for green fodder yield, leaf length, number of nodes per plant, dry matter yield and crude protein yield. While, the magnitude of heterosis in the negative direction was observed for days to flowering, leaf width, leaf : stem ratio, stem thickness, dry matter content, HCN content and NDF content. The hybrid AKMS 14A x S 1049 revealed the highest and significant heterosis and heterobeltiosis for green fodder yield, dry matter content and dry matter yield. The hybrids 3660 A x PB 22, Indore 9 A x PB 22 and AKMS 14A x HC 171 and AKMS 14A x PB 78 were recorded to be the most significant heterotic hybrids over standard check GFSH 1. Hybrid AKMS 14 A x IS 2472 gave higher green fodder yield with low HCN content and NDF content as compared to check variety GFSH 1. On the basis of $gca : sca$ ratio, preponderance of non-additive gene action for green fodder yield per plant suggesting heterosis breeding programme could be useful for developing superior genotype for green fodder yield.

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Key words : Heterosis, Green fodder yield, Genotypes, HCN content, Protein content

Sorghum is a often cross-pollinated crop. In order to make forage sorghum an enterprising and remunerative crop, there is a need to develop varieties / hybrids having early maturity, faster growth, and high forage yield compiled with high protein and low HCN content at flowering stage. For development of such forage hybrid, knowledge and information on genetic architecture is essential for formulation of efficient breeding strategies for genetic improvement of sorghum as a forage crop. The availability of cytoplasmic male sterile line (CMS) in this crop had made commercial exploitation of heterosis. The phenomenon of heterosis had provided the most important genetic tool for improving yield. Identification of specific parental combination, which is capable of producing the highest level of heterotic effects in F_1 , is of greater value in hybrid seed production programme.

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MATERIALS AND METHODS

In present experiments, material comprised of three male sterile line as a female, sixteen genotype as a tester and it's 48 hybrids and one standard check evaluate in three different environment (different date of sowing) condition in RBD design with three replications. The experiment was conducted at Department of Plant Breeding and Genetic, Anand Agricultural University, Anand. Each entry was accommodated in a 4.5 m long single row plot with spacing of 30 x 10 cm. Recommended package of practices were followed. Five plants were randomly selected and tagged to record data on green fodder yield and its related traits. For measuring qualitative traits random sample drawn from the total yield of a particular entry.

RESULTS AND DISCUSSION

Per cent heterosis over better parent (heterobeltiosis) for green fodder yield revealed varying magnitude of expression in different environment (Table 1). The relative heterobeltiosis ranged from -72.93% ($P_1 \times P_{15}$) to 6.04% ($P_3 \times P_4$) in E_1 . In E_2 , -45.81% ($P_1 \times P_{15}$) to 196.42% (