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Short communication

PERFORMANCE OF SORGHUM GENOTYPES AT SOWING DATES IN SOUTHERN RAJASTHAN

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Sorghum [*Sorghum bicolor* (L.) Munch] is the king of millets and third important crop in the country after rice and wheat. Sorghum is not only staple food but it is also required to fulfill fodder requirement in order to make animal husbandry sector more viable. There is a great need to maintain well balanced and regular supply of more nutritious feed and fodder to the animals in the state. Selection of suitable genotypes according to length of growing period is key factor to sustain production of sorghum in rainfed condition. The production can be increased or sustained by adopting suitable cultivars which mature in short period. Therefore, study of suitable genotype under different weather conditions are of paramount importance. Hence, assessment of suitable date of sowing and genotypes are quite essential for obtaining maximum grain yield of sorghum.

A field experiment was conducted at Instructional Farm, Rajasthan College of Agriculture, Udaipur during *Kharif* 2011. The soil of the experimental site was clay loam in texture having pH 7.8 and organic carbon 3.2 g kg^{-1}. It was medium in available nitrogen and phosphorus while high in available potassium. The experiment consisted of 12 treatment combinations comprising three dates of sowing (30 June, 15 July and 30 July) and four genotypes (CSH 16, CSV 17, CSV 23 and CSH 23) laid out in factorial randomized block design replicated thrice. The crop was sown keeping row to row and plant to plant spacing as 45 cm x 12 cm using the seed rate of 12 kg ha^{-1}. The crop was fertilized with 80, 40 and 40 kg nitrogen, phosphorus and potassium per hectare. Half the dose of nitrogen in the form of urea and full dose of phosphorus as DAP were applied as basal and remaining dose of nitrogen was top dressed one month after sowing. The crop was raised following the recommended package of the zone. All the parameters under test were evaluated adopting the standard procedures.

Data (Table 1) indicated that plant height (214.75 cm) increased significantly under 30 June sown crop which remained at par with 15 July sown crop. The lowest plant height (146.67 cm) was recorded in 30 July sown crop. Date of sowing brought about significant variation in dry matter accumulation. The maximum dry matter accumulation $plant^{-1}$ at harvest was recorded in 30 June sown crop which was found statistically at par with the crop sown at 15 July. However, it showed superiority over 30 July sown crop with an increase of 41.2 per cent. The maximum LAI (3.23) was recorded in 30 June sown crop which was significantly superior over 30 July sown crop by 42.2 % and at par with 15 July sown crop (3.19). Lowest HCN (70.47), minimum days to 50% flowering and lowest days to maturity was noticed under 30 June sown crop. The crop sown at 30 June gave significantly highest number of panicle m^{-2} (14.5), number of grains $panicle^{-1}$ (2908.9) and grain weight per panicle (86.42g) which was significantly superior over crop sown at 15 July and 30 July. Significantly maximum weight of panicle (102.92g) and test weight (30.4g) were recorded in 30 June sown crop which was at par with the crop sown at 15 July. However, it showed superiority over 30 July sown crop. The highest grain (4615 kg ha^{-1}) and stover yield (11338 kg ha^{-1}) were obtained under 30 June sown crop which was significantly superior over 15 July and 30 July sown crop. Further 15 July sown crop recorded significantly higher grain yield (by 3638 kg ha^{-1}) and stover yield (by 4527 kg ha^{-1}) over 30 July sown crop. However, 30 July sown crop recorded the lowest stover yield (6208 kg ha^{-1}). The maximum harvest index (29.43%) was recorded with 15 July sown crop which was followed by 30 June sown crop (29.31%). However, both these dates were significantly higher over 30 July sown crop and recorded 189.6 and 188.4% higher harvest index, respectively. The increase in growth parameters under 30 June sown crop might be due to more favourable climate which facilitate better solar interception, absorption and utilization of radiant energy as well as longer duration available for growth and development of the crop. This might have resulted in more translocation of photosynthates, major portion of which was utilized for increasing leaf area and ultimately dry matter accumulation. The early sown crop received more rainfall and less crop weed competition during the crop growing period. With successive delay in sowing, the crop received reduced rainfall, sunlight and other weather parameters. Thus, better environment under early sowing could be attributed to overall improvement in crop growth as reflected by increase in LAI and dry matter accumulation. The significant increase in growth parameters ultimately reflected an increase in yield attributing character viz.; number of panicle m^{-2}, number of grains $panicle^{-1}$, weight $panicle^{-1}$, grain weigh $panicle^{-1}$, test weight and harvest index might be due to better uptake and translocation of photosynthates during the reproductive phase of the crop, thus increasing the size and weight of grains. The results are in close association with the findings of Hara (2003) and Chitte *et al*. (2008).

Table 1: Effect of date of sowing and genotypes on growth and yield parameter, HCN and yield of sorghum

Treat-ments	Plant height at harvest (cm)	Dry matter (g/plant) at harvest	Days to flowering 50%	LAI 60 DAS	Days to maturity	HCN (ppm)	No. of panicle (m^2)	No. of grains/ panicle	Weight of panicle (g)	Grain weight/ panicle	Test weight (g)	Grain yield (kg ha^{-1})	Stover yield (kg ha^{-1})	Harvest index (%)
Sowing dates														
30 June	214.75	124.46	63.7	3.23	94.3	70.47	14.5	2908.9	102.92	86.42	30.4	4615	11338	29.31
15 July	209.58	121.84	64.2	3.19	95.4	76.86	12.8	2634.5	98.83	77.75	30.2	4299	10735	29.43
30 July	146.67	88.14	69.9	2.27	104.7	83.64	11.5	1231.7	40.17	27.33	23.6	661	6208	10.16
CD (5%)	11.96	10.95	2.2	0.39	4.4	2.22	0.8	115.5	7.37	5.56	1.2	366	1145	2.36
Genotypes														
CSH 16	196.44	116.11	65.8	2.60	98.1	72.73	13.6	2380.9	87.11	73.11	30.8	3699	10039	23.17
CSV 17	133.56	101.34	60.0	2.55	89.8	71.12	12.5	2272.9	63.56	48.11	22.8	2771	6489	28.43
CSV 23	234.89	119.39	72.2	3.56	103.4	81.07	12.8	2060.5	82.89	62.33	29.2	2999	11655	18.10
CSH 23	196.44	109.08	65.7	2.89	101.2	83.04	12.7	2319.1	85.11	71.78	29.6	3298	9525	22.17
CD (5%)	13.81	12.65	3.8	0.43	5.1	2.56	0.9	133.4	8.02	6.42	1.4	423	1322	2.73

It is clear from the data (Table 1) that genotype CSV-23 registered significantly higher plant height (234.89 cm), LAI (3.56) and dry matter (119.39 g/plant) which was superior over genotypes CSH-16, CSV-17 and CSH-23**.** Data further indicate that genotype CSV 17 registered the lowest HCN content at 30 DAS (71.12 ppm) and highest harvest index (28.43%) Among the genotypes**,** CSV-17 was found earliest with regards to flowering (60 days) and maturity (89.8 days). **T**he highest number of panicles m^{-2} (13.6) was recorded in CSH 16 with the per cent increase of 9.4, 6.6 and 7.0 over CSV 17, CSV 23 and CSH 23, respectively. On the contrary, the maximum number of grains per panicle was recorded in genotype CSV-17 (2380.9) which was found statistically at par with genotypes CSH-16 and CSH-23. Maximum weight of panicle (88.56 g) was recorded in CSH-23 which was statistically at par with genotypes CSH-16 and CSV-23. The highest grain weight $panicle^{-1}$ (73.11g), test weight (30.8g) and grain yield (3699 kg ha^{-1}) were recorded in genotype CSH-16 which was significant superiority over genotypes CSV-17 and CSV-23 in this regard. Data (Table 1) indicated that the genotype CSV-23 registered significantly higher stover yield over CSH-16, CSH-23 and CSV-17. Sorghum genotypes differed significantly with respect to various parameters might be due to the differential behaviour in their genetic makeup. In case of grain yield CSH 16 was found superior while CSV-23 was found superior with respect to stover and biological yield over other genotypes. Results corroborate with the findings of Mali *et al.* (2002) and Singh and Sumeriya (2004).

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