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Evaluation of growth, yield and yield Atribute performance of sorghum (*Sorghum bicolor* L. Moench) varieties in Prayagraj region

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Abstract
The present experiment was conducted during kharif season 2019-2020 at Field Experimentation Centre, Department of Genetics and Plant Breeding, Sam Higginbottom University of Agriculture Technology and Sciences, Prayagraj. The data were recorded for growth, yield and yield atributes was found significant in field conditions and recorded significant variations in different growth and yield parameters. Among the total 13 varieties used in this experiment and the variety V_{13} (GVA-16) followed by V_{11} (JAI KISAN), V_2 (GVA-1) and V_1 (RG-5) showed significantly increased seed vigour parameters of sorghum and in field condition it is observed that V_{13} (GVA-16) followed by V_{12} (RAHUL-66), Among the 13 varieties of sorghum GVA-16 showed maximum quality and yielding attributes and GV-18 recorded lowest in all the parameters.

Keywords: Sorghum, growth, yield parameters, seed quality and significant

Introduction
Sorghum (*Sorghum bicolor* (L.) Moench) is one of the world's most important nutritious coarse cereal crop and now gaining importance as an industrial crop. Sorghum ranks fifth among the cereals in the world after wheat, rice, maize and barley. For more than 500 million people in more than 30 countries, sorghum is an important dietary staple food (ICRISAT, 2006) [10]. Sorghum is one of the main staples for the world's poorest and most food-insecure people. Sorghum is grown mainly in the arid and semi-arid tropics of the world. The crop is genetically suited to hot and dry agro ecologies where it is difficult to grow other food grains.
Sorghum is mainly grown in USA, India, Nigeria, China, Mexico, Sudan and Argentina. Grain sorghum and maize (corn) are comparable in nutrition and costs of production. In hotter and drier areas such as the Southern US, Africa, Central America and South Asia, sorghum is preferred as it requires lesser water than corn and produces better yields than corn in dry conditions (Carter *et al.*, 1989) [5]. After the United States and India, Nigeria is the third largest world sorghum producer (FAOSTAT, 2013) [7]. Ninety % of sorghum produced by United States and India is utilized as animal feed, while Nigeria is the world's leading country for food grain sorghum production.
Sorghum is able to tolerate drought better than most other grain crops. Sorghum has potential of adoption to adverse climatic conditions and with the introduction of early maturing and high yielding hybrids, the crop has gained importance in the irrigated areas as well. It has a very large and extensive tap root system that enables it to obtain water and nutrients from soil depth of over five feet. It is used as a staple food for human and animal feed. The grain is used to process wax, starch and local alcohol (Agrama and Tuinstra, 2003) [1]. Sorghum fodder possesses oxalic acid and prussic acid. It produces a tonnage of dry matter having digestible nutrients (50%), crude protein (8%), fat (2.5%) and nitrogen free extracts (45%) (Azam *et al.*, 2010) [3]. It can be used fresh as well as can be stored in form of silage and hay for future use. Its grains contain about 10-12% protein, 03% fat and 70% carbohydrates, therefore, it can replace other grains in the feeding program for dairy cattle and poultry (Ullah *et al.*, 2007) [20].
Most farmers adopt improved sorghum varieties simply because of early maturity and high yielding ability. On top of that, most improved varieties have high grain quality, attractive colour and good market. While climate change is continuous, there is need to increase effort on researches to develop new drought tolerance sorghum, millets and other crops which will withstand the harsh environment in future to secure food for the people (Msongaleli *et al.*,

2017) [15]. While emphasizes is for farmers to adopt improved sorghum seeds still the availability of seed has been poor (Mpangwa, 2011) [14].

So keeping these aspects in view the present experiment entitled the Evaluation of growth, yield and yield atribute performance of sorghum (*Sorghum bicolor* L. Moench) varieties in Prayagraj region was carried out.

Materials and Methods

The experiment was carried out to study the "Evaluation of growth, yield and yield atribute performance of sorghum (*Sorghum bicolor* L. Moench) varieties in Prayagraj region". The experiment was conducted at the experiment site of field at the department of genetics and plant breeding, SHUATS, Prayagraj. The experimental material consists of 13 varieties and seed of sorghum *viz*., RG-5 (V_1), GVA-1 (V_2), RAMYA-66 (V_3), GV-18 (V_4), CSH-5 (V_5), CSH-9 (V_6), RGM-11 (V_7), U.P DESI LOCAL VARITEY -1 (V_8), SRI NITHYA -22 (V_9), SRI NIYHYA -28 (V_{10}), JAI KISAN (V_{11}), RAHUL-66 (V_{12}), GVA-16 (V_{13}). The field experiment was in three replications in randomized block design. Spacing was maintained at 45 X 15 cm, with plot size of 2x2 m^2. Recommend dose of fertilizer applied was 80:40:40 (N: P: K)

For field emergence count one hundred seeds from each treatment in three replications were used and count was taken on the 15th day after sowing by using following formulae

$$\text{Field emergence (\%)} = \frac{\text{Number of seedling emerged on 15}^{\text{th}}\text{ days}}{\text{Total no. of seeds sown}} \times 100$$

Days to 50% flowering was recorded by selecting five randomly selected plants in a plot in field. Plant height was measured at 30 and 60 DAS and average height of five plants was recorded in centimeters. The total numbers of leaves from five randomly selected plants were counted manually from each treatment. Panical count was taken by selecting five plants randomly. Average seeds per inflorescence of five plants were recorded by divideding total number of seeds per plant by total inflorescence in plant. Seed yield per plant was recorded by counting the avererage weight of all seeds harvested from five randomly selected plants and seed yield per plot was recorded by couning weight of grains harvested from each plot in grams. The biological yield was calculated by adding total grain yield and straw yield.

Harvest index (HI) each plot was recorde by following formulae,

$$\text{Harvest index (\%)} = \frac{\text{Grain yield}}{\text{Biological yield}} \times 100$$

Statistical analysis for Randomized Block Design (RBD) was carried out according to methodology advocated by Panse and Sukhatme (1967) [19] and for CRD it was according to methodology advocated by Fisher (1936) [8].

Result and Discussion

Growth parameters Table.1 Indicates that for growth parameters field emergence % maximum was recorded by V_{11} - JAI KISAN (82.00%) followed by V_9-SRI NITHYA-22 (77.67%). Minimum field emergence percentage was recorded by V_1-RG-5 (59.67%). Similar results were observed by Habyarimana *et al.*, (2004) [9]. Days to 50% flowering found non-significantly, minimum days to 50% flowering (30.67) was recorded by V_{10}-SRI NIYHYA -28 followed by V_7 -RGM-11 (31.00). Maximum days to 50% flowering were recorded by V_9- SRI NITHYA -22 (34.33). Similar results were observed by Mc Guire (2008) [13]. Significantly maximum plant height (116.07 cm) was recorded by V_{11} - JAI KISAN followed by V_9-SRI NITHYA-22 (110.07 cm) and V_3 - RAMYA-66 (104.00 cm). Minimum plant height was recorded by V_{12}-RAHUL-66 (73.47 cm). Similar results were observed by Bidinger and Raju, (2000) [4]. Number of panicles per plant was recorded maximum (74.13) by V_9- SRI NITHYA -22 followed by V_6- CSH-9 (68.00) and V_{13}-GVA-16 (66.73). Minimum number of panicles per plant was recorded by V_1-RG-5 (49.00). Similar results were observed by Mulatu and Ketema (2001) [16].

Table 1: Mean performance of sorghum for growth and yield character

Sr. No.	Treatments	Field Emergence percentage	Days to 50% flowering	Plant height (cm)	Number of leaves per plant	Number of panicle per plant	Number of seeds per panicle	Seed yield per plant (g)	Seed yield per plot (g)	Biological yield (g)	Harvest index (%)
1	V_1	59.67	31.33	87.20	7.63	49.00	83.13	65.00	751.20	1121.40	67.37
2	V_2	68.67	32.33	82.47	7.40	54.93	84.73	85.60	571.53	911.51	63.70
3	V_3	68.67	31.33	104.00	8.03	58.27	68.67	70.40	756.37	940.66	82.00
4	V_4	62.00	31.00	87.87	9.33	56.87	75.00	94.20	720.39	1136.30	63.67
5	V_5	73.33	31.67	89.07	8.20	64.40	80.20	85.40	745.80	1121.51	66.57
6	V_6	71.00	33.67	85.33	7.33	68.00	79.53	105.20	788.24	1193.64	66.17
7	V_7	73.67	31.00	95.00	6.87	59.73	112.07	81.47	602.17	1041.62	59.50
8	V_8	70.67	31.67	87.93	7.07	64.20	75.00	94.93	888.60	1283.84	69.43
9	V_9	77.67	34.33	110.07	7.73	74.13	80.10	80.07	800.63	1136.61	70.30
10	V_{10}	66.67	30.67	85.07	6.37	59.47	88.07	87.87	579.23	1013.55	57.33
11	V_{11}	82.00	32.67	116.07	7.27	66.27	77.70	82.67	734.23	1271.70	58.03
12	V_{12}	77.67	34.00	73.47	6.93	66.23	75.67	87.13	796.93	1178.12	68.27
13	V_{13}	75.33	33.67	94.93	7.63	66.73	67.07	99.80	676.20	1206.97	55.84
Grand Mean		71.31	32.26	92.19	7.52	62.17	80.53	86.13	723.96	1119.80	65.24
C.D.(5%)		12.14	2.95	22.69	1.39	12.97	21.24	20.91	183.72	294.76	13.67
SE(m)		4.16	1.01	7.77	0.48	4.44	7.28	7.17	62.94	100.99	4.68
SE(d)		5.88	1.43	10.99	0.68	6.28	10.29	10.13	89.01	142.82	6.62
C.V.		10.10	5.43	14.61	11.00	12.38	15.65	14.41	15.06	15.62	12.43

Yield parameters

Table.1 Indicates that for Yield parameters Significantly maximum number of seeds per panicle (112.07) was recorded by V_7-RGM-11 followed by V_{10}-SRI NIYHYA -28 (88.07), V_2-GVA-1 (84.73) and V_1-RG-5 (83.13). Minimum number of seeds per panicle was recorded by V_{13}-GVA-16 (67.07). Similar results were observed by Clerget *et al.*, (2004) [6] whereas; significantly maximum seed yield per plant (105.20 gm) was recorded by V_6-CSH-9 followed by V_{13}-GVA-16 (99.80 gm) and V_8-U.P DESI LOCAL VARITEY-1 (94.93 gm). Minimum seed yield per plant was recorded by V_1-RG-5 (65.00 gm). Similar results of were observed by Naeem *et al.*, (2002). Seed yield per plot was recorded significantly maximum (888.60 gm) byV_8-U.P DESI LOCAL VARITEY -1 followed by V_9-SRI NITHYA -22 (800.63 gm) and V_{12}-RAHUL-66 (796.93 gm). Minimum seed yield per plotwas recorded by V_2-GVA-1 (571.63 gm). Similar results of were observed by Kusalkar *et al.*, (2003) [12]. Biological yield found non-significantly, maximum biological yield (1283.84 gm) was recorded by V_8-U.P DESI LOCAL VARITEY -1 followed by V_{11}-JAI KISAN (1271.70 gm) and V_{13}-GVA-16 (1206.97 gm). Minimum biological yield was recorded by V_2-GVA-1 (911.51 gm). Similar results were observed by Kainth *et al.*, (2004) [11]. Significantly maximum harvest index (82.00%) was was recorded by V_3-RAMYA-66 followed by V_9-SRI NITHYA-22 (70.00%), and V_8-U.P DESI LOCAL VARITEY-1 (69.43%). Minimum harvest indexwas recorded by V_{13}-GVA-16 (55.84%). Similar results of were observed by Nabi *et al.*, (2006) [17].

Conclusion

On the basis of results obtain I can conclude that variety V_9-SRI NITHYA has perform good in the means plant growth V_8-U.P DESI LOCAL VARITEY-1 followed by V_3-RAMYA-66 shows good results in yield and yield attributes under prayagraj climatic condition.

Refrences

1. Agrama HA, Tuinstra MR. Phylogenetic diversity and relationships among sorghum accessions using SSRs and RAPDs. African Journal of Biotechnology 2003;2:334-340.
2. Anonymous. Texas Cooperative Extension at: http://texasextension.tamu.edu 2004.
3. Azam M, Waraich EA, Pervaiz A, Nawaz F. Response of a newly developed fodder (*Sorghum bicolor* L. monech) variety (F-9917) to NPK application. Pak. J Life Soc. Sci 2010;8:117-120.
4. Bidinger FR, Raju DS. Mechanisms of adjustment by different pearl millet plant types to varying plant populations. J. Agric. Sci 2000;134:181-189.
5. Carter PR, Hicks DR, Oplinger ES, Doll JD, Bundy LG, Schuler RT *et al*. "Grain sorghum (Milo)." Alternative Field Crops Manual 1989.
6. Clerget B, Dingkuhn M, Chantereau J, Hemberger J, Louarn G, Vaksmann M. Does panicle initiation in tropical sorghum depend on day-to-day change in photoperiod? Field Crops Res 2004;88:11-27.
7. FAOSTAT. Database of agricultural production. Rome: Food and Agriculture Organization of the United Nations. Available at [accessed December, 2017] 2013.
8. Fisher RA. The correlation between relative on the supposition of genotypes grown in Kumaun Himalaya, Indian Journal Genetics 1936;66(1):37-38.
9. Habyarimana E, Laureti D, De Ninno M, Lorenzoni C. Performances of biomass sorghum [*Sorghum bicolor* (L.) Moench] under different water regimes in Mediterranean region. Industrial Crops and Products 2004;20:23-28.
10. ICRISAT 2006. http://www.icrisat.org/crop-sorghum.htm
11. Kainth RA, Naeem M, Chohan MSM, Khan AH. Fodder yield potential of advanced lines of sorghum under irrigated conditions. J. Agric. Res 2004;42:277-281.
12. Kusalkar DV, Awari VR, Pawar VY, Shinde MS. Physiological parameters in relation to grain yield in rabi sorghum on medium soil. Adv. Plant Sci 2003;16:119-122.
13. McGuire SJ. Challenges facing participatory reform in the Ethiopia sorghum improvement programme. Agricultural Systems 2008;96:139-149.
14. Mpangwa M. Adoption and economic impacts of improved sorghum varieties in semi-arid areas of Tanzania: A case of Singida rural district. MSc. Thesis, Agricultural Economics of Sokoine University of Agriculture, Morogoro, Tanzania 2011.
15. Msongaleli BM, Tumbo SD, Kihupi NI, Rwehumbiza FB. Performance of Sorghum Varieties under Variable Rainfall in Central Tanzania. International Scholarly Research Notices. Article ID 2506946 2017.
16. Mulatu E, Ketema K. Participatory Varietal Selection in Lowland Sorghum in Eastern Ethiopia: Impact on Adoption and Genetic Diversity. Expl Agric 2001;37:211-229.
17. Nabi CG, Riaz M, Ahmed G. Comparison of some advanced lines of *Sorghum bicolor L. Monech*for green fodder/dry matter yield and morpho economical parameters. J. Agric. Res 2006;44:191-196.
18. Naeem M, Chohan MSM, Khan AH, Salah-ud-Din S. Study of green fodder yield potential and its components of different pearl millet (Pennisetumamericanum L.) varieties under irrigated conditions of Faisalabad. Asian J. Plant Sci 2003;2:74-76.
19. Panse VG, Sukhatme PV. Statistical Methods for Agricultural Workers. Indian Council of Agricultural Research 1967,103-108.
20. Ullah A, Khan AA, Nawab K, Khan A, Islam B. Growth characters and fodder production potential of sorghum varieties under irrigated conditions. Sarhad J Agric 2007;23:265-268.