

Effect of staggered sowings on seed quality parameters of sorghum hybrid cv. SHD-9704 (*Sorghum bicolor*)

■ SHARNKUMAR AND MERWADE

SUMMARY

The present investigation was carried out in the Department of Seed Science and Technology, College of Agriculture, University of Agricultural Sciences, Dharwad during *Rabi* season in 2007 and *Kharif* season in 2008 and their pooled data on effect of staggered sowings on seed quality parameters of sorghum hybrid cv-SHD-9704 (*Sorghum bicolor*). The 100 seed weight, germination percentage, root length, shoot length, seedling vigour index and seedling dry weight were significantly more and less (3.28 g, 92.17%, 15.34 cm., 17.65 cm, 3035, 318.3 mg, respectively) and (2.90 g, 84.80%, 14.00 cm, 16.39 cm, 2579 and 293.63 mg, respectively) in sowing of female parent 4 days before male parent (S_1) and sowing of female parent 10 days before male parent (S_2).

Key Words : Sorghum, Staggered sowing, 100 seed weight, Germination, Root length, Shoot length, Seedling dry weight and Seedling vigour index

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Sorghum (*Sorghum bicolor* (L.) Moench) commonly known as 'jowar', is the fifth most important cereal crop in the world next to wheat, rice, maize and barley. In India, it is cultivated on about 7.93 million hectare area with annual production of 7.78 million tonnes and productivity of 981 kg per ha (Anonymous, 2008). The major sorghum growing states in India are Maharashtra, Karnataka, Andhra Pradesh, Madhya Pradesh, Rajasthan and Tamil Nadu. In India, Karnataka state is one of the important sorghum growing states and stands second in area and production after Maharashtra. In Karnataka, it accounts for 1.38 million hectare area and production of 1.62 million tonnes with average productivity of 1192 kg per ha (Anonymous, 2009). About 50

per cent of people in Karnataka depend on sorghum as a staple food crop particularly in Northern Karnataka *viz.*, Bijapur, Dharwad, Belgaum, Raichur, Gulbarga, Bellary and Mysore. Turai *et al.* (2004) revealed that seeds from staggered sowings recorded higher germination, root and shoot lengths, seedling dry weight and vigour index but seeds from simultaneous sowing treatment recorded lower values for seed quality traits. To achieve better synchronization between parental lines of DSH-1sunflower hybrid for higher seed yield and quality, staggered sowing may be followed.

MATERIAL AND METHODS

The laboratory experiments were conducted during 2007 (*Rabi*) and 2008 (*Kharif*) to study the effect of staggered sowings on seed quality attributes in pre-released sorghum hybrid SHD-9704 in the Department of Seed Science and Technology, College of Agriculture, University of Agricultural Sciences, Dharwad.

The observations were made on 100 seed weight (g), germination (%), root length(cm), shoot length (cm), seedling dry weight (mg) and seedling vigour index. The data obtained

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from various periodical observations were subjected to statistical analysis. The analysis of variance and interpretation of data were done as per procedure given by Gomez and Gomez (1984). The experimental data of 2007 (*Rabi*) and 2008 (*Kharif*) were used for combined analysis to arrive best treatment combination effect. The germination percentages were converted into angular transformation values and then subjected to the statistical analysis.

RESULTS AND DISCUSSION

The experimental findings obtained from the present study have been discussed in following heads:

Seed quality parameters:

In the present study, the seed quality parameters such as 100 seed weight, germination percentage, root length, shoot length, seedling vigour index and seedling dry weight differed

Table 1 : Effect of staggered sowing on 100 seed weight (g), germination (%), root length(cm), shoot length (cm) of sorghum hybrid cv. SHD-9704

Treatments	100 seed weight(g)						Germination (%)					
	Rabi 2007-08		Kharif 2008-09		Pooled data		Rabi 2007-08		Kharif 2008-09		Pooled data	
S ₀	3.26		3.10		3.18		90.80(72.33)*		88.33(70.01)*		89.57(71.14)*	
S ₁	3.37		3.20		3.28		93.40(75.11)*		90.80(72.33)*		92.17(73.74)*	
S ₂	3.26		2.95		3.11		87.80(69.54)*		84.93(67.14)*		86.37(68.32)*	
S ₃	2.98		2.81		2.90		86.07(68.07)*		83.53(66.04)*		84.80(67.03)*	
Mean	3.22		3.02		3.12		89.52(71.10)*		86.90(68.76)*		88.23(69.92)*	
	S.E.±	C.D.	S.E.±	C.D.	S.E.±	C.D.	S.E.±	C.D.	S.E.±	C.D.	S.E.±	C.D.
		(P=0.05)		(P=0.05)		(P=0.05)		(P=0.05)		(P=0.05)		(P=0.05)
S	0.03	0.08	0.03	0.08	0.02	0.05	0.91	2.61	0.87	2.58	0.90	2.58

Table 1 contd....

	Root length(cm)						Shoot length (cm)					
	Rabi 2007-08		Kharif 2008-09		Pooled data		Rabi 2007-08		Kharif 2008-09		Pooled data	
	15.71		14.25		14.98		17.37		16.66		17.02	
	16.03		14.64		15.34		18.06		17.24		17.65	
	15.06		13.79		14.43		16.92		16.45		16.68	
	14.54		13.46		14.00		16.53		16.25		16.39	
	15.34		14.04		14.69		17.22		16.65		16.93	
	S.E.±	C.D.	S.E.±	C.D.	S.E.±	C.D.	S.E.±	C.D.	S.E.±	C.D.	S.E.±	C.D.
		(P=0.05)		(P=0.05)		(P=0.05)		(P=0.05)		(P=0.05)		(P=0.05)
	0.13	0.36	0.11	0.32	0.08	0.23	0.19	0.48	0.15	0.43	0.12	0.35

NS =Non-significant

Staggered sowings of female parent (S)

* Figures in the parenthesis are arcsine transformed values

S₀ - Simultaneous sowing of female and male parents

S₁ - Sowing of female parent four days before male parent

S₂ - Sowing of female parent seven days before male parent

S₃ - Sowing of female parent ten days before male parent

Table 2 : Effect of staggered sowing on seedling dry weight (mg) and seedling vigour index of sorghum hybrid cv. SHD-9704

Treatments	Seedling dry weight (mg)						Seedling vigour index					
	Rabi 2007-08		Kharif 2008-09		Pooled data		Rabi 2007-08		Kharif 2008-09		Pooled data	
S ₀	320.00		297.87		308.93		2978		2725		2852	
S ₁	330.53		306.20		318.37		3182		2888		3035	
S ₂	311.53		288.87		300.20		2801		2561		2681	
S ₃	301.47		285.80		293.63		2666		2492		2579	
Mean	315.88		294.68		305.28		2907		2666		2787	
	S.E.±	C.D.	S.E.±	C.D.	S.E.±	C.D.	S.E.±	C.D.	S.E.±	C.D.	S.E.±	C.D.
		(P=0.05)		(P=0.05)		(P=0.05)		(P=0.05)		(P=0.05)		(P=0.05)
S	3.10	8.86	3.06	8.77	2.71	7.76	27	78	27	76	18	53

NS – Non significant

Staggered sowings of female parent (S)

S₀ - Simultaneous sowing of female and male parents

S₁ - Sowing of female parent four days before male parent

S₂ - Sowing of female parent seven days before male parent

S₃ - Sowing of female parent ten days before male parent

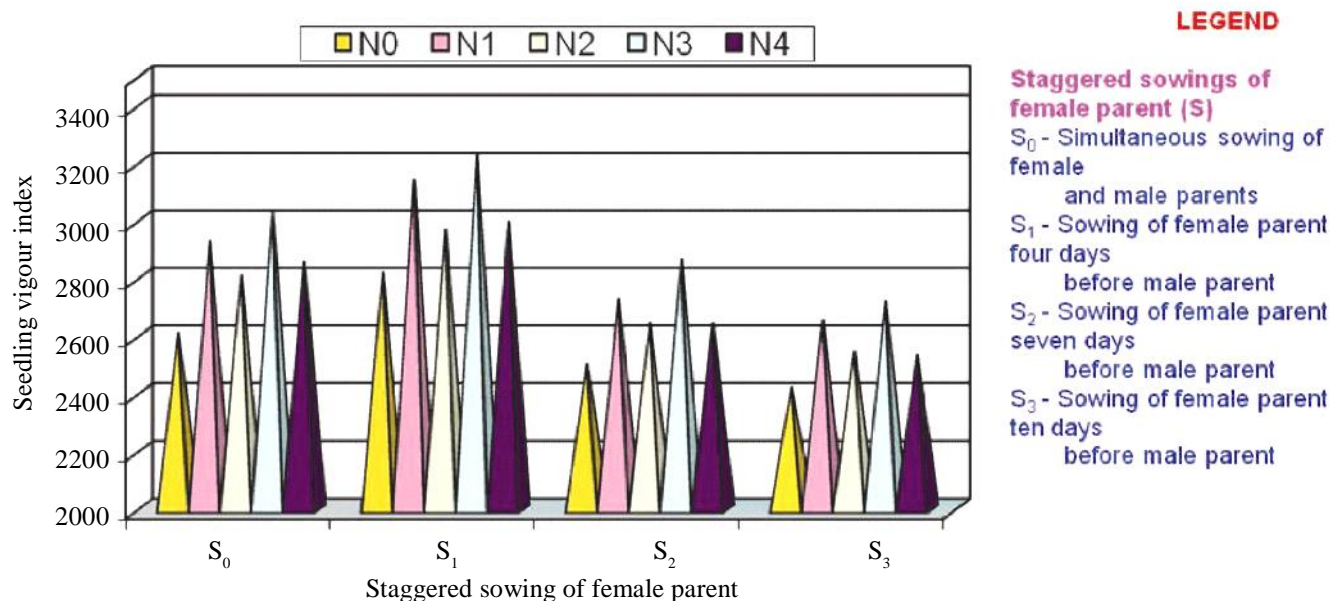


Fig. 1 : Effect of staggered sowings on seedling vigour index

significantly due to staggered sowings in both the years of experiment and as well as combined year analysis.

Among different dates of staggered sowings, the sowing of female parent 4 days before male parent (S₁) recorded significantly more 100 seed weight (3.28 g) (Fig. 1), germination percentage (92.17%) (Table 1), root length (15.34 cm), shoot length (17.65 cm), seedling vigour index (3035) and seedling dry weight (318.37 mg) (Table 2) followed by sowing of female and male parent on same day (S₀) (3.18 g, 89.57%, 14.98 cm, 17.02 cm, 2852 and 308.93 mg, respectively) as against female parent sown 10 days before male parent (S₃) (2.90 g, 84.80%, 14.00 cm, 16.39 cm, 2579 and 293.63 mg, respectively).

The significantly higher seed quality parameters noticed in female parent sown 4 days before male parent may be attributed better seed development which resulted in increased 100 seed weight due to efficient accumulation and translocation of photosynthates from source to sink as compared to those harvested seeds from female parent sown 10 days before male parent. Similar findings were also reported by Basavaraju and Bommegouda (1982), Shivappa (1988), Lakkappan (1999), Patil (2001) and Prasad (2006) in sorghum.

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