

Effect of foliar application of plant nutrients 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 foliar application of plant nutrients on seed quality parameters of sorghum hybrid cv SHD-9704 (*Sorghum bicolor*). The foliar spray of urea @ 2% (N₃) recorded significantly maximum 100 seed weight (3.26 g), root length (15.64 cm), shoot length (17.58 cm), seedling vigour index (2967) and seedling dry weight (323.29 mg), whereas it was minimum (2.94 g, 13.81 cm, 16.25 cm, 2592 and 288.21 mg, respectively) in the foliar spray of water (N₀).

Key Words : Sorghum, Plant nutrients, 100 seed weight, Germination, Root length, Shoot length, Seedling dry weight and seedling vigour index

How to cite this article : Sharnkumar and Merwade (2014). Effect of foliar application of plant nutrients on seed quality parameters of sorghum hybrid cv SHD-9704 (*Sorghum bicolor*) Sharnkumar and Merwade. *Internat. J. Plant Sci.*, 9 (1): 161-163.

Article chronicle : Received : 22.10.2013; Revised : 01.11.2013; Accepted : 10.11.2013

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 Tamilnadu. 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). The plant nutrients

like urea and GA₃ are known to be potential chemical to enhance seed crop productivity of sorghum hybrid by modifying morphological and physiological characteristics in enhancing source to sink relationship ultimately realizing higher yield of quality hybrid seeds.

MATERIAL AND METHODS

The laboratory experiments were conducted during 2007 (*Rabi*) and 2008 (*Kharif*) to study the effect of foliar application of plant nutrients 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 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

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treatment combination effect. The germination percentages were converted into angular transformation values and then subjected to the statistical analysis.

RESULTS AND DISCUSSION

The results of the present study as well as relevant discussions have been presented under following sub heads:

Seed quality parameters:

The foliar application of plant nutrients exhibited

significant variations on seed quality parameters in both the years of experiment as well as pooled analysis of two years. The foliar spray of urea @ 2% (N_3) recorded significantly higher 100 seed weight (3.26 g) (Table 1), germination percentage (89.83%), root length (15.64 cm), shoot length (17.58 cm), seedling vigour index (2967) (Table 2) and seedling dry weight (323.29 g) (Table 2) and lower seed quality parameters in water spray control (N_0) (2.94 g, 86.58%, 13.81 cm, 16.25 cm, 2592 and 288.21 mg, respectively). The higher seed quality parameters noticed in foliar spray of urea @ 2%

Table 1 : Effect of foliar application of plant nutrients 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	
N_0	3.04		2.84		2.94		88.00(69.71)*		85.17(67.33)*		86.58(68.49)*	
N_1	3.27		3.06		3.16		90.17(71.71)*		87.67(69.43)*		88.92(70.54)*	
N_2	3.20		2.99		3.10		89.00(70.61)*		86.33(68.28)*		87.67(69.43)*	
N_3	3.36		3.17		3.26		91.08(72.61)*		88.42(70.09)*		89.83(71.39)*	
N_4	3.22		3.02		3.12		89.33(70.92)*		86.92(68.78)*		88.13(69.83)*	
Mean	3.22		3.02		3.12		89.52(71.10)*		86.90(68.76)*		88.23(69.92)*	
	S.E. \pm	C.D.	S.E. \pm	C.D.	S.E. \pm	C.D.	S.E. \pm	C.D.	S.E. \pm	C.D.	S.E. \pm	C.D.
N	.03	(P=0.05)	0.03	(P=0.05)	0.02	(P=0.05)	1.02	NS	0.89	NS	1.01	NS

Contd... Table 1

Treatments	Root length(cm)						Shoot length (cm)					
	Rabi 2007-08		Kharif 2008-09		Pooled data		Rabi 2007-08		Kharif 2008-09		Pooled data	
	14.36		13.27		13.81		16.46		16.03		16.25	
	15.83		14.38		15.11		17.47		16.71		17.09	
	15.05		13.86		14.45		17.05		16.64		16.85	
	16.37		14.92		15.64		17.90		17.26		17.58	
	15.08		13.76		14.42		17.23		16.60		16.91	
	15.34		14.04		14.69		17.22		16.65		16.93	
	S.E. \pm	C.D.	S.E. \pm	C.D.	S.E. \pm	C.D.	S.E. \pm	C.D.	S.E. \pm	C.D.	S.E. \pm	C.D.
	0.14	(P=0.05)	0.13	(P=0.05)	0.09	(P=0.05)	0.19	(P=0.05)	0.17	(P=0.05)	0.14	(P=0.05)

NS=Non-significant

Foliar applications of plant nutrient (N)
Planting ratios (P)

N_0 – Control (Water spray) N_1 – GA_3 @ 150 ppm N_2 – GA_3 @ 250 ppm N_3 – Urea @ 2% N_4 – Urea @ 3%

* Figures in the parenthesis are arcsine transformed values

Table 2 : Effect of foliar application of plant nutrients 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	
N_0	297.50		278.92		288.21		2688		2497		2592	
N_1	321.58		300.83		311.21		3005		2728		2867	
N_2	309.58		291.00		300.29		2859		2632		2745	
N_3	335.67		310.92		323.29		3096		2839		2967	
N_4	315.08		291.75		303.42		2887		2638		2762	
Mean	315.88		294.68		305.28		2907		2666		2787	
	S.E. \pm	C.D.	S.E. \pm	C.D.	S.E. \pm	C.D.	S.E. \pm	C.D.	S.E. \pm	C.D.	S.E. \pm	C.D.
N	3.46	(P=0.05)	3.43	(P=0.05)	3.03	(P=0.05)	30	(P=0.05)	30	(P=0.05)	21	(P=0.05)

NS – Non significant

Foliar applications of plant nutrient (N)

N_0 – Control (Water spray) N_1 – GA_3 @ 150 ppm N_2 – GA_3 @ 250 ppm N_3 – Urea @ 2% N_4 – Urea @ 3%

may be due to increased fertility level leading to higher seed set and well matured and developed seeds with higher food reserves. Obviously, this has led to higher seed recovery percentage and increased seed size. Similar results were reported by Krishnaswamy and Ramaswamy (1979), Shivappa (1988), Lakkappan (1999), Patil (2001) and Kannababu *et al.* (2002) in sorghum and Turai *et al.* (2004) in sunflower.

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