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RESEARCH PAPER

Evaluation of TwinN in *Rabi* sorghum on growth and growth parameters in northern transitional zone of Karnataka

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Abstract : A field experiment was carried out on TwinN in *Rabi* sorghum at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad Karnataka during *Rabi* seasons (2009 and 2010) to evaluate the sorghum growth and growth parameters. The experiment was laid out in Randomized Block Design with eight treatments and three replications. The pooled results for two seasons showed significantly higher plant height (230.33 cm), number of leaves per plant (9.23), root length (19.20 cm), dry root mass (84.33 g) and ear head girth (19.07 cm) were recorded in 40:40:40 N:P_2O_5:K_2O kg/ha with two TwinN sprays at 5th leaf and flower primordial stage(T_5) which was at par with 80:40:40 N:P_2O_5:K_2O kg/ha. Further dry matter production and accumulation in stem, leaves, ear heads and TDMP (42.44,4.88,22.92 and 68.19 g /plant, respectively) also showed similar trend in T_5

Key Words : TwinN, *Rabi* sorghum, Root length, Root dry mass, Dry weight of stem, TDMP

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INTRODUCTION

TwinN is a breakthrough product that reduces the amount of nitrogen fertilizer needed. It is a freeze dried microbial product diagothrophs and produced in modern sterile fermentation. Every batch quality control tested by NSW Govt. laboratories with 710 cfu /ha of very high concentration. All strains present and free of contaminants and reliable shelf life-12 months cool(Lic) storage and 1,5,10 and 100 ha packs available. The purpose of using TwinN is to improve profitability through decreasing fertilizer and increasing yield levels.

Increase sustainability of production :

– Enable compliance with emerging legislations improve soil productivity
– Decrease carbon foot preet of production
– Decrease leaching of NO_3 into water ways

To limit nitrogenous fertilizer applications in Europe, Australia etc. :

Hence, to know the performance of TwinN in cereal crops like *Rabi* sorghum an experiment was carried out with the objective to know the response of TwinN on growth and growth parameters of *Rabi* sorghum.

MATERIALS AND METHODS

The field experiment was conducted at Main Agricultural Research Station, University of Agricultural Sciences, Dharwad, which lies in northern transitional zone (Zone-8) of Karnataka and region IV of agro climatic zones of India. The soil type was clay loam with pH of 8.9. The available nitrogen (231 kg/ha) and phosphorus (22.98 kg/ha) were low and potassium (250 kg/ha) was in medium range. The experiment was laid out in Randomized Block Design with eight treatments comprising of 40:40:40 NPK kg/ha + 1 TwinN spray at 5th leaf stage and two TwinN spray at 5th leaf stage and primordial stage, 20:40:40 kg NPK/ha with one Twin-N spray at 5th leaf stage and two TwinN spray at primordial stage, 0:40:40 kg NPK/ha with one TwinN spray at 5th leaf stage and two sprays at 5th leaf and primordial stage, with RDF (80:40:40)NPK kg/ha as a standard check) and 0:40:40 kg NPK/ha + No TwinN

spray (control) and replicated thrice.

The recommended FYM and NPK fertilizers were applied as per treatment and *Rabi* Jowar(DSV-4) seeds were sown during October last week for both the seasons. Two protective irrigations were given with two inter cultivations and one hand weeding. The growth parameters were recorded including root length to compare the effectiveness of the TwinN. The data were subjected for statistical analysis.

RESULTS AND DISCUSSION

The data on plant height, number of leaves, total dry matter production(g/plant) and its distribution in stem, leaves and reproductive parts, root length (cm), dry root mass(g/ plant) are presented in Table 1, 2 and Fig 1, 2.

Among different treatments combining with TwinN application in *Rab*i sorghum recorded significantly higher plant height (230.33 cm), number of leaves (9.23),,root length 19.20 cm), dry root mass (84.33 g) and ear head girth (19.07 cm) were recorded in RDF-80:40:40 N:P_2O_5:K_2O kg/ha with two TwinN sprays at 5th leaf and flower primordial stage (T_5.) In rest of the treatments registered lower values. Further dry matter production and accumulation in stem, leaves , ear heads and TDMP (42.44,4.88,22.92 and 68.19 g /plant, respectively) also showed similar trend in T_5 .

The increase in plant height and other parameters might be due beneficial effect of TwinN in reducing 50 per cent of nitrogenous fertilizers. Standard check (T_1) which was closely followed by T_5. The higher root length and dry root mass in 40: 40: 40 NPK kg/ha with two TwinN spray at 5th leaf and flower primordial stage is mainly due to decreasing nitrogenous fertilizers.

These results are in agreement with the findings of Anonymous (2009 a and b) that in wheat crop 50 per cent nitrogen with two TwinN foliar spray recorded higher yield compared to control and Anonymous (2000) opined that two TwinN application + 50 per cent chemical fertilizers gave the higher yield in maize with a 25 per cent increase over the zero N. Like that many other research work carried out by Anonymous, 2010 (a) , Anonymous, 2010 (b) on sunflower, Anonymous, 2010 (c) on wheat, Anonymous, 2010(d) on maize, Anonymous, 2010(e) on sugarcane and Anonymous, 2011 on sugarcane in Zambia.

Table 1: Performance of TwinN in *Rabi* sorghum on growth and growth parameters during *Rabi* – 2009 and 2010 at MARS, Dharwad

Sr. No.	Treatments	Plant height (cm)			Number of leaves / plant			Root length (cm)			Dry root mass(g)			Ear head girth(cm)		
		2009-10	2010-11	Pooled	2009-10	2010-11	Pooled	2009-10	2010-11	Pooled	2009-10	2010-11	Pooled	2009-10	2010-11	Pooled
1.	RDF (80:40:40 NPK Kg/ha)(std check)	226.33	226.00	226.11	9.13	9.33	9.23	19.27	19.13	18.78	83.33	84.33	83.83	19.43	18.70	18.80
2.	40:40:40 Kg NPK/ha + 1 TwinN spray at 5th leaf	222.33	220.67	221.50	8.57	8.50	8.53	16,67	16.87	16.77	73.00	73.33	8.57	16.73	16.6	16.67
3..	20: 40:40 Kg/ NPK/ha + 1 TwinN spray at 5th leaf	219.00	219.00	219.00	8.13	8.10	8.12	16.32	16.60	16.07	69.00	67.33	68.17	16.33	16.30	16.32
4.	40: 40:40 Kg NPK/ha -1 TwinN spray at 5th leaf	214.33	215.33	214.83	7.07	7.07	6.88	16.07	15.77	15.92	62.33	61.00	61.67	12.93	12.90	12.92
5.	40: 40:40 Kg NPK/ha = 2 TwinN spray at 5th leaf & Flower primor dial stage	230.00	230.67	230.33	9.13	9.13	9.23	18.60	18.97	19.20	84.00	84.67	84.33	18.07	18.10	19.07
6.	20: 40:40 Kg/ NPK/ha + 2 TwinN spray at 5th leaf & Plower primor dial stage	220.00	220.67	220.33	8.80	8.52	8.66	17.93	18.37	18.15	78.33	79.33	78.83	17.90	17.77	17.83
7.	0:40:40 Kg NPK/ha + 2 TwinN spray at 5th leaf & Flower primor dial stage	215.00	214.00	214.00	7.53	7.53	7.53	17.47	17.00	17.23	63.33	64.00	63.67	14.87	14.97	14.92
8.	0:40:40 Kg NPK / ha+ NoTwinN spray (control)	205.33	206.33	205.83	5.97	5.80	9.23	13.83	14.17	14.00	52.33	54.00	53.07	12.60	12.93	12.76
	S.E.±	2.35	1.47	1.75	0.29	0.22	0.24	0.57	0.57	0.47	0.50	1.95	1.49	0.35	0.35	0.32
	C.D at 5 %	7.2	4.47	5.32	0.88	0.66	0.72	1.71	1.42	1.52	1.52	5.64	4.33	1.05	1.06	0.98

Conclusion :

To conclude, 40: 40: 40 NPK kg/ha + two TwinN sprays at 5th leaf and flower primordial stage was found at par with standard check by reducing 50 per cent nitrogenous fertilizers.

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Table 2 : Dry matter production and accumulation in stem (g/plant), leaves, ear heads and TDMP of *Rabi* sorghum at harvest as influenced by application of TwinN at harvest (2009 and 2010)

Sr. No.	Treatments	Dry wt of stem/plant			Dry wt. of leaves (g)			Dry matter accumulation in ear head (g)			TDMP (g) at harvest		
		2009	2010	Pooled	2009	2010	Pooled	2009	2010	Pooled	2009	2010	Pooled
1.	RDF (80:40:40 NPK Kg/ha) (std check)	43.8	40.02	41.55	4.80	4.50	4.65	20.15	20.81	20.48	68.75	65.33	67.04
2.	40:40:40 Kg NPK/ha + 1 TwinN spray at 5th leaf	40.10	27.02	33.56	4.06	3.70	3.88	20.09	19.68	19.88	64.25	50.40	57.33
3.	20: 40:40 Kg/ NPK/ha + 1 TwinN spray at 5th leaf	30.98	27.00	28.54	2.40	2.60	2..50	18.17	18.37	18.27	51.45	47.58	49.52
4.	40: 40:40 Kg NPK/ha – 1 TwinN spray at 5th leaf	33.90	21.06	27.48	4.08	2.70	3.39	17.29	16.36	16.83	55.27	40.12	47.70
5.	40: 40:40 Kg NPK/ha = 2 TwinN spray at 5th leaf & Flower primor dal siage	42.08	42.80	42.44	4.90	4.84	4.88	22.95	22.88	22.92	68.43	67.94	68.19
6.	20: 40:40 Kg/ NPK/ha + 2 TwinN spray at 5th leaf & Plower primor dal siage	42.00	27.30	34.65	4.02	3.08	3.55	20.97	21.01	20.99	66.09	51.39	58.74
7.	0:40:40 Kg NPK/ha + 2 TwinN spray at 5th leaf & Flower primor dal siage	36.62	20.00	28.31	4.02	3.70	3.86	18.52	17.88	18.21	89.18	41.59	50.39
8.	0:40:40 Kg NPK / ha+ NoTwinN spray (control)	18.00	18.08	18.04	2.10	2.50	2.30	16.71	16.93	16.82	36.81	37.40	37.10
S.E.±		0.23	0.20	0.14	0.18	0.19	0.15	1.01	1.03	0.58	0.65	0.68	0.41
C.D.at 5 %		0.58	0.60	0.52	0.38	0.40	0.36	2.90	3.30	1.96	1.88	1.90	1.08

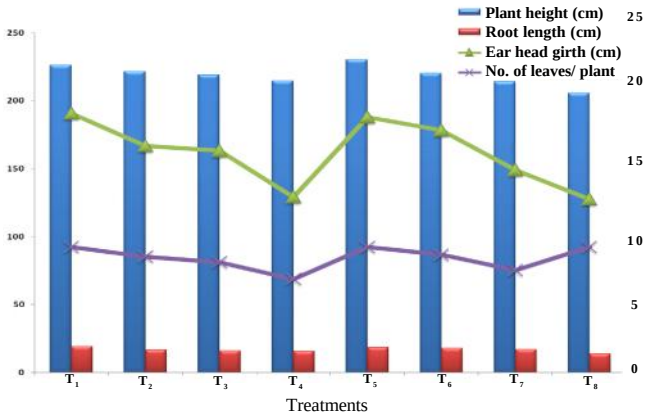

Fig. 1: Performance of TwinN in *Rabi* sorghum on growth and growth parameters during *Rabi*- 2009 and at MARS, Dharwad

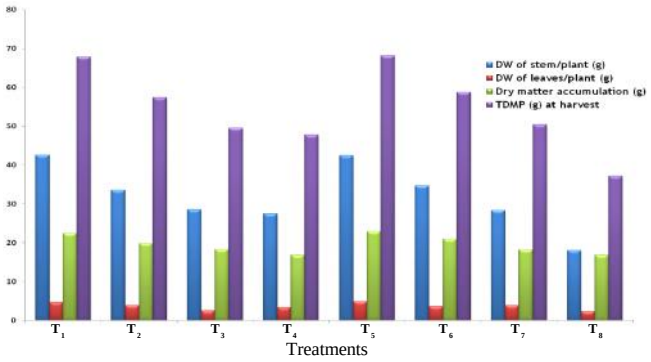

Fig. 2: Performance of TwinN in *Rabi* sorghum on dry mater production and accumulation at harvest indifferent parts during *Rabi*- 2009 and 2010, at MARS, Dharwad

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