

EFFECT OF SEED RATE ON THE FODDER YIELD OF SOME SELECTED MAIZE COMPOSITES

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Abstract

An experiment was conducted at Joydebpur during rabi 1989-90 and 1990-91 to find out the suitable maize composite and optimum seed rate for higher yield of fodder. Green fodder yield, density/sq.m. and plant height were significantly affected by seed rate and varieties. Average over the years, BFC-3 gave highest fodder yield (42.45 t/ha) with 60 kg seed/ha. The other two composites yielded higher with same seed rate but their yields could not exceed the yield of BFC-3 in both the years of trial.

Introduction

Maize ranks third in production among cereal crops but first among fodder crops (Anonymous, 1981). The plant is succulent, sweet & palatable and also free from toxicants which can be used as stover, as fodder or as silage (Patel *et. al.*, 1990). At present fodder is an acute problem in different parts of Bangladesh specially from the month of November to April. To overcome this problem, maize can be used as fodder during lean period of the year. Different varieties need specific agronomic and cultural practices to express their best potential in terms of yield & quality (Patel *et. al.*, 1990). At present there is no recognized high yielding maize variety for fodder and

information on proper management practices on this crop are also lacking. Hence, the present study was undertaken to find out the optimum seed rate of different maize varieties for high production of fodder.

Materials and Methods

The experiment was carried out on silty clay loam soil (pH6.5) at Joydebpur during rabi season (December 1989 to February 1990 and November 1990 to February 1991). Three seed rates (30, 45 and 60 kg/ha) and three composites of maize (Barnali BFC-3 and Savar-1) were tested. A split plot design with three replications was used with seed rate as main plot and varieties in sub plot. Seeds were sown on December 3, 1989 and November 26, 1990. The unit plot size was 5m x 3m.

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Fertilizers were applied at the rate of 120 kg N, 60 kg P₂O₅, 50 kg K₂O, 20 kg S and 5 kg Zn/ha in the form of Urea, Triple Superphosphate (TSP), Muriate of Potash (MP), Gypsum and Zinc sulphate, respectively.

All the TSP and MP fertilizers and 40 kg N were applied basically. The remaining nitrogen was applied as topdress in two equal splits, 30 and 60 days after emergence followed by irrigations. Total rainfall was recorded during the month of December, January, February and March were 6.4, 0.0, 26.4 and 240.0 mm respectively during 1989-90 and 4.2, 13, 5.4 and 25.8 mm in 1990-91. Plants were harvested at silking stage on March 10, 1990 and March 3, 1991. Observations were made on the plant height at harvest and yield components from 10 randomly selected plants per plot. Data on number of plants/m² were taken from three randomly selected quadrats each of 1m² in all plots before harvest. For yield estimation 4m x 2m was harvested where 50 cm was discarded around the plot. The collected data were analyzed statistically and means were compared by least significance difference (LSD).

Results and Discussion

Fodder yield, plants/m², plant height, number of green leaf and green leaf weight/plant were significantly influenced by year to year variation. Fodder yield and plants/m² were significantly higher in 1989-90 but plant height and stem weight were higher in 1990-91. Plants/m² were lower in all the varieties in 1990-91 than in 1989-90. On an average germination percentage before sowing of different composite of seeds were 96 and 90 in 1989-90 and 1990-91, respectively. Initial high soil moisture (34% by volume) in 1989-90

resulted in higher germination than in 1990-91 (28% by volume). Similar results were also obtained by Kowser *et. al.*, 1969 who reported that higher soil moisture resulted in higher germination.

Effect of seed rate

Fodder yield, plants/m², plant height and weight of stem per plant were significantly influenced by seed rate in both the years as well as in pooled. Number of leaf differed significantly due to seed rate in 1990-91 only but with the increase or decrease of seed rate, weight of leaf/plant was not significantly affected in any of the years (Table 1). Significantly highest fodder yield was obtained from 60 kg seed/ha during 1989-90, 1990-91 and pooled respectively. The result obtained in India by Nehra *et. al.*, 1981, also found higher fodder yield at 60 kg seed rate. Higher stover yield was obtained mainly due to higher number of plants/m². Plant height and plant population were higher in higher seed rates in both the years and averaged over the years. Significantly highest weight of stem/plant was obtained from lower seed rate. This may be attributed to the availability of space, nutrients and sunlight with less interplant competition for the same. Although plants/m² were lower in 1990-91 but the yield was compensated by yield attributes such as green weight of stem and leaf and plant height (Roy and Quasem, 1987).

Effect of composite

The cultivar significantly influenced the fodder weight and plants/m² in both the years but weight of stem/plant was not affected in 1990-91, and plant height in 1989-90. On an average, stover yield, plants/m² and plant height were significantly influenced by cultivars. The

Table 1. Final density, plant height, number of leaf per plant, and weight of leaf per plant of maize as affected by seed rate and composites.

Composite	1989-90			1990-91			Pooled Average		
	Seed rate kg/ha								
	30	45	60	30	45	60	30	45	60
	Plants/m²								
Barnali	8.43	10.74	14.03	4.25	5.83	7.04	6.34	8.28	10.53
BFC-3	8.89	10.51	13.80	5.42	5.96	8.33	7.15	8.23	11.06
Savar-1	9.91	14.28	17.72	4.75	5.46	8.45	7.33	9.87	13.08
LSD (.05) for									
Seed rate (S)	=	0.36		0.80				0.46	
Variety (V)	=	0.24		0.75				0.46	
S x V	=	0.42		1.27				0.80	
	Plant height (cm)								
Barnali	145.30	144.40	152.60	158.30	176.10	184.70	151.80	160.25	168.65
BFC-3	147.20	145.50	156.40	178.30	181.90	188.90	162.75	163.70	172.65
Savar-1	145.60	144.80	155.30	176.30	188.90	181.10	160.95	166.85	168.20
LSD (.05) for									
Seed rate (S)	=	0.87		4.50				4.25	
Variety (V)	=	NS		4.27				4.25	
S X V	=	NS		8.22				4.58	
	Number of leaf/plant								
Barnali	11.86	11.73	11.67	11.66	11.60	10.93	11.76	11.69	11.03
BFC-3	12.73	12.87	12.67	12.33	12.00	11.80	12.53	12.43	12.24
Savar-1	12.47	12.40	12.40	12.20	11.66	11.21	12.64	12.03	12.22
LSD (.05) for									
Seed rate (S)	=	NS		0.16				NS	
Variety (V)	=	0.38		0.37				0.32	
S x V	=	NS		NS				NS	
	Green leaf weight/plant (g)								
Barnali	80	70	70	130	140	131	105	105	100.5
BFC-3	100	100	100	143	147	136	121.5	123.5	118
Savar-1	60	60	70	127	137	123	93.5	91.5	96.5
LSD (.05) for									
Seed rate (S)	=	NS		NS				NS	
Variety (V)	=	8.5		3.6				7.21	
S X V	=	NS		NS				NS	

NS = Not significant

highest fodder yield (about 34 t/ha) was obtained from variety BFC-3 (Fig. 1&2). The lowest yield was recorded from variety Barnali

in 1989-90 and Savar-1 in 1990-91 which was at par with Barnali. The highest stover yield was produced from BFC-3 due to higher

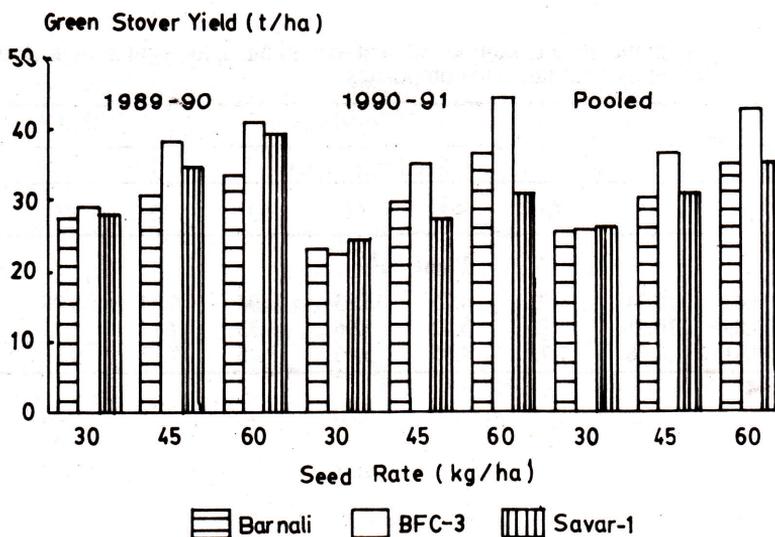


Fig.1 Green stover yield (t/ha) of maize as affected by seed rate and variety. (LSD values at 5% level for seed rate : 2.19, 2.33 & 2.33 in 1989-90, 1990-91 & pooled respectively and for variety : 2.07, 3.31 & 2.33 in 1989-90, 1990-91 & pooled respectively)

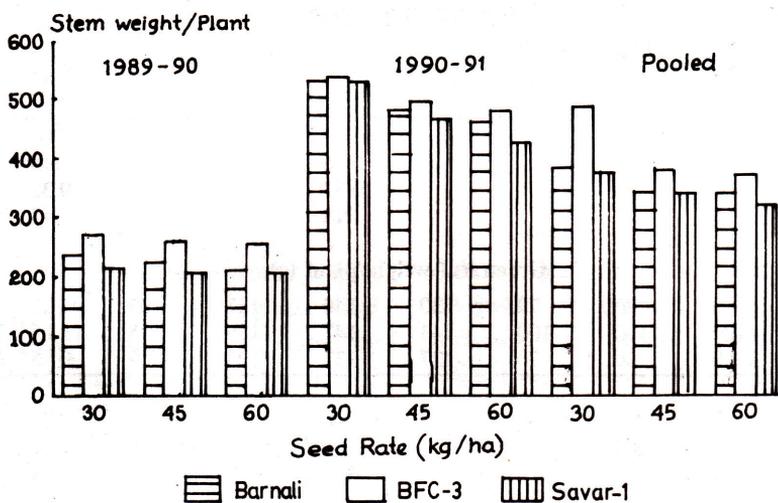


Fig.2 Green stem weight /plant (g) of maize as affected by seed rate and variety. (LSD values at 5% level for seed rate : 8.33, 0.51 & 4.84 in 1989-1990, 1990-91 & pooled respectively and for variety : 16.99, 8.61 & 4.84 in 1989-90, 1990-91 & pooled respectively)

number of leaf/plant, weight of stem and leaf/ plant. Lower green stover yield was obtained from Savar-1 due to lower stem and leaf weight/plant although higher number of plants/m². was recorded. Similar trend was found in pooled data.

Interaction between seed rate and composites

Fodder yield, plants/m². and stem weight were significantly affected by seed rate and variety in both the years and pooled. Plant height alone was found significant in 1990-91, and pooled. Significantly highest green stover yield (44.23 t/ha) was obtained from variety BFC-3 with seed rate of 60 kg/ha in 1990-91 but similar seed rate and variety also gave higher yield (40.67 t/ha) in 1989-90 which was closely followed by the variety Savar-1 with the same seed rate. Averaged over the years, significantly highest green yield (42.45 t/ha) was recorded from the variety BFC-3 with seed rate of 60 kg/ha. This higher stover yield may be due to higher plant height, stem and leaf weight/plant. The lowest stover yield (22.17 t/ha) was recorded from lower seed rate with variety BFC-3 in 1990-91 which was at par with Barnali and Savar-1. During 1989-90, the lowest fodder yield was obtained from lower seed rate with composite Barnali which was closely followed by Savar-1 and BFC-3. But average over the years the lowest stover yield was obtained from Barnali with the lowest seed rate. Higher fodder yield due to higher seed rate were recorded in all the varieties but significantly highest green stover weight was

obtained from variety BFC-3 with 60 kg/ha seed rate.

The result thus indicated that the composite BFC-3 should be grown with 60 kg/ha seed rate for higher fodder yield at Joydebpur. However, further research with higher seed rate would be interesting to corroborate the results obtained.

Rererences

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