

## FERTILIZER RECOMMENDATION FOR FOXTAIL MILLET AT CHARLAND OF BOGURA

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### ABSTRACT

The experiment was conducted in the farmer's field of Gozaria char, Sariakandi, Bogura during Rabi, 2023-2024 to develop a suitable fertilizer dose for foxtail millet. The treatments were T<sub>1</sub>: FRG'2018 (28-20-37-0.5-0.5 kg ha<sup>-1</sup> of NPKZnB), T<sub>2</sub>: T<sub>1</sub> + 25% NPKZn, T<sub>3</sub>: T<sub>1</sub> + 50% NK, T<sub>4</sub>: T<sub>1</sub> + 1kg B ha<sup>-1</sup> and T<sub>5</sub>: Farmers practice (46-15-20-14-1.5-1.3 kg ha<sup>-1</sup> of NPKSZnB (average of 20 farmers). Treatments were assigned randomly, and fertilizer doses were applied accordingly following RCB design. Maximum seed yield (2.18 t ha<sup>-1</sup>) was recorded from T<sub>4</sub> treatment that was statistically similar to T<sub>5</sub> and the minimum (1.92 t ha<sup>-1</sup>) from T<sub>1</sub> treatment. The highest gross return (Tk. 152600 ha<sup>-1</sup>) was amounted from T<sub>4</sub> treatment against the cultivation cost of Tk. 35265 ha<sup>-1</sup> that together led to the higher gross margin (Tk. 117335 ha<sup>-1</sup>). Lower gross return (Tk. 134400 ha<sup>-1</sup>) as well as gross margin (Tk. 99505 ha<sup>-1</sup>) was obtained from the T<sub>1</sub> treatment. Therefore, the suitable doses of fertilizer is 28-20-37-0.5-1.5 kg ha<sup>-1</sup> of NPKZnB for foxtail millet at charland of Bogura.

**Key words:** Foxtail millet, recommended dose, fertilizers, charland area.

### Introduction

Foxtail millet (*Setaria italica*) is an important staple food for millions of people in southern Europe and Asia (Marathe, 1993). It is widely cultivated in Asia, Europe, North America, Australia and North Africa for grain or forage (Austin, 2006). Millet crops are grown on marginal lands and under low-input agricultural conditions or situations in which major cereal crops often produce low yields (Amadou *et al.*, 2013). The area under millet production in Bangladesh is about 2920 acres with a production of 1229 m tons (BBS, 2018). The land of Bogura district termed as the most millet production area of Bangladesh is covering 385 acres area with production of 120 MT (BBS, 2018). "Charland" is the Bengali term, its English meaning is "Riverine island" for mid-channel island that emerges periodically from riverbed as a consequence of accretion (Elahi, 1991). In Bangladesh, the char lands can be divided into five sub areas (The Jamuna, The Ganges, The Padma, The upper Meghna and the lower Meghna River) where Tista and old Brahmaputra also constitute some char land areas (Islam *et al.*, 2012). These char land areas are the best habited for the millet production. Its cultivation now has been concentrated in the charland only. Comparatively low yield, competition from other high value as well as high yield potential crops it has been shifted from the mainstream agriculture to char areas of different rivers. The reasons for low yield are i) lack of improved varieties, ii) inadequate and irrational use of fertilizers by the farmers and iii) depletion of native soil fertility and soil productivity specially in charland. To combat this problem it is necessary to use optimum dose of fertilizers. Considering the above facts, the experiment has been undertaken to find out an optimum dose for the cultivation of millet in the charland condition.



## Materials and Methods

The experiment was conducted in the farmer's field of Gozaria char, Sariakandi, Bogura during *Rabi*, 2023-2024. One foxtail millet variety BARIKaon-2 (Released by BARI during September, 2001) were tested in the experiment. Five treatments viz.  $T_1$ : recommended dose of FRG'2018 (28-20-37-0.5-0.5  $\text{kg ha}^{-1}$  of NPKZnB),  $T_2$ :  $T_1 + 25\%$  NPKZn,  $T_3$ :  $T_1 + 50\%$  NK,  $T_4$ :  $T_1 + 1\text{ kg B ha}^{-1}$  and  $T_5$ : Farmers practice (46-15-20-14-1.5-1.3  $\text{kg ha}^{-1}$  of NPKSZnB (Average of 20 farmers). The experiments were laid out in RCB Design with three replications having plot size 20  $\text{m}^2$ . One farmer considered as each replication. Soil samples were collected from the experimental field and sent to the SRDI laboratory, Bogura for chemical analysis. The soil analysis result presented in Table-1. Half urea and all others fertilizers were applied at final land preparation. Rest urea was applied at 40 DAS followed by irrigation. Seeds were sown on 16 January, 2024. One irrigation was applied at 40 DAS. The crop was harvested during 27 April, 2024. At harvest, 10 randomly selected plants from each plot were carefully uprooted to record plant height (measured from the root-stem junction to the top of the shoot), Tillers  $\text{plant}^{-1}$ , Panicle length, Seed panicle $^{-1}$ , 1000 seed weight and seed yield. The yield per plot was recorded and converted into yield per hectare. Data were analyzed statistically using statistix-10.

## Results and Discussion

The yield and yield contributing performance of foxtail millet are presented in Table 2. Significant variation was found among the treatments of all characters. The highest plant height (118.00 cm) was obtained from  $T_4$  treatment and it was significantly different from all other treatments. The highest number of tillers  $\text{plant}^{-1}$  (4.13) in  $T_4$  treatment which was followed by  $T_1$  and  $T_3$  treatments. The highest panicle length was also 18.67 cm in  $T_4$  and the lowest (14.47 cm) from  $T_2$ . The highest weight of seed panicle $^{-1}$  was (6.80 g) in  $T_4$ . The seed panicle $^{-1}$  was 5.53 g in  $T_2$  treatment. The highest 1000 seed weight was in 2.50 g at  $T_4$  and the lowest in 2.26 g at  $T_1$  treatment. The highest seed yield was also 2.18  $\text{tha}^{-1}$  in  $T_4$  treatment. The lowest seed yield (1.92  $\text{tha}^{-1}$ ) was found in  $T_1$  treatment.



Nadeem *et. al.* (2020) reported that the grain yield of foxtail millet significantly increased by the application of macro and micro nutrient. The economic performance are presented in Table 3. The highest gross return (Tk. 152600  $\text{ha}^{-1}$ ) and gross margin (Tk. 117335  $\text{ha}^{-1}$ ) was calculated from  $T_4$  and the lowest gross return (Tk. 134400  $\text{ha}^{-1}$ ) and gross margin (Tk. 99505  $\text{ha}^{-1}$ ) from  $T_1$  treatment.

Table 1. Average nutrient status of initial soil (0-15 & 15-30 cm depth) of the experimental fields at Gozaria char, Sariakandi, Bogura

Matter	pH	OM (%)	Total N (%)	K (meq 100 $\text{g}^{-1}$ soil)	P	S	Zn	B
					$\mu\text{g g}^{-1}$ soil			
Value	7.5	1.71	0.09	0.12	11.75	34.33	1.36	0.28
Interpretation	N	L	VL	L	L	H	Optimum	L

N= Neutral, H=High, L=Low, VL=Very low

Table 2. Yield and yield contributing characters of foxtail millet at Gozaria char, Sariakandi, Bogura during *Rabi*, 2023-2024

Treatment	Plant height (cm)	Tillers plant <sup>-1</sup>	Panicle length (cm)	Seed weight panicle <sup>-1</sup> (g)	1000 seed wt. (g)	Yield plot <sup>-1</sup> (kg)	Seed yield (t ha <sup>-1</sup> )
T <sub>1</sub>	114.33 b	3.46 ab	16.60 ab	5.80 b	2.26 c	3.90 c	1.92 d
T <sub>2</sub>	113.67 b	3.27 b	14.47 b	5.53 b	2.46 ab	4.16 b	2.05 bc
T <sub>3</sub>	114.33 b	3.40 ab	15.07 ab	6.33 ab	2.40 abc	3.96 c	1.95 cd
T <sub>4</sub>	118.00 a	4.13 a	18.67 a	6.80 a	2.50 a	4.43 a	2.18 a
T <sub>5</sub>	112.47 b	3.25 b	16.63 ab	6.06 ab	2.33 bc	4.26 ab	2.10 ab
CV%	11.27	5.71	8.11	5.05	6.55	5.56	5.55

Table 3. Cost and return analysis of foxtail millet at Gozaria char, Sariakandi, Bogura during *Rabi*, 2023-2024

Treatment	Grain Yield (t ha <sup>-1</sup> )	Gross return (Tk. ha <sup>-1</sup> )	Total variable cost (Tk. ha <sup>-1</sup> )	Gross margin (Tk. ha <sup>-1</sup> )	BCR
T <sub>1</sub>	1.92	134400	34895	99505	3.85
T <sub>2</sub>	2.05	143500	37599	105901	3.81
T <sub>3</sub>	1.95	136500	37805	98695	3.61
T <sub>4</sub>	2.18	152600	35265	117335	4.32
T <sub>5</sub>	2.10	147000	36334	110666	4.04

Market price of foxtail millet @Tk.70 kg<sup>-1</sup>

T<sub>1</sub>: recommended dose of FRG'2018 (28-20-37-0.5-0.5 kg ha<sup>-1</sup> of NPKZnB), T<sub>2</sub>: T<sub>1</sub> + 25% NPKZn, T<sub>3</sub>: T<sub>1</sub> + 50% NK,

T<sub>4</sub>: T<sub>1</sub> + 1kg B ha<sup>-1</sup> and T<sub>5</sub>: Farmers practice (46-15-20-14-1.5-1.3 kg ha<sup>-1</sup> of NPKSZnB)

### Farmers' opinion

Previously farmers of the area were cultivated local variety and use of imbalanced fertilizer dose. They are very happy to see the new variety and interested to grow BARI Kaon-2 for its higher yield and economic return use for suitable fertilizer dose.

### Conclusion

The treatment T<sub>4</sub> (T<sub>1</sub> + 1kg B ha<sup>-1</sup>) gave the attractive yield and economic return in the Char land of Gozaria, Sariakandi, Bogura due to application of suitable fertilizer dose.

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