Mysore J. Agric. Sci., 56 (2) : 419-428 (2022)

Influence of Organic Bio Priming and Foliar Spray on Growth and Seed Yield Attributes in Foxtail Millet (*Setaria italica* L.)

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ABSTRACT

A field experiment was carried out at Research Institute of Organic Farming, UAS, GKVK, Bangalore during *Rabi* 2019 & *summer* 2020 to know the effects of organic bio priming treatments and foliar spray on growth and seed yield attributes in foxtail millet. The field experiment was laid out in Factorial Randomized Block Design. The results revealed that Organic bio priming treatment and foliar spray and their interaction showed significant variation on growth and seed yield attributes of foxtail millet in both seasons. Among the two season in summer season Bheejamruta (3%) recorded highest plant height at 30,60 and 90 DAS (36.98, 74.00 and 93.35 cm respectively), number of tiller per plant (11.45), panicle length (25.11 cm), seed weight per panicle (64.82g), 1000 seed weight (4.03 g), seed yield per plot (2261.9 g), seed yield (1838.9 kg/ha) and least number of Days to 50 per cent flowering (60.52) and days to maturity (100.50), compared to control. Foliar application (F_2) of Panchagavya (3%) recorded highest plant height on 60 and 90 DAS (61.11 and 88.81 cm), number of tiller per plant (9.67), panicle length (22.92 cm), seed weight per panicle (65.05 g),1000 seed weight (3.97 g) seed yield per plot (2230.0 g), seed yield (1813.0 kg/ha) and lowest number of Days to 50 per cent flowering (62.42) days to maturity (104.25), compared to control. The interaction of Bheejamruta (3%) along with Panchagavya (3%) (T2F2) also found best for the both growth and yield parameters.

Keywords : Foxtail millet, Organic, Bio priming treatment, Foliar spray

MILLETS are the major food and fodder plants in semi-arid areas and are gaining more importance globally. Millets are amazing in their nutrient content and each of the millets are rich in fibres, non-starchy polysaccharides with few unique nutrients and have been recognized as 'nutritious or nutritious grains' since they have superior quality proteins and essential amino acids. Among millets, foxtail millet (*Setaria italica* L.) is a dry land crop belonging to the family of Poaceae. It mainly constitutes protein (11.7%), fat (3.9%), ash (3%), crude fibre (7%) and carbohydrates (60.9 g). It contains few major micronutrients like Ca (31 mg), Fe (2.8 mg) and amino acids like niacin (3.2 mg), thiamine (0.59 mg) and riboflavin (0.11 mg) (Ahmed *et al.,* 2017). The area is mostly concentrated in Madhya Pradesh, Andhra Pradesh, Gujarat, Tamil Nadu, Maharashtra and Karnataka. In Karnataka, it is widely grown in Haveri, Dharwad and Belagavi districts of Northern Transitional Zone of Karnataka (Zone-8).

The application of nutrients with soil and foliar spray is considered as efficient and economical method to supply nutrient requirement at critical stages of crop growth (Chandrasekhar and Bangarusamy, 2003). As organics are rich in nutrients, it helps to enhance the physical and chemical properties of soil, in turn it has led to higher seed yield and quality. The options available for foliar supplementation of nutrients include use of various organic manures *viz.,* bheejamruta, sea weed organic gel, FYM, compost, vermin-compost, green manures, bio-fertilizers *etc.,* along with other nutrient management practices like use of fermented organics *viz.,* Panchagavya, cow urine and fish tonic. Application of foliar organic nutrients entails the supply of plant hormones and nutrients in liquid form to the plant through aerial parts of the plants *viz.,* leaves and stems and other sites to realize enhanced yield and quality (Manonmani and Srimathi, 2016). The uniqueness of organics is that it provides growth promoting hormones and

immunity boosters for plants. (Xu *et al.,* 2003; Sreenivasa and Naik, 2011).

The advantage of liquid organic nutrients is that it can be dispersed in water easily and is rapidly taken up by plants when compared to solid organic fertilizers and interestingly plants can absorb nutrients about twenty times faster through the leaves than applied through the soil, which helps in overcoming temporary, acute nutrient shortages in the crops. Hence, the present investigation was taken up to study the effect of organic bio priming treatment and foliar application on growth and seed yield attributes in foxtail millet.

Material and Methods

A field experiment was conducted at Research Institute of Organic Farming UAS, GKVK, during *Rabi* 2019 & Summer 2020 to study the organic bio priming treatment and foliar spray on plant growth and seed yield attributes in foxtail millet variety SIA-3156 and the experiment consisting of two factors where,

Factor - 1 : Bio Priming

T_1: *Pseudomonas fluorescence +Azatobacter* @ 10g/kg of seed,

T_2: Bheejamruta @ 3.0 %,

T_3: Sea Weed Organic gel at (5g in 25 ml of water),

T_4: Control (water)

Factor - 2 : Foliar Spray

F_1: Cow urine @ 10%

F_2: Panchagavya @ 3.0%

F_3: Fish tonic at @ 5.0%

F_4: Control

Seed are Primed at the time of sowing and the foliar sprays was taken at 50 per cent flowering stage according to the treatment combinations and observation were recorded.

Detail of Experiment

The experiment, consisting of two different level of treatments which is laid out in a Factorial Randomized Block Design (RBD) and replicated thrice.

Crop : Foxtail millet

Variety : SIA- 3156

Design of the experiment: Factorial Randomised Block Design

Treatment set 1 (bio priming treatment) : 4

Treatment set 2 (Foliar spray) : 4

Number of Replications : 3

Total Number of treatment combinations : 4 x 4 = 16

Number of plots : 4 x 4 x 3 = 48

Plot size : 4.1m x 3.0m

Spacing : 30x10cm

Season : *Rabi* - 2019 & Summer 2020

From each treatment of each replication, five selected plants were tagged for recording observations. Mean of five plants for each character was worked out and used for statistical analysis. Measurements were recorded at appropriate stages of plant growth on all the ten quantitative characters *viz.,* the mean of five plants in each replication was used for analysis of variance.

Results and Discussion

The observations taken on growth and yield parameters are summarized. (Table 1-4)

All the growth parameters differed significantly due to seed bio priming (Table 1) in *rabi* season. The foxtail millet seeds were primed with Bheej amruta (3.0%) and recorded highest in all other growth parameters like plant height at 30, 60 and 90 days (27.48, 35.00 and 58.79 cm, respectively), number of tillers (3.33/plant), days to 50 per cent flowering and days to maturity recorded less number of days (57.41 and 85.75 respectively). While, the lowest plant height (17.68, 28.82 and 51.09 cm) was noticed in 30, 60 and 90 DAS respectively and number of tillers (2.46/plant), days to 50 per cent flowering (66.91) and days to maturity (94.33) recorded more number of days in Control (T_4).

TABLE 1

Effect of organic bio priming treatment and foliar application on growth attributes in foxtail millet variety cv. SIA-3156 in *rabi* -2019

Treatments	Plant height (cm)			Days to 50 % flowering	Number of tillers / plant	Panicle length (cm)	Days to maturity
	30 DAS	60 DAS	90 DAS				
Seed bio-priming treatment							
T_1	24.28	33.81	53.10	59.25	2.90	15.44	88.58
T_2	27.48	35	58.79	57.41	3.33	16.55	85.75
T_3	23.73	31.34	52.81	56.50	2.79	16.57	86.83
T_4	17.68	28.82	51.09	66.91	2.46	16.24	94.33
S.Em±	0.19	0.68	0.41	0.7	0.07	0.17	0.53
CD at 5%	0.56	1.99	1.20	2.18	0.22	0.51	1.51
Foliar Spray							
F_1	23.97	33.56	55.25	59.41	2.96	15.53	88.81
F_2	24.05	34.37	58.89	58.25	3.36	17.92	85.66
F_3	23.64	32.8	53.95	55.16	2.84	16.77	87.08
F_4	21.51	28.23	47.70	67.25	2.32	14.57	94.33
S.Em. ±	0.19	0.68	0.41	0.75	0.07	0.17	0.53
CD at 5%	0.56	1.99	1.20	2.18	0.22	0.51	1.55
Interaction							
T_1F_1	24.38	35.95	53.97	58.67	3.31	15.25	89.00
T_1F_2	24.76	35.72	56.75	55.33	3.11	15.42	85.67
T_1F_3	22.49	34.61	53.75	54.33	2.89	16.71	87.33
T_1F_4	25.52	28.94	47.93	68.67	2.36	14.38	92.33
T_2F_1	27.34	36.66	60.80	57.33	3.22	15.61	79.67
T_2F_2	31.04	38.70	71.00	53.00	4.56	19.42	83.33
T_2F_3	24.94	36.13	55.03	53.67	3.11	16.50	81.00
T_2F_4	26.60	28.54	48.35	65.67	2.44	14.67	93.00
T_3F_1	25.53	32.51	52.68	56.33	2.78	15.63	85.33
T_3F_2	21.41	33.38	55.06	58.33	3.14	19.17	85.67
T_3F_3	28.74	31.47	55.85	45.00	2.78	16.77	87.33
T_3F_4	19.27	28.04	47.67	66.33	2.44	14.72	95.00
T_4F_1	18.65	29.17	53.58	65.33	2.56	15.65	93.67
T_4F_2	19.02	29.70	52.78	66.33	2.67	17.69	94.00
T_4F_3	18.39	29.01	51.19	67.67	2.56	17.10	92.67
T_4F_4	14.69	27.44	46.85	68.33	2.11	14.53	97.00
Mean	23.30	32.25	53.95	60.02	2.88	16.20	88.88
S.Em±	0.38	1.37	0.82	1.5	0.15	0.35	1.06
CD at 5%	1.12	3.97	2.40	4.36	0.44	0.51	3.10
CV (%)	2.89	7.38	2.66	4.34	8.99	3.76	2.08

DAS: Days After Sowing; NS – Non significant, T_1: *Pseudomonas fluorescence* + *Azatobacter* (10g/kg Seeds), T_2: Bheejamruta (3%); T_3: Sea Weed Organic Gel (5g in 25ml of Water); T_4: Control ; F_1: Cow Urine (10%); F_2: Panchagavya (3%) ; F_3: Fish tonic (5%); F_4: Control

TABLE 2

Effect of organic bio priming treatment and foliar application on 1000 seed weight (g), seed weight per panicle (g), seed weight per plot (g) and seed yield (kg/ha) in foxtail millet variety cv. SIA-3156 in *rabi* -2019

Treatments	1000 Seed weight (g)	Seed weight per panicle (g)	Seed yield per plot (g)	Seed yield (kg / ha)
Seed bio priming treatment				
T_1	3.71	5.08	1806.7	1468.9
T_2	4.03	5.14	1838.8	1494.9
T_3	3.91	5.23	1782.0	1448.7
T_4	3.58	4.30	1745.3	1418.9
S.Em±	0.05	0.08	14.7	11.91
CD at 5%	0.14	0.23	45.5	34.57
Foliar Spray				
F_1	3.71	5.33	1811.3	1472.62
F_2	4.15	5.91	1851.6	1505.42
F_3	3.94	4.29	1814.0	1474.86
F_4	3.43	4.22	1695.8	1378.72
S.Em±	0.05	0.08	14.7	11.91
CD at 5%	0.14	0.23	42.5	34.57
Interaction				
T_1F_1	3.77	5.10	1829.7	1487.5
T_1F_2	3.86	6.19	1837.0	1493.5
T_1F_3	3.78	4.50	1829.7	1487.5
T_1F_4	3.45	4.56	1730.7	1407.0
T_2F_1	3.65	5.58	1848.0	1502.4
T_2F_2	4.74	5.93	1961.7	1594.9
T_2F_3	4.39	4.59	1848.0	1502.4
T_2F_4	3.38	4.47	1697.7	1380.2
T_3F_1	3.86	5.75	1793.0	1457.7
T_3F_2	4.35	6.68	1826.0	1484.6
T_3F_3	3.87	4.34	1822.3	1481.6
T_3F_4	3.56	4.19	1686.7	1371.3
T_4F_1	3.58	4.92	1774.7	1442.8
T_4F_2	3.66	4.86	1782.0	1448.8
T_4F_3	3.74	3.74	1756.3	1427.9
T_4F_4	3.36	3.70	1668.3	1356.4
Mean	3.8	4.94	1793.2	1457.9
S.Em±	0.10	0.16	29.30	23.82
CD at 5%	0.14	0.47	84.63	68.80
CV(%)	4.58	5.67	2.83	2.83

DAS: Days After Sowing; NS – Non significant; T_1: *Pseudomonas fluorescence* + *Azatobacter* (10g/kg Seeds); T_2: Bheejamruta (3%); T_3: Sea Weed Organic Gel (5g in 25ml of Water); T_4: Control ; F_1: Cow Urine (10%); F_2: Panchagavya (3%) ; F_3: Fish tonic (5%) ; F_4: Control

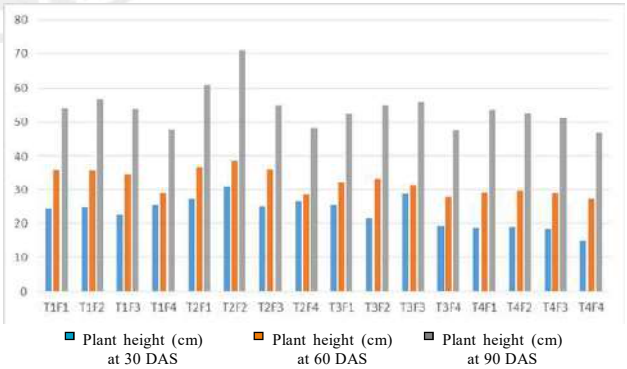
All the growth parameters were found significant due to seed bio priming (Table 3) in *summer* season. The foxtail millet seeds were primed with Bheej amruta (3.0 %) that recorded highest in all other growth parameters like plant height (at 30, 60 and 90 DAS 36.98, 74.00 and 93.35 cm, respectively), number of tillers (11.57/plant), days to 50 per cent flowering and days to maturity recorded less number of days (60.52 and 100.50 respectively). While, the lowest plant height (23.97, 46.52 and 78.61 cm) was noticed in 30, 60 and 90 DAS respectively and number of tillers (5.82/plant), days to 50 per cent flowering (72.16) and days to maturity (119.24) recorded more number of days in Control (T_4).

All the growth parameters differed significantly due to foliar spray (Table 1) in *rabi* season. The foxtail millet crop was sprayed with Panchagavya (F_2) that recorded highest (24.05, 34.37 and 58.89 cm) plant height at 30, 60 and 90 DAS respectively and highest (3.36) number of tillers/plant and the less number of days to 50 per cent flowering (85.66) in Panchagavya (3%) was noticed. The less number of days taken to maturity (55.16) was recorded in fish tonic (F_3), while, the lowest plant height (21.51, 28.23 and 47.70 cm) was recorded at 30 DAS, 60 DAS and 90 DAS respectively. The lowest (2.32) number of tillers /plant were noticed in control. The higher (67.25) number of days took for 50 per cent flowering in control (F_4) and more (94.33) number of days taken to maturity in control.

All the growth parameters differed significantly due to foliar spray (Table 3) in *summer* season. The foxtail millet crop was sprayed with cow urine (F_1) that recorded highest (32.53, 59.01 and 83.11 cm) plant height in 30, 60 and 90 DAS respectively and highest (9.00) number of tillers / plant and less number of days to 50 per cent flowering (62.42) in Panchagavya (3%) was noticed. The less number of days taken to maturity (104.05) was recorded in fish tonic (F_3). While, the lowest plant height (29.37 and 58.16 cm) was recorded at 30 and 60 DAS. The lowest (7.75) for number of tillers / plant were noticed in control.However, higher (67.92) number of days to took for 50 per cent flowering in fish tonic (F_3) and higher (109.53) number of days were taken to maturity in Control.

All the growth parameters recorded significantly for interaction due to seed bio priming and foliar spray in *rabi* season (Table 1 and Fig.1). The highest plant height (31.04, 38.70 and 71.00 cm) was noticed in 30, 60 and 90 DAS respectively. The more (4.56) number of tillers in seed treated with bheejamruta (3.0%) foliar spray with 3.0 per cent panchagavya (T_2F_2) Whereas less (45.00) number of days taken to 50 per cent flowering was noticed in (T_3F_3) and less number of days to maturity (79.61) was recorded in (T_3F_1). The lowest (14.69, 27.44 and 46.85 cm) plant height was observed in 30, 60 and 90 DAS respectively and less (2.11) number of tillers were also recorded. While, more number of days taken to 50 per cent flowering and days to maturity (68.33 and 97.00 respectively) was noticed in control (T_4F_4).

All the growth parameters found significant for interaction due to seed bio priming and foliar spray in *summer* season (Table 3 and Fig.2). The highest plant height (39.87, 78.07 and 102.81 cm) was noticed in 30, 60 and 90 DAS respectively. The more (13.44) number of tillers, less (54.29) number of days taken to 50 per cent



T_1: *Pseudomonas fluorescence* + *Azatobacter* (10g /kg Seeds) T_2: Bheejamruta (3%) T_3: Sea Weed Organic Gel (5g in 25ml of Water) T_4: Control F_1: Cow Urine (10%) F_2: Panchagavya (3%) F_3: Fish tonic (5%) F_4: Control

Fig. 1 : Influence of bio priming and foliar spray on plant height of foxtail millet in *rabi 2019*

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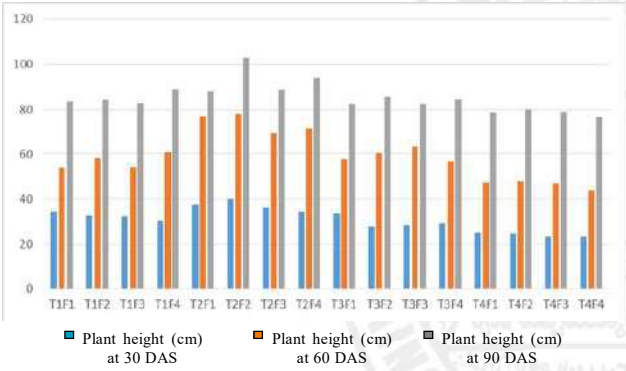
flowering and days to maturity (86.1) in seed treated with bheejamruta (3.0%) and foliar spray with 3.0 per cent panchagavya (T_2F_2). The lowest (23.23, 43.86 and 76.51 cm) plant height was observed in 30, 60 and 90 DAS respectively and less (4.36) number of tillers were also recorded. While, more number of days taken to 50 per cent flowering and days to maturity (73.67 and 124.8, respectively) was noticed in Control (T_4F_4).

The increase in plant growth attributing is mainly due to the presence of plant growth regulating substance present in Panchagavya *viz.*, IAA, GA_3. When panchagavya is applied through foliar application it would have been created stimuli in the plant system due to higher production of growth



T_1: Pseudomonas fluorescence + Azatobacter (10g /kg Seeds); T_2: Bheejamruta (3%); T_3: Sea Weed Organic Gel (5g in 25ml of Water); T_4: Control , F_1: Cow Urine (10%); F_2: Panchagavya (3%); F_3: Fish tonic (5%); F_4: Control

Fig. 2 : Influence of bio priming and foliar spray on plant height of foxtail millet in summer 2020

regulators and its action in the cell and plant system might have helped in enhancing biological efficiency of the crop. Similar results was reported by (Yadav and Christopher, 2006).

Foliar application helps in slow release of nutrients into leaves and other parts of the plants through the process of absorption. During this process, nutrients loss will be low as a result of exchange of cation capacity with increased activity of organic content. Thus nutrients will be available for longer time in required quality so that plants can absorb the nutrients as per the requirement, which results in improved growth, development and yield components. Similar results was observed by (Somasundaram, 2003 and Kulkarani, 1991) in foxtail millet.

All the seed yield parameters found significant due to seed bio priming (Table 2) in *rabi* season. The foxtail millet seeds primed with Bheejamruta (3%) that recorded highest (4.03 g) 1000 seed weight, seed yield (1838.8 g) per plot, seed yield (1494.9 kg/ha), whereas, panicle length and seed weight per panicle was found maximum (16.57 g and 5.23g) in sea weed organic gel (T_3), the lowest seed weight (4.30 g) per panicle, seed yield per plot (1745.3 g) and seed yield (1418.9 kg/ha) was found in control .

All the seed yield parameters differed significantly due to seed bio priming (Table 4) in *summer* season. The foxtail millet seeds primed with Bheejamruta (3%) recorded highest (26.44 cm) for panicle length, seed weight (14.01 g) per panicle, seed yield (2261.9 g) per plot, seed yield (1829.52 kg/ha), whereas, 1000 seed weight alone found maximum (4.04 g) in *Pseudomonas fluorescence* + *Azatobacter*, the lowest seed weight (12.20 g) per panicle, seed yield per plot (2115.3 g) and seed yield (1743.45 kg/ha) was found in Control .

All the yield parameters differed significantly due to seed bio priming (Table 2) in *rabi* season the foxtail millet crop was sprayed with panchagavya (3%) recorded highest 1000 seed weight, panicle length and seed weight per panicle, (4.15g, 17.92 cm and 5.91g respectively), seed yield (1851.6 g) per plot, seed yield (1505.42 kg/ha) and whereas lower seed weight (4.22 g) per panicle, seed yield per plot (1695.8 g) and seed yield (1378.2 kg/ha) was found in control.

All the seed yield parameters recorded significant due to foliar spray (Table 4) in *summer* season. The foxtail millet crop was sprayed with panchagavya (3%) which recorded highest panicle length, 1000 seed weight (23.45cm and 3.97 g), higher seed

TABLE 3

Effect of organic bio priming treatment and foliar application on growth attributes in foxtail millet variety cv. SIA-3156 in summer-2020

Treatments	Plant height (cm)			Days to 50 % flowering	Number of tillers / plant	Panicle length (cm)	Days to maturity
	30 DAS	60 DAS	90 DAS				
Seed bio-priming treatment							
T_1	32.37	56.69	84.82	66.03	6.96	20.60	100.94
T_2	36.98	74.00	93.35	60.52	11.57	26.44	100.50
T_3	29.90	59.47	83.78	62.75	8.38	22.90	102.24
T_4	23.97	46.52	78.61	72.16	5.82	16.44	119.24
S.Em±	0.80	0.22	0.56	0.32	0.23	0.57	0.61
CD at 5%	2.69	0.64	1.63	0.93	0.69	1.66	1.79
Foliar Spray							
F_1	32.53	59.01	83.11	66.28	7.80	21.60	105.25
F_2	31.21	61.11	88.11	62.42	9.00	23.45	104.25
F_3	30.12	58.41	83.32	67.92	8.18	21.56	104.05
F_4	29.37	58.16	86.01	64.84	7.75	19.78	109.53
S.Em±	0.80	0.22	0.56	0.32	0.23	0.57	0.61
CD at 5%	2.33	0.64	1.63	0.93	0.69	1.66	1.79
Interaction							
T_1F_1	34.22	53.69	83.19	66.04	7.78	21.02	101.2
T_1F_2	32.57	58.34	84.22	65.54	7.16	21.96	101.1
T_1F_3	32.20	54.19	82.71	69.47	7.44	20.93	96.9
T_1F_4	30.53	60.57	89.19	63.07	5.50	18.50	104.6
T_2F_1	37.45	77.25	88.01	62.92	9.56	25.74	103.0
T_2F_2	39.87	78.07	102.81	54.29	13.44	33.48	86.1
T_2F_3	36.47	69.34	88.89	66.04	11.44	24.16	103.9
T_2F_4	34.17	71.37	93.69	58.85	11.81	22.39	109.0
T_3F_1	33.68	57.76	82.49	63.94	7.44	22.53	99.1
T_3F_2	27.98	60.29	85.50	58.55	8.97	20.89	110.9
T_3F_3	28.62	63.02	82.47	64.73	7.78	24.51	100.7
T_3F_4	29.35	56.85	84.66	63.78	9.37	23.70	99.8
T_4F_1	24.80	47.38	78.78	72.22	6.44	17.11	117.7
T_4F_2	24.45	47.78	79.94	71.33	6.44	17.50	118.1
T_4F_3	23.23	47.10	79.24	71.44	6.11	16.64	116.4
T_4F_4	23.43	43.86	76.51	73.67	4.36	14.53	124.8
Mean	30.81	59.18	85.14	65.37	8.19	21.60	105.8
S.Em±	1.61	0.44	1.12	0.64	0.47	1.14	1.23
CD at 5%	4.66	1.28	3.27	1.87	1.37	3.32	3.58
CV (%)	9.08	1.29	2.30	1.71	9.98	9.20	2.02

DAS: Days After Sowing; NS - Non significant; T_1: Pseudomonas fluorescence + Azatobacter (10g/kg Seeds); T_2: Bheejamruta (3%); T_3: Sea Weed Organic Gel (5g in 25ml of Water); T_4: Control; F_1: Cow Urine (10%); F_2: Panchagavya (3%); F_3: Fish tonic (5%); F_4: Control

TABLE 4

Effect of organic bio priming treatment and foliar application on 1000 seed weight (g), seed weight per panicle (g), seed weight per plot (g) and seed yield (kg/ha) in foxtail millet variety cv. SIA-3156 in summer-2020.

Treatments	1000 Seed weight (g)	Seed weight per panicle (g)	Seed yield per plot (g)	Seed yield (kg / ha)
Seed bio priming treatment				
T_1	4.04	13.16	2200.5	1802.12
T_2	4.03	14.01	2261.9	1829.52
T_3	3.86	13.36	2213.5	1775.92
T_4	3.59	12.20	2115.3	1743.45
S.Em±	0.02	0.03	28.01	0.56
CD at 5%	0.06	0.11	81.30	1.64
Foliar Spray				
F_1	3.80	12.41	2148.6	1753.8
F_2	3.97	13.69	2230.0	1803.6
F_3	3.91	13.73	2258.0	1851.2
F_4	3.84	12.90	2154.4	1742.2
S.Em±	0.02	0.03	28.01	0.56
CD at 5%	0.06	0.11	81.30	1.64
Interaction				
T_1F_1	3.85	12.35	2250	1829.8
T_1F_2	4.11	13.23	2253	1832.2
T_1F_3	4.14	13.47	2262	1839.6
T_1F_4	4.09	13.59	2205	1706.9
T_2F_1	3.88	12.69	2122	1726.00
T_2F_2	4.17	15.41	2410	1903.2
T_2F_3	4.06	14.68	2314	1881.8
T_2F_4	4.04	13.26	2222	1807.0
T_3F_1	3.85	12.35	2117	1735.3
T_3F_2	3.95	13.56	2161	1755.6
T_3F_3	3.83	14.03	2314	1881.0
T_3F_4	3.82	13.52	2295	1731.9
T_4F_1	3.61	12.26	2121	1724.2
T_4F_2	3.65	12.56	2120	1723.6
T_4F_3	3.62	12.75	2105	1802.7
T_4F_4	3.44	11.25	2120	1723.3
Mean	3.88	13.19	2212	1787.8
S.Em±	0.04	0.07	56.02	1.135
CD at 5%	0.12	0.22	161.82	3.29
CV (%)	1.98	1.00	4.42	6.87

DAS: Days After Sowing; NS - Non significant; T_1: Pseudomonas fluorescence + Azatobacter (10g/kg Seeds); T_2: Bheejamruta (3%); T_3: Sea Weed Organic Gel (5g in 25ml of Water); T_4: Control ; F_1: Cow Urine (10%); F_2: Panchagavya (3%); F_3: Fish tonic (5%); F_4: Control

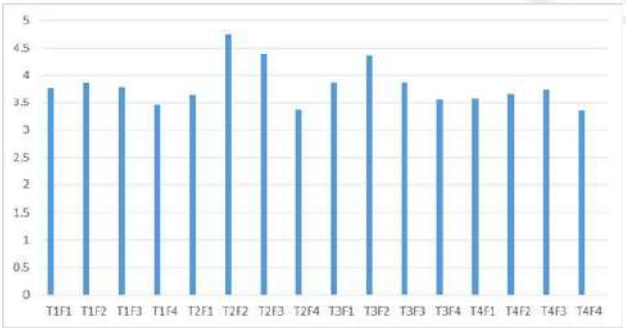
weight per panicle, seed yield per plot and seed yield per hectare (13.73 g, 2258.0 and 1851.2 respectively) were reported in fish tonic (F_3). Whereas, the lowest 1000 seed weight (3.80), seed yield per plot (2148.6 g) and seed weight per panicle (12.41 g) were recorded in cow urine (F_3). Lowest (19.78 cm) panicle length was recorded in control (F_4) and the lower seed yield (1742.2 kg/ha) was noticed in panchagavya (3%).

All the yield parameters differed significantly for interaction due to seed bio priming and foliar spray in *rabi season* (Table 2 and fig. 3). The highest panicle length (19.42 cm), 1000 seed weight (4.74 g), seed yield per plot (1961.7 g) and seed yield (1594.9 kg/ha) in seeds bio primed with bheejamruta (3%). Whereas highest seed weight per panicle (6.68 g) in T_3F_2 (seed bio primed with Sea Weed Organic gel + panchagavya). whereas lowest (14.53 cm) panicle length, 1000 seed weight (3.36 g), seed weight per panicle (3.70 g), were noticed in control (T_4F_4). Seed yield per plot (1668.3) and seed yield (1356.4 kg/ha) was noticed.

All the seed yield parameters were found significant for interaction due to seed bio priming and foliar spray in *summer season* (Table 4 and fig. 4). The highest panicle length (33.48 cm), 1000 seed weight (4.17 g), seed weight per panicle (15.41g), seed yield per plot (2410 g) and seed yield (1903.2 kg/ha) were noticed in seeds bio primed with bheejamruta (3%) and foliar spray with Panchagavya (3%) (T_2F_2). Whereas, lowest (14.53 cm) panicle length, 1000 seed weight (3.44 g), seed weight per panicle (11.25 g) were noticed in control (T_4F_4). However, seed yield per plot (2105 g) was noticed in T_4F_3 (Seeds bio primed with water along with spray of fish tonic) and seed yield was found lowest (1706.9 kg/ha) in T_1F_4 (seed bio primed with *Pseudomonas fluorescens* + *Azatobacter* with no foliar spray).

The maximum enhancement in seed yield with different foliar sources might be due to increased activity of nitrate reductase and supply of essential plant nutrient at required crop growth stage.

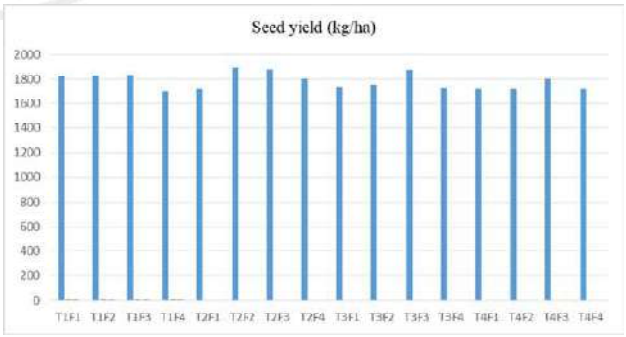
Foliar spray during 50 per cent flowering stage might have helped in accumulation of essential nutrients required for grain filling stage which results in better seed yield. Increase in growth, yield and yield attributes might be due to the assimilation of nutrients applied through foliar application at flowering stage which helps the crop to meet the required nutrients demand, because flowering stage of the crop is characterized by more uptake of nutrients for sink development. Foliar application resulted in increased absorption and translocation of nutrients for photosynthetic activity. These results are in agreement with the findings of Pavan and Hunje (2019) in kabuli chickpea and Sreenivasa and Naik (2011) in wheat, Megha and Fathima, 2020 in foxtail millet.



1000 Seed weight (g)

T_1: *Pseudomonas fluorescence* + *Azatobacter* (10g /kg Seeds); T_2: Bheejamruta (3%); T_3: Sea Weed Organic Gel (5g in 25ml of Water); T_4: Control; F_1: Cow Urine (10%); F_2: Panchagavya (3%); F_3: Fish tonic (5%); F_4: Control

Fig. 3: Effect of organic bio priming treatment and foliar application on 1000 seed weight of foxtail millet in *rabi 2019*



T_1: Pseudomonas fluorescence + Azatobacter (10g /kg Seeds); T_2: Bheejamruta (3%); T_3: Sea Weed Organic Gel (5g in 25ml of Water); T_4: Control; F_1: Cow Urine (10%); F_2: Panchagavya (3%); F_3: Fish tonic (5%); F_4: Control

Fig. 4: Effect of organic bio priming treatment and foliar application on seed yield (kg/ha) of foxtail millet in summer 2020

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Seed Bio priming treatment with foliar application of organic nutrients exhibited significant differences in growth parameter at different stages of the crop. The results revealed that, among two seasons in summer season Bheejamruta (3%) seed treatment (T_2) recorded highest plant height at 30, 60 and 90 DAS (36.98, 74.00 and 93.35 cm respectively), Days to 50 per cent flowering (60.52), number of tiller per plant (11.57), number of productive tiller per plant (28.05), panicle length (26.44 cm), days to maturity (100.50), seed weight per panicle (14.01 g), 1000 seed weight (4.03 g), seed yield per plot (2261.9 g) and seed yield (1829.52 kg/ha) compared to control. Foliar application (F_2) of Panchagavya (3%) recorded highest plant height on 60 and 90 DAS (61.11 and 88.81 cm), Days to 50 per cent flowering (62.42), number of tiller per plant (9.00), panicle length (23.45 cm), days to maturity (104.25), seed weight per panicle (13.69 g), 1000 seed weight (3.97 g) seed yield per plot (2230.0 g) and seed yield (1803.6 kg/ha) compared to control. From the experiment results it can be concluded that seed bio priming treatment with bheejamruta and organic foliar spray with Panchagavya recorded high in seed yield in summer season when compare to *rabi* season.

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(*Received :* August 2021 *Accepted :* February 2022)