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Research Article

Response of Nutrients Combination on Flowers Yield of *Bela* in Catchments area of River Ganga

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ABSTRACT

The field study was conducted during 2015-16 to 2017-18 on farmers fields of Mahmoodpur Pad and Saleempur Bagia villages of Kannauj block in district Kannauj. The pilot area is situated in the catchments of river Ganga. The soil of pilot project was sandy loam, having pH 8.0, organic carbon 0.26%, total nitrogen 0.02%, available P_2O_5 10.00 kg/ha and available K_2O 273 kg/ha, therefore, the nutrients status of soil was low. The application of 100 g N + 150 g P_2O_5 + 100 g K_2O + 25 g Mg + 3 g boron + 6 g $ZnSO_4$/ plant gave highest flower yield by 93.75 q/ha, while farmers practice of nutrient application gave lowest flower yield of 63.00 q/ha. The highest gross income, net income and BCR were computed by Rs 843750/ha, Rs 583754/ha and 1:3.30, respectively, under 100 g N + 150 g P_2O_5 + 100 g K_2O + 25 g Mg + 3 g boron + 6 g $ZnSO_4$ treatment. The lowest gross income (Rs 567000/ha), net income (Rs 380975/ ha) and BCR (1:3.00) were recorded under farmers practice. The growth and yield attributes were concordance to yield.

Keywords*: BCR, Catchment area, Economic yield, Pilot area, Poor nutrients status.*

INTRODUCTION

Among the perfume yielding, *Bela* is play very important role in *attar* production, which sell at fancy price. The flowers of *Bela* are used to impart a gentle pleasing aroma to innumerable high-grade perfumery preparation. It blooms from March to August and reported yield is 30-35 quintals of fresh flowers per hectare annually on farmers fields (Singh et al., 2014[a]). It is observed that the crop remains in the field for 5-7 years or depend on the management of farm house holds. The *Bela* crop prefer well drained, rich sandy loam to clayey loam soils and remain in bloom longer in a mild climate. Picking is done during the early morning hours for good recovery of the concrete by using the solvent-extraction method.

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In the vicinity of Kannauj, which is situated in the catchments of river *Ganga*, the cultivation of *Bela* is more popular, because Kannauj is famous city for *attar* preparation. The feedback received from the fields of *Bela* growers, the farm families harvest low flowers yield due to poor nutrients management. The perfumers also reported that the recovery percentage of concrete is less than the expectation. With the view to harvest good quality flower, more net profit and desired recovery of concrete, the trial on nutrients management was planned and carried out with full participation of farmers in villages of Kannauj district.

MATERIALS AND METHODS

The trial was conducted during 2015-16 to 2017-18 on farmers fields of Mahmoodpur Pad and Saleempur Bagia villages of Kannauj block in district Kannauj. The pilot area is situated in alluvial tract of Central Plain Zone of U.P. in catchments area of river *Ganga*. The main objective of the study was to harvest good quality of flowers, more net profit and desired recovery of concrete. The secondary objective was to increase the financial status of small and marginal farm families. The pilot area situated on loam texture soil, having pH 8.0, organic carbon 0.26, total nitrogen 0.02%, available P_2O_5 10.00 kg/ha and available K_2O 273 kg/ha, therefore, the fertility status was low. The farming situation of the area was irrigated. The main problem of the flowers growing area is lower yield of flowers due imbalance application of nutrients by farmers. The field trial was conducted on farmers fields and compared the flowers yield and economics with conventional practice of nutrients application (farmers practice). The cultivar *Mongara single* was used in the study. The nursery plants of Bela were planted from 30 August to 8 September in rainy seasons of experimental years. The flowers harvested between 15 April to 30 August in every year.

The three treatments i.e., 120 g P_2O_5 with 4 kg FYM/plant (farmers practice) 100 g N + 150 g P_2O_5 + 100g K_2O + 10 kg FYM/ plant (RBD) and 100 g N + 150 g P_2O_5 + 100 g K_2O + 10 kg FYM + 25 g Mg + 3 g boron + 6 g $ZnSO_4$ / plant were studied. The aromatic crop of *Bela* was raised with full recommended package of practices. The irrigations were given as and when required. The trial was under taken on ten farmers fields.

RESULTS AND DISCUSSION

The pooled data of three years are given in Table-1 and discussed here under appropriate heads-

(1) Growth parameters-

Application of 100 g N + 150 g P_2O_5 + 100g K_2O + 10 kg FYM + 25 g Mg + 3 g boron + 6 g $ZnSO_4$ / plant produced flowers upto 150 days, which was closely followed by 100 gN + 150 g P_2O_5 + 100 g K_2O + 10 kg FYM/plant (120 days) . The lowest flowering duration by 115 day was noted on applied dose of 120 g P_2O_5 + 4 kg FYM/ plant (farmers practice). The combined application of all plant nutrients was responsible for increasing the flowers duration. The highest girth of total branches was measured under the treatment of 100 g N + 150 g P_2O_5 + 100 g K_2O + 10 kg FYM + 25 g Mg + 3 g boron + 6 g $ZnSO_4$/ plant of 2.67 m. The other two treatments were produced lower diameter of all branches in comparison to above treatment (T_3). The considerable higher production of branches / plant at 100 g N + 150 g P_2O_5 + 100 g K_2O + 10 kg FYM + 25 g Mg + 3 g boron + 6 g $ZnSO_4$, supported to higher girth of total branches.

(2) Yield attributes

Data displayed that flowers weight / plant was recorded maximum by 7.5 kg / plant under 100 g N + 150 g P_2O_5 + 100 g K_2O + 10 kg FYM + 25 g Mg + 3 g boron + 6 g $ZnSO_4$ / plant treatment while farmers practice and recommended dose of fertilizers (100 g N + 150 g P_2O_5 + 100 g K_2O + 10 kg FYM produced 5.2 kg / plant and 6.4 kg / plant, respectively. The similar trend was also found in 100- flower weight.

(3) Flower yield (q/ha)-

Application of 100 gN + 150 g P_2O_5 + 100 g K_2O + 10 kg FYM + 25 g Mg + 3 g boron + 6 g $ZnSO_4$ / plant gave highest flower yield by 93.75 q/ha. The considerable increase of

flower weight/plant and 100-flower weight was responsible for higher flower yield. The farmers practice of nutrients application yielded lowest flower yield by 63.0 q/ha. The reduction of flowers weight / plant and 100-flower weight, supported to the lowest flower yield (q/ha). The similar results have also been reported by Singh et al. (2014 a) and Singh et al. (2014 b).

(4) Economic studies-

The data recorded on economics have been reported in Table-2. The cost of cultivation under treatment of 100 g N + 150 g P_2O_5 + 100 g K_2O + 10 kg FYM + 25 g Mg + 3 g boron + 6 g $ZnSO_4$ was computed Rs 259996/ha which was higher over farmers practice (Rs 186025/ha) and recommended dose of fertilizers application (Rs 235896 / ha). The higher gross return of Rs 843750 / ha, net return of Rs 583754/ha and BCR of 1:3.30 were found with reaping of flowers under 100 g N + 150 g P_2O_5 + 100 g K_2O + 10 kg FYM + 25 g Mg + 3 g boron + 6 g $ZnSO_4$/plant treatment. The lowest gross return, net return and BCR were computed by Rs 567000/ha, Rs 380975/ha and 1:3.00, respectively, under farmers practice. The application of recommended dose of fertilizers was given gross income, net return and BCR by Rs 743400 / ha, Rs 507504/ha and 1:3.20, respectively. The production of flowers/ ha was responsible for higher and lower incomes and BCR. Singh et al. (2008), Singh et al. (2013), Singh et al. (2014 a) and Singh et al. (2014 b) also reported the similar results.

Table 1: Performance of fertilizer doses on growth, yield traids and yield of *Bela*.
(Pooled data of three years)

Treatment	Duration	Total branches girth (m)	Weight of flower/plant kg (kg)	Weight of 100 flower (g)	Yield (q/ha)
Farmers practice - (120 g P + 4 kg FYM/plant)	115	2.40	5.2	22	63.00
Recommended dose of fertilizers (100 gN : 150 g P_2O_5 + 100 g K_2O and 10 kg FYM/plant)	120	2.50	6.4	26	82.60
Recommended dose of fertilizers + Micronutrient (25 g Mg + 3 g Boron and 6 g $ZnSO_4$)	125	2.67	7.5	30	93.75

Table 2: Performance of fertilizer doses economics of jasmine (*Bela*)
(Pooled data of three years)

Treatment	Gross Cost (Rs/ha)	Gross Returns (Rs/ha)	Net Return (Rs/ha)	Additional profit (Rs/ha)	B:C Ratio
Farmers practice - (120 g P + 4 kg FYM/plant)	186025	567000	380975	-	3.0
Recommended dose of fertilizers (100 gN : 150 g P_2O_5 + 100 g K_2O and 10 kg FYM/plant)	235896	743400	507504	126529	3.2
Recommended dose of fertilizers + Micronutrient (25 g Mg + 3 g Boron and 6 g $ZnSO_4$)	259996	843750	583754	282779	3.3

CONCLUSION AND RECOMMENDATION

Since the addition of 25 g Mg+3 g boron + 6 g $ZnSO_4$ / plant with recommended dose of nutrients application increased the considerable flowers yield of *Bela*, therefore, farm house holds may to suggested for application of aforementioned dose of nutrients, which will increase the economic yield and net return.

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