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Effect of Organic and Inorganic Source of Nutrient on Plant Growth and Flowering Behaviour in Mango vt. "Amrapali"

Kalyani Nagraj[1], Ishwar Markam[2] and Gulshan Gawde[3]
[1]Department of Fruit Science, [2]Department of Floriculture, [3]Department of Ag. Economics
Indira Gandhi Krishivishwavidyalaya (IGKV), Raipur, (C.G.)
*Corresponding Author E-mail: Kalyani13990@gmail.com
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ABSTRACT

An experiment was carried out at Horticulture Research Farm, Department of Fruit, Science Indira Gandhi Krishi Vishwavidyalaya, Raipur, Chhattish gar hduring 2015-16 to find out the effect of organic and inorganic source of nutrients in relation to plant growth and flowering behaviour in mango,vt. Amrapali which were planted at 5 x 5 m spacing. The data of experiment revealed that, among the ten treatments, 80% Recommended dose of fertilizer (RDF)+ Cow dung slurry@10 lit//tree showed best results. The highest shoot length (48.83cm), shoot girth (0.93cm), number of leaves per shoot (33.42), number of primary branch (10.00), length of panicle (33.15 cm), number of panicle per rachis (39.57), number of flower per panicle (319.08) and minimum flowering duration (21.72days) was found in the treatment where 80%(RDF) +Cow dung slurry@10 lit//tree was applied.

Key words: *Cow dung slurry, Flowering, Growth, RDF (Recommended Dose of Fertilizer)*

INTRODUCTION

Mango (*Mangifera indica*) is the leading fruit crop of India and considered to be the king of fruits. Besides delicious taste, excellent flavour and attractive fragrance, it is rich in vitamin A&C. The tree is hardy in nature, can be grown in a variety of soil and requires comparatively low maintenance costs. The mango kernel also contains 8-10 percent good quality fat which can be used for soap and also as a substitute for cocoa butter in confectionery. Chhattisgarh is one of the important mango growing state of India and occupies 2163.47 thousand hectares area with production of 18526.98 million tonnes and a productivity of 5.25 metric tonnes ha-[1 1]. Most of the area of Chhattisgarh is rainfed and vast acreage has an immense potential to improve mango production. Mango is grown in all the districts of Chhattisgarh, but the maximum acreage is in Raipur, Bastar, Durg and Rajnandgaon.

MATERIAL AND METHODS

The field experiment was carried out at Horticulture Farm, during 2015-16.The 15 year old Amrapali plants under high density with a spacing of 5 x 5 m were used in the study.

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Investigations related to plant growth and flowering behaviour parameters were carried out in the Department of Fruit, Science Indira Gandhi Krishi Vishwavidyalaya, Raipur (C.G). The factorial experiment was laid out in Randomized Block Design (RBD) with ten treatment and three replications. The experiment consisting three levels of inorganic fertilizer(100% NPK, 80% NPK and 60% NPK).The Three levels of inorganic fertilizers (100% NPK, 80% NPK and 60% NPK) were applied alone and also in combinations with different sources of nutrient (organic and bio-fertilizers) viz. Cow dung slurry, Vermiwash, Azospirillum C.G. Trychome and PSB. The plant fertilized with 100% NPK revealed 500g nitrogen, 300g phosphorus and 500g potassium. Nitrogen fertilizer was applied in three split doses. First dose of Nitrogen was applied on 20thjan, before flowering, While the second dose of Nitrogen was applied on 20th March, after flowering and third dose of Nitrogen was applied on 20th April after the fruit setting. Phosphorus and Potash were applied in a single application before flowering on the 20th December. The fertilizers used a source of Nitrogen, Phosphorus and Potassium were Urea, Single super phosphate and Potassium Sulphate respectively each was incorporated to the concerned plant and organic fertilizers@10lit/tree. Organic, inorganic and bio-fertilizers were applied in a ring 1 meter away from the trunk and at a depth of 30 cm.

RESULT AND DISCUSSION

Plant Growth

The interaction of source of nutrients as regards to plant growth, combined application of 80% recommended dose of fertilizer and a set of organic source (cow dung slurry@ 10lit/tree) registered maximum shoot length (48.83cm), shoot girth (0.93cm), number of leaves per shoot (33.42), number of primary branch (10.00), The increase in growth parameters under the treatment 80% RDF+ Cow dung slurry@10lit/tree might be due to the easily availability of required quantity of nutrients and improved soil conditions due to the addition of cow dung slurry for releasing the different macro and micro nutrients at proper stage required for plant growth which might have manifested in enhancing the growth parameters of mango. The lower values of these parameters were observed in control (T_0) could be attributed to non-availability of required quantum of nutrients[2] The results are in confirmity with the finding of Kundu *et al.*[5], and Gautam *et al.*[4],Similar results were also reported by Dutta *et al.*[3], in guava.

Fig1: Effect of organic and inorganic source of nutrient in relation to plant growth in mango

	Treatments	Shoot length (cm)	Shoot girth (cm)	Number of leaves per shoot	Number of primary branches
T_0	Control (Without nutrient application)	39.03	0.72	26.16	5.67
T_1	100% RDF (Without fertilizer)	48.44	0.92	32.40	9.33
T_2	80% RDF + Cowdung slurry 10lit/tree	48.83	0.93	33.42	10.00
T_3	80% RDF + Vermiwash 10lit/tree	47.09	0.87	31.97	8.70
T_4	80% RDF + C.G Trychome	46.30	0.81	30.30	8.00
T_5	80% RDF + Azospirillum+PSB	43.33	0.77	29.46	7.25
T_6	60% RDF + Cowdung slurry 10lit/tree	46.33	0.82	31.41	8.33
T_7	60% RDF + Vermivash 10lit/tree	45.80	0.78	29.57	7.50
T_8	60 %RDF + C.G Trychome	40.37	0.74	26.53	6.00
T_9	60% RDF + Azospirillum + PSB	41.12	0.75	27.56	6.33
	SEm±	0.01	0.01	0.37	0.08
	CD at 5% level	0.05	0.04	1.10	0.25
	CV %	0.07	2.94	2.16	1.92

Flowering Behaviour

The data is evident that, flowering duration effected by significantly with the application of different treatments. Significantly minimum flowering duration (21.72days) was recorded under the treatment 80% RDF + Cow dung slurry@ 10 lit/tree (T2) fallowed by 100% RDF (T1). The flowering duration was significantly maximum (29.29days) was with the control (T0). The maximum number of panicle per rachis (39.57), maximum length of panicle (33.15 cm), maximum number of flower per panicle (319.08) was recorded with the treatment 80% RDF + Cow dung slurry @10lit/tree (T2) followed by 100% RDF (T1). The favorable flowering behaviour like number of flower per panicle and flowering duration etc. under 80% RDF + Cow dung slurry@10lit/tree might be due the availability of complete fertilizers. The results are in good confirmity with the finding of Yadav *et al*.[6], who reported that number of flower per panicle were highly influenced by the different level of complete fertilizers.

Table 2: Effects of organic and inorganic source of nutrient in relation to flowering behaviour in mango

	Treatments	Flowering duration (days)	Number of panicle per rachis	Length of panicle (cm)	Number of flower per panicle
T_0	Control (Without nutrient application)	29.29	27.66	23.49	173.82
T_1	100% RDF (Without fertilizer)	22.94	37.97	31.62	249.27
T_2	80% RDF + Cowdung slurry 10lit/tree	21.72	39.57	33.15	319.08
T_3	80% RDF + Vermiwash 10lit/tree	23.83	37.07	30.79	227.86
T_4	80% RDF + C.G Trychome	25.25	35.87	29.20	202.43
T_5	80% RDF + Azospirillum+PSB	26.95	32.00	27.57	195.85
T_6	60% RDF + Cowdung slurry 10lit/tree	24.46	36.90	30.63	219.85
T_7	60% RDF + Vermivash 10lit/tree	25.97	34.63	28.19	199.33
T_8	60 %RDF + C.G Trychome	28.50	29.60	26.61	181.18
T_9	60% RDF + Azospirillum + PSB	27.22	31.57	27.24	189.32
	SEm±	0.41	0.12	0.46	2.24
	CD at 5% level	1.23	0.35	1.37	6.66
	CV %	2.80	0.61	2.78	1.79

SUMMARY

As regards to the vegetative growth parameters and reproductive growth parameter, the maximum shoot length, maximum shoot girth, maximum number of leaves per shoot, number of primary branch, minimum flowering duration, length of panicle, number of panicle per rachis , number of flowers per panicle were recorded under the treatment of 80% RDF +Cow dung slurry@ 10lit/tree(T_2). The minimum value for these parameters and maximum flowering duration was recorded in control (T_0).

CONCLUSION

The present study showed that 80% Recommended Dose of Fertilizer (RDF) along with cow dung slurry@10lit/tree is most suitable for good source of nutrient in plant. It have significant influence on growth and flowering behaviour in mango.

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