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Response of French Marigold to varied spacing and Phosphate level on Sodic Soil

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Introduction

French marigold (*Tagetes patula* Linn.) is a popular flower crop, easily cultivated with wide adaptability to varying soil and climate conditions. It is a hardy, dwarf annual, forming a bushy plant. The flowers are small and compact, either single or double and their colour may be yellow, orange, golden yellow, primrose, mahogany, rusty red, tangerine or deep scarlet or a combination of these. The flowers are extensively used on religious and social function, while leaved and flowers have medicinal value. The present investigations were undertaken to explore the potential odf its cultivation on partially reclaimed sodic wastelands with suitable agri-horticultural practices.

Materials and Methods

The field experiments were conducted on partially reclaimed sodic soil of Banthra Research Station of CSIR-National Botanical Research Institute, Lucknow during the winter season. The soil of the experimental plot was clay-loam with 8.7 pH, 0.6 dS m-1 electrical conductivity, low organic matter and nitrogen along with poor physical properties. The experiment was conducted in Split Plot Design with two spacings (30×30cm and 45 × 45 cm) as main plot treatments and four phosphate levels (0,30,60 and 90 kg ha^{-1}) as sub-plot treatments with five replications. The seedlings were raised in nursery beds in October and transplanted in field at 30 days age, after basal application of farm yard manure at 25 tons ha-1 and nitrogen at 40 kg ha^{-1}. The crop was top-dressed with 40 kg N ha^{-1} after 45 days of transplanting. The size of sub plots was 2.7m × 1.8m and observations were recorded on plant height, number of primary and secondary branches, number of flowers, and their weight and per unit area field.

Results and Discussion

Proper spacing between rows and plants (optimum plant population) is required for better development and high flower yield of French marigold. Wider spacing of 45x45cm (49,382 plants ha-1) resulted in significantly more number of primary and secondary branches and higher number and yield of flowers per plant, as compared to 30x30cm spacing (1,11,111 plants ha-1). Plant height and flower weight also showed the same statistical magnitude. However, large plant population in closer spacing compensated for the lower per plant yield and produced significantly higher flower yield (98.8q ha-1) as compared to wider spacing. Different species of marigold have specific requirement of optimum plant population (spacing) in different soil and climatic conditions. The studies conducted on *T. erecta* also revealed significantly higher per plant yield at 40x30cm as reported by S. Sridhar *et.al* (2010) and Lakshmi *et al* (2014). Favourable conditions like availability of nutrients, sunlight and soil moisture to individual plant in wider spacing would have increased the flower yield.

Marigold responds to fertilization, but information on response to *T. patula* to fertilizer application, especially phosphorous in sodic soils is scanty. The findings of our experiment revealed that phosphate levels had significant effect on plant height, number of primary branches, flowers per plant and flower yield on per plant and unit area basis. Increasing phosphate level from 60 to 90 kg ha-1 did not cause significant improvement in plant height, number of flowers and yield per plant and unit area yield. Phosphate application at 60 kg ha-1 produced 44% more flowers as compared to control. The interaction effect of spacing and phosphate levels was significant for single flower weight only

Table 1: Effect of spacings and phosphate levels on growth and flower yield of *Tagetes patula*

Treatments	Plant ht. (cm)	No. of primary branches	No. of secondary branches	No. of flowers per plant	Flower weight (g)	Flower yield per plant (g)	Flower yield (q ha-1)
Spacings							
30 × 30 cm	24.8	8.0	94.5	43.8	1.047	44.2	98.8
45 × 45 cm	24.2	9.8	101.1	54.9	1.051	55.5	84.6
CD (5%)	NS	1.2	8.1	6.7	NS	2.8	12.8
Phosphate							
0 kg ha	22.2	8.4	91.0	41.9	0.980	41.7	74.2
30	23.7	9.0	98.6	45.1	1.005	45.8	83.6
60	25.3	8.6	95.1	53.4	1.048	55.3	107.1
90	9026.6	9.6	100.6	57.3	1.164	56.6	102.0
CD (5%)	1.6	0.8	NS	5.6	0.053	0.053	2.6
Interaction	NS	NS	NS	NS	NS	NS	NS

(Table-1). The effects of N, P and K have been studied on nutrient content and dry weight and it was noticed that on omitting P, both dry weight and P content were reduced.

References

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