Effect of Organic Sources of Nitrogen and Biofertilizer Singly and in Synergistic form on Growth and Yield in Carnation

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Abstract - Flowers are associated with mankind from the dawn of civilization. It is said that in India man is born with flowers lives with flowers and finally dies with the flowers. Carnation is one of the most important commercial flowers of the world. The increasing demand of cut flowers is growing momentum with the increasing aesthetic sense and the higher socio-economic standard of the people. Infact the quickest and surest way to boosting crop production in the enhancement is the use of commercial fertilizers, but the high cost of chemical inputs need to sustain crop production, problems of their availability and the environmental pollution caused by them have necessitated the research to find out ultimate energy sources. Use of organic source of nitrogen and bio-fertilizers enrich the soil by supplying micro nutrients which are eco-friendly. These organics have their own beneficial effect on physical, chemical and biological properties of soil. (Ravindran et al., 1968) Successive field experiments were carried out to explore the best treatment among the organic sources of nitrogen and bio-fertilizers on the growth parameters and yield of carnation. It was found that the best combinations were farm yard manure with azospirillium, poultry manure with azotobacter and application of 50%RDN through vermicompost may be suggested to the florists for growing the best blooms of carnation.

Keywords: Camation, organic carnation, nitrogen, bio-fertilizers.

I. INTRODUCTION

Carnation (Dianthus carophyllus Linn.) belonging to the family Caryophyllaceac is one the most important commercial flower of the world. Its botanical name is Dianthus., it is a Greek derivative meaning the Divine flower. It is native of central and southern Europe (Swarup, 1967). The clove like fragrances and wide range of shade are marked features of carnation (Boss and Yadav, 1993).Due to its keeping quality, wide range of forms ability to withstand long distance transportation and remarkable ability to rehydrate after continuous shipping. carnation is preferred by growers to roses and chrysanthemum in several flower exporting countries. The whole plant is employed as vermifuge in China(Caius, 1973). The volatile oil present in this flowers contain30%eugenol,7%phenylethyl alcohol,40%benzyl benzoate, 5% benzyl salicylate and1%methyl salicylate (Naves and Mazuyer,1947).

Now a days chemical; nitrogen base farming is being commonly practice to increase the crop production. Increasing consumption of chemical nitrogen has exerted additional monetary pressure on the growers and this has also imposed adverse effects on soil physico-chemical properties, soil microflora and productivity of quality flowers. Organics like FYM, poultry manure vermicompost and bio-fertilizers like azotobacter, azospirillum have contributed a lot as alternative to chemical nitrogen. Abbas et al. (2006) advocated the use of bio-fertilizer as effective way of reducing pollution of soil. These organics are very beneficial for the physical, chemical and biological properties of soil (Ravindran et al. 1968). In addition to nitrogen supply ,the organics contain a very large population of bacteria, actinomycetes and other microbes which enrich the soil by supplying micronutrients. Syamala et al (2010) reported the significance of application of organic fertilizers with chemical fertilizer.

II. MATERIAL AND METHODS

The experiment was carried out in the research plot of the department. The experiment field was divided into twelve plots called treatment plots with specific code of T_1, to T_{12}. T_{12} was the control plot where nothing was administered. All the remaining plots were treated with organic nitrogen and bio-fertilizers singly and in combination which was as follows:

T_1 - 100% recommended dose of farm yard manure.

T_2 - 100% RDN through poultry farm.

T_3- 100% RDN through vermi compost. T4-100% RDN through Azospirillum.

T_5-100% RDN through Azotobacter.

T_6-50%RDN through FYM + 50% RDN through Azospirillum:

T_7-50% RDN FYM + 50% Azotobacter.

T_8-50% Poultry manure + 50% Azospirillum.

T_9-50% poultry manure + 50% Azotobacter.

T_{10} -50% vermicompost + 50% Azospirillum.

T11-50% vermicompost + 50 Azotobacter.

T12– Control

The crop selected for experiment was Carnation (Dianthus caryophyllus). The design of experiment was randomized

block design (RBD) size of each plot was $1\times1m^2$. Seedlings attained to four leaf stages and 5 to 6 cm height in the nursery was transplanted at 20cm x 20cm spacing in the different treatment plots followed by light watering. All the normal cultural practices- watering, weeding, hoeing etc were done as per required. Growth was observed after every 15, 30, 45, 60, 75, 90, 105, 120, 135 and 150 days of planting and yield was calculated by counting the plucked flowers from three tagged plants in each plot at full bloom stage.

III. RESULT AND DISCUSSION

The plant height was measured in cm after 15, 30, 45, 60, 75, 90, 105, 120, 135 and 150 DAP. The results from the table no.-1 and the statistical analysis exhibited the significant influence of organic source of nitrogen and biofertilizers singly and in combination on plant height. Of the organic source of nitrogen treatments, the application of 100% RDN through vermicompost (T_3) was found better over T_1. (100% RDN+ FYM) whereas application of 100% RDN through Azotobactor (T_5) was noted better over (T_4) (100% RDN through Azospirillum).

Overall, the synergistic form of 50% RDN through vermicompost -50% RDN through Azospirillum (T_{10}) produced the plants of maximum heights. However, the treatments concerning to the application of 100%RDN through FYM (T_1) and 100%RDN through poultry manure (T_2) in all stages of observation. Yield of flowers exhibited remarkable. production due to the application of T_1 to T_{11} over control (T_{12}) However, the magnitude of yield vary from treatment to treatment. T_{10} exhibited statistical superiority over rest of other treatments. The strong influence of nitrogen on productivity has been experimentally substantiated by (Deswal et al.,1983.,Shah et al., 1984)

Regarding yield of flowers it is clear from the Table No. 2 that maximum number of flowers 21.67 and 22.77 per. plant was recorded in T_{10} (where 50 % RDN through vermicompost + 50% RDN through azospirillum were applied) which was significantly more that of T_1 to T_9, T_{11} and T_{12} (control). Apparently T_{10} proved itself statistically better than that of others in relation to the production of number of flowers per plant. This is substantiated by the finding of Ray and Yadav, 1966.

IV. REFERENCES

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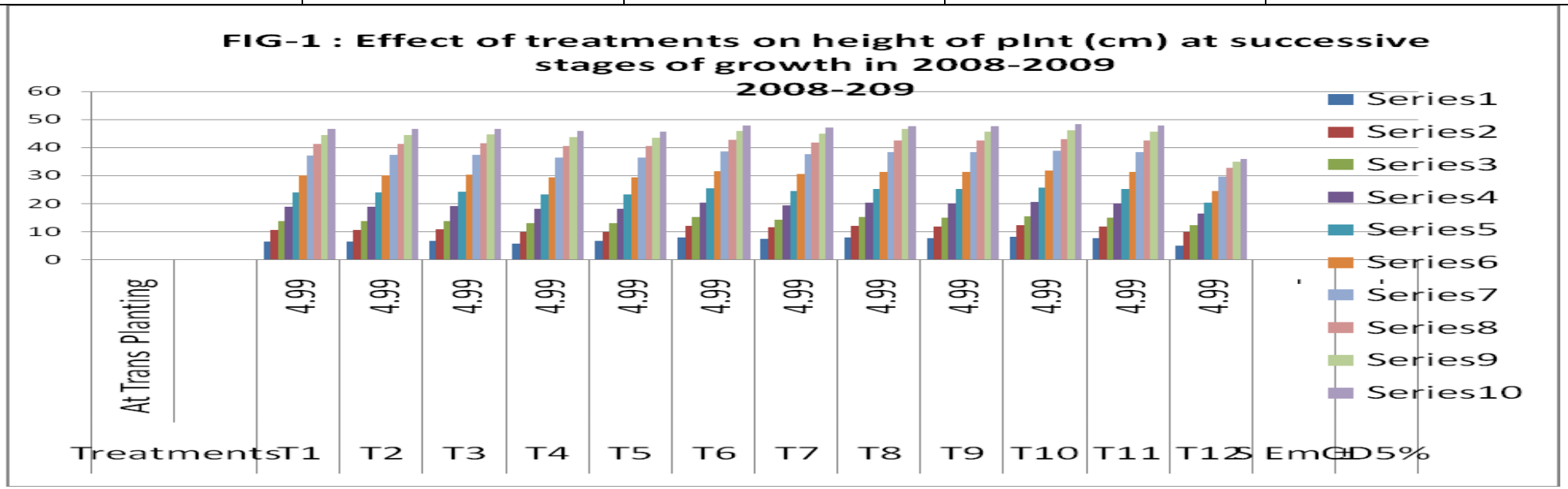
Table I :- Effect of treatments on height of plant (cm) at successive stages of growth in 2008-2009 and 2009-10

Treatm-ents	At Trans Planti ng	2008-09										At Transp lanting	2009-10									
T_1	4.99	6.55	10.63	13.75	18.84	23.96	30.07	37.19	41.29	44.42	46.52	5.13	7.04	11.16	14.35	19.65	24.68	30.77	32.89	42.04	45.13	47.24
T_2	4.99	6.64	10.77	13.87	18.98	24.09	30.21	37.31	41.42	44.53	46.65	5.13	7.17	11.26	14.48	19.69	24.80	30.91	38.02	42.13	45.22	47.36
T_3	4.99	6.74	10.85	13.96	19.08	24.18	30.29	37.40	41.51	44.62	46.74	5.13	7.28	11.36	14.57	19.78	24.89	31.02	38.11	42.22	45.34	47.44
T_4	4.99	5.85	9.96	13.08	18.18	23.28	29.41	36.51	40.63	43.73	45.85	5.13	6.37	10.47	13.68	18.90	24.02	30.12	37.21	41.32	44.45	46.36
T_5	4.99	6.83	9.92	13.06	18.15	23.25	29.37	36.47	40.59	43.59	45.71	5.13	6.33	10.45	13.65	18.87	23.47	30.08	37.20	41.30	44.32	46.42
T_6	4.99	8.00	12.11	15.20	20.31	25.42	31.53	38.64	42.76	45.85	47.97	5.13	8.52	12.61	15.81	21.03	26.15	32.23	39.37	43.46	46.57	48.75
T_7	4.99	7.46	11.56	14.30	19.41	24.52	30.65	37.73	41.85	44.97	47.06	5.13	7.97	12.07	14.92	20.14	25.22	31.33	38.25	42.56	45.66	47.78
T_8	4.99	8.10	12.21	15.34	20.45	25.16	31.27	38.39	42.51	46.60	47.72	5.13	8.61	12.71	15.95	21.16	26.27	32.38	39.49	43.59	46.71	48.81
T_9	4.99	7.73	11.85	14.95	20.06	25.16	31.27	38.39	42.51	45.60	47.72	5.13	8.24	12.34	15.56	20.77	25.88	31.99	39.10	43.21	46.31	48.43
T_{10}	4.99	8.25	12.33	15.45	20.56	25.67	31.77	38.89	43.07	46.13	48.22	5.13	8.74	12.85	16.04	21.27	26.49	32.49	39.60	43.70	46.81	48.94
T_{11}	4.99	7.83	11.91	14.99	20.12	25.24	31.33	38.45	42.56	45.65	47.78	5.13	8.31	12.41	15.62	20.84	25.93	32.06	39.16	43.26	46.39	48.49
T_{12}	4.99	5.07	99.20	12.28	16.42	20.52	24.6	29.73	32.85	34.96	36.06	5.13	5.61	9.72	12.92	17.13	21.23	25.34	30.45	33.54	35.65	36.77
S Em #	-	.025	.009	.010	.009	.010	.006	.009	.012	.010	.007	-	.007	.009	.008	.06	.006	.006	.010	.011	.008	.006
CD5%	-	0.72	.026	.030	.028	0.31	.018	.025	.036	.030	.019	-	.021	.025	.023	.019	.019	.019	.028	.033	.022	.019

Table II :- Effect of treatments on height of plant (cm) at successive stages of growth in 2008-2009 and 2009-10

Treatment	2008-09		2009-10	
	Percent stand of the crop	Yield of flowers (q/ha)	Percent stand of the crop	Yield of flowers (q/ha)
T_1	95.63	16.62	95.90	18.57
T_2	65.27	20.21	95.63	22.31
T_3	95.03	22.53	95.37	24.43
T_4	94.73	18.76	95.07	20.72
T_5	94.33	19.65	94.73	21.74
T_6	96.77	22.20	97.13	24.28
T_7	95.87	23.14	96.23	25.16
T_8	97.10	26.96	97.43	28.87
T_9	96.27	27.60	96.53	29.64
T_{10}	97.50	28.73	97.87	32.42
T_{11}	96.53	28.35	96.83	31.12
T_{12}	94.10	8.81	94.50	8.23
S.Em$\pm$	0.049	0.054	0.039	0.030

CD at 5%	0.143	0.159	0.116	0.089



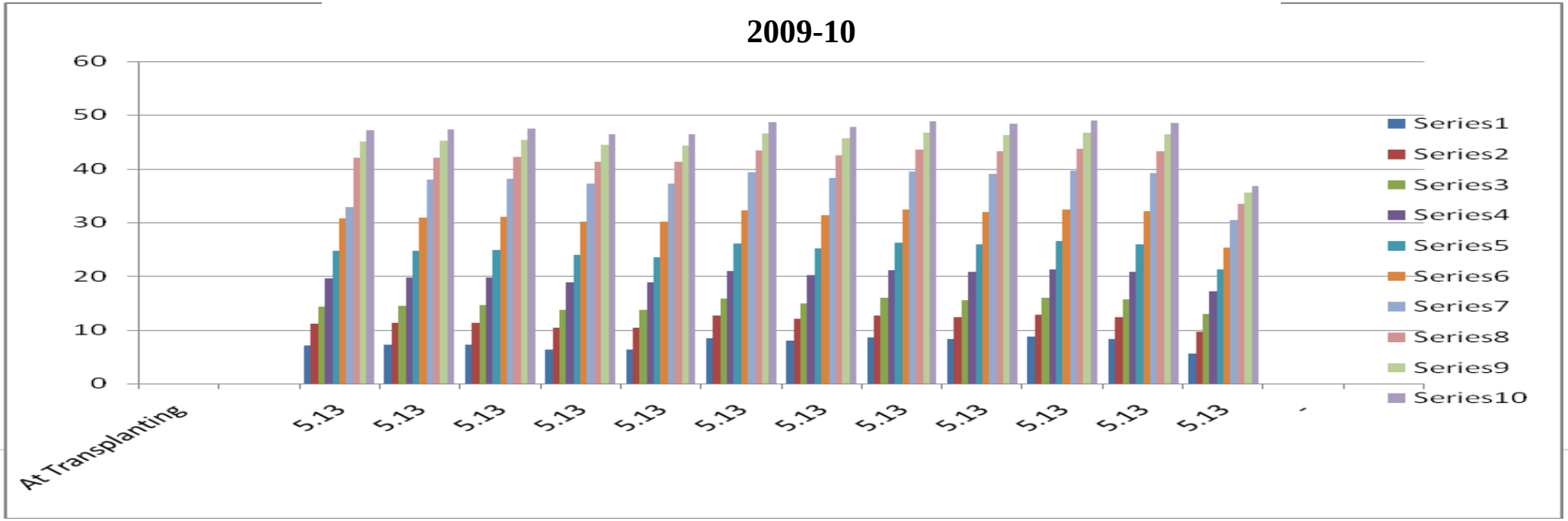


Fig. II Effect of treatments on percent stand of the crop and yield of flowers (q/ha) in 2008-2009 and 2009-10