

Effect of certain organics and pressmud on growth and yield characters of tomato

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Accepted : August, 2008

ABSTRACT

An experiment was conducted to study the effect of certain organics and pressmud on growth and yield characters of tomato. The trial was conducted in a Completely Randomized Design with thirteen treatments in three replications. The treatments consisted of application of Farmyard manure 25.0 t/ ha, Pressmud 12.5 t/ ha and Vermicompost 5.0 t/ ha at two different levels (100 and 50 per cent of recommended level) and their combinations along with foliar spray of Panchagavya (3 per cent). The results of the present study indicated that the combined application of Farmyard manure 12.5 t/ ha plus vermicompost 2.5 t/ ha plus panchagavya 3 per cent as foliar spray resulted in improving the growth characters like plant height, internodal length, number of branches, number of leaves and leaf area and yield characters like number of flower clusters per plant, number of flowers per cluster, number of fruits per plant, single fruit weight and fruit yield per plant in tomato followed by the application of pressmud 6.25 t/ ha + vermicompost 2.5t/ ha + panchagavya 3 per cent.

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Key words : Farmyard manure, Vermicompost, Panchagavya, Pressmud

Tomato (*Lycopersicon esculentum* Mill) is one of the most important vegetable crops in the world. Among the different kinds of vegetables, tomato finds an important place in the human diet, because it is rich in ascorbic acid, sugar, calcium and vitamins. Organic manures play a vital role in improving the soil fertility and productivity of soils which has been acknowledged for generations. In recent years, organic farming is becoming more popular in India because people are now aware about the disastrous side effects caused by chemical farming on health and environment and now prefer organically grown foods. The use of certain organics like farmyard manure, vermicompost and pressmud partly substitute chemical fertilizers and also reduce the cost of production. Panchagavya is a single organic input, which can act as a growth promoter and immunity booster. It has a significant role in providing resistance to pests and diseases and in increasing the overall yield. With this background in view, the present investigation was undertaken to study the effect of certain organics like farmyard manure, vermicompost, panchagavya and pressmud on growth and yield characters of Tomato.

MATERIALS AND METHODS

A pot culture study was carried out in the vegetable field unit, Department of Horticulture, Faculty of Agriculture, Annamalai University. Tomato seeds of cv. PKM-1 were used for this study. The experiment was conducted in a Completely Randomized Design with thirteen treatments in three replications. The treatments consisted of application of Farmyard manure 25.0 t/ ha,

Pressmud 12.5 t/ ha and Vermicompost 5.0 t/ ha at two different levels (100 and 50 per cent of recommended level) and their combinations along with foliar spray of Panchagavya (3 per cent). The observations regarding growth characters like plant height, internodal length, number of branches, number of leaves and leaf area and yield characters like number of flower clusters per plant, number of flowers per cluster, number of fruits per plant, single fruit weight and fruit yield per plant were recorded and the results were statistically analyzed.

RESULTS AND DISCUSSION

Data presented in Table 1 showed that the growth parameters *viz.*, plant height, internodal length, number of branches, number of leaves and leaf area were significantly influenced by the application of certain organics and pressmud along with foliar application of panchagavya. The highest plant height (71.40 cm) was recorded in the treatment combination of farmyard manure 12.5 t/ha + vermicompost 2.5t/ ha + panchagavya 3 per cent as foliar spray (T₁₁) followed by T₁₃ (pressmud 6.25 t/ ha + vermicompost 2.5t/ ha + panchagavya 3 per cent) which recorded 68.61 cm. The minimum plant height (53.15 cm) was recorded in the control (T₁). Regarding the internodal length, it was maximum in T₁₁ (farmyard manure 12.5 t/ ha + vermicompost 2.5t/ ha + panchagavya 3 per cent) which recorded 6.45 cm followed by T₁₃ (pressmud 6.25 t/ ha + vermicompost 2.5t/ ha + panchagavya 3 per cent) which recorded 5.86 cm. The minimum value of 4.68 cm was recorded in the control (T₁).

Table 1: Effect of certain organics and pressmud on growth characters of tomato cv. PKM-1

Treatments	Plant height (cm)	Internodal length (cm)	Number of branches	Number of leaves	Leaf area (cm ²)
T ₁ - Control	53.15	4.68	4.44	19.24	33.86
T ₂ - FYM 25 t ha ⁻¹	59.21	5.07	5.78	25.29	44.70
T ₃ - FYM 25 t ha ⁻¹ + PG 3 %	62.70	5.12	6.10	27.05	46.60
T ₄ - PM 12.5 t ha ⁻¹	62.56	5.14	5.56	26.12	47.26
T ₅ - PM 12.5 t ha ⁻¹ + PG 3 %	52.50	5.18	6.24	27.42	49.87
T ₆ - VC 5 t ha ⁻¹	60.40	5.21	5.90	26.32	52.89
T ₇ - VC 5 t ha ⁻¹ + PG 3 %	62.00	5.26	6.31	27.85	55.71
T ₈ - FYM 12.5 t ha ⁻¹ + PM 6.25 t ha ⁻¹	63.71	5.30	6.13	29.86	60.12
T ₉ - FYM 12.5 t ha ⁻¹ + PM 6.25 t ha ⁻¹ + PG 3 %	66.26	5.47	6.55	31.96	66.47
T ₁₀ - FYM 12.5 t ha ⁻¹ + VC 2.5 t ha ⁻¹	63.63	5.41	6.38	31.35	55.16
T ₁₁ - FYM 12.5 t ha ⁻¹ + VC 2.5 t ha ⁻¹ + PG 3 %	71.40	6.45	8.18	33.16	78.16
T ₁₂ - PM 6.25 t ha ⁻¹ + VC 2.5 t ha ⁻¹	63.90	5.43	6.45	28.90	56.40
T ₁₃ - PM 6.25 t ha ⁻¹ + VC 2.5 t ha ⁻¹ + PG 3 %	68.61	5.86	7.12	32.56	73.14
S.E. ±	1.12	0.19	0.33	0.24	2.18
C.D. (P=0.05)	2.31	0.38	0.68	0.58	4.49

FYM- Farmyard manure

PM- Pressmud

VC - Vermicompost

PG - Panchagavya

The number of branches and number of leaves per plant showed significant variations among the various treatments. The maximum number of branches (8.18) and leaves (33.16) were recorded in the treatment T₁₁ (farmyard manure 12.5 t/ha + vermicompost 2.5t/ha + panchagavya 3 per cent) whereas the control (T₁) recorded the minimum value for number of branches (4.44) and leaves (19.24). Regarding the leaf area, T₁₁ (farmyard manure 12.5 t/ha + vermicompost 2.5t/ha + panchagavya 3 per cent) recorded the maximum value of 78.16 cm² followed by T₁₃ (pressmud 6.25 t/ha + vermicompost 2.5t/ha + panchagavya 3 per cent) which registered a value of 73.14 cm². The control (T₁) registered the minimum leaf area (33.86 cm²).

The results of the present study are in agreement with the findings of Mohamed Rafi *et al.* (2002) in tomato and Subbarao and Sankar (2001) in brinjal. Organic manures improve the soil physical conditions and promotes microbial and soil organic matter, which in turn produces organic acids, which inhibits IAA oxidase enzymes, resulting in enhancing the promotive effect of auxin – IAA, which has direct effect on plant growth (Leopold, 1974). The increase in growth parameters due to application of vermicompost may be due to the presence of growth substances, nitrogen fixers, other essential nutrients (Bano *et al.*, 1987) and also due to higher P fertilization by a symbiotic mycorrhizal association (Kale *et al.*, 1987).

Panchagavya is fermented organic manure with high microbial load with Effective Micro Organisms (EMO) and methylotrophs Profile Bacteria. These EMO in Panchagavya would have enhanced the productivity of

phytohormones like auxins and gibberellins that might have in turn, stimulated the growth parameters *viz.*, maximum plant height, internodal length, number of branches and leaves and leaf area (Sendurkumaran *et al.*, 1999). In the present study also, foliar spray of panchagavya (3%) along with other organic manures like farmyard manure (12.5 t/ha) and vermicompost (2.5t/ha) resulted in enhancing the growth parameters. Similar findings have been reported by Sendurkumaran *et al.*, (1999) and Sridhar (2003).

Data presented in Table 2 shows significant variations among the various treatments. In the present study, plants supplied with organic manures *viz.*, farmyard manure 12.5 t/ha + vermicompost 2.5 t/ha + panchagavya 3 per cent as foliar spray (T₁₁) showed more number of flower clusters per plant (14.23) and more number of flowers per cluster (6.35), followed by the treatment T₁₃ (pressmud 6.25 t/ha + vermicompost 2.5t/ha + panchagavya 3 per cent) which recorded 12.86 flower clusters per plant and 5.60 flowers per cluster, while the control recorded the minimum values of 6.70 and 3.13, respectively. This might be due to the better nutritional status of the plant, which was favoured by this treatment. Subbarao and Sankar (2001) reported that application of farmyard manure + vermicompost resulted in earlier flowering and higher flower production, which may be due to the better aeration, adequate drainage and creation of favourable soil environment for deeper penetration of root and higher nutrient extraction from the soil.

The number of fruits and single fruit weight are the most important traits in determining the yield and these traits were greatly influenced by the application of certain

Table 2: Effect of certain organics and pressmud on yield characters of tomato cv. PKM-1

Treatments	Number of flower clusters per plant	Number of flowers per cluster	Number of fruits per plant	Single fruit weight (g)	Yield per plant (g)
T ₁ - Control	6.70	3.13	12.33	28.63	353.02
T ₂ - FYM 25 t ha ⁻¹	8.78	3.96	17.17	34.97	600.43
T ₃ - FYM 25 t ha ⁻¹ + PG 3 %	9.08	4.23	17.50	37.20	651.60
T ₄ - PM 12.5 t ha ⁻¹	8.89	4.13	17.52	36.27	635.45
T ₅ - PM 12.5 t ha ⁻¹ + PG 3 %	9.78	4.36	18.54	37.53	695.80
T ₆ - VC 5 t ha ⁻¹	9.16	4.30	18.33	36.57	670.32
T ₇ - VC 5 t ha ⁻¹ + PG 3 %	9.77	4.37	18.83	37.78	711.39
T ₈ - FYM 12.5 t ha ⁻¹ + PM 6.25 t ha ⁻¹	10.36	4.39	19.50	38.93	759.13
T ₉ - FYM 12.5 t ha ⁻¹ + PM 6.25 t ha ⁻¹ + PG 3 %	12.22	5.01	20.05	40.05	803.02
T ₁₀ - FYM 12.5 t ha ⁻¹ + VC 2.5 t ha ⁻¹	10.24	4.40	19.77	39.74	785.65
T ₁₁ - FYM 12.5 t ha ⁻¹ + VC 2.5 t ha ⁻¹ + PG 3 %	14.23	6.35	22.30	44.93	1001.93
T ₁₂ - PM 6.25 t ha ⁻¹ + VC 2.5 t ha ⁻¹	10.34	4.41	19.20	39.97	767.42
T ₁₃ - PM 6.25 t ha ⁻¹ + VC 2.5 t ha ⁻¹ + PG 3 %	12.86	5.60	21.15	42.47	898.24
S.E. ±	0.61	0.28	0.53	1.17	28.59
C.D. (P=0.05)	1.26	0.58	1.09	2.41	58.78

FYM- Farmyard manure

PG - Panchagavya

PM- Pressmud

VC - Vermicompost

organics and pressmud along with panchagavya as foliar spray. The number of fruits and single fruit weight was maximum (22.30 and 44.93 g, respectively) in the treatment combination of farmyard manure 12.5 t/ha + vermicompost 2.5 t/ha + panchagavya 3 per cent (T₁₁) followed by T₁₃ (pressmud 6.25 t/ha + vermicompost 2.5t/ha + panchagavya 3 per cent) which recorded the values of 21.15 and 42.47 g, respectively. The control (T₁) recorded the least values for both the characters (12.33 and 28.63 g, respectively). The results presented in Table 2 revealed that significant differences existed among the various treatments with regard to fruit yield per plant. Among the different treatments, the highest yield (1001.93 g/plant) was recorded in T₁₁ (farmyard manure 12.5 t/ha + vermicompost 2.5 t/ha + panchagavya 3 per cent) followed by T₁₃ (pressmud 6.25 t/ha + vermicompost 2.5t/ha + panchagavya 3 per cent), which registered a value of 898.24 g/plant. The minimum value (353.02) was recorded in control (T₁).

It was observed by Naik and Srinivas (1992) that taller plants with more number of branches, increased photosynthetic area and favourable physiological activities under higher nutrient levels could have resulted in more production and translocation of photosynthates in plants, which accelerated the formation of more number of large sized fruits resulting in higher yields. Higher yields due to application of vermicompost may be attributed to the high level of nutrients along with growth stimulating substances excreted by earthworms into their casts. The favourable effect of panchagavya on fruit yield may be due to the fact that panchagavya acts as a growth-promoter and

immunity booster (Sundarraman *et al.*, 2001).

It can be concluded from the results of the present study that combined application of Farmyard manure 12.5 t/ha plus vermicompost 2.5 t/ha plus panchagavya 3 per cent as foliar spray resulted in improving the growth and yield characters in tomato followed by the application of pressmud 6.25 t/ha + vermicompost 2.5t/ha + panchagavya 3 per cent.

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