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REGULAR ARTICLE

INFLUENCE OF WATER SOLUBLE FERTILIZERS ON GROWTH IN BRINJAL HYBRID (*SOLANUM MELONGENA* L.)

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ABSTRACT

In the present study, a field investigation was carried out to study the effect of water soluble fertilizers on growth and yield parameters of brinjal hybrids due to application of various levels of water soluble fertilizer. Foliar spray of NPK with 5 and 7 sprays, each starting from 30 DAT at 10 d interval, formed twenty treatments in two hybrids. The results showed that among the two different concentrations of foliar applied nutrients, 7 sprays of 1% NPK (19:19:19) along with 100 per cent recommended dose of fertilizer (200:150:100 kg ha⁻¹) recorded the highest plant height, number of primary branches, secondary branches, stem girth, number of leaves per plant, leaf area.

Keywords: Brinjal, Water soluble fertilizer, Growth parameters

INTRODUCTION

Brinjal (*Solanum melongena* L.) is one of the principle crops of India and is widely grown throughout the year in various parts of the country. The brinjal hybrids are more responsive to fertilizers application. Usually, the fertilizers are applied as soil drenching in brinjal cultivation. But due to various factors, the fertilizer responses will be low in soil application. Therefore, foliar nutrition may be a better way to supplement the nutrients to the plant [1].

Hence, field investigation was carried out to study the effect of water soluble fertilizers on growth and yield parameters of brinjal hybrids.

MATERIALS AND METHODS

A field experiment was carried out at University Orchard, Department of Horticulture, Faculty of Agriculture, Annamalai University, Annamalai Nagar, Tamil Nadu. Two brinjal hybrids viz., Mahyco No.39 (Ravaiya) produced by Mahyco Seed Innovation P. Ltd Maharashtra and Indam Supriya produced by Indo-American Hybrid Seeds (India) P. Ltd Bengaluru were used in the present study. The experiment was laid out in Factorial Randomized Block Design and replicated thrice. The treatments consisted of application of two levels of inorganic fertilizer (100 % and 75% Recommended Dose Fertilizer @ 200:150:100 kg NPK) along with the two concentrations of water soluble fertilizers viz., NPK (19:19:19) at 0.5% and 1% as in five and seven sprays. Seeds were sown in raised beds at a spacing of 5 cm across the beds and at a depth of 0.25 cm. Thirty five days old healthy seedlings were transplanted in

the main field. The seedlings were planted in a uniform spacing of 90 cm x 60 cm in the plot and immediately after transplanting. Intercultural operations and harvesting were done as per the recommendation. The required quantity of manures and fertilizers were applied as per the treatment. The inorganic fertilizers were applied in the form of urea, superphosphate and murate of potash as per the treatments. N was applied in two split doses, first dose was given as a basal application and the remaining N was given thirty days after sowing. The full dose of phosphorus and potassium were applied as basal application at the time of transplanting. Foliar application of required quantity of 19:19:19 NPK were given in five and seven sprays starting from thirty days after transplanting at ten days intervals. The observations on various growth parameters viz., plant height, number of primary branches, secondary branches, stem girth, number of leaves per plant, leaf area.

RESULTS

The plant height was significantly influenced by the interaction effect of treatments x hybrids. The maximum plant height was observed in T₁₀H₂ (100% RDF+WSF 1.0%+7 Sprays) with the mean value of 117.04 cm. The highest number of primary branches (6.96), number of secondary branches (8.83) and number of leaves per plant (49.24) were recorded the maximum in T₁₀H₁. The maximum stem girth was observed in T₁₀ H₂ (4.84 cm) which received 100% RDF combined with 1.0% WSF (7 Sprays) in Ravaiya. The highest leaf area (90.98. cm²) were recorded in the same treatment.

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Table 1: Influence of water soluble fertilizers on growth parameters in brinjal

Treatments	Plant height (cm)	Primary branches	Secondary branches	Stem girth (cm)	Number of leaves	Leaf area (cm ²)
F ₁ H ₁	71.94	4.13	6.12	2.15	25.87	49.26
F ₂ H ₁	75.24	5.30	7.03	3.17	27.84	53.31
F ₃ H ₁	81.38	5.52	7.22	2.30	29.89	56.36
F ₄ H ₁	95.24	5.59	7.59	3.31	32.09	60.41
F ₅ H ₁	86.09	5.62	7.87	3.34	34.99	64.15
F ₆ H ₁	100.38	5.81	8.13	3.31	37.24	71.32
F ₇ H ₁	90.18	5.95	8.24	3.09	41.99	75.25
F ₈ H ₁	99.33	6.03	8.31	3.36	44.14	79.31
F ₉ H ₁	104.38	6.12	8.46	3.35	46.15	82.35
F ₁₀ H ₁	109.46	6.96	8.83	3.53	49.24	86.41
F ₁ H ₂	83.05	3.34	4.83	2.20	21.81	56.53
F ₂ H ₂	88.20	3.67	5.12	2.80	22.86	60.58
F ₃ H ₂	92.15	3.78	5.76	3.39	25.91	63.63
F ₄ H ₂	104.54	3.80	5.86	3.52	27.93	67.68
F ₅ H ₂	97.20	3.96	6.08	3.72	29.98	71.73
F ₆ H ₂	108.82	4.12	6.40	4.06	32.04	74.78
F ₇ H ₂	101.78	4.23	6.25	3.39	35.09	78.83
F ₈ H ₂	103.40	4.38	6.71	3.73	37.14	82.88
F ₉ H ₂	112.24	4.53	6.90	4.32	40.19	86.93
F ₁₀ H ₂	117.04	5.02	7.19	4.84	44.29	90.98
S. Ed	2.31	0.30	0.15	0.12	1.62	1.75
CD (P= 0.05)	4.63	0.60	0.31	0.24	3.25	3.51

DISCUSSION

The increase in plant height in the present study might be due to the increased cell division and elongation at higher levels of N. Similar findings were reported by [2] and [2] in brinjal. The increase in plant height due to water soluble fertilizers used as foliar spray contain all the three major nutrients and nitrogen played an important role in increasing the plant height in brinjal [3]. In general, plant height increased with the increased levels of fertilizers. Similar result was also observed in the present study where the plant height increased with the increased combined levels of inorganic fertilizers. This finding was also supported by the views of [4] in brinjal.

Moreover, the plants supplied with higher dose of inorganic fertilizers were taller than the plants which received lower levels of inorganic fertilizer. In the present study, the increase in height with increased higher level might be due to the fact that the nitrogen which is a constituent of chlorophyll increased the synthesis of chlorophyll and have resulted in enhanced photosynthesis which ultimately resulted in better growth of the plant. Similarly, the role of P and K on vegetative growth has been emphasized by [5]. Phosphorus is also involved in the energy transfer system in the plant tissues. Hence, it is obvious that a good supply of phosphorus would generally improve the growth.

In the present study application of various levels of inorganic and water soluble fertilizers and the hybrids significantly influenced the primary and secondary branches. Among the interaction effect between hybrids x treatments the more number of primary and secondary branches were recorded in T₁₀H₁ (6.96 and 8.83) which received (100% RDF+WSF 1.0%+7 Sprays) and the least was recorded in T₁H₂ (3.34 and 4.83) which received 75% recommended dose of fertilizers. The increase in number of branches was due to higher levels of nutrients supplied

through foliar application of water soluble fertilizer at early crop stage could have encouraged more number of auxiliary buds and ultimately resulted in more number of branches. Similar results of better branching with foliar application of nutrients and inorganic fertilizers were reported by [6] in brinjal, [7] in tomato and [8] in chilli.

In the present study, application of various levels of foliar application of water soluble fertilizer significantly influenced the stem girth (4.84 cm), number of leaves (49.24), leaf area (90.98 cm²) and chlorophyll content (39.41). The highest values of all leaf characters recorded in T₁₀H₂ which received (100% RDF+WSF 1.0%+7 Sprays) and the least was recorded in 75% recommended dose of fertilizers in T₁H₁. It might be attributed by the solubility and uniform distribution of nutrients from the granules might have increased the nutrient availability in the root zone [9]. The leaves are major site of photosynthesis and act as a major source for the sink. Generally, the leaf production is determined both by environment and nutrition. Among the nutrients, nitrogen plays an important role in leaf production, being a chief constituent of protein and protoplasm it might have enhanced the chlorophyll content of leaves and cell division, thus resulting in more number of leaves [10]. Similar results were obtained by foliar application of nutrients by [3] in brinjal and [11] in okra.

CONCLUSION

Based on the present investigation, among the water soluble fertilizers and inorganic fertilizers tested foliar application of 7 sprays of NPK (19:19:19) along with the 100% application of inorganic fertilizer (200:150:100 kg NPK ha⁻¹) recorded the highest growth parameters in brinjal.

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