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Original Research Article

Effect of Pruning and Micronutrients on Flowering, Fruiting and Yield of Sweet Pepper

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A B S T R A C T

A field experiment was carried out during *Kharif* season of the academic year 2019-2020 at Department of Horticulture, College of Agriculture, Parbhani. A field experiment comprised with Factorial Randomized Block Design with three replication having two factor the Factor A consisted six levels of micronutrients viz. M_1 chelated Zn 0.2%, M_2 chelated Fe 0.2%, M_3 chelated Bo 0.1%, M_4 chelated Cu 0.1%, M_5 chelated Mn 0.2%. M_6 chelated Mix 0.2% and Factor B consisted two levels of pruning viz. P_1 pruning 20 DAT, P_2 pruning 30 DAT. In respect of flowering characters days to 1^{st} flowering and number of flower in Sweet pepper were recorded under the treatment combination of M_1P_2 (Chelated Zinc 0.2% + Pruning at 30 days after transplanting). Whereas, fruit character viz., dimeter of fruit, length of fruit, Also number of fruit plant^{-1}, fruit yield plant^{-1}, fruit yield plot^{-1} and fruit yield ha^{-1} were found to be maximum with the treatment combination of M_1P_2 (Chelated Zinc 0.2% + Pruning at 30 days after transplanting) had also recorded maximum weight of fruit, in Sweet pepper.

Keywords

Pruning, Micronutrient, flowering, Fruit yield, Fruit

Introduction

China is the major producer of capsicum and contributes 36 per cent of the worlds cultivated area with a production of 15.03 million tones. India contributes average annual production of 327 thousand tonnes from an area 46 thousand with a productivity of 7108.70 kg per hectare (Anonymous 2018).

Sweet pepper (*Capsicum annuum* L.) is to be considered as one of the important vegetable crops belonging to the family Solanaceae. It is native to Tropical South America (Shoemaker and Teskey, 1995). The domesticated pepper could be broadly classified into sweet and hot types based on their levels of pungency. Capsicum consists of 20–27 species, five of which are domesticated: *C. annuum, C. baccatum, C. chinense, C. frutescens, and C. pubescens.* Capsicum (*Capsicum annuum L. var. grossum* Sendt; 2n =24). Flower production is significantly increased when the night temperatures during the growing season is between 12-21°C and fruits also develops sun scalds when grown in the dry season in the open field.

Pruning of the capsicum plants to two stem, three or four stem not only facilitate easy training operation but also permit closer planting, early ripening of fruits and ultimately higher yields of larger sized fruits

(Dasgan and Kazim, 2003). Due to the heavy vegetative growth and fruit load on the colored pepper plants shoot pruning proves to be one of the important factor in proper utilization of production area. Micronutrient fertilizers are one of the outstanding sources of nutrient that effect on growth and development of sweet pepper.

Materials and Methods

The present investigation was carried out during Kharif season of the year 2019-2020 at Department of Horticulture, College of Agriculture, Parbhani to study the effect of pruning and micronutrients on growth, quality and chlorophyll content of Sweet pepper. The research was carried out on the variety Raja. A field experiment was laid out with Factorial Randomized Block Design having two factor the Factor A consisted six levels of micronutrients viz. M_1 chelated Zn 0.2%, M_2 chelated Fe 0.2%, M_3 chelated Bo 0.1%, M_4 chelated Cu 0.1%, M_5 chelated Mn 0.2%. M_6 chelated Mix 0.2% and Factor B consisted two levels of pruning viz. P_1 pruning 20 DAT. P_2 pruning 30 DAT.

The treatments were replicated three times in a Factorial Randomized Block Design. The seedlings were prepared in protray in shadenet of Horticulture Department, Parbhani. The protrays were watered regularly still transplanting of seedling in the field. Seedlings were allowed to grow up to 30 days and then transplanting was done in the experimental plot. The uniform size, healthy and 30 days old seedlings were selected for transplanting. The seedlings were transplanted on raised bed by planting of one healthy seedling hill-1 at the spacing of 50 cm x 40 cm distance. The recommended dose of fertilizer (100: 50: 50 kg NPK ha-1) was applied to all the plots in the form of urea, single super phosphate and muriate of potash. Out of this, full dose of P and K and 1/2 dose of nitrogen was applied at the time of transplanting. The remaining 1/2 dose of nitrogen was applied at 30 days after transplanting.

Micronutrients were applied as per treatment. For each treatment 100 ppm were sprayed on the foliage of the plants during vegetative stage, flower initiation stage and 2 times at blooming by a mini hand sprayer. Pruning operation was carried out at 20 days after transplanting (DAT). And 30 after transplanting (DAT) shoot pruning was done with remaining four shoot in a plant with a sharp knife and in case of no pruning it was allowed normal growth of a plant.

Observations on growth parameters viz., plant height were recorded at 90 DAT, and leaf area were recorded also chlorophyll content in leaves and quality parameters viz., vitamin C content of Sweet pepper.

Results and Discussions

Flowering parameters

The data presented in table 1 revealed that, the treatment (M_1P_2) Chelated Zinc 0.2% + Pruning at 30 days after transplanting (T_2) recorded significantly maximum days to 1^{st} flowering (60.05 %) and it was found statistically at par with the treatment (M_2P_2) Chelated Fe 0.2% + Pruning at 30 days after transplanting (59.63 %). However, significantly minimum days to flowering (48.59%) obtained by the treatment i.e. M_1P_1. The possible reason might be due to the fact that micronutrients is an essential element found in the meristematic regions of plants such as root tips, emerging leaves and buds. Flowering of the plant is the reproductive phase of the plant life. Health of plant is affected by the availability of nutrients to the plant. Similar result was also notified by Kumari *et al.*, (2017) in capsicum.

As regards days to number of flowers for the treatment (M_4P_1) Chelated Cu 0.1% + Pruning at 20 days after transplanting took significantly minimum number of flowers (60.94) and it was found statistically at par the treatments (M_6P_1) Chelated Mix 0.2% + Pruning at 20 days after transplanting (62.14). However, significantly maximum days were required (65.03) for number of flowers with the treatment (M_1P_2) Chelated Zn 0.2% + Pruning 20 days after transplanting. Number of flowers and fruits were affected by pruning and. This may be due to fact that cultivars used varied in their genetic make-up. Temperature variation during the experiment could have also affected the number of flowers and fruits a plant can produce. Temperature could have caused flower and fruit abortion during data collection. Above findings were confirmed by Sowley *et al.,* (2013) in tomato.

Fruit parameters

The data presented in table 1 revealed that, the treatment (M_1P_2) Chelated Zinc 0.2% + Pruning at 30 days after transplanting had produced significantly the maximum diameter of fruit (8.38 cm) and it was found to be at par with the treatments (M_2P_1) Chelated Fe 0.2% + Pruning at 20 days after transplanting (7.12 cm), (M_2P_2)

Chelated Fe 0.2% + Pruning at 30 days after transplanting (6.52 cm), whereas, significantly minimum diameter of fruit (6.93 cm) was recorded with the treatment (M_1P_1) Chelated Zinc 0.2% + Pruning at 20 days after transplanting. Maximum fruits diameter was might be due to zinc and boron as these act as catalyst in the oxidation and reduction process and in sugar metabolism which might have increased fruit diameter. The present finding was in accordance with the result of Singh, Madhu *et al.,* (2017) in capsicum.

As regards length of fruit the treatment (M_1P_2) Chelated Zinc 0.2% + Pruning at 30 days after transplanting had produced significantly maximum length of fruit (12.38 cm) and it was found to be at par the treatment (M_6P_2) Chelated Mix 0.2% + Pruning at 30 days after transplanting (11.23 cm). However, significantly minimum length of fruit (10.93 cm) was recorded with the treatment (M_1P_1) Chelated Zinc 0.2% + Pruning at 20 days after transplanting. Maximum fruit length might be due to involvement of zinc micro nutrients in cell division and cell expansion, involvement of boron on synthesis of metabolites and rapid translocation of photosynthetic and mineral iron from other parts of the plant to developing fruit The similar result was also reported by Singh *et al.,* (2017) in capsicum.

As regards number of fruit per plant the treatment (M_1P_2) Chelated Zinc 0.2% + Pruning at 30 days after transplanting showed significantly maximum number of fruit per plant (40.77) and it was found to be at par with the treatments (M_6P_2) Chelated Mix 0.2% + Pruning at 30 days after transplanting (38.93). Whereas, significantly minimum number of fruit (35.06) was recorded with the treatment (M_4P_1) Chelated Cu 0.2% + Pruning at 20 days after transplanting. This is may due to increased number of fruits due to foliar spray of micronutrients might be attributed to enhanced photosynthetic activity, resulting in increased production and accumulation of carbohydrates and favorable effect on vegetative growth and retention of flowers and fruits, which might have increased number and weight of fruits. Increased number of fruits in response to micronutrients (B, Zn and mixture). Above finding were confirmed by Pandav *et al.,* (2016) in brinjal.

Table.1 Flowering, fruiting and fruit yield influenced by micronutrient and pruning

Treatment	Days to 1st flowering	Number of flower	Number of fruit	Fruit setting (%)	Diameter of fruit (cm)	Length of fruit (cm)	Fruit weight (g)	Fruit yield/ plant (g)	Fruit yield/ plot (kg/m^2)	Fruit yield/ha (ton)
Factor - A (Micronutrient)										
M1	54.37	63.48	38.36	60.37	7.65	11.65	119.86	4603.19	55.23	34.51
M2	57.14	62.29	36.62	58.78	6.82	10.82	118.62	4344.83	52.13	32.57
M3	55.98	61.85	36.06	58.29	7.16	11.16	118.06	4258.10	51.09	31.93
M4	54.95	61.97	36.05	58.15	6.67	10.67	118.05	4258.07	51.09	31.76
M5	53.15	62.81	37.51	59.86	6.59	10.59	118.91	4466.25	53.58	33.48
M6	54.32	63.06	37.40	59.27	7.00	11.00	118.90	4450.61	53.38	33.36
SE+_	**0.014**	**0.262**	**0.267**	**0.307**	**0.214**	**0.214**	**0.276**	**41.67**	**0.498**	**0.312**
CD at 5% level	**0.042**	**0.772**	**0.787**	**0.907**	**0.632**	**0.632**	**0.815**	**123.02**	**1.470**	**0.921**
Factor – B (Pruning)										
P1	59.93	61.77	35.89	58.15	6.66	10.66	117.89	4232.13	50.78	31.73
P2	57.04	63.39	38.11	60.09	7.299	11.299	119.581	4561.56	54.72	34.14
SE+_	**0.008**	**0.151**	**0.154**	**0.177**	**0.124**	**0.124**	**0.159**	**24.06**	**0.287**	**0.180**
CD at 5% level	**0.24**	**0.446**	**0.455**	**0.524**	**0.365**	**0.365**	**0.471**	**71.02**	**0.849**	**0.532**
Interaction (M x P)										
M_1P_1	48.69	61.93	35.95	58.03	6.933	10.93	117.95	4240.38	50.88	31.79
M_1P_2	60.05	65.03	40.77	62.71	8.380	12.38	121.77	4966.00	59.58	37.24
M_2P_1	54.65	62.00	36.39	58.68	7.12	11.12	118.39	4309.36	51.71	32.31
M_2P_2	59.63	62.58	36.85	58.88	6.52	10.52	118.85	4380.31	52.55	32.84
M_3P_1	56.32	61.70	36.03	58.38	6.94	10.94	118.03	4253.01	51.03	31.89
M_3P_2	55.63	62.00	36.09	58.20	7.38	11.38	118.09	4263.18	51.15	31.96
M_4P_1	55.30	60.94	35.06	57.52	6.12	10.12	117.06	4104.42	49.24	30.77
M_4P_2	54.60	63.00	37.05	58.79	7.22	11.22	119.05	4411.72	52.93	32.75
M_5P_1	51.28	61.90	36.05	58.57	6.12	10.12	118.05	4256.17	51.06	31.91
M_5P_2	55.03	63.73	38.97	61.15	7.06	11.06	119.77	4676.33	56.11	35.06
M_6P_1	51.34	62.14	35.87	57.72	6.76	10.76	117.87	4229.43	50.74	31.71
M_6P_2	57.29	63.99	38.93	60.82	7.23	11.23	119.93	4671.80	56.02	35.01
SE+_	**0.020**	**0.370**	**0.377**	**0.435**	**0.303**	**0.303**	**0.391**	**58.94**	**0.704**	**0.441**
CD at 5% level	**0.059**	**1.092**	**1.113**	**1.283**	**0.893**	**0.893**	**1.153**	**173.98**	**2.079**	**1.303**

M_1 - Chelated Zn (0.2%), M2 - Chelated Fe (0.2%), M3- Chelated Bo (0.1%), M4- Chelated Cu(0.1%), M5-Chelated Mn(0.2%), M6- Chelated Mix (0.2 %), P1- Pruning (20 DAT), P2 - Pruning(30 DAT).

Data regarding fruit weight are presented in table 1. The treatment (M_1P_2) Chelated Zn 0.2 % + Pruning at 30 days after transplanting took significantly maximum fruit weight (121.77 g). The average value for the trait was the maximum under zinc spray. Average fruit weight also exhibited the beneficial effect of micronutrient spray over control. Improvement in the fruit weight and size due to spray of micronutrients may be attributed to the role of these elements in the plant nitrogen metabolism, carbohydrate metabolism and translocation of photosynthates. The similar result was also notified by Agarwal *et al.,* (2018) in capsicum.

The data presented in table 1 revealed that, the treatment (M_1P_2) Chelated Zinc 0.2% + Pruning at 30 days after transplanting had produced significantly the maximum fruit setting (62.71 %) and it was found to be at par with the treatments (M_5P_2) Chelated Mn 0.2% + Pruning at 30 days after transplanting (61.15 %), whereas, significantly minimum fruit setting (57.52 %) was recorded with the treatment (M_4P_1) Chelated Cu 0.2% + Pruning at 20 days after transplanting. This is may due to chelating agent and regulates availability of metabolic micro-nutrients to plants. The present finding s are in accordance with the result of Jamir, Tajungsola *et al.,* (2017) in capsicum.

Yield parameters

The data presented in table 1 revealed that, the number of fruit plant^{-1} were noticed significantly maximum (4966.00 g) with the treatment (M_1P_2) Chelated Zinc 0.2% + Pruning at 30 days after transplanting which was found to be at par with the treatments (M_6P_2) Chelated Mix 0.2% + Pruning at 30 days after transplanting (4671.80 g). While, significantly minimum number of fruit plant^{-1} (4240.38 g) were noted with the treatment i.e. (M_1P_1) Chelated Zinc 0.2% + Pruning at 20 days after transplanting. Fruit yield calculated on per plant and per hectare basis, was significantly affected by micronutrient treatments application of micronutrients produced the maximum fruit yield followed by retention of flowers and fruits, which might have increased the number and weight of fruits. Increased yield in response to micronutrients (B, Zn and mixture).The similar result was also reported by Purna Datta Reddy (2018) in capsicum.

Fruit yield plant^{-1} (4966.00 g), fruit yield plot^{-1} (59.58 kg/m^2) and fruit yield ha^{-1} (37.24 t/ha) was found to be maximum with the treatment of Chelated Zinc 0.2% + Pruning at 30 days after transplanting (M_1P_2). The micronutrients spray, two sprays of zinc (100ppm) or boron (100ppm) were found best under greenhouse conditions for obtaining higher yield and quality of capsicum irrespective of the variety. Interaction effects of micronutrients to variety were significant for marketable traits of capsicum. Above finding are in accordance with result of Agarwal, Ankur *et al.,* (2018) in capsicum.

References

Anonymous, 2018. Horticultural statistic at a glance 2017. http://www.agricoop.nic.in

Dasgan, Y. H and Abak, K. (2003) Effect of planting density and number of shoot on yield and fruit characteristics of pepper grown in glasshouse. Turkey J. Agric. Forest., (27): 67-73.

G.Purna Datta Reddy., Syam Sunder Reddy P., Chandramohan Reddy G. and Thanuja Sivaram G. (2018) Effect of Foliar Application of Micronutrients on Growth and Yield Parameters in

Tomato (*Solanum lycopersicon* L.) Int. J. Pure App. Biosci, 6 (2): 929- 934.

Kumari, Sarika., Das, Asim., Devi, Rajkumari Asha., Chattopadhyay, Sankhendu Bikash And Kulshreshtha, Shubham Kumar. (2017) effect of transplanting date and micronutrient for quality and sustainable production of capsicum varieties under protected condition. International Journal of Agriculture Sciences, 9(15) :4097-4100.

Pandav, A.K., Nalla, Manoj Kumar., Aslam. T., Rana, M. k and Bommesh, J.C (2016) Effect of Foliar Application of Micronutrients on Growth and Yield Parameters in Eggplant cv HLB 12. Environment & Ecology 35 (3): 1745 - 1748.

Singh, Madhu., Ameta, K.D., Dubey, R.B., Meena, N.L., Meena, Somendra and Lal, Shankar (2017) Effect of Humic Acid and Micro Nutrients on Growth and Yield of Poly House Grown Capsicum (*Capsicum annum* L.) Chem. Sci Rev Lett, 6(22):1189-1193. (2)

Sowley, E. N. K, and Damba, Y (2013) Influence Of Staking And Pruning On Growth And Yield Of Tomato In The Guinea Savannah Zone Of Ghana. International Journal of Scientific & Technology Research, 2(12).

Agarwal, Ankur (2018) Growing Environments and Micronutrients Application Influence Fruit and Seed Yield of Capsicum (Capsicum Annum).Nutrition and food science International Journal, 5(1).