

Original Research Article

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Studies on the Effect of Pruning on Cucumber cv. Malini Grown Under Protected Conditions

D. Shivaraj^{1*}, D. Lakshminarayana², P. Prasanth³ and T. Ramesh³

¹Department of Vegetable Science, ²Department of Floriculture and Landscaping, College of Horticulture, Mojerla, SKLTS Horticultural University, Rajendranagar, Hyderabad – 500032, India

³Department of Crop Physiology, College of Agriculture, PJTS Agricultural University, Rajendranagar, Hyderabad – 500032

*Corresponding author

ABSTRACT

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An investigation was conducted to study the effect of Pruning and Training systems on Cucumber cv. Malini grown under protected conditions. The whole experiment was arranged over 12 treatments consisting of 4 levels of Pruning, P₁ (Removal of flower buds up to 45cm), P₂ (Removal of flower buds up to 60cm), P₃ (Removal of flower buds up to 75cm) and P₄ (No Pruning). The characters like vine length, leaf area, days to first flowering, days to first harvest, number of fruits per vine, fruit length, fruit diameter etc. were significantly influenced by pruning systems. The significant differences for vine length and leaf area were observed among various treatments and P₂ recorded high value for these characters which was at par with P₃ and P₁. P₂ registered significantly highest number of fruits per plant (23.77), higher yield per vine and per hectare (6.40 kg and 141.68 t/ha) having statistically similar results with that of P₃.

Introduction

Cucumber (*Cucumis sativus* L.) is one of the most important and popular vegetable crops grown extensively throughout the tropical and subtropical region of the world. It belongs to the family cucurbitaceae and is native to Southern Asia (Adams *et al.*, 1992). Cucumber is a truly versatile vegetable because of wide range of uses from salads to pickles and digestive aids to beauty products (More, 2015). It is one of the most preferred

vegetables grown under protected conditions in the world. Its demand is throughout the year because of its popular use. Cucumber, being a high value low volume crop, its exploitation on commercial scale in naturally ventilated polyhouse can improve productivity and generate good income to the growers. These technologies are highly suitable for the states like Telangana where government is coming with certain schemes for increasing the socioeconomic status of small farmers through high profitability.

Greenhouse growers often encounter various problems regarding agronomical aspects of the crop. Being a profusely and fast growing plant cucumber plant needs manipulation in its architecture through pruning and training for getting maximum yields of good quality. Pruning of leaves, side branches and flower buds contribute to the ultimate yield in many ways. A dense canopy of leaves shades the fruits causing them to pale. These excess leaves are pruned and sufficient number of leaves is maintained on the plant. Excess pruning may sometimes causes the plants cease flowering. Therefore it is important to maintain sufficient foliage on the plant for adequate rates of photosynthesis (Premalatha *et al.*, 2006). So the investigation was aimed to study the effects of pruning on cucumber grown under protected conditions

Materials and Methods

A Cucumber variety Malini (Smenes Ltd., India) popular among the cucumber growers in Telangana was taken for the investigation during November, 2016. The experiment was conducted under shade net of 357 m² at Vegetable Research Block, College of Horticulture – Mojerla, SKLTS Horticultural University, Hyderabad (Telangana) situated at 78° 29' East longitude and 17° 19' North latitude with an altitude of 542.3 m above the mean sea level. The location is characterized by semi arid climate.

The whole experiment was arranged over 12 treatments consisting of 4 levels of pruning P₁ (Removal of flower buds up to 45cm), P₂ (Removal of flower buds up to 60cm), P₃ (Removal of flower buds up to 75cm) and P₄ (No Pruning). Seeds were sown in triangular method and the description of pruning treatments is as follows. In the pruning treatments P₁, P₂, P₃ all the flower buds, lateral branches are pruned up to heights of 45cm, 60cm and 75cm respectively. In the

pruning treatment P₄ the plants are left unpruned. The experiment was laid out in a Randomized Complete Block Design (Factorial concept) with three replicates on raised beds having dimensions of 100 x 40 x 50 cm (width, height & distance between two beds) and plot size of 21m. The data on various parameters *viz.*, vine length, leaf area, days taken to first flowering, days taken to 50% flowering, days taken to first harvest, number of fruits per vine, fruit length, fruit diameter, fruit weight, fruit yield per vine, fruit yield per plot, fruit yield per hectare, marketable yield, and deformed fruits were recorded on five randomly tagged plants and the mean values were subjected to statistical analysis as per Panse and Sukhatme (1985).

Results and Discussion

The data pertaining to various yield and yield contributing traits used for evaluation of the treatments were statistically analyzed to test their significance and results of these data have been given in tables 1 and 2.

Vegetative and fruit parameters

The plant height and leaf area at all the intervals of growth period of crop were significantly higher in treatment P₂. The highest vine length was reported in P₂ treatment (291.80) and is on par with P₃ and P₁ at 90 DAS. Similarly the highest leaf area is also reported in P₂ treatment (636.04) and is on par with treatment P₁. The highest vine length may be due to the diversion of nutrients to main shoot, resulted in exposure of pruned plant to light conditions, enhanced higher photosynthetic activities. These results were in accordance with that of Suthar *et al.* (2007). The maximum leaf area might be due to better interception of sunlight into canopy structure. Similar results were reported by Hao *et al.* (2010). Among different treatments of pruning, P₂ took significantly lowest

number of days to first flowering (30.90) and first harvest (46.66) which was at par with treatment P₁ for days to first harvest only. This may be due to the highest vine length and leaf area which supplemented assimilates required and promoted early flowering and early harvest is due to the early flowering of that treatment. The present findings are comparable with that of Suthar *et al.* (2007) and Hong (2000).

The significant variation for number of fruits per vine fruit length and diameter were recorded by P₂ treatment which was on par with treatment P₃ for number of fruits per vine only. But for the parameters fruit length and fruit diameter P₂ is at par with treatments P₁ and P₃. This might be due to the maximum leaf area of this treatment which lead to enhanced photosynthetic activities and their accumulation.

The parameter fruit weight also got affected by the effect of pruning treatments significantly. The highest fruit weight was recorded in P₁ (274.02 g) and it is at par with P₂ and P₃. This might be due to less fruit number, average fruit length, and diameter. These findings are in line with the reports of Vikram kumar *et al.* (2017).

Yield parameters

Various levels of pruning imparted significant influence on total yield per vine (kg). Maximum yield was recorded in P₂ (6.40 kg) and it was on par with P₃. The results related to parameters fruit yield per plot, yield per hectare and marketable yield were significant. Maximum yield for those parameters were reported in P₂ (70.14 kg, 141.68 t/ha and 137.15 t/ha respectively). And they were on par with P₃ for fruit yield per plot and per hectare and not for marketable yield. Pruning also shown significant effect on parameter deformed fruits which are expressed in percentage. Lowest percentage of deformed fruits is reported in P₂ (3.21 %) and it was at par with P₃. These results are due to the longest vine length, maximum leaf area, more number of fruits per vine, higher fruit length and diameter of the treatment as compared to others. These results are in conformity with the findings of Suthar and Ram (2006) and Bhatia *et al.* (2012). The highest marketable yield is due to the pruning methods followed which allowed the fruits to expose to light conditions and resulted in production of healthy fruits. The results were inconsistent with the reports of Hao *et al.* (2010).

Table.1 Effect of pruning on vegetative traits of cucumber under protected conditions

Treatment	Vine length at 30 DAS (cm)	Vine length at 60 DAS (cm)	Vine length at 90 DAS (cm)	Leaf area at 30 DAS (cm ²)	Leaf area at 60 DAS (cm ²)	Leaf area at 90 DAS (cm ²)	Days taken to first flowering	Days taken to 50% flowering
P ₁	93.08	202.30	289.00	347.40	485.50	625.96	31.70	36.60
P ₂	100.17	210.05	291.80	348.50	500.03	636.04	30.90	36.20
P ₃	101.20	204.09	290.87	345.90	492.60	634.32	31.80	36.40
P ₄	88.67	197.45	281.34	340.50	479.90	601.84	32.30	36.70
SEm ±	1.37	0.56	1.90	1.92	2.63	0.63	0.15	0.14
CD at 5 %	S	S	S	S	S	S	S	NS

P₁ = Removal of flowers up to 45 cm, P₂ = Removal of flowers up to 60 cm, P₃ = Removal of flowers up to 75 cm and P₄ = No pruning

Table.2 Effect of pruning on fruit and yield attributes of cucumber under protected conditions

Treatment	Days taken to first harvest	Number of fruits per vine	Fruit length (cm)	Fruit diameter (cm)	Fruit weight (g)	Fruit yield per vine (Kg)	Fruit yield per plot (Kg)	Fruit yield per hectare (t/ha)	Marketable yield (t/ha)	Deformed fruits (%)
P ₁	46.98	20.11	20.54	5.51	274.02	5.49	59.90	121.02	119.73	4.44
P ₂	46.66	23.77	20.85	5.61	272.54	6.40	70.14	141.68	137.15	3.21
P ₃	47.42	22.22	20.62	5.58	262.09	5.80	63.50	128.26	123.36	3.96
P ₄	48.83	21.22	19.03	4.86	232.74	4.88	53.90	108.88	101.93	6.50
SEm ±	0.17	0.72	0.31	0.10	10.72	0.20	2.26	4.56	4.22	0.25
CD at 5 %	S	S	S	S	S	S	S	S	S	S

P₁ = Removal of flowers up to 45 cm, P₂ = Removal of flowers up to 60 cm, P₃ = Removal of flowers up to 75 cm and P₄ = No pruning.

In conclusion most of the traits under investigation were influenced by effect of pruning methods. The treatment P₂ resulted in maximum gain in yield under protected conditions, which was statistically comparable with P₃. The excellent performance of cucumber is a result of congenial microclimate inside the shade net, high yield potential of cucumber supplemented with recommended fertigation dose in properly pruned plants. Therefore, it can be concluded that cultivation of cucumber under shade net is highly profitable through pruning of plants up to 60 cm.

References

Adams, P., Graves, C.J. and Winsor, G.W. 1992. Some responses of cucumbers, grown in beds of peat to N, K and Mg. Hort Science 67: 877– 84.

Ali, M.R., Halim, G.M.A. and Mehraj, H. 2016. Stages of vine pruning for vine production of bottle gourd varieties and lines in summer season. Journal of Bioscience and Agriculture research. 09: 792.795.

Al-Obeid, S. 2007. Effect of growth

techniques (pruning method) on the production of cucumber grown in greenhouses. Arab University Journal of agriculture science. 15(1): 19-27.

Arora, S.K., Pandita, M.L. and Sidhu, A.S. 1982. Effect of Pruning on vegetative growth, flowering and Yield of round melon (*Citrullus vulgaris* Var. Fistulosus) Var. Hissar Selection. Indian Journal of Horticulture. 39: 224-229.

Bhatia, A.K., Batra, V.K. and Singh, V.P. 2012. Performance of gynoecious hybrids of cucumber under plastic greenhouse. High value vegetables in Southeast Asia: Production, Supply and Demand (SEAVEG) Report.

Duong, H.X. 1999. Effect of pruning on yield and quality of cucumber. AVRDC Training Report . 51.

Ekwu, L.G., Nwokwu, G.N. and Utobo, E.B. 2012. Effect of mulching materials and pruning on growth and yield of cucumber (*Cucumis sativus* L.). International Journal of Agriculture and Rural Development. 15(2): 1014-1021.

Hao, X., Wen, G., Papadopoulos, A.P. and Khosla, S. 2010. A twin-head “V” High-wire greenhouse Cucumber production

- system for reducing crop start-up costs. Hort Technology. 20(6): 963-970.
- Hong, Q. 2000. Effect of pruning and spacing on yield and quality of cucumber. AVRDC Training Report, China. 7
- Hoza, G. 2013. Research regarding the influence of various pruning systems at cornichon Cucumber cultivated in solarium. Journal of horticulture, Forestry and Biotechnology. 17(1): 219-222.
- More, T.A. 2015. Cucurbitaceous Vegetables (Cucumber). Textbook of Vegetables, Tuber and Spice crops. 254-261.
- Okafor, C.G. 2007. Effect of staking and pruning on the vegetative growth and yield of Cucumber. Unpublished undergraduate project. Ebonyi State University, Abakaliki. 95.
- Panse, V.G and Sukhatme, P.V. 1985. Statistical methods for agricultural workers. Indian Council of Agricultural Research, New Delhi, India.
- Premalatha, M.G.S., Wahundeniya, K.B., Weerakkody, W.A.P. and Wicramathunga, C.K. 2006. Plant training and spatial arrangement for yield improvements in greenhouse Cucumber (*Cucumis sativus* L.) varieties. Tropical Agricultural Research. 18: 346-357.
- Sibgolab Khoshkam. 2016. The effect of pruning and planting density on yield of greenhouses cucumber in jiroft. International Journal of Scientific Engineering and Applied Science. 2: 212-227.
- 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: 103 – 108.
- Suthar and Ram, M. 2006. Effect of pruning and ethrel application on vegetative growth and fruit yield of Cucumber under greenhouse condition. Haryana Journal of Horticultural Sciences. 35: 92-95.
- Suthar, M.R., Arora, S.K., Bhatia, A.K., Singh, V.P. and Malik, T.P. 2007. Effect of pruning and ethrel application on flowering behavior of Cucumber (*Cucumis sativus* L) under polyhouse conditions. Haryana Journal of Horticultural Sciences. 36: 135-138.
- Vikram, K.K., Ameta, K.D., Suresh kumar, T., Akshay,C., Suman, G. and Satveer yadav. 2017. Effect of spacing and training on growth and yield of polyhouse grown Cucumber (*Cucumis sativus* L.). International Journal of Current Microbiology and Applied Sciences. 6(8): 299 – 304.

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