

Training and Pruning in Cucurbitaceous Vegetables: Application and its Impact

Sudheer Kumar Yadav¹, Udit Kumar^{2*}, K. Prasad³, Ajay Kumar⁴ and Anushruti¹

¹Department of Horticulture, Babasaheb Bhimrao Ambedkar University, Lucknow

²Department of Horticulture, PG College of Agriculture, RPCAU, Pusa

³Department of Horticulture, Tirhut College of Agriculture-Dholi, RPCAU, Pusa

⁴Division of Fruit Crops, ICAR-IIHR, Bengaluru

Corresponding Author

Udit Kumar

Email: udit@rpcau.ac.in



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ABSTRACT

The cucurbitaceous crops are traditionally cultivated horizontally on the ground surface in summer and rainy season. The more number of insect-pests and disease incidence occur in summer and rainy season cause reduction in fruit yields as well as deteriorate the fruit quality. By nature of the cucurbitaceous crops is a weak climber and needs proper support for its growth, development, pollination and fruiting. Training and pruning is an approach to increase the fruit yield per unit area, improved fruit quality as well as reduces the insect-pest and disease incidence. Training and pruning maintain relationships between vegetative and reproductive growth with the objective of obtaining more no of female flowers and fruiting. The production of quality seeds is problematic during rainy season due to several factors like poor pollination, fruits rots, and rudimentary seed developments. The increase in number of tertiary branches due to pinching favoured the production of higher number of female flowers in the basal nodes due to arrest in apical dominance to check and reduce the auxin level in terminal shoots and divert in to auxillary shoots to increase higher rate of source and sink. Now days, training and pruning method is becoming more relevant in the present scenario, to cope up with the major challenges faced by the farmers.

INTRODUCTION

Cucurbitaceae is the largest family in vegetable crops. Cucurbits comprise 117

genera and 825 species. Higher productivity is also observed in trailing is due to increase in the

photosynthesis. Sunlight is utilized by maximum number of leaves and higher number of side branches resulting in enhanced assimilation of carbohydrates caused to increase in yield. To increase the productivity of the crop, it is essential to standardize the agro techniques such as trailing of vines to modify the fruit set and fruit yield. Trailing of vines over pendal or telephone wire at a height of around 1.5-2.0 m plays an important role in growth and quality of the fruits. The production of qualitative fruits during rainy season affected by several factors like poor pollination, fruits rots, and rudimentary seed developments. That's why the crop should be staked or trailed on pendals or telephone wire to prevent the crop from direct contact with the soil and to get better quality fruits. Farmers sometimes allow the vines to trail on the ground leading to the production of fruits with yellow bellies, overcrowding of vines and subsequently the attack by mould due to high humidity. Staking of watermelon shows enormous disparity and difference over un staked one, as a result of avoiding competition, overcrowding and correct exposure or positioning of watermelon leaves to sunlight for effective photosynthetic activities that will enhance fruiting (Pradhan et al., 2021).

Therefore it is concluded that pruning method is beneficial to the farmers for higher production and quality vegetable production and also therefore it is recommended that vegetable grower farmers should adopt pruning practices to obtain higher marketable yields that will fetch them good prices. However it is imperative to gain sound knowledge of training and pruning in vegetable crop with a careful consideration of suitable training and pruning methods, intensity, growth stages and crop season in respect of a particular vegetable crop in order to obtain the desired yield and quality attributes (Thakur et al., 2018).

Training– The judicious removal of plant part for proper shape and size and capable heavy crop lode. The growing of plant over different training system in respect to give specific shape and structure of plant. Trailing and staking is done to increase yield, better exposure of plant to sunlight and ventilation and increases fruit yield, reduces the proportion of unmarketable fruit, enhances the production of high quality fruits, prevent diseases of fruit rot, utilized the ground space for Inter cropping, allows better aeration and exposes the foliage to sunlight for photosynthetic activities. Due to its considerably high yields, ease in cultivation, steady market demand and export potential, bitter gourd has gained commercial importance and thus it is considered the commercial vegetable of the state. Till now the traditional method is being followed to cultivate bittergourd i.e., sowing the seeds in furrows opened at a wider distance and training the vines on the ground. Limited attempts are being conducted to grow the vines with the help of some supports. Some of the well-versed cultivators do train the vines on either kniffin or bower (Bhanuprakash and Sankari, 2021).

Pruning - Judicious removal of plants parts like leaf, flower and fruits etc. to obtain good and qualitative yield. Pinching is a kind of pruning which encourages tertiary sprouts in the plant. In this method the tips of main branch are cut down when the plant is very small, this operation encourages secondary and tertiary branches and improve the balance between vegetative and reproductive growth to enhance production. A good pruning system deals with the removal of the side shoots up to the first flower appearance, allowing two branches to expand from the terminal flower node, followed by periodic removal of shoots from the inner part of the plant. And removal of the oldest suffices to allow good air exchange and a balanced framework of

plants (Tomar et al., 2022). A plant of this group bears so many branches but all are not able to bear fruits. So, it is necessary to remove the branches from main stem for better flowering and fruiting. The excellent performance of cucumber was observed in properly pruned plant up to 60 cm as a result of congenial microclimate inside the shade net giving high yield potential of cucumber supplemented with recommended fertigation dose.

Application of training and pruning in cucurbits crops

Cucumber: Cucumber requires a support system to grow vertically by means of its tendrils. The plants are trained upwards retaining two branches for better interception of light. The strings are hang down from wire stretched at height of 1.5 to 2.0 m. The main stem is pruned to 25 cm and two sturdy laterals are allowed to grow. Weak and unproductive lateral branches should be removed. The older leaves that are touching the ground surface are removed periodically in order to diminish the fungal infections and pest accumulation. Leaves are retained to a length of about 1.5 – 2.0 m on the stem from the growing tip at any stage of growth. In parthenocarpic cucumber varieties, one single stem is allowed from the starting of the plant and the fruits are allowed on the main stem only (Tomar et al., 2022).

Watermelon: The main stem watermelon is trained vertical along with 3-4 strong branches with the help of strings. The first female flower is pinched off if it develops below 8-10 nodes on the main stem. 2-3 fruits are allowed to develop between 12 to 25 nodes. Growing tip of each branch after 2nd or 3rd node is pinched off. For small-fruited cultivars, 4-5 fruits are allowed to develop per plant. A support is provided to the

developing fruits using nylon net bags if the insect pollination has been used in the protected structures (Tomar et al., 2022).

Muskmelon: In muskmelon, the single stem training is the common and plants are trained upright. All the branches below 6-8 nodes are removed and the female flowers are retained on branches emerging from 9 to 16 nodes on the main stem. The tips of the branches are pinched off after fruit set by retaining 2-3 leaves per branch. The top of main stem is pinched out after 25 nodes.

Bottle gourd: Alia and Mehrajc 2016. Studies on Four bottle gourd varieties and lines (V1: BARI Lau-3, V2: BARI Lau-4, V3: LS 0012-5-3 and V4: LS 0026-5-3) and three pruning stages (P1: Pruning at two vine stage, P2: Pruning at 3 vine stage and P3: Pruning at 4 vine stage) were implied to observe the effect of pruning on the maximization of vine production in bottle gourd. V4 produced maximum number of vine (117.2/plant) and highest vine yield (10.2 t/ha) among four varieties while P3 produced maximum number of vine (109.2/plant) and highest vine yield (9.1 t/ha) among three pruning techniques. The maximum number of harvested vine (118.0/plant) and highest vine yield (10.73 t/ha) was found from V4P3 which was statistically followed by V4P1 and the lowest vine yield was recorded from V2P1 (6.62 t/ha). LS 0026-5-3 along with pruning of terminal shoots four vine stages can be recommended for better vine production in bottle gourd for use as leafy vegetable. Naafe et al., 2022 revealed that On the basis of Influence of pinching on growth and yield of bottle gourd and find Bottle gourd varieties Lauki and CO1 hybrid are better in term of yield whereas pinching at 3rd node stage is good practice for getting better growth and yield of bottle gourd.

Summer Squash (*Cucurbita pepo*)-In summer squash, the main stems and branches are short, thus for making the plant bushy any training and pruning are not required. However, the older leaves are removed for proper aeration (Tomar et al., 2022).

Winter Squash (*Cucurbita maxima*) - In winter squash, the stems are long and needs upright training. The main stem is pinched off at 4 nodes and allowing two strong branches to develop. Two fruits are allowed on each branch between 12-16 nodes. The main branches are pinched off at 30 nodes. A support is provided with a nylon net bag to each developing fruit (Tomar et al., 2022).

CONCLUSION

In India cucurbits are grown during rainy and summer season and it suffer from many insect pest and disease infestation. The relevant literature pertaining to the training and pruning on the vegetative growth and yield of cucurbits. Trained vines are less affected by fruit fly and downy mildew as well as give maximum yield

per hectare compare to untrained plant. Growing of different shade loving crops likes turmeric, ginger under shade of different training system. Selection of different short duration vegetable crops as inter crops under trellis.

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