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EFFECT OF PRUNING AND ETHREL TREATMENT IN CUCUMBER (*Cucumis sativus*)

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Abstract

Cucumber, being a high value low volume crop, its exploitation on commercial scale in open space can improve productivity and generate good income to the growers who are unable to facilitate greenhouses. 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 yield 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 cause the plants to cease flowering. Therefore, it is important to maintain sufficient foliage on the plant for adequate rates of photosynthesis. Application of plant growth regulator, Ethrel is used to increase the female flowers which ultimately contribute to higher fruit yield.

Introduction:

Cucumber (*Cucumis sativus*) is one of the most important and popular vegetable crop grown extensively throughout the tropical and subtropical region of the world. It is an annual vine having trailing or climbing habit. Its fruits vary in shape, size, color and quite nutritious. The immature fruits are used as salad and for making pickles as well. Fruits consumed raw are considered good for avoiding constipation, jaundice and indigestion.

How does it work?

Pruning of lateral branches of cucumber plants has given encouraging results in terms of earliness and higher fruits yield. It is a popular operation best known to the farmers now a day. Besides this, plant growth

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regulators, when applied at appropriate growth stages, have increased the number of pistillate flowers (Loy, 1971).

Ethrel (2-chloroethyl phosphonic acid) popularly known as Ethephon has been used to modify the pattern of sex expression in cucumber in terms of increased number of pistillate flowers (Patil *et al.*, 1983 and Kshirsagar *et al.*, 1995).

Effect of pruning on vegetative and reproductive growth

Pruning, in horticulture, is the removal or reduction of parts of a plant, tree, or vine that are not requisite for growth or production, are no longer visually pleasing, or are injurious to the health or development of the plant. Pruning is common practice in orchard and vineyard management for improvement of flowering and fruiting.

Role of pruning is well established in increasing the yield of several vegetable crops (Mangal and Yadava 1979; Mangal *et al.*, 1981; Single *et al.*, 1982 and Arora *et al.*, 1982). A significant increase in fruit yield by pruning of the plants has been reported. Pruning of the tips of cantaloupe vines 2-$2^1/_2$ m long increased the number of fruits but there was disproportionate number of small sized fruits (Brown 1968). Sims and Gledhill(1968) observed significant difference in cucumber vine length in pruned plants over un-pruned, and clipping of plants resulted in maximum fruit set per plant. Similarly, Hartmann *et al.* (1969) reported a significant increase in length of main shoot in pruned plants than un-pruned plants in cucumber. They also found maximum fruit yield over control.

Is Pruning Cucumbers Necessary?

Pruning is necessary to keep the vines growing in the right direction. Proper pruning helps the plant produce higher yield and quality fruit. When vine is cut-off, the energy that was going into its growth is redirected elsewhere. So, if cucumber vine is putting all its energy into growing lots of stems and leaves, it's not going to be focusing on fruit development thus, by reducing the attention demanding branches, the plant gets chance to produce more fruits.

When pruning is done?

Before pruning, healthy growth of the plant is maintained, letting it grow up to 6 to 8 feet in height. Growth of any side branches, below the height of first 5 leaves in the plant, is purned. After the height is attained, the growth of side branches is allowed. Growing tip of the main branch is removed once the plant reaches 6 to 8 feet in height. This cutting of 1G branch promotes the growth of many 2G branches (Fig. 1). Once 2G branch grows up to a height of 1 to 2 feet length, then the tip of branches is removed. After few days the growth of many 3G branches appears. These branches will bear good number of female

flowers and hence, will result in increased yield.

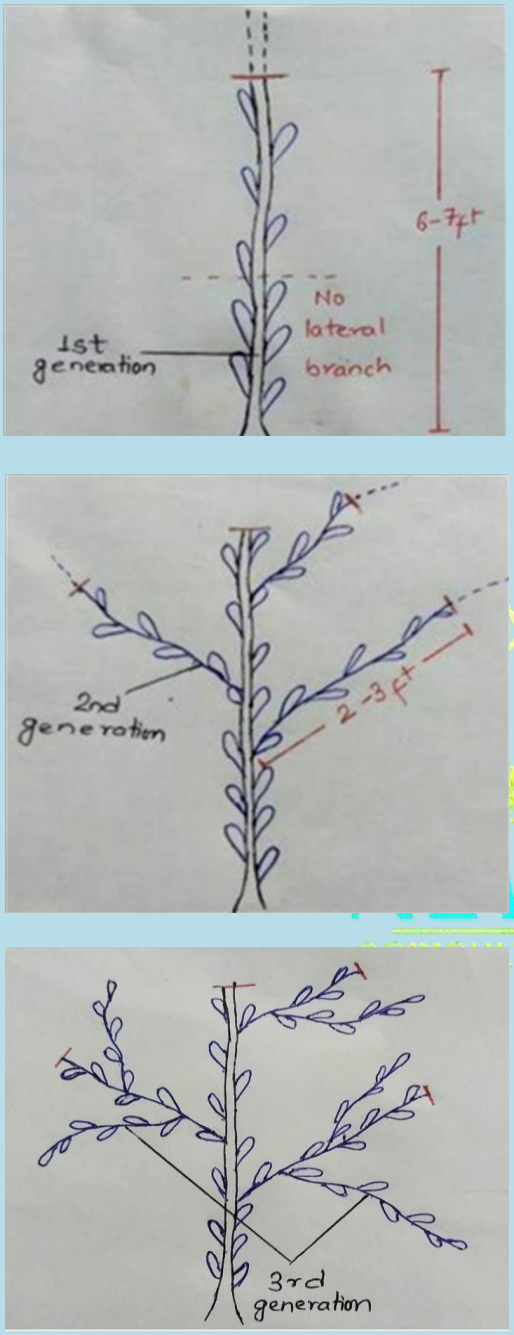

Fig. 1: Different generations of branches after pruning

How To Prune A Cucumber Plant

Pinching is done at lower 5-7 nodes on the base of the main stem. If the vines are long, then clippers should be used to avoid any damage to the main vine. A clean cut, as close as possible to the main vine, is given, If the shoots are so large that they're already hooked to the trellis, then they are left and newer stems are used. Any flower on the plant should be removed so that plant blooms on top.

Next, any leaf, vine, or fruit that is severely damaged or showing signs of disease, is removed. Vines that just won't grow in the right direction are purned as well. If the leaves are super bushy in one place, then they should be thinned out for better air circulation. Excess fruits or leaves should be purned to redirect energy.

Effect of ethrel on vegetative and reproductive growth

Ethylene is regarded as a multifunctional phytohormone that regulates both growth, and senescence. It promotes or

inhibits growth and senescence processes depending on its concentration, timing of application, and the plant species. Application of ethephon, an ethylene releasing compound, enhanced ethylene evolution and increased leaf area of mustard at a lower concentration, while inhibited at higher concentration (Khan, 2005; Khan *et al.,* 2008). Ethylene governs the development of leaves, flowers, and fruits. It may also promote, inhibit or induce senescence depending upon the optimal or sub optimal ethylene levels (Kooning's and Jackson, 1979; Khan, 2005; Pierik *et al.,* 2006).

Ethrel has been found useful to increase the number of female flower and fruit yield in cucumber. Femaleness ultimately contributes to higher fruit yield. Patil *et al.* (1983) and Kshirrsagar *et al.* (1995) reported significant increase in fruit yield of cucumber with the foliar application of ethrel. Sims and Gledhill (1969) suggested application of ethrel to induce the formation of female flowers in cucumber. Ethrel application increased female flowers and reduced male flower population. It reduced the male : female sex ratio as compared with control and produced female flowers at lower nodes (Rudich *et al.,* 1969).

Conclusion

Flowering in cucurbits is very important phase of development because fruiting and yield depends on this process. Cucumber bears unisexual flowers and sex expression is genetically controlled, but it can be modified by environmental factors and application of growth regulators thus, sex ratio of male : female flowers (1:13-15) can be increased by using some mechanical techniques and chemical practices.

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