Methods of Training and Pruning of Tomato and Cucumber Crop

EXERCISE

16.1 Methods of training and pruning in tomato

16.2 Methods of training and pruning in cucumber

OBJECTIVE:

- Hands on training and pruning in tomato and cucumber

Delivery schedule: 02 periods

Student's expectations/learning objective:

- Importance of training and pruning

- To demonstrate the training and pruning methods in tomato and cucumber.

- To compare the effect of training and pruning on yield

Handouts/material/equipment's & tools required: Paper sheet and pen to note down the instruction, secateurs, bamboo/any other stakes, polypropylene twine, wire *etc.*

Pre-learning required: Introduction to training and pruning

Introduction:

Training is done to keep shoots and fruits away from the ground. It results in reducing losses due to fruit rot and other infections. It is easy to spray the well trained plants for the control of insects and diseases. Moreover, harvesting of fruits becomes easy than the untrained plants. On the other hand, pruning is the removal of small shoots emerging in between main shoot and compound leaf of tomato. It is important to prune tomato plants (suckered) to reduce the number of branches. This makes plants more suitable for staking. Plant type also determines the amount of pruning in tomato. Properly pruned plants produce early and large fruits than non-pruned plants of the same variety.

Experiment 16.1: Methods of training and pruning in tomato

Pruning tomato plants: You have read in chapter 8 of theory about different growth habits (determinate and indeterminate) in tomato. Determinate types are not pruned. In contrary, indeterminate types are heavily pruned when trellised, moderately pruned when staked, and lightly pruned when caged.

Procedure:

Method of pruning:

- Remove shoots which are less than 4 inches in length to avoid injury to the plant.

- Early in the morning, remove a sucker either by holding it between your thumb and second finger and twist it to the side until it breaks or cut it with a secateurs.

- Do not cut suckers with a knife because there is danger of spread of viral diseases.

Pruning of side branches
Source: www.theinnovationdiaries.com
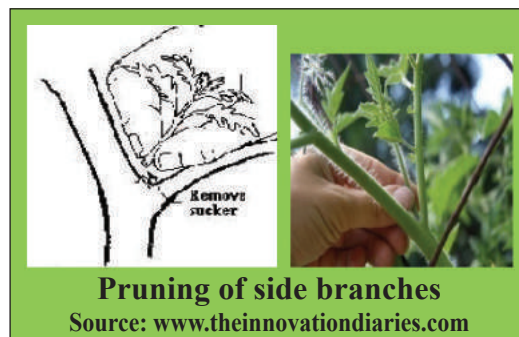
Methods of training tomato

There are three popular methods of supporting tomato plants which are mentioned as under:

1. Staking

2. Trellising

3. Caging

1. **Staking:** The standard method of one plant per stake is the most time-consuming training procedure because it requires constant pruning and tying. Amongst above mentioned three methods, staking requires minimum space per plant and is least expensive. Wooden or metal stakes 1.5-2.0 m long are required for indeterminate varieties and 1-1.25m long for determinate varieties. Wooden stakes should be at least 2.5-3.0 cm^2. On the other hand, metal stakes can be used which in general have small diameter and long life. Sections of concrete reinforce rods (rebar) make excellent tomato stakes. Raise plants at a spacing of 60-90 cm between rows and 30-45 cm between plant to plant with in a row.

Procedure of staking:

i) Single-Stake Support:

- The wooden or metal stakes are submerged 30-45 cm in the ground and left about 150 cm above ground.

- Set stakes 60-90 cm apart, 60 cm deep and 90-120 cm apart with in a row.

- Seedlings should be planted about 15-20 cm above the bottom end of each stake.

- Train only two or three fruit-producing branches of indeterminate plants by removing all other suckers.

- A popular method is to select the main stem with the suckers that develop immediately below the first flowering cluster (a very strong sucker), and one more sucker just below that.

- Pruning is a continuous operation since side shoots or suckers grow out rapidly. If side shoots are allowed to develop, the plant will soon be sprawling in many directions.

- The main stem should be tied loosely to the stake with soft, thick twine by first tying it to the stake and then looping it loosely around the plant.

- If the twine is too tight, it may incise into the stem as the plant grows. Tie individual branches to the stake with soft string.


Single branch staking

2. Trellising:

- It is used only for indeterminate varieties.

- The plants are grown at a spacing of 90 cm between rows and 30cm apart with in a row.

- The plants are trained by retaining the main stem only (Single branch training), or occasionally on double branch *i.e.* main stem and one strong sucker.

- It is important to remove all other suckers.

Different methods of trellising are:

i) Double wire trellis:

- The double wire trellis can be raised by submerging either 1.5-1.8 m high metal poles or square wooden/bamboo poles in the ground about 5-6 m apart.

- The end posts should be fixed firmly with support wires.

- Then, a twine wire is run from one pole around the other pole and back to the starting pole. This makes two parallel wires, tightly placed about 10 cm apart.

- The first set of wire is placed about 45-60 cm above the ground level. The next 3-4 sets of wire are erected tightly at 45-50 cm apart till the top of the posts.

Double-wire trellising
Source: www.extension.org
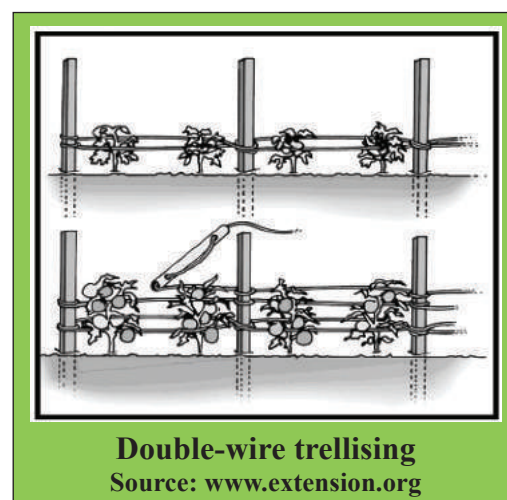
- Plants are allowed to grow up between these sets of wire.

- As the plants grow, they are further directed to the next set of wires and are allowed to climb there.

- Some pruning is necessary to keep side shoots from sprawling away from the trellis.

ii) Tree or Head system:

- Similar to double wire trellis, raise a trellis (fence) by fixing 2-2.2 m high metal poles or square wooden/ bamboo poles in the ground about 5-6 m apart.

- The tops of the posts should be about 6 feet above the soil surface.

- Stretch a heavy wire or a piece of barbed wire between the tops of the two posts.

- Extend a polypropylene twine along the base of the row and tie it with both ends of the poles.

Modified trellis method

- Use same polypropylene twine to train the plant by putting knot of the one end of it with the base twine and the other end to the top wire.

- Barbed wire prevents twine from slipping as the top wire droop down with the weight of the plants

- As plants grow, wrap them around the twine for support. For trellising two stems per plant, use a separate cord for each stem.
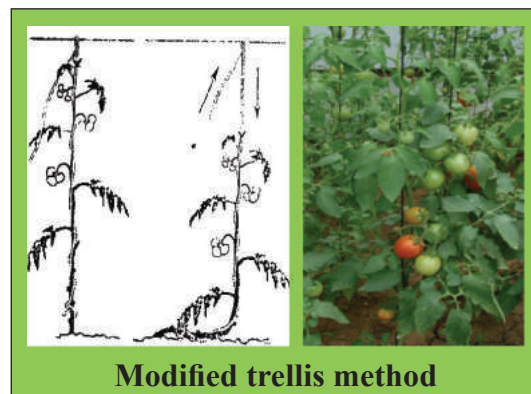
Caging: Tomato plants supported by cages made from concrete reinforcing wire require considerably less labour than either staked or trellised tomatoes because there is no tying and only limited pruning.

- A 5-foot length of 10-guage support wire with 6-inch openings makes a cage of about an 18-inch diameter.

- Make cages at least 5 feet in height for indeterminate varieties. Small cages are best for determinate varieties.

- Set tomato plants 90 cm apart in the row and place a cage over each plant. Push legs into the ground for fixing the cage.

- Caged plants are generally pruned to four or five main fruiting branches.

- As plants grow, keep turning ends of the branches back into the cages.

Caging
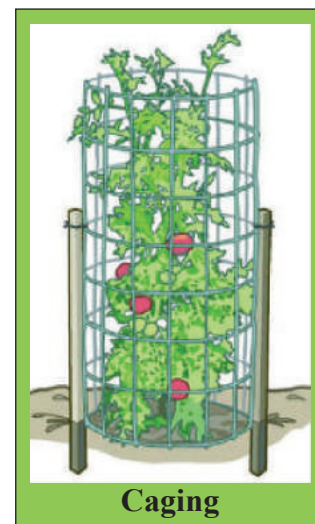
Exercise 16.2: Methods of training and pruning in cucumber

Procedure

### 1. Tree or Head System:

● Build a trellis (fence) by fixing 2-2.2 m high metal poles or square wooden/bamboo poles in the ground about 5-6 m apart.

● The tops of the posts should be about 6 feet above the soil surface.

● Stretch a heavy wire or a piece of barbed wire between the tops of the two posts.

● Extend a polypropylene twine along the base of the row and tie it with both ends of the poles.

Tree system

● Use same polypropylene twine to train the plant by putting knot of the one end of it with the base twine and the other end to the top wire.

● Barbed wire prevents twine from slipping as the top wire droop down with the weight of the plants.

● In this system, the vines are trained like dwarf bush. It is the most suitable method for training cucurbits.

● In this system, the first four to six lateral runners, as well as leaves are removed that appear up to first 50 cm of the plant height.

Source: www.tomatoville.com

● The main stem of the plant should be attached to the top of the trellis structure with ties. This can lead to continuous horizontal growth.

● As plants grow, wrap them around the twine for support.
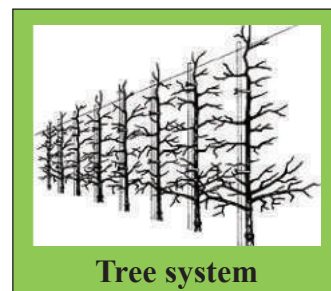
2. Pergolla System:

● This system of training is also known as Pendal or Arbour or Umbrella or Bower.

● It is the other method used for training cucumber.

● In this system, the vines are spread over a criss cross net work of wires above the ground supported by pillars (concrete or stone) or metal poles or square wooden/bamboo poles.

● Galvanized wires of 5, 8 and 10 gauge thickness and turning buckles are used.

Umbrella system
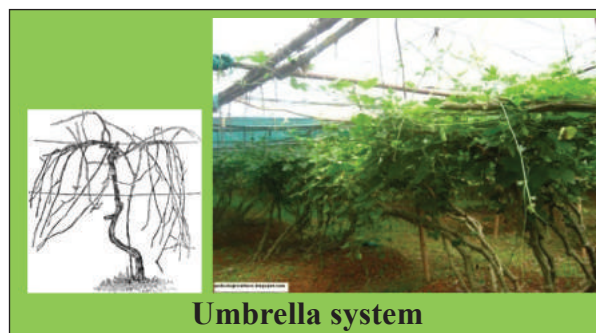
- Only the best growing shoot from the plant is allowed to grow upright along the stake provided up to the bower height.

- In this system, two vigorous shoots in opposite direction are selected and allowed to grow in opposite directions on the wires overhead. They serve as primary arms and from these primary arms, secondary shoots emerge.

- These primary and secondary arms form the permanent frame work of the vine.

- This system gives better exposure of the foliage to the sun and thus results in better quality fruits and higher yield.

3. **Double wire trellis:** Similar to tomato, the double wire trellis can be used for staking cucurbits like cucumber, small melon, or small winter squash with fruit weight up to about one kg.

- The double wire trellis can be erected by submerging either 1.5-1.8 m high metal poles or square wooden/bamboo poles in the ground about 5-6 m apart. The end posts should be fixed firmly with support wires.

- A twine wire is run from one pole around the other pole and back to the starting pole. This makes two parallel wires, tightly placed about 10 cm apart.

- The first set of wire is placed about 60-90 cm above the ground level. The next 3-4 sets of wire are erected tightly 45-50 cm apart up to the top of the posts.

- Plants are allowed to grow up between these sets of wires.

- As the plants grow, they are further directed to the next set of wires and are then allowed to climb.

Exercise

1. Do pruning of unwanted branches in tomato and apply head system of training. Keep some of the plants without pruning and training for comparison. Analyse the effect of these operations on quality of fruits and total yield.

2. Apply either arbour or head system of training in cucumber and compare the performance with untrained plants for yield and fruit quality.