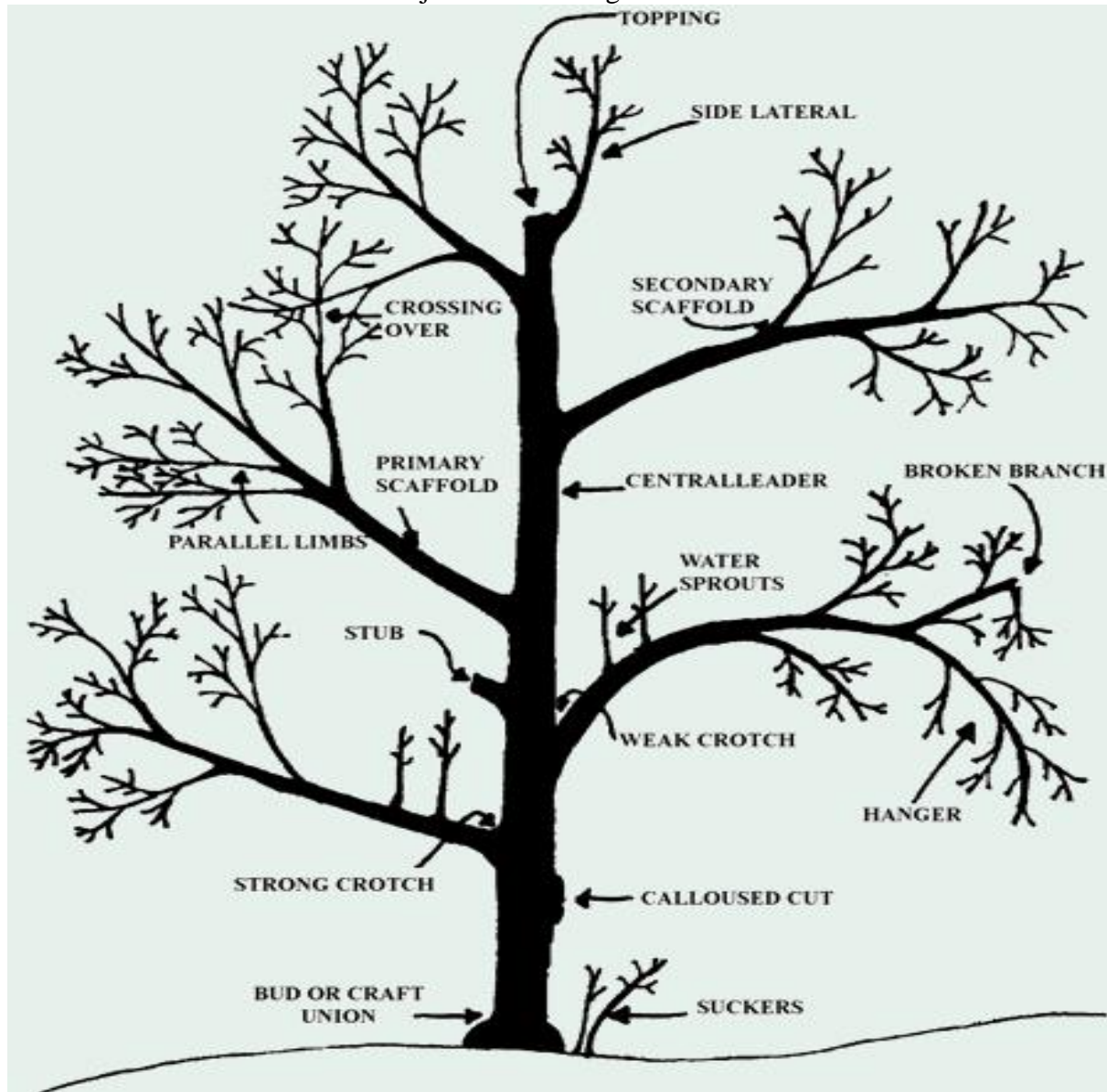


Training

Before actually discussing the subject of training, it is necessary to understand the various **terms** used to make the subject more intelligible.



Trunk: The main stem of the plant.

Head: The point on the trunk from which first branches arise.

Scaffold branches: The main branches arising from the head are known as scaffold branches. Trees in which scaffold branches arise within 60-70cm height from the ground level are called **low head trees** and those in which they come out from the trunk above 120cm are called **high head trees**.

Crotch: The angle made by the scaffold limb to the trunk or the secondary branch to the scaffold limb is called **crotch**.

Leader: The main stem growing from ground level up to the tip dominating all other branches is called **leader**.

Water shoot: A vigorous growing unbranched shoot arising on any branch or leader is called **water shoot**.

Water sucker: The growth appearing on rootstock portion is called **water sucker**.

The reasons for training fruit trees, ornamental trees, shrubs etc. are:

- 1) There are number of plants, which grow wild and don't bear if they are left to themselves and will not have any symmetry in their growth.
- 2) Most of the time, the unpruned trees put forth vegetative growth only. Hence, bearing will be delayed.
- 3) When plants are grown in rows at close spacing, they grow tall and occupy interspaces, making intercultural operations difficult to practice.
- 4) For want of sunlight, the lower branches wither and die. The shaded fruits (**apple, citrus** etc.) fail to develop colour.
- 5) Untrained trees will generally be less productive because of excessive vegetative growth for most of the time.
- 6) The framework being weak in untrained trees, it breaks easily due to strong winds as well as heavy loads of crop.

All the above problems can be overcome by training the trees. Man can train the plant to suit his desire. By training the plants, ideal conditions can be provided for better production. The fruit trees are trained to a particular system depending upon their habit of growth and the flowering and ornamental shrubs etc. can be trained to a particular shape like animals, birds etc. It is necessary to pay attention to the training of a plant during the first few years when it is young. In this period, its permanent framework is built up as decided upon by the grower.

Definition of training:

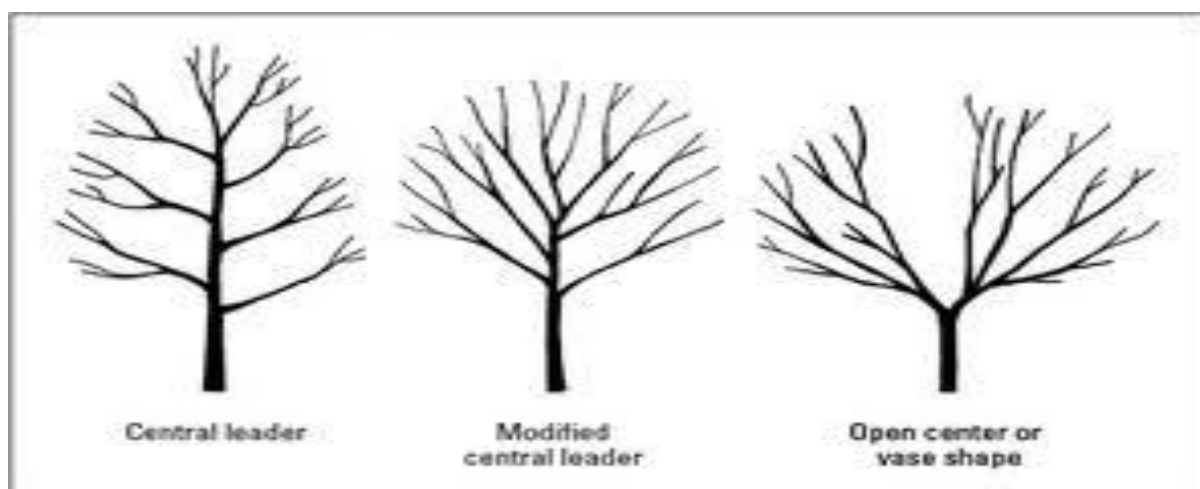
Physical techniques that control the shape, size and direction of plant growth are known as training **or** in other words training in effect is orientation of plant in space through techniques like tying, fastening, staking, supporting over a trellis or pergola in a certain fashion or pruning of some parts.

Training refers to the judicious removal of plant part / parts to develop proper shape of a plant capable of bearing a heavy crop load.

Objectives:

- To facilitate orchard cultural operations.
- To provide an attractive appearance.
- To admit more light and air to the centre of the tree and to expose maximum leaf surface to the sun for increasing production and for complete colour development
- To protect the tree trunk from sunburn injury.
- To secure a balanced distribution of fruit bearing parts on the main limbs of the plant.

Methods of Training



(i) **Open centre system (Vase shaped)**

In this system the main stem is allowed to grow to a certain height and the leader is cut to encourage lateral scaffold from near the ground giving a vase shaped plant. This is common in peaches, apricots and ber.

(ii) **Central leader system (closed centre)**

In this system the central axis of plant is allowed to grow unhindered permitting branches all around. This system is also known as **closed centre system** and common in use in apple, pear, mango and sapota.

(iii) **Modified leader system**

This system is in between open centre and central leader system wherein central axis is allowed to grow unhindered upto 4—5 years and then the central stem is headed back and laterals are permitted .It is common in apple, pear, cherry, plum, and guava

Details of Training:

(i) **Height of the head:** This is the height from ground to first branching or scaffolding. Depending on the height the trees could be divided in three groups.

(a) **Low head :** 0.7—0.9 m. This is common in windy areas. Such plants are easy to maintain.

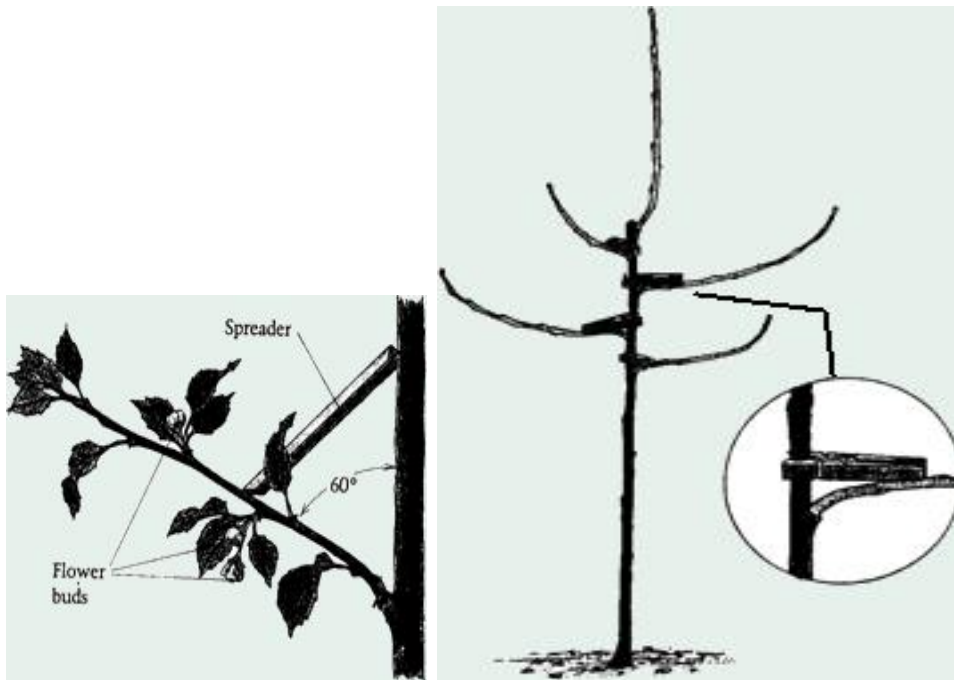
(b) **Medium head :** 0.9—1.2 m. This is the most common height which combines both effects, ability to stand against wind and easy management.

(c) **High head:** More than 1.2 m. Common in tropics in wind free areas. Operations under the canopy are easy to perform.

(ii) **Number of scaffold branches:** It refers to allowing of number of scaffolds on the primary axis of the tree which vary from 2 to 15 but extremes are undesirable. In fruit trees 5 to 8 scaffolds are preferred to make the tree mechanically strong and open enough to facilitate cultural operations.

(iii) **Distribution of scaffolds:** Scaffolds should be distributed in all the directions spaced at 45-60 cm allowing strong crotches through wide angles of emergence.

Bending of scaffold



The formation of the main frame work of the tree is the most important part of the training.

- 1) Usually, two to four main branches are encouraged. These should be allowed to arise from different directions and also at some distance from one another, so as to form a well-balanced head.
- 2) The frame work is greatly strengthened, if the branches are spaced at about 15cm distance with medium crotches (40° — 50°)
- 3) If two or more branches of equal size are allowed to arise from one place, they form a bad crotch and often split from their common joint.

A well trained tree is an asset to the farmer and therefore, efforts should be made for training trees appropriately in formative years for sustainable production. In fact the process should have begun from nursery itself.

Pruning

Definition:

It refers to removal of plant part like bud, shoot, root etc. to strike a balance between vegetative growth and production. This may also be done to adjust fruit load on the tree.

Pruning is the removal of unwanted, surplus annual growth; dead, dried and diseased wood of the plants is called Pruning.

Objectives:

- (i) To control plant size and form.
- (ii) For plant performance like

- (a) Establishment of transplant where leaves/shoots are pruned to strike a balance between root and shoot so that plants lose less water against restricted root system lost during lifting of plants.
- (b) Improvement in productivity and quality by regulating the load of the crop and extent of flowering.
- (c) For flower and fruit quality.
- (d) Elimination of non-productive vegetative growth like water sprouts, suckers, dead and diseased wood.
- (e) In case of forest trees production of knot free timber.

Types of pruning:

Basically there are three types of pruning with definite purposes.

(i) Frame pruning.

(ii) Maintenance pruning.

(iii) Renewal pruning.

(i) **Frame pruning:** This pruning is done to provide shape and form to a plant in its formative years so that tree develops strong framework and a shape for ease of operations. This process begins from nursery itself and continues up to fruiting stage. This is done continuously irrespective of the season.

(ii) **Maintenance pruning:** To maintain status- in production level and for uniform performance this pruning is done. In some plants like grapes, apple, pear, peach etc. (deciduous trees) it is an annual feature and in others (evergreen like mango, sapota) it is rare confining to removal of water sprouts and unproductive growth and opening of the tree.

(iii) **Renewal pruning:** This pruning is done in old trees like mangoes which shows decline. In this case severe pruning is required.

Factors to be considered in pruning:

In some of the tree species pruning as a regular feature in bearing trees is done to strike a balance between vegetative growth and production so that farmers get sustained production uniformly with optimum quality of produce. To achieve this one should consider the following factors.

(i) Time at which buds are differentiated in relation to blooming.

(ii) The age of the wood that produces the most abundant and highest quality of fruit buds.

In consideration of these factors our knowledge about bearing habit of the tree/plant should be complete. Bearing habit means relative position of a fruit with reference to its potential bud giving rise to flower or inflorescence in the shoot. This habit varies from plant to plant.