

## Training and Pruning of Temperate Fruit Plants

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Training and pruning are one of the most important orchard management practices particularly in temperate fruit crops for proper canopy development, quality fruit production, removing the dead and decaying parts and rejuvenation of old and senile plants. Correct training and pruning of the fruit plants results in the proper framework of the plants that displays a large surface area of the tree canopy to the full sunlight and supports heavy crop loads, whereas, incorrect training and pruning results in bushy growth with narrow crotch angles (Fig.1). Training of the plants starts with the planting and continues till the plant lives.

Training and pruning of temperate fruit crops are done with two major objectives:

1. To provide the desired shape and framework to the plants.
2. To help plants to achieve balanced growth and produce quality fruits.

**Training:** Training of fruit plants starts as soon as they are planted in the orchard. In the initial years, if plants are trained properly, the requirement of pruning in the later years becomes lesser. Training refers to the cultural practice in which tree growth is directed towards desired shape and form. Training of the young fruit plants is essential for accurate framework development. In order to avoid cutting large biomass from the plant to make desired shape of the plant, it is better to direct tree growth with correct training. Training of temperate fruit plants included dormant pruning, summer training and summer pruning. All the fruits crops require training, though the extent of pruning for training may vary from crop to crop.

### Objectives of Training

- To get a specific plant shape.
- To admit lighter and air to the centre of the tree to expose maximum leaf surface to the sun.
- To direct the growth of the tree so that various cultural operations such as spraying, ploughing, harvesting can be performed easily at lower cost.

- To protect the tree from sun-burn and wind damage.
- To secure a balanced distribution of fruit bearing parts of the tree.

### Principles of Training

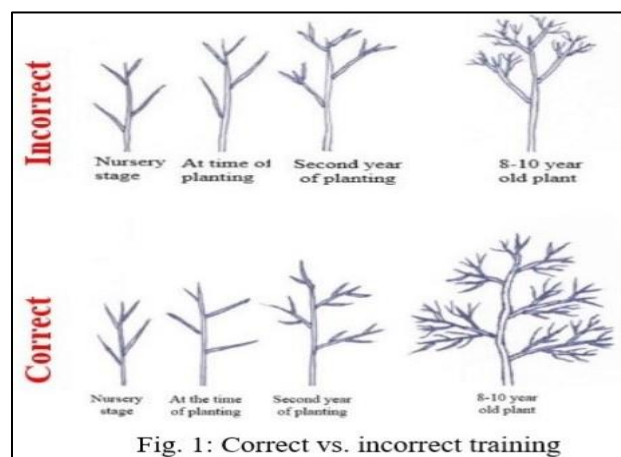


Fig. 1: Correct vs. incorrect training

- Formation of the strong main framework.
- Branches must be suitably spaced apart and the tree must be balanced on all the sides.
- Never allow several branches to grow at one place or very near each other.
- Maintain wide branch crotch angles.
- Careful training of main branches is very essential.

The aim of accurate training is to direct tree growth into desired framework of branches while minimizing the cutting of branches.

**Training systems:** Under conventional orchards, there are mainly three important training methods in temperate fruit crops.

### Central leader:

In this system the main stem of the plant is allowed to grow unrestricted (Fig. 2). The plant grows very fast, becomes very tall but the plant

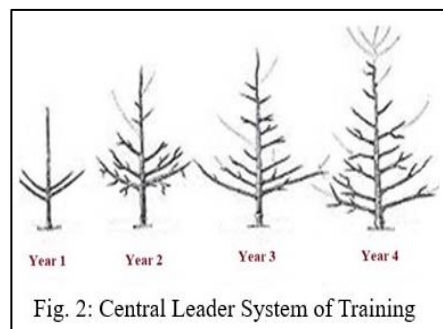


Fig. 2: Central Leader System of Training

spread remains restricted. In this type of training system, the fruits are borne mainly on the upper branches and lower branches remains under shade so they bear less fruits.

**Open centre system:** In this system the central leader is cut at a height of 60-75cm within one year of planting.

After cutting the central leader, the side shoots grow fast which are also trained in the subsequent years. Plants attain lesser height and more spread as

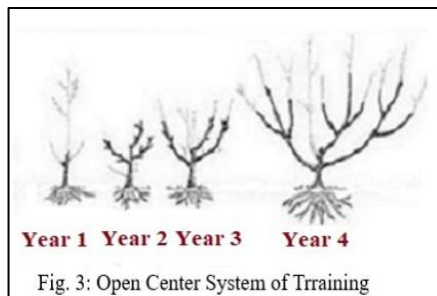


Fig. 3: Open Center System of Training

compared to central leader system (Fig. 3). In these plants the cultural operations like spraying and harvesting are easy to do.

**Modified leader system:** One year old whip without a single branch is planted in the dormant season. After transplanting the tip of plant is headed back 2-3 feet above the ground level. In the next dormant season 3-4 branches spaced at 10-15 cm, having wider crotch angle projecting in opposite directions are retained with lowest one 45 cm above ground. The selected branches are headed back to ¼ of growth to a bud projecting to the outer direction.

**Table 1. Training systems for different temperate fruit crops under conventional orchards.**

Fruit plant	Training system
Walnut, Pecannut, Pear, Cherry	Central leader
Apple, Pear, Cherry	Modified central leader
Peach, Plum, Apricot, Almond	Open central

Under high density and ultra-high-density cultivation of temperate fruit crops, different training systems are adopted e.g. tall spindle, Vertical axis (Fig. 4), Head and spread, Tatura trellis etc.

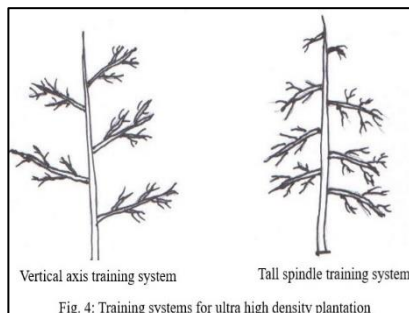


Fig. 4: Training systems for ultra high density plantation

**Tatura Trellis system in Peach:** It is one of the highest yielding systems. In this, plants are trained to Y shaped leader in which both the branches are supported with

wire system. Trees are planted at about 6 x 1 m apart accommodating 1668 trees/ha.

**Pruning:** Pruning involves cutting away portion of plant to improve its shape, bring desired change in growth, improve flowering and fruiting and to improve the fruit quality. It is done by diverting flow of food from one part of the plant to another part. Temperate fruits are pruned every year during their dormancy period (dormant pruning) and on-set of summer (summer pruning). The fruiting plants should be carefully pruned keeping in mind the areas on which flowers are borne. The main objective of pruning is to get good quality fruits and making the plants easy to work with.

### Objectives of pruning

- To maintain root/shoot ratio.
- To obtain specific form of the plant.
- To develop specific geometry within the plant and its overall topology.
- To maintain optimum balance between vegetative and reproductive parts.
- To contain the size of the plant and promotion of optimum shoots/fruiting points.

### Effect of Pruning

- Getting rid of unwanted growth.
- Increases new vegetative growth.
- In young trees flowering can be manipulated.
- Rejuvenation of old trees.
- Reduces the plant surface area as a result, tree remain dwarf which is compensated by accommodating a greater number of dwarf trees.
- Improvement in size, colour and quality of fruits.

### General rules for pruning of fruit tress

- Young trees should be pruned lightly.
- Prune mature tree more heavily, especially if they have shown little growth.
- Prune the top portion of the tree more heavily than the lower portion.
- Thin out more shoot towards the end of a well-pruned branch in a mature tree. This will increase fruit size and quality on the remaining shoots.
- To reduce the height of an excessively tall tree, cut whole limbs at the top, making cuts flush

with the bark of a lower limb. Stubs left in the top of a tree would not heal.

- Follow 3:1 pruning rule for pruning which states that leader should be 3 times the diameter of any of the lateral branches in the upper part of the tree.

### Systems of pruning

**Thinning out:** When a shoot is entirely removed from the point of its origin and no re-growth is allowed to take place from the cut ends.

**Heading back:** When the terminal portion of branch/shoot is removed and it encourages lateral growth from the remaining shoot. Smaller the portion of the shoot, lesser will be the lateral growth and larger the portion of the shoot removed, heavier will be the lateral growth.

**Dehorning:** Cutting away the main limbs or thick major branches.

**Bulk pruning:** Heavy pruning all over the tree. For good fruit production only judicious heading back or thinning out should be done.

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