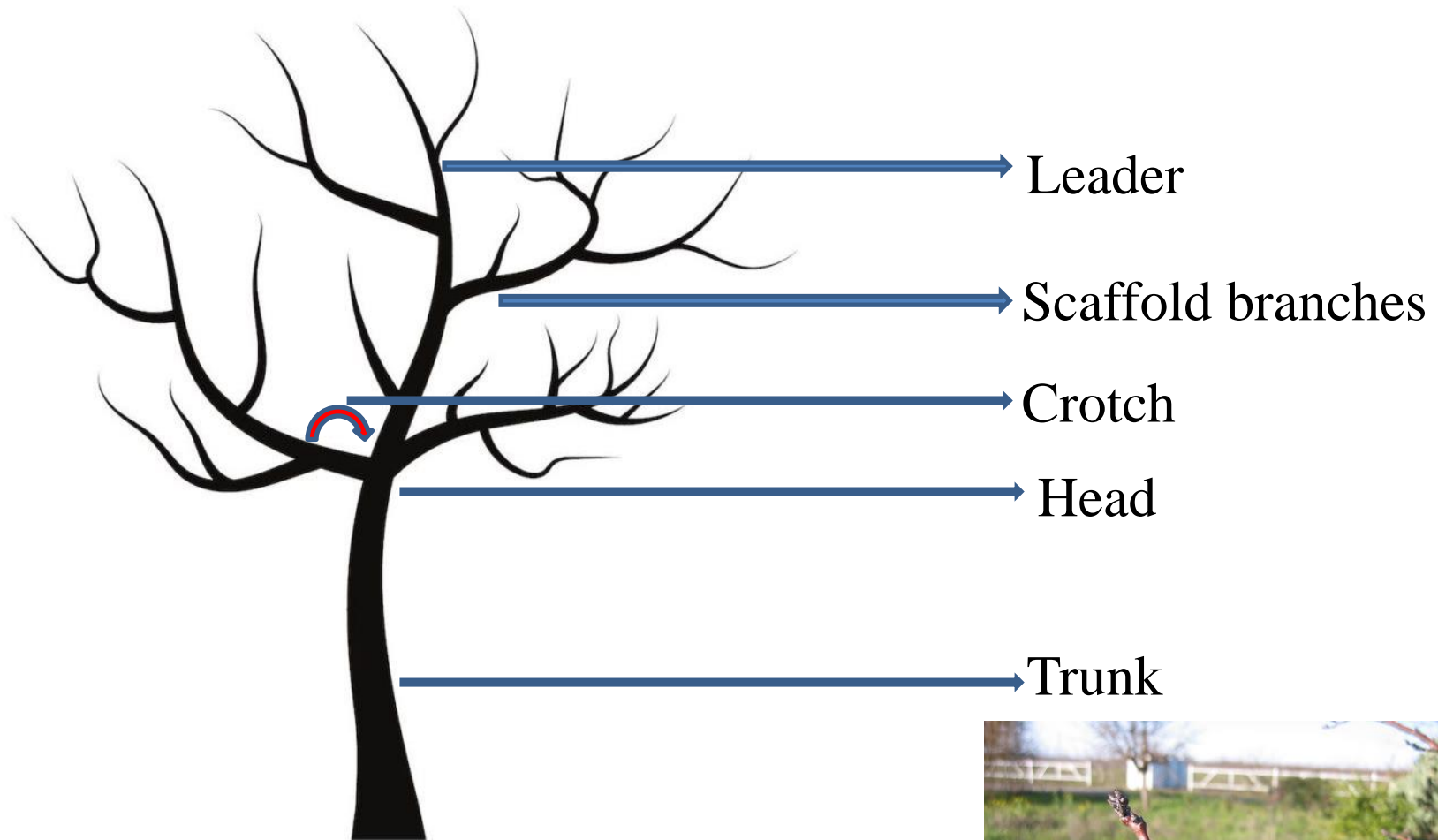




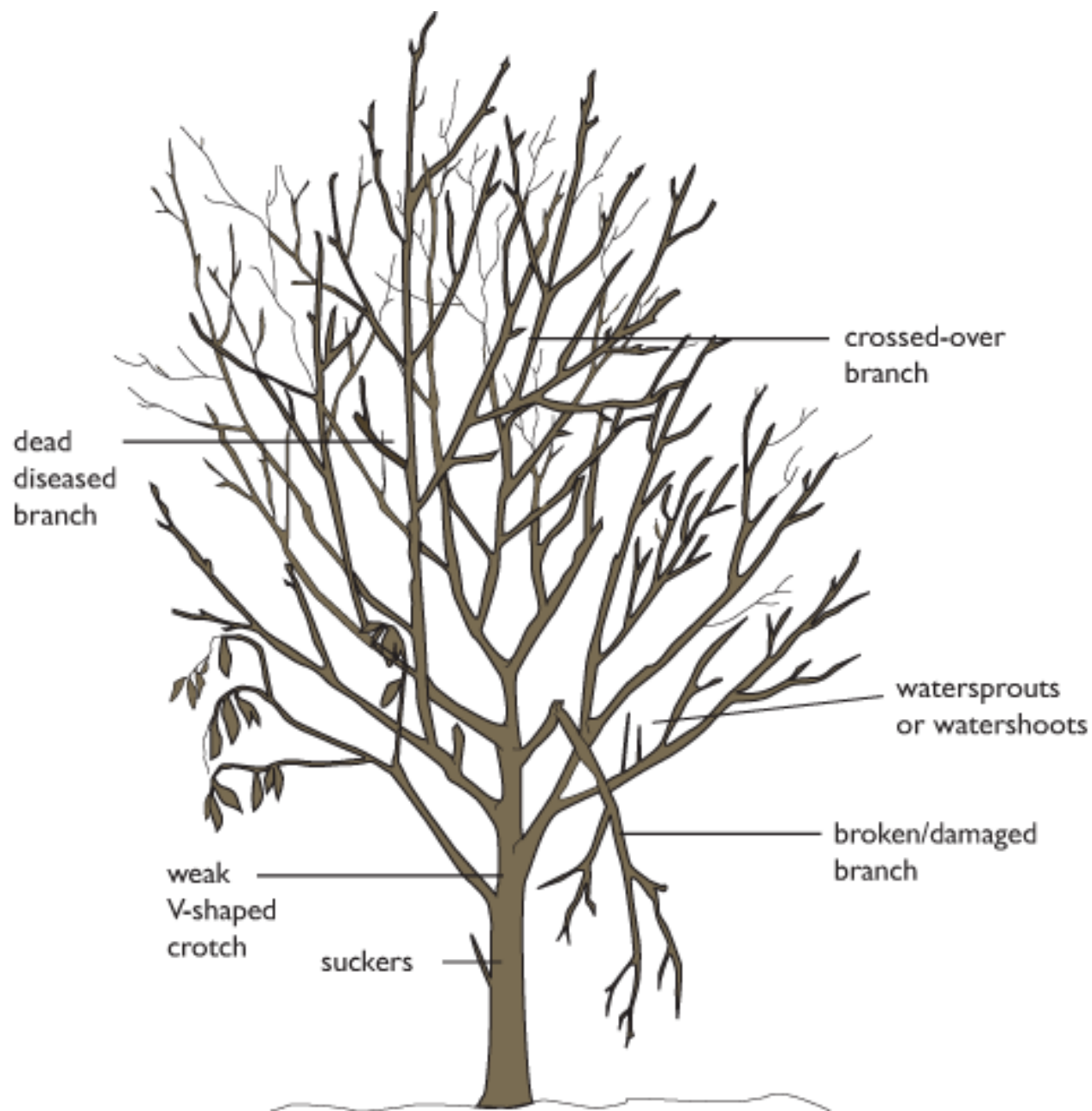
# **TRAINING AND PRUNING OF HORTICULTURAL CROPS**





Spur





# PRUNING

- Pruning is the proper and judicious removal of plant parts such as shoots, spurs, leaves, roots or nipping away of terminal parts etc. to correct or maintain tree structure and increase its usefulness.
- Removal of a branch removes not only stored carbohydrates but reduces the potential leaf surface as well.
- Pruning increases fruit size, nitrogen per growing point and stimulates growth near the cut.

## **Factors affecting pruning**

**The severity, kind and amount of pruning to be done on a tree depend on the**

- age,**
- existing framework,**
- condition of bark and wood,**
- Growth characteristics**
- Fruiting habit of the variety**
- Whether tree is permanent or filler**

# Objectives of Pruning

- To control the size of the plant.
- To control the form (structural make up of the plant) which involves number, placement, relative size and angle of branches.
- Better quality fruits by better light distribution.
- To remove diseased, criss-crossed, dried and broken branches.
- To remove the non-productive parts in order to divert the energy into those parts that are capable of bearing fruits.
- Proper proportion of root- shoot ratio.
- To regulate the fruit crop.
- Longevity of the tree.
- Chances of insects-pests, diseases and winter injury are less.

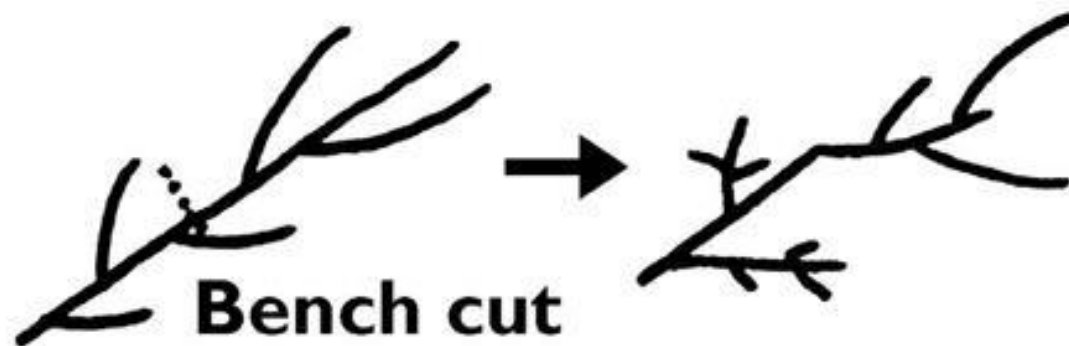
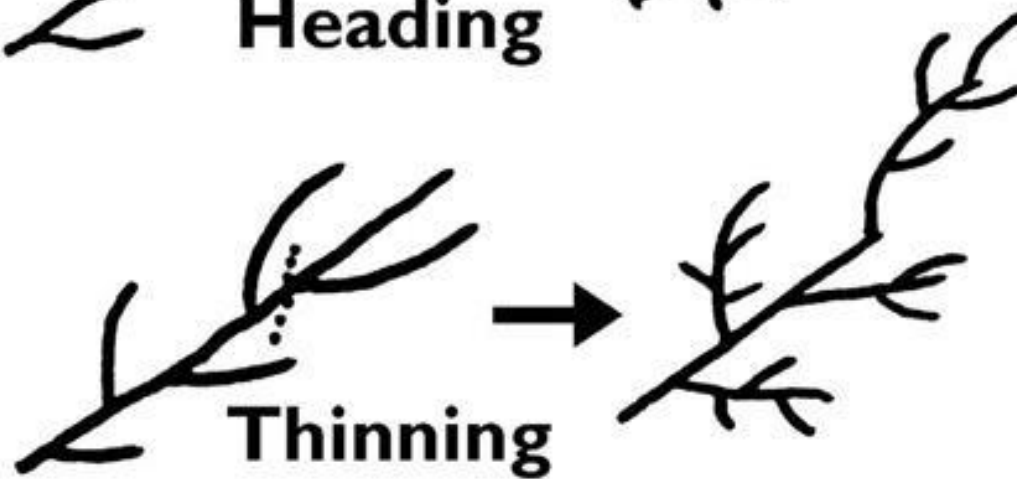
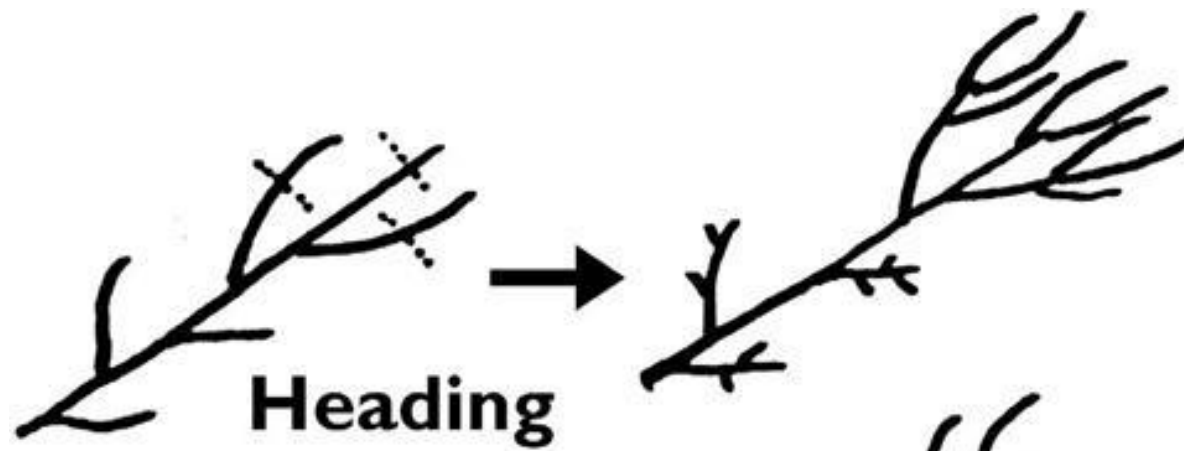
# Principle of Pruning

- To admit more sunlight
- Remove unproductive branches which are producing few or no fruits
- To keep the plant in its proper vigor and vitality
- To obtain optimum yields of good quality fruits.
- Pruning of larger limbs should be avoided as far as possible.
- Pruning of young trees should be done more carefully than the yielding trees, since severe pruning of young trees delays the cropping and much

# Types of Pruning

- Thinning out
- Heading Back
- Bulk Pruning
- Thin wood Pruning





## Thinning out:

- When a shoot is entirely removed from the point of its origin and no re-growth is allowed to occur from the cut ends.
  - do not invigorate the tree

## Heading back:

- When the terminal portion of branch/shoot is removed and it encourages lateral growth from the remaining shoot.
- Heading back promotes the growth of lower buds as well as several terminal buds below the cut.
- When lateral branches are headed into one year old wood, the area near the cut is invigorated. The headed branch is much stronger and rigid, resulting in lateral secondary branching.

## Bulk pruning

Heavy pruning is done for good fruit production.



## **Thin wood pruning:**

- **Refers to the removal of slow growing, weak, under hanging branches or shoots which are either not fruiting or producing fruits of low quality.**



## Bench Cut –

- **Removes vigorous, upright shoots back to side branches that are relatively flat and outward growing.**
- **used to open up the center of the tree and spread the branches outward.**
- *This is a major cut and should only be used when necessary.*

## **PRUNING ON BASED ON PURPOSE**

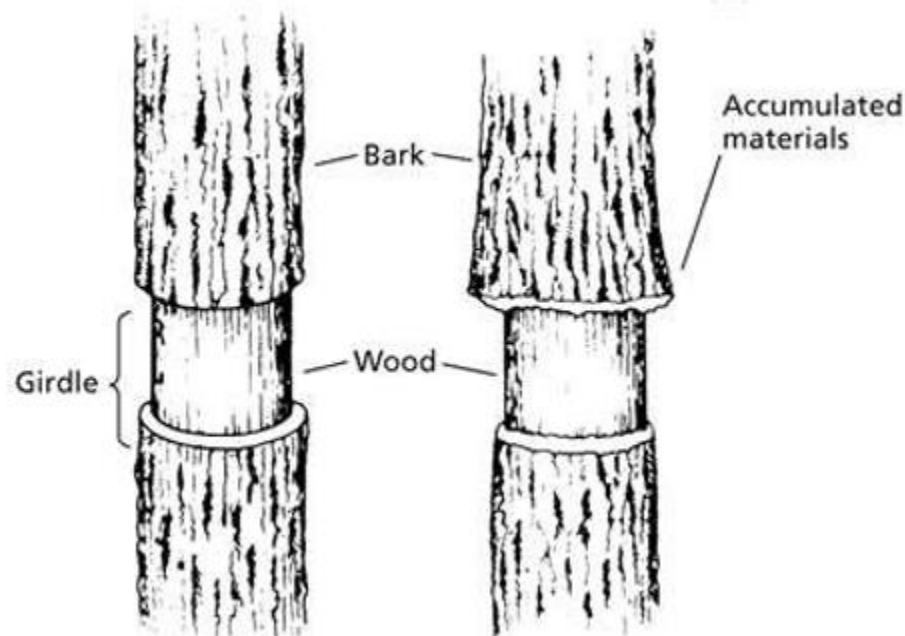
- (i) Frame pruning.**
- (ii) Maintenance pruning.**
- (iii) Renewal pruning.**

# Special operations to increase fruiting

## Girdling

**Girdling**, as practiced in commercial vineyards, consists of the removal of a ring of bark from 3 to 6 mm wide entirely around a selected trunk or branch

(1) hasten maturity; (2) aid uniform berry coloring; (3) increase the size of berries and clusters; and (4) improve berry set

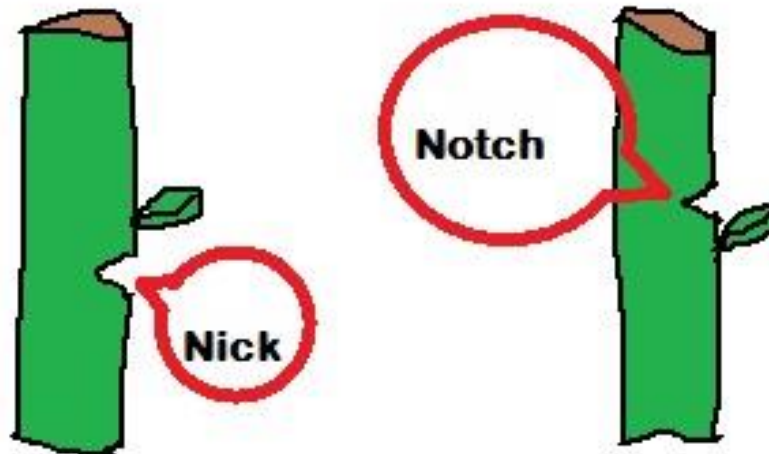


## Notching

- Removal of wedge shaped bark piece from above the bud to make a notch is called as notching.
- To promote vegetative growth
- Adopted in fig.

## Nicking

- Removal of wedge shaped bark piece below the bud to make a notch is called as nicking.
- to promote flowering
- Adopted in mango



## Pinching

- Removal of 3-5 cm terminal portion of plants after 30-45 DAP is called as pinching.
- to promote lateral branching
- Adopted in marigold, chrysanthemum, carnation, etc.

## Disbudding

- Removal of lateral buds of plant
- to promote apical growth
- Adopted in rose, carnation





# Season of Pruning

- **Dormant Pruning**
- **Summer Pruning**

# TRAINING

Physical techniques that control the shape, size and direction of plant growth are known as training.

## Objectives:

- To improve appearance and usefulness of plant/tree through providing different shapes and securing balanced distribution.
- To ease cultural practices including inter cultivation, plant protection and harvesting.
- To improve performance like planting at an angle of  $45^\circ$  and horizontal orientation of branches make them fruiting better.

# Objectives of Training

- To admit more sunlight and air to the centre of the tree and to expose maximum leaf surface to the sunlight.
- To direct the growth of the tree so that various cultural operations, such as spraying and harvesting are performed at the lowest cost.
- To protect the tree from sunburn and wind damage.
- To secure a balanced distribution of fruit-bearing parts on the main limbs of the plant.

# Training Systems

- **Central Leader**
- **Open- Centre**
- **Modified Leader**

# Central Leader System

- Main trunk extends from the soil surface to the total height of the tree
- Several side branches grow at different heights in various directions.
- **Advantages:**
  - Such trees are structurally best suited to bear crop load and to resist the damage from strong winds.
- **Disadvantages:**
  - Trees under this system grow too tall and are less spreading.
  - Tree management (spraying, pruning, thinning and harvesting) is difficult.
  - Shading effect on interior canopy (the lower branches of such trees may be so much in shade that the fruit may not be able to develop proper colour).





# Open Centre System

- Main trunk is allowed to grow upto 1.0 m by cutting within a year of planting.
- 3-5 lateral branches are allowed to develop from short main stem.
- good for mechanical harvesting.
- Advantages:
  - The trees so trained allow maximum sunshine to reach their branches.
  - Better clouration of fruits on the interior side of the tree.
  - Trees are more fruitful and low spreading tree greatly facilitate operations like spraying, pruning, thinning and harvesting.
- Disadvantages:
  - Such trees are structurally weak, and their limbs are more likely to break with crop load and strong winds.
  - This system does not only need severe pruning to start with but also constant effort to maintain its form through drastic pruning treatment.



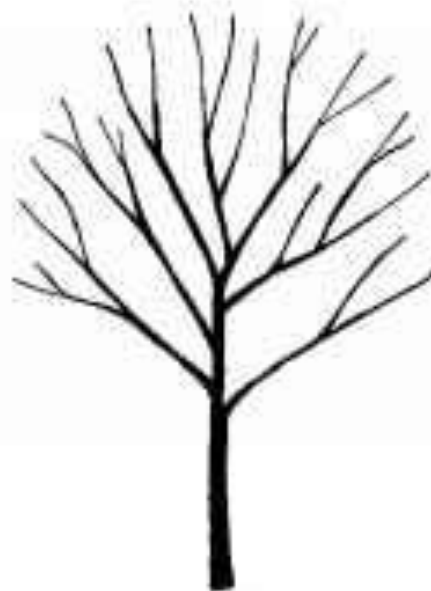
# Modified Leader System

- This system combines the best qualities of the central leader and open centre systems.
- A leader develops on the young tree until it reaches the height of 2-3 m and then the growth is restricted.
- Laterals are selected to ascent in a spiral fashion up the central trunk and are cut until the proper number and distribution of branches have been obtained.
- **Advantages:**
  - The branches are well distributed, allowing plenty of sunshine to reach the interior of the tree.
  - The trees is structurally strong and not prone to limb breakage.
  - Owing to limited height of trees, spraying, pruning and harvesting may be done easily.

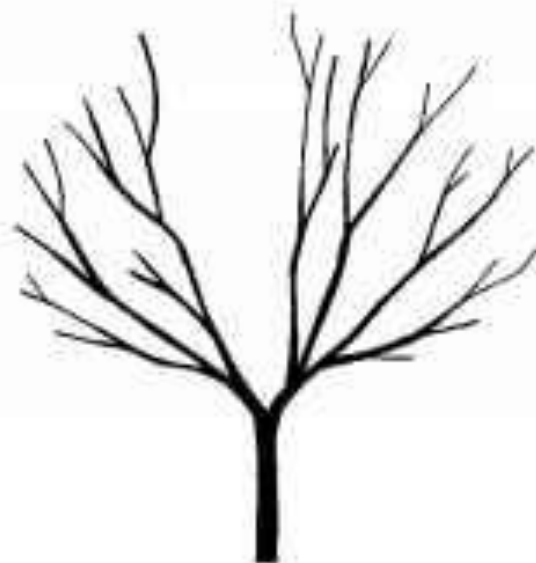




Central leader



Modified  
central leader

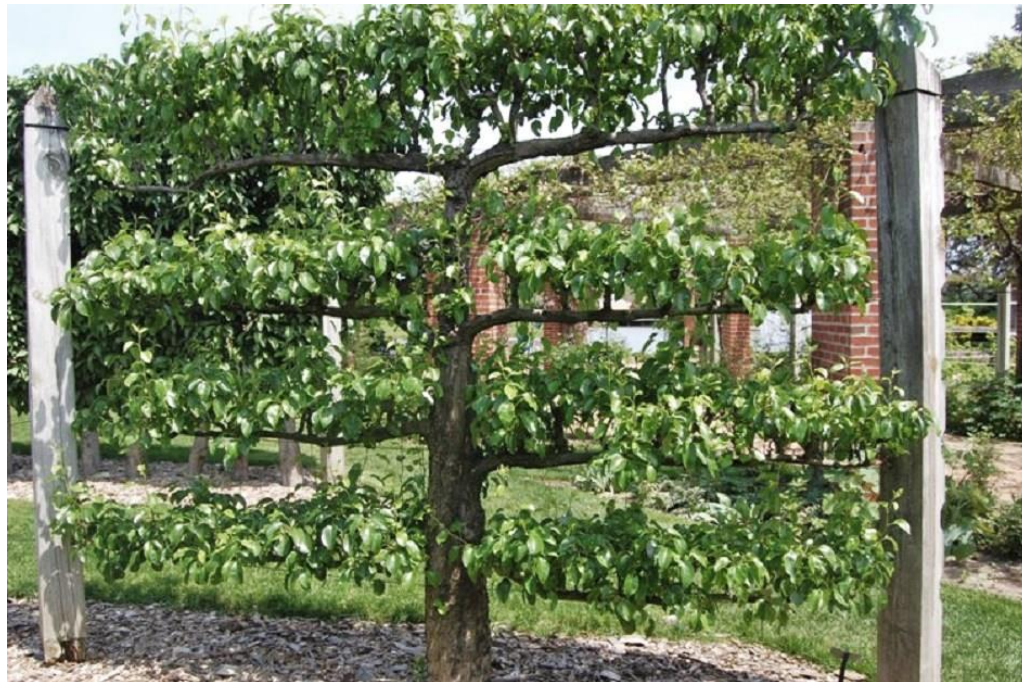


Open center



## Espaliers:

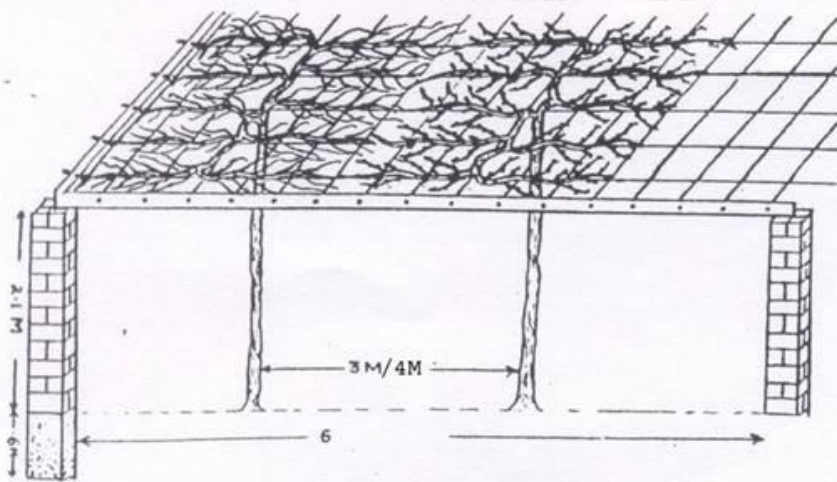
- Espalier, a French word derived from the Italian *spalliera*, which means “something to rest the shoulder (*spalla*) against,”
- Similar to kniffin system of training grapes.
- The trellis is 5 feet high with either 2 wires at 3 feet and 5 feet OR 4 wires at 2,3,4, and 5 feet.



## Bower System

- This system is also called overhead, arbour or pergola.
- Owing to vigorous of the vine and pronounced apical dominance in the tropics, this system is found most suitable for many of the commercial grape cultivars.
- Though it is very expensive, it was found most appropriate one and associated with highest yield.
- Bower system of training provides a desirable microclimate in the vine canopy and reduces the adverse effects of arid and hot weather on vine metabolism and life.



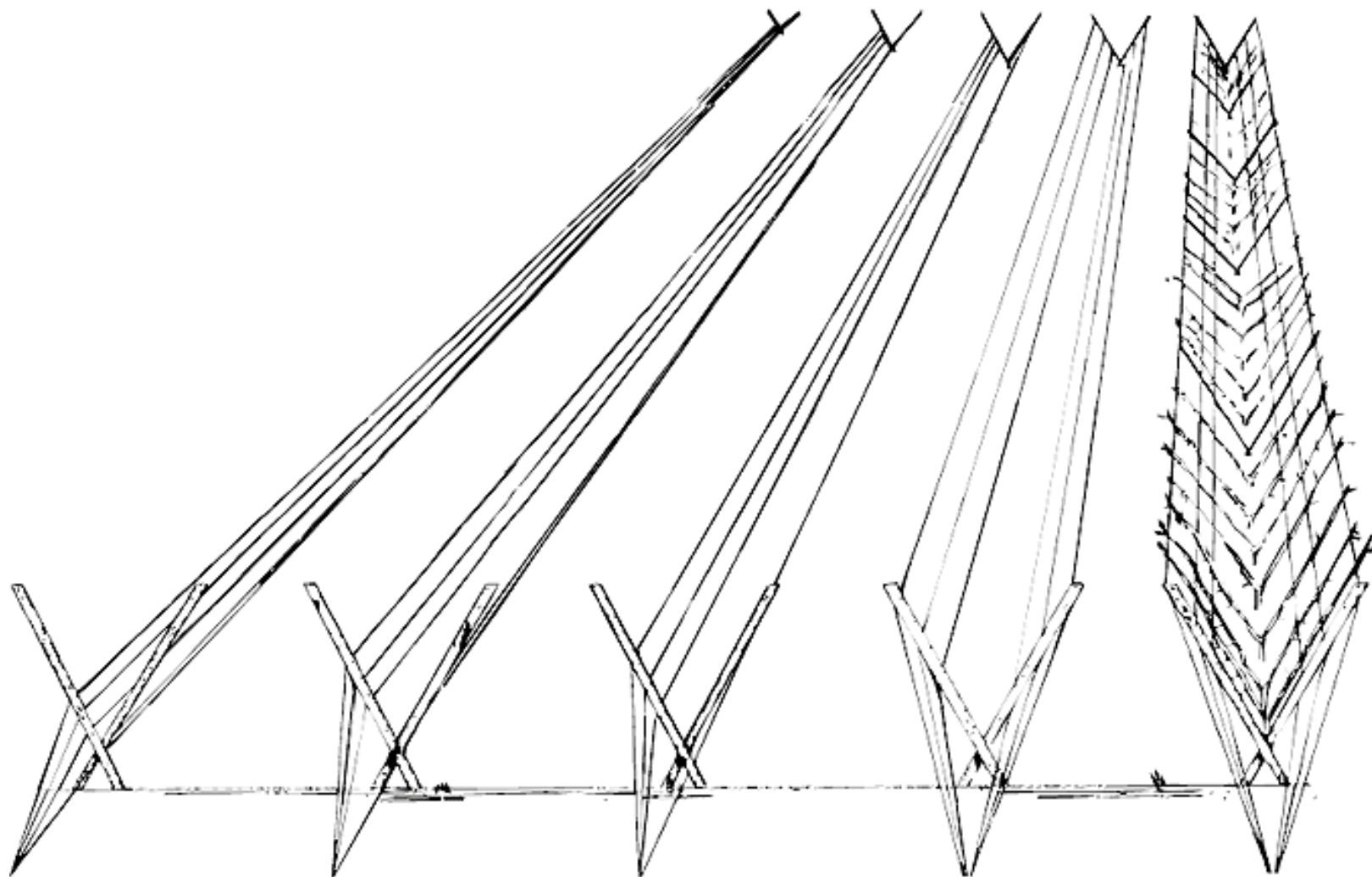


Training of vines on Bower system.



# Tatura Trellis system

- One of the highest yielding systems.
- System appears to be V shaped.
- Trees are planted about 6 x 1 m apart ( 1668 trees/ha).
- Bearing starts in the second year.
- Main framework consists of Y shaped leaders which are tied with the wires.



2. As the trees grow, the bottom wires are moved up another 270 mm

3. Moving up of the wires continues as the trees grow in height. The middle wire remains in position.

4. The wires are now in permanent position, 1 m apart. Three wires either side for 6 m rows. Two wires either side for A 5 m rows

5. Intermediate frames no more than 15 m apart (these frames have been shown in rows 1-4).



