

# Apple

## Intercultural Operations

### Weed Control

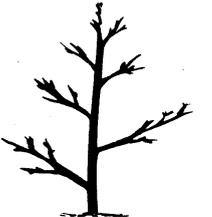
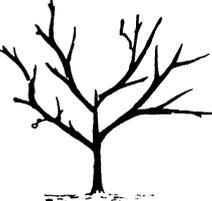
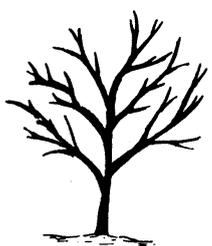
The young apple is very vulnerable to competition for nutrient from the weeds. Weeding should be done at regular intervals during the initial years. Apart from hand weeding use of herbicides to eliminate weeds both in the nursery as well as in the field is recommended. In the nursery, the weeds are controlled by pre-emergence application of Nitrofen (0.5-1 kg a.i./ha) or Simazine (0.2-4 kg a.i./ha). In the field, pre- and post-emergence application of Atrazine (2-6 kg a.i./ha) or Terbacil (1-3 kg a.i./ha) effectively controls the weed population. Mulching followed by herbicide application is the most effective method of controlling the weed population. The best time of application of these herbicides is early in the spring.

### Mulching

Mulching with straw, hay, sawdust, oak leaves or other organic matter increases the humus content of the soil and its moisture holding capacity. Various plastic and polythene mulches are also used. Black alkathene mulch in cooler climatic conditions is very effective in weed control and moisture conservation. It also helps in reducing fruit drop and improve fruit size, colour and quality.

### Training

The objective of training is to admit maximum sunlight and air upto the centre of the tree and to have maximum exposure of foliage to sunlight. It is also done with the view to direct the growth of the plants in such a way that cultural operations are possible with maximum efficiency and at a lower cost. The various methods of training adopted in apples are as follows -

	<p><b>Central Leader System</b> : In this system, the tree has a main stem and well-spaced subordinate branches. The tip of the central leader branch is usually cut back which results in development of scaffold limbs. This system of training gives large trees therefore pruning is done during the dormant season.</p>
	<p><b>Open Centre System</b> : The central leader is pruned about 1 m above ground level and 3-5 well-spaced scaffold branches are retained. Secondary scaffold branches are allowed to develop on the primary scaffold. Fruit bearing laterals are borne on both primary and secondary scaffold branches. Since the centre of the tree is open, there is more admission of light and air thus improving the quality and colour of the fruits.</p>
	<p><b>Modified Leader System</b> : It is an intermediate between central leader and open centre system. Initially for 3-4 years the tree is allowed to grow like central leader system until 6 to 8 scaffold branches develop around the central leader. The central leader is then cut from the central axis keeping the centre of the tree open as in the open system. In this type of training, the tree develops well-space limbs with strong crotches. As the tress have open top the sunlight penetration is deep inside the tree canopy.</p>

## Pruning

Pruning is one of the most important practice which promotes plant vigour and productivity. Pruning is done with a view to divert the sap flow towards the fruiting branches and to force the plants to bear more fruits or to induce vigorous vegetative growth. During pruning, weak-growing and diseased branches are removed from the tree. Usually the trees are pruned every year in the month of December-January. The systems of pruning adopted in apple cultivation are as follows-

### Established Spur System :

Objective of this pruning is to develop permanent fruit spurs for production of fruits. To ensure formation of spurs on the laterals the central leader is cut back every year along with the strong erect laterals near the central leader. This leads to wide angled vigorous laterals for formation of spurs.

### Regulated System :

Regulated pruning is practiced generally on apple cultivars growing on semi-dwarfing and vigorous rootstocks. Before planting, the central leader of the tree is cut back at 75 cm on which three well-placed primary branches are allowed to grow. In bearing trees, the growth of leader and strong laterals are encouraged by pruning weak and crowded branches.

### Renewal System :

In vigorous cultivars instead of developing permanent spurs, the objective is to encourage continuous growth of new healthy shoots, spurs and branches every year. A part of the tree is pruned every year to produce fruits in the following year on the new shoot growth, while the unpruned parts produces fruit buds.

## Thinning of Fruits

Thinning is one of the major techniques employed to regulate fruit quality. In apples, heavy bearing not only results in small-sized poor quality fruits but also sets in alternate bearing cycle. Judicious thinning done at the proper stage of fruit development can regulate cropping and improve fruit size and quality. Since manual thinning is cumbersome and expensive, chemical thinning is employed. The chemicals used in thinning along with their concentration and stage of application are as follows:

Chemical	Dose (ppm)	Stage
NAA	10-15	Full bloom to 4 weeks after petal fall
NAAm	20-100	Petal fall
2, 4-D	2-10	Full bloom to petal fall
2, 4, 5-T	2-2.5	Full bloom to petal
Carbaryl/Sevin	1,000-2,000	Petal fall 4 weeks after petal fall
DNOC	1,000-2,000	Full bloom

(ICAR: 50 years of crop science research in India, 1996).

Chemical thinners should not be applied in very hot and dry conditions as it adversely affects the absorption. Spraying should be done thoroughly to cover the entire canopy. Sometimes chemical thinning follow calcium deficiency therefore adequate calcium nutrition should be supplemented after thinning.