



FACULTY OF AGRICULTURAL SCIENCES & ALLIED INDUSTRIES

Pruning

- 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.

Objectives

1. To control plant size and form.
2. For plant performance like
3. 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.
4. Improvement in productivity and quality by regulating the load of the crop and extent of flowering.
5. For flower and fruit quality.
6. Elimination of non-productive vegetative growth like water sprouts, suckers, dead and diseased wood.
7. In case of forest trees production of knot free timber.

Types of Pruning

- Basically there are three types of pruning with definite purposes.
 1. Frame Pruning.
 2. Maintenance Pruning.
 3. Renewal Pruning.

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.

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.

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 During 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

4. Time at which buds are differentiated in relation to blooming.
5. The age of the wood that produces the most abundant and highest quality of fruit buds.
6. In consideration of these factors our knowledge about bearing habit of the tree/plant should be complete.
7. Bearing habit means relative position of a fruit with reference to its potential bud giving rise to flower or inflorescence in the shoot.
8. This habit varies from plant to plant.

Kinds of Flower Bearing Shoots

- Depending on the position of fruit bud and the kind of flower bearing shoots it produces, fruit trees can be classified into following eight groups.
- Basically there are two types of flowering: terminal and lateral and within each category there is variation depending on flower shoot: pure or mix, terminal or lateral.
- **Group-1:** Fruit buds borne terminally and unfold to produce inflorescence without leaves. E.g. [mango](#).
- **Group-2:** Fruit buds borne terminally unfolding to produce leafy shoots that terminate into flower clusters e.g. apple and unfolding to produce leafy shoot with flower cluster in the leaf axils. E.g. Fig and Avocado.
- **Group—3:** Fruit buds borne terminally unfolding to produce leafy shoots with flowers or flower cluster in the axil of leaf. E.g. Guava
- **Group-4:** Fruit buds borne laterally unfolding to produce flowers without leafy parts. E.g. Citrus, Coconut, Papaya and Coffee.
- **Group-5:** Fruit buds borne laterally unfolding to produce leafy shoot terminating in flower clusters. E.g. Grapes.
- **Group-6:** Fruit buds borne laterally.
- **Group-7:** Fruit buds borne both terminally and laterally but unfolding to produce inflorescence terminally. E.g. Walnut.
- **Group-8:** Fruit buds always borne adventitiously in old trunk or shoots. E.g. Jackfruit, Cocos, Indian star goose berry.

Season of [Pruning](#)

- Generally [pruning](#) should be done in such a time that physiology of plant is disturbed to the minimum and it should not interfere with the principal function of the plant.
- Fruit trees are pruned for fruiting when dormant i.e. late winter in case of temperate fruits and soon after harvest in evergreen if required.
- Some times the trees are subjected to stress to induce dormancy before [pruning](#) as in bahar treatment.
- [Pruning](#) for structural adjustment is done when plant is making growth i.e. summer [pruning](#).
- Generally [pruning](#) is regularly done in temperate fruit crops like apple, pear, peach, plum, cherry, walnut, apricot, grape and subtropical crops like pomegranate, lemon, ber, guava.

- Evergreens like [mango](#), sapota and litchi are rarely pruned except thinning of branches to avoid overcrowding and removal of deadwood. However, now this concept is under change.

Techniques in [Pruning](#)

Basically there are two techniques which could be utilized individually or in combination depending on the need of the crop.

1. **Heading back:** It is cutting back of terminal portion of a branch to a bud. This encourages spreading of growth, bushiness and compact plant. It is also called pinching.
2. **Thinning out:** It means complete removal of a branch to a lateral or main trunk. This makes the plant open, large tree or plant. Thinning out of growing wood is also called deshooting.

Table: [Pruning](#) time and techniques in fruit crops

Sl. No.	Crop	Time	Technique
1	Apple	Late winter	Light thinning coupled with heading back.
2	Peach	Late winter (Dec-Jan)	A combination of thinning out and heading back.
3	Plum	Late winter (Dec-Jan)	A combination of thinning out and heading back.
4	Grape		
	North India	Late winter (Jan)	Heading back of cane.
	South India	Summer pruning (Aug)	Heading back to one or two buds which is almost thinning out.
		Winter pruning (Sept-Oct)	Heading back to cane.
5	Mango	After harvest	Thinning.
6	Phalsa		
	North	Late winter early spring	Heading back.
	South	Dec-Jan	Heading back.
7	Ber	Summer (April-May)	Heading back and thinning out of old branches.

Other important considerations

1. Use good and sharp equipment.
2. Cut should be small, smooth and slanting so that water does not accumulate on cut end.

3. Large wounds should be treated with antifungal chemicals like Bordeaux paste.
4. Shoots from rootstock should be removed regularly.\
5. Removal of deadwood, parasites (loranthus), epiphytes (ferns), climbing vines and nests of bees, wasps, ants, termites should also become part of [pruning](#).

Management of Plants

Besides [pruning](#) and [training](#) plants can also be managed through biological and chemical methods:

1. Biological control

1. In this method following techniques could be utilized.
2. Use of rootstock: Use of dwarf, vigorous and semi vigorous rootstocks can alter plant size. E.g. M IX for dwarfing of apple and trifoliolate for dwarfing of citrus.
3. Phloem disruption (Ringing): can be utilized for regulating flowering and fruiting.
4. Hardening : By subjecting plants to low temperature, high heat or stress , the plant size can be altered.

2. [Chemical control](#)

- a. There are a number of plant growth regulators like inhibitors, retardants, gibberellin, [auxins](#) and [ethylene](#) when applied to plant modify plant growth and development and they can also be utilized for managing plant and its performance.
- b. Some of the useful responses are being mentioned below:
 - i. Rooting - [Auxins](#) enhance rooting. E.g. IBA, NAA Bolting, GA enhances while MH reduces bolting.
 - ii. Modification of flower sex- [Ethylene](#) for the induction of femaleness and [gibberellins](#) for maleness.
 - iii. Flower induction - Auxin and [ethylene](#) in pineapple, cultarr in [mango](#) have positive role, [gibberellins](#) may help delaying flowering. Fruit set - [Auxins](#) and [gibberellins](#) in seedless fruits have positive role.
 - iv. Control of fruit drop : [Auxins](#) check fruit drop
 - v. Thinning - [Auxins](#) in higher concentration and phenols can be utilized to thin crop.
 - vi. Regulation of ripening - [Ethylene](#) enhances whereas [auxins](#), kinetin and [gibberellins](#) delay ripening.
 - vii. Pinching - Methyl ester
 - viii. Disbudding - NAA
 - ix. Sprout control - NAA
 - x. Abscission Enhancement by [ethylene](#) and check by gibberllins and [auxins](#).
 - xi. Storage disorder - pro-phenyl amine reduces storage disorders.
 - xii. All these techniques individually or in combination can be utilized for the management of tree and its productive functions. However, they need to be utilized after proper testing for their concentration, timings, and combinations.

Top Working

- It is a technique or method of rejuvenation where in the objective is to upgrade seedling plantations of inferior varieties with superior commercial cultivars or hybrids suitable for domestic or export market or the desired variety of the grower.
- The technique involves grafting with procured scions of desired variety on shoots emerged on pruned branches by adopting softwood grafting during monsoon season (Season of top working slightly varies from species as it also depends on availability of good shoot and scions).
- The scion shoots and the emerged shoots should be of same thickness.

Advantages

1. Increase the tree productivity /orchard productivity.
2. Conversion of old and senile orchards into productive orchards.
3. Conversion of seedling or inferior variety plantaion /orchard into new orchard with desirable variety or varieties through top working.
4. Possibility of grafting several varieties on the same plant.
5. Increasing the fruit set of orchard by grafting few shoots with polliniser varieties.
6. Additional income by selling the pruned wood during non bearing season or period.

Disadvantages

1. Chances of death of plant if not done properly or on severe [pruning](#).
2. Need good management post [pruning](#) period.
3. Loss of crop for 2-3 years
4. Chances of pest and disease occurrence (stem borer, anthracnose etc.).
5. Needs skilled labour for thinning of shoots, removal of side shoots etc.
6. Top working technique can be successfully followed in crops like [Mango](#), Sapota, Aonla, Cashew, Guava, Tamarind, Jackfruit, etc.