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CANOPY MANAGEMENT THROUGH TRAINING AND PRUNING IN FRUIT CROPS

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Abstract

The aerial orientation of branches and leaves of tree is known as canopy. Canopy management is the manipulation of tree canopy to optimize its production potential with excellent quality fruits. In many fruit crops, increase in production with enhanced fruit quality is obtained by managing canopies of short statured trees. The objective of canopy managements is to develop a better plant architecture and increase a greater number of plants per unit area. Physical techniques that control the shape, size and direction of plant growth are known as training. When the plant is stalked or tied or supported over a trellis or pergola in certain fashion or some of its parts are removed or trimmed with a view to give the plant a particular shape, this operation is called training. Intercultural operations can be easily and well adopted as well as harvesting of fruits. Proper growth and definite shape of tree and more no. plants per unit area can be obtained through canopy management

Key Words- Canopy, training, pruning, intercultural operations and management.

Introduction

The aerial orientation of branches and leaves of tree is known as canopy. In other words, it is the aerial frame work aerial structure of branches with leaves that is tree canopy. Canopy management is the manipulation of tree canopy to optimize its production potential with excellent quality fruits. In many fruit crops, increase in production with enhanced fruit quality is obtained by managing canopies of short statured trees. Pruning is defined as the judicious removal of parts like root, leaf, flower, fruit etc. to obtain good and qualitative yield. Judicious removal of plant part to obtain better and qualitative yield is termed as pruning. Pruning is started in later part of plant life, when it becomes capable to produce flower and fruits. Intercultural operations can be easily and well adopted as well as harvesting of fruits. Proper growth and definite shape of tree and more no. plants per unit area can be obtained through canopy management

OBJECTIVES OF CANOPY MANAGEMENT

- To develop a better plant architecture.

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❖ To increase a greater number of plants per unit area.

Methods		Examples
Bush system	• The height of the plant is kept to 2.0 meters. • During 1st year, the plant is cut at a height of 70cm. • No shoot is allowed to grow up to a height of 25 to 30cm. • Above this height, 3 to 4 branches are allowed to grow over which number of branches emerge out .The plants acquire the shape of bush.	Apple
Pyramid system	• The alternative tiers of horizontal branches radiating from main stem scattered all around, gives the plant an appearance of pyramid. • The branches are allowed to grow on main stem at 20cm height from ground level.	Apple
Espalier system	• Espalier (French word) meaning a fence or a fruit wall. • In this system, using poles, 3-6 rows of wires are stretched one above the other. • 1st row of wire is stretched at a height of 60-70cm, 2nd row at 130-140cm,3rd row at 200cm from ground level. • Over these wires, the branches of the trees are trained in both the directions parallel to the ground.	Apple and pear
Cordon system	• The plants are planted at a distance of 1-1.5m. • The stem of the plant is tied with wire. • The wires of 12-13 guage are fixed to the ground using cement and concrete at 4.5 to 6.0 m interval. • The plants are maintained single stemmed by practicing severe pruning of emerged branches duringwinter and summer.	Apple, pear

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Tatura trellis system	• This system is developed by David Chalmers, Ban Van den Ende and Leo van Heek at Irrigation Research Institute,Tatura,Victoria, Australia(1973). • The trellis of wire is erected using iron pole of 10.5 feet height over which 12 guage high tensile steel wire is stretched. • In between two trellises, gap of 7 ft is maintained. • Orientation of trellis- north-south direction. • Canopy managed by mechanical hedger.	Apple, pear, peach, plum, apricot, nectarine, sweet cherry, kiwifruit, grape etc.

❖ To developing the canopy with centre opened so that it gets better exposure to sun light.

TRAINING:-

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

SPECIAL METHODS OF TRAINING

Fruit crops	**Method of training**
Mango	Modified centre leader system
Grapes	Head system, Bower system, Telephone system, Kniffin system.
Guava	Open central leader system
Pomegranate	Multistem training system
Karonda	Single and double stem training system
Fig	Open central leader system
Custard apple	Single stem training system
Ber	Modified centre leader system
Apple	Modified centre leader system

Pear	Modified centre leader system, Open centre leader system in India
Apricot	Open centre leader system
Cherry	Modified centre leader system

OBJECTIVES OF TRAINING

- To develop strong framework of tree.
- To control and regulate shape of trees so that orchard cultural operations can be done easily.
- To have a better crotch angle between scaffold branches of the trees.
- To facilitate interception of sunrays to each and every part of trees.
- To remove water sprouts.
- To develop a balance between vegetative and reproductive growth of tree.

PRUNING:- Pruning is defined as the judicious removal of parts like root, leaf, flower, fruit etc. to obtain good and qualitative yield. Judicious removal of plant part to obtain better and qualitative yield is termed as pruning. Pruning is started in later part of plant life, when it becomes capable to produce flower and fruits.

OBJECTIVES OF PRUNING

- To enhance the production and quality of fruits
- To prevent formation of weak crotch angle.
- To restore root and shoot ratio.
- To regulate number and location of main scaffold branches.
- To remove criss cross branches from the tree.
- To regulate growth and fruiting.
- To regulate exposure to sunlight.

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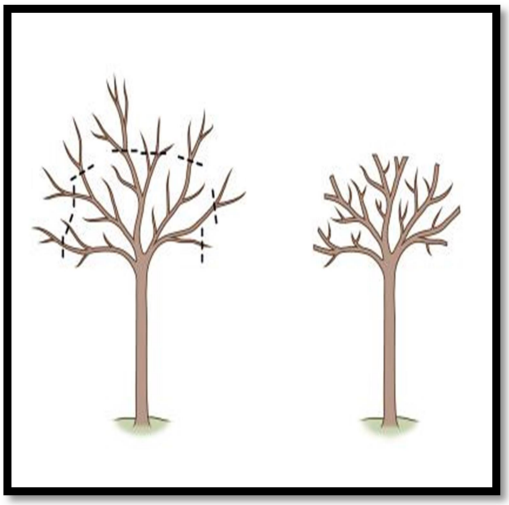
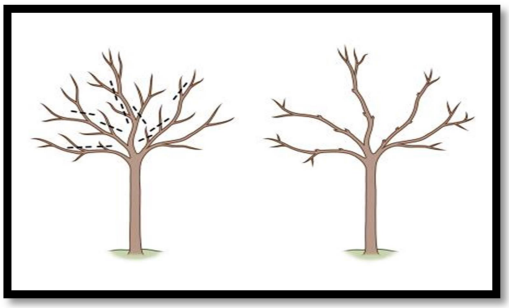
METHODS OF PRUNING:-

Heading back:- Removal of terminal portion of shoot leaving basal portion intact is termed as heading back. It stimulates the development of more growing points than corresponding thinning out.



Thinning out:- When the shoots or branches, which are considered undesirable, are removed entirely from the base or point of attachment, it is called as thinning out. These cuts allow sunshine to filter through and penetrate the tree's branches, good aeration & ventilation in tree.



Notching:- Partial ringing of a branches above a dormant lateral bud is called as notching. Notching a bud prevents the inhibitory influence of certain compounds on the bud, the supply of carbohydrates coming through the phloem from above and increase the supply of water and nitrogen from below through the xylem.

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Nicking:- Partial ringing of a branches below dormant bud is termed as nicking. It causes a greater concentration of carbohydrates in the bud and reduces the supply of water and nitrogen from below. Nicking helps to produce spurs from buds in apple.

Girdling:- Removal of 2-3 mm wide strip of barks around the stem. Girdling is a milder treatment to draw a knife around the branch so as to cut through the bark but not the wood. A wire tied very firmly round the stem also serves the same purpose. Increase fruit size.

Ringing:- In this process, a circular ring of bark measuring about 3 cm in length is removed. It hastens flowering and fruiting by allowing greater accumulation of photosynthesis in upward portion of the plant.

Dehorning:- It is developed in GB Pant University of Agriculture and Technology by Santram and Sirohi 1989.Dehorning is the removal of intermingled criss-cross branches from the plant. It is done in Vidharbha regions of Maharashtra. It is done soon after harvesting. To induce flowering. Example - In (Mango) Dasehari variety irregular bearing can be overcome by dehorning technique.

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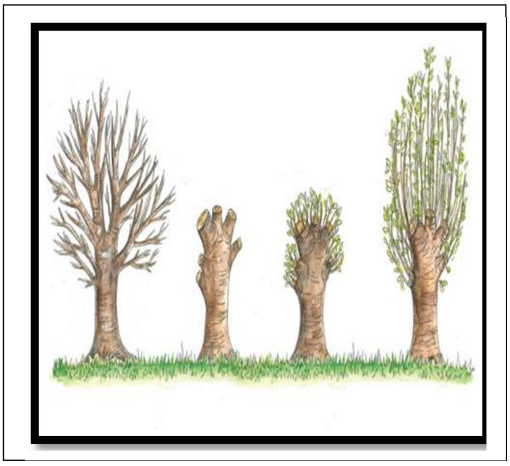
Pollarding:- More cutting back of the shoots, indiscriminately to reduce the height of the tree is called pollarding.

- This refers to the practice of removing the growing point in shade trees.
- Encourage side branches.

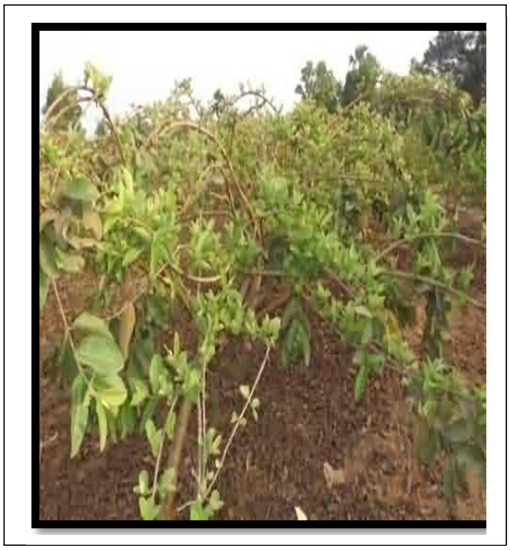


Skirting:-

- ✓ Skirting is defined as removal of low hanging branches.

Example – Mango.

Bending:- It includes removal of all small twigs excluding 30 cm terminal portion of shoot. Shoot bending is known to reduce shoot growth and to enhance flowering on fruit trees. Time of bending - in Summer-April- May for winter and in October for early summer crop. In case of bending the effect of apical dominance of the growing shoot is removed and auxins during translocation activate the dormant buds. This is usually practiced with guava in the Maharashtra state (Deccan area).



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Root pruning:- Removal of roots 40cm away from the base of the plant. It is generally accompanied by drying out of the soil. Irrigation is withheld 2-4 months before the trees are expected to flower. About a month before flowering season, some of the larger roots are exposed, and the smaller roots are removed. It is commonly practiced in Maharashtra, Madhya Pradesh, Tamil Nadu and some parts of South India.

Leaf pruning:- Removal of roots 40 cm It is defined as removal of old and senescence leaves from the plants. Prune date palm in June. The end of spring, beginning of summer, is the best time to prune old foliage. Remove all the old leaves, referred to as fronds. Taking off some of the green fronds is also recommended to cut down on the amount of maintenance the tree.

Pruning techniques	Purpose	Examples
Heading back	Reduce the tree size.	
Thinning out	To increase fruit size. To reduce the alternate bearing tendency.	Grapes, Peach Plum, Quince.
Notching	To induce the fruiting branches and increase the bearing area of the plant.	Poona Fig (Pune region of Maharashtra)

Nicking	To increase the flowering shoots. To induce spurs from buds.	Apple, Poona Fig (Pune region of Maharashtra)
Girdling	To increase the berry size.	Grapes.
Ringing	To increase fruit bud formation.	Grapes.
Dehorning	To induce flowering.	Mango (Vidharbha Region of Maharashtra)
Pollarding		Mango
Skirting	To remove lower hanging branches.	Mango
Bending	To increase the lateral branches and fruit production.	Guava(Allahabad region in UP), Apple
Root pruning	To make dwarf.to induce flowering, fruitfulness and determining the flowering time.	Mandrin (Citrus), Pomegranate.
Leaf pruning	Remove disease and dry leaves.	Datepalm

PRUNING TIME AND TECHNIQUES IN IMPORTANT FRUIT CROPS

Fruit crops	Time of pruning	Techniques
Apple	Late Winter	Light thinning coupled with heading back
Peach	Late Winter	A combination of thinning out and heading back
Plum	Late winter	A combination of thinning out and heading back
Grape (North India)	Late winter	Heading back of cane
Grape (South India)	Summer pruning (April) Winter pruning (Sept - Oct)	Heading back to one or two buds which is almost thinning out Heading back to cane
Mango	After harvest	Thinning

Phalsa (North India)	Late winter / Early Spring	Heading back
Phalsa (South India)	Dec – Jan	Heading back
Ber	Summer (April – May)	Heading back and thinning out of old branches

Conclusion:-

- ✓ Reduced the infestation of insect pests and diseases through canopy management to get good quality of fruits.
- ✓ Provided a way for interception of light and air in trees/orchard.
- ✓ Removal of dead and broken branches that minimize the chance of damage of plant.
- ✓ Intercultural operations can be easily and well adopted as well as harvesting of fruits.
- ✓ Proper growth and definite shape of tree and more no. plants per unit area can be obtained through canopy management.

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