

Week - 7 Cultivation of apricot

Objective:

In this lecture the students will be made familiar with area and production, climatic and soil requirements, varieties, rootstocks and propagation, training and pruning, manure and fertilizers application, after care, irrigation, fruit thinning, harvesting and post-harvest management of apricot

INTRODUCTION

Taxonomical details

Order = Rosales

Family = Rosaceae

Sub-family = Prunoideae

Genus = Prunus

Sub genus = Prunophora

Species = armeniaca

Basic chromosome number = 8

Somatic chromosome number = 16

Introduction

- Apricot is an important fruit crop of mid-hills and dry temperate regions of the country.
- Its fruits are attractive, delicious and highly nutritious.
- It is very rich in Vitamin- A and also contains more carbohydrates, proteins and phosphorus than majority of common fruits.
- They are mostly used as dessert, and because of perishable nature it can be canned, frozen and dried.
- The fruits are also processed into jam, nectar and squash.
- The kernels which are either sweet or bitter depending upon the variety, is a valuable byproduct.
- Sweet kernels are used in confectionary, while bitter kernels are used for oil extraction and raising rootstocks.

ORIGIN AND DISTRIBUTION

- The cultivated apricot has its origin in Western China.
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- The apricot fruit moved westward from central Asia through Iran and transcaucasus region and reached Italy during first century , to England in 13th century and to North America by 1720.
- The major apricot producing countries are China, USSR, Turkey, Italy, Spain, Greece, France and USA.
- Commercial cultivation of apricot in India is at recent origin and was started by European settler and missionaries after 1870.
- Presently, apricot is grown commercially in hills of HP, J & K, Uttarakhand and to a limited extent in North-Eastern hills.
- Some drying type of apricots are also being grown in the dry temperate regions of J & K, Kinnaur & Lahaul spiti in HP.
- In India, it occupies as area of 13115 ha with a production of 17894MT (NHB.2010).

VARITIES

- In India, apricot is grown in mid and high hills and dry temperate areas having variable climatic conditions. Varieties which are suitable for mid hills are not suitable for high hills or dry temperate region.
- About 100 varieties of cultivated apricot are available in India and most of them area of exotic origin.
- The promising varieties recommended for different regions of the country are as under:

A. Himachal Pradesh Early Late

Mid hills New castle, Early Shipley, Kaisa Shakarpara

High hills Kaisa, Nugget, Royal Suffaidda, Charmagz, St.Ambroise, Moorpark. Nari

Dry Temperate Charmagz, Suffaidda, Shakarpara, Kaisha, Halman, Nari.

B. UTTARAKHAND

Charmagz, Kaisha, Moorpark, Turkey, St.Ambroise, Shipley*s Early, Chaubattia Alankar, Chaubattia Madhu, Chaubattia Kesri

C. Jammu and Kashmir:

Ladakh:

Halman, Rakcha Karpu, Tokpopa, Narmu and Khante

Kashmir –

Turkey, Australian, Charmagz, Rogan and Shakarpara.

New Varieties for mid hills.

Early Maturing - Baiti, Beladi. Early maturing Apricot

Late - Farmingdale, Alfred.

CLIMATE AND SOIL:

- Apricot can be successfully grown at an altitude between 900 to 2000 m amsl.

- The white fleshed sweet kernelled apricots require cooler climate and are grown in dry temperate regions up to 3000 m amsl.
- The long cool winter (300-900 chilling hours), frost free and warm spring are favorable for fruiting.
- Average summer temperature between 16.6 to 32.2oC is suitable for growth and quality fruit production.
- In general, the sites located on North-Eastern aspect at lower elevation and South-Western at higher elevation are suitable for its cultivation.
- Spring frost causes extensive damage to the blossoms, which are killed when temperature falls below 4oC.
- An annual rainfall of about 100mm, well distributed throughout the season is good for normal growth and fruiting
- Apricot is quite hardy and can grow in most of the soils, but deep, fertile and well drained loamy soils are much suitable for its growth and development.
- The pH of the soil should be 6.0-6.8. In Ladakh and Kinnaur, large wild apricot trees are found growing in sandy well drained soil which is not very fertile.

PROPAGATION, POLLINATION AND NUTRITION

ROOT STOCK AND PROPAGATION

- Apricots are commercially propagated by grafting or budding on rootstocks. The multiplication through cuttings is rarely done as it gives very low rooting success.
- Wild apricot (Chulli) and wild peach seedlings are commercially used as a rootstock. However, wild apricot seedlings are generally preferred as rootstocks because the graft union is good and the trees are more vigorous than on plum and wild peach seedlings.
- Peach is a satisfactory rootstock for light soils and dry conditions, but sometimes the graft union is enlarged or rough.
- In heavy soils under excessive soil moisture conditions apricot on Myrobalan plum makes better growth.
- Different clonal rootstocks have been recommended in different regions .i.e. Myrobalan 29C and Marianna 2624 for California; GF 31, GF 8-1 for France and Marianna 7/7 for South Africa.
- For raising the seedling rootstocks, the seeds are collected from fully ripe wild apricot fruits.
- Seeds are stratified for 45-50 days at 4oC to break dormancy.
- Pre-stratified seeds are sown in nursery beds, which attain a graftable size after one year.
- The seedlings which attain pencil thickness in one year is grafted with tongue method in the month of February., while the seedlings of less thickness are T- budded in the month May-June.
- Chip budding performed in the month of September also give good success.

PLANTING AND PLANTING DENSITY

- The apricot plants are planted during the dormant season i.e. end of December to February, but early planting gives better establishment of plants.
- Undesirable trees and shrubs should be removed from the land during its initial preparations by digging and ploughing.
- On the flat land, a regular planting layout system such as square and triangular is followed, while on the hill slopes, contour system is generally practiced
- The spacing of plants varies with the soil, climate and vigour of variety and rootstocks.
- The plants are generally planted at a spacing of 6mx6m
- The pits of 1x1x1m dimension are dug about a month before planting and are filled with a mixture of soil and 50-60 kg well decomposed FYM. About 1 kg SSP and 10 L. of Chlorophyriphos (4ml/ 1 litre of water) is also added to each pit.
- In comparison to other temperate fruits, high density planting in apricot have begun rather late as there are very less dwarfing rootstocks.
- A density of 7200 trees/ha has been reported in Cv. Canino.

TRAINING AND PRUNING:

- The apricot is trained to open vase and modified centre leader system of training though the open vase system of training is more popular in hilly regions.
- One year plant is headed back at about 60-70cm above the ground and 3-5 well spaced shoots are allowed to grow in all the directions, while undesirable shoots are pinched off during summer.
- In first dormant season 3-5 primary scaffold branches arising at proper angle of 45^o, well spaced (10-15cm apart) and spirally arranged around the tree trunk are selected..
- The lowest branch should be 40-45 cm. above ground level. All the primary scaffold branches are headed back to half of their growth to get the secondary branches on them.
- During the second dormant pruning, 4-5 well spaced secondary branches are selected on each primary branches and other are removed.
- At the end of the third year the pruning is confined to the thinning of branches which are crossing or crowding each other.
- Apricot bears on spurs and laterally on one year old shoots. The spurs have a short life of 3-4 years and many of them also get broken during the fruit plucking.
- The production of young growth is therefore essential for the initiation of new spur's which generally takes place at the base of the growing laterals.
- In young bearing trees pruning should be light and of corrective type but in older trees heavy pruning should be done to maintain balance between growth and fruiting.
- In new castle apricot, 25-30 percent thinning of one year old shoots and 1/3rd heading back is recommended to improve size and fruit quality.
- After pruning, Mashobra or Chaubattia paste is applied on the cut end of the shoots.

FLOWERING

- In apricot, usually three buds develop in the axil of a leaf at each node on a shoot and spur. The central one being a vegetative bud, the two side buds are floral.
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- Time of flowering and its duration varies with the variety and the prevailing weather conditions.
- Under mid hills condition the flowering in apricot comes in the month of March and higher hills at the end of March and April.

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Pollination and fruit set

- Most of the commercial as a apricot are self fruitful and set fruits without pollinizer.
- However, varieties like Charmagz and Perfection have been reported self incompatible.
- There is generally a good fruit set in the apricot Cvs growing in appropriate climatic conditions.
- There is 40-60% fruit set in the cultivars commercially grown in mid hills, but fruit drop is to the extent of 79% in these cultivars, which occurs mostly in second week after fruit set.
- A spray of 10ppm NAA at the beginning of pit hardening reduced the pre- harvest drop.

MANURING AND FERTILIZERS:

- Apricot trees remove large amount of nutrients from the soil and require organic organic manures as well as chemical fertilizers for normal growth and fruit production.
- The manurial requirements depend upon age of tree, type of soil, climate conditions and cultural practices, which vary from region to region.
- FYM is applied during December-January along with full dose of P and K by broadcasting method.
- Nitrogen is applied in 2 doses via first half dose of N is spring 2-3 weeks before flowering and remaining half N a month later ,if irrigation facilities are available.
- Under rain-fed conditions the second half dose of N should be applied at the onset of monsoon rains or through one or two foliar sprays of urea 0.05% after fruit set
- Fertilizers should be broadcast on the soil surface under the spread of the trees and mixed with the soil.
- It should not be applied in too wet or too dry soil. In high rainfall areas with steep slopes, the band application of nitrogenous fertilizers should be preferred over broadcasting.

Table 1: Recommended fertilizers schedule for apricot in Himachal

Age of the tree (year)	FYM (kg)	CAN (g)	N (g)	SSP (g)	P ₂ O ₅ (g)	MOP (g)	K ₂ O (g)
1	10	280	70	220	35	165	100
2	15	560	140	440	70	335	200
3	20	840	210	660	105	500	300
4	25	1120	280	880	140	670	400
5	30	1400	350	1100	175	835	500
6	35	1680	420	1320	210	1000	600
7 and above	40	2000	500	1560	250	1170	700

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AFTER CARE/CULTURE

Thinning: -

- Fruit set in apricot is rather heavy which results into under sized fruits and also increases the tendency of biennial bearing.
- Fruit thinning improves fruit size, promotes regular bearing, decreases limb breakage due to heavy crop load and maintains the tree vigour
- Fruit thinning should be done within forty days after full bloom i.e. during the last week of April or first week of May, because this is the effective period influencing fruit bud formation.
- Both hand and chemical thinning method are employed.
- Depending upon the crop load, the fruit may be thinned till the fruit are 6-10cm apart. A spur should have not more than two fruits.
- Foliar spray of 25 to 50ppm NAA 20 days after fruit set is best for thinning.

ORCHARD SOIL MANAGEMENT AND WEED MANAGEMENT

- Sod culture plus mulching of basin with dry grass or black polythene is the common orchard floor management practice followed in apricot orchards.
- In apricot orchards atrazine or diuron @ 4.0kg/ha as pre-emergence and gramoxone @ 2kg/L or glyphosate @800ml/ha as post-emergence has been found effective and economical in controlling weeds.
- Mulching of trees basin with 10-15cm thick dry grass also checks the weed growth.

- During the initial 3-4 years of orchards life when the plants are young, intercropping with leguminous crops like pea, bean, soybean, cowpea, and also tomato and strawberry is recommended as they enrich the soil and also give economic returns.

IRRIGATION

- Though apricot is tolerant to dry atmosphere yet require irrigation water especially during critical periods of fruit growth and development.
- Water requirement varies with the soil, tree age, climatic conditions and irrigation method. The peak water use period is from end of April to mid of June, which coincides with fruit development period.
- Irrigation at 20 per cent depletion of soil moisture from field capacity improves fruit size and yield. Irrigation interval should be 10 days during May and 6-8 days during June.
- In all, eight irrigations in a season are sufficient for apricot in mid hill of Himachal Pradesh..

MATURITY INDICES. HARVESTING AND YIELD

- Change of surface colour, days from full bloom to harvest and fruit T.S.S are considered to be the best indices of maturity.
 - For fresh market, the fruits are plucked when surface color turn green to yellow.
 - Fully ripe fruits are, however, harvested for freezing, canning and drying.
 - In Himachal Pradesh, days from full bloom to harvest and fruit T.S.S. have been standardized for different varieties to judge the optimum time of harvest.
 - Since apricot fruits are very perishable, due care is required during harvesting, packing and transportation.
 - The fruits should be harvested in the morning hours and direct exposure of fruits to sun are avoided during grading and packing.
 - Apricot trees start fruiting at the age of 5 years and give economic yield up to 30-35years. Apricot attains full bearing age at about 8-10 years and yield about 50-80kg fruits per trees.
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Name of variety	DFFB to harvest	TSS ° Brix
Shipley's early	73 ± 4 days	15-16
New castle	84± 4 days	12-15
Blenheim	85± 4 days	15-16
Shakapara	96± 4 days	14-17
Royal	100± 4 days	12.5-15
Kaisha	92± 4 days	12-15
Alfred	86± 4 days	13-16
Baiti	82± 4 days	11-13
Beladi	81± 4 days	12-14
Farming dale	84± 4 days	12-15

POST HARVEST MANAGEMENT

- Before packing, the fruits are graded according to the size of the fruit.
- Fruits are packed in the wooden boxes or CFB cartons. Each box is lined inside with newspaper sheets keeping the margins for over hanging the flaps.
- The boxes are initially padded with pine needles at the bottom to avoid brushing of the fruits.
- Wrapping of individual fruits is not done in apricot. Then fruits are arranging in layers and top layer is covered with paper by bringing together over hanging flaps.
- The top of the box is nailed in case of wooden boxes whereas CFB carton are sealed with adhesive tape.

Table 3. Grading and packing of apricot fruits

Grade	Fruit size (mm)	No. of layers	No. of fruit per layer	Size of box (cm) Inner size
Special	42 and above	3	28-32	37X16.5X16.5
Grade-1	36-42	4	38-43	37X16.5X16.5
Grade-11	L 36	4	50-56	37X16.5X16.5

Done



- In order to save wood, small sized CFB cartons can also be used for packing of apricot fruits. These are lighter in weight easy to handle and in packing and harvesting no extra labour and expenditure like wrapping material, nails, padding material etc are required. However, they are slightly more expensive than wooden boxes and need protection from direct rains but fetch better prices because of lesser bruising damage.
- Apricot fruits can be stored at 0oC for 1-2 weeks with 85-95 per cent relative humidity.