

# Pear

Pear is one of the superior temperate fruits having good taste and flavors. The pear needs relatively less care due to its hardy nature which enables it to flourish well even on water logged soils.

Importance and uses

Pear is very delicious and juicy fruit. It is rich source of protein and mineral like phosphorus.

**B.N. - *Pyrus* sp.**

**Family - Rosaceae**

Genus *Pyrus* with three distinct groups under cultivation

1. Common pear or French pear or English pear (*Pyrus communis* L)
2. Chinese or sand pear (*Pyrus sinensis*)
3. Oriental pear (*Pyrus pyrifolia*)

**Origin-**

Common pear – Europe and Western Asia

Chinese pear – Mongolia and Mantschuria

**Varieties**

**Hilly areas** - Bartlett, Kieffer, Baggugosha

**Plains** - Punjab Gold, Punjab Soft, Punjab Nectar, Punjab Beauty, Patharnakh

**Climate-**

The pear can successfully be grown at an elevation ranging from 1200 to 2250 m.

Temperature range from 27 °C to 33 °C in summer is very congenial for pear cultivation.

**Soil-** It requires deep, heavy loam soil. The pH of the soil should be ranged between 6.0 to 7.5.

Sandy soil or soil with high lime content should be avoided.

**Propagation**

Commercial method-

Shield or T budding

Tongue grafting

Rootstock- Kainth or Mahal (*Pyrus pashia*)

**Time** – Budding = April-May or August- September when bark starts splitting

Grafting = December- January when the stock and scion were dormant

**Training and Pruning-**

The modified central leader system is the best for restricting the tree size through modified the leader branches and crop load and its quality are better regulated

**1<sup>st</sup> Year-**At planting the pear plants should be headed back to one meter height from the ground level.

**2<sup>nd</sup> Year-** The selection for 4 to 5 main limbs should be made. These main limbs should arise between 0.6 to 1.5 m length of the main trunk and spaced atleast 15 cm rustically apart from one another in an alternate fashion around the trunk. These limbs should be headed back to 2/3 of the length at the time of first pruning in January.

**3<sup>rd</sup> Year-** The required number of main limbs should be achieved by selecting limbs from the portion between 0.6 to 1.5 m of the trunk. Second winter pruning of the already selected limbs and first pruning of the newly selected main limbs should be done in January.

It should be headed back to 2/3 of their length i.e. prune to about 20-25 cm in the second winter.

The secondary branches should be headed back at different height so that the tertiary branches arise at different levels to ensure better penetration of light and air into the interior of the tree.

**4<sup>th</sup> Year-** The central leader should be headed back to a suitably placed lateral. Slight heading back of the tertiary branches should also be done.

**Note-**The yearly extended growth should be maintained extending about 23 cm.

### **Manures and fertilizers**

Nautiyal and Prakash (1990) recommended 25 g N, 15 g P<sub>2</sub>O<sub>5</sub> and 25 g potash in first year and an increase in dose in subsequent years.

#### **Time and method**

Compost + P & K – January

½ Nitrogen – February

½ Nitrogen – April

### **Irrigation**

- (i) One irrigation after compost and fertilizers application in last week of January
- (ii) Another copious irrigation may be given before flowering so that sufficient soil moisture is available throughout flowering
- (iii) Regular irrigation at 7-10 days interval during April to August as per need
- (iv) After harvest, the tree may be irrigated at 3-4 weeks interval till they reach leaf shedding stage
- (v) No need of irrigation during December - January

### **Flowering and fruiting**

February-March

**Intercropping-** Leguminous crops such mung, cowpea, gram and pea may be grown in the young and non-bearing orchards.

## Harvesting

(i) **Maturity-** The pear is a climacteric fruit which ripens on the tree as well as after harvesting. Pear fruit must be picked before tree ripe in order to develop good quality.

## Peach

B.N.- *Prunus persica*

Origin- China

### Composition and uses

- (i) Peaches are rich sources of protein as almost all essential amino acids are present.
- (ii) Peaches are also a good source of vitamins and minerals being rich in carotene, thiamine, riboflavin and niacin
- (iii) Peaches are grown both for fresh market and processing. It is suitable for juice making.
- (iv) Peaches are highly perishable fruit

### Climate

- (i) The limiting factors in peach cultivation are the minimum winter temperatures, chilling hours, spring frost, hailstorms, high humidity and desiccating winds during summer.
- (ii) Most peach cultivars need specific chilling hours at 7.2 o C for proper foliation and bloom in the spring, They fail to foliate and fruit satisfactorily on growing in warmer regions.
- (iii) The specific chilling hours at 7.2 o C is more effective in breaking the vegetative and flower buds from dormancy
- (iv) High temperature prevailing during December- January causes bloom abnormality resulting in failure to set fruit in peach. High temperature during winter not only prolongs the rest period but also counteracts the influence of chilling
- (v) Chilling requirement is the quantity of accumulated temperature (hours) below 7.2 o C which is necessary to condition buds for normal growth after the rest.
- (vi) Inadequate chilling results in delayed and sporadic foliation, deformed and non-viable flower parts and flower bud abscission. These may be crop failure and weakening of plant if the delayed defoliation is very serious.

### Soil

- (i) For commercial plantation deep (one meter) sandy-loam soil rich in organic matter is ideal.
- (ii) Oxygen supply in the root zone is an important requirement hence, compost soil having less than 10-20 per cent pores should be avoided.

- (iii) Ideal soil pH is 5.8 to 6.8.
- (iv) Acid or saline/ sodic soils should not be considered for peach cultivation
- (v) If subsoil is hard, imperious, tree may grow satisfactorily for years, but subsequently they may become weak and die.
- (vi) It is highly susceptible to waterlogged situation and prefers perfect drainage.

### **Varieties**

J.H.Hale, Alexander, Elberta, Early Grandy, Flordasun, Flordaqueen, Flordaprince, Flordagold, Shan-e- Punjab, Pratap

**Pratap-** It is early variety and takes 76 days for maturity after fruit set. The colour of its fruit is yellow with red blush and flesh colour is also yellow with red colorations. It yields 70 Kg fruit/plant. It has better keeping quality.

**Shan-e- Punjab-** This is an early cultivar, maturing in the first week of May. It produces large fruits of 5.0-5.5 cm diameter weighing about 90 gms each. The colour of the fruit is yellow with red blush, juicy and sweet with excellent taste, flesh yellow and with completely free stone. The average yield is about 70 Kg/tree.

### **Propagation**

Commercially propagated by T-budding and Tongue grafting.

Rootstock- Peach seed, Plum seed

Time of budding- Autumn season, spring or June.

September was reported to be superior than in May – June in the western hills of India.

Ring budding during April- May and T- or shield budding from June to September gave good success.

### **Training and pruning**

Young peach plants are pruned to develop a strong framework. At the time of planting, stem is cut to about 61 cm from the ground and 3 to 4 branches are allowed to develop on it. The selected branches should be well spaced and well developed on all sides, but not lower than 30 cm from the ground.

During the first dormant season, two well spaced secondary branches are selected on each main branch.

At the time of dormant pruning in the second year, secondary branches should not be except to balance the shape of the tree.

### **Planting distance**

6 m x 6 m  
 6 m x 4.5 m  
 6 m x 3.0 m

**Planting Time**

Peach planting is commonly done in late winter or early spring. In peach bar rooted plants are planted.

**Pruning of mature trees**

Bearing peach trees require heaviour and regular pruning than other temperate fruits which in principle is done too maintain a balance between growth and fruiting. Peach tree bears fruit laterally on the previous seasons growth and once a growth has fruited it will never bear again in its life.

Time- Dormant season (December- January)

**Manures and fertilizers**

Age (Years)	Farmyard manure (Kg/tree)	Nutrient(g/tree)			Fertilizer(g/tree)		
		N	P2O5	K2O	Urea (46 %)	Super phosphate	Muriate of potash
1	10	90	30	90	180	190	150
2	15	180	60	180	360	380	300
3	20	270	90	270	540	570	480
4 & above	25	500	120	500	1000	760	830

**Intercropping-** Cow pea, Soybean

**Flowering**

Peach is a precious tree commencing bearing in second year after planting.

Flowering starts in the first week of February and continuous till end of February.

Peaches are pollinated through insects. The pollen of peach is highly viable. Commercial peach are self-fruitful and set good crops without cross-pollination

J.H.Hale is perhaps only variety is self-unfruitful and requires to be pollinated by other varieties.

Fruit setting starts in the beginning of March. The fruit of Flordasun peach took 11 weeks to reach stage of harvest to maturity from the time of setting.

Fruit are borne on one year growth. A small proportion of the crop, however, is also borne on short lived spurs. Peach is a drupe fruit and its edible portion is mesocarp.

### **Harvesting and handling of fruits**

The Flordasun and Pratap peach cvs. takes 11 weeks to reach the stage of harvest maturity from the time of fruit setting. The fruit of Pratap and Flordasun cultivars starts maturity earlier of all i.e. by the end of April. The peach harvesting period of different peach cultivars in plains is from middle of May to middle of June.

The peach fruits being perishable in nature need to be handled quickly when it is ready for harvest.

The average yield of full grown tree of different varieties varies from 70 to 120 Kg.

### **Insect-pests**

#### **(i).Peach leaf curl aphis (*Brachycaudatus helichroysi*)**

Symptoms - Show curly appearance generally from March to May in the plains.

Control- Rogor 1.5 ml / liter spray after fruit set.

Spray should be repeated after 15 days.

#### **(ii) Peach black aphis (*Pterochlorus*)**

Symptoms – damage by sucking the sap from the bark of the stem, limbs and branches from April to June.

Control - Rogor 1.5 ml / liter

#### **(iii) Mite**

Symptoms – damage by sucking the sap from the bark of the stem, limbs and branches from April to June.

Control - Rogor 1.5 ml / liter

#### **(iv) Defoliating beetles**

Destroy foliage and developing fruits.

Control - Sevin 50 % WP 1 kg in 500 liters of water.

#### **(v) Peach fruit fly- (*Dacus dorsalis*)**

The incidence of this pest starts in early May in North India and continues till the crop is over.

Fruits nearing maturity are punctured by the fruit fly for egg laying. Its larvae feed and develop in the ripening fruits. The infested part of the fruit rots.

Control-Spray endosulfan 105 ml/litre after fruit set and repeat spray after 20 days.

## **Diseases**

### **(i) Shot hole** (*Stigmia carpophila*)

Dark brown scattered lesions appear on leaves which enlarge rapidly. Abscission of the diseased leaves results in shot holes.

Control - Ziram (0.2 %) at leaf fall or bud swelling stage.

### **(ii) Peach leaf curl** (*Taphrina deformans*)

Symptoms- Destroyd new leaves in the spring and cause defoliation. Leaves become thickened, reddened, twisted and punkered. Young twigs become swollen and pale and may die back.

Control – Ferbam 200 g in 100 liter of water.

### **(iii) Powdery mildew** (*Podosphaera leucotricha*)

Shoots and leaves become covered with a powdery coating during hot, dry weather.

Control – Diseased shoots should be pruned.

Spray Aureofungin 1 g per 10 liter of water.

## **Virus**

Symptoms - Mosaic mottling, leaf curling, Puckering, reduction in leaf size.

Excessive proliferation of buds

Control – Insects vectors and mites should be controlled with appropriate spray during the season to reduce the transmission of the virus.

### **Crown gall** (*Agrobacterium tumefaciens*)

Symptoms – Formation of tumors of varying sizes especially at the crown portion and sometimes on roots and other parts of the plant.

For raising disease free plant in the orchard following points may be kept in view.

- (i) Procure disease free plant material from a reliable source.
- (ii) Avoid injury to the roots and crown portion of the plant at the time of uprooting from nursery
- (iii) Keep the plants free from insects, nematodes and rodents injuries.
- (iv) Discourage the exchange of plant material without knowing its sanitary condition
- (v) Uproot and destroy the diseased plant from orchards whenever noticed.

## Plum

Plum is a strong growing small tree. This fruit found favour with the orchardists because of their phenomenal yield potential and high economic returns.

### **Origin** - China

The plum first introduced in India by Mr. Alexander Couatts in his orchard at Mashobre (Simla Hills).

### **Importance and Uses**

It is one of the richest sources of vitamin B1 (Thiamine). Plum fruit is also rich in vitamin A and riboflavin.

The plum fruit is known for its cooling effect and is considered best to overcome the effect of jaundice. The plum fruit is used extensively for the preparation of juice and squash.

### **Climate**

The Japanese plums do very well in the low and mid hill regions, ranging between 650 and 1650 meters above sea level. A few varieties of Japanese plums are also growing successfully in the sub-montane tracts of the Punjab and Haryana. Some varieties of plum can be grown successfully even in the warmer region of the plains.

Soil- The Japanese plum can even do well on inferior soils having shallow water table and high pH. However, for good growth and longer life of the plants, well-drained medium to deep loam soils are most suitable.

### **Varieties**

**Kala-Amritsari** - The most widely grown cultivar in the plains of Punjab. It is self fruitful, the yield of which will improve if pollinated with Titron. Bearing is heavily with an average yield of 40-50 Kg fruit per tree.

**Satluj Purple** - The fruit of this variety is significantly superior to Kala- Amritsar in terms of fruit weight and size. Its average yield is 29.5 kg per plant. It ripens a week earlier (around 10 th May) than other sub-tropical plum varieties and takes 81 days to mature.

**Santa Rosa** - Self fruitful and prolific bearer cultivar.

**Mariposa** - It requires cross pollinated for adequate fruit set.

### **Propagation**

**Hard wood cutting**- Dipping the basal portions (5.0-7.5 cm) of hard wood cutting for about 24 hours in 100 ppm solution of I.B.A.



## **Budding**

Method – T or Shield

**Time** - December – January

**Planting Time** – The plants do not need any earth ball and are lifted from the nursery with bare roots. Plum should be in dormant condition.

## **Flowering and fruiting**

The flowering in Japanese plum varied from 11-14 days which started on 5 March and ended on 21 March. In most of the plum varieties grown under sub-tropical conditions of Punjab and Haryana. Flowering starts in the first week of March. The fruit setting starts in the second week of March.

**Irrigation** – The irrigation should be avoided during flowering and fruit setting stage. During April and May frequent irrigations should be given for proper development of fruit size and quality. Irrigation should be stopped at the colour break stage to avoid heavy fruit drop.

## **Intercropping-**

The short stature, shallow rooted, leguminous crops like moong, mash, gram, clusterbean etc can be sown as intercrops.

**Manuring and fertilization** – for one year old plum tree given

FYM – 6kg

N -30 g

P-15 g

K- 36 g/plant/year given, double the quantity every year up to the age of 6 years. Therefore, the quantity of FYM, N, P and K should be kept constant at FYM 36 kg

N 180 g

P 90 g and K 216/tree/year

**Time**- FYM+P+K+1/2 N – December

½ N- March

**Training and pruning-** The tree should be trained to the modified leader system.

The plant is headed back to the height of 90 cm ground level after planting in the field. Two year old trees have a number of laterals, 4 or 5 of which are usually quite satisfactory but the one most favorably located around the main stem should be selected to make a proper framework.

Plum bears on one year growth as well as on shot spurs. To encourage fresh growth and to maintain a system of healthy spurs, light annual pruning should be done in January.

**Pollination and fruit setting** – The Japanese plum cultivars grown commercially require pollination to set satisfactory crops. Most Japanese plum cultivars are self unfruitful and

require cross pollination. Self fruitfulness is not a constantly stable character and may vary from year to year and area to area. In Kala Amritasari fruit set reported 27.8 per cent.

### **Harvesting and handling of fruits**

The plum fruit reaches ripe stage in 12 week after fruit set. The peak season for plum harvest in Punjab is second fortnight of May. The variety Kala- Amritasari ripens in the second week of May.

The grown up tree of plum yield about 30-50 kg of fruits per tree. Plum fruits develop the best dessert quality on the tree.

### **Insect Pests**

- (i) **Plum case worm** (*Ceramastopsychae pendula*)  
It is a serious pest and cause damage by ribbing the bark of tender twigs, branches and stem.  
Control- Endosulfan 1.5 ml/Litre
- (ii) **Hairy caterpillar**  
It is sporadic pest and feed on the leaves.  
Control- Endosulfan 1.5 ml/Litre
- (iii) **Chaffer and defoliating beetles**- It destroys the folige and developing fruits. Control- Carbaryl (Sevin) – 1.5 ml / litre
- (iv) **Bark eating caterpillars**- They cause damage by boring holes into the trunk and branches and by feeding on the bark.  
Control- Endosulfan 1.5 ml/Litre

### **Disease**

- (i) **Bacterial canker and gummosis**  
C.O – *Pseudomonas moraprunorum*  
Symptoms- The main trunk of the tree, branches, shoots, fruit spurs, blossoms, dormant buds, leaves and even fruits are attacked, The attacked bark become brown, gummy and sour- smelling.  
Control- Applying Mashobra paste after clearing the wound before the commencement of summer rains.
- (ii) **Shot holes –**  
C.O = *Stimina carpophila*  
Symptoms- Dark brown scattered lesion appear on leaves which enlarge rapidly. Abscission of the diseased area results in shot holes.  
Control- Ziram 2 g/litere spray at leaf fall stage.