

**LEC .31 PEAR - SOIL, CLIMATE, PLANTING, VARIETIES, NUTRIENT  
AND WATER MANAGEMENT, SPECIAL CULTURAL OPERATIONS,  
PHYSIOLOGICAL DISORDERS, PESTS AND DISEASES,  
MANAGEMENT PRACTICES**

**PEAR**

The probable origin of the *Pyrus* genus is mountainous China. From there it moved to East and West and in the different ecological conditions, the evolution would have taken place. Pear is next to apple in the temperate fruits. It is a rich source of carbohydrate as sugars, starch and cellulose and minerals like calcium (8 mg/100g) phosphorous (15mg/100g) and sulphur (14mg/100g).

**Climatic and soil requirements:**

Pear is adapted to a wide range to climatic condition from as low as  $-26^{\circ}\text{C}$  (in dormancy) and as high as  $45^{\circ}\text{C}$  (in growing period). However most of the pear cultivars require about 1200 hours below  $7^{\circ}\text{C}$  during winter to complete their chilling requirement in order to flower and fruit to a satisfactory level. However after bud break, at blossoming and fruiting phase, below freezing temperature will affect the crop severely. Because of its tolerance to wide range of climate and soil, it is grown both in temperate and subtropical conditions. In the tropical belt pear can be grown at an elevation of 1300-2100 M above sea level. Deep, well drained, fertile, medium textured clayey loam soil is the bet for pears. A neutral pH range of 6.0-7.5 will be ideal. A minimum soil depth of 180 cm is required. When compared to apple, pear is less tolerant to drought but more tolerant to wet soils.

**VARIETIES:**

Pear cultivars can be classified in to 3 groups viz., European types, Asian types and the hybrids of European and Asian types.

The Asian types (oriental pears) are mainly derived from *Pyrus pyrifolia*, *Pyrus ussuriensis* or their hybrids. The European types are derived from *Pyrus communis*.

**European types (Tail pears)**

### **Bartlett (or) William's Pear**

It is the most popular commercial cultivar throughout the world (except Chin & Japan). It requires more chilling hours (1500 hrs) for bud break and flowering. The fruit is ovate pyriform, medium large, green at the time of harvest turning to bright yellow after ripening. Flesh is white, melting, firm and juicy. It has originated in England. High yielding clones like Bartlett Improved I, Verona-25, Ferrera have been identified.

### **Anjou:**

Originated in France. It is fairly resistant to very low temperature and fire blight. Large fruit, skin bright green when harvest and turning to greenish yellow on ripening. Flesh is fine, mildly acidic. Fruits have high dessert quality and very long keeping quality.

### **Flemish Beauty:**

The trees are bigger with more branches. Fruit is large obovate and smooth. The flesh is pure white, very juicy free of grit cells. It is a self-fruitful variety. It can also be used a good pollenizing cultivar.

### **Max Red Bartlett:**

A bud mutant of Bartlett; plants and fruits resemble parent except that the fruit colour is dark cranberry red and shoots and leaves have a reddish tinge.

'Moonglow' and 'Magness' are two fire blight resistant varieties evolved in USA, Flesh is free from grit cells.

### **Jorgonelle:**

It is an European type with superior quality and adapted to South Indian Hills like Kodaikanal (warm winter conditions).

### **Starcrimson:**

Trees are medium sized fairly upright and spreading, Fruits medium sized, oblong ovate, pyriform, dark red change to attractive Crimson red in cold storage. Flesh cream white, moderately juicy, aromatic, high in TSS, sweet with excellent eating quality.

### **Early China**

Trees are upright and compact. Fruits round, small, greenish with red blush and very attractive.

Asian types and Hybrids (common pears)

### **Kieffer:**

It is well adapted to different climatic conditions and moderately resistant to fire blight. The fruit is brownish, gritty and hard. It is a self unfruitful variety.

**Gola:**

It is found to be suitable for lower altitude. Fruits are large, round and possess excellent keeping quality. Hence it is suitable for long distance transport.

**Le Conte:**

Suitable for lower arid hills as its chilling requirement is low. Fruits are round in shape, small in size, yellowish green in colour. But it is a blight susceptible variety.

**Patharnakh:**

This is another low chilling variety. Tolerant to very high temperature and hot winds. It possesses a peculiar quality combination of drought tolerance as well as tolerance to water logged condition. Fruits are round with prominent dots. Fruits have tough skin and hence suited for long distance transport.

**Propagation:**

Pears are commercially propagated by shield or 'T' budding and also by whip and tongue grafting.

The root-stocks are raised from the seeds of commercial pear varieties. A number of F1 hybrids of *Pyrus communis* such as Old Home x Farmingdale are multiplied clonally and used as rootstock. Quince (*Cydonia oblonga*) is another related genus which shows very good compatibility with a number of commercial cultivars and it is resistant to woolly aphids, nematodes but susceptible to Oak root fungus, fire blight, cold and excess of lime in soil. Quince clones are easily propagated by semihardwood and softwood cuttings. Some of the commercially used clones of quince are QA, QB, QC. But commercial cultivars of pear like pear Bartlett, Bosc, Eldorado need 'Old Home' as interstock as they don't have compatibility with Quince.

The chilled scions of Doyenne du comice grafted at 1.0 m height on 1.0m long shoots of Pant pear -18 stock found to be the best for higher fruit yield and quality.

**Preparation of Field and planting:**

One year ahead of planting, the field should be prepared by removing stems and roots of previous trees and shrubs, leveled giving a gentle slope for drainage of excess water during heavy rains.

For a crop on its own rootstock (pear), an initial spacing of 3 M x 2 M is given which is changed to 6 M x 4 M after 4-5 years. For pear on Quince, a planting distance of 3.5 M x 1.1 M is enough since quince has the effect of dwarfing the trees.

The pit size should be 1 M x 1 M x 1 M and the pits are filled with a mixture of soil and compost. The planting can be taken up during late fall or early spring. Immediately after planting the basin should be formed and irrigated.

### **Training and pruning:**

Pears are trained in a number of systems like pine shaped, pyramid, spindle, palmette and trellis. Among these, palette system and tatura trellis are found to be commercially superior. In tatura trellis, the rows are oriented North-South. Each tree is topped to develop two arms to form 'Y' shape in East – West direction within 50°-60° crotch angle. Tensioned wires on steel frames support the arms to a height of 4-5 M and the branches on each arm are trained on these trellises.

Bearing trees are pruned by combining heading back and thinning out. Pear bears fruit bud on spurs arising on two year old wood and a spur continues to bear for more than six years.

### **Manures and manuring:**

An optimum dose of major nutrients is 600g N, 150 g P and 300g K per tree to get the maximum yield. Normally in pears, the response to P and K can be seen only in soils of low availability of P&K. At higher altitudes where soil pH will be less than 7, the 'P' will not be available. Similarly, when the soil pH is more than 7 (alkaline condition) too, the 'P' availability will be less. Under these conditions, application of additional 'P' will increase the yield.

Nitrogen @60g/tree in two splits (2/3<sup>rd</sup> in January and 1/3<sup>rd</sup> in May) along with a basal dressing of 40g each of phosphorus and potash was found the best in Bagugosha cultivar of low-chilli pear.

### **Harvest, yield and storage:**

Fully mature fruits are harvested while still firm and green for distant market. For local market, they are left on the trees to get better quality fruits. At an interval of 3-4 days, two or

three pickings are taken up. Fruits should be carefully handled while storage and transit as the bruising is possible by rubbing with one another as well as stalk damage. From a well-maintained orchard an yield of 30 – 40 tonnes/ha/year can be expected. The unripe fruits harvested at optimum maturity can be stored for even 5 months at a temperature of  $-1^{\circ}\text{C}$ . Ripening can be accomplished by keeping at 15 to 21 and 21 to  $25^{\circ}\text{C}$  and 80-85% RH in 3-6 days depending on the cultivar. Most of the commercial cultivars require this post harvest chilling treatment for proper ripening. When such post harvest chilling treatment for proper ripening. When such post harvest cold treatment are not available, the fruits can be treated with ethylene, so that they ripen properly and get good quality (both taste and colour).