CALENDAR OPERATIONS FOR PEAR ORCHARD

Mahabir Singh Sandhu

Assistant Professor Horticulture
Agricultural Farm In-charge, Department of Agriculture, Sri Guru Granth Sahib World University
Fatehgarh Sahib, Punjab, India

PREFACE

Fruit is an integral part of human life. Fruits take care of our health as well as give us the ability to fight many diseases. These are not delicious and refreshing but are also a major source of minerals, vitamins and proteins. 80-90 percent of problems arising from malnutrition can be well managed with fruits. According to nutrition experts, an individual should consume at least 85 grams of fruit per day. The consumption of fruits as part of a balanced diet acts as a catalyst and therefore, has a special significance in our human life.

In India, it is predominantly grown in Jammu and Kashmir, Himachal Pradesh, Punjab, Uttarakhand, Haryana, Arunachal Pradesh, Assam and South India. In Jammu and Kashmir, enormous potential exists for pear cultivation due to the prevalence of the most favorable agro-climatic conditions. Among pome fruits, the Pear occupies the second position after the apple covering an area of 48,000 lakh hectares with an annual production of 2.94 lakh tonnes.

Fresh pear fruits are delicious, nutritious and have a wide variety of sizes and colors. Pear fruit is rich in both macronutrients and micronutrients, an excellent source of dietary fiber and vitamin C, carbohydrates, sugars, protein, potassium, phosphorus, vitamin A, magnesium, iron and zinc.

Like other fruits, Pear is seasonal and perishable which after maturation ripens rapidly and is thus subjected to heavy post-harvest losses. Despite the fact that the Pear production is increasing due to improved horticultural practices and improved production technology, the inadequacies in handling, storage, transportation, and marketing pose a greater problem during glut season and result in heavy post-harvest losses and fetches low prices to the farmers.

The fruit growers are interested in the maximum growth of the trees and higher production of the fruit. Soil management, weeding, manuring and fertilization, irrigation, training and pruning, insect-pest and disease management and harvesting are some of the important factors which have to be taken into consideration for getting the economic returns and maintaining the vigor of fruit trees.

This calendar deals with recent practices that have been Introduced by research workers. I have also contributed my personal experience on fruit crops.

29 June, 2022

Mahabir Singh Sandhu
JANUARY:
1. The best time for planting pear trees is from mid-December to mid-January.
2. The plant should be headed back from the height of 90cm at the time of planting.
3. Irrigation should be given immediately after planting so that soil may settle down properly around the roots. After two to three days, second light irrigation should be given.
4. A circular Basins of 3 feet radius should be prepared immediately after planting. The level of soil near the trunk should be kept slightly higher than the level of basins so that water may not come in direct contact with the trunk.
5. Farmyard manure should be mixed in the basins at the rate of 40-60 kg per tree. Irrigation should be applied immediately after it is thoroughly mixed in the basins.
6. The pruning of old pear trees should be done in January to early February before sprouting.
7. The pear is T-budded or tongue grafted on Kainth seedling. Tongue grafting is done in December-January when there is no flow of sap.
8. The fruit full of production of old trees can be restored by heading back of 3 to 4 main scaffolds about 15cm in January 1st week. Paint the cut ends with Bordeaux paint.
9. To the old orchard pear trees, no irrigation should be given in the month of January to avoid early sprouting.
10. To control shoot-fruit fly and bark canker, Decorticate the wounds with a disinfected solution. A repeated spray of 2:2:250 Bordeaux mixture on the wounds of dead wood and pruned branches of trees.
11. Prune out 15 to 20 percent of last year’s growth to allow the light into the center of the tree. Remove broken, drooping, crossed, or diseased limbs, as well as water sprouts and root suckers.
12. Pear can be grown successfully at 15-25° C in winter with a minimum temperature of 2-10°C in January.
13. The sprouted seeds should be sown in the nursery beds in January at a distance of 15 cm rows 30 cm apart, immediately. One-month-old seedlings are planted in the nursery at a distance of 10 x 60cm. These seedlings become graftable in January next year.
14. Pear trees tend to become less productive at an age of 20 years. Production on such trees can be restored by rejuvenation by heading back the 3-4 main scaffolds to about 15cm during December-January.
15. To control Shoot-fruit blight, cankers on the trunk and in the crotches should remove and the dead bark decorticated along with 2cm of the healthy bark.

FEBRUARY:
1. Late planting of pear trees is from mid-January to the first fortnight of February before they start new growth.
2. The older trees need renewing and invigorating the bearing wood of the trees. This is accomplished by thinning out the bigger branches entirely. This helps open up the trees for more light for better color.
3. To control Aphids by spraying 160 g Thiamethoxam 25 WG in 500 liters of water first at the initiation of foliage 2nd fortnight of February.
4. To control the Bark eating caterpillar, remove webbing and apply kerosene into the holes during February. Treat all the alternate host plants in the vicinity.
5. To the control aphids in Patharnakh are a single spray of 200 ml Imidaclopid 200 SL at full bloom on the 2nd-3rd week of February is effective.
6. Aphids attack the pear as soon as the spouting starts (February-April) The attack is more severe on semi-soft pears than on hard pears. They can also be controlled by spraying 200 ml Imidaclopid 200 SL in 500 liters of water first at the initiation of foliage 2nd the fortnight of February.
7. Remove diseased (fire blight) and broken limbs in February.
8. Complete planting of Pear within January when plants are still dormant for better establishment.
9. Half dose of nitrogen is added in early February before flowering.
10. Pear trees are usually trained according to the ‘modified leader system’.

MARCH:
1. The plants should be headed back at a height of 90 cm at the time of planting. The buds start spouting in February-March.
2. Prune 20% of last year’s growth to let light in.
3. Spray trees with dormant oil to control San Jose scale, mite eggs, and overwintering adult pear psylla.
4. The unwanted secondary/tertiary branches should be removed. The leader should be cut back to good places, outgrowing lateral.
5. The top most shoots shot in the center is kept as the leader but it is cut back where the immature portion starts.
6. Three to five lateral which are properly spaced at a distance of 15 to 20 cm from each other in different directions should be selected.
7. The rest scaffolds should be completely removed. Paint the cut ends with Bordeaux paint, mainly sprouts shall emerge on these stubs in March.
8. Fruit-setting in pear starts by end of March. The fruit is borne on spurs. rain in this time, thus adversely affecting fruit-set.
9. Subsequent irrigations should be given as and when required. The irrigation interval up to March maybe 10-12 days.
10. The trunk of young plants should be white washed once in March.
11. Weeds can be effectively controlled by spraying the herbicide namely hexuron 80 WP (diuron) at 4.0 kg/hectare as pre-emergence (first fortnight of march).
12. Repeating spray of Thiamethoxam 25 WG in 500 liters of water, at full bloom (first fortnight of march) and third at fruit set (2nd fortnight of march) on semi-soft pear.
13. The fruit set can be increased by spraying 20 ppm of Gibberelllic acid at the full bloom stage.
14. Spray 0.2 percent Captan at a pre-bloom stage when the trees are dormant and continuous till fall at 10 days interval.
15. Repeating spray of Bordeaux mixture to control shoot-fruit blight and bark canker.
16. To control Root-rot and Sap-wood-rot, 0.3 percent copper oxychloride 50% in March and again in June. After the leaf falls again spray with the same as in March.
17. Three foliar sprays of KNO₃ @ 1.5 percent (15 g per liter of water) at 15, 30, and 45 days after full bloom to improve fruit yield and quality of Patharnakh and semi-soft pear.

APRIL:
1. Boron deficiency may cause blossom blight to pear. Boron deficiency can be corrected by 2. Broadcasting borax in the tree basins at the rate of 100 g per tree in early fall. Such treatment usefully prevents boron deficiency for three years.
2. Irrigated the pear orchards at weekly intervals.
3. The other half dose of 1000 g nitrogen is added in the second week of April after the fruit set.
4. After an applied half dose of recommended fertilizer, lay a 10 cm layer of paddy straw (5.5 tons per acre) to cover the soil surface of the plantation to check weed, erosion, and temperature fluctuation in the pear orchard.
5. One fruit per cluster may be retained after thinning. This operation should be performed soon after the occurrence of the natural fruit drop in the middle of April for crop regulation.
6. Saving the spurs from breakage during the fruit thinning helps regular fruiting throughout the life of the pear tree.
7. Spray trees with a recommended fungicide to control pear scab at green tip stage, full bloom, and 10 days intervals until rain stop.
8. To help prevent powdery mildew, spray trees with a fungicide such as calcium polysulfide (liquid lime-sulfur) or wettable sulfur.
9. Spray application of fixed coper every five days during bloom may help control the fireblight, although causes russetting on some pear cultivars.
10. To check the attack of white ants, the trees should be given Confidor 70 WP Imidacloprid (chloro-nicotinyl) 3 g per tree.
11. To check the pear scab disease, apply bulky organic manures of the trees.

MAY:
1. T-budding in pears tree is also practiced from May to July. Pear plants can also be propagated through hard-wood cuttings in May.
2. Due to shortage of water during April, May, and June leads to the formation of hard and small fruits of poor quality. Pear trees should be irrigated at an interval of 5-7 days depending upon the soil.
3. The trunk of young plants should be white washed again in May to avoid injury from sunburn and to prevent cracking of the bark.
4. Raising of Kainth rootstock without stratification seeds should be sown in the nursery bed in the last week of September or the first week of October to become baddable in May-June.
5. To control the weeds, gramosoxone 24 WSC (paraquat) at 3 liters/hectare should be sprayed as post-emergence when the weeds are growing actively and to a height of 15-20 cm.
6. To correct the zinc deficiency, zinc sulfate 3kg + 1.5 kg unslaked lime per 500 liters of water is suitable for spraying on non-bearing trees in April- May.
7. To control Sap-wood-rot, to each full-grown tree (4-6 years) apply 10 g Bavistin 50 percent WP + 5 g Vitavax 75 percent WP mixed with 10 liters of water along the trunk and around the drip area twice once before the monsoon (April-may).
8. Spray Mancoczeb 600 g, carbendazim 100 g, and Zineb 600 g from the appearance of disease in May-June at three weeks intervals one after the other.
9. Removal of Castor and Bhang, as they act as alternate sources of mites.
10. If the crop is heavy on pear trees, fruit can thin 6” apart.
11. Monthly spray to control codling moth worm in pear orchard (May-August).
12. Drip irrigates daily or sprinkler irrigates every 2-3 weeks.

**JUNE:**
1. Maximum temperature 20-32°C and minimum temperature 10-18°C during June prevail.
2. Raising *Kainth* rootstock without stratification in October can be buddable in June.
3. As the season warms up the irrigation interval may be reduced to 10-12 days up to June.
4. The shoots appearing on the rootstock should be removed, otherwise they will have an adverse effect on the growth of plants.
5. Water is needed in the summer months, which is the active growing period when young fruits are developing.
6. Intercrops like moong, mash, and sunflower can be grown during the Kharif season.
7. Cover crops an intercrop in pear orchard for providing cover to the soil surface. Soyabean, cowpea, moong, and sunhemp are suitable to cover crops.
8. Apply frequent irrigation to check the attack of spider mites in pear orchards.
9. To the control fruit flies, spray 1250 ml (0.05%) Sumicidin 20 EC (fenvalerate) in 500 liters of water at the end of June.
   Repeated the spray at weekly intervals if required.
10. Fix fruit fly traps @16 traps acre in the first with of June for the control of fruit flies Recharge the traps if required.
11. Repeated spray of Bordeaux mixture in June to control shoot-fruit blight and bark canker.
12. Spray 0.3 percent copper oxychloride 50% in June to control root-rot and sap-wood-rot.
13. To control pear leaf spot, spray Manozeb 600 g, carbendazim 100 g, and zineb 600 g from the appearance of disease in June.
14. Control aphids if damage exceeds 50% leaves crinkled and aphids present.
15. Control mites if the damage is severe.

**JULY:**
1. Black polythene as a mulch in the orchard is increase the yield of pear by 14 percent over clean cultivation.
2. Irrigation during the rainy season is not required. As regards the color composition, dessert, and keeping quality of fruits, neither too little nor too much water is needed.
3. Cover crops are usually cut and mulched or mixed into the soil. These are preventing erosion during heavy rains and cool in summer.
4. Bearing trees should be irrigated through flood method during July at 5-7 days so that fruit size may be increased.
5. During the month of July, a rainfall requirement of 100-125 cm is considered adequate.
6. The best flavor and keeping quality in Bartlett pear develop in locations where summer is fairly hot and dry.
7. Areas exposed to excessively hot winds during July also have an adverse effect both on the fruit and foliage of pear trees.
8. In case there is the emergence of weeds during/after the rainy season, a spray of gamoxone 24 WSC (paraquat) at 3 litres/ hectare should be sprayed.
9. Preharvest spray of ethephon at 100-300 ppm in the 2nd week of July is hasten the maturity of pear fruit by two weeks.
10. Clean up fallen fruit to reduce codling moth.
11. Avoid cool nights (10°C) during a month before harvest, thus causing softening and premature ripening of pear, also impairing fruit size and quality.
12. Pear is harvested by gently lifting up the fruit until it separates from the spur. Do not twist or pull.

**AUGUST:**
1. Iron chlorosis in young trees can be controlled by spraying chlorotic young trees with a solution of 0.3 percent ferrous sulfate.
2. Rain water should not stagnate for long period in the orchard, which may cause heavy mortalities.
3. Save the fruit from bird damage before harvesting.
4. Sowing *Kainth* seeds on a raised bed in November-December, become buddable in August-September.
5. A small stalk (button) should be kept with the fruit to avoid fruits-rot, due to fungus, in storage.
6. The fruit should be picked carefully without any bruises or injuries.
7. Most pear cultivars ripen and develop the best desert quality at 15.6-21°C and RH 80-85%.
8. After harvesting, pear fruits are cooled to a temperature of -0.6 to -1.6°C to remove field heat and arrest ripening.
9. Pear fruits can be categorized into four grades and specified as A, B, C, and D grades. The highest distribution is found in B grade (46%) followed by C grade (30%) and A grade (14%). The fruits belonging to a grade A and B which accounted for 60 percent are more acceptable to the consumers.
10. The pear fruits can be graded according to AGMARK grades as such, extra-large 7.5 cm, large 6.5 cm, medium 5.5 cm, small 5.5 cm respectively.
11. For sending fruit a short distance, baskets, and CPB cartons are largely employed.
12. The base of the wooden box is given a thick layer of dried grass. A sheet of paper is then spread to cover the grass as well as the sides of the box. The fruit is arranged in the box in layers. The uppermost layer is covered with paper. It is then followed by a layer of dried grass. Then, the lid is closed with the help of nails.
13. After harvesting fruit in August, the trees should be irrigated at an interval of 20 days or so up to end of October.
14. Copper deficiency can be controlled by spraying copper sulfate at the rate of 0.5 percent after fruit harvest.
15. Clean up all fallen fruits from the soil surface and overripe fruits still remaining on the pear tree.

**SEPTEMBER:**
1. Fully mature fruits of *Kainth* are collected in September. These fruits are dumped for softening and easy extraction of seed. The seeds need stratification before sowing in the field or raised nursery bed.
2. The seed extracted from mature fruits in the last week of September or the first week of October can be sown directly.
3. Raised root suckers from the underneath of old pear trees become buddable during September.
4. Pear trees should be irrigated at a 15-day interval in September.
5. Too full-grown pear trees of Punjab beauty, a supplemental dose of urea @ 500 g is given in September in addition to recommended fertilizer doses to get better fruit size and higher yield and fruit size.
6. To control of bark-eating caterpillar, remove webbing and apply kerosene into the hole during September.
7. To each full-grown tree (4-6 years) apply 10 g Bavistin 50 WP + Vitavax 75 percent WP mixed with 10 liters of water along the trunk and around the drip area twice-once after the monsoon (September-October).
8. At leaf fall, remove and destroy or compost leaves to prevent the spread of sooty blotch.

**OCTOBER:**
1. The seeds of *Kainth* are placed in moist sand in wooden boxes in layers one above the other during October.
2. The pear trees should be irrigated at an interval of 20 days or so up to the end of October.
3. In hills, 60-100 kg FYM, 700 N and K₂O each, and 350 g P₂O₅ are given to ten-year-old pear trees.
4. Rake and burn fruit trees leave for insect and disease control.
5. In October, cash crops such as peas, strawberries, and vegetables are grown in the vacant space between the rows of trees.
6. The main plowing operations are carried out when the trees are least active. The optimum period falls in October.

**NOVEMBER:**
1. The *Kaith* seeds are also sown on raised beds during November.
2. The rootsuckers (Batankan) are collected from the underneath of old pear trees during November.
3. Establishment of mother stool beds for mound layering, the planting of mother stock is done at a distance of 40 to 45 cm plant to plant and 1.5 meters from rootstock to rootstock during the month of November-December.
4. Continue regular irrigation until fall rains and cold weather arrive.
5. Apply the paint mixture from two inches below the soil surface to two feet above.
6. Intercrops like wheat, peas, grams, and senji may be grown during rabi season in young and rejuvenated pear orchards to get some income during the non-bearing period.

**DECEMBER:**
1. The *Kaith* seeds are also sown on the raised bed during December. These seeds seedlings become graftable in December.
2. The root suckers raised from underneath old pear trees are headed back leaving two to three buds from the ground level and planted 10 cm in rows 30 cm apart leaving 60 cm space after every two rows. Those suckers are graftable during December-January with the scion cultivars.
3. The pear plants can also be raised through hard-wood cuttings. The cuttings are prepared from juvenile shoots during December.
4. Incompatibility of Quince A can be overcome by double grafting with old home or hardy varieties. Mound layering is generally done during December to propagate this rootstock clonally.
5. Some fruit plants such as peach, plum, and phalsa may also be interplanted as fillers.
6. Under sub-tropical conditions of Punjab, the entire dose of farmyard manure, superphosphate, and muriate of potash is added in December.
7. If rainfall is below normal, irrigated the pear trees once during the winter, allowing the water to soak to a depth of 2 to 3 feet to encourage deep rooting.
8. Dormant disease control applications use copper, lime sulfur (calcium polysulfide), Bordeaux mixture and (a mix of powered copper and hydrated lime) to prevent certain fungal diseases like leaf curl, shoot hole and scab.
9. Pear trees are slightly higher level than the surrounding area to reduce the chance of damage by frost.
10. Collect and burn or carefully plough under the fallen leaves to minimize ascospore discharge and consequent infection with the disease. Prune the trees to promote good aeration.

REFERENCES