

Avocado: Propagation, Cost of cultivation, Yield in India

Radha and Kaushal Kumar

Introduction:

Avocado (*Persia americana*) is originated from tropical America. It originated in Mexico and Central America, probable from more than one wild species. In India, it was brought at some stage in first decade of 19th century. Avocado is the maximum nutritive among end result. The pulp is wealthy in proteins (as much as 4%) and fat (up to 30%), however low in carbohydrates. The fat is just like olive oil in composition and is widely used in the guidance of cosmetics. The avocado is rich in copper and iron, two mineral parts of antioxidant enzymes, avocados again show their nutritional quality. Potassium is also excessive in avocados, as it's far has one of the highest potassium prices in tropical and non-tropical fruits and vegetables.

Propagation of Avocado tree

- ❖ In India, avocado is normally propagated via seeds. The viability of seeds of avocado is quite short (2 to 3 weeks) but this could be advanced by means of storing the seed in dry peat or

sand at 50°C. Removal of seed coat before sowing speeds up germination. In India maximum of the timber grown are seedlings in origin. The seeds taken from mature end result are sown directly in the nursery or in polyethylene bags.



- ❖ When 8-365 days old, the seedlings are equipped for transplanting. The seedling took more time to begin fruiting and the yield and fruit excellent is distinctly variable. Due to cross-pollination, there may be extremely good variability within the seedlings constituted of seeds, it is plant as indicated for the formation of industrial orchards. These seedlings flowers take long time to produce first crop and fruit fine in unreliable.

Radha and Kaushal Kumar

Ph.D. Scholar Department of Fruit Science, College of Horticulture Acharya Narendra Deva University of Agriculture and Technology, Kumarganj, Ayodhya
Research Scholar Department of Fruit Science, College of Horticulture Rani Lakshmi bai central Agriculture university Jhansi

Vegetative propagation of advanced clones of avocado through budding or grafting is important to keep away from these problems. In India, presently, there is no commercial nursery engaged in vegetative propagation of avocado, neither is there any initiative either at governmental or non-public level to undertake nursery manufacturing of avocado planting material.

A guide to Avocado cultivation cost, yield and growing practices

- ❖ The avocado is associated with lower blood pressure because it's miles excessive in monounsaturated fat. All amino acids are found inside the avocado. Another advantage is avocados had been shown to preserve exact LDL cholesterol while reducing LDL cholesterol. Avocado is specially used fresh, in sandwich filling or in salads.
- ❖ It is also used in preparing ice creams and milk shakes and the pulp may be preserved via freezing.
- ❖ Three antifungal compounds have been isolated from the peel extracts of immature culmination of the Green cultivar. The avocados are found, to contain excessive proteins, their caloric cost ranges from 1500 to 2250 calories per Kg. Our researchers are in a view that the protein content of an

avocado is three times that of an apple, nearly equal to that of the local plantain and much less than olive fruit.

Avocado production in India

- ❖ The production in India is very limited and they are not commercial plantation of Avocado. The agro-climatic conditions prevailing in various parts of the country appear to be favourable for bringing more areas under avocado.
- ❖ Presently, plantations are not well organized and they are scattered. Also, quite a good number of improved varieties are now available with higher yield potential. Avocados are grown scattered in southern tropical states like Tamil Nadu, Kerala, Karnataka, and Maharashtra. Also popular in the north-eastern Himalayan state of Sikkim on hill slopes at elevations if 800- 1,600 meters. Avocados are grown at higher elevations frequently, to prevent soil erosion.
- ❖ Avocado is grown successfully in neighbouring Sri Lanka, where good quality fruits are harvested during May to August and December to January at different regions. Similar agro-climatic conditions to Sri Lanka are available in the Andaman's and Nicobar Islands and in the tropical southern India.

❖ With proper varietal selection it should be possible to exploit so the possibility of out-of-season production, thus enhancing the availability Avocado fruits produced in the country can be marketed without much difficulty, particularly to meet the requirement of the growing tourist industry. The mainland India and the Andaman and Nicobar Islands are attracting foreign tourists in a large number of places, where avocado could find a good market access. Avocado has also a good export potential.

Different varieties of Avocado for Commercial Cultivation

Hass -Predominantly Guatemalan along with some Mexican genes; a chance seedling of unknown parentage, from California; Flower group A; Oval shaped fruit, small to medium sized fruits with pebbly green skin forming purplish black when ripened and creamy, pale green flesh available throughout the year; 66-70 % recovery.

Fuerte -Mexican x Guatemalan hybrid; collected by Carl Schmidt in 1911 from Atlixco, Puebla, Mexico; named 'Fuerte' meaning 'strong' or 'hardy'. Flower group B; Pear shaped, medium to large size weighing 170 - 500g, smooth green fruits of high quality with creamy, pale green flesh, easily peeled

and available late fall through spring; 75-77 % recovery.

Gwen -Gwen is a selection of 'Thille', which is a seedling of Hass. Plump, oval, green, medium to large sized fruits turning dull when ripe, pebbly and thick in appearance with creamy, pale green flesh and is available in late winter through late summer..

Bacon- Ahybrid of Mexican x Guatemalan; Flower group B; Fruit ovate; mid-winter green-skinned variety of good quality, medium- sized weighing 170- 510g; Skin thin, green and glossy with leathery texture; Early maturing with very pale yellow green flesh, recovery 61%, precious with consistent production and higher yields than Fuerte.

Zutano - A hybrid from Mexican x Guatemalan; Flower group B; Pear shaped, large fruit with shiny thin, yellow green skin and light textured pale green flesh with light taste and moderate shelf life available fall through early winter. Recovery 65 %. Susceptible to anthracnose and is moderately susceptible to Phytophthora root rot. Can tolerate saline

A hybrid from 'Anaheim' X 'Nabal'; Round shaped, medium to large sized fruits weighing 270 - 680g; slightly pebbly thick green skin and buttery flesh with good taste and good shelf life, available summer to early fall.

Pinkerton- Guatemalan hybrid; a semi dwarf; Flower group A, Fruit pyriform, medium size weighing 230-425g, seed size is relatively small, mid-season maturity with attractive cream coloured flesh, recovery 82%. Resistant to Anthracnose pest.

Xanh- Big sized fruits (170-180mm in length and 400-600gm weight), good quality fruits with light yellow pulp colour.

Pollock- It is oblong to pear shaped; very large, up to 5 lbs (2.27 kg); skin smooth; flesh green near skin, contains 3 to 5% oil; seed large, frequently loose in cavity. Season: early July to August or Oct. Shy-bearing and too large but of superior quality.

TKD 1 -These fruits are of medium sized and round in shape. Trees upright and semi spreading hence suited for high density planting. Yield 264kg/tree. Fruits are sweet TSS8° brix, fat 23.8%, protein 1.35%.

CHES A-1 - Fruits borne in clusters of 3 to 5, medium size green, round weigh 200-250 g. ripen in May-June and September-October. Total Soluble Solids - 10.5 Brix. Pulp- pale yellow, Recovery - 60%. Yield 300-500 fruit per tree.

Field preparation and planting method of Avocado

- ❖ The avocado plantation in a notably new location required care in selection of the sorts. The kinds of both A and B

companies should be decided on and their flowering have to overlap.

- ❖ The proportion of A and B organization types may be 1:1 or 2:1. Avocado is planted out to a distance of 6 to 12 meters relying on the power of range and its growth habit. For varieties having a spreading kind of boom, like Fuerte, al much broader spacing must be given.
- ❖ In areas prone to excess water, they should be planted on mounds as avocados can't face up to waterlogging. In Sikkim, a planting distance of 10 x 10 meters on hills slopes is preferred. While in south India, when it's far planted with coffee the plating distance varies from 6meter to 12 meters. The pits of 1 cubic meter length are dug for the duration of April - May and full of farmyard manure and pinnacle soil (1:1 ratio) before planting. Planting is carried out in June- July or sometimes in September.

Fertilizers and manures for Avocado Trees

- ❖ Avocados need heavy manuring, and alertness of nitrogen has been located to be maximum essential. In general, young avocado bushes must receive N, P₂O₅ and K₂O in a

proportion of 1:1:1 and older trees in the proportion of 2:1:2.

- ❖ At a pH of above 7, iron deficiency signs and symptoms may seem which may be corrected by making use of iron chelate at the price of 35 g/tree. Various micronutrients (Fe, Zn, B) have profound effects on tree growth, nutrient uptake and yield of avocado.
- ❖ Integrated nutrient management with inorganic fertilizer, supplemented via natural manuring, is advocated for avocado. In Coorg region and the humid tropical location of Karnataka, Kerala and Tamilnadu the fertilizers must be implemented in two split doses in May - June and September - October.
- ❖ While in Northern India fertilizer may be carried out in two split doses in March-April and September-October or just earlier than and after the onset of the monsoon. Foliar utility of zinc sulphate (0.5 according to cent) and different micro nutrients can be undertaken in April-May or September - October.

Training and pruning of Avocado trees

- ❖ The plants need to be given mild pruning in initial levels for growing an open centre canopy. After that pruning

is not often practiced, especially in types along with Pollock pinnacle is accomplished to reduce the tree size at the same time as in spreading types like Fuerte, branches are thinned and shortened. The losing and ground touching branches need to be pruned for ease in cultural practices.

- ❖ Heavy pruning has been discovered to promote excessive vegetative growth, consequently reducing the yield

Irrigation requirement for Avocado trees

- ❖ In India, avocado is grown in those regions wherein rainfall is excessive and pretty wherein rainfall is excessive and pretty distributed throughout the year. Therefore it's miles grown beneath rain fed situations and irrigation is normally no longer given.

❖ Irrigation at periods of 3 to 4 weeks throughout the dry months is beneficial. Sprinkler irrigation has been reported to improve the fruit length and oil percent and advances harvesting time. To keep away from moisture stress for the duration of winter season, mulching with dry grass/dry leaves is desirable. Flooding is not advised as it promotes root rot incidence.

Intercultural and weed management of Avocado

- ❖ Deep cultivation in avocado orchards should be avoided due to floor roots. Intercropping with legumes or shallow-rooted crops may be achieved in younger orchards which can smother weeds also.
- ❖ The monoculture plantation of avocado may be maintained with sod culture. The weeds are major troubles in high rainfall zones of south India. The use of gramexone or Ghyphosate is suggested to govern weeds.
- ❖ In espresso primarily based plantation system, scruffling performed for espresso is sufficient to manipulate weed. Care ought to be taken that the roots of avocado now not disturbed during scruffling.

Flowering, pollination and fruiting of Avocado

- ❖ Avocado begins bearing at 5-6 years after planting and has a marked tendency to biennial bearing which is standard in a number of other fruit trees. But there's specific hassle in fruit set as a ways as avocado concerned. In avocado, the inflorescence is a compound panicle.
- ❖ The character vegetation are morphologically bisexual having fertile male and female organs.

- ❖ But they showcase dichogamy viz., the male and female organs coming to maturity at one of a kind time thereby fending off self-pollination of an individual flower. In dichogamy, they may be protogynous viz., the female components coming to maturity earlier than male organs. The type of dichogamy in avocado is a complex one unique to avocado-the diurnally synchronous dichogamy.



NEW ERA
AGRICULTURE MAGAZINE

- ❖ The female parts of all flowers that open at a time in a selected tree will mature concurrently and therefore behave functionally as female flower. The male elements of identical plants will come to maturity when the vegetation open where next time and therefore all of them behave as male flora at some point of that period. By this the crosspollination between flowers of the equal tree are also ruled out.

- ❖ The situation is in addition worsened by means of the reality that each one the bushes of a specific institution could be exhibiting the equal sex segment at a selected time and the opposite intercourse segment at some stage in the next opening of the identical flower.
- ❖ So if the one of the organization are planting in mass, they'll not set fruit and each group requires inter-planting of bushes of mother institution, the two corporations being with one another.

Fruit harvesting and yield of Avocado

- ❖ Avocado plant life raised from seeds begin bearing 5 to 6 years after planting even as graded flora starts yielding in 3-four years. Mature fruits of red varieties trade their coloration from red to maroon, whereas culmination of inexperienced varieties come to be greenish-yellow.
- ❖ Fruits are equipped for harvest while the colour of seed coat within the fruit adjustments from yellowish white to darkish brown. Mature culmination ripen six to 10 days after harvesting.
- ❖ The fruits remain difficult so long as they stay on the trees, softening simplest after harvest. The yield tiers from approximately 100 to 500 fruits consistent with tree. In Sikkim, fruits

are harvested all through July to October is the same old harvesting time. In Coorg region culmination are to be had from June to October. In Tamil Nadu, July-August is the peak harvest time.

Post-harvest handling, storage and marketing

- ❖ Avocados do now not ripen at the tree, and fruits soften simplest after they're picked. Fruits want to be picked carefully. Avocados have to be harvested at the right stage of maturity.
- ❖ In India, fruits of 250 to three hundred grams in length are preferred. Most famous varieties are Hass, Fuerte and Green. Hard, mature end result are harvested and allowed to ripen all through shipping and distribution.
- ❖ Unripe avocados may be stored for up to four weeks at 5 to 8°C. Presently, there's no prepared marketing gadget for avocado as the manufacturing is small and production areas are scattered.
- ❖ **The cost of cultivation of avocado for Fertilizers** - Rs.10,000
- ❖ The cost of cultivation of avocado for Manures- Rs.10,000
- ❖ The cost of cultivation of avocado for Herbicide- Rs.10,000

- ❖ The cost of cultivation of avocado for Pruning- Rs.20,000
- ❖ The cost of cultivation of avocado for Irrigation- Rs.50,000
- ❖ Miscellaneous charges - Rs.30,000
- ❖ The cost of cultivation of avocado for land preparation - Rs.50,000
- ❖ The cost of cultivation of avocado harvesting - Rs. 30,000
- ❖ The cost involved for Agricultural Equipment - Rs.20,000
- ❖ Labour charges- Rs.50,000
- ❖ Costs involved for Marketing- Rs.30,000
- ❖ 10% of total charges- Rs.56,000
- ❖ The total cost involved in Avocado cultivation is about - Rs. 5,96,000.

