

Cultivation of Almond

Production Technology of Fruit and Plantation crops
B.Sc. (Ag) 2nd year 3(2+1)

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Botanical Description

Botanical name : *Prunus dulcis*

Family : Rosaceae

Chromosome no. : $2n = 28$

ORIGIN AND DISTRIBUTION :

Origination place : South west and Central Asia

Major growing countries : United States, Spain ,Iran , Morocco, Italy, Australia

Leading producer : United States, 2002742 tones(63% of the total)

Major state in india : Jammu and Kashmir

Nutritional value per 100kg :

CONTENT	QUANTITY
Water	4.4 g (4%)
Energy	2423 kHz
Carbohydrates	21.6 g (22%)
Protein	21.2 g (21%)
Fat	49.9 g (50%)
Vitamin B2	1.014 mg
Vitamin E	25.6 g
Potassium	705 mg
Calcium	264 mg
Magnesium	268 mg
Manganese	2.285 mg
Phosphorus	484 mg

Botany:

- a. Botanically Almond is a Drupe (3.5 to 5.0 cm).
- b. Edible part is Nut.
- c. Sometime flower bud comes both terminally and laterally which is advantageous.
- d. Almond produce peryginous self incompatible flowers.
- e. It is cross pollinated.
- f. Usually the almond tree is a deciduous and reaches up to 10 meters in height, with a trunk of up to 30 to 35 cm in diameter.



Health benefits of almonds: -

- Almonds are a source of many vitamins and minerals.
- Good for bone health.
- Regulating cholesterol.
- Good for heart health.
- Boost immune power.
- Good for skin.
- It have Anti-Inflammatory properties.
- Help in regulating blood pressure.
- Boost energy.
- Preventing colon cancer.
- Protecting from diabetic situations.
- Relieving from constipation.
- Help in weight loss program.

Climatic and soil Requirements :

- ❑ Almonds can be grown above 800 to 3500 meter above sea level.
- ❑ Almond grows best in Mediterranean climates with warm, dry summers and mild, wet winters.
- ❑ The required soil PH is 07 to 8.5.
- ❑ The optimal temperature for their growth is between 15°C to 32 °C and the tree buds have a chilling requirement of 250 to 600 hours below 7.2 °C to break dormancy.
- ❑ Almond plants are very sensitive to cool and frost conditions, hence areas with heavy frost conditions are not suitable for almond cultivation.

Avoid plantation in very cold areas where frost conditions take place frequently since these fruit trees are very sensitive to the frost conditions.

Cultivars:-

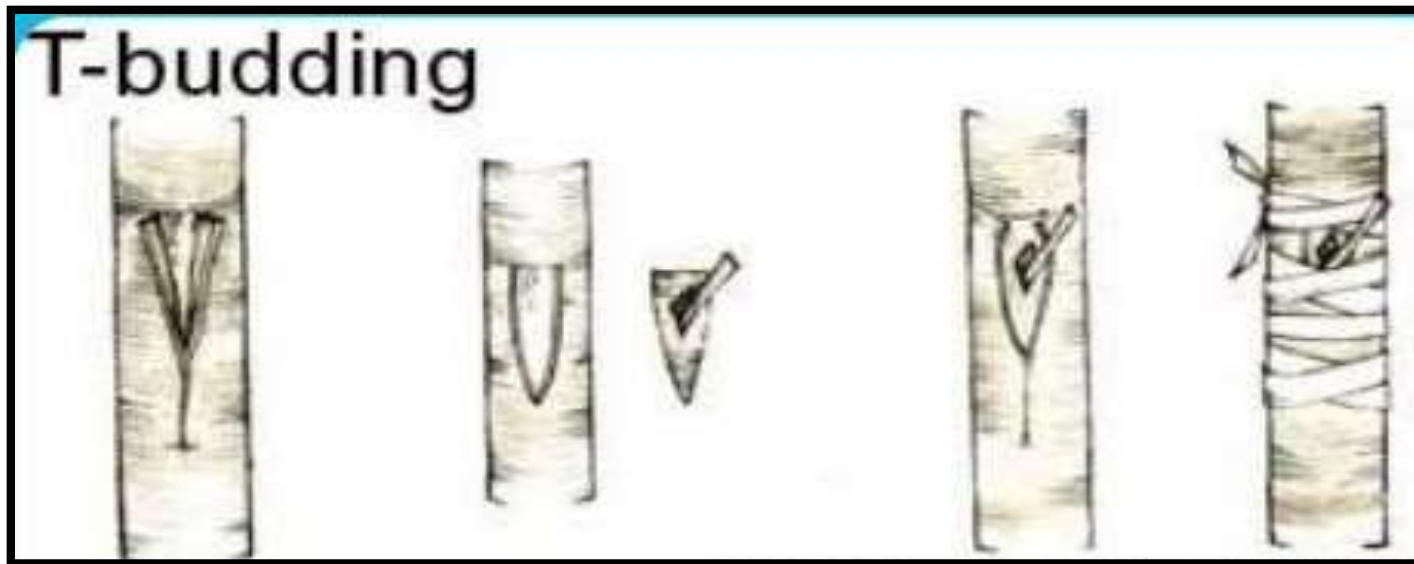
1. *Nonpareil* :- Most grown in California which is high in yielding, nutty flavor, crunchy texture, medium size kernel, and have great market potential in the market.
2. *Neplus*:-Large nut, dark brown skin, Early & great pollenizer for the Nonpareil
3. *Carmel*:-2nd most important commercial cultivar after **Nonpareil**, produce high-quality nut, longer, larger and dark brown kernel, etc
4. *Peerless*:-very attractive bisque colored hard shell, dark brown and small kernel having great nutty taste

5. **Price:-** Another popular variety, rear small nuts, darker skin, have kernel which is slightly bitter with nutty taste
6. **Butte:-** Softer shell, small kernel, resembles the Padre variety in appearance and taste
7. **Sonora:-** Largest kernel, longer, smoother and light colored, great nutty taste, crunchy consistency, etc.
8. **Monterey:-** Highly productive variety, larger & longer kernels having larger, soft shell
9. **Aldrich:-** Produces a plump, medium-sized nut having medium and hard plump

Propagation of Almond :

Root stock, Hardwood cutting, Grafting(mid august), Budding , Micro propagation

T Budding of Almond : - First week of march



Plantation of Almond :-

The budded plants should be planted in a square or hexagonal system of plantation should be followed by keeping a distance of 6 meters apart from each other for normal plantation depending on the soil type and availability of irrigation.

However, for planting with medium-high density system, the spacing should be 4.0 meter by 4.0 meter and for high-density plantation, the spacing should be 3.5 meters to 2.5 meters.

Irrigation :-

The requirement of irrigation in commercial almond farming is an important task that plays an important role in nut production and varies, depending on climate and soil type, used for cultivation. However, water to be supply on the basis of plant need.

Irrigating with the drip and channel irrigation system is the best way of irrigation for maximum utilization of water. However, excess water from the plant base should be drained out, especially in the case of heavy rains and floods because this fruit plants are very sensitive to the water-stagnation.



MANURING

Almonds trees plants are the heavy feeder. Adding about 5 tonnes of farmyard manure per hectare are the time of land preparation

Apply Nitrogen in about two to three equal doses.

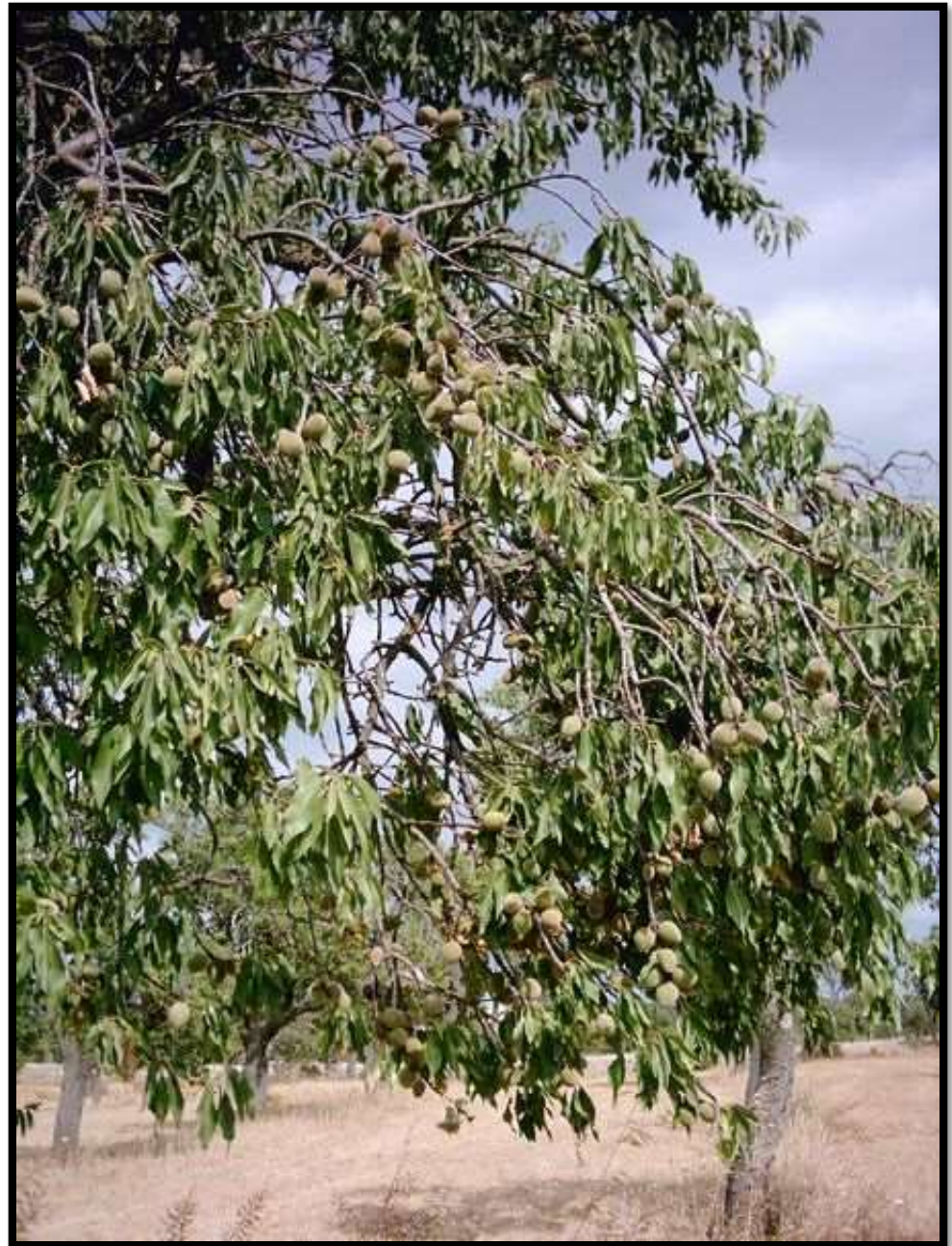
Compost :-10kg/plant, Nitrogen :- 30gm/plant, Phosphorus :- 20gm/plant , Potash :- 20gm/plant

Give the first one with DAP and MOP, few days before the expected blooming.

Provide the 2nd with Urea after about 20 to 25 days for good fruit setting. The 3rd one should be given with Urea, a couple of weeks later than the previous one. Foliar spray of urea @ 2 % is found to be beneficial in promoting the fruit set, but formation and in the growth of other crucial stages such as flowering.

TREE :-

- ❖ Deciduous tree.
- ❖ Growing 4–10 m in height
- ❖ Flowers are white to pale pink, 3–5 cm (1–2 in) diameter with five petals, Produced singly or in pairs and appearing before the leaves in early spring.



Bud Break / Bloom

- February and March



Training and pruning :

- a) Almond plants are trained according to modified leader system.
- b) It bears mostly on spurs which live for five years. Thus in young trees, only diseased, dry wood and the branches which are interfering with each other should be removed.
- c) Water sprouts arising on the stem should also be removed as early as possible.
- d) In old bearing trees, pruning is done to remove one-fifth of the growth every year.

INFLORESCENCE OF ALMOND:



**INFLORESCENCE OF TEMPERATE
ALMOND**



**INFLORESCENCE OF SUB-TROPICAL
ALMOND**

Blossoming of bitter almond tree



Diseases of Almond :-

1. Hull Rot

Rhizopus stolonifer



2. Brown Rot Blossom Blight

Monolinia laxa

3. Anthracnose

Colletotrichum acutatum

4. Alternaria leaf spot

Alternaria alternata



Monilia on a tender fruit Almond

Insect of Almond :-

**1. Pavement ant
(Southern fire ant)**

Tetramorium caespitum

Solenopsis xyloni, S. molesta



Pavement ant

2. Twig Borer

3. Mites

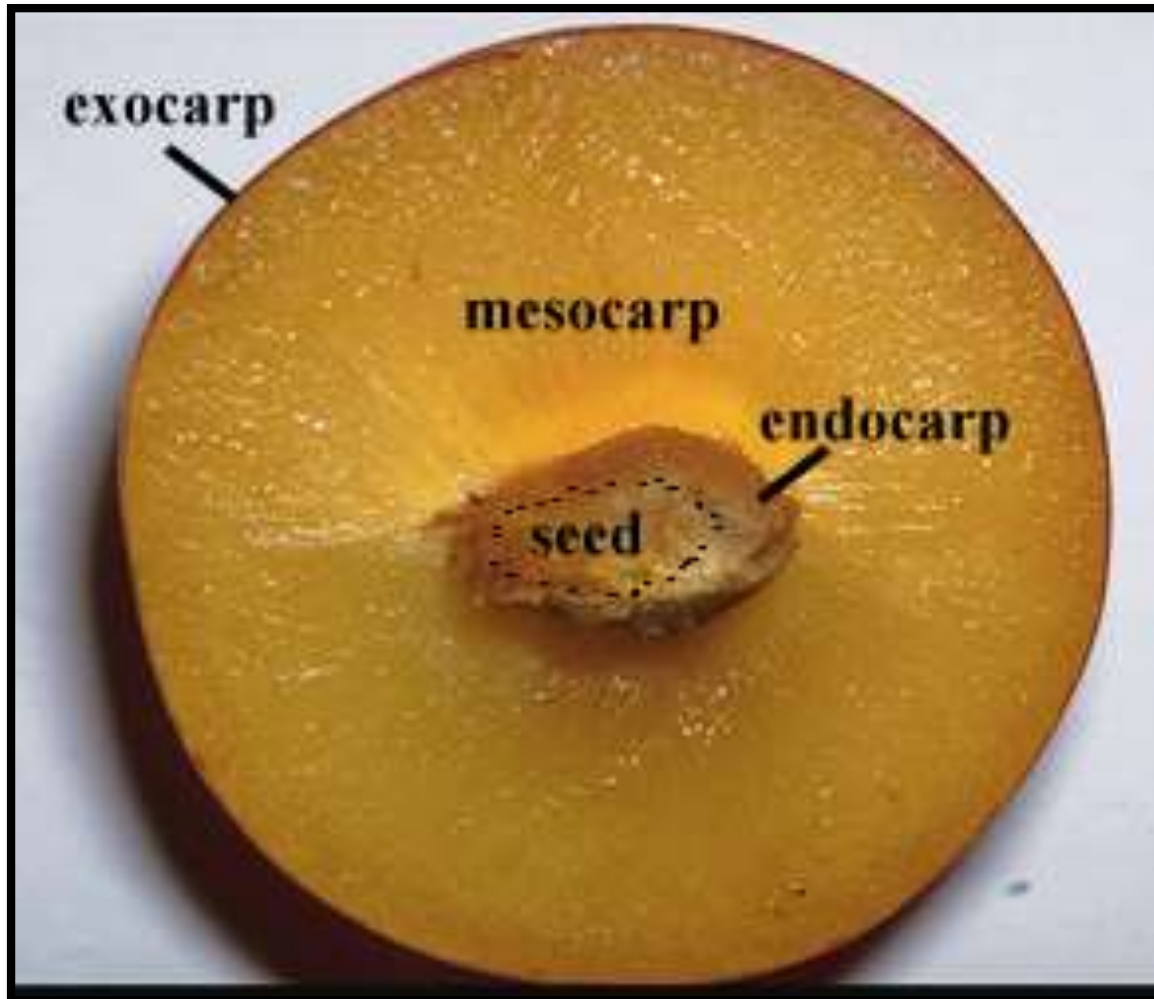
4. Navel orange worm

Hull Split

- July = August



Fruit of Almond



Age of starting production in plant :-

Start producing fruit at the age of 3 to 4 years but the maximum production at the age of 6 to 7 year up to 50 years

Harvesting : - In the late July, the shell becomes starts splitting open and start color changes from green to yellow with slight cracks on the shell.

Harvesting Indices :

- *Hull split of 95% of nuts.*
- *Ripened nuts should be prevented from bird damage*

Post harvest Methods :

- Shaking
- Raking/Sweeping =Dry on orchard floor
- Pickup
- Hulling/Shelling
- Processing

- Shaking



- Raking / Sweeping



- Picking



- Hulling



- Processing



Yield of Almond Farming :-

The yield of almond farming or cultivation depends soil type, facility of irrigation, application of manure and other farm management skills, practiced during the cultivation.

However, averagely, one can easily obtain about more than 2 tonnes of nuts per hectare annually per year.

STORAGE:-

- A. Before going for storage nuts should be treated at 17.8*c for 48 hours to destroy the egg and pest of previously applied naval orange pest
- B. Almond can be stored for Months under room temperature
- C. It can also be stored for more years if kept at 0 to 7*c

Processing = Products



Dormancy:-

- November=January



**THANK
YOU**