

PHALSA



Dr. P. K. Yadav
Professor and Head

Botanical name: Grewia subinaequalis

Family: Tiliaceae

Origin: India

Fruit type: Drupe

Edible part: Epicarp & Mesocarp

Chromosome no. 36

Synonyms: Shukri, dhaman



Introduction

- ▶ Phalsa is hardy and small bushy in nature and preferred as an ideal crop for growing in arid and hot region
- ▶ It can be grown successfully on the slop of hills. It is also preferred for dryland horticulture and silvi- horticulture.
- ▶ Ripe phalsa fruit consumed as fresh as desserts or processed into refreshing fruit.

Uses and Composition

- ▶ The phalsa fruits contain high carbohydrate (6.8 to 25.8 %), sugar and acid (0.42 to 2.5 %) and very little protein and fat.
- ▶ The citric acid is the major acid in the fruit with traces amount of malic acid. The fruits are rich in vitamins and mineral. It contains high amount of vitamin A and high antioxidant value. The phalsa fruits are rich in flavonoids, carotenoids and anthocyanins.
- ▶ The phalsa fruits are rich in potassium, which plays important role in energy metabolism and normalizing blood pressure.
- ▶ The seed of phalsa contains 5 percent oil, which is bright yellow in colour and contains 65 % linoleic acid, 13 .5 % oleic acid and 11% stearic acid

Conti..

Nutrients	Nutrient value per 100g edible portion
Moisture (%)	80.8
Carbohydrate (%)	21.1
Protein (%)	1.5
Fat (%)	0.9
Fibre (%)	1.2
Calcium (mg)	129
Phosphorus (mg)	39
Potassium (mg)	375
Iron (mg)	3.1
Vitamin B3 (mg)	0.3
Vitamin C (mg)	22
Vitamin A (carotene) ug	419

Uses

- ▶ Phalsa has been used in various medicines since Vedic period. The ripe fruits have a cooling effect on body
- ▶ The fruits cures thirst and burning sensation, remove and cure inflammations.
- ▶ The fruit is also good for the troubles of throat. It also helps to remove the dead foetus. The unripe fruits and bark of phalsa plant cures biliousness and *Vata and Kapha*.
- ▶ The bark is used as a soap substitute in some areas. The mucilaginous extract of the bark is used in clarifying sugar and jiggery.

Origin & Distribution

- ▶ It is native to India and other countries like Nepal, Pakistan, Bangladesh, Cambodia and Thailand. It was introduced into the Philippines before 1914 and also naturalized in Australia.
- ▶ In India, it is commercially cultivated in the states of Punjab, Haryana, Rajasthan, Uttar Pradesh and Madhya Pradesh. Besides these states, it is also cultivated on a limited scale in the states of Maharashtra, Gujarat, Andhra Pradesh, Bihar and West Bengal.
- ▶ In India, Punjab is the leading state of phalsa in terms of area & production which is 30 ha & 196 ton respectively.
- ▶ In Rajasthan, phalsa can be grown in Dholpur, Ajmer, Jaipur

Soil & Climate

- ▶ It can be grown on a wide range of soils, even on moderately alkaline soils.
- ▶ It is considered to be one of the hardiest fruits and is drought resistant.
- ▶ Fields where other fruit crops are unsuccessful, Phalsa can be grown with success. best results are obtained in well drained loamy soils. Suitable soil pH is 6.1 to 6.5 (mildly acidic).
- ▶ Under waterlogged conditions, plants become chlorotic and make poor growth.
- ▶ The phalsa can grow successfully. All over the country except at higher elevations.
- ▶ It can stand the frost, and The plants can tolerate temperatures as high as 44°C.
- ▶ Phalsa plants can also thrive well in the humid tracts of the coastal India.

Varieties

There are no distinct varieties known in phalsa. People have given some local names such as 'Local' and 'Sarbati'. **No more varieties are available in phalsa.**

▶ Propagation

Phalsa is propagated by seed as well as by vegetative means.

▶ A. Seed propagation

- Freshly extracted seeds are used for raising seedlings.
- Seeds lose their viability under ordinary storage after 90 to 100 days.
- The viability of seeds can be retained for a period of six months under cold storage.
- Seeds require 15-20 days for germination and seedlings get ready for transplanting in the field by 3-4 months.

▶ B. Vegetative propagation

There are mainly three vegetative propagation methods used for phalsa.

Conti...

▶ **1. Cutting**

- Several vegetative methods are reported to be successful in phalsa.
- It has been reported that treating phalsa cuttings with 100 ppm indole butyric acid (IBA) for 24 hours yields 60% success.
- according to another report, as high as 70% success can be achieved from hard wood cuttings treated with 100 ppm IBA.

▶ **2. Layering**

- Propagation of phalsa by air layering has also been tried by some workers.
- According to one report, air layering gives 50% success when the air layers are treated with a mixture of IBA, NAA, 2, 4-D and boron in 10, 000, 10,000, 1000 and 100 ppm, respectively.

▶ **3. Grafting**

- A technique of soft wood grafting has been recommended by some workers for phalsa in which rootstocks are grown in situ for a year or more.
- Almost 100% success has been recorded in this method.

PLANTING

- ▶ Phalsa plants can be planted either during July– August or February– March when the plants have shed their leaves.
- ▶ About 8–12 months old seedlings are better for planting.
- ▶ Usually planting is done 2.5 to 3.0 meters apart both ways, thus, accommodating about 1100 –1500 seedlings per hectare.
- ▶ phalsa is well suited for close planting (density orchards).
- ▶ For increasing the plant population paired row (double row) planting system can be tried.
- ▶ Due to increased population the total yield is increased by 20–30 percent.
- ▶ N, P and K@ 100, 40 and 25 kg /ha respectively should be applied.
- ▶ Among the micro–nutrients, zinc and iron are found to influence berry size and juiciness.

Fertilizer

- ▶ Chundawat and Gupta (1974) found that application of 15 kg farmyard manure and 125 g Nitrogen per bush after sprouting is optimum for high production.
- ▶ Pundir and Pathak (1981) recorded higher yield of phalsa by application of 100 kg Nitrogen, 40 kg Phosphorus and 25 Kg potassium per hectare.
- ▶ Singh and Singh (2003) found that 100g Nitrogen /plant gave higher yield. Over all it can be summarized that 100g nitrogen, 40g phosphorus and 40 g potassium per plant should be given. The best time of application of fertilizer and manure is February after the pruning of the trees.

Irrigation

- ▶ The Phalsa can withstand drought and does not demand irrigation as frequently as other fruit trees.
- ▶ Adequate supply of irrigation water at regular intervals especially during flowering and fruiting periods can go a long way for ensuring better health of plants and more profitable yields.
- ▶ The time and amount of irrigation may vary greatly according to the soil, climate, rainfall and age of plants.
- ▶ Generally, one irrigation every 15 to 20 days in summer (except during rains) and once every 4–6 weeks in winter is considered adequate.
- ▶ Adequate amount of irrigation to the plants during the time of development of berries, will make them bigger in size and juicier.

Intercropping

- ▶ Since phalsa is commonly grown near cities and towns, it can profitably be intercropped with vegetables and this practice can pay good dividends to the growers.
- ▶ The phalsa plants have to be maintained in a bush form by regular annual pruning and this can allow the space left in between the lines to be profitably used for growing vegetable crops.
- ▶ The phalsa can also be grown as an intercrop in the mango or other fruit crop orchards particularly during the initial years.

Flowering and Fruiting:

- ▶ Generally, phalsa is a cross-pollinated fruit crop and pollination is completed by the insect such as honey bees, wasp, etc. However, some flowers are self-pollinated.
- ▶ phalsa flower are hermaphrodite but cross pollination is essential for better fruit set. Generally found that fruit set (61.60%) in open pollination was significantly higher than the self-pollination (23.00%). Irrespective of modes of pollination, there were non-significant differences on fruit set in tall (45.00%) and dwarf (38.01%) types of phalsa. The main insect pollinators for phalsa are *Apis florea*, *A. mellifera*, *A. dorsata*, *Megachile bicolor* and *Chalicodoma cephalotes* were observed foraging both nectar and pollen, while other foraged for nectar only.

Conti..

- ▶ For increases the size of the fruits use two sprays of 2.5 ppm 2,4-D at flowering and 8 days after flowering increased yield by 74%. The spray of 60 ppm GA and 5 ppm , 2,4,5-T was also found increasing yield by 64 %. These sprays also reduce the time of harvesting. Gibberellic acid has been reported to improve fruit set and increase fruit size

Harvesting and Yield:

- ▶ After 40-45 days of flowering, the fruits start ripening.
- ▶ For harvesting, hand picking is employed.
- ▶ The period of harvesting continues up to the first week of June.
- ▶ Since ripening in phalsa is not uniform, several pickings are required.
- ▶ The fruits are highly perishable and utmost care should be taken to avoid damage to them.
- ▶ Harvesting continue for almost one month and is done several times at alternate days due to gradual and steady ripening of fruits on clusters. The average fruit yield is 5 to 10 kg per plant

Post Harvest Handling and Value Addition

- ▶ The fruits are highly perishable and must be marketed and utilized within a day or two. The mature fruits can be stored for 48 hours while ripe fruits can be stored for 24 hours. Thereafter fruits colour turns to dark red and fruit became flaccid and taste of fruits became bitter due to fermentation. Due to shorter shelf life local markets sell the fruits in near.
- ▶ The phalsa is used for preparation of Phalsa juice (sarbat) and Phalsa squash. Phalsa juice ferments very rapidly and preservative such as sodium benzoate must be used for longer storage of the juice

Pest

1. Mealy bug (*Drosicha mangifera*)

Mango mealy bug (*Drosicha mangiferae*) has been reported to cause severe damage to plant. The fruit set is severely affected by the attack of this insect.

controlled by spray of 0.4% monocrotophos or diazinon.

2. Bark eating caterpillar (*Inderbela tetraonis*)

It is a polyphagous pest which found in neglected orchards. The insect makes tunnels in trunk and branches of trees. The insect eat bark in the night. The effected plants show retarded growth and reduced productivity .

Controll injecting kerosene oil or petrol in the holes by plugging the mouth with mud. This operation can be performed once 10 a year at pruning time.

Conti....

3. Leaf eating caterpillar (*Euprodctis fraterna*):

The caterpillar causes heavy losses to leaves. Fully-grown caterpillars are reddish brown in colour with dark coloured head. It pupates on the plants. These usually attack the plants in the night and in case of severe infestation entire plant may be defoliated .

Controlled by Spray with Carbaryl and Endrin (0.1%).

Diseases

1. Leaf spot disease It is a fungal disease caused by *Cercospora grewiae*.

On affected leaves tiny brown lesions appear on both sides of the leaves. Cause premature leaf fall particularly during rainy season.

It can be controlled by spraying Dithane Z- 78 at 0.3% concentration or Blitox 0.2% concentration.

2. Rust: caused by *Dasturella grewiae*. Light brown spot develop on the lower side of leaves as a result of the infection. This results in defoliation of leaves

Controlled by: Alternate Sprays of DM -45 (0.3%) and Sulfex (0.2%) at 15 days interval

Storage

- ▶ Phalsa fruits are highly perishable and, therefore, they should be utilized within 24 hours of harvesting.
- ▶ Immediate marketing is possible only when the orchards are located nearby some cities.