

## Growing Phalsa: Simple Techniques for Better Harvests

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Phalsa, a plant originating from India, has been utilized since ancient times, tracing back to the Vedic era. Its ripe fruits are enjoyed fresh or processed into refreshing beverages, particularly favored during the hot summer season. However, due to its short shelf life, Phalsa is primarily sold locally.



Its commercial cultivation is concentrated mainly in the northern and western parts of India. Known by different names in various Indian languages-such as Phalsa, dhamin, parusha, and shukri in Hindi, dhaman in Punjabi, man-bijal in Assamese, phalsa and shukri in Bengali, mirgi chara and pharasakoli in Oriya, phalsa in Gujarati, phalsi in Maharashtra, jana, nallajana, phutiki in Telugu, palisa, tadachi in Tamil, buttiyudippe and tadasala in Kannada.

### Origin and Distribution

Phalsa thrives in the wild across regions spanning Uttar Pradesh, Rajasthan, Punjab, Haryana, Madhya Pradesh, West Bengal, and various parts of South India. However, its cultivation is predominantly limited to small-scale operations in Punjab, Haryana, Rajasthan, Gujarat, and Uttar Pradesh. Commercial plantations are often established in close proximity to major urban centers. The total cultivated area for Phalsa is less than 1000 hectares. Challenges such as small fruit size, prolonged ripening periods, the necessity for frequent harvesting, and the fruits are highly perishable nature restrict the crop's popularity. Beyond India, Phalsa is also grown in countries including Pakistan, Nepal, Bangladesh, Laos, Sri Lanka, Thailand, the Philippines, Vietnam, and on an experimental basis in certain regions of the United States of America.

### Nutrient composition

- Phalsa fruits are rich in carbohydrates (ranging from 6.8% to 25.8%), sugars, and acids (0.42% to 2.5%), with minimal amounts of protein and fat. The primary acid present is citric acid, accompanied by traces of malic acid.
- These fruits boast abundant vitamins and minerals, with particularly high levels of vitamin A and significant antioxidant content.
- Phalsa fruits are abundant in flavonoids, carotenoids, and anthocyanins, which are known for their antioxidant properties. Anthocyanins, in particular, aid in reducing the risk of heart disease by impeding cholesterol formation.

- Potassium, found abundantly in Phalsa fruits, plays a crucial role in energy metabolism and helps regulate blood pressure.
- The flavonoids present in Phalsa contribute to its antioxidant activity, while anthocyanins aid in preventing heart disease by inhibiting cholesterol formation.
- Rich in potassium, Phalsa fruits play a significant role in energy metabolism and assist in maintaining healthy blood pressure levels.

### Medicinal value

- Ripe fruits of Phalsa induce a cooling sensation in the body upon consumption.
- They possess tonic qualities and are reputed for their aphrodisiac properties.
- Phalsa fruits are known to alleviate thirst and burning sensations while addressing and treating inflammations.
- They are reputed to be beneficial for heart health, blood disorders, fevers, and diarrhea.
- Additionally, these fruits are considered effective for alleviating throat discomfort.
- They are also believed to aid in the expulsion of a nonviable fetus.

### Other species

*Grewia glabra*, *Grewia micrococas*, *Grewia optiva*, *Grewia tilifolia*, and *Grewia belosa*

### Varieties

- Phalsa lacks standardized varieties but exhibits regional preferences, such as tall and short types in Hissar, Haryana, with the dwarf variant being more productive.
- Variations in sugar content, with the dwarf variety having higher total and non-reducing sugars, and differences in seed protein content, distinguish Phalsa cultivars.
- In Kanpur, varieties like Local and Sharbati are cultivated, with limited variability observed within the Phalsa species.

### Botany

- Phalsa plant: A medium-sized, drooping shrub, capable of growing up to 4 meters tall if left unpruned.
- Stem: Gray with rough bark, producing several long, slender, drooping branches covered in dense hairs when young.
- Leaves: Alternately arranged, simple, broadly cordate to ovate with pointed tips, measuring 20 cm in length and 15 cm in width, with coarse toothed edges and 1-2 cm petioles.
- Inflorescence: Clusters of 3 to 5 flowered axillary cymes, grouped in clusters of 2 to 8, typically 16 to 25 cm long. Receptacle hairy on the upper half.
- Flowers: Small, 1 to 2 cm in diameter, bright orange-yellow. Five oblong, glabrous sepals, and five petals measuring 5 to 7 cm long, also orange-yellow.
- Fruits: Very small, initially purple, ripening to crimson red. Produced in clusters on 2 to 3 cm long peduncles. Botanically a drupe, measuring 1.0 to 2.0 cm in diameter and 1.0 to 1.5 cm in length, weighing 1.0 to 2.0g. Ripening occurs 45 to 55 days after flowering.
- Seeds: Typically one per fruit, hemispherical, 5 to 7 mm in size.



### Climate

- Phalsa is a subtropical fruit plant adaptable to diverse climates, except high altitudes, thriving up to 1,000 m elevation.
- Ideal growth occurs in regions with distinct summer and winter seasons; deciduous in winter, yet remains evergreen in warmer areas without dormancy.

- Temperature tolerance ranges from 3°C to 45°C, with light frost resilience but necessitates protection from extreme cold.
- Optimal fruit ripening, color development, and taste require ample sunlight and warm to hot temperatures.
- Overall, Phalsa is versatile, with adaptable growth patterns depending on climate, crucial for its successful cultivation and fruit quality.

### Soil

Phalsa demonstrates robust growth across diverse soil types, thriving in fine sand, clay, or even limestone, although it flourishes best in loamy soil. An ideal pH range of 6.1 to 6.5 is recommended for optimal growth. Frequently cultivated in marginal lands near urban markets for convenient fruit distribution, its yield and fruit quality are notably enhanced when cultivated in well-drained loamy soil.

### Propagation

- Phalsa propagation methods include seed, cutting, grafting, and layering, with seed propagation being the most popular.
- Seeds are extracted from ripe fruits, with approximately one to two kilograms needed for one hectare of seedling production. Seeds remain viable for 90 to 100 days at normal temperatures and up to six months in cold storage.
- Hardwood cuttings are commonly used for propagation, with wood type and planting date influencing rooting. Treatment with auxins such as IAA, IBA, or NAA enhances rooting of challenging hardwood cuttings.
- Layering is another method used for propagation, with auxin treatment improving rooting in both ground and air layers.
- Softwood grafting has shown success in certain experiments, with defoliation of the scion one to two weeks before grafting increasing graft success rates.

### Planting

Phalsa plants are typically spaced at distances of 2.5 to 4 meters, with 1000 to 1500 plants per hectare, though higher yields can be achieved through denser planting. Pair row planting, with rows 60 cm apart and pairs of rows 3 m apart, has shown increased yields. As Phalsa is often grown in marginal lands, pits of 60 cm x 60 cm x 60 cm should be prepared, filled with a mixture of soil and farmyard manure. Planting of eight to twelve-month-old seedlings is recommended, with planting seasons in July-August or February.

### Irrigation

Phalsa, known for its drought tolerance, generally doesn't demand frequent irrigation. However, studies reveal that irrigating during fruit set and development stages enhances both yield and fruit quality. It's recommended to irrigate once after fertilizer application, followed by additional irrigation every 15-20 days during the fruit growth phase to optimize yield and quality.

### Pruning

Regular pruning is crucial for Phalsa cultivation, favoring low-growing dwarf or bushy varieties for optimal fruit quality. Fruit-bearing occurs on current season's growth, necessitating annual pruning to promote new shoots and enhance yield. Moderate pruning to around 1 meter height is recommended for better fruit production compared to drastic trimming.

### Nutrition Management

- Phalsa plants exhibit positive reactions to nitrogen, with phosphorus enhancing fruit sugar levels and potassium increasing acidity.

- Optimal yield is achieved with a fertilizer ratio of 100:40:25 kg/ha.
- For high production, it's recommended to apply 15 kg farmyard manure and 125 g nitrogen per bush after sprouting.

### **Flowering and Fruiting**

Phalsa plants typically begin bearing fruit 15 to 18 months after planting, with optimal yields realized after three years. Flowering initiates in February-March, lasting approximately one month, with small yellow flowers. While Phalsa flowers are hermaphroditic, cross-pollination is necessary for improved fruit set; open pollination results in significantly higher fruit set compared to self-pollination.

### **Harvesting and yield**

- Phalsa fruits ripen within 40 to 55 days after flowering, typically harvested during April and May as they transition from green to crimson red.
- Mature crimson red fruits are selected for distant markets, while dark purple ripe fruits are preferred for local markets.
- Harvesting, done manually due to small size and staggered ripening, extends for about a month, occurring every alternate day to accommodate gradual ripening within clusters.
- Average fruit yield ranges from 5 to 10 kg per plant.

### **Post-harvest handling and value addition**

Phalsa fruits have a short shelf life, requiring quick utilization within one to two days. While mature fruits last up to 48 hours, ripe ones deteriorate within 24 hours, turning dark red and bitter due to fermentation. Consequently, local markets are preferred for immediate sales. In Pakistan, 80% of phalsa producers sell their crops to contractors pre-harvest, receiving only 27% of the retail price. Phalsa is commonly used for making juice and squash, but preserving the juice requires sodium benzoate due to rapid fermentation.

### **Future Scope**

- Phalsa fruits present significant opportunities for commercial cultivation in India due to increasing demand and unique flavor profiles.
- Processing Phalsa into various products like juices, jams, and syrups can diversify the market and enhance economic value.
- With growing interest in natural and functional foods, Phalsa's nutritional benefits offer potential in the health and wellness industry.
- Phalsa cultivation supports environmental conservation and rural livelihoods, with scope for sustainable agricultural practices and export market expansion.

### **Conclusion**

In conclusion, the production technology of Phalsa fruit offers promising opportunities for agricultural advancement and economic growth in India. Through optimized agronomic practices, value addition, and market development, Phalsa cultivation can be further enhanced to meet increasing demand both domestically and internationally. Additionally, focusing on sustainability, research and development, and rural empowerment can ensure the long-term viability and prosperity of Phalsa production. With its unique flavor, nutritional benefits, and versatility, Phalsa stands as a valuable crop contributing to the agricultural landscape and the well-being of communities across the country.