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Dragon Fruit Farming in India: The Rise of a New Wonder Crop

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Dragon fruit is a tropical climbing cactus that is native to Central and South America. It is a member of the Cactaceae family and is known as the "Queen of the Night." This important exotic crop was brought to India in the late 1990s. Vietnam, China, and Indonesia are major producers worldwide, while Gujarat, Maharashtra, and Karnataka are important growing regions in India. The plant favours subtropical regions with well-drained, slightly acidic soil and temperatures about 25°C. Stem cuttings are the primary method of propagation, and the skin and flesh colours (red, white, and yellow) of the many types differ. Strong supports and nutrient-rich soil with fertilisers like FYM and NPK are essential for cultivation. Drip irrigation increases production despite its resistance to drought. Frequent trimming enhances the yield and health of plants.Flowering takes place from May to October, and because of nocturnal blooms and self-incompatibility, it frequently requires manual pollination. It is susceptible to diseases including anthracnose and stem rot, but it is comparatively resistant to pests. Fruit size and sweetness can be increased during off-season production by utilising night-break lighting technologies. Dragon fruit is a successful and sustainable crop for modern farming and has a variety of uses in juices, jams, and essential oils.

Introduction

Dragon fruit is a non-climacteric, tropical climbing vine that is a member of the Cactaceae family. It is native to the tropical and subtropical forests of Mexico and South America. (Mizrahi et al.,1996). It is a long day plant that produces large, fragrant, nocturnal flowers that bloom at night that why it is known as night-blooming cereus," Honolulu queen," belle of the night," and "queen of the night" (Anushi et al., 2024).Dragon fruit growing countries are Vietnam, China, Indonesia, Thailand, Taiwan, Malaysia, Philippines, Cambodia, India, USA, Australia, Israel, and South Africa. Three major countries—Vietnam, China, and Indonesia—produce more than 93% of the world's dragon fruit. Over half (51.1%) of global production comes from Vietnam alone. (Wakchaure et al., 2020).In India major dragon fruit Producing state are Gujrat, Karnataka, Maharashtra accounting for around 70% of total production in 2020 (Kantaria et al. 2024).This crop was brought to India in the late 1990s, and it is currently one of the most significant new exotic fruit crops for the nation's economy. (Rymbai et al., 2025).The fruits are low in calories and high in calcium (6.3-8.8 mg/100 g), phosphorus (30.2-36.1 mg/100 g), iron(0.5-0.61 mg/100 g), protein (0.16-0.23%), fat (0.21-0.61%), and fibre (0.7-0.9%). (Jalgaonkar et al., 2020)Dragon fruit is a profitable crop that requires little water and can be grown with little supervision.

Climate and Soil Requirements

Dragon fruit is a semi-epiphytic plant that need Warm, tropical to subtropical Climate with plenty of sunshine and moderate humidity are ideal for dragon fruit growth. The ideal temperature for its growth is around 25 °C. When fruits are developing on the plant, it requires a temperature between 30 and 35 °C, but it can withstand temperatures as high as 40

°C and as low as 7 °C. Dragon fruit could be grown in a wide range of soils. The most important factor is that the soil should be well drained as it does not tolerate water logging. Dragon fruit prefers slightly acidic soil.

Propagation Methods

The dragon fruit can be multiplied both asexually (by cuttings) and sexually (by seed). Plants produced from seeds have a longer juvenile phase and are not true to type. The most effective and quick method of propagating dragon fruit is by cuttings (Figure 1). The slant-cut, 15–30 m long stem is utilised for planting. After 12 to 18 months of planting, plants produced from stem cuttings start to blossom (Prasad et al., 2022)

Figure 1: Stem cutting of Dragon fruit

Varieties

On the basis of skin and flesh colour:

• Red varieties: Moroccan red, Jumbo red, Vietnam red (pink skin with dark red flesh).

• White varieties: Delight , David bowie, LA woman, Alice (pink skinned and white fleshed).

•Yellow varieties: Israeli yellow, Colombia yellow , Golden dragon (Yellow skinned fruits with white flesh.)

Planting

In a single post system, planting is typically done at a distance of 3x3 m . Single posts are permitted to branch and drop down after reaching a vertical height of 1.5 to 2 meters. To make it easier for them to climb, dragon fruit can be placed close to the poles. Depending on the climate, each pole may have two to four plants.(Figure 2)

Figure 2: In each pole Four Plant is planted.

Nutrient Management

Dragon fruit plants are heavy feeder of fertilizer .When planting dragon fruit, it is often required to use 10–15 kg of FYM and 100 g of SSP per plant and For the first two years, each plant needs about 300 g N, 200 g P, and 200 g K annually. The mature plant should get four equal split doses of 540 g N, 720 g P, and 300 g K spaced three months apart.

Irrigation Management

During the hot and dry days, a plant needs about 2-4 liters of water twice a week(Jana & Basu, 2025).Dragon fruit's shallow root system is mainly found in 15 to 30 cm of soil. In order to supply enough water during dry seasons, irrigation must be guaranteed. Dragon fruit development and productivity are greatly impacted by scientific irrigation techniques, of which drip irrigation is thought to be one of the most successful.(Figure 3)

Figure 3: Drip irrigation in Dragon Fruit Orchard

Training and Pruning

The dragon fruit needs strong support structures like concrete or wooden posts and wall columns because it is a climbing cactus with epiphytic tendencies. Securing the immature stem to these columns is crucial for supporting and promoting the growth of aerial roots. Maintaining particular cladode densities is advised for maximum productivity: 120–160 per pole or 12–16 per square meter in mop top training systems, and 12–15 per running meter in high density trellis systems. (Kakade et al., 2025).Pruning increase Productivity and quality of fruit and also reduce insect pest infestation. Best time of pruning is between Nov -Dec.

Flowering and Fruiting

The dragon fruit flowers are white and bloom at night (Figure 4). Their pleasant aroma attracts pollinators. Flowering normally takes place from May to August and the fruits are harvested 30-40 days after setting. Dragon fruit can flower and fruit at the same time. In their natural habitat, dragon fruit are pollinated by frugivorous bats or moths. Due to a high degree of herkogamy and a partial self-incompatibility, most varieties are scarce of natural pollinators and need to be hand-pollinated. Dragon fruit flowering is typically in waves and each wave lasts approximately one week .The number of flowering waves varies between species of pitaya, from 1 to 8.Most ideal harvesting period for dragon fruit is June−October in India. The plant start yielding after 12-15 months from the date of planting.

Figure 4: White Hermaphrodite Flower of Dragon fruit

Pest and Disease Management

Dragon fruit is relatively pest-free. The common pests reported are ants, scale insects, mealy bugs, beetles, borers.

- Anthracnose (*Colletotrichum* spp.) is one of the major diseases which infect the stem as well as fruits. It is controlled by carbendazim/mancozeb.
- Watery stem rot (*Xanthomonas campestris*) cause vine damage in heavily precipitated areas.

To help minimize the disease, broader spacing, sufficient air circulation, correct drainage, and enough sunlight are all important.

Post-Harvest Management

The fruit pulp is used to make juice, wine, jam, jelly, candy, syrup and preserve. Peel has utilization for the extraction of natural food colorant as well as a source of pectin. Seeds are mainly utilized to extract the oil from it which contains about 50% essential fatty acids.

Off season flower production in dragon fruit

Dragon fruit only produces blooms and fruit in the long-day months of May to October under natural conditions. The market need during the off-season can be met by altering the timing of fruit ripening. By providing more light during the short day, fruits are able to flower at the necessary time. Additional lighting, known as "night-break," which involves turning on lights for four hours in the middle of the night, can cause dragon cacti to flower during their off-season.CFL or LED lights can be used for this from 10 p.m. to 2 a.m. the next day. One bulb can be placed in the middle of four pitaya trees, or it can be suspended between two rows of pitaya at a height of 0.7 to 1.2 meters. The light should be distributed throughout the tree. November through April is the off-season producing period. Because off-season fruits are bigger and sweeter, they are more popular on the market than fruits from summer crops. However, one of this technology's limitations is the high cost of electricity.

Conclusion

India's dragon fruit industry is growing quickly because of its versatility, minimal water requirements, and great profits. It provides sustainable production when climate, nutrition, irrigation, and pollination are all properly managed. Using cutting-edge techniques like off-season flowering and pruning can increase market demand, yield, and profitability.

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