

Popular Article

Dragon Fruit- An Emerging Fruit Crop in India

Anusha N M*, Mude Ramya Sree and Amol K Jadhav

Ph.D Scholars, Division of FHT, ICAR-IARI, New Delhi

<https://doi.org/10.5281/zenodo.6984190>**Abstract**

Dragon fruit, pitaya or strawberry pear (*Hylocereus* spp. and *Selenicereus* spp.) or Kamalam is emerging as a super crop worldwide. It has many advantages, because of which it has drawn much attention among Indian growers like low water and nutrient requirements, relatively less requirement of resources for establishing the orchard and maintenance, multiple harvest of fruit in a year, potential to sustain high yield up to 20 years, high benefit to cost ratio. It has now become the favorite fruit among consumers due to high nutraceuticals and functional properties (e.g., rich in antioxidants and fibres). Being a crassulacean acid metabolism (CAM) plant with xerophytes' characters, it has got potential to grow in diversified agroclimatic conditions, marginal areas and owing to its low maintenance, high profitability. In recent years the area under dragon fruit cultivation is increasing in Maharashtra, Karnataka, Andhra Pradesh, West Bengal, Telangana, Tamil Nadu, Odisha, Gujarat and the Andaman and Nicobar Islands, as well as in many north eastern states. The major challenge in dragon fruit cultivation is to standardize region specific protocols of cultivation, harvesting and post-harvest management practices for enhancing yield and quality. At present, little information is available on cultivation aspects of Dragon fruit. Research on different aspects of cultivation, global and national cultivation status and health benefits of this fruit can help to maximize the benefits to worldwide growers and consumers and to expand the market of dragon fruit.

Keywords: Dragon fruit, health benefits, cultivation**Introduction**

Dragon fruit (*Hylocereus* spp.), an herbaceous perennial climbing cactus, also referred to as red pitaya, is one of the emerging fruit crops due to its attractive red or pink colour and fruit's high economic value as well as its high antioxidant potential, vitamin and mineral content. It has been originated from Central and South America and was introduced in India during the late 90's. Production of dragon fruit has many advantages including low water and nutrient requirements, relatively less resources requirement for establishment. It has a potential to produce multiple fruit harvest per year, higher yield up to 20 years and high benefit to cost ratio. The production of dragon fruit in India is about 4.2MT with an area of 400ha with a productivity of 8.0 to 10.5 t/ha (Ahmad *et al.*, 2019). on the condition of the cervix, canine Pyometra can be classified as either open-cervix or closed-cervix; however, the closed form is a more serious condition that requires surgical intervention to prevent concurrent infection and mortality (Smith, 2006).



Dragon fruit belongs to cactus family and requires long day for flowering and can be well cultivated in the agro-climatic regions of Southern, Western and North Eastern India. Dry and Frost-free climate is most suitable for its cultivation. Indian states like Gujarat, Karnataka and Maharashtra are the leading producers contributing about 70% of India's dragon fruit production.

Health benefits of Dragon fruit

Dragon fruit is rich in vitamins, minerals, phenolics, flavonoids, antioxidants and dietary fibres and hence has great health benefits. It is believed that dragon fruit helps in prevention of cough and asthma, speedy healing of cuts and wounds due to its high vitamin C content, helps to alleviate uterine hemorrhage issues, act against cardio related problems and lowering blood sugar levels for people with type 2 diabetes. It plays a crucial function in tissue creation, strengthens bones, and creates strong teeth as it is rich in Ca and P content.

Types of dragon fruit based on color

- (i) Red skin, white flesh (*Hylocereus undatus*), mainly from Vietnam and Thailand;
- (ii) Red skin, red flesh (*Hylocereus polyrhizus*) come mainly from Israel and Malaysia;
- (iii) Red skin, purple flesh (*Hylocereus costaricensis*) from Guatemala, Nicaragua, Ecuador, and Israel; and
- (iv) Yellow skin, white flesh (*Hylocereus (Selenicereus) megalanthus*) from Colombia and Ecuador



Red skin, white flesh



Red skin, red flesh



Red skin, purple flesh



Yellow skin, white flesh



Soil and climate

Dragon Fruit can be grown in wide range of soil types. However, soils which are rich in organic matter, slightly acidic and well drained are most suitable for its cultivation. Climatic conditions in states of Karnataka, Kerala, Tamil Nadu, Maharashtra, Gujarat, Orissa, West Bengal, Andhra Pradesh and Andaman Nicobar Islands are ideal for dragon fruit production. It is tolerant to adverse weather conditions. It requires an annual rainfall of 1145- 2540 mm/year. It prefers a dry tropical climate with an average temperature of 20-29°C, but can withstand temperatures of 38-40°C and as low as 0°C for short periods (Karunakaran, *et.al.*,

2014). Above 40°C, plants will be damaged. Flower and fruit drop is a common problem during heavy rainfalls (Karunakaran and Arivalagan, 2019).

Propagation and Planting

Dragon fruit can be propagated by two methods mainly stem cuttings and seeds. The most common and commercial method of dragon fruit propagation is stem cuttings as seeds (showed variability) take long time (3-4 years) for fruiting. Cuttings should be prepared from quality mother after fruiting season. Planting is done using 20-25 cm stem cuttings. Cuttings are taken 1-2 days before being planted in the field, as the latex oozing out of cut is allowed to dry. The cuttings should be treated with fungicides and planted in poly bags, filled with 1:1:1 ratio of soil, farmyard manure and sand. The bags should be placed in shady area and cuttings become ready for planting within 5-6 months (Tripathi *et al.*, 2014). Dragon fruit should be planted in open sunny area and shade should be avoided. The planting distance of dragon fruit plants depends on the kind of support system used for training. In vertical support, the distance between the plants should be 1.5-2.0 meter while in horizontal support the distance is reduced to almost 50 cm and allows for intensive farming. With this method we can accommodate more than 1700 plants in 1 acre of land.

Training system

The Dragon fruit plants are fast growing vines and they grow up to 8 cm per week, so proper training is very essential. The lateral buds and branches should be pruned to grow towards stands. Lateral branches are then allowed to grow once vine reaches the top of pole. The removal of tip of main stem allows growth of new lateral shoots at the ring to form an umbrella like structure of vines where flowers are formed and develop into fruits. The dragon fruit is trained on different trellis systems namely concrete pole and rings, 'T' stand and iron wires and wooden ladder for dragon fruit establishment. Concrete poles are mostly preferred because of its durability. With a vertical support a 2–3 m distance between planting lines is required which could accommodate 2000 and 3750 cuttings/ ha, at the rate of three cuttings per support is planted.

Water and nutrient management

The requirements of fertigation schedules/ irrigation practices were optimized based on soil and climatic conditions. About 2–4 litres of water weekly twice per plant is sufficient and installation of drip system could be main practice in orchards of dryland areas. The pitahaya's root system is superficial and can rapidly assimilate even the smallest quantity of nutrients. For proper nutrient requirement to the plant the



combination of mineral and organic nutrition is advantageous. The dose of N-450, P-205 and 350- K₂O 300 g/plant perform best result for yield and quality.

Harvesting

The fruit skin colors very late in the maturation stage, after anthesis the skin color changes from green to red or rosy-pink within 25 or 27 days (Nerd *et al.*, 1999). It will take 30 days for harvest to *H. costaricensis*. The absence of a peduncle makes picking difficult. The present harvesting technique of simply move the fruit in clock wise direction and twisting the fruit cause less or no injury to the fruits. Careful handling during processing and storage, especially for *H. costaricensis* whose foliated scales is brittle is necessary.

Pest and diseases

Prevalence pests like ants, nematodes, scale insects, mealy bugs are common in dragon fruit in India. The ants are very notorious and cause major damage to the flowers and fruits. Different fungal (*Gloeosporium agaves*, *Macssonina agaves*, *Dothiorella* sp. and *Botryosphaeriadothidea*), viral (Cactus virus X), and bacterial (*Xanthomonas* sp. and *Erwinia* sp.) diseases are also reported (Guyen, 1996).

References

- Ahmad, H.B., Mohd, M.H., Nur, S.J. (2019). Status and challenges of dragon fruit production in Malaysia. FFTC Agricultural Policy Platform (FFTC-AP). pp. 1–8.
- Karunakaran, G. and M. Arivalagan.(2019). Dragon Fruit - A New Introduction Crop with Promising market. Indian Horticulture 63(1):8-11.
- Karunakaran, G., P.C. Tripathi, V. Sankar, T. Sakthivel and R. Senthilkumar.(2014). Dragon Fruit – A new introduction crop to India: A potential market with promising future. Abstract In proceeding: National Seminar on Strategies for conservation, Improvement and utilization of underutilized fruits on 1-3rd December, 2014 at Karnataka, India. PP 138-139.
- Guyen, V. K. (1996). Floral induction study of dragon fruit crop (*Hylocereusundatus*) by using chemicals, *Univ. Agric. Forest., Fac. Agron., Hô Chi Minh-ville, Vietnam*, 54.
- Nerd, A., Gutman, F., Mizrahi Y. (1999). Ripening and Post-Harvest behaviour of fruits of two *Hylocereus* species (Cactaceae). *Postharvest Bio. Tech*; 17(1):39-45.
- Tripathi, P.C., G. Karunakaran, V. Sankar and R. Senthil Kumar. (2014). Dragon fruit: Nutritive and Ruminative Fruit, Technical Bulletin No. 11/2014. Indian Institute of Horticultural Research, Bengaluru, India. pp1-9.

