



Dragon Fruit: An Underutilized Fruit Crop in Bundelkhand Region

(Abdullah Zaid, *Ujjaival Rai, Ali Khan and Deepak Tomar)

Banda University of Agriculture and Technology, Banda

*Corresponding Author's email: shubham.ujjaival10@gmail.com

Abstract

More than 70% of earth surface is covered by water and it is one of the most critical resource for all kind of development but water on land is highly uneven in its distribution over both space and time. Many areas on the earth do not receive any rains for years, in most other areas the rain occur for a short period of time and due to this natural variability of rainfall, Bundelkhand region is highly effected by it. Bundelkhand region comprises of 13 districts out of which six districts lies in south of Madhya Pradesh (Chhatarpur, Panna, Tikamgarh, Sagar, Damoh, and Datia) and seven districts lies in north of Uttar Pradesh (Banda, Chitrakoot, Mahoba, Hamirpur, Jalaun, Lalitpur and Jhansi). Bundelkhand region is largely characterized by **shallow red soils**, undulating topography, extreme weather conditions and recurrent droughts makes the agriculture in this region more difficult leading to low crop productivity, low crop intensity, and higher soil loss through erosion and runoff due to this extreme weather condition most fruit crops fails to survive but dragon fruit survives successfully in this harsh climactic condition and give better yield and return to farmers. Dragon fruit is considered as a heavenly fruit on the earth due to its high nutritive and medicinal values. It is considered to lower blood sugars in type 2 diabetes furthermore Eating fruit is considered beneficial for carbohydrate metabolism, strengthening bones and teeth, heart tissues, healthy blood and tissue formation.

Introduction

Dragon fruit is also known as pitaya, strawberry pear, night blooming cereus, moon lovers and condrella plants. It is a fast growing xerophytic cactus like plants with crawling nature belong to genus *Hylocereus* and family *Cactaceae* originated in Central and South America. Dragon fruits got its name 'Dragon' because its skin is covered with bracts or scale. Dragon fruit is becoming popular among the consumer due to its high nutritive value and unique colour and shape and also betacyclin content which act as antioxidant. It is considered as fruit crop for future, it has ornamental value due to the beauty of their large flowers. Recently Gujrat government rename it as kamalam. It is a long day plant with beautiful night blooming flower, it produces fruit in the second year after planting and attain commercial production within 5 years. In India, dragon fruit was introduced during the late 1990s. Initially cultivation of dragon fruit was started by the farmers from Karnataka, Maharashtra, Gujarat, Kerala, Tamil Nadu, Orissa, West Bengal, Andhra Pradesh, Telangana and Andaman & Nicobar Islands, Nowadays, its cultivation has extended to

Rajasthan, Punjab, Haryana, Madhya Pradesh, Uttar Pradesh and North Eastern States. According to recent estimates, Gujarat, Karnataka and Maharashtra are the leading producers contributing about 70% of India's dragon fruit production, the water scarce areas of Kutch in Gujarat, Northern Karnataka and Western Maharashtra are major dragon fruit growing regions of the country.

Climate & Soil

Dragon fruits prefer a dry tropical & sub-tropical climate with an average temperature of 20-29⁰c but can withstand up to 38-40⁰c temperature. Which is most prevalent temperature in Bundelkhand region. Because of hardy nature of fruit crop it can survive adverse climatic condition of bundelkhand region such as low rainfall, low humidity, high temperature and scorching sun. Any kind of soil which is well drained and rich in organic matter with slightly acidic in nature is preferred for dragon fruit cultivation. As stated earlier, dragon fruit can be grown in wide range of soils but it, should be well drained. However, the loamy soil, rich in organic matter is good for its commercial cultivation. It is very shallow rooted crop; mostly the roots confined up to 40 cm, therefore, depth of soil may not be problem for the cultivation. Taking advantage of this trait, cultivation of dragon fruit can be extended to shallow soils particularly in hilly areas. It prefers slightly acidic soil of pH 5.5–6.5 for its optimum growth.

Propagation

Commercial propagation is done by stem cutting, 20-25 cm long stem cutting are used for planting, cuttings are kept in polythene bags filled with 1:1:1 ratio of soil, FYM, & sand. It starts fruiting within 14-16 months after planting it can also be propagated through seeds but seed propagation is not preferred due to variability in seedling and it also takes long time of 5-6 years to come into flowering and fruiting.

Health benefit

Dragon fruit is gaining popularity in India as a nutritious and medicinal fruit. It is being eaten with a say of high nutritional and remedial value over various health problems. After exploring the available research evidences related to high nutritive and medicinal values of dragon fruit, it can be concluded that dragon fruit is rich in nutrients like vitamin C, B1, B2, B3, high fiber content, minerals like Ca, Fe, P, less carbohydrates and no fats, seeds rich with 50 per cent of essential fatty acids namely, linoleic acid and linolenic acid – a necessity in human metabolism and cannot be synthesized from other food components by human body. Furthermore it also has several other pharmacological activities such antioxidant activity, anticancerous activity, antimicrobial activity, prebiotic effect, cardio protective effect and hypocholesterolemia effect. Some essential nutritional composition with their quantity is represented in the table below:

Nutritional composition	White fleshed	Red fleshed
Carbohydrate	11.2 mg	3.52 g
Glucose	5.70 mg	9.70 mg
Energy	67 kcal	50 kcal
Vit c	3 mg	7 mg
Vit a	0.01 mg	18mg
Magnesium	38.90 mg	41 mg
Calcium	10.20 mg	6 mg
Iron	3.37 mg	0.3 mg
Phosphorus	27.75 mg	30.2-36.1 mg
Potassium	272.0 mg	290 mg
sodium	8.90 mg	76 mg

Sources: FAO (2002) and <https://www.healwithfood.org>

Planting system

Dragon fruit cultivation prefers full sunlight condition with an open area is very suitable for planting. The shady areas are not suitable for dragon fruit planting. Generally in single post

system planting is done at 3x3 m distance. Single post vertical height of pole 1.5 m to 2 m at which point they are allowed to branch and hang down (fig.1). The Dragon fruit may be planted near the poles to enable them to climb easily. Number of plants per pole may be 2 to 4 plants depending on the climatic condition. Lateral shoots must be limited and 2-3 main stems are allowed to grow. Because lateral shoots must be removed time to time. It is important to arrange round metal/concrete frame to maintain balanced shrub. Because it spread the hanging shoots. The addition of dolomite and organic fertilizer at planting is beneficial. The media consisted of the soil enriched with organic inputs like farmyard manure, coir compost, vermicompost along with bio fertilizers improves its yield and quality content.

Training systems

The Dragon fruit plants are fast growing vines and produce more thick dense of branches during the initial stage. The lateral buds and branches should be pruned to grow towards stands. Once vines reach up to the top of the stands the branches are then allowed to grow. The removal of tip of main stem is done to allow growth of new shoots to grow laterally and climb at the ring to form an umbrella like structure of vines where flowers will emanate and develop into fruits which will induce lateral branching. This pruning referred to as structural pruning or making a structure on the trellis. The well grown vine may produce 30 to 50 branches in one year and may be more than 100 branches in-four years. Bagging can also be done to protect the fruits from ants, insects and sunburn (fig.2)

Conclusion

Bundelkhand region is largely characterized by **shallow red soils**, undulating topography, extreme weather conditions, and recurrent droughts, making the agriculture in the region more difficult leading to low crop productivity, crop intensity, and higher soil loss through erosion and runoff Dragon fruit if adopted in water scarce region can prove to be an asset to small holders as well as entrepreneur farmers. It is a fast return perennial fruit with high yield, as regular bearing brings steady income to the growers. Beside high initial establishment cost due to cement poles and trellis, its becoming very much demanding amongst the farmers because of its very high return. In addition, once planted, it will grow for about 15-20 years. It starts giving return immediately one and half year after plantation through selling of pruned plant parts as planting material and from second year onwards through selling of fruits. The annual income from dragon fruit orchard can be obtained in a range of Rs 3-4 lakhs per year per ha and during third year it is expected to reach at a peak of Rs. 5-6 lakhs from 4th year onward.



Fig.1



Fig.2