



Effect of Organic Manures and Biofertilizer on Field Establishment of Dragon fruit (*Hylocerus polyrhizus*)

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Dragon fruit (*Hylocerus polyrhizus*), introduced as a new crop in low rainfall zone and rocky barren land, is gaining rapid popularity amongst farmers. It's a nutritious fruit with a variety of uses. The pulp constitutes 70-80 percent of the ripe fruit. Dragon fruit is mainly available in three variants viz, red skin with white pulp (*Hylocereus undatus*), red skin with red pulp (*Hylocereus monacanthus* previously known as *H. polyrhizus*) and yellow skin with white pulp (*Hylocereus megalanthus* previously known as *Selenicereus megalanthus*). The red fleshed varieties of dragon fruit are relatively rich in antioxidants. It is known to prevent colon cancer, diabetes and neutralizes toxic substances such as heavy metals; reduce cholesterol and high blood pressure. It's rich in vitamin C, phosphorus and calcium. Fruits are low fat and rich in minerals with the optimum TSS value of 15-18⁰B. It is widely used as fruit salad in standard hotels and restaurants. It can be processed to range of industrial products such as juice, jam, syrup, ice cream, yogurt, jelly, preserve, candy and pastries. The red and pink peel of dragon fruit is used for extraction of natural colours. The flower buds of dragon fruit are used to make soups or mixed in salads.

Botanical Description

Some of the botanical characteristics of the plant are mentioned below. • *Hylocereus polyrhizus* is a climbing vine cactus species of the family Cactaceae. It is a fast growing, epiphytic or xerophytic. • It is one of 15 accepted *Hylocereus* species. While many of these have ornamental value because of their flowers, only five are important as fruit producers. • Common names such as 'dragon fruit', 'pitaya' and 'pitahaya' are generic terms, which include several species of columnar and climbing cacti. They are often applied to species other than *H. polyrhizus* too and usually refer to the fruits rather than the plant. • It is considered native to southern Mexico, the Pacific coast of Guatemala, Costa Rica, and El Salvador. It is now commercially cultivated and widely distributed throughout the tropics and some temperate regions. • Stems are triangular, 3-sided, although sometimes 4- or 5-sided, green, fleshy, jointed, many branched. Each stem segment has 3 flat wavy ribs and corneous margins may be spineless or have 1-3 small spines. • Stems scandent, creeping, sprawling or clambering, up to 10 m long. Aerial roots, which are able to absorb water, are produced on the underside of stems and provide anchorage for stems on vertical surfaces. • Flowers are 25-30 cm long, 15-17 cm wide, nocturnal, scented and hermaphroditic; however, some cultivars are self-compatible. • Flowers are typically white in colour and bell shaped, stamens and lobed stigmas are cream coloured. • Fruit is a fleshy berry, oblong to ovoid, up to 6-12 cm long, 4-9 cm thick, red with large bracteoles, pulp white, edible, embedded with many small black seeds. • Average fruit weight is 350-400 g, although may weigh up to 900 g.

Nutritional Importance

The typical nutritional value of ripen dragon fruit is as follows (Table 1).

Nutritional value of dragon fruit:

Nutrient	Amount (per 100g)	Daily value(%)
Water	87 g	-
Protein	1.1 g	2.1
Fat	0.4 g	-
Carbohydrate	11.0 g	3.4
Fiber	3 g	12
Vitamin B1 (Thiamine)	0.04 mg	2.7
Vitamin B2 (Riboflavin)	0.05 mg	2.9
Vitamin B3 (Niacin)	0.16 mg	0.8
Vitamin C (Ascorbic Acid)	20.5 mg	34.2
Calcium (Ca)	8.5 mg	0.9
Iron (Fe)	1.9 mg	10.6
Phosphorus (P)	22.5 mg	2.3

Role of Organic Manures and Biofertilizer

Dragon fruit requires judicious application of manure and fertilizer for higher yield. In initial stage, more nitrogen should be applied for good vegetative growth and in the later stages, more amounts of phosphorus and potash should be applied. Application of Calcium and other micronutrient are beneficial for this crop. Organic Matter plays key role in dragon fruit development and growth. Each plant should be applied with 10 to 15 kg of organic compost/organic fertilizers. As these types of lands are having very poor soil fertility therefore initially 10-15 kg FYM and 100 g SSP/ plant hill are required at the time of planting. Application of chemical fertilizers should be practiced 2 to 3 months after planting a dragon fruit when plant starts gaining growth. Depending upon the type of soil the chemical fertilizers should be given. We have developed fertilizer schedule for rocky barren land which act as light soil with very poor soil fertility status. Therefore, during the first two years, 500 g urea and 500 g P and 300 g K should be applied to each pole per year in four splits at three months interval. After it has been in the ground for a year or more, the dragon fruit's roots have become established and are demanding more nutrients from the soil. Plants grow faster and need more nutrition. After two years each pole having four plants should be fertilized with 800 g N, 900 g P and 550 g K per pole per year which should be well distributed in six splits. Nutrients should be supplied both through basal as well as by fertigation through drip system install at top of the pole to feed aerial roots (Nangare *et al.*, 2020).

According to Kumar *et al.* (2022) each plant was fed 15-20 kg with organic inputs well decomposed FYM or poultry manure, coir compost and vermicompost along with bio-fertilizers and recommended dose of fertilizer: (500: 300:250 NPK and 100 each of Azotobacter, Phosphate Solubilizing and Potash Solubilizing Bacteria were applied to each plant g/plant/year) in the cluster demonstration of dragon fruit at Muthi & Durtlang Village of Aizawl District.

The study revealed that growth and growth attributing characters were significantly influenced by integrated of organic, inorganic and bio-fertilizers. The maximum plant height (129.30 cm), number of branches per plant (7.61), number of thorns (58.41) and stem

diameter (19.13 cm) were observed under the various treatments consisting of Water spray (T1), FYM (T2), 100% NPK (T3), Azotobacter (T4), PSB (T5), FYM + 50% NPK (T6), FYM + 75% NPK (T7), FYM + 50% NPK + Azotobacter (T8), FYM + 75%NPK +Azotobacter (T9),FYM + 50% NPK + PSB (T10), FYM + 75%NPK + PSB (T11) , FYM + 50%NPK + Azotobacter + PSB (T12) and FYM + 75%NPK +Azotobacter + PSB (T13) respectively. Hence, treatment combination (T13) can be considered as best treatment for enhancing vegetative growth characters in dragon fruit under Lucknow conditions (Verma *et al.*, 2019).

Dey *et al.* (2019) reported that Maximum plant height (285 cm), number of branches (10) per plant, maximum number of bracts (25) per fruit, highest yield (14.5) per plant were obtained in red fleshed dragon fruit from the best treatment i.e., T6 comprising of vermicompost@1 kg+ FYM @1.5 kg+ Mustard cake@ 500g in dragon fruit.

References

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