

Quality Rootstock Production of Jackfruit Under Controlled Conditions

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Artocarpus heterophyllus is popularly known as Kathal, is a member of the Moraceae family and is widely available throughout India and its neighbouring continents. Ayurveda refers to its medicinal powers. It is a staple of the typical Indian diet and known to nurture the largest edible fruit varying from 3-35 Kg. Its phytochemistry suggests that it has anti-inflammatory, antioxidant, antifungal, antidiabetic effects along with high carotene, lectin (protein) and Jacaline (restricts the HIV infection & colon cancer). Compounds like morin, dihydromorin, cynomacurin, artocarpine, isoartocarpin, cyloartocarpin, artocarpesin, oxydihydroartocarpesin, artocarpetin, norartocarpetin, cycloartinone, betulinic acid, artocarpanone are found in abundance in *Artocarpus heterophyllus* and are beneficial for treating skin conditions, fever, boils, wounds, convulsions, constipation, ophthalmic disorders, preventing anaemia and snake bites, among other ailments. Therefore, it becomes important to aggrandize jackfruit production to combat malnutrition, food stability and explore its medicinal uses.



Fig. 1 Inarching in Jackfruit

Propagation

In the propagation aspect, sexual propagation does not include rootstock advantages, also seedlings have long juvenile stages and more vigorous vegetative growth. As jackfruit is a cross-pollinated crop sexual propagation leads to more variability, and segregation of species. Asexual methods have more prominent advantages over sexual propagation. In asexual methods – Approach grafting (Inarching) has been the most successful technique for small-scale production. Cleft grafting has been proven to have enormous potential, yielding 30-80 % graft success. It is a viable option if it can be refined to yield

consistently greater success rates. It's a far superior system for sustaining and spreading than inarching for outstanding cultivars.

Rootstocks

A rootstock of a plant is typically its subterranean portion, from which new above ground growth is generated. It has a completely developed root structure, which is responsible for nutrient uptake and its transportation.

Rootstocks have a effect on scion known as stionic effect. In terms of tree canopy, nutrient availability, uptake, yield, fruit quality (physical appearance and nutritional qualities) and resistance to insect, pests, diseases, drought, salinity, oxidative, heat and low temperature stress. All these rootstock capabilities are essential in defining the potential of scion. When establishing a fruit orchard, rootstock species are thought to be a way to achieve sustained production. Different fruit rootstocks with higher yield and quality are created using various breeding programmes across the world wide.

Types of rootstocks

Seedling rootstocks: They are raised by simple seed sowing. They have more strong and deep roots. Thus, providing better stability and strength to the upper ground portion. There are less chances of transmission of viruses from mother to progenies and they have more genetic variation in growth and yield parameters.

Clonal rootstocks- These are produced by vegetative means of multiplication. These rootstocks are uniform in nature to their mother plant. Since, produced by vegetative propagation such as layering, cutting and micropropagation. Raised and utilized for an individual particular desired character, which includes resistance to abiotic and biotic stresses, hardiness, etc.

Raising of quality seedling rootstocks in controlled conditions (polyhouse)

Two important components of the regulated plant development environment in a polyhouse are light transmission and insulation.

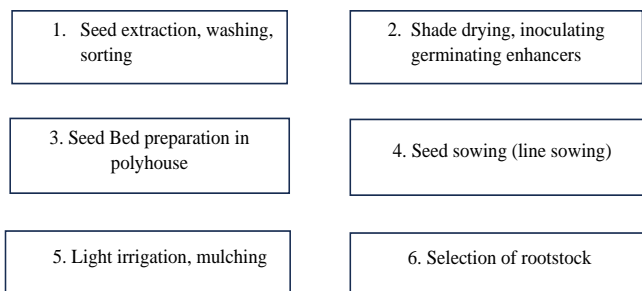


Fig 2. Extraction and shade drying of Jackfruit seeds

1. Light Transmission: There are many levels of light transmission available with polyethylene films used in polyhouses. This indicates that they let a specific quantity of sunlight through and reach the interior plants. Depending on the particular requirements of the crops being cultivated, the amount of light delivered can be changed. It's crucial to remember that, in comparison to greenhouse glass, light transmission in polyhouses can be less.

2. Insulation: Polyethylene films used in polyhouses might provide anti-condensation and UV stabilizing qualities.



Fig 3. Seed sowing and mulching(straw) Seedbed under protected cultivation

3. Temperature: To encourage healthy plant growth in polyhouses, it is crucial to maintain an ideal temperature. Temperatures can harm agricultural yields, growth rates, and photosynthesis. Low temperatures can restrict plant growth and raise the danger of frost damage, while high temperatures can cause excessive transpiration and lower crop yields.

4. Climate maintenance: Monitoring and adjusting several variables, including temperature, humidity, light, and CO₂ levels, is necessary for an efficient climate management approach in polyhouse farming. Automated climate control systems are seen in certain highly developed polyhouses. Thus, maintaining a micro climate. After preparation of raised seed beds, seed sowing is done along the lines 5-6 cm apart. Seeds

sown at 1cm deep. Further, light irrigation is done followed by mulching. Mulching has an additive effect in this technology.

Mulching is crucial to the life of our landscape & crop production system. It cut down on the quantity of water that evaporates significantly from soil which in turn lower the amount of water required by seedlings. It helps in moisture conservation & limiting the growth of weeds. Mulches used are of organic or inorganic in nature. Pebbles, plastic mulches, stones are inorganic whereas straw, manure & saw dust are organic in nature. Thus, mulching adds to the idea of maintaining the microclimate in parallel with protected cultivation.

Selection of rootstock

1. Seedling rootstock of 1-2 years are selected.
2. Girth should be of pencil thickness.
3. The rootstock must not be mundane and free from nematode, gall formation and should not be infested from diseases and pests.
4. Cultivar should be compatible with scion. Thus, successful graft union & no signs of graft incompatibility (translocated or localized).

Conclusion

Jackfruit being native to India and not explored to an extent demands vigilance by growers and researchers. As it highly beneficial to the human community. Production of quality rootstocks in polyhouse conditions will surely provide boost to its production. As polyhouses, greenhouses and other structures of protected cultivation are a boon to the horticulture industry. Further, mulching either organic or inorganic supplements the microclimate adjustments and benefits the growth, root strength and yield parameters.

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