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Pomato: Harnessing Twin Benefits of Potato and Tomato

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ABSTRACT

The article explores the innovative practice of growing "*Pomato*," a unique combination of potatoes and tomatoes, on the same plant through grafting. It was developed at ICAR-Indian Institute of Vegetable Research, Varanasi, India. This technology allows farmers to harness the dual benefits of a single plant, even in small spaces like balconies or pots. *Pomato* exhibits qualities of both parents, providing tolerance to soil-borne diseases with no compromise on the taste of tomatoes and potatoes. The study discusses the successful cultivation of *Pomato*, its advantages, such as space efficiency and reduced resource inputs, and its potential economic impact. Moreover, the challenges and care involved in the grafting process, along with the economic viability of *Pomato* farming, are highlighted. The concept of *Pomato* represents an exciting prospect for enhancing agricultural productivity and resource optimization.

Keywords: Grafting, *Pomato*, Union, Vegetable, Productivity

INTRODUCTION

In the realm of agriculture, where innovation meets sustainability, a fascinating development has taken root: the *Pomato*. Aptly named, this unique plant represents the union of two beloved vegetables, potatoes and tomatoes, both thriving on the same plant through the art of grafting. The melding of these solanaceous wonders opens a door to a novel agricultural practice where dual benefits can be harnessed from a single plant. *Pomato*, a portmanteau of potato and tomato, emerges as a potential game-changer, particularly for regions facing land constraints or those seeking to optimize space utilization, such as urban balconies or small plots. This innovative technology, showcases the successful grafting of improved tomato

Fig 1: *Pomato* seedlings prepared by cleft or apical wedge and side grafting

cultivars onto potato seedlings. As we delve into the intricacies of *Pomato* cultivation, we discover a plant that not only produces both tomatoes and potatoes but also exhibits the combined qualities of its parent plants. The grafted *Pomato*, distinct from other somatic hybrids, maintains genetic separation between its aboveground and underground parts, offering a fascinating glimpse into the world of agricultural ingenuity. The historical roots of *Pomato* cultivation trace back to the efforts of Oscar Soderholm in the 1930s, who, after two decades of experimentation, successfully grafted tomatoes onto potatoes. Fast forward to the present day, and *Pomato* has gained commercial traction, with names like '*TomTato*' and 'Potato Tom' entering markets in the United Kingdom and New Zealand, respectively. In this era of technology-driven agriculture, *Pomato* emerges as an eco-friendly and resource-efficient solution, especially beneficial for farmers in developing countries. The process of cultivating *Pomato* involves the delicate art of inter-specific grafting, bringing together the potato as the rootstock and the tomato as the scion. The resulting plant promises not only a space-saving marvel but also potential time and labour savings without compromising the quality of the produce. This article unravels the fascinating journey of *Pomato*, exploring its cultivation techniques, economic viability, and the promising impact it holds for the agricultural landscape, ultimately painting a vivid picture of a sustainable and innovative future in farming.

Cultivation Techniques of *Pomato*:

Pomato, a unique combination of potato and tomato achieved through grafting, requires specific cultivation techniques to ensure successful growth and bountiful harvests. Following steps can be adopted to cultivating *Pomato*:

1. **Selection of Rootstock (Potato):** Choose small sprouted potato tubers for raising rootstocks, as they sprout easily and produce sturdy stems suitable for grafting.

2. **Sowing Potato Tubers:** Sow potato tubers directly in large pots or small polythene bags filled with a mixture of soil, sand and organic matter (FYM or vermicompost) in a ratio of 2:1:1. Sow tubers between the months of August to October to ensure optimal tuberization and growth in ambient temperatures between 15-20°C.

3. **Preparation of Potato Seedlings:** Plant potato tubers in big pots (10–12-inch diameter) filled with well-pulverized soil and organic manure.

4. **Selection of Scion (Tomato):** Choose an improved cultivar of tomato or cherry tomato as the scion for grafting.

5. **Sowing Tomato Seeds:** Sow tomato seeds in pots or potting plugs 5-7 days after planting the potato tubers. Grafting is done when the potato sprout reaches 7-10 cm, usually around 25-30 days after planting, and the tomato seedling develops one true leaf pair, typically 22-25 days after sowing.

6. **Grafting Techniques:** Two common grafting techniques are cleft grafting (CG) and side grafting (SG). In cleft grafting, make a v-shaped cut in the rootstock and a tapered wedge in the scion before placing them together. Side grafting involves making a slant cut on both rootstock and scion and securing them with a silicone clip.

7. **Graft Healing and Acclimatization:** Transfer grafted plants to a grafting chamber with optimal humidity, light and temperature conditions for 4-5 days. Move healed plants to partial shade for 7-10 days for acclimatization, gradually reducing humidity and increasing temperature.
8. **Hardening Process:** Expose grafted plants to full sunlight for 5-7 days before transplanting to promote hardening.
9. **Transplanting:** Transplant *Pomato* plants in the field at 75 × 50 cm spacing or in large pots (10-12 inches) filled with a soil mixture.
10. **Cultural Practices:** Provide appropriate support, such as staking, especially for indeterminate or cherry tomato varieties. Implement regular cultural practices like weeding, hoeing and earthing up for optimal growth. Manage pests (white fly, leaf miner, fruit borer) and diseases (early and late blight, Rhizoctonia blight) as needed.
11. **Irrigation and Fertilization:** Implement surface irrigation or drip fertigation based on soil moisture levels. Apply fertilizers, including nitrogen, phosphorus, and potassium, in a scheduled manner for optimal growth.
12. **Harvesting:** Harvest tomato fruits starting from 75 to 90 days after transplanting. Potato tubers are harvested after the senescence of the scion plant, typically 150-160 days after planting.
13. **Yield and Economic Considerations:** *Pomato* allows the harvest of both tomato and potato from a single plant, with a slight reduction (around 25%) in yields compared to independent cultivation. Conduct economic assessments considering the cost of cultivation, net profit and benefit-cost ratio.

Table 1: Requirement of fertilizer application for different cultural practices in *Pomato*.

Practice	Description
Transplanting	
Potting Mix	Soil, sand, and vermicompost or FYM (2:1:1 ratio)
Soil Type	Light (sandy loam or loam) with good organic matter content
Field Preparation	
Application of FYM	20 tonnes/ha or vermicompost at 10 t/ha at least 15 days before planting
NPK Fertilizers	Applied at the rate of 150:60:80 kg/ha
	Half of N and full P and K at planting time
	Remaining N in three splits: 30, 45, and 60 days after transplanting
Drip Fertigation System	
Water-soluble Fertilizer	(19:19:19) scheduled twice a week, starting from the 3rd week after transplanting, @ 10, 4.5, and 4.5 kg/ha/application
Additional Fertilizers	Potassium nitrate and calcium nitrate
Pot Planting	

Soil Volume	10 kg
Mixing	1.10 kg FYM/vermicompost, 5.5 g each DAP and MOP
N Supply	Rest of N in the form of Urea @ 12 g thrice, 30, 45, and 60 days after planting
Fertilizer Sprays	2-3 sprays of water-soluble fertilizer (19:19:19) and micronutrient mixtures @ 4 g/liter of water

Source: Bahadur *et. al.,* (2021)

Fig 2: Appropriate stage for harvesting *Pomato*

Fig 3: Intermediate stage of tomato is best for *Pomato*

Advantages of *Pomato*:

1. **Double Harvest:** Producer can get both potatoes and tomatoes from same plant.
2. **Saves Space:** It requires small places to grow, like pots or balconies.
3. **Needs Less Stuff:** It requires less water, fertilizer, or work.
4. **Fights Diseases:** It can handle common tomato diseases better.
5. **Keeps Tastes Good:** The taste of tomatoes and potatoes is still yummy.
6. **Fits in Cities:** Good for growing veggies in cities where there is not much space.
7. **Good for the Earth:** It is a cool way to grow food and helps the environment.
8. **Likes Different Temperatures:** It can handle in cold as well as hot weather.

Disadvantages of *Pomato*:

1. **Takes Longer to Grow:** It needs a bit more time to start growing than usual.
2. **Smaller Fruits and Potatoes:** The fruits and potatoes might be a bit smaller.
3. **Makes Less Food:** You might get less yield compared to growing them separately.

Future Trends in Grafted Vegetable Production: *Pomato*

Pomato is a innovative dual-benefit technique developed through grafting of tomatoes onto potatoes, allows dual cultivation on same plant, perfect for small plots and containers. It is very effective technique to enhanced productivity. Grafting hybrid tomatoes onto potatoes can triple *Pomato* yield, offering a promising future with advanced methods. Commercializing grafted *Pomato* as '*TomTato*' and 'Potato Tom' signals a rising global trend, showing increased acceptance of grafted veggies. It has significant impact on developing countries as *Pomato*, a breakthrough in inter-specific grafting, brings big benefits to farmers in developing nations, saving space, time and labor. Despite advantages, challenges like delayed growth and smaller fruits persist. Ongoing research aims to make *Pomato* more accessible and efficient for broader adoption.

SUMMARY

Pomato is an innovative agricultural marvel born through inter-specific grafting, revolutionizes crop cultivation by enabling the simultaneous production of tomatoes and potatoes on a single plant. Despite its benefits, including reduced space requirements, lower resource inputs, and resistance to soil-borne diseases, challenges such as delayed harvest and marginally smaller yields must be acknowledged. The economic feasibility, exemplified by a commendable benefit-to-cost ratio of 1.75, underscores the promise of *Pomato* farming. Current research endeavors are dedicated to overcoming existing challenges, enhancing the potential of *Pomato* as an enticing option for farmers seeking efficient and space-saving dual-crop solutions. The continued evolution of *Pomato* showcases its potential to redefine agricultural practices and contribute to sustainable and resource-efficient farming.

REFERENCE

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