



Original Article



Development of *Brimato* Plant: A Boon for the Farmers

Sahil Sinha¹, Manish Sharma^{2*}, Ankur Sahu³, Jitendra Kumar⁴ and Monishka Verma⁵

^{1,3,4, &5}PG Scholar, CHRS, Mahatma Gandhi University of Horticulture and Forestry (Durg), Saja-491993, Chhattisgarh, India

²Assistant Professor, CHRS, Mahatma Gandhi University of Horticulture and Forestry (Durg), Saja-491993, Chhattisgarh, India

*Corresponding author: manish.cau@gmail.com

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ABSTRACT

This article introduces "*Brimato*," an innovative dual grafting technology developed at ICAR-Indian Institute of Vegetable Research, Varanasi, Uttar Pradesh. By grafting brinjal and tomato onto a same plant, this approach maximizes vegetable yield from a single source. The successful field demonstration showcases balanced growth, early fruiting and substantial harvests, making *Brimato* ideal for space-constrained urban and suburban areas. Ongoing research focuses on commercial production, emphasizing its potential for efficient and sustainable vegetable cultivation.

Keywords: Brimato, Tomato, Brinjal, Grafting

INTRODUCTION

The fusion of agriculture and innovation has given rise to a revolutionary approach - the *Brimato* plant, a testament to the transformative power of inter-specific grafting. Grafting emerges as a beacon of hope in agriculture, offering resilience against adversities while elevating vegetable productivity. Multiple grafting, where scions of the same botanical family unite, presents an extraordinary avenue to yield multiple vegetables from a solitary plant. At the ICAR-Indian Institute of Vegetable Research in Varanasi, the dual grafting of brinjal and tomato, known as the *Brimato*, showcased the ingenuity of this approach. The institute successfully merged the renowned Brinjal Hybrid - *Kashi Sandesh* and the improved Tomato cultivar - *Kashi Aman* onto the specialised brinjal rootstock - IC 111056. The meticulous operation unfolded when brinjal seedlings are 25 to 30 days old and tomato seedlings are 22 to 25 days old. Utilizing the side/splice method, precise slanting cuts are made on both the rootstock and scion, initiating an orchestrated dance between the two plants. Post-grafting, a controlled environment nurtured the nascent *Brimato*, ensuring its delicate growth and eventual transplantation into the field. Within 60 to 70 days post-planting, the *Brimato* bore testament to its



Fig 1: Generated image for illustration

potential. Each tomato plant yielded an average of 36 fruits, weighing an impressive 2.383 kg, while the brinjal component yielded a substantial 2.684 kg from approximately 9.2 fruits per plant.

Grafting for development of *Brimato*

Grafting, an intricate horticultural practice, plays a pivotal role in the revolutionary agricultural advancement witnessed in the development of *Brimato*. This technique involves uniting distinct plant tissues to create a cohesive union and in the case of *Brimato*, it became the cornerstone of a groundbreaking approach. The process entailed combining scions from the brinjal hybrid and tomato cultivar onto specialised brinjal rootstock, facilitating the simultaneous growth of these distinct vegetables within a single plant.

Initiated when the brinjal seedlings are 25 to 30 days old and the tomato seedlings are 22 to 25 days old, the grafting procedure employed the side/splice method. Precise slanting cuts of 5 to 7 millimetres at a 45-degree angle are meticulously made on both the rootstock and scion. This surgical precision ensured intimate tissue fusion, establishing a robust connection between the grafted components.

Following grafting, the seedlings underwent a controlled environmental regimen, optimizing conditions for initial growth. After 15 to 18 days, the grafted saplings are transplanted into the field. Meticulous care is required during the early growth stages and maintained balanced development in both the brinjal and tomato scions, ensuring optimal nutrient allocation and subsequent fruition. The astounding outcomes underscored the potential of grafting technology, yielding remarkable harvests from a single plant.

This breakthrough in agriculture holds promise, especially in space-limited urban and suburban settings where innovative cultivation methods are crucial. The integration of grafting techniques, as demonstrated by *Brimato*, showcases a sustainable approach to maximizing vegetable production and addressing challenges in resource-constrained environments.

Why it is a boon for farmers

"At the ICAR-Indian Institute of Vegetable Research in Varanasi, the innovative grafting of brinjal and tomato led to the *Brimato*, following the success of the grafted *Pomato* (Potato + Tomato). Meticulous techniques joined the brinjal hybrid - *Kashi Sandesh* and tomato cultivar - *Kashi Aman* into a brinjal rootstock - IC 111056. Grafting occurred at 25-30 days old for brinjal seedlings and 22-25 days old for tomatoes, involving precise cuts on rootstock and scion. Post-grafting, seedlings thrived under controlled conditions before field transplantation. Remarkably, within 60-70 days, *Brimato* plants yielded abundantly—each tomato plant bore 36 fruits (2.383 kg), while brinjal plants produced 2.684 kg from 9.2 fruits per plant."



Fig 2: Grafting

Source: vegetablegrowersnews.com



Fig 3: Grafted Seedlings

Future aspects

The innovative grafted *Brimato* technology not only addresses space limitations in urban areas but also holds promise for broader agricultural advancements. Looking ahead, its potential commercial production could revolutionize urban agriculture, facilitating the growth of multiple vegetables in confined spaces. Moreover, further research and development might expand this technique to encompass diverse vegetable families, offering an array of multi-grafted plants. The ongoing exploration at the ICAR-IIVR, Varanasi, hints at evolving agricultural practices that may extend to other regions, fostering sustainable, space-efficient cultivation methods for diverse crops.

Policy implications for grafted crop cultivation

1. Research Funding:



Fig 4: Elaborating visitors about Brimato
Source - ICAR



Fig 5: *Brimato* at bearing stage
Source - ICAR

- Allocate research funds for studying and developing grafted crop technologies, including *Brimato*, to enhance agricultural productivity and sustainability.
- ### 2. Educational Programs:
- Implement educational programs and training for farmers, extension workers and agricultural professionals to disseminate knowledge about grafted crop cultivation techniques.
- ### 3. Incentives for Adoption:
- Introduce financial incentives or subsidies for farmers adopting grafted crop technologies like *Brimato*, encouraging widespread adoption.
- ### 4. Extension Services:
- Strengthen extension services to provide continuous support and guidance to farmers adopting grafted crop cultivation, addressing challenges and disseminating best practices.
- ### 5. Collaboration with Research Institutions:
- Foster collaboration between government bodies and research institutions to facilitate continuous research on grafted crops, including *Brimato*, ensuring ongoing innovation.

6. **Infrastructure Development:**

- Invest in infrastructure development to support grafted crop cultivation, such as nurseries, research centres and facilities for large-scale production.

7. **Crop Insurance Programs:**

- Include grafted crops under existing crop insurance programs to mitigate risks associated with adverse weather conditions or crop diseases.

8. **Market Access and Promotion:**

- Facilitate market access for grafted crops by creating awareness campaigns and promoting the benefits of the *Brimato* and similar technologies.

Economic viability and market opportunities of *Brimato*:

1. **Diversification of Income Streams:**

- *Brimato* cultivation offers farmers the opportunity to diversify their income by producing two high-demand vegetables on a single plant, potentially increasing overall profitability.

2. **Higher Yields per Unit Area:**

- The dual grafting technique allows for increased productivity within limited spaces, providing an efficient use of land and resources.

3. **Cost Efficiency in Production:**

- Assess the potential cost efficiencies associated with *Brimato* cultivation, including reduced land requirements and optimized resource utilization.

4. **Market Demand for Novelty Crops:**

- Explore the market demand for unique and innovative crops like *Brimato*, catering to consumer preferences for novel and diverse produce.

5. **Premium Pricing for Grafted Produce:**

- Investigate the possibility of premium pricing for grafted crops, reflecting their uniqueness, improved quality and potential higher nutritional value.

6. **Export Opportunities:**

- Assess the export potential of *Brimato* produce, particularly in regions where dual grafting is a novel concept, creating opportunities for international trade.

7. **Value-Added Product Development:**

- Explore the development of value-added products derived from *Brimato*, such as processed foods or specialty products, to further enhance market opportunities.

8. **Consumer Awareness Programs:**

- Implement programs to educate consumers about the benefits of *Brimato*, potentially increasing demand and creating a niche market for these grafted vegetables.

Problems in Adaptation of *Brimato*:

- 1. Complex Grafting Process:** The grafting technique is required precision and expertise, posing a challenge in achieving successful graft unions.
- 2. Vulnerability to Infections:** Grafting sites may become susceptible to infections or diseases, affecting plant health and productivity.
- 3. High Labour Intensity:** The meticulous process of grafting demands skilled labour is potentially increasing production costs.
- 4. Climate Sensitivity:** Extreme weather conditions or fluctuations can affect the success rate of graft unions and subsequent plant growth.
- 5. Specific Rootstock Requirements:** Finding suitable rootstock variants for different scions may limit the scalability of *Brimato* across regions.
- 6. Yield Consistency:** Maintaining consistent and high yields across various batches or regions might pose a challenge.
- 7. Market Acceptance:** Consumer acceptance and market demand for this novel produce might require substantial promotion and education.

CONCLUSION:

The significance of the Dual Grafted *Brimato* Technology (DGBT) extends far beyond its scientific prowess. It's potential for urban and suburban areas, where space for vegetable cultivation is limited and immense. This innovation allows for the cultivation of multiple vegetables in vertical gardens or pot cultures, optimizing available space efficiently. As research on the commercial production of grafted *Brimato* continues at the ICAR-IIVR in Varanasi, the prospects for farmers are promising. This innovative technology not only maximises productivity but also stands as a beacon of hope for sustainable farming practices in an ever-evolving agricultural landscape.

REFERENCES:

ICAR-Indian Institute of Vegetable Research, Varanasi, Uttar Pradesh