

BRIMATO: NEW VEGETABLE CROP

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Introduction

Securing food production for a growing population would necessitate the development of new high-yielding varieties as well as the closure of the yield gap between yield potential under optimal conditions and the yield actually obtained by farmers. The days of producing a single vegetable on a single plant or field to harvest were long gone. Agricultural science has developed a number of techniques for growing nutritious vegetables more quickly. There are many countries with highly intensive land use that employ vegetable crop grafting. Grafting is the process of attaching parts of two plants so that they form a single unit and function as one plant. The term "scion" refers to the upper component of the grafted plant, while "rootstock" refers to the lower portion. In Asia, grafting has been employed in agriculture for more than 2000 years to increase plant productivity, minimize disease susceptibility and increase agricultural sustainability by using fewer resources. In recent years, we have observed a variety of crops being grown using these methods, and scientists are currently working on novel approaches to producing numerous vegetables simultaneously. This surgical method connects two distinct genotypes to combine desirable features in the scion and rootstock, normally used in vegetable crops. Scions of vegetable crops like watermelon, squash, cucumber, bitter melon, tomato and eggplant, etc. can readily be grafted onto different rootstocks prior to being transplanted in the field or in greenhouses.

Brimato: a two-in-one grafted plant

Grafting is an innovative and cost-efficient technique commonly practiced in solanaceous crops such as tomato. Inter-specific grafting has shown promise in strengthening plant resistance to biotic and abiotic stresses as well as in boosting yield. A new technological alternative called dual or multiple grafting involves joining two or more scions from the same

family in order to produce numerous vegetables from a single plant, which has been successfully demonstrated in tomato. Formerly, growing tomatoes and potatoes together was known as pomato, but this time, scientists have created a new method known as Brimato: an innovative technology to produce brinjal and tomato on the same plant through grafting. Tomato (*Solanum lycopersicum* L.) and brinjal or eggplant (*Solanum melongena* L.) are important vegetable crops in India and are members of the same plant family, Solanaceae. Brimato is a new technology developed by ICAR- Indian Institute of Vegetable Research (IIVR), Varanasi, after thinking about producing these two vegetables in one plant. It is non-genetically modified since the brimato plant was created via an inter-specific grafting method rather than a genetic engineering technique. In inter-specific grafting, choosing a rootstock with a robust root system and a scion with superior fruit quality is a good combination for getting healthy crop production with the highest yield per unit area from a single plant. After a successful field demonstration of grafted Pomato, IIVR demonstrated Brimato during 2020-21.

<i>Scions</i>	Brinjal Hybrid - Kashi Sandesh and improved cultivar of Tomato - Kashi Aman
<i>Rootstock</i>	IC 111056 (Brinjal)
<i>Grafting method</i>	Side/splice method

Kashi Sandesh is a brinjal hybrid having semi-upright (height 71.0 cm) plant habit with green stems, purplish green leaves and purple flowers that appear in 45 days after transplanting. Fruits are purple, medium, sized and round. Tomato cultivar of Kashi Aman was found to be a promising high yielding round-fruited type. It is resistant to Tomato Leaf Curl Virus Disease. This variety carries an allele of virus resistance gene Ty-3 but it is salt sensitive. Tomato plants grafted on brinjal rootstock IC-111056 demonstrated better salt stress and waterlogging tolerance. Brimato integrates the hardiness of the brinjal plant, which does well to endure both extreme waterlogging and droughts.

The grafting operation was performed when tomato seedlings were 22 to 25 days old and brinjal seedlings were 25 to 30 days old. In approximately 5% of seedlings, the Brinjal rootstock (IC 111056) is prone to developing two branches. Slanting cuts of 5 to 7 mm (45° angle) were made in both the rootstock and the scion. Following grafting, the seedlings were housed in a controlled environment where the temperature, humidity, and light levels were maintained optimally for the first 5 to 7 days, followed by another 5 to 7 days in partial shade. The grafted plants were planted in the field 15 to 18 days following the grafting operation. Care was taken throughout the early growing period to ensure balanced growth in both brinjal and tomato scions. Shoots were also removed as soon as they appeared below the

grafting union. Aside from 25 t of FYM, the fertilizers were applied at a rate of 150, 60 and 100 kg NPK per ha. After planting, the tomato and brinjal both began to bear fruit 60 to 70 days later. The results of the experiment showed that the yield of tomatoes per plant was roughly 36.0 fruits, weighing 2.383 kg, while the yield of brinjal per plant was 9.2 fruits, weighing 2.684 kg. Brimato is regarded as a multipurpose plant due to its dual cropping system, space-saving, large growth in a kitchen garden and roof gardening for seasonally producing fresh vegetables.



Fig. 1: Grafted seedlings



Fig. 2: Brimato plants at bearing stage (Source: IIVR)

Conclusion

Vegetable grafting is a relatively recent technology in India, where it is being evaluated as a substitute strategy to address biotic and abiotic stresses in vegetable farming. Contrarily, the modern grower is motivated by the need to cultivate novel inter-specific grafted plants in order to counter numerous biotic and abiotic risks. Brimato is a significant scientific advancement becoming known for supervised indoor cultivation which would enable the simultaneous growing of crops in dense cities. In urban and suburban areas with limited space for growing vegetables, the dual-grafted Brimato technology would be particularly helpful. Moreover, hybrid plants that grow vegetables could alleviate pressure on labour and water requirements for cultivation. People who are interested in growing vegetables in their gardens can also take advantage of this worthwhile farming method, and they can now plant tomatoes and brinjal in the same garden bed.

References

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