

Reversal of dwarfness in a short-statured variant of clove (*Syzygium aromaticum* (L.) Merr. & Perry) by approach grafting

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Abstract

Approach grafting of short-statured variant (dwarf) of clove (*Syzygium aromaticum*) was successful on ordinary clove rootstock and the graft union was obtained in 6–8 months with 64% success and 100% field establishment. The resultant graft had the appearance of ordinary clove with increase in internodal length of the scion shoot. But when ordinary clove was approach grafted to dwarf clove rootstock the internodal length of the scion was reduced. The study indicated that the rootstock had a definite influence on the scion, with regard to growth in clove.

Keywords: approach grafting, clove, short statured variant, *Syzygium aromaticum*.

Clove (*Syzygium aromaticum* (L.) Merr & Perry), a tree spice, is a tall evergreen tree growing to about 20 m in height. Harvesting of clove buds using a ladder is the normal practice, which is laborious and costly. A dwarf and compact canopy suits well in intercropping systems and helpful for easy harvest. Attempts were made to locate dwarf clove trees, during germplasm collection surveys in India and a dwarf variant of about 16 years old was located at Black Rock Estate, Kanyakumari District, Tamil Nadu (Krishnamoorthy & Rema 1994). It was 2 m tall, with a canopy width of 5 m and profuse branching habit as against 10 m height of similar-aged ordinary clove trees. Branching started at 60 cm above ground level and the leaves were arranged in clusters with very short internodes (0.8 cm) as compared to ordinary clove (1.8 cm). The seeds of this dwarf clove plant were collected and seed-

lings were raised at Indian Institute of Spices Research (IISR), Experimental Farm, Peruvannamuzhi (Kerala). They exhibited a dwarf stature growing to a height of 50 cm at eighth year.

As the seed source for dwarf types was very limited, attempts were made to clonally propagate dwarf clove available at IISR Experimental Farm, Peruvannamuzhi, by approach grafting on ordinary clove using the technique standardized for clove (Rema & Krishnamoorthy 1994). Reciprocal grafting to see possible indications of rootstock-scion interactions were also attempted on a limited scale.

The observational trial was conducted at IISR Experimental Farm, Peruvannamuzhi during 2004. Seedlings of ordinary clove were raised in polybags filled with potting mixture and 2 year old seedlings were used as rootstock

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Table 1. Effect of rootstock on scion of clove

Root stock	Scion	No. of grafts	Success (%)	Length of internode of scion before grafting (cm)	Length of internode of scion after grafting		
					Mean (cm)	Range (cm)	CV (%)
Ordinary clove	Dwarf clove	25	64	0.80	1.66	1.2–2.1	19.36
Ordinary clove	Ordinary clove	25	80	1.80	1.78	1.5–2.5	18.49
Dwarf clove	Dwarf clove	4	50	0.80	0.38	0.3–0.4	23.92
Dwarf clove	Ordinary clove	2	50	1.80	0.73	0.70–0.76	5.81

for approach grafting. Mature shoots of current season's growth of 10 year old dwarf clove seedlings that did not flower were used as scions for grafting (25 nos.) during October. Further, four scions of dwarf clove and two scions of ordinary clove were also grafted on to rootstocks of dwarf clove. Ordinary clove was grafted (25 nos.) on to its own rootstock to observe rootstock-scion interactions in reciprocal grafting. The rootstocks and the mother plants were watered regularly and protected from direct sunlight after grafting. The lower portion of the scion and the upper portion of the rootstock were detached after 6–8 months after successful union. The grafts were maintained in the nursery for 8–9 months before observations on internodal length were taken.

Approach grafting of dwarf clove was successful by using ordinary clove rootstock and the graft union was obtained in 6–8 months. A 64% success was obtained with 100% field establishment indicating the potential of this propagation technique for multiplication of dwarf clove. The response of dwarf and ordinary clove was different on various rootstocks (Table 1).

When dwarf clove was used as scion for approach grafting on ordinary clove, all the resultant grafts had the appearance of ordinary clove. The mean internodal length on the newly produced scion portion of the graft increased to 1.66 cm showing the effect of rootstock on scion when new shoots/new leaves were formed as seen in an ordinary

clove. But when dwarf clove was approach grafted on dwarf clove, the resultant grafts exhibited dwarfness (mean internodal length - 0.38 cm). Ordinary clove when approach grafted on dwarf clove rootstock, the mean internodal length of the scion was reduced from 1.78 cm to 0.73 cm. This indicated that rootstock had a definite influence on the scion. Dwarf clove plants are preferred for high density planting and for easy harvest.

The dwarfness in clove may be due to the lack of gene for synthesis of gibberellic acid (GA) which is needed for shoot elongation (Phinney 1956). Hence, the dwarfness was reversed when grafted on normal clove which has GA. On the other hand, when dwarf clove was used as rootstock for ordinary clove, the GA in the scion would not have been sufficient for shoot elongation and dwarfing effect was observed. Long term studies are required to reveal whether this effect will be stable as the tree expands its canopy as it grows.

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