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## Grafting studies in ornamental cacti

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### Abstract

This study was conducted to assess the grafting success and morphological characters of scion and rootstock of ornamental cacti. Different scions (*Gymnocalycium* spp. (7 types) and *Echinopsis multiplex*) were grafted on rootstock *Hylocereus undatu*. The scion length and width was found to be maximum in T<sub>3</sub> (*E. multiplex* on *H. undatus*) as 1.15 cm and 5.20 cm. Number of areoles was maximum in T<sub>6</sub> (*G. mihanovichii* (Yellow) on *H. undatus*) as 31.00. Number of spines per areoles and number of spines per plant was found maximum in T<sub>3</sub> (*E. multiplex* on *H. undatus*) as 11.50 and 240.50. Success percentage and survival percentage was maximum in T<sub>3</sub> (*E. multiplex* on *H. undatus*) as 80 %.

**Keywords:** Grafting studies, ornamental cacti

### 1. Introduction

Cactus belongs to the family Cactaceae. It contains 130 genera and 2000 species. The word “cactus” - Latin word “*kaktos*” (Spiny plant). It is grown for their beautiful flowers, aesthetics of the stems (monstrose and cristate form) and spines. It is most preferred by the people owing to their easy maintenance

### Propagation of cacti

Seeds (*Astrophytum myriostigma*), Cuttings (*Myrtillocactus geometrizans*), Offshoots (*Mammillaria zeilmanniana*), Grafting and Tissue culture. Among which grafting is chosen because of its slower growth and high mortality rate in seed propagules, to increase the aesthetic value and bring out various combination of colored scions, to create more commercial value, to ensure better growth and flowering by grafting scions of slow growing species into fast-growing stocks, to rescue a plant from disease or rot

### Materials and methods

This experiment was conducted in Botanical garden, Department of Floriculture and Landscape Architecture, TNAU, Coimbatore. Different scions (*Gymnocalycium* spp. (7 types) Picture 2. and *Echinopsis multiplex*) was grafted on rootstock *Hylocereus undatu* Picture 1. The statistical design was Completely Randomized Design (CRD).



Picture 1: *Hylocereus undatu*

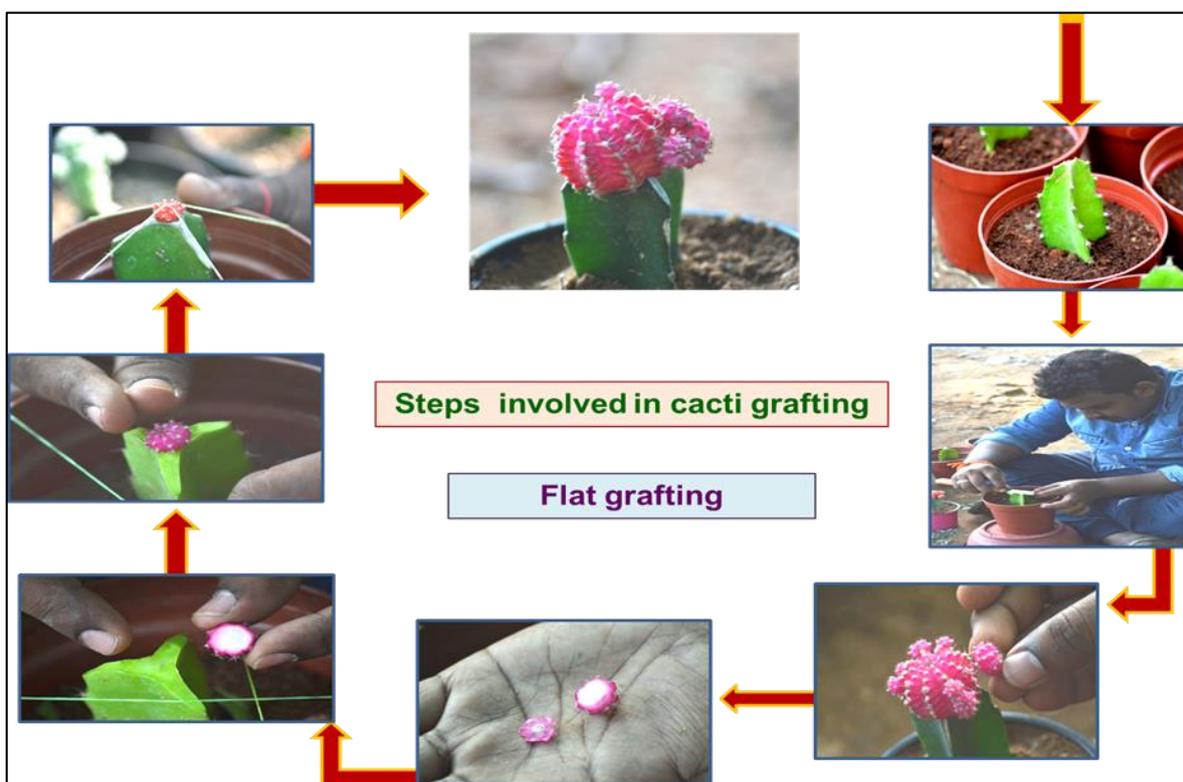
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**Picture 2:** Scions used a) (*G. mihanovichii* (Red) on *H. undatus*), b) (*G. mihanovichii* (Pink) on *H. undatus*), c) (*E. multiplex* on *H. undatus*), d) (*G. mihanovichii* (Orange) on *H. undatus*), e) (*G. mihanovichii* (Deep orange) on *H. undatus*), f) (*G. mihanovichii* (Dark brown) on *H. undatus*), g) (*G. mihanovichii* (Rose) on *H. undatus*)



**Picture 3:** Steps involved in grafting of cactus

**Results and Discussion**

The scion length and width was found to be maximum in T<sub>3</sub> (*E. multiplex* on *H. undatus*) as 1.15 cm and 5.20 cm. The scion length and width was found to be minimum in T<sub>4</sub> (*G. mihanovichii* (Orange) on *H. undatus*) as 0.85 cm and 4.75

cm given in the Table 1.

Number of areoles was maximum in T<sub>6</sub> (*G. mihanovichii* (Yellow) on *H. undatus*) as 31.00 and minimum in T<sub>5</sub> (*G. mihanovichii* (Deep orange) on *H. undatus*) as 28.50. Number of spines per areoles and number of spines per plant was

found maximum in T<sub>3</sub> (*E. multiplex* on *H. undatus*) as 11.50 and 240.50 given in the Table 2. Success percentage and

survival percentage was maximum in T<sub>3</sub> (*E. multiplex* on *H. undatus*) as 80 % given in Table 3.

**Table 1:** Morphological parameters of grafted cacti

Treatments	Scion length(cm)	Scion width(cm)
T <sub>1</sub> ( <i>G. mihanovichii</i> (Red) on <i>H. undatus</i> )	1.00	4.95
T <sub>2</sub> ( <i>G. mihanovichii</i> (Pink) on <i>H. undatus</i> )	0.90	5.00
T <sub>3</sub> ( <i>E. multiplex</i> on <i>H. undatus</i> )	1.15	5.20
T <sub>4</sub> ( <i>G. mihanovichii</i> (Orange) on <i>H. undatus</i> )	0.85	4.75
T <sub>5</sub> ( <i>G. mihanovichii</i> (Deep orange) on <i>H. undatus</i> )	1.05	4.90
T <sub>6</sub> ( <i>G. mihanovichii</i> (Yellow) on <i>H. undatus</i> )	0.95	5.05
T <sub>7</sub> ( <i>G. mihanovichii</i> (Dark brown) on <i>H. undatus</i> )	1.00	5.05
T <sub>8</sub> ( <i>G. mihanovichii</i> (Rose) on <i>H. undatus</i> )	0.95	5.15

**Table 2:** Morphological parameters of grafted cacti

Treatments	No. of Areoles	No. of Spines/ Areole	No. of spines/ plant
T <sub>1</sub> ( <i>G. mihanovichii</i> (Red) on <i>H. undatus</i> )	29.50	4.50	133.00
T <sub>2</sub> ( <i>G. mihanovichii</i> (Pink) on <i>H. undatus</i> )	29.50	4.50	100.00
T <sub>3</sub> ( <i>E. multiplex</i> on <i>H. undatus</i> )	20.50	11.50	240.50
T <sub>4</sub> ( <i>G. mihanovichii</i> (Orange) on <i>H. undatus</i> )	29.50	4.50	73.00
T <sub>5</sub> ( <i>G. mihanovichii</i> (Deep orange) on <i>H. undatus</i> )	28.50	4.00	114.50
T <sub>6</sub> ( <i>G. mihanovichii</i> (Yellow) on <i>H. undatus</i> )	31.00	5.00	156.00
T <sub>7</sub> ( <i>G. mihanovichii</i> (Dark brown) on <i>H. undatus</i> )	30.50	4.00	123.50
T <sub>8</sub> ( <i>G. mihanovichii</i> (Rose) on <i>H. undatus</i> )	30.00	3.50	106.50

**Table 3:** Success and survival percentage of grafted cacti

Treatments	Success percentage (%)	Survival percentage (%)
T <sub>1</sub> ( <i>G. mihanovichii</i> (Red) on <i>H. undatus</i> )	80.00	70.00
T <sub>2</sub> ( <i>G. mihanovichii</i> (Pink) on <i>H. undatus</i> )	60.00	60.00
T <sub>3</sub> ( <i>E. multiplex</i> on <i>H. undatus</i> )	80.00	80.00
T <sub>4</sub> ( <i>G. mihanovichii</i> (Orange) on <i>H. undatus</i> )	80.00	70.00
T <sub>5</sub> ( <i>G. mihanovichii</i> (Deep orange) on <i>H. undatus</i> )	70.00	60.00
T <sub>6</sub> ( <i>G. mihanovichii</i> (Yellow) on <i>H. undatus</i> )	40.00	40.00
T <sub>7</sub> ( <i>G. mihanovichii</i> (Dark brown) on <i>H. undatus</i> )	60.00	60.00
T <sub>8</sub> ( <i>G. mihanovichii</i> (Rose) on <i>H. undatus</i> )	60.00	50.00

**Table 4:** Cost economics for grafted cacti (Per graft)

Sl. No	Particulars	Cost (Rs.)	Remarks
1.	Media cost	1.75	Includes Coir pith, Sand, BCA's and GR's
2.	Container	10.00	Plastic pot
3.	Rootstock	25.00	Cuttings of <i>H. undatus</i>
4.	Scion	30.00	Offshoots of selected scion
5.	Man power (Grafting technician)	15.00	Capability: 100 nos./day @ Rs. 1500/ day
6.	Maintenance	30.00	For a period of 6 months after grafting
7.	Plant protection measures	10.00	Pest – Scales Disease – Root rot (at weekly intervals)
	Total	121.75	

## Conclusion

The scion length and width, number of spines per areoles and number of spines per plant, success percentage and survival percentage were found to be more in T<sub>3</sub> (*E. multiplex* on *H. undatus*). Number of areoles was high in T<sub>6</sub> (*G. mihanovichii* (Yellow) on *H. undatus*).

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