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## Effect of season on the survival and growth of hibiscus cuttings

**DB Chatse, SB Thorat, VB Chavan, IG Gawas, SP khedkar and SM Khan**

**Abstract**

The present investigation was carried out to study the effect of season on the survival and growth of Hibiscus cuttings in konkan agro-climatic condition under polyhouse at Hi-tech project of Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli during January 2018 to December 2018. Propagation through semi-hardwood cuttings of Hibiscus, the cuttings were planted in season such as T<sub>1</sub>: January, T<sub>2</sub>: February, T<sub>3</sub>: March, T<sub>4</sub>: April, T<sub>5</sub>: May, T<sub>6</sub>: June, T<sub>7</sub>: July, T<sub>8</sub>: August, T<sub>9</sub>: September, T<sub>10</sub>: October, T<sub>11</sub>: November, T<sub>12</sub>: December and the experiment was conducted in randomized block design with twelve treatments and three replications. The maximum survival and sprouting percentage, leaf area, length of sprout were recorded in the treatments T<sub>2</sub> (February). It can be concluded that propagation through semi-hardwood cuttings in the treatment T<sub>2</sub> i.e. February month had proved to be the best month for propagation under polyhouse conditions in konkan conditions of Maharashtra.

**Keywords:** Hibiscus, propagation techniques, season, semi-hardwood cuttings

**Introduction**

Hibiscus (*Hibiscus rosa-sinensis* L.) is national flower of Malaysia. Hibiscus is one of the most beautiful flowering and evergreen shrub. Hibiscus is used as ornamental flowering shrub in the garden. It can also be used as flowering hedge plant, shrubbery border and potted plant for roadside planting in the home garden. The Hibiscus is used as an offering to goddess Kali and Lord Ganesha in Hindu worship. The flower are in many colours including red, pink, white, orange, yellow, purple and even multi-colour. The common name of Hibiscus is China rose, Chinese hibiscus, Gurhal, shoe flower and Jaswand.

Hibiscus belongs to Malvaceae family. It is native from tropical Asia (Vietnam and Southern China). The four main species of hibiscus having ornamental value and cultivated in tropics and sub tropics are *Hibiscus rosa-sinensis* L., *Hibiscus mutabilis* L., *Hibiscus syriacus* L., and *Hibiscus schizopetalus* Hook.

The hibiscus is an evergreen shrub; the plants can grow 15 feet tall in frost-free areas. Its bark is light-gray colour. Ornamental hibiscus plant grows best in full sun light. It requires moderate temperature and severely high humidity. Hibiscus plants prefer sandy loam but not heavy soils. In poorly drained soil, the shrub is seriously affected. Plant prefers neutral to slightly acidic soil. These plants thrive best in the soils with pH level between 5.5 to 6.5. Hibiscus can be growing throughout the year provided there is a sufficient irrigation and sun light.

It is propagated by sexual and asexual method of propagation. A cheaper and efficient method with minimum usage of plant material would be raising plant through cutting. Among the various vegetative method, cutting is most convenient method of propagation. For propagation of hibiscus through cuttings softwood, semi-hardwood and hardwood stems are used. Semi hardwood cutting is better than tip cutting for propagation of China rose (Chowdhuri *et al.* 2017) [2]. The rooting of cuttings depends on the nature of its woodiness has been demonstrated by several workers. Hence, a proper choice of wood is an important factor in rooting of cuttings.

This plant has no capacity to produce seed in this climate, so vegetative propagation is only process of multiplication and cuttings of stem would be the best method of propagation. But types of stem, time of cutting are the major criteria for obtaining maximum success. However, In view of the above, an experiment was conducted in this university to solve the above cited problem.

### Material and methods

The experiment was conducted in polyhouse no.4 Hi-tech project, Department of Horticulture, College of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli during January 2018 to December 2018.

The planting material was obtained from two-three years old uniformly green shrub of Hibiscus. A mature shoot was categorized into three main portions on the basis of maturity of wood as softwood, semi-hardwood and hardwood cuttings. The basal portion of mature stem was used as hardwood cutting; the middle portion of the stem used as semi-hardwood cutting and the terminal portion of the stem was used as softwood cutting. The length of semi-hardwood cutting was kept 15 cm. Few leaves were kept in both softwood and semi-hardwood cuttings. A slant cut was given at the base of the cuttings and each cutting had about three to four buds. A transverse cut was given at top of each cutting. For keradix powder treatment, the basal end of the cutting (0.5 -1.5) was dipped in water later dipped in keradix powder taken in a beaker. Then the treated cuttings were planted in polybags (6" x 8") containing media i.e. soil + FYM (3:1). Intercultural operations like weeding and irrigation carried out as per requirement. Hand weeding was carried out at monthly interval. The irrigation was given on daily basis through 1.25 mm lateral for half an hour. Plant protection measures were taken from time to time to keep plants free from pest.

### Result and discussion

During the course of experiment various observations were recorded such as sprouting percentage (30 DAP), survival percentage (90 DAP), leaf area, length of sprout and number of adventitious root recorded after three month of planting.

In Table 1. at 30 DAP different treatments recorded significant difference in per cent sprouting of hibiscus cuttings. Per cent sprouting varied from 72.67 to 99.33 among the various treatments. The highest per cent sprouting (99.33) was recorded in treatment T<sub>2</sub> (February). The lowest sprouting per cent (72.67) was recorded in treatment T<sub>12</sub> (December). February planted cuttings resulted in better sprouting than other planting season due to higher promoter to inhibitor ratio during that period. Carbohydrate reserves in the cuttings were also responsible for the maximum sprouting (Struce, 1981)<sup>[10]</sup>. These results are in conformity with the results of Singh and Singh (2002)<sup>[8]</sup> in Bougainvillea and Singh (2001)<sup>[9]</sup> in Jasmine.

After three months planting, different treatments showed significant difference in per cent survival of hibiscus cuttings. Per cent survival varied from 39.33 to 98.66 per cent among the various treatments. The highest per cent survival (98.66) was recorded in T<sub>2</sub> (February) and was significantly superior over the rests. The lowest sprouting per cent (39.33) was noticed in T<sub>8</sub> (August).

**Table 1:** Effect of season on sprouting and survival percentage of hibiscus cuttings

Treatment Details		Sprouting %	Survival %
		30 DAP	90 DAP
T <sub>1</sub>	January	88.00 (69.77)	75.33 (60.23)
T <sub>2</sub>	February	99.33 (87.28)	98.66 (86.15)
T <sub>3</sub>	March	95.33 (77.58)	92.00 (73.65)
T <sub>4</sub>	April	91.33 (72.90)	88.66 (70.38)
T <sub>5</sub>	May	82.00 (64.91)	73.33 (58.95)
T <sub>6</sub>	June	83.34 (65.91)	67.33 (55.15)
T <sub>7</sub>	July	89.33 (70.95)	53.33 (46.92)
T <sub>8</sub>	August	81.33 (64.40)	39.33 (38.83)
T <sub>9</sub>	September	86.66 (68.59)	52.66 (46.53)
T <sub>10</sub>	October	80.00 (63.45)	72.00 (58.06)
T <sub>11</sub>	November	76.66 (61.12)	58.00 (49.60)
T <sub>12</sub>	December	72.67 (58.49)	61.33 (51.55)
S.Em. ±		0.90	1.85
C.D. at 5%		2.65	5.42

In Table 2. at 90 DAP, there was significant variation in leaf area among the various treatments. The maximum leaf area (108.76) was recorded in treatment T<sub>2</sub> (February). However, the minimum leaf area (77.81) was observed in treatment T<sub>12</sub> (December).

At 90 DAP of cuttings; there was significant variation in length of sprout among the various treatments. The maximum

length of sprout (17.26) was found in treatment T<sub>2</sub> (February) which was at par with the treatments T<sub>3</sub> (16.40), T<sub>11</sub> (15.47) i.e. March and November, respectively. The minimum length of sprout (7.74) was found in the treatment T<sub>1</sub> (January). It might be due to wood maturity of cuttings which probably reserves high starch and sugar.

**Table 2:** Effect of season on leaf area, length of sprout and number of adventitious root of hibiscus cuttings

Treatments details	Leaf area (cm <sup>2</sup> ) 90 DAP	Length of sprout (cm) 90 DAP	Number of adventitious root (no.) 90 DAP
T <sub>1</sub>	79.43	7.74	9.67
T <sub>2</sub>	108.76	17.26	20.20
T <sub>3</sub>	100.70	16.40	20.60
T <sub>4</sub>	98.04	12.88	16.40
T <sub>5</sub>	82.96	12.34	15.00
T <sub>6</sub>	87.41	10.65	19.33
T <sub>7</sub>	84.80	8.83	14.87
T <sub>8</sub>	90.61	12.08	17.07
T <sub>9</sub>	86.02	13.75	18.60
T <sub>10</sub>	85.02	12.66	11.00
T <sub>11</sub>	82.17	15.47	11.40

T <sub>12</sub>	December	77.81	10.44	12.27
	S.Em. ±	2.36	0.73	0.24
	C.D. at 5%	6.94	2.15	0.69

After three months of planting, the number adventitious roots were significantly influenced by the different treatments. The number of adventitious roots varied from 9.67 to 20.60. The higher number of adventitious roots (20.60) was found in treatment T<sub>3</sub> (March) which was at par with the treatment T<sub>2</sub> (20.20). The lower number of adventitious roots (9.67) was found in the treatment T<sub>1</sub> (January).

### Conclusion

On the basis of the result obtained on propagation through cuttings in Hibiscus (*Hibiscus rosa-sinensis* L.) under polyhouse conditions during the month of February had given promising results in growth parameters like per cent sprouting, per cent survival, leaf area and length of sprout. Hence, from the present investigation carried out on the propagation of hibiscus through semi hardwood cuttings in the month of February had proved to be the best month for propagation under konkon conditions of Maharashtra.

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