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Original Research Article

Studies on Standardization of Season for Stem Cutting in Hibiscus

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A B S T R A C T

The experiment was laid out in Randomized Block Design (RBD) with twelve treatments and three replications**.** Propagation through semi-hardwood cuttings of Hibiscus, the cuttings were planted in season such as T_1: January, T_2: February, T_3: March, T_4: April, T_5: May, T_6: June, T_7: July, T_8: August, T_9: September, T_{10}: October, T_{11}: November, T_{12}: December. The maximum number of leaves, diameter of sprout and root length were recorded in the treatments T_2 (February). Propagation through semi-hardwood cuttings in the treatment T_2 i.e. February month had proved to be the best month for propagation of hibiscus.

Keywords
Hibiscus, Season, Semi-hardwood cuttings

Introduction

Hibiscus is a very important ornamental flowering shrub. Hibiscus (*Hibiscus rosa-sinensis* L.) is a well known member of the 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 common name of Hibiscus is China rose, Gurhal, and Jaswand. Hibiscus is one of the most beautiful flowering and evergreen shrub. This plant is used for loose flower production for offering to the God, garden decoration in the shrubbery boarder and potted plant for roadside planting in the home garden. The flower are brilliantly coloured ranging from red, pink, white, orange, yellow, purple and even multi-colour.

Hibiscus plant grows well in full sun light. It requires moderate temperature for the proper plant growth and flower production. Hibiscus gives good result in well-drained sandy loam soil. Growers can get many flowers with soil rich in organic matter. Soil pH vary from 5.5 to 6.5. Hibiscus plants are propagated by seed, stem cutting, grafting, budding, layering and it is propagated by tissue culture as commercial method too (Hartmann *et. al.* (2002). In general, hibiscus is propagated by cutting. It is the most common method of its multiplication. 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).

Hibiscus can be propagated by seed, cuttings or layering. It does not set seed in some areas. Due to its increasing demand as medicinal,

aromatic and ornamental plant, requires planting material on a large scale. But, its inability to set seeds under konkon condition, so vegetative propagation is only process of multiplication. Among the vegetative methods ,propagation through stem cuttings is the best, appropriate and cheap method compared to its propagation through seed and tissue culture. Hence, for large scale production of plants there is a need to standardize the propagation techniques including the season, type of cutting. However, In view of the above, an experiment was conducted in this university to solve the above cited problem.

Materials and Methods

The present investigation on the "Studies on standardization of season for stem cutting in Hibiscus" was carried out in poly house condition during January 2018 to December 2018 at Hi-tech project, Department of Horticulture, College of Agriculture, Dr. Balasaheb Sawant Konkan Krishi Vidyapeeth, Dapoli. 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 where 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.

Results and Discussions

During the course of experiment various observations were recorded such as number of leaves, number of sprouts, diameter of sprout, days required for bud initiation per cutting and root length recorded after three month of planting.

In Table 1, at 90 DAP of cutting, the various treatments showed significant effect on number of leaves. The maximum number of leaves i.e. (27.80) was recorded in the treatment T_2 (February). The minimum (11.27) was found in treatment T_{12} (December). It might be due to wood maturity of cuttings which probably reserves high starch and sugar. The appropriate planting season played some role in augmenting the number of leaves per cutting. Similar results were obtained by Pal and Swarup (1974) and Singh and Singh (2002) in bougainvillea cultivar Thimma.

At 90 DAP of cutting, there was significant variation in number of sprouts of cuttings among the various treatments. The maximum number of sprouts of cutting (4.73) was found in T_3 (March) which was at par with the treatments T_2 (4.40) and T_4 (4.07) i.e. February and April, respectively. However, the minimum (3.20) was observed in treatment T_{12} (December). February and March planted cuttings resulted in better sprouting than other planting season due to the presence of sufficient growth promoting

substances for both root and shoot initiation. These result are close conformity with the results of Kumari *et al*. (2010) who noted maximum number of sprouts in cutting of bougainvillea in the month of February and March.

In Table 2, at 90 DAP of cuttings, there was significant variation in diameter of sprout among the various treatments. The maximum diameter of sprout (3.47) was found in treatment T_2 (February) which was at par with the treatments T_9 (3.42), T_5 (3.37), T_3 (3.36), T_4 (3.35), T_6 (3.32) i.e. September, May, March, April and June, respectively. However, the minimum (2.53) was observed in treatment T_{12} (December). Present findings also corroborated well with the results of earlier researchers (Panwar *et al*., 1994 and Singh and Singh, 2002) in bougainvillea.

After three months of planting, days required for initiation of bud was significantly influenced by different treatments from time of planting. The minimum days (31.87) required for initiation of bud was recorded in treatment T_4 (April), which was significantly superior over rest of treatments under taken. However, the maximum days (43.53) required for initiation of bud was recorded in T_{11} (November).

Table.1 Effect of season on number of leaves and number of sprouts of hibiscus cuttings

Treatment Details		Number of leaves (no.)	Number of sprouts (no.)
		90 DAP	90 DAP
T_1	January	14.27	3.67
T_2	February	27.80	4.40
T_3	March	24.33	4.73
T_4	April	19.67	4.07
T_5	May	22.80	3.87
T_6	June	22.27	3.87
T_7	July	21.40	3.73
T_8	August	23.27	3.93
T_9	September	22.27	3.47
T_{10}	October	17.40	4.00
T_{11}	November	13.20	3.87
T_{12}	December	11.27	3.20
S.Em. ±		**0.67**	**0.23**
C.D. at 5%		**1.95**	**0.68**

Table.2 Effect of season on diameter of sprout, days required for initiation of bud and root length of hibiscus cuttings

Treatments details		Diameter of sprout (mm) 90 DAP	Days required for initiation of bud (no.) 90 DAP	Root length (cm) 90 DAP
T_1	January	2.90	41.13	12.84
T_2	February	3.47	37.93	21.50
T_3	March	3.36	35.93	18.63
T_4	April	3.35	31.87	16.51
T_5	May	3.37	36.53	15.37
T_6	June	3.32	40.20	15.90
T_7	July	3.28	37.73	15.29
T_8	August	2.97	35.33	14.65
T_9	September	3.42	38.80	17.79
T_{10}	October	2.78	41.73	13.69
T_{11}	November	2.61	43.53	10.51
T_{12}	December	2.53	41.73	11.54
S.Em. ±		**0.07**	**1.36**	**0.11**
C.D. at 5%		**0.21**	**3.99**	**0.33**

After three months of planting, the root length was significantly influenced by the different treatments. The root length varied from 10.51 to 21.50. The highest root length (21.50) was observed in treatment T_2 (February). The lowest root length (10.51) was with T_{11} (November). The increase in the length of root over control may be due to the enhanced hydrolysis of carbohydrates, auxin induced accumulation of metabolites, synthesis of new proteins, cell enlargement and cell division caused by treatment with auxin.

In conclusion, the out come of present study can be concluded as the 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 number of leaves, diameter of sprout, and root length. February month proved better than all other treatment to increase various attributes related to the growth as well as root of Hibiscus cuttings.

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