Journal of Medicinal Plants Studies
www.PlantsJournal.com

ISSN (E): 2320-3862
ISSN (P): 2394-0530
NAAS Rating: 3.53
JMPS 2018; 6(4): 180-181

Received: 27-05-2018
Accepted: 28-06-2018

G Gokula Kannan
Dept. of Medicinal and Aromatic Crops, HC & RI, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

K Rajamani
Dept. of Medicinal and Aromatic Crops, HC & RI, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

L Nalina
Dept. of Medicinal and Aromatic Crops, HC & RI, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

D Uma
Dept. of Biochemistry, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Correspondence
G Gokula Kannan
Dept. of Medicinal and Aromatic Crops, HC & RI, Tamil Nadu Agricultural University, Coimbatore, Tamil Nadu, India

Studies on the effect of different spacing on *Caralluma sarkariae* (Lavranos & Frandsen) cuttings

G Gokula Kannan, K Rajamani, L Nalina and D Uma

Abstract
Caralluma sarkariae is a succulent herb belongs to the family of Apocyanaceae. The population of *Caralluma sarkariae* is found growing in a secluded area at Nagamalai hills of Madurai, Tamil Nadu. The crop with its immense medicinal value such as anti-obesity and anti-diabetic properties need to be explored and promoted in non-traditional areas. Hence the experiment was taken up to study the effect of different spacing on *Caralluma sarkariae* cuttings. The results revealed that, the use of different spacing greatly influenced the growth parameters particularly shoot and root length were greatly influenced in closer spacing of 15×15 cm.

Keywords: *Caralluma sarkariae*, cuttings, anti-diabetic, anti-obesity, kallimudaiyan

Introduction
Caralluma sarkariae (2n = 22, Family: Apocynaceae), the endemic succulent herb is an important indigenous medicinal plant with restricted distribution in India. *Caralluma* species have been documented in the Arabic and Indian traditional medicines. This plant contains glycosides which are reported to be the main reason for the medicinal activity [1]. Pharmacological activities of *Caralluma* species have been reported for appetite suppression, anti-obesity activities, anti-inflammatory activity, analgesic activity, anxiolytic activity, antiatherogenic activity, wounds healing and antibacterial activity [2]. *Caralluma sarkariae* has been reported to be distributed in few habitats of Madurai district in Tamil Nadu and the range of variation in distribution, floral features such as hairiness, striation patterns in the species was reported [3]. In India, *Caralluma* is cooked as a vegetable and is used in preserves such as chutneys and pickles. It is also eaten raw. In Western India, *Caralluma fimbriata* is a famine food suppressing appetite and for quenching thirst. The hunting tribe's chew chunks of the *Caralluma* cactus to suppress hunger and thirst when on a long hunt. *Caralluma* is difficult to germinate through seeds and successful attempts were made to improve seed germination as well as through vegetative methods [4]. To protect wild species like *Caralluma sarkariae*, scientific information on plant propagation, and spacing is required to make it commercially viable.

Materials and Methods
The experimental field was located at Botanical Garden, Department of Medicinal and Aromatic Crops, Horticultural College and Research Institute, TNAU, Coimbatore during 2017-2018. *Caralluma sarkariae* planting materials were collected from Horticultural College and Research Institute, Periyakulam, Theni district. The plant collection site is located at an altitude of 300 m above mean sea level with geographical bearing of 10º12'N latitude and 77º35'E longitude. The collected plants given to Botanical Survey of India for species authentication. Beds were prepared with 2.5m width and 2.5m length. Cuttings were planted at 15×15 cm, 15×30 cm, 30×30 cm, 30×45 cm, 45×45 cm spacing in 20 plots. The stem cuttings were planted slantly by inserting 1/3rd of the length in the soil. It was laid out in RBD with four replications. Shoot length, root length, number of shoots, number of roots, establishment percentage and number of days taken per sprouting parameters was observed. SPSS software used for statistics analysis.

Treatments	Spacing
T_1	15×15 cm
T_2	15×30 cm
T_3	30×30 cm,
T_4	30×45 cm
T_5	45×45 cm

Results and Discussion

Significant variation was observed for shoot length with different spacing studies. The highest shoot length (18.30 cm) was recorded in the spacing of 15×15 cm, while the shoot length was lowest (12.84 cm) in the spacing (30×45 cm). The root length was highest (9.80 cm) in the spacing of 45×45 cm while the lowest length (6.58 cm) was recorded in the spacing (30×45 cm). The number of shoots was the highest (6.80 cm) in the spacing of 30×45 cm while the lowest number (3.60 cm) in 15×30 cm. The highest number of roots (17.60 cm) was recorded in the spacing of 45×45 cm while the lowest number (9.0 cm) in the spacing (15×30 cm). The establishment percentage was the highest (46.81%) in 15×15 cm while the lowest (34.11%) in 15×30 cm. Early sprouting (32.6 days) was observed in plants spaced at 15×15 cm while it took more days for sprouting (44.2) in plants spaced at 45×45 cm (Table 1).

The spacing levels exhibited significant differences for different shoot parameters. Closer spacing (15 x 15 cm) resulted in higher shoot length when compared to the wider spacing (45 x 45 cm). Similarly**,** the number of shoots was highest in plants spaced at 15 x 15 cm. *Caralluma* is a succulent plant which grows upward and require optimized spacing to tap the photosynthesis and soil moisture. Being a plant that grows vertically, closer spacing, increased plant shoot length in closer spacing, the plants tends to grow vertically and promotes apical bud development due to the production of high levels of auxin and low levels of cytokinin in those regions. Also, the lower level of cytokinin production will not allow the plants to produce side shoots there by the plants produce decreased number of branches as well reduced plant spread. The similar trend on shoot characters was also observed with *Ocimum gratissimum* [5], *Solanum viarum* [6], senna [7] and davana [8]. In the present study, closer spacing resulted in highest plant height and similar findings of closer spacing were reported in kalmegh [9], and in Makoi [10]. Unlike the shoot parameters, root characters were found to be influenced by wider spacing. The length of root, number of roots was highest in wider spacing (45 x 45 cm).

In the present study, closer spacing (15 x 15 cm) resulted in higher plants establishment percentage which was mainly due to earlier sprouting (32.6 days) in the closer spacing. The plants that receive wider spacing facilitated better root parameters through which the establishment of plants was also good and such reports were hitherto published in many horticultural crops.

Conclusion

Among the various spacing levels, closer spacing of 15x 15 cm recorded the highest shoot length, establishment percentage with early sprouting. The root length, number of roots was highest in plants spaced at 45×45 cm while the number of shoots was highest in 30×45 cm. Considering various growth parameters, plant spacing of 15×15 cm is ideal for better growth and yield in *Caralluma sarkariae*.

Table 1: Growth parameters observed in *caralluma sarkariae* cuttings

S. No	Treatments	Shoot length (cm)	Root length (cm)	No. of shoots	No. of roots	Establishment (%)	Days taken for sprouting
1	T_1	18.30	9.76	4.20	15.60	46.81	32.6
2	T_2	12.94	6.92	3.60	9.00	34.11	37.2
3	T_3	16.56	8.08	6.00	9.80	35.54	38.2
4	T_4	12.84	6.58	6.80	11.80	45.83	36.8
5	T_5	17.34	9.80	3.80	17.60	36.8	44.2
Mean		15.60	8.22	4.89	12.76	39.81	37.8
SE(d)		0.31	0.10	0.08	0.16	0.65	0.51
CD(P=0.05)		0.69	0.22	0.17	0.36	1.41	1.11

References

1. Ramesh M, Rao YN, Kumar MR, Rao AVNA, Prabhakar M, Reddy BM. Antinociceptive and anti-inflammatory activity of carumbelloside-I isolated from *Caralluma umbellata*. Journal of Ethnopharmacology. 1999; 68(1-3):349-352.
2. Devi SG, Dhamotharan R. *Caralluma fimbriata*-An Important Medicinal Plant: A Review of Its Traditional Uses, Phytochemistry and Pharmacological Properties. International Journal of Pharm Tech Research. 2016; *9*(5):223-230.
3. Aditya. Habitat colour variance in *Caralluma sarkariae* Lavranos & Frandsen. Asclepias. *Asclepias*. 2009; 105:5-8.
4. Samydurai P, Thangapandian V. Received by Kris Received on 2012-9-10 ID No. B760 Revised on Pages 15 Caralluma species
5. Balyan S, Sobti S. Effect of inter-and intra-row spacing on growth, yield and eugenol content in *Ocimum gratissimum* Linn. (var. clocimum). Indian Perfumer. 1990; 34(3):217-224.
6. Subbi Reddy G, Krishnan R, Chandravadana M. Plant density and arrangement for higher berry and solasodine yields in *Solanum viarum*; rectangular vs square spacing. Tropical Agriculture, 1991, 68.
7. Ilangovan R, Subbiah R, Naiarajan S. Effect of spacing, nitrogen and phosphorus on certain growth parameters of senna (*Cassia angustifolia* Vahl.). South Indian Horticulture. 1990; 38(1):53-54.
8. Janardhana R, Sreenivas B, Govind R. Effect of planting dates and intra-row spacings on growth, herbage and oil yield of davana (*Artemisia pallens* Wall.). Indian Perfumer. 1990; 34(4):250-252.
9. Shivanna M, Ramesh G, Ram A. Influence of organics and biofertilizers on the growth and yield of kalmegh (*Andrographis paniculata*). Journal of Medicinal and Aromatic Plant Sciences. 2010; *32*(3), 251-256.
10. Sivakumar V. Studies on standardization of protocol for maximization of growth, yield and alkaloid content in Black nightshade (*Solanum nigrum* L.). M. Sc.,(Hort.) Thesis, Tamil Nadu Agricultural University, Coimbatore-3, India, 2004.