



Cultivation Study in Air Potato (*Dioscorea bulbifera* L.) by Using Various Growth Parameters

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Abstract: *Dioscorea bulbifera* L belongs to the family Dioscoreaceae a native to tropical Asia and sub-Saharan Africa. It is found throughout India particularly in warmer places and positional therapeutic uses. It contains flavonoids, steroids, and cardiac glycosides like phyto constituents. The current works deals with the study with regards to cultivation of this wild medicinal plant and its domestication. Vegetation of plant height and branches were focused in different replicate to find out the significance level of growth in each case. Tabular and graphical data reveals and represent the information regarding agro-culture practice for said plant.

Key words: *Dioscorea bulbifera*, Air potato, Cultivation, Medicinal Plant, Dioscoreaceae, vegetation, height and branches.

INTRODUCTION

Dioscorea bulbifera L. belongs to the family Dioscoreaceae commonly called as Air potato. Locally plants are called as Gainthi, Varahi, Dukar-kand, and Kadu-karanda in various part of Maharashtra. Plant is famous for its bulbs and its medicinal importance. Plant is with climber tuberous root and annual twinning herbs, distributed in moist tropical area (Mubo *et al.*, 2013). Plant tuber is edible (Borthakur SK 1996 and Sinha SC 1996) and used in lowering glycemic index and helpful to protect against diabetes (Punjani BL 2007). Plants parts are also used for the treatment of throat infections, goiter and caners like gastric and carcinoma of rectum (Chandra *et al.*, 2012).

Air potato contains flavonoids, terpenoids, cardiac glycosides and saponins (Dweck AC 2000). Plant show free radical scavenging and anti-oxidant activity therefore it serves as an alternative natural anti-oxidant (Balasubramanian *et al.*, 2012 and Simoes *et al.*, 2009). Since oxidative stress is a key player in several diseases such as cancer, arteriosclerosis, cardiovascular diseases, antimicrobial, diabetes mellitus, ageing and inflammatory diseases, results from an imbalance between formation and neutralization of prooxidants (Samane *et al.*, 2006 and Ghosh *et al.*, 2012).

Aerial part is a glabrous-leafed, non-spiny, perennial climbing plant producing annual stems up to 10 meters long from a woody, tuberous rootstock. Stems scramble over the ground, or twine into the surrounding vegetation (Ahmed *et al.*, 2009). The stems twine left-handed and produce aerial axillary bulbils. The plant is often cultivated in tropical areas, mainly for its edible aerial bulbs, though also for its roots (Miller, 2003; Acevedo-Rodríguez and Strong, 2005).

The broad native distribution of *Dioscorea bulbifera* includes much of Asia and Africa and the plant has been widely introduced to new tropical and subtropical areas including the Americas (Coursey 1967 and Meena & Yadav 2011).



Flower



Habit



Bulb



Cultivation

Dioscorea bulbifera L.

MATERIAL AND METHODS

For current investigation for study of cultivation pattern and vegetative growth in *D. bulbifera*, plant vegetation and growth of height were focused. The vegetation of *Dioscorea bulbifera* was recorded by observing their branches separately as per the blocks of experimental and plots in departmental garden. The number of branches/plant was recorded at the intervals of 15 days in four plants. To get accurate vegetation growth in term of their branched per plants, 10 replicates of each plants has been observed in decided time intervals.

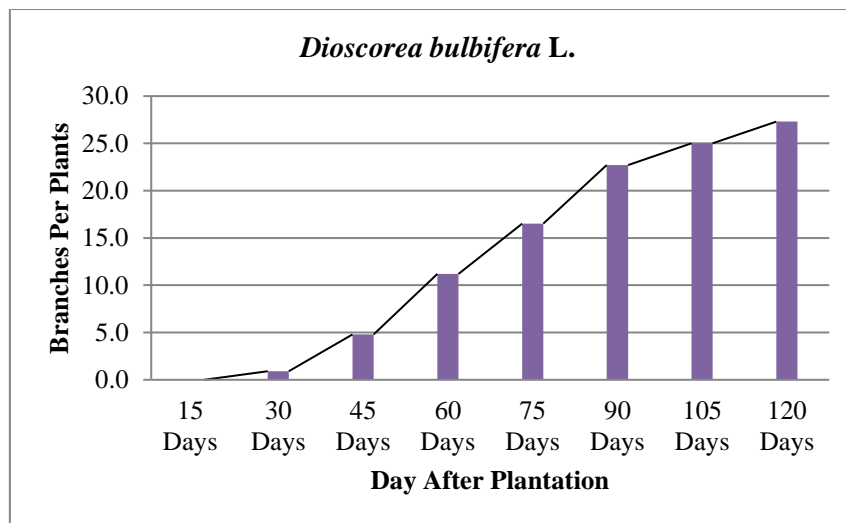
The height of the plant was recorded for 10 different replicates in centimeter (cm) by a scale of suitable length from collar up to the base of topmost fully expanded leaf. Average height (shoot length) of plant was measured at 15, 30, 45, 60, 75, and 90, day after sowing (DAS) or Propagules transplantation to pots among all five plants. Total height of the plants after 90 days and per day average growth of plants is also recorded.

RESULT AND DISCUSSION

Vegetative growth pattern in *Dioscorea bulbifera* L. studied for ten different replicates by counting their branches number and its growth per day. It was found that growth rate of 0.9 ± 0.038 branches per day after 120 days of germination among all replicates (Table 1 and Graph no. 1).

Replicate of Plant	Table 1 <i>Dioscorea bulbifera</i> L. Vegetative branches per plants								Growth Rate Per Day
	15 Days	30 Days	45 Days	60 Days	75 Days	90 Days	105 Days	120 Days	
Replicate 1	0.0	1.0	6.0	12.0	18.0	24.0	26.0	28.0	1.0
Replicate 2	0.0	1.0	4.0	11.0	17.0	23.0	25.0	27.0	0.9
Replicate 3	0.0	2.0	5.0	12.0	18.0	24.0	25.0	26.0	0.9
Replicate 4	0.0	1.0	6.0	12.0	18.0	23.0	24.0	27.0	0.9

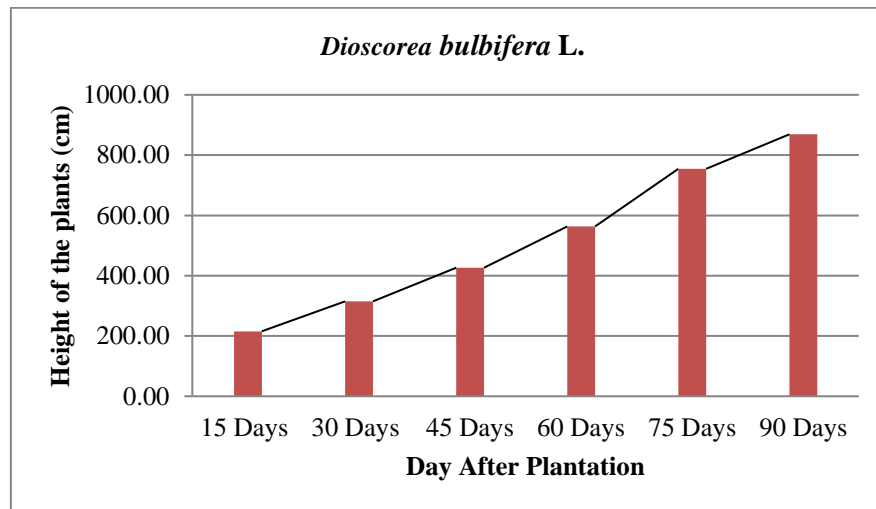
Replicate 5	0.0	2.0	6.0	13.0	19.0	23.0	24.0	27.0	1.0
Replicate 6	0.0	0.0	5.0	12.0	16.0	23.0	26.0	28.0	0.9
Replicate 7	0.0	0.0	4.0	10.0	15.0	22.0	25.0	28.0	0.9
Replicate 8	0.0	1.0	4.0	10.0	15.0	22.0	24.0	26.0	0.9
Replicate 9	0.0	0.0	3.0	9.0	14.0	22.0	26.0	28.0	0.9
Replicate 10	0.0	1.0	5.0	11.0	15.0	21.0	25.0	28.0	0.9
Total	0.0	0.9	4.8	11.2	16.5	22.7	25.0	27.3	0.9
Growth Rate Per Day with SD= 0.9±0.038									



Graph no. 1: Vegetative branches growth in *Dioscorea bulbifera*

In *Dioscorea bulbifera* height of the plant is also measured by its shoot length by intervals for 15-90 days plant. Total growth rates for stem or shoot growth was recorded, it found that's 34.95±0.226 cm per day as in Table 2 and graph no. 2.

Replicate of Plant	Table 2. <i>Dioscorea bulbifera</i> L.							Per Day Growth (cm)
	Height of the plants (Shoot length in cm) (Arial Bulbs as a Propagules)							
	15 Days	30 Days	45 Days	60 Days	75 Days	90 Days	Total	
Replicate 1	215.50	310.50	425.50	562.30	751.20	845.50	845.50	34.56
Replicate 2	214.60	311.40	426.70	567.20	756.20	875.30	875.30	35.02
Replicate 3	215.20	321.20	427.10	548.20	754.90	845.30	845.30	34.58
Replicate 4	213.60	325.10	428.60	543.70	758.20	904.30	904.30	35.26
Replicate 5	214.50	310.20	430.50	571.90	754.30	864.50	864.50	34.95
Replicate 6	216.50	315.20	431.01	561.00	746.20	877.50	877.50	34.97
Replicate 7	214.00	314.20	425.10	581.60	759.40	843.10	843.10	34.86
Replicate 8	218.20	314.70	428.10	569.50	754.20	876.00	876.00	35.12
Replicate 9	216.50	317.30	424.80	563.70	766.50	863.50	863.50	35.03
Replicate 10	217.20	312.40	422.00	564.10	749.50	895.50	895.50	35.12
Total	215.58	315.22	426.94	563.32	755.06	869.05	869.05	34.95
Growth Rate Per Day with SD= 34.95±0.226								

**Graph no. 2. Height of the plants in *Dioscorea bulbifera*****ACKNOWLEDGEMENT**

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