



**AN INVESTIGATION OF INITIATION AND ROOT GROWTH OF *BRYOPHYLLUM*
DETACH LEAF WHEN PLACED ON MOIST SANDY SOIL AND MOIST FILTER
PAPER RESPECTIVELY FOR A PERIOD OF 4 DAYS**

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Abstract

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The adventitious roots initiation and growth of adventitious root in detach *Bryophyllum* leaf were studied. Notches of *Bryophyllum* leaf was the most important site for the initiation of adventitious roots. Adventitious roots were initiated from the notches when isolated leaves were placed on moist sandy soil and moist filter paper respectively and sprayed with water frequently. The number of notches in a *Bryophyllum* leaf ranged in between 6 to 36, but adventitious roots did not develop equally on the notches present. It might so happen that the root hormones present at the notches, responsible for root initiation were not present in the notches in suitable concentration, other physiological condition prevailing at notches might also be responsible for root initiations. The result showed that all *Bryophyllum* leaf are not suitable for adventitious root production. It depends upon several factors like age of leaf, position of leaf, environmental conditions, medium on which roots are grown etc. Only particular leaves are suitable for adventitious roots production.

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Key words: *Bryophyllum* leaf, adventitious root, moist sandy soil, growth.

INTRODUCTION

Bryophyllum (Family Crassulaceae) is an interesting perennial herb. It is found to grow in dry rocky places and it exhibits xerophytic characters. A mature *Bryophyllum* plant attains a height of three to four feet. Leaves are succulent and opposite decussate forming four vertical rows of leaves on the stem or a branch. Besides photosynthesis and storage of food materials *Bryophyllum* leaves are important for special type of vegetative reproduction which takes place frequently by means of adventitious buds found to be present on the notches of the leaf margin besides being ornamental, it is also an important medicinal plant. Dry leaf powder is useful for certain diseases. Leaf juice is good for piles, flatulence, syphilis, retention of urine strongly. (Sarma, 1978) Adventitious root formation is a complex phenomenon. Essentially, the root formation consists of two phases root initiation and root growth (Lovell *et.al.*, 1971) and plant species differ with regard to the duration of each phase. In adventitious root formation, the water status of cutting plays a great role. According to Evans (1952) even a slight water deficit which may be inefficient to cause any visual symptoms of distress results in considerable delay or reduction, in the rooting response. Root growth depends on the temperature and soil temperature (Tanaka, 1932) High soil temperature inhibit root growth (Singh, 1978) have confirmed that shading of cutting under mist gives better rooting. In view of the complex function of roots various aspects have been studied to understand the physiology of root growth and development under different growth conditions. Several reviews have appeared during the last decade on various aspects of growth and development (Scott, 1972). Initiation and growth of root on *Bryophyllum* leaf depends to a great extent on the photosynthetic activity of leaf. Adventitious roots do not arise in a very

young leaf notch of *Bryophyllum* because chloroplast present in the very young leaf may remain in the protoplast form.

MATERIALS AND METHODS

100 numbers of *Bryophyllum pinnatum* sample were collected. These collected samples were planted on previously prepared beds of loamy soil cow dung mixture in rows carefully. Distance between two *Bryophyllum* plants were maintained at one foot and distance between two rows at 18th inches so that each plant could grow properly i.e., without interference in respect of light and space. The plants were watered every afternoon. After four months from the date of plantation, *Bryophyllum* plants grew substantially to a height of about one and half foot. *Bryophyllum pinnatum* leaves were used for the present investigation.

EXPERIMENTAL METHODS

Determination of suitable leaf for production of adventitious roots when placed in moist sandy soil for a period of 4 days:

Leaves of *Bryophyllum* plants were serially counted from the apex of the plant toward the base as the 1st pair, 2nd pair, 3rd pair, 4th pair, etc. The young leaves in the apical bud were not counted and only the mature leaves were taken into account. 1st pair of leaf of each *Bryophyllum* plant was exempted from the experiment as they were not mature. 108 such leaves, 36 from each *Bryophyllum* plant were collected and placed on moist sandy soil with their dorsal surface downward. Water were sprayed 2/3 time daily on the sandy soil to keep the leaves moist. All the leaves were left to rooting in diffused sunlight. Date and time of placing the leaves on sandy soil were recorded. The experiment was repeated three times with three replication in each case. Results of rooting behaviour from the experiment were observed after 4 days numbers of roots produced per notch

in each leaf, length of each root were recorded. The results are presented in Table nos. 1, 2, 3 and Graph nos.1.1, 1.2, 2.1, 2.2, 3.1 and 3.2 respectively.

Determination of suitable leaf for production of adventitious roots when placed in moist filter paper for a period of 4 days:

108 mature leaves 36 leaf from each *Bryophyllum* were collected and placed on moist filter paper, with dorsal surface downward. Water was sprayed two times daily to prevent the leaves from drying and continued until the experiment was completed. Experiment was repeated three times with three replication in each case. These set of leaves were left to rooting in diffused sun light as was done in the previous experiment. Date and time of placing leaf on moist filter paper for the experiment were recorded. After four days number of root produced per notch in each leaf, length of each root were recorded. The results are shown in Table no.4 and Graph nos. 4.1, 4.2 respectively.

RESULTS AND DISCUSSION

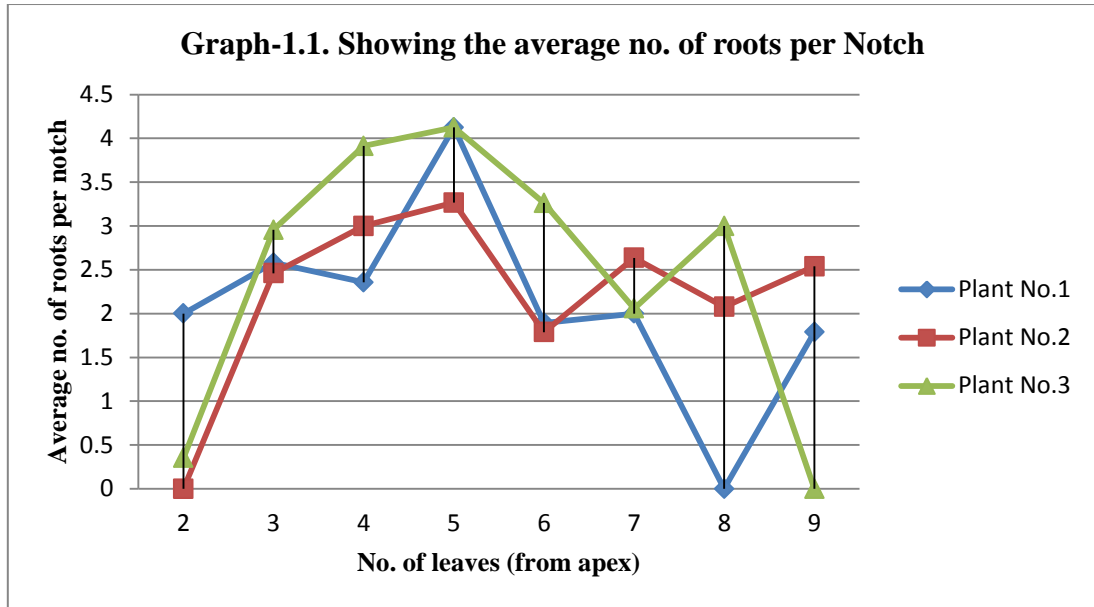
It was seen that almost all the mature leaves in general and lowermost laves in particular gives rise to adventitious roots.

The results obtained in various experiments were presented. Therefore it was proposed to study suitable leaf for rooting in an artificial condition when they were detached from the mother plant and placed in the moist sandy soil and moist filter paper respectively for a period of four days. From the results obtained in the experiment (Table- 1to 4) It was seen that fourth, fifth and sixth leaves were suitable so far as number of roots produced per notch and average length of each root were concerned. To ascertain the factors that control the variation in the adventitious roots, investigation were made by Samantarai and Sinha (1957) in the induced roots in isolated leaves. The production of adventitious roots on the notch at *Bryophyllum* leaf probably depends upon the leaf area. Production of adventitious roots indirectly depends upon the photosynthetic activity, the photosynthetic rate is significantly more in the large leaf area than a small one (Panwar *et.al.*, 1986). Root initiation and root growth on *Bryophyllum* leaves and their notches are very complicated process and this process is determined synergistically by a number at factors.

EXPERIMENTAL RESULTS

Table- 1: Determination of suitable leaf for production of adventitious root when placed in moist sandy soil for a period of 4 days.

	PLANT NO. 1		PLANT NO. 2		PLANT NO. 3	
No. of leaves (From the apex)	Average no of roots per notch	Average length of each root (mm)	Average no of roots per notch	Average length of each root (mm)	Average no of roots per notch	Average length of each root (mm)
2	2.000	2.070	0	0	0.352	2.666
3	2.580	3.790	2.461	4.531	2.956	5.000
4	2.357	4.500	3.000	6.111	3.913	5.444
5	4.125	5.151	3.266	4.693	4.125	5.444
6	1.894	2.220	1.789	2.764	3.263	4.435
7	2.000	2.535	2.636	2.758	2.059	4.487
8	0	0	2.076	2.592	3.000	4.791
9	1.789	2.750	2.539	3.348	0	0



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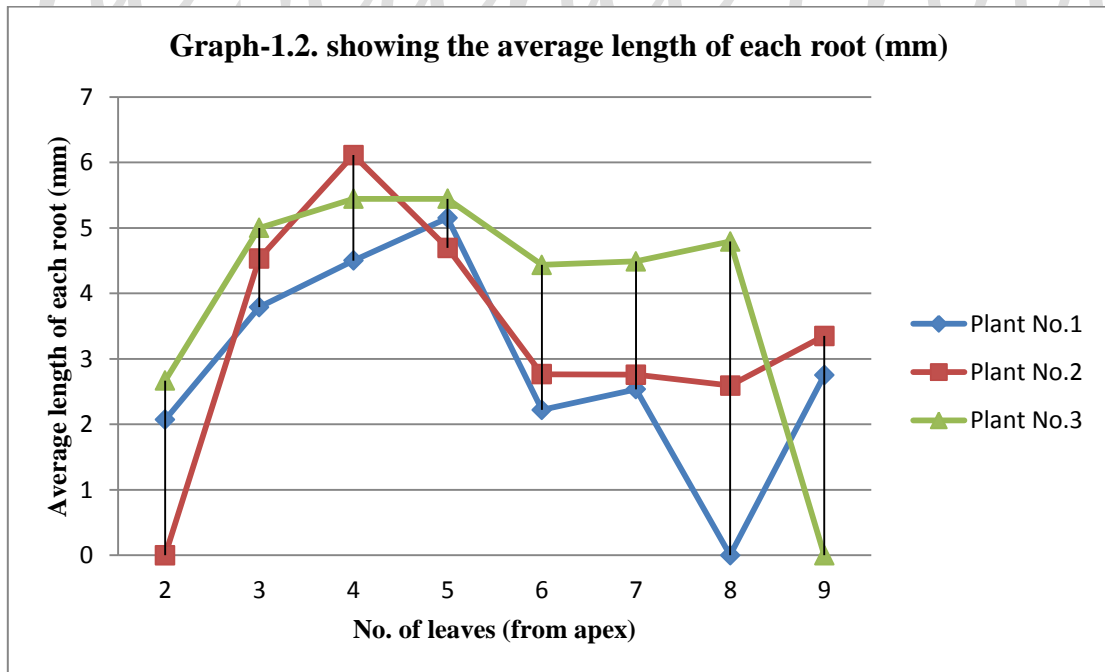
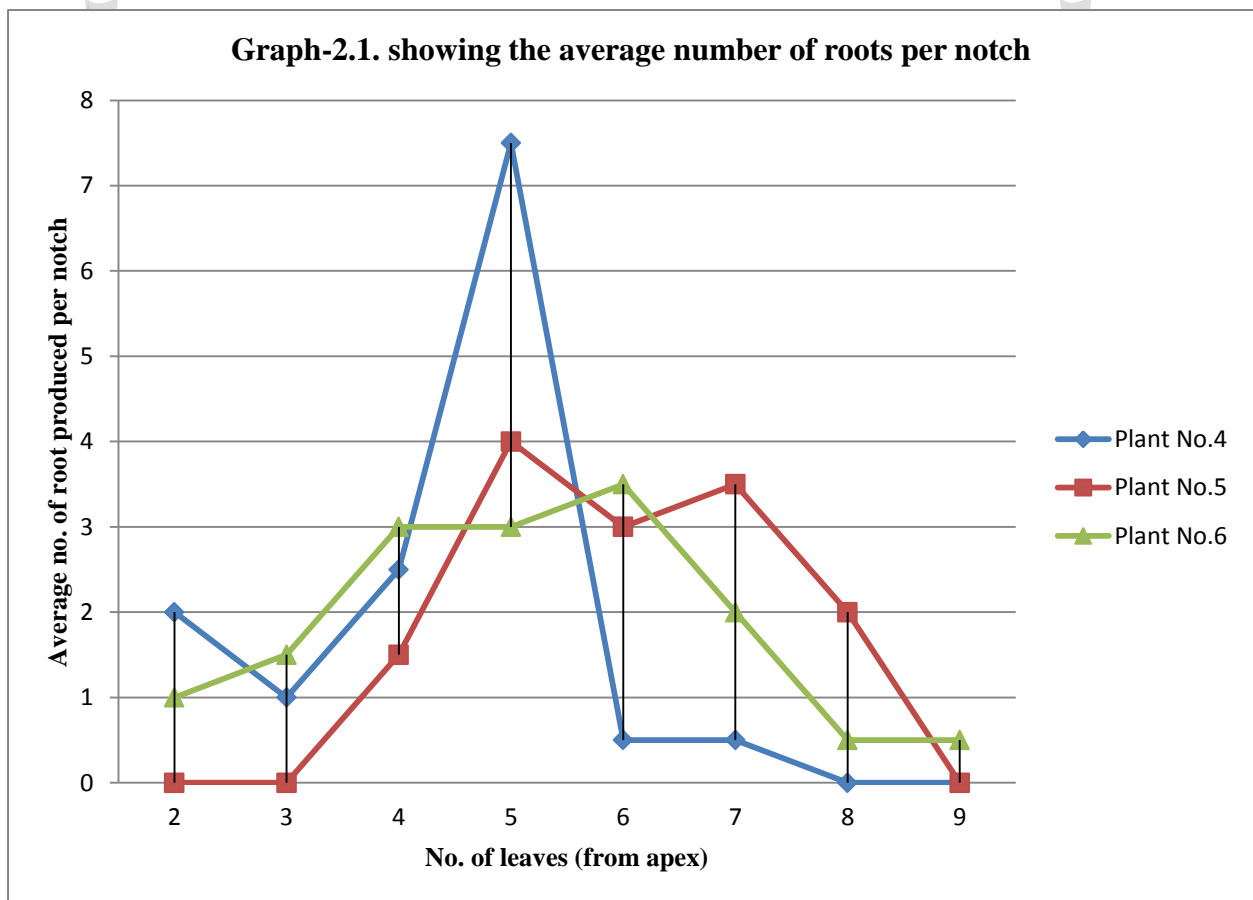


Table- 2: Determination of suitable leaf for production of adventitious root when placed in moist sandy soil for a period of 4 days.

No. of leaves (From the apex)	PLANT NO. 4		PLANT NO. 5		PLANT NO. 6	
	Average no of roots per notch	Average length of each root (mm)	Average no of roots per notch	Average length of each root (mm)	Average no of roots per notch	Average length of each root (mm)
2	2.000	0.500	0	0	1.000	1.000
3	1.000	1.000	0	0	1.500	2.000
4	2.500	1.500	1.500	1.000	3.000	2.000
5	7.500	4.000	4.000	2.000	3.000	3.000
6	.500	.500	3.000	1.00	3.500	2.000
7	.500	1.00	3.500	1.500	2.000	1.500
8	0	0	2.000	1.500	.500	.500
9	0	0	0	0	.500	.500



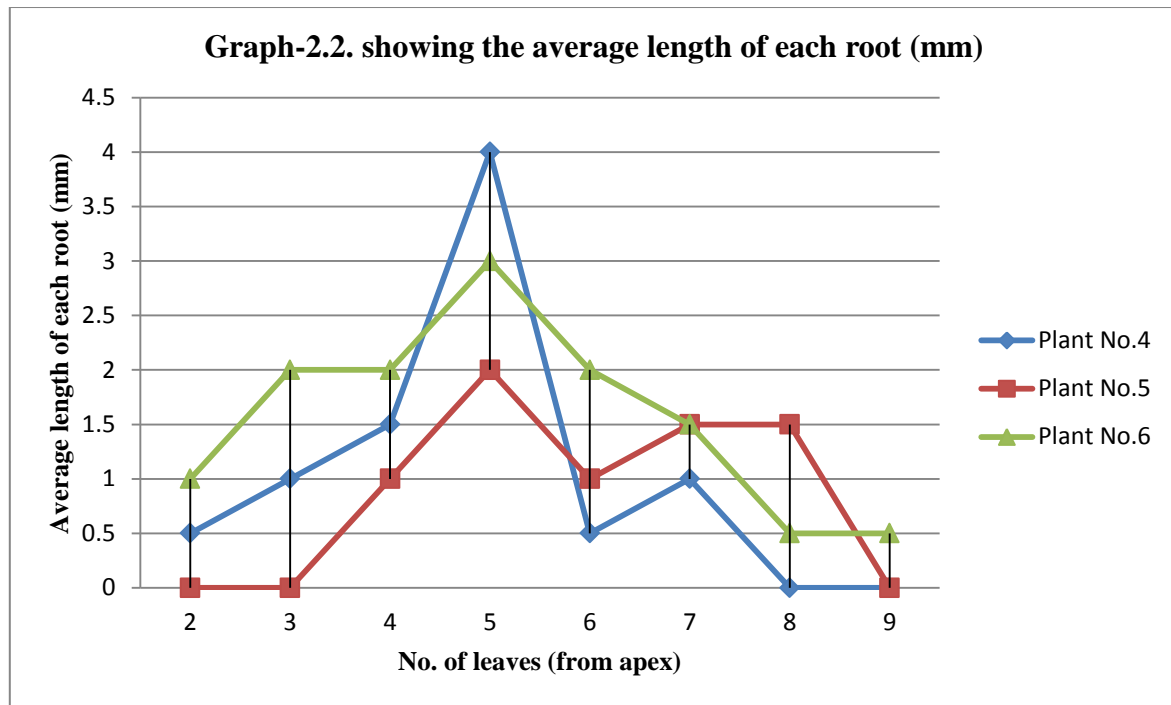
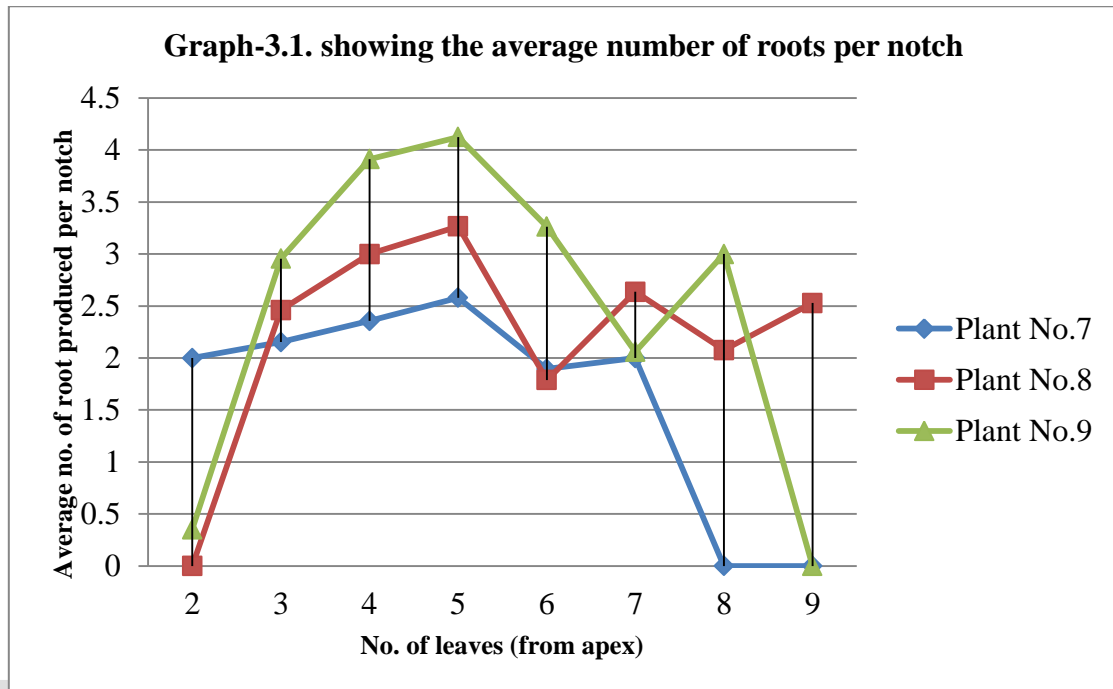


Table- 3: Determination of suitable leaf for production of adventitious root when placed in moist sandy soil for a period of 4 days.

No. of leaves (From the apex)	PLANT NO. 7		PLANT NO. 8		PLANT NO. 9	
	Average no of roots per notch	Average length of each root (mm)	Average no of roots per notch	Average length of each root (mm)	Average no of roots per notch	Average length of each root (mm)
2	2.000	2.070	0	0	0.352	2.666
3	2.153	3.790	2.461	4.531	2.956	5.000
4	2.357	4.500	3.000	6.111	3.913	5.444
5	2.580	4.693	3.266	6.500	4.125	5.751
6	1.894	2.222	1.789	2.764	3.263	4.435
7	2.000	2.535	2.636	2.758	2.059	4.487
8	0	0	2.076	2.592	3.000	4.791
9	0	0	2.529	3.348	0	0



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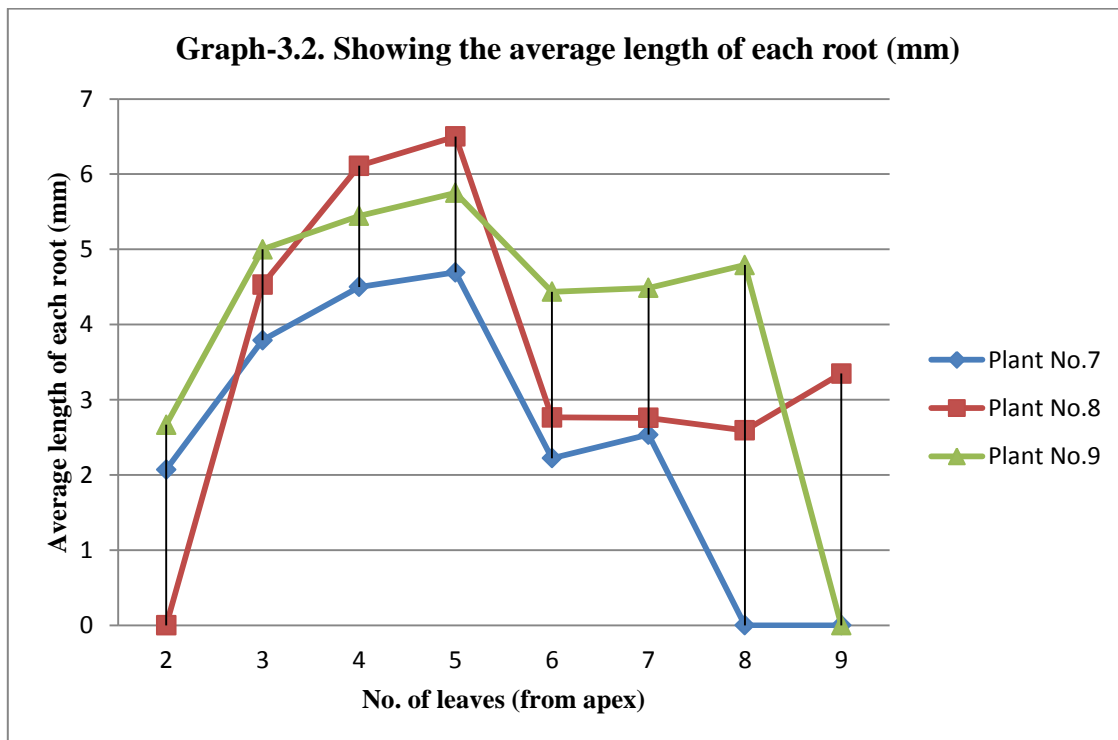
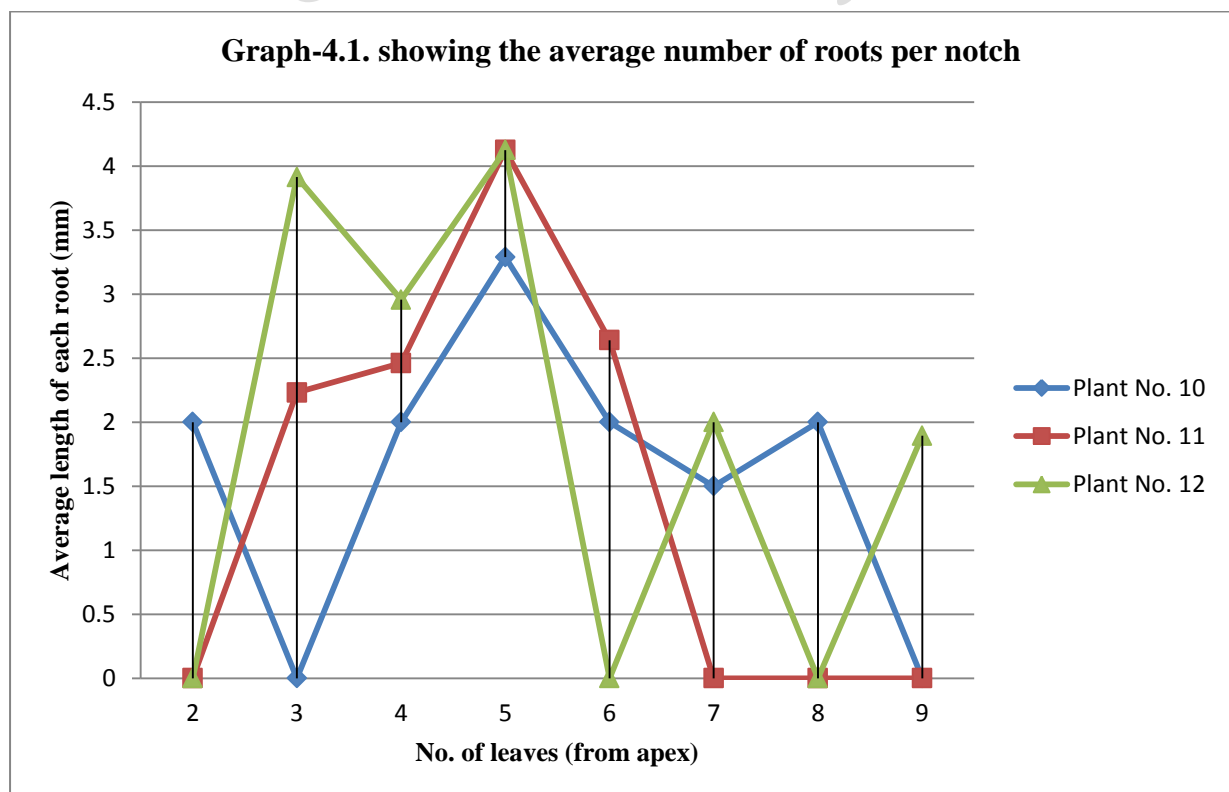
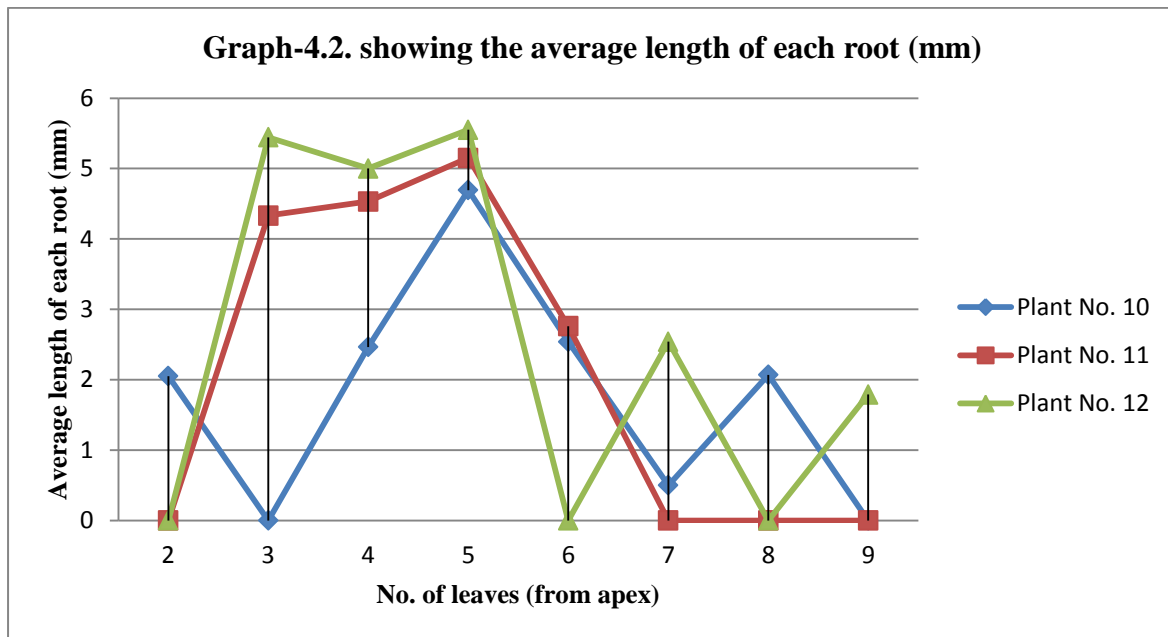


Table- 4: Determination of suitable leaf for production of adventitious root when placed on moist filter paper for a period of 4 days.

	PLANT NO. 10		PLANT NO. 11		PLANT NO. 12	
No. of leafs (From the apex)	Average no of roots per notch	Average length of each root (mm)	Average no of roots per notch	Average length of each root (mm)	Average no of roots per notch	Average length of each root (mm)
2	2.000	2.050	0	0	0	0
3	0	0	2.231	4.331	3.913	5.444
4	2.153	2.464	2.461	4.531	2.956	5.000
5	3.288	4.694	4.125	5.151	4.125	5.551
6	2.000	2.540	2.640	2.760	0	0
7	1.500	.500	0	0	2.000	2.540
8	2.000	2.070	0	0	0	0
9	0	0	0	0	1.894	1.789

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