

## **BIBLIOGRAPHY**

LONGATI, RACHELYN B. APRIL 2013. Effect of Different Misting Frequency on the Rooting Characteristics of Shoot tip Cutting of Three Species of *Medinilla*. Benguet State University, La Trinidad Benguet.

Adviser: Araceli G. Ladilad, PhD.

## **ABSTRACT**

This study was conducted at BSU Ornamental Horticulture Area, Department of Horticulture, College of Agriculture; from November to December 2012 to determine the effect of different misting frequencies on the rooting of shoot tip cuttings of different species of *Medinilla*; and to determine the rooting characteristics of shoot tip cuttings of the different species of *Medinilla*.

Results revealed that there were highly significant differences observed on the number of days from sticking to root initials as affected by the three *Medinilla* species evaluated. Shorter days from sticking to rooting were noted from the shoot tip cuttings of *Medinilla aphelandra* and *Medinilla multiflora*. Significant differences were likewise, obtained on the number of roots one and two months after sticking in the rooting media. There were no significant differences obtained on the percentage rooting and length of roots produced two months after in the growing media.

Shoot tip cuttings that were misted three times a day significantly produced longer roots. However, there were no significant differences noted on the number of roots after



one month from sticking of shoot tip cuttings and on the percentage rooted of cuttings. However, highly significant differences were noted on the number of days to root initials, number of roots, the shoot length, and length of roots one and two months after sticking in the growing media.

There were no significant interaction effects observed between the three different *Medinilla* species and different misting frequencies in all of the parameters gathered.

Misting of the shoot tip cuttings three and four times a day is recommended for the production of more and longer roots in shoot tip cuttings of *Medinilla*. Shoot tip cuttings of *Medinilla aphelandra* and *Medinilla multiflora* are good propagules for faster and uniform rooting.



## RESULTS AND DISCUSSION

### Number of Days to Root Initials

Effect of species. Table 1 shows highly significant differences on the number of days to root initiation of medinilla cuttings as affected by the different medinilla species grown. Results show that cuttings of *Medinilla aphelandra* and *Medinilla multiflora* were the earliest to initiate roots with means of 21.75 and 21.58 days, respectively from sticking, as compared to the shoot tip cuttings of *Medinilla scortechinii* which initiated roots after 32.08 days, or approximately 11 days later.

Effect of misting frequency. Highly significant differences were also noted on the number of days to root initiation as affected by frequency of misting of medinilla shoot tip cuttings. Results show that cuttings misted three and four times a day initiated roots earlier after 23.00 and 23.67 days, compared to the control or the untreated medinilla cuttings which produced root initials of 0.5 cm only after 28.33 days from sticking.

Root formation in cuttings is not only affected by hormones but also by other factors like environment, rooting medium, chemical treatments as well as the plant itself as a factor. Cuttings can absorb small amounts of water through its cut end but the amount of water absorbed is not enough to replace the amount normally lost through the process of transpiration which has to be slowed down by keeping the relative humidity high in the vicinity of the cuttings and keeping the temperature relatively lower. Misting or sprinkling water can increase relative humidity (Adriance and Brinson, 1955).



Table 1. Number of days to root initials

TREATMENT	MEAN
<u>Medinilla Species</u>	
<i>M.aphelandra</i>	21.75 <sup>b</sup>
<i>M.multiflora</i>	21.58 <sup>b</sup>
<i>M.scortechinii</i>	32.08 <sup>a</sup>
<u>Misting Frequency</u>	
Control (no misting)	28.33 <sup>a</sup>
Two times a day	25.56 <sup>b</sup>
Three times a day	23 <sup>c</sup>
Four times a day	23.67 <sup>c</sup>

Means with common letters are not significantly different at 5% level by DMRT

Interaction effects. There were no significant interaction effects observed between the different misting frequencies and the three medinilla species on the number of days from sticking to the production of 0.5 cm root initials.

Number of Roots One Month After Sticking of Shoot tip Cuttings

Effect of species. Results show that medinilla shoot tip cuttings produced significantly different number of roots as affected by the species grown. 30 days after sticking in the floral foam. *Medinilla scortechinii* cuttings produced the lowest average number of roots with a mean of only 4.33 roots per cutting. A mean of 5.58 roots was obtained from the *Medinilla multiflora*, while shoot tip cutting of *Medinilla aphelandra* had the highest average number of roots produced with a mean of 6.50 roots per cutting.



Table 2. Number of roots one month after sticking of shoot tip cutting

TREATMENT	MEAN
<u>Medinilla species</u>	
<i>M.aphelandra</i>	6.50 <sup>a</sup>
<i>M.multiflora</i>	5.58 <sup>ab</sup>
<i>M.scortechinii</i>	4.33 <sup>b</sup>
<u>Misting Frequency</u>	
Control (no misting )	4.22 <sup>a</sup>
Two times a day	5.44 <sup>a</sup>
Three times a day	6.67 <sup>a</sup>
Four times a day	5.56 <sup>a</sup>

Means with common letters are not significantly different at 5% level by DMRT

Effect of misting frequency. There were no significant differences obtained on the average number of roots one month after sticking of shoot tip cuttings in the rooting media as affected by the number of mistings done per day.

Interaction effect. There were no significant interaction effects observed between the different misting frequency and the medinilla species grown on the number of roots produced per cutting one month after sticking.

#### Number of Roots Two Months After Sticking of Shoot tip Cuttings

Effect of species. Statistical analysis showed that shoot tip cuttings of *Medinilla multiflora* and *Medinilla scortechinii* with similar mean of 9.75 roots per cutting, produced the highest number of roots two months after sticking of the shoot tip cuttings rooted in floral foam.



This results conform to the earlier report of Halfacre and Barden (1979) that different varieties of given species have been found to have different number of roots, after sticking them in the rooting media.

Effect of misting frequency. Highly significant differences were obtained on the number of roots per cutting after two months from sticking in floral foam. Higher average number of roots was obtained on shoot tip cuttings misted three times a day with a mean of 10.22 roots, followed by those misted two times a day with a mean of 8.89 roots per cutting. The untreated or control plants produced the lowest average number of roots with a mean of only 7.00 roots per cutting.

Interaction effect. There were no significant interaction effects observed between the different misting frequency and medinilla species on the number of roots produced per cutting two months after sticking in the floral foam.

#### Length of Roots One Month After Sticking of Shoot Tip Cuttings

Effect of species. Table 4 shows that highly significant differences prevailed on the average root length after one month from sticking of shoot tip cuttings. Cuttings of *Medinilla scortechinii* produced the shortest roots with a mean of only 0.31 cm; while cuttings of *Medinilla aphelandra* and *Medinilla multiflora* produced the longest roots with a mean of 0.93 cm and 0.96 cm; respectively.



Table 3. Number of roots two months after sticking of shoot tip cutting

TREATMENT	MEAN
<u>Medinilla species</u>	
<i>M.aphelandra</i>	9.75 <sup>a</sup>
<i>M.multiflora</i>	8.08 <sup>b</sup>
<i>M.scortechinii</i>	7.83 <sup>b</sup>
<u>Misting Frequency</u>	
Control	7.00 <sup>c</sup>
Two times a day	8.89 <sup>ab</sup>
Three times a day	10.22 <sup>a</sup>
Four times a day	8.11 <sup>bc</sup>

Means with common letters are not significantly different at 5% level by DMRT

This finding as explained by Nye and Tinker (1977) that their differences are in the rooting patterns of different plant species. Every species has its inherent genetic make-up that made the response in rooting different, or almost similar in some cases. Effects of misting frequency. Statistical analysis showed that shoot tip cuttings misted three and four times a day had significantly produced longer roots with a mean of 0.88 cm and 0.86 cm, respectively, followed by shoot tip cuttings misted twice a day with a mean of 0.67 cm. The untreated or control cuttings produced the shortest roots after one month from sticking with a mean of only 0.52 cm.

Interaction effect. There were no significant interaction effects observed between the different misting frequency and the medinilla species on the average root length produced per cutting one month after sticking of shoot tip cuttings in floral foam.



Table 4. Length of roots one month after sticking of shoot tip cutting

TREATMENT	MEAN ( cm )
<u>Medinilla species</u>	
<i>M.aphelandra</i>	0.93 <sup>a</sup>
<i>M.multiflora</i>	0.96 <sup>a</sup>
<i>M.scortechinii</i>	0.31 <sup>b</sup>
<u>Misting Frequency</u>	
Control	0.52 <sup>c</sup>
Two times a day	0.67 <sup>b</sup>
Three times a day	0.88 <sup>a</sup>
Four times a day	0.86 <sup>a</sup>

Means with common letters are not significantly different at 5% level by DMRT

Length of Roots Two Months After Sticking of Shoot tip Cutting

Effect of species. There were no significant differences obtained on the average root length two months after sticking as affected by the (3) three species of medinilla cuttings used as shown in table 5. Length of roots ranged from 6.75 to 6.83 cm.

Effect of misting frequency. Highly Significant differences were noted on the effect of misting frequency on the average root length produced by medinilla cuttings two months after sticking as shown in Table 5. Misting of shoot tip cuttings three and four times a day promoted the production of longer roots with means of 8.11 cm and 7.39 cm; respectively. The untreated or control cuttings again produced the shortest roots with a mean of 5.11 cm. after 60 days from sticking of cuttings.

Interaction effect. There were no significant interaction effects observed on the different misting frequencies and the three medinilla species on the length of roots two months from sticking.





Table 5. Length of roots two months after sticking of shoot tip cutting

TREATMENT	MEAN ( cm )
<u>Medinilla species</u>	
<i>M.aphelandra</i>	6.75 <sup>a</sup>
<i>M.multiflora</i>	7.04 <sup>a</sup>
<i>M.scortechinii</i>	6.83 <sup>a</sup>
<u>Misting Frequency</u>	
Control	5.11 <sup>b</sup>
Two times a day	6.89 <sup>ab</sup>
Three times a day	8.11 <sup>a</sup>
Four times a day	7.39 <sup>a</sup>

Means with common letters are not significantly different at 5% level by DMRT

#### Shoot Length One Month After Sticking of Shoot Tip Cutting

Effect of species. There were no significant differences obtained on the average shoot length one month after sticking of medinilla cuttings in floral foam as affected by three species used (Table 6).

Effect of misting frequency. Highly significant differences prevailed on the average shoot length as affected by misting one month after sticking of shoot tip cutting. Earlier shoots were significantly noted in shoot tip cuttings that were misted three times a day with a mean of 11.44 cm but was statistically comparable with shoots produced by the untreated or control cuttings which had a mean of 10.11 cm long one month after sticking.

Interaction effect. There were no significant interaction effects between the different misting frequency and the three (3) species of medinilla species on the average shoot length.

Table 6. Shoot length one month after sticking of shoot tip cutting.



TREATMENT	MEAN ( cm )
<u>Medinilla species</u>	
<i>M.aphelandra</i>	10.79 <sup>a</sup>
<i>M.multiflora</i>	10.63 <sup>a</sup>
<i>M.scortechinii</i>	10.21 <sup>a</sup>
<u>Misting Frequency</u>	
Control	10.11 <sup>b</sup>
Two times a day	10.17 <sup>b</sup>
Three times a day	11.44 <sup>a</sup>
Four times a day	10.44 <sup>b</sup>

Means with common letters are not significantly different at 5% level by DMRT

#### Shoot Length Two Months After Sticking of Shoot Tip Cutting

Effect of species. Significantly longer shoots were measured in plants of species *Medinilla aphelandra* and *Medinilla multiflora* which had shoot length measuring 14.08 and 14.75 cm two months after sticking, and produced the longest shoots. On the other hand, shoot tip cuttings of *Medinilla scortechinii* produced the shortest shoots with a mean of only 12.92 cm (Table 7).

Effect of misting frequency. Likewise, highly significant differences prevailed on the average shoot length two months after sticking of cuttings as affected by misting frequency. Earlier shoots were significantly noted in shoot tips cuttings that were misted three times a day with a mean of 14.61 cm, but was statistically comparable with the untreated or control cuttings which had a mean of 13.10 cm

Table 7. Shoot length two months after sticking of shoot tip cutting.



TREATMENT	MEAN ( cm )
<u>Medinilla Species</u>	
<i>M.aphelandra</i>	10.08 <sup>a</sup>
<i>M.multiflora</i>	14.18 <sup>a</sup>
<i>M.scortechinii</i>	12.92 <sup>b</sup>
<u>Misting Frequency</u>	
Control (no misting)	13.10 <sup>b</sup>
Two times a day	13.33 <sup>b</sup>
Three times a day	13.61 <sup>a</sup>
Four times a day	13.72 <sup>b</sup>

Means with common letters are not significantly different at 5% level by DMRT

Interaction effect. There were no significant interaction effects between the different misting frequency and the medinilla species on the average shoot length two months after sticking the cuttings.

#### Percentage of Rooted Cuttings

Effect of species. There were no significant differences obtained on the percentage of rooted cuttings after sticking shown in table 8. All species had 100% rooted cuttings two months after sticking in floral foam.

Effect of misting frequency. There were no significant differences obtained on the percentage of rooted cuttings after sticking in the rooting media as affected by the number of misting done per day. Rooting percentage was 100% in all frequencies of misting done in the study.



According to (Adams and Bamford, 1984) spraying the plants with fine droplets of water to increase humidity and reduce temperature, with a consequent slowing of transpiration rate the cool condition favoring the survival of the aerial parts of the cutting which encourage the division of cells in the cambium area of the root initial.

Interaction effect. There were no significant interaction effects observed between the different misting frequency and the medinilla species grown on the percentage of rooted cuttings after sticking in floral foam.

Table 8. Percentage of rooted cuttings

TREATMENT	MEAN (%)
<u>Medinilla species</u>	
<i>M.aphelandra</i>	100 <sup>a</sup>
<i>M.multiflora</i>	100 <sup>a</sup>
<i>M.scortechinii</i>	100 <sup>a</sup>
<u>Misting Frequency</u>	
Control	100 <sup>a</sup>
Two times a day	100 <sup>a</sup>
Three times a day	100 <sup>a</sup>
Four times a day	100 <sup>a</sup>

Means with common letters are not significantly different at 5% level by DMRT





Figure 1. Overview of the study one month from sticking of medinilla shoots tip cuttings

SPECIES 1



Figure 2. Rooting characteristics of *Medinilla aphelandra* one month from sticking. From left (T<sub>0</sub>) control, (T<sub>1</sub>) twice a day, (T<sub>2</sub>) three times a day, (T<sub>3</sub>) four times a day

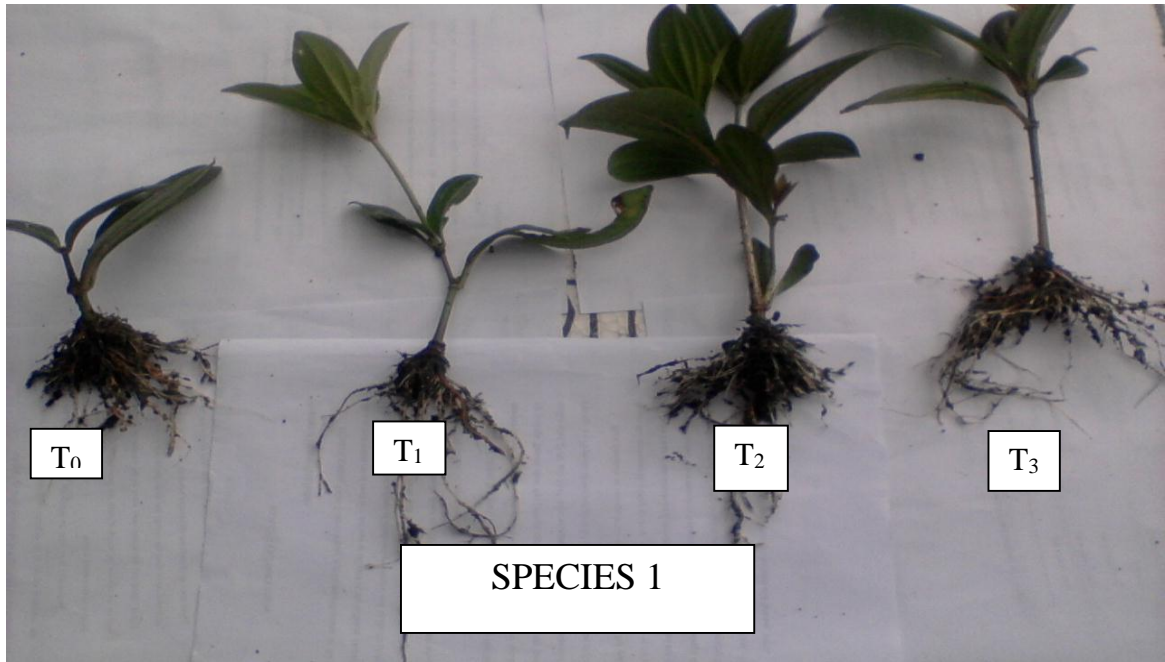


Figure 3. Rooting characteristics of SPECIES 2 sticking. From left (T<sub>0</sub>) control, (T<sub>1</sub>) twice a day, (T<sub>2</sub>) three times a day, (T<sub>3</sub>) four times a day



Figure 4. Rooting characteristics of *Medinilla multiflora* one month from sticking. From left (T<sub>0</sub>) control, (T<sub>1</sub>) twice a day, (T<sub>2</sub>) three times a day, (T<sub>3</sub>) four times a day

## SPECIES 2

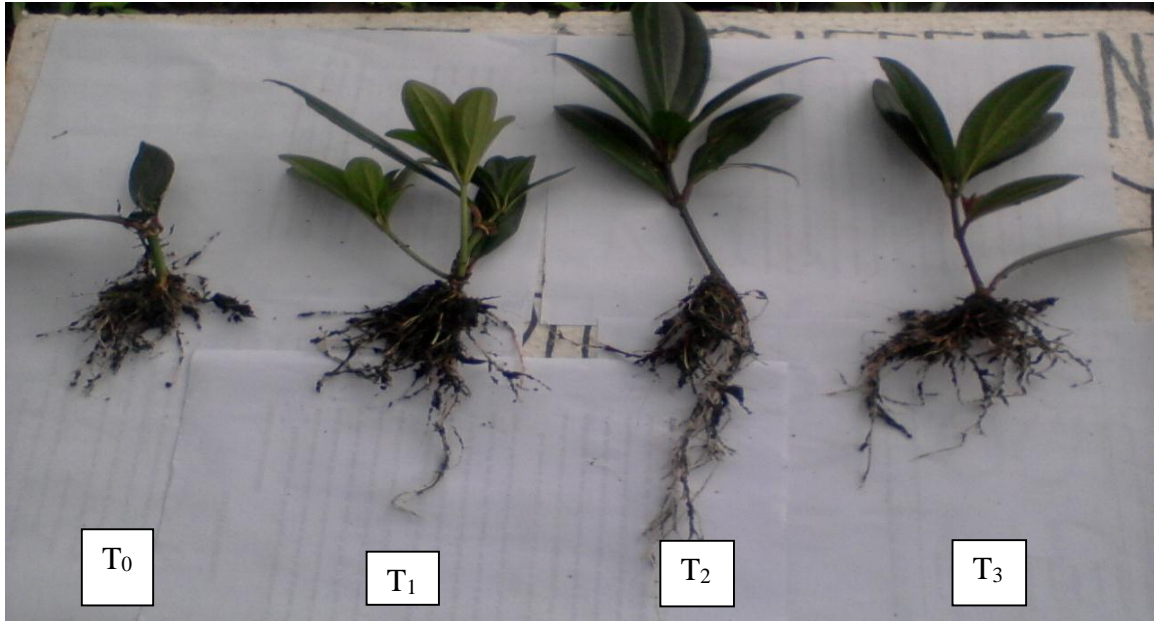
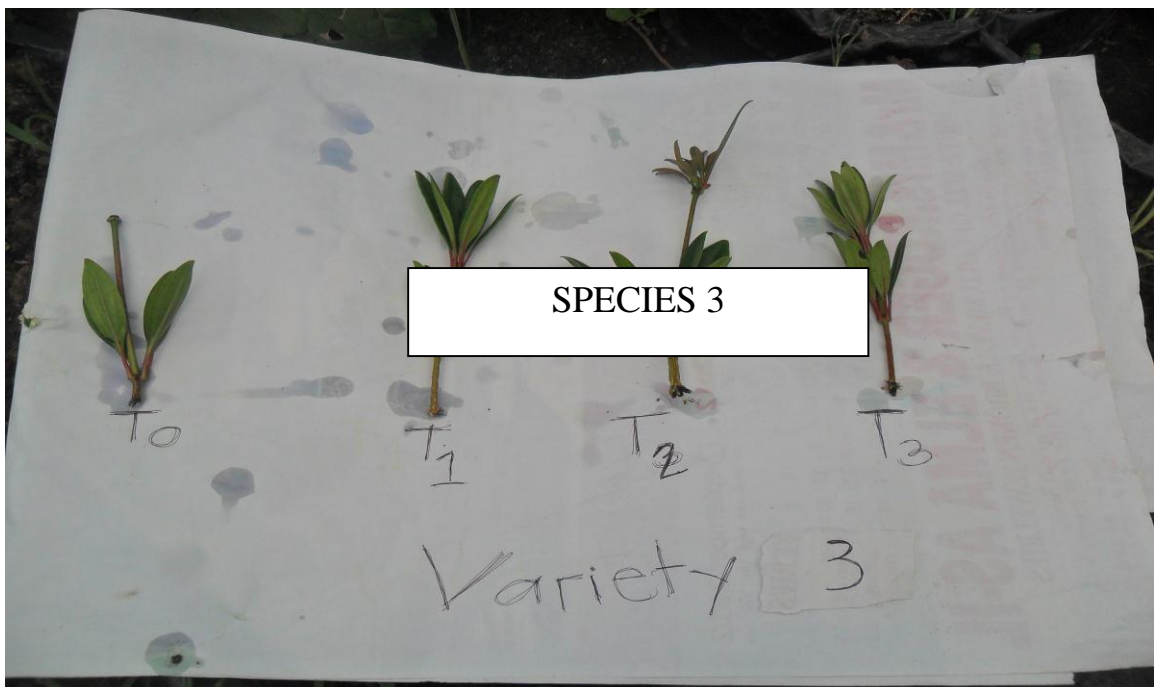


Figure 5. Rooting characteristics of *Medinilla multiflora* two months from sticking. From left (T<sub>0</sub>) control, (T<sub>1</sub>) twice a day, (T<sub>2</sub>) three times a day, (T<sub>3</sub>) four times a day

Figure 6. Rooting characteristics of *Medinilla scortechinii* one month from sticking. From left (T<sub>0</sub>) control, (T<sub>1</sub>) twice a day, (T<sub>2</sub>) three times a day, (T<sub>3</sub>) four times a day



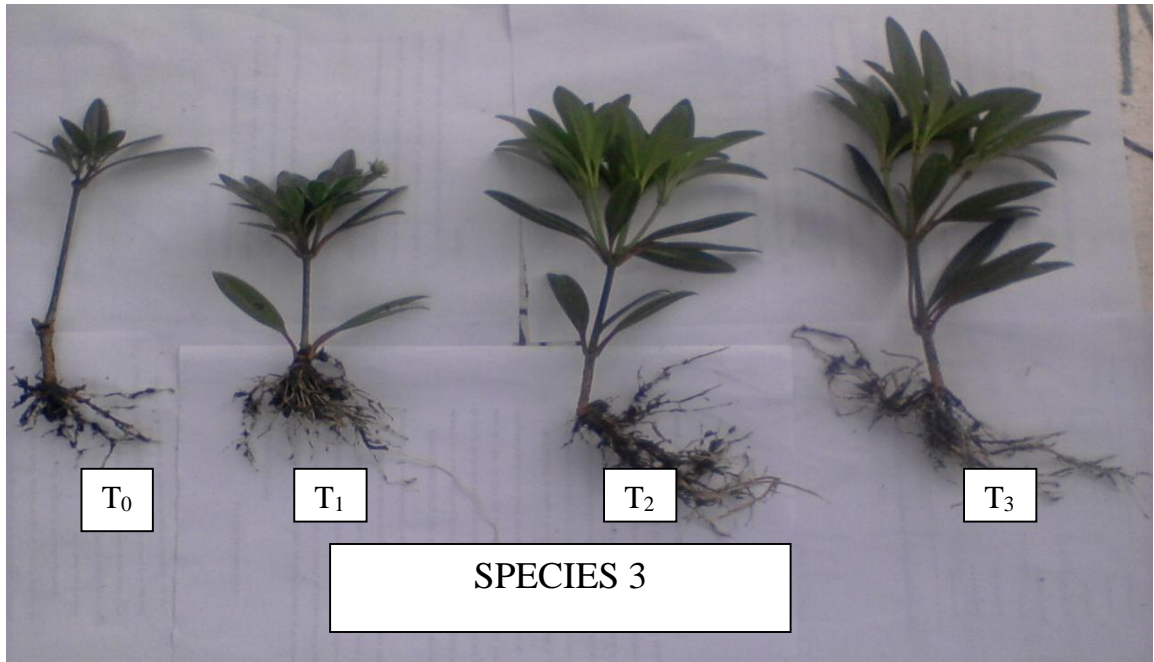


Figure 7. Rooting characteristics of *Medinilla scortechninii* two months from sticking. From left (T<sub>0</sub>) control, (T<sub>1</sub>) twice a day, (T<sub>2</sub>) three times a day, (T<sub>3</sub>) four times a day



## SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

### Summary

Shoot tip cuttings of three different species of medinilla were applied with different misting frequencies such as twice a day, thrice a day; and four times a day to determine the effect of misting frequency on the rooting of shoot tip cutting of three different species of medinilla; and to determine the response of three species of medinilla treated with different misting frequencies.

Results revealed that there were highly significant effects of species on the first appearance of roots. Also, *Medinilla aphelandra* and *Medinilla multiflora* significantly produced the highest number and longer roots two months after sticking in the floral foam. There were no significant differences obtained on the percentage rooting of shoot tip cuttings and on the length of roots produced two months after sticking as affected by different medinilla species.

Shoot tip cutting that were misted with three times a day had longer roots. There were no significant differences noted on the number of roots one month after sticking of shoot tip cuttings and on the percentage rooted cuttings. However highly significant differences were noted on the number of days to root initials and on the number and length of roots, and shoot length one and two months after sticking in the rooting media.

Statistically there were no significant differences on all of the results on the combined effects of the different medinilla species and the different misting frequencies on the rooting of medinilla shoot tip cuttings.



## Conclusions

Based from the results of the study, shoot tip cuttings of different species of medinilla can be misted three and four times a day frequency for earlier production of roots and to reduce rapid transpiration in the cuttings. Moreover cuttings of different species of medinilla can be used as propagules to increase the number of plants in the nursery.

## Recommendations

Three times a day and four time a day misting of medinilla shoot tip cuttings is recommended for the production of more and longer roots, and longer shoots in shoot tip cuttings of medinilla. *Medinilla aphelandra* and *Medinilla multiflora* are good propagules for faster and uniform rooting.



## LITERATURE CITED

- ADAMS K.M, and BAMFORD.1984. Principle of Horticulture. Great Britain. P. 38.
- ADRIANCE, G.W. and F.R. BRINSON. 1955. Propagation of Horticulture Plants. New York: McGraw- hill Book, Inc. Pp. 199-131.
- BAYENG, B.O. 1999. Response of shoot tip cuttings of Spray mums. ( *Chrysanthemum Morifolium* Ramat) to rooting Techniques. BS Thesis (unpub.) BSU, La Trinidad Benguet. P. 29.
- DELA ROSA, J.P. 2000. Rooting Characteristics of *Medinilla* ( *Medinilla Magnifica*, Lindl) as affected by different concentration of ANAA. P. 26.
- FLETCHER, W.W R.C KIRWOOD. 1982. Herbiciaes and Plant Growth Regulators. Great Britain: Granada publishing, Lta. P.810. Delmar Publisher Inc. Pp. 316-318.
- HALFACRE and BARDEN. 1979. Introduction of Horticulture. Pp. 352-354.
- HARTMAN, H. T and D.C. KESTER. 1975. Plant Propagation Principle and Practices. Pentice Hall New Delhi India. Pp. 305-518.
- HARTMAN, H. T and D.C. KESTER. 1968. Plant Propagation Principle and Practices. Pentice Hall New Delhi India. Pp. 208-211.
- INGELS, J.E. 1994. Ornamental Horticulture Science, Operations and Management. Delmar publisher Inc. Pp. 49, 53-54.
- JACOB, R, C.1972. Plant Physiology. New York. D. Van Norstand.so. P. 435.
- MACLI-ING, G.B.2004. Rooting Characteristic of Milflores (*Hydrangea mycrophyla*) As affected by kinds of stem cutting and different rooting hormones. BS Thesis. BSU, La Trinidad Benguet. Pp. 3-6.
- MANAWAG, A.L...2000. Response of stem Cutting Oriental Arboute (*Thija orientale*) to Different Rooting Hormones BS Thesis BSU, La Trinidad Benguet. Pp. 22-23
- REILEY, E and SHRYJ.R. 2002. Introductory Horticulture. USA:Thompson Learning, Inc. Pp. 229-305.
- WEAVER, R.T. 1972. Plant Growth Substances in Agriculture. San Francisco, California:W.H.Freeman and co. P. 128

