

BIBLIOGRAPHY

PACITO, LEZBILYRE W. APRIL 2013. Effect of Gibberellic Acid on the Growth and Flowering of *Medinilla multiflora*. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

The experiment was conducted at the Ornamental Horticulture Research Area, Benguet State University, La Trinidad, Benguet from September 2012 to March 2013. This study aimed to determine the effect of GA₃ on the growth and flowering of medinilla; and to establish the best rate/s or frequency of gibberellic acid application that will promote the best growth and that will enhance the flowering of medinilla.

The medinilla plants were applied one time per month, one time every two months and once every three months with gibberellic acid at the concentrations of 250, 500, 750, and 1000 ppm. Data gathered were initial height, initial number of leaves, and initial number of laterals before transplanting to the prepared potting media.

Results showed that there were no significant differences on the effect of the different GA₃ concentrations and frequency of application on the aesthetic duration, leaf number at flowering, plant height at flowering, and duration to flower senescence. Statistical analysis showed that application of GA₃ in different concentrations and frequency of application did not promote any significant effects on the growth and flowering of the experimental plants.



However, highly significant differences among treatments were obtained on the number of days from visible flower bud initiation to 50% anthesis. GA₃ concentration affected the number of days of visible flower bud initiation, application of 500 ppm of GA₃ promoted faster initiation of flower buds which were observed 43.44 days after GA₃ application. Statistical analysis also revealed that highly significant effects were obtained on the durations of flower bud initiation. Plants applied once with GA₃ every month, had a mean of 41 days for the flower buds to be formed from the date of treatment.

Plants treated with 1000 ppm of GA₃ had the highest number of laterals at 50% flowering. Statistical analysis revealed that it produced more laterals compared to the other treatments.

Based on the results of the study, it is recommended that for earlier flower bud initiation in medinilla, GA₃ should be applied once every month at a concentration of 500 ppm, and to increase the number of laterals at flowering, GA₃ should be applied once every two months at a concentration of 1000 ppm.



RESULTS AND DISCUSSION

Plant Height

Effect of GA₃ concentration. Table 1 presents the initial and final height of the medinilla plants. Statistical analysis revealed that there were no significant differences among the treatments before transplanting. After 50% anthesis of the medinilla plants, statistical analysis showed that there were still no significant differences among the treatments in their final heights. This indicates that application of different concentrations of GA₃ had no significant effect on the height of the medinilla plants.

Effect of frequency of application. Table 1 shows that there are no significant differences in the plant height at 50% anthesis as affected by frequency of application of gibberellic acid.

Table 1. Mean initial and final height of plants

TREATMENT	PLANT HEIGHT (cm)	
	INITIAL	AT50% ANTHESIS
<u>GA₃ Concentration (ppm)</u>		
250	36.222 ^a	38.544 ^a
500	38.556 ^a	40.833 ^a
750	38.889 ^a	41.800 ^a
1000	35.444 ^a	38.567 ^a
<u>Frequency of application</u>		
1 time per month	35.000 ^a	38.333 ^a
1 time every two months	37.167 ^a	39.925 ^a
1 time every three months	39.667 ^a	41.550 ^a

*Means with the same letter are not significantly different at 5% level by DMRT



Interaction effect. There were no significant differences in the initial as well as the height of the medinilla plants at 50% anthesis in terms of their interaction effect.

Number of Leaves

Effect of GA₃ concentration. Table 2 presents the initial number of leaves at the start of the experimentation and the number of leaves at the time where the flowers had reached 50% anthesis. Statistical analysis revealed that there was no significant difference in the initial until the medinilla plants reached 50% anthesis of flowering.

Effect of frequency of application. Table 2 show that there is no significant difference in the number of leaves as affected by frequency of application of GA₃.

Interaction effect. Results show that there were no significant differences on the number of leaves at initial and at 50% anthesis of the flowers in terms of their interaction effect.

Table 2. Mean number of leaves at flowering and before transplanting

TREATMENT	NUMBER OF LEAVES	
	INITIAL	AT 50% ANTHESIS
<u>GA₃ Concentration (ppm)</u>		
250	97.778 ^a	153.889 ^a
500	100.333 ^a	164.333 ^a
750	97.667 ^a	156.633 ^a
1000	99.556 ^a	171.667 ^a
<u>Frequency of application</u>		
1 time per month	126.417 ^a	186.167 ^a
1 time every two months	102.750 ^a	187.167 ^a
1 time every three months	67.333 ^a	124.667 ^a

*Means with the same letter are not significantly different at 5% level by DMRT



Number of Lateral Stems at Flowering

Effect of GA₃ concentration. Table 3 presents the number of laterals of the medinilla plants. Statistical analysis revealed that there was a highly significant difference in the initial number of laterals between concentrations given with 250 and 500 ppm against 750 and 1000 ppm. Highly significant difference was also observed in the number of laterals during the 50% anthesis of flowering. Concentrations 250 ppm, 500 ppm, 750 ppm, and 1000 ppm of GA₃ had a number of 4.778, 5.444, 6.889 and 7.444 laterals respectively. GA₃ had promoted the growth of the laterals, and results showed that medinilla plants that were applied with 1000 ppm of GA₃ had the highest number of lateral stem at 50% anthesis of flowering.

Effect of frequency of application. Statistical analysis revealed a highly significant difference among the frequency of application in the number of laterals. Results showed that medinilla plants that were applied with GA₃ once every two months

Table 3. Mean number of laterals at flowering and before transplanting

TREATMENT	NUMBER OF LATERALS	
	INITIAL	AT 50% ANTHESIS
<u>GA₃ Concentration (ppm)</u>		
250	3.889 ^b	4.778 ^b
500	3.667 ^b	5.444 ^{ab}
750	5.556 ^a	6.889 ^{ab}
1000	5.778 ^a	7.444 ^a
<u>Frequency of application</u>		
1 time per month	4.750 ^a	6.083 ^{ab}
1 time every two months	5.833 ^a	7.417 ^a
1 time every three months	3.583 ^b	4.917 ^b

*Means with the same letter are not significantly different at 5% level by DMRT



had the highest number of laterals at 50% anthesis of flowering, which has a number of 7.417 laterals. Study showed that applying GA₃ once every two months promotes better growth on the lateral stems of the medinilla plants.

Interaction effect. Results show that there were no significant differences on the number lateral stems at flowering in terms of interaction effect.

Number of Days from Transplanting to Flower Panicle Initiation

Effect of GA₃ concentration. Table 4 presents the number of days from transplanting of medinilla plants. Statistical analysis revealed that there is no significant difference among the treatments.

Effect of frequency of application. Table 4 showed that there is no significant difference on the number of days from transplanting as affected by frequency of application of GA₃.

Table 4. Number of days from transplanting to flower panicle initiation

TREATMENT	MEAN (days)
<u>GA₃ Concentration (ppm)</u>	
250	49.222 ^a
500	51.778 ^a
750	49.889 ^a
1000	51.222 ^a
<u>Frequency of application</u>	
1 time per month	47.917 ^a
1 time every two months	52.000 ^a
1 time every three months	51.667 ^a

*Means with the same letter are not significantly different at 5% level by DMRT



Interaction effect. Results show that there were no significant differences on the number of days from transplanting to flower panicle initiation in terms of their interaction effect.

Aesthetic Duration

Effect of GA₃ concentration. Table 5 presents the aesthetic duration of the medinilla plants. Statistical analysis revealed that there is no significant difference among the treatments applied with different concentrations of GA₃. Indicating that using 250 ppm or even 1000 ppm of GA₃ does not prolong the aesthetic duration of the medinilla plants.

Effect of frequency of application. Results in the statistical analysis revealed that there is no significant difference among the different frequency of application regarding on their aesthetic duration.

Table 5. Mean aesthetic duration of medinilla flowers

TREATMENT	MEAN (days)
<u>GA₃ Concentration (ppm)</u>	
250	35.000 ^a
500	34.111 ^a
750	33.889 ^a
1000	35.111 ^a
<u>Frequency of application</u>	
1 time per month	32.583 ^a
1 time every two months	35.083 ^a
1 time every three months	35.917 ^a

*Means with the same letter are not significantly different at 5% level by DMRT



Interaction effect. Results show that there were no significant differences on the aesthetic duration of the flowers from 25% anthesis to the onset of senescence in terms of interaction effect.

Number of Days from Visible Flower Bud Initiation to 50% Anthesis

Effect of GA₃ concentration. Table 6 presents the visible flower bud formation of the medinilla plants. Statistical analysis revealed that there is a high significant difference among the treatments applied with different concentrations of GA₃. Results show that medinilla plants that were applied with 250 ppm and 500 ppm of GA₃ are both highly significantly different to the ones that are applied with 750 ppm and 1000 ppm of GA₃. Concentrations of 750 ppm and 1000 ppm are also highly significant to concentrations 250 ppm and 500 ppm.

Table 6. Number of days from visible flower bud initiation to 50% anthesis

TREATMENT	MEAN (days)
<u>GA₃ Concentration (ppm)</u>	
250	44.333 ^b
500	43.444 ^b
750	46.111 ^a
1000	48.222 ^a
<u>Frequency of application</u>	
1 time per month	44.833 ^b
1 time every two months	41.000 ^b
1 time every three months	50.750 ^a

*Means with the same letter are not significantly different at 5% level by DMRT



Study showed that medinilla plants that were given 500 ppm had the lowest number of days, which has 43.444 days, for the flower bud to initiation at 50% anthesis which is good because flowers had developed faster.

Effect of frequency of application. Results in the statistical analysis revealed that there is a high significant difference among the different frequency of application. Medinilla plants that were applied once every three months are highly significant to frequencies given once per month and once per two months. Results also showed that medinilla plants that were applied with GA₃ once every one month had the best performance regarding on the days of visible flower bud initiation, having 41.000 days. Results show that time of application can affect the development of the flower buds as well as the concentration that was used.

Days from Flower Senescence to Full Fruit Development

Effect of GA₃ concentration. Table 7 presents the flower senescence of the medinilla plants. Statistical analysis reveals that there is no significant difference among the treatments on the number of days from flower senescence to full fruit development of the medinilla plants.

Effect of frequency of application. Table 7 showed no significant difference on the number of days from flower senescence affected by frequency of application of GA₃. There was no effect in the frequency of application of GA₃ in the flowering of the medinilla plants.



Table 7. Number of days from flower senescence to full fruit development

TREATMENT	MEAN (days)
<u>GA₃ Concentration (ppm)</u>	
250	23.111 ^a
500	22.333 ^a
750	22.222 ^a
1000	23.667 ^a
<u>Frequency of application</u>	
1 time per month	22.250 ^a
1 time every two months	23.333 ^a
1 time every three months	22.917 ^a

*Means with the same letter are not significantly different at 5% level by DMRT

Interaction effect. Results show that there were no significant differences on the number of days from flower senescence to full fruit development of the medinilla plants in terms of interaction effect.

Length of Pendulous Flower
Panicle at 50% Anthesis

Effect of GA₃ concentration. Table 8 presents the length of pendulous of the medinilla plants. Statistical analysis reveals that there is no significant difference among the treatments. This indicates that application different concentrations of GA₃ had no significant effect regarding on the length of pendulous of the medinilla plants.

Effect of frequency of application. Table 8 shows no significant difference on the length of pendulous affected by frequency of application of GA₃. There was no effect in the frequency of application of GA₃ in the length of pendulous of the medinilla plants.



Table 8. Length of pendulous flower panicle at 50% anthesis

TREATMENT	MEAN (cm)
<u>GA₃ Concentration (ppm)</u>	
250	12.778 ^a
500	14.189 ^a
750	14.133 ^a
1000	14.756 ^a
<u>Frequency of application</u>	
1 time per month	13.625 ^a
1 time every two months	13.508 ^a
1 time every three months	14.758 ^a

*Means with the same letter are not significantly different at 5% level by DMRT

Interaction effect. Results show that there were no significant differences on the length of the pendulous flower panicle at 50% anthesis in terms of their interaction effect.





Figure 1. Transplanting of medinilla



Figure 2. Spraying of gibberellic acid one month from transplanting



Figure 3. Flowering of medinilla at 50% anthesis



Figure 4. Medinilla at full fruit development



Figure 5. Flowering of Medinilla at 25% Anthesis

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

Summary

The experiment was conducted at the Ornamental Horticulture Research Area, Benguet State University, La Trinidad, Benguet from September 2012 to March 2013. The medinilla plants were applied once in every month, once in every two months and once in every three months with gibberellic acid at a concentrations of 250, 500, 750, and 1000 ppm.

Results showed that medinilla plants that were applied with gibberellic acid at a concentration of 250, 500, 750, and 1000 ppm at different frequency application, applied once every month, once every two months, and once every three months had no significant effects in almost all of the data that were gathered and analyzed. But statistical analysis also revealed that there was a highly significant difference on the number of days from visible flower bud initiation to 50% anthesis and the number of laterals at 50% of flowering.

Medinilla plants that were applied with 500 ppm of GA₃ concentration had the fastest initiation of flower buds which had a mean of 43.444 days. Statistical analysis also revealed that the effect of frequency application also had a highly significant effect on the flower bud initiation, medinilla plants that were applied once in every month had a mean of 41.000 days for the flower bud to initiate.

Statistical analysis revealed that medinilla plants that were given 1000 ppm of GA₃ had the highest number of laterals having a mean of 7.444 laterals at 50% of flowering. Statistical analysis also revealed that frequency of application had a highly significant effect. Medinilla plants that were applied once in every two months had the highest number of laterals having 7.417 at 50% of flowering. While medinilla plants that were applied once



in every month and once in every three months had a number of laterals of 6.083 and 4.917 respectively.

Conclusions

It is therefore concluded that using a concentration of 500 ppm GA₃ and application of once every month will hasten the flower bud to initiate which will lead to faster production of flowers. Application of 1000 ppm GA₃ at a frequency of once every two months will enhance the number of lateral stems at flowering.

Recommendations

Based from the results of this study, application of GA₃ is recommended to use for improving the number of lateral stems at flowering at a concentration of 1000 ppm once every two months. It is also recommended to use GA₃ to shorten the number of days of visible flower bud initiation at a rate of 500 ppm once every month.



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