BIBLIOGRAPHY

CABANSI, ALEXI BRIAN B. MAY 2012. Rooting of Blueberry (*Vaccinium spp.*) Shoot Tip Cuttings as Affected by Different IBA Concentrations. Benguet State University, La Trinidad, Benguet.

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ABSTRACT

The study was conducted to determine the effect of IBA concentrations on the rooting characteristics of blueberry shoot tip cuttings; and to evaluate the best concentrations of IBA that will enhance uniform rooting and shoot growth of blueberry shoot tip cuttings.

Results shows that blueberry shoot tip cuttings dipped in 500ppm IBA concentration enhanced faster rooting, promoted the production of longer roots and shoots; and promoted shorter duration to attain transplanting stage.

RESULTS AND DISCUSSION

Number of Days to Visible Root Formation

There were significant statistical differences observed on the number of days to visible root formation of blueberry shoot tip cuttings as affected by the different IBA concentrations as presented in Table 1. Blueberry shoot tip cuttings treated with 500ppm IBA concentration initiated earlier roots with a mean of 35.00 days followed by cuttings treated with 1000ppm with a mean of 42.75 days. Cuttings dipped in 250 ppm IBA and untreated cuttings form the latest roots with a mean of 49.00 days from sticking.

Villanueva (2004) stated that the application of 100ppm ANAA concentration on shoot tip cuttings of petunia also promoted earlier root formation; in comparison, both IBA and ANAA can promote root formation in shoot tip cuttings.

Table 1. Numbers of days to visible root formation of the blueberry shoot tip cuttings

TREATMENT	MEAN
IBA Concentration (ppm)	
0	49.00[a]
500 ANAA (control)	44.00[a]
250	49.00[a]
500	35.00[b]
750	44.50[a]
1000	42.75[a]

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

Average Number of Roots Per Cutting

Table 2 shows that there were no significant effects of the different IBA concentrations used on the number of roots produced per cutting on blueberry. However, numerical results showed that shoot tip cuttings treated with 750ppm IBA produced the highest number of roots with a mean of 8.88 followed by cuttings treated with 500ppm ANAA (control) and 500ppm IBA concentration with means of 7.88 and 7.75 roots, while the untreated shoot tip cuttings of blueberry produced the lowest mean of 6.63 roots per cutting.

Caweng (1999) found that marcotted pear stems with 200ppm ANAA concentration had the highest number of roots developed. In comparison, IBA must have a higher concentration to induce production of more roots per cutting, while the use of ANAA requires lesser concentration.

Table 2. Average number of roots per cutting of blueberry after 90 days

TREATMENT	MEAN
IBA Concentration (ppm)	
0	6.63[a]
500 ANAA (control)	7.88[a]
250	7.25[a]
500	7.75[a]
750	8.88[a]
1000	7.00[a]

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

Percentage Survival

The influence of the different IBA concentrations showed significant effects on the percentage survival of blueberry shoot tip cuttings (Table 3).

Blueberry shoot tip cuttings treated with 1000ppm IBA concentration had the highest percentage of survival with a mean of 86% followed by the cuttings dipped in 500ppm and 250ppm IBA concentrations that are both having the same means of 85.75%. The lowest percentage survival was observed on the cuttings dipped in 500ppm ANAA (control).

Otculan (2005) found the effect of different IBA concentrations in the percentage survival of shoot tip cuttings of carnation C.v. Red Indio treated with 25,50,75 and 100ppm IBA concentrations had the highest percentage survival. He found that IBA in high or low concentrations can promote higher survival of cuttings compared to the untreated (control).

Table 3. Percentage survival of the blueberry shoot tip cuttings after 90 days

TREATMENT	MEAN (%)
IBA Concentration (ppm)	
0	74.75[ab]
500 ANAA (control)	60.50[b]
250	85.75[a]
500	85.75[a]
750	85.50[a]
1000	86.00[a]

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

Percentage of Rooted Shoot Tip Cuttings

There were significant effects of the various IBA concentrations on the percentage rooting of blueberry shoot tip cuttings as shown in table 4. Based on numerical data, it was observed that the highest percentage of rooting was noted on blueberry cuttings dipped 750ppm IBA concentration. This had the highest percentage of 96.50%, followed by those treated with 250 ppm, 1000ppm, 500ppm concentrations and the untreated cuttings with means of 93%, 89% and 85.75% respectively. The lowest percentage of rooting was observed on cuttings dipped in 500ppm ANAA (control) with a mean of 67.75%.

Bayeng (1999) stated that the application of 100ppm IBA concentration full strength and one half strength ANAA promoted 100% rooting of spray type mums cuttings. In comparison, it is more effective to combine the two rooting hormones to attain higher percentage in rooting of cuttings.

Table 4. Percentage of the rooted blueberry shoot tip cuttings after 60 days

TREATMENT	MEAN (%)
IBA Concentration (ppm)	
0	85.75[a]
500 ANAA (control)	67.50[b]
250	93.00[a]
500	85.75[a]
750	96.50[a]
1000	86.00[a]

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

Average Root Length

As presented in Table 5, there were no significant effects observed on the average root length of blueberry shoot tip cuttings as influenced by the different IBA concentrations. However, numerically findings show that shoot tip cuttings of blueberry treated with 500ppm IBA concentration produced the longest average root length with a mean of 4.21cm three months from sticking in the rooting media followed by those treated with 1000ppm IBA concentration with a mean of 3.41 roots per cutting. The shortest roots were observed in the untreated cuttings with a mean of 1.71cm.

The results agree with the earlier findings of Cachatar (1999) that the suckers of anthurium "kansako" treated with 500ppm IBA concentration had the longest roots produced. The application of 500ppm IBA concentration was also found to promote longer average root length.

Table 5. Average root length of blueberry shoot tip cuttings after 90 days

TREATMENT	MEAN (cm)
IBA Concentration (ppm)	
0	1.71[a]
500 ANAA (control)	2.63[a]
250	2.35[a]
500	4.21[a]
750	3.03[a]
1000	3.41[a]

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

Average Shoot Length

Table 6 shows highly significant effects of the different IBA concentrations on the average shoot length on the blueberry shoot tip cuttings. Results show that shoot tip cuttings of blueberry treated with 500ppm IBA concentration produced the tallest shoots with a mean of 8.06 cm after three months from sticking in the rooting media, followed by those treated with 750ppm and 1000ppm IBA concentrations with means of 8.01 cm. and 7.99 cm, while the shortest shoots were recorded in the untreated cuttings with a mean of 7.76 cm.

Similarly, Rufino (2009) also found in her study that using 500ppm ANAA concentration could induce the production of longer shoots in blueberry shoot tip cuttings. In comparison IBA and ANAA can be used to enhance longer shoots to by application of the same concentrations.

Table 6. Average shoot length of blueberry shoot tip cuttings after 90 days

TREATMENT	MEAN (cm)
IBA Concentration (ppm)	
0	7.76[b]
500 ANAA (control)	7.81[b]
250	7.98[a]
500	8.06[a]
750	8.01[a]
1000	7.99[a]

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

Number of Days the Rooted Shoot Tip Cuttings are Ready for Transplanting

There were highly significant statistical differences observed on the number of days the rooted shoot tip cuttings are ready for transplanting as affected by the IBA concentrations is presented in Table 7. Result show that the blueberry shoot tip cuttings treated with 500ppm IBA concentration were the earliest to attain transplanting stage with a mean of 60.50 days followed by the cuttings treated with 750ppm IBA concentration with a mean of 63.25 days. The untreated blueberry shoot tip cuttings took longer days before they are ready for transplanting having a mean of 73.25 days.

Otculan (2005) mentioned that ten minutes soaking of cuttings at 50,75 or 100ppm IBA concentrations promoted earlier readiness for transplanting in carnation c.v. Red Indio shoot tip cuttings. In comparison flowers such as carnation requires lower concentrations for earlier transplanting date while bush plants requires higher concentrations for earlier transplanting date.

Table 7. Number of days the rooted shoot tip cuttings ready for transplanting

TREATMENT	MEAN (cm)
IBA Concentration (ppm)	
0	73.25[a]
500 ANAA (control)	71.50[a]
250	67.25[b]
500	60.50[d]
750	63.25[c]
1000	66.25[b]

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

(a.)

(b.)

Figure 1.Overview of the experimental area at (a) sticking of shoot tip cuttings; and (b) before the termination, data collection and observation.

Figure 2. Preparation of the rooting media.

Figure 3. The shoot tip cuttings are ready for soaking in different IBA concentrations.

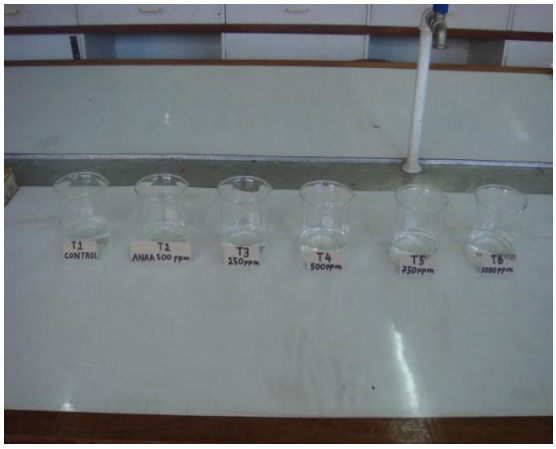


Figure 4. Different IBA concentrations.

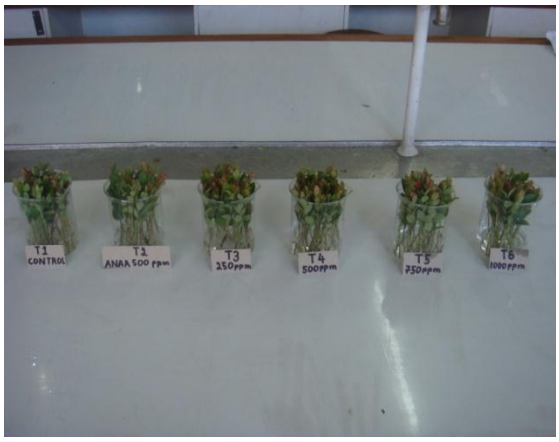


Figure 5. Soaking the cuttings in IBA solution for 30 minutes.

Figure 6. Sticking of cuttings in the rooting media (sandy loam soil).

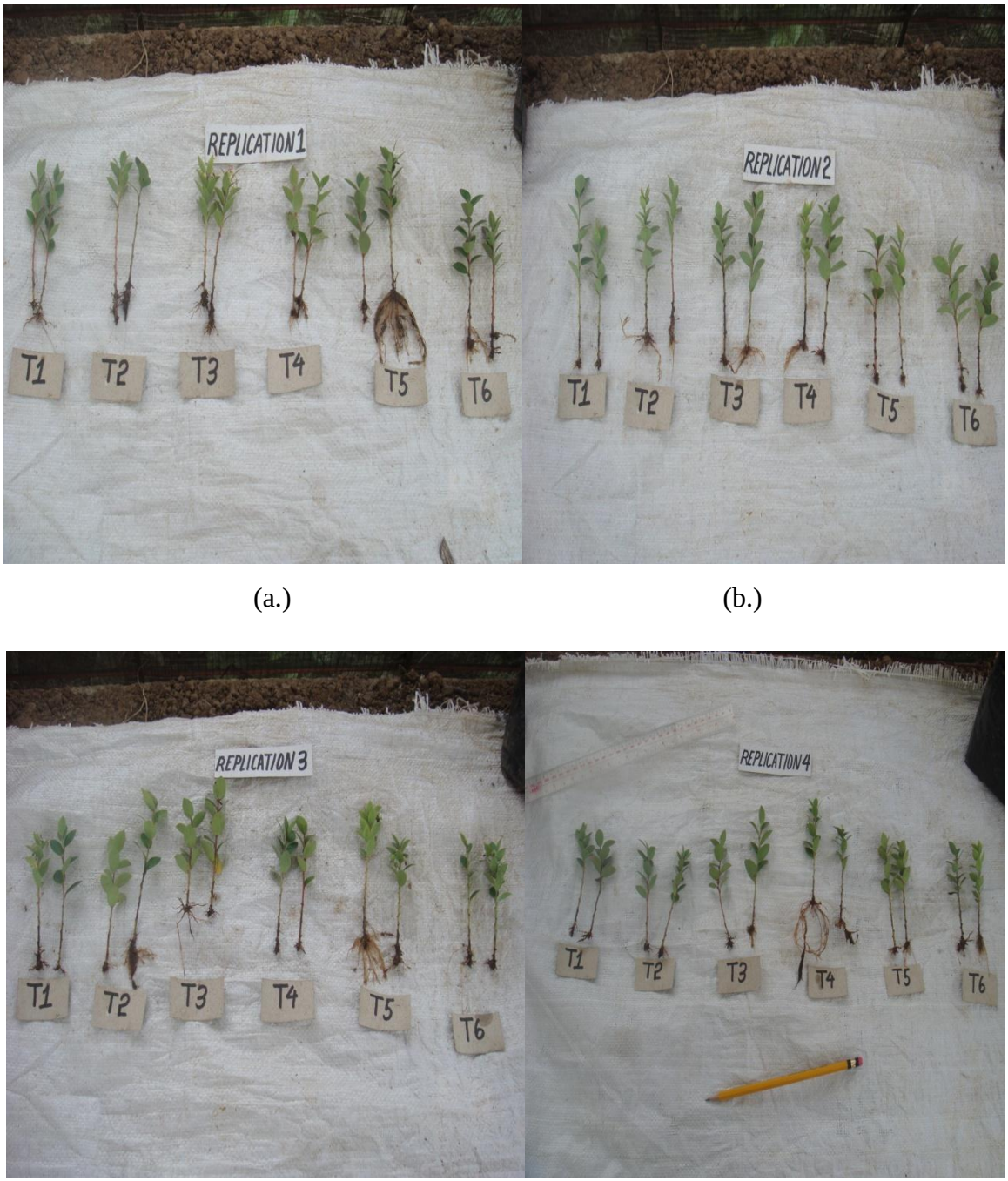
Figure 7. The cuttings with roots and shoots, 90 days from sticking in the rooting media.

Figure 8. Shoot tip cuttings with longer shoots and new roots 60 days from sticking of cuttings.

(a.) (b.)

(c.) (d.)

Figure 9. Sample of shoots produced by shoot tip cuttings after transplanting in black PEP bags, (a) sample of treatment 4, soaked in 500 ppm IBA; (b) sample of treatment 5, soaked in 750 ppm IBA; (c) sample of treatment 6, soaked in 1000 ppm IBA; and (d)sample of treatment 3, soaked in 200 ppm IBA .



(a.) (b.)

(c.) (d.)

Figure 10. The length and number of roots in rooted shoot tip cuttings 90 days from sticking in the rooting media. (a) picture of replication 1 showing treatment 1-6 and the roots that was produced; (b) picture of replication 2 showing treatment 1-6 and the roots that was produced; (c) picture of replication 3 showing treatment 1-6 and the roots that was produced; and (d) picture of replication 4 showing treatment 1-6 and the roots that was produced.

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

Summary

This study was conducted at the pomology project, Benguet State University, La Trinidad, Benguet from January 2012 to March 2012 to determine the effect of the different IBA concentrations on the rooting of blueberry shoot tip cuttings, and to observe the best concentration of IBA that can promote root development and growth of shoots.

Treating blueberry shoot tip cuttings with IBA at a concentration of 500ppm IBA concentration promoted earlier root formation, initiated longer shoots and roots and was the earlier duration to transplanting stage. The blueberry shoot tip cutting that were dipped in 750ppm IBA concentration had the highest percentage of rooted cuttings and average number of roots per cutting. While in percentage survival, the cuttings dipped in 1000ppm IBA concentration is best concentration obtained higher rates of survival.

Conclusions

Based on the results of the study, it was concluded that treating the basal ends of shoot tip cuttings of blueberry with 500ppm IBA concentration at 2.5 cm level of solution for 30 minutes promoted faster rooting, produced longer roots and shoots and earlier duration to transplanting stage. Using 750 ppm IBA promoted the production of higher number of longer roots in the cuttings. Blueberry shoot tip cuttings soaked in the concentration of 1000 ppm IBA had the highest percentage survival.

Recommendations

Based on the findings, it is therefore recommended that the basal stem ends of blueberry shoot tip cuttings should be dipped in 500 ppm IBA at 2.5 cm of solution for 30 minutes before sticking in the rooting media since it was observed to enhance faster rooting, induce production of longer roots and shoots and earlier duration to transplanting stage. Further study is also recommended on the rooting media compositions for shoot tip cuttings of blueberry.

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