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The Effect of Different Root Hormones on the Propagation of American Rose (*Rose centrifolia*) Stem Cuttings under Germinating Chamber

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ABSTRACT

This study was conducted to determine the most effective hormone for root development of American Rose stem cuttings. There were four (4) treatments used in the study namely: T_1 - control; T_2 - full strength ANAA; T_3 - full strength Hormex; and T_4- pure coconut water. Analysis of Variance revealed that the differences among treatment means were not significant in terms of the number of roots developed and survival rate of rose stem cuttings. However, there was a significant difference among the treatment means on the average length of shoot developed. ANAA, coconut water and distilled water (control) significantly influenced the elongation of shoots of American Rose stem cuttings.

Keywords: root hormones, American rose, Rose centrifolia, ANAA

INTRODUCTION

Roses, member of genus Rosa (Rosaceae), have long been one of the major cutflower crops. The industry is based largely on the hybrid tea rose, a perpetually blooming, long-stemmed rose whose pedigree incorporates many species. In greenhouse culture, the plants are budded or grafted onto *Rosa manetti* vigorous root stock.

Roses are grown all year round, but heaviest demand (and the highest prices for the blooms) is during the major florist holidays of Christmas, Valentine's Day, Easter and Mother's Day. Commercial nurseries in the Southern and Western United States propagate rose plants.

Realizing the pressing need of increasing demand for planting materials, the study focused on the possibility of rapid propagation of rose cuttings with the use of root hormones such as ANAA, Hormex, and coconut water. These hormones were proved to be very useful in propagating some plants. They are

found to be capable of inducing root growth especially in asexually propagated plants.

Rose stem cuttings are moderately difficult to propagate thus, the problem of high mortality of stem cuttings always arises. Hence, this study attempted to determine the plant growth hormone that could best promotes root development of American rose stem cuttings.

METHODOLOGY

The experiment was conducted using the Completely Randomized Design (CRD) with four (4) treatments and three (3) replicates. The treatments were as follows: T_1- Control (distilled water), T_2- Full strength ANAA, T3- Full strength Hormex, and T4- pure coconut water). Fifteen (15) sample plants in each treatment per replication were established as basis of observation.

Soil media preparation. Fine river sand (0.10-0.25 mm) was collected from Aborlan River, Aborlan, Palawan. The sand was drenched with hot water to sterilize the soil and eliminate disease causing microorganism.

Construction of propagation chamber. A propagating chamber (1.0 m wide, 0.85 m high and 1.5 m long) was constructed with bamboo slates as frames and transparent plastic sheets as walling and roofing to control the relative humidity. Around 6 inches thick of stones (2.0-3.0 inches diameter) were spread inside the propagating chamber. The sterilized river sand about 4 inches thick was then placed on top of the stones to serve as the soil media. The chamber was divided into twelve equal plots for the different treatment and replications.

Preparation of Rose stem cuttings. One hundred-eighty (180) cuttings of American Rose were cut into 4 inches length using a pruning shear. Only healthy stem cuttings were selected.

Treatment media preparation. Two hundred fifty (250 ml) of ANAA, Hormex and young coconut water (pasteurized at 80°C) were used as treatment media.

Application of Hormones. The basal end of the cuttings were dipped in 4 treatments for one hour at room temperature.

Planting of cuttings. The cuttings were planted as soon as they were withdrawn from the treatment by inserting the basal end in slanting position at a depth of 1 inch inside the clonal propagating chamber. The soil was slightly pressed around the planted cuttings to prevent the dislodging.

Care and management. Proper care and management were carried out until the end of the study. Mist spray was applied to the plants in the morning and in the afternoon to prevent wilting. The stems cuttings were cultured for three (3) months.

The data collected were number of roots developed after 20 days, length of roots developed, final number of roots developed, average length of shoots developed, survival rate and average temperature inside the germinating chamber.

The data gathered were analyzed using Analysis of Variance (ANOVA) at 5% significance level.

RESULTS AND DISCUSSION

The rose cutting in all treatments except in Treatment 3 (full strength Hormex) developed the same number of roots after 20 days of propagation (Table 1). In terms of average length of roots developed, cuttings in Treatment 4 (treated with coconut water) exhibited the longest roots (μ=2.96 inches). This was followed by cuttings in treatment 3 (treated with Hormex), treatment 1 (control) and treatment 2 (treated with ANAA) with mean root lengths of 1.6 inches, 1.19 inches, and 1.14 inches respectively (Table 1). Though the use of coconut water resulted to highest mean root length developed, analysis of variance between treatment means in terms of length of roots developed is not significant.

On the final number of roots developed, cuttings in treatment 4 highest number of roots developed (μ=4.67). This was followed by cuttings under the control group (μ=4.23 roots) and those treated with ANAA (μ=3.0 roots). Cuttings treated with Hormex exhibited the least number of roots developed (μ=1.0 roots) (Table 1). Though the final number of roots developed after the propagation period is variable, the analysis of variance indicated that there were no significant differences among treatment means.

In terms of the average length of shoots developed. The cuttings planted in treatment 1 (control) produced the longest shoot with a mean of 6.77 inches. This was followed by cuttings in Treatment 4 and Treatment 2 with means of 4.97 inches and 4.5 inches, respectively. On the other hand, cuttings in Treatment 3 produced the shortest shoot with a mean of 0.50 inches (Table 1). ANOVA revealed a significant difference among treatment means.

On the survival rate of cuttings, data indicated that highest survival rate was recorded among control plants (33.33%), followed by those treated with coconut water (23.30%). Cuttings treated with Hormex and ANAA had the same survival rate of 10.0%. Though survival rate of rose cuttings under the different

treatment varies, analysis of variance indicated that the difference between treatments is not significant.

Table 1. American rose cuttings' mean number of root developed after 20 days, average length of roots developed, final number of roots developed, average length of shoots developed and survival rate.

Treatments	Number of roots developed after 20 days	Average length of roots developed (inches)	Final number of roots developed	Average length of shoots developed	Survival rate
T_1- Control (Distilled water)	1.0	1.19	4.23	6.77	33.33
T_2- Full strength ANAA	1.0	1.14	3.00	4.50	10
T_3- Full strength Hormex	0	1.60	1.0	1.5	10
T_4- Pure coconut Water	1.0	2.96	4.67	4.97	23.30
F value	ns	0.850^{ns}	1.52^{ns}	6.38^{*}	ns

ns- not significant
* - significant

The above data indicated that the application of root hormones to American Rose cuttings do not influence their root development and survival rate, however it affects the development of their shoots. According to the Encyclopedia Americana (1996), the ability of the stem cuttings to develop roots is variable. It includes the factors that depend on the species, age, and development of plant, the type and location of the stem, the time of the year, and various other environmental factors during the propagation process. Further according to Foskett (1994), the use of auxins i.e. ANAA and Hormex can have either positive or negative effect as plant growth regulator depending on its concentration which was not evaluated in this study. The use of coconut water enhances shoot development due the presence of gibberellins, a growth regulator which enhance root development (Rodly and Dear, 1979). Likewise, the cytokinin found in ANAA stimulate root development (Meredith *et al.* 1970). The data further indicated that rose cuttings can be propagated even without the use of root hormones.

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