AN ABSTRACT OF THE THESIS OF

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in Biology presented on August 3, 1979

Title: Affects of Rooting Hormones on African Violet Cuttings (Saintpaulia ionantha)

Abstract approved: James S Wilson

A study was conducted to test the effects of rooting hormones on African violet leaf cuttings taken from asexual offsprings of a single parent plant, "Blue Boy." Distilled water (control) and four hormones, "Rootgro", "Transplantone", "Hormodin" and "Rootone" were used in this experiment. Selected leaf cuttings were grown in vermiculite filled pots and watered with the appropriate solutions. These pots were placed randomly in a gridded biogrowth chamber which was set at 18 C with 65 % humidity and a 14 hour day. The results of this study indicated that leaf cuttings grown in distilled water produced healthy young plants as quickly as any of the commercial hormones.

AFFECTS OF ROOTING HORMONES ON AFRICAN VIOLET CUTTINGS (SAINTPAULIA IONANTHA)

A Thesis

Submitted to

the Department of Biology

Emporia State University, Emporia, Kansas

In Partial Fulfillment

of the Requirement for the Degree

Master of Science

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by

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Summer, 1979

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ACKNOWLEDGMENT

I wish to express thanks to the members of my committee, Dr. James Wilson, Dr. John Ransom, and Dr. Robert Parenti, for their help and supervision during this study. I wish also to thank my wife Jeline, for all of her help and encouragement in all of my graduate work.

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INTRODUCTION

In 1892, Walter von Saint Paul Illaire, the German Governor of East Africa found specimens of African violets growing in the Tanga Province. He sent plants to his father, who gave them to the director of the Botanic Gardens, Herman Wendland of Herrenhausen. Wendland described the specimens as Saintpaulia ionantha in the June 10, 1893 issue of "Gartenflora" (Grayson, 1973).

Since its introduction into the United States in 1926, the popularity of African violets has grown steadily. This is due to its ability to produce an abundance of flowers even in the often less than satisfactory modern home environment. Because of this, many experiments have been conducted to improve existing strains and for the introduction of new hybrids. Consequently numerous propagation studies were undertaken to provide material for a continuing expanding domestic market.

Research at the University of Wisconsin has concentrated on the production of new asexual hybrids by mass propagation techniques using tissue culture (Bilky & Hildebrandt, 1977). This involves the growing and controlling of live plant cells aseptically on an artificial culture medium. The medium consisted of water, sugar and agar, macro-elements, trace elements, vitamins and various hormones. Differences in the hormonal levels induced the growing cells to either divide

and form a callus or to produce a mass of roots or sprouts from the callus.

The number of plantlets that can be produced by micro-propagation is essentially limitless. Tests using this technique showed that as many as 20,000 plantlets can be grown in a three month period, where traditionally grown leaf cuttings usually produced only five (Bilky & Hildebrandt, 1977).

The Soil Chemistry Division of the Texas Agricultural Extension Service has concentrated on other aspects such as nutrient needs of African violets (Pennington & Jones, 1974). The method used involved removal of similar-sized leaf cuttings from a parent plant. The cuttings were potted in vermiculite and watered with the appropriate nutrient solution.

From techniques described in the research at the University of Wisconsin and the Texas Agricultural Extension Service, an experiment was designed to determine which of four rooting hormones would produce new plants in the shortest possible time.

METHODS AND MATERIALS

All African violet cuttings used in this study were taken from asexual offsprings of a single parent plant, "Blue Boy." Leaves selected possessed blades between four and five centimeters in width and petioles of approximately four centimeters in length. These cuttings were placed in pots containing sterile vermiculite. Each pot was numbered and identified as to type and concentration of an aqueous medium. These samples were randomly placed in a gridded biogrowth chamber which was set at 18 C, 65 % humidity and a 14 hour day.

Cuttings were examined every third day with a hand lens to determine if root hairs and/or leaf bud initiation had begun. After growth had occurred, all cuttings were then checked on a daily basis. To prevent damage to the root system during examination, the cuttings were washed with their cultural solution, in order to remove the vermiculite. After examination, the cuttings were carefully replanted. The collected data were eventually compared statistically by using a t test at .05 level of significance.

Hormone concentrates were weighed using a triple-beam balance. After weighing, each was placed into a flask along with the appropriate amount of distilled water, mixed with a magnetic stirrer, transferred to a storage container and then kept at 4 C.

RESULTS AND DISCUSSION

Results of this study indicated that distilled water produced healthy new plants (leaf buds) in leaf cuttings of the African violet, "Blue Boy," as quickly as any of the four commercial hormonal compounds tested. Water and "Hormodin" (0.2 %) both produced buds in 65 days. All other growth media tested produced healthy new plants, but over a longer period of time. There were no other discernible differences in any of the plants cultured in this experiment.

The first root hairs occurred with "Rootone" at 0.1 % concentration in 28 days (Table I). It was followed by "Transplantone" at 0.2 % and "Hormodin" at 0.5 % in 30 days. "Rootgro" at 1.0 % and 2.0 % concentrations produced root hairs in 31 days and distilled water produced root hairs in 32 days.

When the number of days required to produce root hairs were compared statistically, there were only eight of 180 comparisons which revealed a significant difference. The differences were as follows: between "Rootgro" and "Hormodin" at 2.0 %, "Rootgro" and "Rootone" at 0.1 %, "Hormodin" and "Rootone" at 0.1 %, "Rootone" at 0.1 % and "Rootone" at 2.0 %, "Hormodin" at 0.1 % and "Hormodin" at 0.5 %, "Hormodin" at 0.5 % and "Hormodin" at 2.0 %, "Rootgro" at 0.1 % and "Rootgro" at 0.2 %, "Rootgro" at 0.1 % and "Rootgro" at 2.0 % concentration.

Table I Days required to produce root hairs on *S. ionantha* using distilled water and four rooting hormones

Trial	Distilled Water	Rootgro					Transplantone					Hormodin					Rootone				
		.1%	.2%	.5%	1%	2%	.1%	.2%	.5%	1%	2%	.1%	.2%	.5%	1%	2%	.1%	.2%	.5%	1%	2%
1	--	33	25	--	27	--	36	35	29	34	--	24	23	--	30	37	26	32	35	26	31
2	35	--	27	27	32	32	37	28	38	36	35	30	39	26	--	36	28	24	37	--	--
3	30	35	24	34	--	29	28	--	22	38	--	36	--	28	--	--	26	37	35	31	28
4	25	38	--	45	28	33	36	36	32	--	--	40	38	--	33	--	21	32	25	29	39
5	31	38	33	36	--	30	--	31	36	36	--	35	35	25	--	35	23	23	27	38	38
6	40	28	39	24	27	--	--	25	--	35	34	--	28	--	34	--	31	23	42	28	--
7	32	34	--	--	39	--	34	39	30	31	28	39	--	28	37	--	29	28	--	39	39
8	32	39	30	--	38	31	24	27	41	--	38	40	31	34	32	36	36	38	28	31	--
9	25	39	29	39	27	29	38	25	28	26	32	34	38	30	29	37	36	32	39	36	31
10	38	35	26	40	--	--	25	24	22	33	34	35	35	36	28	28	--	--	--	37	39

-- Leaf cutting died

Table II Days required to produce leaf buds on *S. ionantha* using distilled water and four rooting hormones

Trial	Distilled Water	Rootgro					Transplantone					Hormodin					Rootone				
		.1%	.2%	.5%	1%	2%	.1%	.2%	.5%	1%	2%	.1%	.2%	.5%	1%	2%	.1%	.2%	.5%	1%	2%
1	--	84	71	--	85	--	81	85	84	69	--	70	63	--	66	62	66	64	76	83	86
2	60	--	63	75	60	84	60	88	65	66	67	64	67	--	--	87	61	67	68	--	--
3	63	66	63	61	--	69	62	--	71	76	--	75	--	68	--	--	65	66	73	84	75
4	64	76	--	60	87	78	70	72	62	--	--	66	64	--	77	--	--	--	72	70	60
5	69	83	69	63	--	66	--	70	69	81	--	67	63	76	--	80	69	66	65	68	84
6	68	69	80	63	80	--	--	73	--	68	80	--	75	--	64	--	--	65	75	71	--
7	63	67	61	--	64	--	80	67	62	88	66	--	--	60	73	--	68	66	--	65	81
8	67	73	66	--	65	81	--	60	67	--	83	69	61	88	78	60	69	70	81	68	--
9	61	--	--	80	68	64	68	64	--	86	--	63	--	63	65	79	66	64	78	82	69
10	66	82	65	79	--	--	65	62	65	66	60	77	60	79	63	77	--	--	--	85	71

-- Leaf cutting died

The initiation of the first leaf buds took 65 days (Table II). This occurred using "Hormodin" at 0.2 % and distilled water. "Rootone" at 0.1 % and 0.2 % produced leaf buds in 67 days, while "Transplantone" produced leaf buds in 68 days.

Comparing the number of days required to produce leaf buds, there were only 17 out of 180 comparisons with a significant difference. The differences were as follows: between "Rootone" and "Transplantone" at 0.1 %, water and "Rootgro" at 0.1 % and 2.0 %, "Transplantone" at 1.0 % and water, water and "Hormodin" at 0.1 %, 1.0 % and 2.0 %, water and "Rootone" at 0.5 %, 1.0 %, and 2.0 %, "Rootgro" at 0.1 % and "Rootgro" at 0.2 %, "Rootone" at 0.1 % and "Rootone" at 0.5 %, "Rootone" at 0.1 % and "Rootone" at 1.0 %, "Rootone" at 0.1 % and "Rootone" at 2.0 %, "Rootone" at 0.2 % and "Rootone" at 0.5 %, "Rootone" at 0.2 % and "Rootone" at 1.0 %, "Rootone" at 0.2 % and "Rootone" at 2.0 % concentration.

SUMMARY

An experimental study was conducted to test the effects of rooting hormones on the production of root hairs and leaf buds in African violet leaf cuttings. A significant difference was found in 25 of 180 comparisons.

"Rootone" at 0.1 % and "Rootgro" at 0.2 % concentration produced root hairs in the least amount of time, 28 and 29 days respectively. "Hormodin" at 0.2 % concentration and distilled water produced leaf buds in the least amount of time, 65 days.

The results of this experiment indicated that distilled water produced new plants as fast as any of the concentrations of commercial growth hormones studied.

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APPENDIX

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