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MIST PROPAGATION OF POINSETTIAS

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The mist propagation of greenhouse plants has received considerable attention in the last few years and was reviewed by Widmer (4). Because poinsettia cuttings are especially sensitive to wilting, this crop seemed an excellent choice for a mist propagation study. Cuttings rooted in sand under mist are often soft and need special care when they are removed from the mist and planted in soil. The poinsettia especially is sensitive to root disturbances. Rooting of the poinsettia in pots of soil under mist, as tried by Shanks (2) in Maryland, would seem to eliminate these disadvantages. Growing conditions in Maryland vary from growing conditions in Minnesota, and this study was undertaken in the summer of 1956 to provide further details for the rooting of poinsettia cuttings directly in soil under mist in the Upper Midwest.

Cuttings of three varieties, Improved Albert Ecke, Barbara Ecke Supreme and Mrs. Paul Ecke, were used in the study. The cuttings were potted in two-and-one-half inch pots in three different soil mixtures. The soil mixtures were (1) one part sphagnum peat moss, one part loam soil, one part sand and one part humus (black peat), (2) two parts sphagnum peat moss, one part loam soil and one part sand and (3) one part sphagnum peat moss and one part sand. Superphosphate (0-20-0) was added to all soils at the rate of a four-inch potful per three bushels of soil. Soil and pots were steam sterilized in all instances. Half of the pots were placed pot-to-pot and the remaining half were spaced two inches apart in both directions. Cuttings were taken from July through September.

Mist was provided by nozzles inserted in a galvanized water pipe thirty inches above the bench. Seven different nozzles were employed and spacing varied with the particular nozzle. The mist was used over two separate greenhouse benches and was controlled by two different methods: (1) an electronic leaf and (2) an interval timer with a sixty-second cycle. The interval timer was set to operate the mist four seconds out of each minute in July, and was gradually decreased to two seconds out of each minute in September. Time clocks turned on the system early in the day and shut it off in the evening.

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The cuttings were fertilized regularly after callusing (usually 10 to 14 days after potting) with an 8-8-10 soluble fertilizer. Shanks (2) suggested regular fertilization to prevent the development of pale foliage, leaf burn and leaf loss. The cuttings were watered immediately after potting and no additional water, other than that supplied by the mist, was applied.

Water pressure in the University greenhouse averaged 70 pounds.

An additional study of late propagated plants was included in this experiment. Strong cuttings of the varieties Barbara Ecke Supreme and Mrs. Paul Ecke were potted in the soil mixture of two parts sphagnum peat moss, one part loam soil and one part sand in two-and-one-half inch pots, and placed under mist on September 20.

Thin and stout cuttings of the varieties Barbara Ecke Supreme and Mrs. Paul Ecke were potted, four to a five-inch pan, in the soil mixture of two parts sphagnum peat moss, one part loam soil and one part sand, and placed under mist on September 26.

Results

A comparison of the rooting of the three poinsettia varieties in the three soil mixtures, with pots spaced and unspaced, may be seen in Table 1. Limited consistent differences in rooting time of the different varieties were noted in the table, although visual observations indicated that plants of the variety Barbara Ecke Supreme lost a few more leaves and had a few less roots.

Cuttings in the soil mixture of two parts sphagnum peat moss, one part loam soil and one part sand showed an overall trend toward better rooting than did cuttings in the other two soil mixtures.

Spacing of the pots lowered the percentage of cuttings rooted in several instances. Cuttings in pots which were not spaced usually stood up better, although only limited wilting occurred when the pots were spaced. A reversal of this tendency for poorer rooting, when the pots were spaced, could be seen in cuttings taken on August 20 and subsequent propagation dates.

The time required for rooting increased as the propagation season advanced, and the percentage of rooting decreased. Although rooting percentages increased when cuttings taken in September were allowed to remain under mist for a longer period than is indicated in Table 1, the percent of rooting did not equal that of cuttings taken in July and August. No rot of cuttings occurred in July and August, but some rot was evident in later propagated plants.

Nozzle 1/4 TTN4W, manufactured by Spraying Systems Company of Bellwood, Illinois, and sold for $2.95, gave the best results throughout the propagation season. Nozzle 1/4 LLN-4W, manufactured by the same company and sold for $2.90, also produced a satisfactory mist, but partially clogged. As a result the nozzles dripped considerably after a short period of use. Humidomist nozzle A6, which was sold for $4.00 by Supreme Electric Products Company of Rochester 7, New York, covered too small an area and was too expensive. Humidomist nozzle T16, sold by the same company for $2.00, produced a coarser mist which covered an area approximately two-and-one-half by six feet, but it failed to mist an area directly below the nozzle. The Monarch Fogger nozzle, sold for $1.50 by the W. A. Westgate Company of Davis, California, produced a good, fine mist, but failed to cover a wide enough area. Several other nozzles which were tried misted too large an area and are better adapted to use in outdoor areas.

Table 1. Rooting of three varieties of poinsettias in three soil mixtures, spaced and unspaced, under mist.

Soil mixture*	Date started	Days under mist	Spacing		Variety					
			Spaced	Unspaced	Impr. Alb. Ecke		Barb. Ecke Supr.		Mrs. Paul Ecke	
					Percent rooted	No. of cuttings	Percent rooted	No. of cuttings	Percent rooted	No. of cuttings
2-1-1	7/12	28	X		100	15	100	19	100	24
2-1-1	7/12	28		X	87	15	100	19	100	24
1-1-1-1	7/12	28	X		100	15	100	19	100	24
1-1-1-1	7/12	28		X	87	15	100	19	88	24
2-1-1	7/27	32	X		100	14	100	30	100	20
2-1-1	7/27	32		X	79	14	87	30	95	20
1-1-1-1	7/27	32	X		100	14	100	30	100	20
1-1-1-1	7/27	32		X	100	14	100	30	100	20
2-1-1	8/6	37	X		100	2	100	6	100	8
2-1-1	8/6	37		X	100	2	100	6	100	8
1-1-1-1	8/6	37	X		100	2	100	6	63	8
1-1-1-1	8/6	37		X	100	2	100	6	50	8
2-1-1	8/20	37	X		33	3	67	15	11	18
2-1-1	8/20	37		X	100	3	87	15	89	18
1-1	8/20	37	X		100	3	80	15	72	18
1-1	8/20	37		X	100	3	80	15	67	18
2-1-1	9/5	34	X		20	10	0	22	16	19
2-1-1	9/5	34		X	70	10	23	22	37	19
1-1	9/5	34	X		0	10	0	22	16	19
1-1	9/5	34		X	40	10	23	22	0	19
2-1-1	9/12	37	X				18	22	11	37
2-1-1	9/12	37		X			14	22	27	37
1-1	9/12	37	X				0	22	5	37
1-1	9/12	37		X			9	22	5	37
1-1-1-1	9/12	37	X				27	22	10	37
1-1-1-1	9/12	37		X			18	22	13	37

*Soil mixtures were as follows:
2-1-1 = 2 parts sphagnum peat moss, 1 part loam soil, 1 part sand
1-1-1-1 = 1 part sphagnum peat moss, 1 part loam soil, 1 part sand, 1 part humus (black peat)
1-1 = 1 part sphagnum peat moss, 1 part sand

Good results were obtained by controlling the nozzles with both the electronic leaf and the interval timer. The interval timer required no attention during the propagating season, however, and the electronic leaf required cleaning of the leaf and minor adjustments at irregular intervals.

Cuttings in two-and-one-half inch pots taken on September 20 were kept under mist until November 2, in order to obtain a good percentage of rooted plants. Approximately one-half of the plants developed good, well arranged bracts which made salable plants for Christmas.

Cuttings placed in five-inch pans on September 26 were also removed from the mist on November 2. Thin cuttings did not make satisfactory plants, but approximately 40 percent of the pans of stout cuttings were satisfactory and an additional 20 percent of the pans had good bract development on one-half of the plants in each pan. These plants were not ready for Christmas, however, and were at their peak on January 3, 1957.

Additional observations indicated that the shading of cuttings under mist increases the time required for rooting.

Discussion

The soil mixture of two parts sphagnum peat moss, one part loam soil and one part sand, which was found to be the best of the three mixtures used in this study, might be considered comparable to the one-half sandy-loam and one-half peat moss mixture used by Shanks (2). Shanks' basic starting soil was a sandy loam, while the basic starting soil used in this study was a silt loam. The soil mixture of one part sphagnum peat moss and one part sand was especially undesirable, because the root ball frequently fell apart when knocked out of the two-and-one-half inch pots for transplanting to pans. Once the roots were disturbed to such an extent the plant never fully recovered.

Placing the pots against each other while under mist provided the best results in the three groups of cuttings propagated prior to August 20. Spacing of the pots provided better results in the August 20 and later propagations. The reason for this preference for spacing was probably correlated with weather conditions and the greenhouse temperature.

As the weather became cooler and the days became shorter, the cooling effect of the mist probably lowered the temperature to a level which hindered the rooting of the poinsettia. Plants which were spaced pot to pot remained too wet during the cool nights and rot as well as slower rooting became evident. Spaced plants had better air circulation and did not remain as wet at night.

Poinsettias are ordinarily rooted at a temperature of 65 to 70° F. and the night temperature in the University greenhouse was 60° F. Shanks (3) stated that a minimum temperature of 65° F. should be maintained in late summer and fall when rooting poinsettias under mist. Kamp (1) reported that bottom heat, supplied by heating cables in the sand will hasten the rooting of cuttings under mist. He found that for carnations a sand temperature of 65° F. proved best, and for chrysanthemums a sand temperature of 75° F. Kamp's work refers to rooting directly in sand, but the same principle would probably apply to poinsettias rooted in soil.

It is possible that the pot to pot spacing, which makes for more efficient use of the greenhouse space, would have been completely satisfactory for the entire propagating season if higher temperature levels had been maintained.

Only a limited number of nozzles were tried in this study, and additional work must be carried on to determine whether a cheaper nozzle or a nozzle which covers a greater bench area may be recommended. Some of the nozzles which did not provide the best results in this study might be entirely satisfactory for other uses.

The interval timer is considered preferable to the electronic leaf for controlling the mist, because of the lower initial cost, the more dependable service and equally good rooting results. Good drainage is essential with either types of control.

Rooting of poinsettia cuttings in soil in two-and-one-half inch pots, rather than in sand, has several distinct advantages. Rooting of cuttings in sand necessitates disturbing the root system when the cuttings are removed from the sand and potted in soil in two-and-one-half inch pots. These cuttings require shading and additional overhead misting after potting until root action is established, but cuttings rooted in soil in pots require no special care following removal from mist. In addition, rooting directly in the pot eliminates one step in the production of young poinsettia plants and thus lowers the cost of production.

Plants which develop from cuttings rooted in the soil mixture of two parts sphagnum peat moss, one part soil and one part sand grow especially well because of the porosity and water retension ability of the soil. Such plants may grow too tall unless the watering is carefully supervised. In view of the rapid growth obtained with this system, it is suggested that no cuttings be taken until August 1 unless especially tall plants are desired.

Plants rooted under mist will have an alkali residue on the leaves if an alkaline or hard water supply is used. This residue is restricted to the original lower leaves and is not a serious problem, as this portion is usually partially hidden by the pot wrapping applied by the retail florist.

The portion of the study which had to do with late propagation appeared to indicate that cuttings propagated after September 20 would not make satisfactory plants for Christmas, and that only stout cuttings should be used at this date. Raising of the temperature of both the rooting medium and the greenhouse proper might have resulted in quicker rooting. If late propagated plants rooted in four rather than five or six weeks, it is conceivable that poinsettias propagated one week after the September 20 date could make satisfactory plants for Christmas.

Additional experimentation must be carried on to provide further answers for this method of propagation, but the information now available indicates that the propagation of poinsettias in soil in pots is a superior method of propagation.

Conclusions

1. Rooting of poinsettia cuttings in soil in pots under mist is recommended for use by the commercial grower.

2. There was little difference in the rooting of the three varieties, Improved Albert Ecke, Barbara Ecke Supreme and Mrs. Paul Ecke with this system.

3. A soil mixture of two parts sphagnum peat moss, one part loam soil and one part sand was preferred.

4. Pot-to-pot placing of the pots was preferable to spacing of the pots for July and August propagation.

5. The 1/4 TTN4W nozzle was the best of the nozzles tried in this study under the conditions in the University greenhouse.

References

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3. Shanks, J. B. 1956. Poinsettia the Christmas plant. The Maryland Florist 32:7.

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