# New York State Flower Growers

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# Mist Propagation and Growing


Robert W. Langhans, Graduate Assistant
Department of Floriculture
Cornell University


Four-inch chrysanthemum cuttings rooted and produced three inches of top growth in twelve days. The twenty-four inch rose cuttings rooted in eighteen days. The use of the mist nozzles is not new, however, little is known about the reasons for the results.

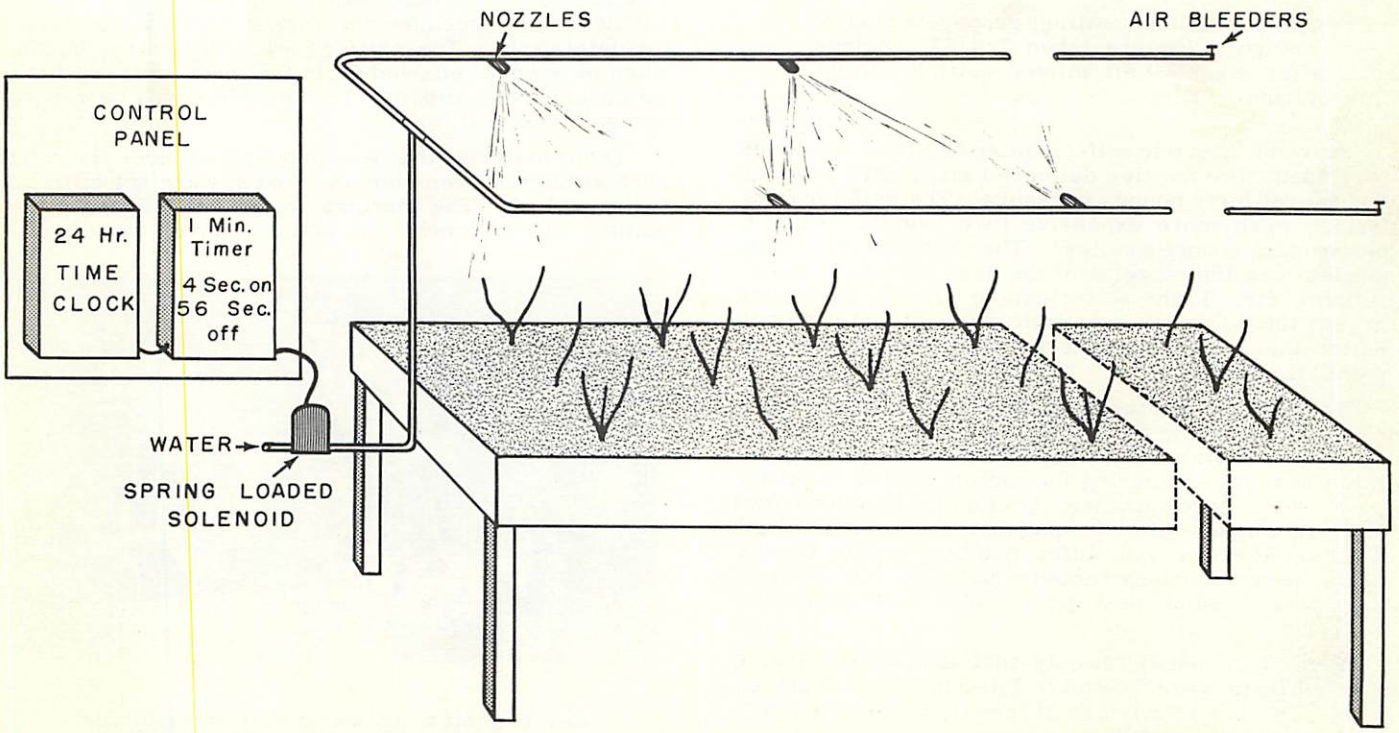
The purpose of the mist was to attain rapid and unchecked growth. The mist of water keeps the leaves constantly moist. The water on the leaves evaporates and cools the leaves. Temperature readings, taken with thermocouples, showed that the leaves under the mist were cooler than leaves not under mist. The thin film of water on the leaves also reduced water loss due to transpiration. The reduced water loss permitted cuttings to be propagated in full sunlight without wilting. Turgidity of the leaves also controls stomatal opening (leaf pores). If the leaves remain turgid the leaf pores will remain open all day. Normally the leaves lose their turgidity about 2:00 in the afternoon, and the leaf pores close. The leaf pores, when open, allow the exchange of $CO_2$, which is the raw product of photosynthesis. If the leaves are given full sunlight and mist, the leaf pores will stay open for a longer time and there should be more photosynthesis and more food produced.

The high humidity and free water around mist-grown plants should produce an excellent environment for the growth of disease. Disease, however, has not been a problem. The reasons for this freedom from disease may be due to the washing of the leaves which would remove any spores landing on the leaves. There is no splashing of water as with syringing or overhead watering which spreads disease. Plant material that was diseased before being placed under the mist would show the signs faster than when not placed under the mist.

There are many new problems with the mineral nutrition of plants growing under the mist. There is leaching of the soil, which will require frequent applications of fertilizer. The plants are growing very rapidly and require more fertilizer. The amount of fertilizer that will be taken up by the plant under mist conditions is unknown. Experiments are set up to determine method of application and frequency of application of fertilizer under mist conditions.

The two major problems in the set up were the location of the nozzles and the timing interval. The nozzles were best located on each side of the bench. The pattern of the mist throughly and evenly covers the bench area. The nozzles were spaced eighteen inches on the bench or three feet in each line. The distance above the bench was not important. The most interesting was head clearance.

The problem of timing interval was alleviated by

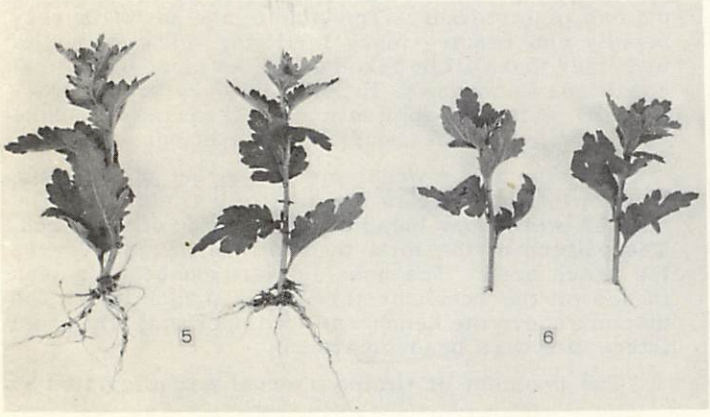



Plan of mist set-up showing the location of spray lines and nozzles, air bleeders, solenoid and control panel in reference to the bench.

reducing the length of the 'on' period. The first timing interval was two minutes 'on' and four minutes 'off'. The long 'on' period was a waste of water, even in propagation. When the two minute 'on' period was used on plants growing in soil, the leaching was excessive. The timing interval has been reduced to four seconds 'on' and fifty-six seconds 'off'. In one eight-hour period, the nozzles deliver only 1.5 pints of water per square foot. The lower delivery reduces leaching of the soil.

When a normal gravity closed solenoid was used, the valve would not close rapidly enough. In the normal solenoid, the flow of water assists gravity in closing the valve. There was a very small flow of water in the spray system, which produced a slugish closure of the valve. A spring loaded solenoid valve would close rapidly under these conditions.

Air in the spray line presented some difficulty. During the night, the water in the spray lines would drain out. The system would start in the morning, and the air in the lines would be compressed. The solenoid valve would close, but the nozzles continued to mist because of the compressed air. Manual valves were put in the ends of the pipe, and every morning the valves were opened to free the air.




Chrysanthemum cuttings propagated in full sunlight. Picture taken 7/6/53, 12 days after stuck. Left misted cutting. Right normal cuttings.

Supreme Electric self-cleaning (model A6) nozzles were used. The nozzles delivered six quarts of water per hour at forty pounds pressure. The self-cleaning nozzles were more expensive than regular nozzles, but the maintenance was less. The problem with many nozzles was the clogging of the hole with dirt, scale, calcium, etc. In the self-cleaning nozzle, a pin goes through the hole when the nozzle shuts off and removes matter that might lodge there. Plans below show the installation used.

The results with the mist have been very interesting. It was possible to root four-inch chrysanthemums in seven to twelve days. The cuttings were propagated in full sunlight and during the rooting period normally grew two to three inches. (picture). Fourteen-inch chrysanthemums were propagated in the same length of time. There was no difference between the type of media used. Cuttings rooted equally well in vermiculite, perlite, sand, peat moss, soil and suspended in wire.

Five, fourteen and twenty-four inch Better Times rose cuttings were rooted in full sunlight in eighteen days. There was no loss of leaves; in fact, the cuttings continued to grow.

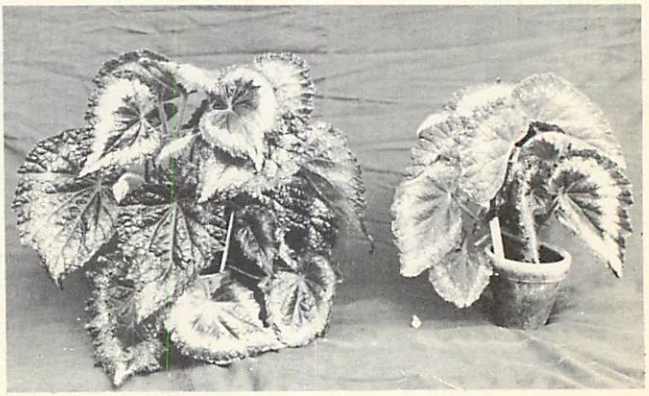
Cattleya orchids and Rex begonias were grown during the summer in full sunlight, under the mist. The results were very favorable (Rex begonia pictured).

Better Times rose cuttings. Picture taken 7/6/53, 18 days after stuck. Left to right-Mist with peat and sand media, mist and suspended in wire. Shaded check with peat and sand media and no shade check with peat and sand media.

There were two times as many breaks made starting dormant Better Times roses when misted compared to normal starting. The average was 9.29 breaks per plant under the mist to 4.50 breaks per plant using normal methods.

The propagation of poinsettias has not been successful. The cuttings rooted in ten to fourteen days and would double their size. This rapid growth was not desirable, because the plants would be too large for later sale. The cuttings were difficult to handle when they were removed from the mist, because there was excessive leaf drop. This problem will be worked on again next fall.

Other material that was propagated under the mist such as chrysanthemums and roses, were not difficult to transplant. The cuttings would wilt slightly when planted in the bench, but would recover rapidly and



Rex begonias grown in full sunlight for 1 1/2 months during the summer. Picture taken 8/14/53. Left-mist. Right-check.

start to grow sooner than normally propagated cuttings.

For the present, the commercial value of the mist spraying is in propagation. All material propagated under the mist roots faster and grows more than cuttings propagated normally.

## Summary

The timing interval used was four seconds on and fifty-six seconds off for eight hours a day. The best location of the nozzles was on both sides of the bench. The nozzles were staggered 18 inches apart. Accurate shut off of the mist was attained with a spring loaded solenoid valve. To remove air in the lines, bleeders were placed in the ends of the pipe. Self-cleaning nozzles reduced maintenance.

Four inch or fourteen inch chrysanthemums were rooted in full sunlight in seven to twelve days. Five, fourteen and twenty-four inch Better Times rose cuttings were rooted in full sunlight in 18 days.

Cattleya orchids and Rex begonias were grown in full summer sun under the mist. The mist doubled the number of buds that broke on dormant Better Times rose plants.

Supreme Electric Product Company
194 Vassar Street
Rochester, New York