

CHIKO HARAMAKI: The first speaker is Mr. Zophar Warner from Willoughby, Ohio who will speak on fogging machines vs. intermittent mist.

FOGGING MACHINES VS. INTERMITTENT MIST

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Since the use of intermittent mist is common, it should not be necessary to review the various controls and ways in which it is used. However, since the use of fog is not so common, it would be well to explain again how it differs from intermittent mist.

Both systems are used to control the water content of the leaves. The mist system acts by keeping the leaf surface covered with water droplets, or at least covered at close intervals. The fogging machine acts by breaking the water into tiny sized particles which spread out and cover all areas of the cuttings; in effect, it is instant and constant humidity.

In dealing with mist and mist nozzels, the capacity is measured in square feet of surface, in the case of fog machines it is cubic feet of capacity.

Humidifiers, which fog machines actually are, have become fairly common in recent years both in homes and in industries. The measure of capacity of a humidifier must be measured by the amount of water the machine can break up in a given time.

The volume of space that can be served with a specific amount of water depends on the temperature of the space involved and by preventing, as much as possible, condensation and dissipation. In other words, it is necessary to use an unventilated, tight, poly-lined house to make the machine effective. If an unlined glass house is used, the fog will condense and run off the glass much faster than it can be manufactured by the machine. This is especially true on cool sunny days. If the greenhouse is properly prepared and the capacity of the machine fits the volume of air space, it should be possible to maintain virtually 100% humidity.

Temperature in the fog house will run high, but since 100% humidity is maintained, most things will root well in temperatures higher than one would think desirable. Ninety degrees Fahrenheit is a good rooting temperature and 100° Fahrenheit apparently does not hurt most cuttings. To control the temperature, a fairly heavy coating of whitewash should be applied to the house. Since the fog itself acts as a shade, the glass near the gutters should be more heavily covered with the shading compound. If enough shading compound is put on the glass to control the temperature on the bright and hot days, it will be too dark on the cloudy days. Therefore, it is necessary to also use supplemental shade to

roll on and off the house on a daily basis whenever it is sunny. I believe we are inclined to confuse light and heat, or at least to consider, during the summer months, that they are more or less synonymous. Most every house has a thermometer but how many do you see that have a light meter? If fog is used successfully, it is absolutely essential to apply and even remove the supplemental shade with meticulous attention given daily to weather and day length. In other words, keep the light level as high as possible for as long as possible each day without allowing the heat to become too high. On dark days and at night the amount of fog can be controlled by adjusting the rate of discharge and or running the machine at intervals.

Cuttings are stuck in flats with a mixture of propagating grade peat and perlite, then carried into the fog house. The mixture should have only enough moisture to prevent drying from the base of the cuttings. Watering should not be necessary during rooting, which is quite rapid. Cuttings should be hardened gradually by removing the flats to an intermittent mist area covered with shade. Both mist and shade are gradually removed until the cuttings are growing under normal conditions and can be transplanted. It is fatal to transplant the cuttings and remove them from their high humidity environment at the same time.

It would also be possible to harden the cuttings in the fog house by adjusting the fog from full time to intervals. But during this time you could be well on the way to rooting the next crop.

Detailed account of fog house propagating was given before this Society by Mr. Stroombeek in 1958 and is printed on pages 47 through 53 of the Proceedings of that year. Anyone contemplating a fog system should read this article. My remarks are of a general nature with emphasis on things we have learned through additional experience.

Fog or mist — which to use? First of all, I would like to say to anyone having success with mist, burlap covered frames, sweat boxes or whatever, **DO NOT CHANGE!** Now that most of the problems of rooting have been solved by advances in Chemistry and equipment, the total capabilities of the Propagator are not exhausted merely by 100% rooting of the cuttings.

It is the common failing of Propagators, especially those not self employed, to confuse change with progress and to install a different system that at the very least is costly to build. This time and money might be better spent in training personnel, and re-evaluating the propagation list. Perhaps good items that have been dropped because of failures could be restored to the propagating schedule.

A fog machine can be used to good advantage in existing greenhouses where the ratio of bench space to cubic feet of air space is high. In other words, it would work well in a low

propagating house; or, you might modify the high houses by partitions of poly. Since heat is already available in the greenhouse, this is quite an advantage. Cool summer nights and heavy rains are often a hazard in outdoor mist propagation.

The additional cost of the fog system is easily balanced by the increased production brought about by rapid rooting and turnover of space used. Those difficult softwood cuttings that wilt and rot or callus without rooting under mist, will for the most part do better under fog. This is also true of plants where continuation of terminal growth is essential.

There are some drawbacks to the fog system of propagating. Pure water is required. Impurities may not be concentrated enough to be detrimental to the cuttings, but will accumulate on the rapidly rotating parts of the machine causing an imbalance and subsequent damage. My experience with humidifiers is limited to the Defensor, manufactured in Zurich, Switzerland. This may not be a problem with all makes of humidifiers.

While the water must be pure, much less water is used than is required with a Mist System. If your present water supply is too impure, it would be practical to buy water and use a humidifier. A low house 10' x 50' can be maintained with 15 to 25 gallons of water per day.

The fog system for Propagating works best during the long hot days. The prime wood conditions for fog propagation occurs earlier than wood selected for other methods. Varying the length and amount of shade on a daily basis is a problem. I do not know of a method of varying the intensity and length of light that is practical for a small operation. More attention and maintenance is required to keep a fog system going than a mist system.

In placing the fogging system in its proper place among the various propagating facilities and equipment, I would place the Nearing Frame on one end and the fog system on the other. The Nearing Frame is a slow, fool proof method that can easily be operated by following simple procedures. The fog system is a sophisticated system to be used where immediate results are desired. Constant optimum heat, light and water must be maintained under highly skilled personnel. The intermittent mist system's place is between the two.

CHIKO HARAMAKI: Thank you Mr. Warner for giving us some facts on which we can base our decision whether we should install a fogging system or continue with intermittent mist. Next on our program we have something new—we have a large number of foreign members, but the distance is too far for them to present papers. So our program chairman has started something new, a taped talk with slides.