

Use of Humidifan for Propagation of Softwood Cuttings®

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BACKGROUND

New England Wetland Plants (NEWP) is a native plant nursery in Amherst, Massachusetts. New England Wetland Plants propagates almost all-native plant material sold from local native sources. In the early stages of the nursery it was apparent rooting softwood cuttings would be a method of propagating many shrubs. Either a fog or mist system was to be installed within a peaked poly house with roll-up sides. Due to water constraints, the volume of water required to run a mist system would be problematic. Research showed the potential advantages of rooting success using fog. In 1996, a Jaybird Humidifan was purchased and installed.

The goal with fog is to maintain a relative humidity (RH) of approximately 100% without saturating the media. Fluctuations in outside temperature, humidity, and cloud cover can effect the fog chamber environment throughout the day. If the fog is not monitored and humidity and temperature not optimally maintained, the results can be catastrophic. Entire batches of cuttings can be stressed and even die in a short time or during overwintering. Having the proper set-up is crucial.

MATERIALS AND ENGINEERING

The north end (44 ft × 21 ft) of a 96 ft × 21 ft, north-south-oriented greenhouse, is curtained off with white poly to form the rooting chamber. White winter poly (50% shade), placed over clear poly of the north end of the greenhouse provides the necessary shade while allowing the sides to roll up along the south end of the house where seedling production occurs. Additional shade was provided with an Aluminet (50% shade) when overheating in the rooting chamber was still happening.

After trial and error, we found mounting the humidifan as high as possible, without oscillation, at the north-central end of the greenhouse to work best. Water was fed to the humidifan, via town water, through an adjustable pressure regulator for even flow rate. Hydrogen dioxide (disinfectant) is injected into the water source at a rate of 1 : 5000 or 1 : 1000 to help control algae and foliar disease. Flow volume was controlled with an adjustable flow meter with 0 to 20 gal/h (GPH) range. A 24-h timer is set for the fog to come 1 h after sunrise and 1 h before sunset. The flow of water is adjusted to 3–10 GPH.

The system was modified to run with a two-stage controller. A 24-h timer turns the fogger on at a set time and water is supplied through a 1st-stage solenoid valve. A thermostat operates a second solenoid valve, which adds flow when temperature increases to a set level. It is wired to also operate an exhaust vent with second stage.

A two-stage controller system requires less frequent manual adjustment and the fog environment is much more consistent throughout the day. When second stage operates, the temperature is moderated and rarely goes above 90 °F.

RESULTS

A range of shrubs and tree species are rooted from cuttings in the fog environment. At times, significant rooting failures have occurred from a drying out event. Usually

Table 1. Maintaining moisture of cuttings.

	Installation cost	Mode of action	Equipment	Energy use	Water use	Problems
Intermittent mist	Med-low	Mist nozzles spray film of water onto foliage	Multiple nozzles closely spaced (42 to 72 per 900 ft ²) Extensive but inexpensive low-pressure plumbing Pressure pump and tank if low yield water source	Low	High	Over wetting of media and leaching of nutrients from foliage
"True fog"	High	Atomized water droplets suspend into air are cooled by evaporation and maintain high humidity around cuttings without over wetting media	Very high pressure pump and plumbing and small orifice nozzles	Med-high	Low	Water treatment needed due to minerals clogging nozzles
Fan-forced fog (humidifan)	Medium	Same as true fog but some larger but "formed, gradual wetting" of media	High-speed fan atomizes water from low flow and low pressure plumbing	Med-high	Low	Some wetting of media but not as much as mist

a small area of the rooting chamber is negatively affected. As our experience and knowledge of the system expands, problems diminish. Cuttings generally root 80% to 100%. Most species root up in 1 to 4 weeks.

ROOM FOR IMPROVEMENT

A controller that adjusts flow level or switches unit on and off by monitoring RH directly is used. Currently there are no humidistats reliable at such high humidity. Possibly install another 2-stage controller to give a total of four settings automatically responding to temperature and/or solar intensity.

SUMMARY

Fan-forced fog using a Humidifan is a viable alternative for rooting softwood cuttings. A very low flow water source is sufficient to cover a 900 ft² area. Initially maintaining optimum conditions for rooting can be challenging. Once familiar with the system and with the proper controller in place, the optimal environment can be attained and cuttings rooted successfully.

The Forest Nurseries in Northeast China®

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The forest region of northeast China includes the forest areas of Heilongjiang, Jilin, and Liaoning Provinces and the forest area in the eastern part of Inner Mongolian Autonomous Region. It is the largest forest region and the most important timber production base in China.

There are very good forest nurseries in this forest region of Northeast China. It is said that if you want to find good nurseries in China, go to the forest region of Northeast China. There are 83 forest industry enterprises (state-owned and managed) in the forest region of Northeast China and each county in the region has its own forestry bureau. Each enterprise and forestry bureau holds one or two standard nurseries with relatively good facilities. For example, Hongwei Nursery in Lushuihe Forest Industry Enterprise in Jilin Province houses a small meteorological station; facilities for employee's rest such as a small park; and rooms for stay and short rest; facilities for seedling growing such as seed cellar, seedling cellar, road system, irrigation system, septic tank, and sterocorary, and equipment for soil tilling, seedbed forming, sowing, and lifting; they can also conduct seed tests and scientific research work, and they have their own specimen room and archives for various regulations and records. Not all of the standard nurseries are equal to Hongwei Nursery, but as a standard nursery, it is essential to have the proper irrigation and fertilization system, road and drainage system, seed treatment and seedling growing facilities, and business office. Software management such as archives and advertisement are very weak in most nurseries because most of the nursery managers do not have such a need and the seedlings grown in these nurseries are mainly used within the enterprise or bureau. They need time and outside influences to change their ideas and be more market driven.