The most important benefit, however, is that the crops will be of a more consistent, higher quality and better acclimated, which is becoming a major issue with the mass merchandisers. Not only that, if the consumers enjoy higher quality plants our entire industry will benefit.

QUESTION-ANSWER SATURDAY MORNING

John LaForge: Have you seen any fog systems inside these retractable-roof houses for propagation?

Richard Vollebregt: At this point, not yet. We have only been promoting this for production ranges. As growers become more aware of it we see fog used in propagation. We have seen it in Arizona were people have flat-roof houses and they were using the fog simply for cooling whereby they would have a retractable shade to reduce the light level and then the fog system would be used to supplement the cooling of the air temperature.

Marge Sweeney: In your Mediterranean house, what was your watering system?

James Ault: Everything is being manually watered in there right now. Since we move plants around so much, trickle irrigation systems have been difficult to use. The soil mix in there is well-drained and you can have a plant that has a high water requirement next to a plant that has a low water requirement and not have problems with irrigating either one.

Ross Merker: How do you manage pest management when you have large numbers of people going through your facility?

James Ault: We have 800,000 people visit and we are open 365 days a year so that is a real concern. We have a full-time integrated pest manager and it is his job to figure this out. We do use some biocontrols. We use a lot of soap and oil that works very well under glass. We avoid including plants in our displays that have serious insect problems.

Patti Kreiber: When do you expect Volume 2?

Bruce Macdonald: It is about 25% complete.

Jim Conner: Under high wind conditions and the curtains are open, what happens to the crops?

Richard Vollebregt: The roof systems have been designed whereby they can be operated at any point in time without regard for wind. The structures, as a general rule, are designed to be exposed to 80 MPH winds when the roof is in a closed or covered position. The roof can be retracted if you want, but our philosophy is that you spent this money to buy a structure to protect these plants and you have to be able to accomplish that objective no matter what the environment is like. If you have to retract the roof to protect the structure because of 50 MPH winds, you shouldn't buy the structure. The horizontal retractable roof systems have been in operation for the last 10 years and have never had a wind-related failure. The main reason for this is that the covering is suspended below stainless steel wires that provide support in up-lift conditions that would occur in a strong wind. The retractable roofs are controlled strictly by light, temperature, or rain.

Bruce Briggs: How do you feel as a displayer of carefully walking the line between selling a product and providing needed information to inform growers?

Richard Vollebregt: The last thing we (sales people) need is another trade show. In order for us to sell anything we have to educate because we are trying to tell people that there are different ways of doing things. At trade shows you never get a chance to sit down and talk in detail like we were able to do here. With the understanding that this is not designed to be a commercial forum, I'm more relaxed and I think the people here are more relaxed because the focus is education. My perception is that it would be taboo for it to be anything else.

Motivating Plant Growth With Your Heating System

Jim Rearden
BioTherm Hydronic, Inc., P. O Box 750967, Petaluma, California 94975

INTRODUCTION

Plants exist in several temperature microclimates simultaneously. A microclimate is defined for this paper's purpose as a small environment that is confined by the structure of the greenhouse, the structure of the plant, and the root zone.

The primary aim of this paper is to heighten the reader's awareness of the existence of these microclimates and to outline the tools that are available today to control the temperature in each. It is essential to understand that providing the optimum temperatures to all the plant's microclimates is essential to achieving maximum quality and production.

To create a reference point for this, I suggest that you try to understand the way a specific plant evolved in nature. Very often this simple approach will yield a very good recipe for creative use of the tools that are available for this purpose. To illustrate the impact microclimate temperature control can have, I asked several growers for feedback as to what effect this approach has had on their production.

Example 1: A well known orchid grower found that, "By controlling our soil temperature at 70F with an air temperature of 63F, we were able to eradicate a major root-fungus problem, called *Pellicularia filamentosa*, that had been rampant when we only controlled air temperatures. . . "

Example 2: A cut rose grower found that, "By heating our plants from below, and letting the warmth move up through the plant, we've seen more bottom breaks, bigger heads, and much less chemical usage. . . "

Example 3: A potted foliage plant grower discovered that, "By elevating our soil temperatures above 68F we have seen much higher production and an elimination of iron chlorosis..."

All three of the growers were exercising a very simple cultural practice—they were creating temperature microclimates that mimicked the environments that their particular crops had adapted to naturally. Simply taking a step back and objectively asking yourself "If I could think like a plant, what would I want for temperature control?", may be the most important practice you could make.