The Push Is On To Improve Postharvest Life Of Pot Plants

The horticulture industry has made great strides in developing improved production methods for many crops. New or improved growing techniques, equipment, pesticides and growth regulators assist you in producing better plants faster.

Unfortunately, your plants are only as good as the way they are handled through shipping channels. You can grow quality plants, but how do you maintain that quality all the way to the consumer? If your plants are packed and/or shipped under adverse conditions, their quality can be greatly reduced. The plants that you grew so carefully could end up of little value to anyone.

Considerable research has been done on the relationship between shipping conditions and the postharvest life of cut flowers. However, only recently have researchers begun to examine the effects of shipping on the postharvest life of pot plants.

A study on the shipping disorders of pot plants at the University of Illinois is now being funded by the **American Florists Endowment.** *Dr. Barry Eisenberg,* postharvest specialist in the Department of Horticulture, and graduate student, *Jack Gruber,* are attempting to determine the cause and solution for these disorders. They are examining the relationship between the opening and closing of plant stomates and the amount of ethylene in and around a plant.

"Anytime you stress a plant, the stomates close and ethylene that normally escapes can be trapped," says Eisenberg. "If the stomates are closed, then internal ethylene builds up and plant tissue is damaged."

Presently, many plants are packaged and shipped under environmental conditions that can greatly reduce their quality. Plants exposed to high temperatures and low light levels may cause stomates to close, resulting in increased ethylene concentrations.

According to Eisenberg, the key compound in reducing shipping disorders may be 1-aminocyclopropane-1-carboxylic acid (ACC), the intermediate precursor to ethylene. He points out that a number of researchers across the country are examining the relationship of ACC with ethylene and plant quality.

"During shipping, stress conditions cause a reduction in the conversion of ACC to ethylene. After the plants are taken out of the shipping environment, this conversion may be accelerated, resulting in increased ethylene production and faster plant senescence." This may account for the reason that some plants look good immediately after being removed from their shipping containers, but 24 hours later they're dead or dying.

"Essentially, what we would like to do is expose a variety of plant materials to different ethylene concentrations," says Eisenberg. "By measuring the amount of ethylene in the plants and the amount released through the stomates, we can determine if there is a relationship between ethylene levels and plant quality."

Impatiens and geraniums are two major crops that have been studied. "We have easy access to both crops," he say. "We have considerable experience with geraniums, and impatiens readily exhibit shipping disorders." Foliage plants and two cut flower species will also be examined for ethylene response.

He points out that growers will not be able to achieve perfect control of the shipping environment for plants. This is due primarily to the diverse product mix that is normally shipped and the lack of postharvest information on these crops.

"There are two key things that growers can do to maintain the proper postharvest environment," he said. "First, they should maintain high carbohydrate levels in their plants. Second, they need to keep ethylene levels low."

According to Eisenberg, environmental controls fit into one of two areas. "We have to either design a smaller, more manipulative system, or we have to modify the shipping atmosphere to control disease and ethylene levels and reduce the loss of plant carbohydrates."

He emphasizes that plants packaged and shipped under poor environmental conditions are going to experience problems. Consequently, this enhances the need for chemical treatments to improve plant quality.

"If we could ship all plants at the proper temperature, humidity, and light levels, most of the current problems could be reduced significantly," he said. "If growers knew that a particular chemical is breaking down during shipping, they could supplement or load the plant up with this chemical before the shipping stress occurs. The problem is, when do you apply a chemical to overcome a postharvest problem? Prior to shipping, after shipping, or at both times?

"We are also finding that each variety seems to react differently to stress conditions. This may result in

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a grower having to apply various concentrations of a chemical, depending on the varieties he is producing."

Eisenberg foresees an integrated approach to handling the postharvest problem of growers. Since it is difficult for most growers to maintain ideal shipping conditions, the use of chemicals will become more prevalent.

"I think the chemical technology is developing quickly. If growers can keep the shipping temperatures down and also apply an ethylene-inhibiting chemical, then the postharvest life of their plants will improve greatly."