

# A New Approach For Floriculture

New research on cuttings conducted by the cooperative research group P<sup>3</sup> looks at the essential factors that determine the success or failure of cuttings.

**By Jim Faust, John Dole and Erik Runkle**

Industry and academia have many things in common, one of which is that we can often accomplish more when we work together than when we work alone. We are more likely to thrive if we learn the fine art of *coopetition*, which can be defined as the process of cooperating with our competition.

Several years ago, we observed that growers were consistently having problems with shipments of unrooted cuttings. Consequently, a research group consisting of three universities and multiple cutting suppliers was formed to improve the performance of unrooted cuttings. This was a challenging feat to undertake, but we believed we would be more successful by working together on these important issues. The academic group consisted of researchers from Clemson University, Michigan State University and North Carolina State University. The initial industry group consisted of Ball FloraPlant, Ecke Ranch, Fischer USA, Oglevee Ltd. and Oro Farms.

Projects were defined that would benefit everyone in the group. Each university focused on its strengths and the different facilities and equipment each brought to the group. The busi-

nesses were able to essentially leverage the resources of their competitors; each company's donation was multiplied by the number of companies in the group. This allowed us to conduct much more research than any one individual university or company could do on its

own. Thus, a win-win arrangement was created. The research group was named P<sup>3</sup> (P-cubed), which referred to the three primary goals of improving production, postharvest and propagation of unrooted cuttings while the "cube" underscores the importance of



*This tray of lantana displays a small- and large-leaved cultivar.*



These images show a progression of symptoms common to lantana. Certain lantana cultivars can be very difficult to ship since they are sensitive to low temperature injury, and they are sensitive to ethylene, which is produced at warm temperatures. Research conducted by the P<sup>3</sup> Research Group has been implemented by cutting suppliers to allow lantana to be consistently shipped with success.

cutting package design as an integral part of the process.

### Cutting Physiology

The premise of the research is that from the moment cuttings are harvested from the stock plant, they are in a freefall heading toward inevitable death. Crazy as this may seem, remember that eventual death is expected from many other horticultural products, such as cut flowers, vegetables and fruits. However, cuttings must survive the postharvest environment and also recover in propagation, form roots and produce new foliage. When you stop and think about it, this is quite a remarkable feat.

Our primary goal is to maintain cutting quality from point of harvest to rooting. Essentially, we are trying to understand the physiology of unrooted cuttings. What are the essential factors that determine the success or failure of cuttings?

The process starts with managing stock plants so cuttings have the necessary resources to tolerate stresses once harvested. The next step is to handle the product in such a fashion as to minimize the stresses that inevitably occur during transit. During this phase, we target the proper package environment. Finally, the importance of properly handling cuttings after arrival and the propagation environment cannot be overlooked.

We have observed how different species have different optimal harvest, shipping and storage requirements. As a result, cutting supply companies are beginning to handle species differently during the harvesting and packaging phases. This might not be obvious when growers receive healthy cuttings, but it is important to realize that suppliers are continuing to fine tune their operations to provide the best possible cutting.

### Building A Better Box

Packaging is an often-overlooked link in the postharvest chain. There is only a handful of packaging science programs at universities in the United States. Fortunately, one of the best is at Clemson University. We have teamed up with packaging scientists to address the issue of how to build a better box. Look for improved package designs to begin to appear in the coming year or two.

Current research also focuses on how to provide the best possible postharvest environment within packages, including environmental factors and a desirable combination of atmospheric gases. The gases that are important include oxygen, carbon dioxide, water vapor and ethylene. The process of modifying these gases within the package is known as Modified Atmosphere Packaging (MAP). These techniques are commonly used with fruits and veg-

etables so they stay fresh in the grocery store. Therefore, we are simply applying well-known concepts to a new crop: unrooted cuttings. ♦



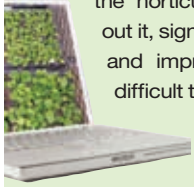
### Partnering For Research

If you missed Paul Fisher's, University of Florida, November 2006 *Big Grower* article on the Young Plant Research Center (YPRC) and would like to learn more about another industry-funded, collaborative research program, visit [www.biggrower.com](http://www.biggrower.com) and search the article archives for Fisher.

The YPRC was created as a team research program that aims to be:

"A leader in team-based research, developing solutions for real industry problems, focused on nutrition, plant health, technology and genetics for the production, propagation and shipping of young plant material."

## RESEARCH EVERYWHERE YOU LOOK



Research is the backbone of the horticulture industry. Without it, significant advancements and improvements would be difficult to achieve. There are a number of research projects happening at universities across the United States at all times. To find out more about university research, check each university's individual Web site.

Here is a sampling of what some universities are working on right now:

**Cornell University**  
Horticulture Research Programs  
[www.hort.cornell.edu/programs.html](http://www.hort.cornell.edu/programs.html)

**Flower Bulb Research Program**  
[www.hort.cornell.edu/miller/bulb/res.html](http://www.hort.cornell.edu/miller/bulb/res.html)

**Michigan State University**  
Horticulture Research Programs  
[www.hrt.msu.edu/station.htm](http://www.hrt.msu.edu/station.htm)

**Orchid Research Program**  
[www.hrt.msu.edu/faculty/Runkle/Orchid/Orchid\\_Research.htm](http://www.hrt.msu.edu/faculty/Runkle/Orchid/Orchid_Research.htm)

**Perennial Research**  
[www.hrt.msu.edu/perennialresearch](http://www.hrt.msu.edu/perennialresearch)

**North Carolina State University**  
Floriculture Research  
[www.ces.ncsu.edu/depts/hort/floriculture](http://www.ces.ncsu.edu/depts/hort/floriculture)

**University of Florida**  
Horticulture Research  
[www.hos.ufl.edu/research/default.htm](http://www.hos.ufl.edu/research/default.htm)

**Floriculture Research**  
<http://hort.ifas.ufl.edu/research/rpflor.htm>

**Rutgers**  
IPM Research  
[www.pestmanagement.rutgers.edu/IPM/Greenhouse](http://www.pestmanagement.rutgers.edu/IPM/Greenhouse)

## Finding Solutions

Two categories of solutions have resulted from our research efforts: recipes and management solutions. Some problems have been addressed by finding the specific recipe or key to unlocking a specific problem. An example of this is lantana.

Previously, many lantana cultivars were considered extremely difficult to ship. Bags of cuttings would arrive completely defoliated or would defoliate shortly after being stuck. When the cuttings didn't defoliate, the shoot tips would often blacken and the cuttings would rot on the propagation bench. As a result, several growers chose to limit selection to easy-to-ship cultivars. We focused on solving the lantana puzzle and found a solution that worked beautifully. Several of our supporters have communicated that their lantana claims dropped to zero once our recipe was implemented.

Once we understood the physiological causes of leaf drop and leaf blackening of lantana, we were able to prevent the losses. However, occasional hiccups in shipping would still result in problems. To reduce these occurrences, Best Management Practices (BMPs) were implemented to tighten all of the links in the chain from cutting harvest to rooting. Each link can experience problems, and successful propagation is only as strong as the weakest link.

As a result, we have worked with cutting suppliers to evaluate all the processes that impact cutting performance. These sessions have served to train staff and underscore the importance of each protocol and procedure. This approach has an impact on difficult-to-ship plants, such as lantana, and also improves the quality of the not-so-difficult species. The bottom line is increased success for cutting propagators and finishers.

## Benefits To The Industry

This research project is financially supported by the floriculture industry,

so our entire focus is on creating solutions to challenges faced by the industry. The individual participating companies have invested in our research as a means of improving their products. The American Floral Endowment and the Floriculture Industry Research and Scholarship Trust have also supported components of the project. We believe the entire floriculture industry benefits from this project; propagators and growers receive higher-quality cuttings with fewer losses and more uniform rooting. Our increasing understanding of the underlying physiology of the stock plant and unrooted cutting results in improved diagnostics and problem solving when inevitable delays and problems occur in the shipping systems. High-quality cuttings don't happen by accident.

As the project grows, we continue to add new supporters. This year, Innova-plant, Syngenta and Metrolina Greenhouses have joined our research group. We also provide technical support and training to independent rooting stations that work closely with our supporters. This information dissemination process is critical to properly implementing the results so the U.S. floriculture industry can continue to benefit. We welcome any company into the P<sup>3</sup> group that wants to participate. In return, supporters receive cutting-edge, research-based information that helps them continue to be industry leaders, be at the forefront of new technologies and deliver reliable products. ■

*For information about the P<sup>3</sup> Research Group, contact Jim Faust at [jfaust@clmson.edu](mailto:jfaust@clmson.edu), John Dole at [john\\_dole@ncsu.edu](mailto:john_dole@ncsu.edu) or Erik Runkle at [runkleer@msu.edu](mailto:runkleer@msu.edu).*

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