



by Rosa Raudales and Leanne Pundt
greenhouse@uconn.edu

Maintaining High-Quality Plants in Retail Settings

In the Northeast, we are finally getting ready to put plants in the ground! Growers do a great job growing high quality plants, however we have noticed that quality may be compromised as plants stay in the garden center for prolonged periods. In this Alert, we will provide some basic management options to maintain high quality plants in retail settings.

We always hope that plants in the shelf will be there for only a short period of time. However, some plants stay for prolonged periods and we must be proactive about maintaining high quality of plants. The retail area is not a growing area, it's a display (Figure 1). Nonetheless, we can do some things similar to what we do in production to maintain high quality plants.

1. Keep plants hydrated and green.

Inadequate irrigation is one of the most common causes of plant loss in retail. Too little or too much can be detrimental. Excessive watering is a persistent problem in production. On the contrary, in retail settings insufficient water tends to be the ongoing problem. At the garden center, usually, plants have well-developed roots (Figure 2), the temperatures are high, the sun is bright, and in many cases the plants are in an open space under direct sunlight (Figure 3). Therefore, they tend to dry up very quickly.

2016 Sponsors



Figure 1. Display of finished plants in garden center.

e-GRO Alert

www.e-gro.org

CONTRIBUTORS

Dr. Nora Catlin

Floriculture Specialist
Cornell Cooperative Extension - Suffolk County
nora.catlin@cornell.edu

Dr. Chris Currey

Assistant Professor of Floriculture
Iowa State University
ccurrey@iastate.edu

Thomas Ford

Commercial Horticulture Educator
Penn State Extension
tgf2@psu.edu

Dan Gilrein

Entomology Specialist
Cornell Cooperative Extension - Suffolk County
dog1@cornell.edu

Dr. Joyce Latimer

Floriculture Extension & Research
Virginia Tech
jlatime@vt.edu

Dr. Roberto Lopez

Controlled Environment/Floriculture
Extension & Research
Michigan State University
rglopez@msu.edu

Dr. Neil Mattson

Greenhouse Research & Extension
Cornell University
neil.mattson@cornell.edu

Dr. Rosa E. Raudales

Greenhouse Extension Specialist
University of Connecticut
rosa.raudales@uconn.edu

Dr. Beth Scheckelhoff

Ext. Educator – Greenhouse Systems
The Ohio State University
scheckelhoff.11@osu.edu

Lee Stivers

Extension Educator – Horticulture
Penn State Extension, Washington County
ljs32@psu.edu

Dr. Paul Thomas

Floriculture Extension & Research
University of Georgia
pathomas@uga.edu

Dr. Brian Whipker

Floriculture Extension & Research
NC State University
bwhipker@ncsu.edu

Heidi Wollaeger

Floriculture Outreach Specialist
Michigan State University
wollaeger@anr.msu.edu

Copyright © 2016

Where trade names, proprietary products, or specific equipment are listed, no discrimination is intended and no endorsement, guarantee or warranty is implied by the authors, universities or associations.



Figure 2. Roots of plants at a garden center.

Keeping plants a little on the dry side is healthy for the crop (we will discuss further below). However, when severe wilting occurs plants may not always recover. To prevent this problem, assign staff to inspect plants regularly and irrigate plants as needed. If possible, check the plants early in the morning and in the early afternoon. Group plants by watering requirement. Identify the plants that tend to be a problem or that have outgrown the container (Figure 2) and keep those in a place where they can be irrigated more often or are in a shaded place.



Figure 3. Garden center in Connecticut. Plants exposed to direct sunlight and high temperature are susceptible to dehydration.

Ideally, plants should be fertilized with every irrigation. Every garden center should have a portable injector to irrigate their plants (Figure 4). The goal is to maintain plant quality, not to promote growth. Therefore, the optimum fertilization regime should include a neutral fertilizer (e.g. 17-4-17) at a low rate (between 50 to 100 ppm N) with low phosphorus (P). The purpose is to maintain the pH and electrical conductivity (EC) of the growing media and feed the plants with enough nutrients to prevent nutrient deficiencies (Figure 5).



Figure 4. Portable fertilizer injector.

Fertilizing with every irrigation may not be an option if staff and/or injectors are limited. In that case, a higher fertilization rate (150-200 ppm N) may be used once a week.

For more information on identification and management of common nutrient disorders in the garden center go to: <http://www.e-gro.org/pdf/338.pdf>



Figure 5. Petunias in a garden center without fertilizer. Nutrient deficiencies developed in garden centers. In this case, nutrient deficiencies varied by species.

Cooperating Universities

UConn



Cornell University



The University of Georgia

IOWA STATE UNIVERSITY

MICHIGAN STATE UNIVERSITY

NC STATE UNIVERSITY



THE OHIO STATE UNIVERSITY

PENNSTATE



Cooperative Extension
College of Agricultural Sciences

VirginiaTech
Invent the Future

MAUMEE VALLEY GROWERS
Choose the Very Best.

In cooperation with our local and state greenhouse organizations

CONNECTICUT GREENHOUSE GROWERS ASSOCIATION



2. Keep plants healthy: Don't forget the IPM abc's.

If you are growing most of the crops that you sell, you have control over when and what plants are displayed in retail. However, many garden centers source their plants from multiple greenhouses, therefore the risk of inadvertently buying plants with pests and diseases is greater. As always, education and prevention are key! Train your employees on how to inspect plants while watering and grooming the plants. Then follow the basic principles of pest management, similar to production, to prevent problems:

- a) Inspect incoming plants.
- b) Monitor plants on regular basis.
- c) Maintain optimum growing conditions. For example, excessive watering increases root-disease incidence and algae buildup encouraging shore flies.
- d) Regularly remove debris and weeds (Figure 6) and place in a covered garbage container.
- e) As more growers are using biological controls, it is easier for retailers to continue this proactive practice because of the lack of harmful pesticide residues.
- f) It is difficult to control pests once they are established, so discard any unsold, unsightly or diseased plants so they do not serve as a reservoir for pest problems (Figure 6).

For more information on pest management in retail settings go to: <http://ipm.uconn.edu/documents/raw2/html/498.php?aid=498>



Figure 6. On the left, weed host infected with aphids. Weeds in the garden center can host pests and diseases and reduce the aesthetic appearance of the display. On the right, sachets with beneficial insects for biocontrol of pests at a garden center (right).

3. Keep plants compact

Stretched plants are not appealing to customers. Non-chemical and chemical alternatives are available for controlling plant growth in the garden center.

Plants stay compact when they are exposed to the right quantity and quality of light. Leaves absorb red light (which inhibits stem elongation) and allow a larger proportion of far red light (which promotes stem elongation) to transmit to the lower canopy. Therefore, plants that are shaded by other leaves are leggy and have soft growth (Figure 7). Therefore, provide enough space for plants. Plants grown with adequate space are also very uniform (Figure 7). Avoiding too tightly packed display areas makes it easier to keep an eye out for too dry plants. Improved air movement between the plants helps prevent the spread of foliar diseases.

For more on other non-chemical control options of plant growth go to: <http://www.e-gro.org/pdf/208.pdf>.

Keep an eye on how hanging baskets might affect plant growth. For more on the effect on hanging baskets go to: http://www.e-gro.org/pdf/2016_521.pdf.



Figure 7. On the left, tomato seedlings with narrow spacing resulted in elongated, spindly and soft growth. On the right, chrysanthemums in production greenhouse. Plants with ample space maintain compact growth.

When space is limited, plant growth regulators are a good option to maintain compact plants. Remember that customers want to buy a plant that is beautiful and compact, but they want it to grow to full size when they take it home. Therefore, only apply plant growth regulators (PGRs) with short residuals. PGRs with short residual include those with chlormequat chloride (e.g. citadel®) or daminozide (e.g. Dazide®) as active ingredients. Both of these PGRs can be applied as foliar sprays. Remember compact, but not stunted, is the ideal plant, so do not overuse PGRs and do not use PGRs with long residuals (e.g. uniconazole and paclobutrazol) in retail.

For more information about PGRs for annuals and herbaceous perennials visit the following links:

<http://e-gro.org/pdf/resources/2015-16%20%20PGR%20Guide%20Annuals%20low-res.pdf>

http://e-gro.org/pdf/PP_PGR_GUIDE_0116.pdf

The quality of the plants at the garden center cannot be better than the plants grown in the production greenhouse. Tight crop planning, supplemental lighting, timely application of PGRs, proper water and nutrient management, spacing (Figure 7), toning, DIF (http://www.e-gro.org/pdf/2016_508.pdf), disease and pest management, etc. are tools and practices implemented during production that have an impact all the way into the garden center. So whether you grow your own plants or source them from another greenhouse, keep in mind all the tools and practices that may impact post-harvest quality.