NCR-101: Committee on Controlled Environment Technology and Use
2003-2004 Station Report

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Personnel

Royal Heins officially retired from the Department of Horticulture in January 2004. Fortunately, we will be interviewing candidates to fill his position in April, and anticipate that the successful candidate will join our Department in August 2004. Ki Sun Kim (Seoul National Univ., Korea) is on sabbatical leave and will be spending a year working with Erik Runkle at Michigan State Univ.

New Facilities Planned

Eighteen general purpose plant growth chambers were ordered last year and all of these are now installed. Twelve of these are Enconair's model GC-20's (20 ft^2 reach-in design), four are AC-60's, and two are AC-40's (with 60 or 40 ft^2 of growing space, respectively). All 18 have humidity controls and remote programming and environmental monitoring capabilities.

We have since ordered another nine chambers from Enconair. Four of these are Enconair's model GC-20's, two are similar but are high light chambers (with a combination of high pressure sodium and metal halide fixtures), and three (somewhat similar) are designed to operate (with lights on) at below freezing (-5C) temperatures. The high light and low temperature chambers are aimed at satisfying the special needs of several groups on campus.

Background: In late 2001, MSU received an NSF Major Research Instrumentation Grant that will pay for the majority of the new chambers. The NSF grant required a match of approximately 35% from the institution and we have since had faculty buy into the program by adding some of their own grant dollars. Total cost of the upgrade (including various matches, remodeling and repairs) is about $1.1M to date.

Another important component of all this will be centralized management of the growth chamber facilities on the MSU campus. Although implementation has been difficult, the goal is not only better equipment, but also better maintenance and access for everyone in the MSU plant sciences community.

Research Projects

Our major research projects in floriculture and controlled environments include:

- Determining the environmental induction of flowering of several potted orchid hybrids utilizing constant and fluctuating day/night temperatures and various photoperiods

- Quantifying the effects of temperature and light quantity on growth and development of several bedding plant species
- Quantifying the vernalization responses of several herbaceous perennial species. Plants are being cooled in ten growth chambers with temperature setpoints of -2.5 to 20 ^{o}C for various durations.
- Determining the effects of light quantity and temperature on stock plant management of herbaceous plants, and the effects on quality and performance of subsequent cuttings
- Identifying the flower induction requirements and commercial production protocols for various herbaceous perennial plants

"Lighting Up Profits" Article Series and Book on Greenhouse Lighting

Erik Runkle and Paul Fisher (Univ. of New Hampshire) are coordinating a magazine series, with multiple contributors, on Light Management for Greenhouses. The series is being published in *Greenhouse Grower* magazine, and the first six issues (of 14 in total) have already been published. The goals of the project are:

- To educate our industry and students about advances in greenhouse lighting
- Highlight research projects and show how they can be applied in greenhouse management
- Promote collaboration among researchers, extension/technical staff, and leading growers

The articles will be compiled into a 96-page book, to be published in July 2004. The intended audience for the book includes greenhouse growers, industry sales and technical staff, and university students. The book will include the 1500-word magazine articles, plus:

- A CD containing Powerpoint slides and Excel spreadsheets for converting units, calculating lighting costs, etc.
- Look-up tables and additional detail
- Research highlights
- Study questions for students of university and extension courses

The authors of the articles include: Theo Blom (Univ. of Guelph), A.J. Both (Rutgers Univ.), Art Cameron (Michigan State Univ.), Martine Dorais (Laval Univ.), John Erwin (Univ. of Minnesota), Jim Faust (Clemson Univ.), Paul Fisher (Univ. of New Hampshire), Royal Heins (Michigan State Univ.), Erik Runkle (Michigan State Univ.), Marc van Iersel (Univ. of Georgia), Helma Verberkt (DLV Facet, The Netherlands) and Ryan Warner (Univ. of Minnesota). Additional researchers will author research highlights. Erik Runkle, Paul Fisher, and A.J. Both will be presenting a lighting seminar in July 2004 at the Ohio Florists' Association Short Course in Columbus.

2003 Publications

Cameron, A., E. Runkle, R. Heins, B. Fausey, and C. Whitman. 2003. Herbaceous perennials: summary tables. Greenhouse Grower 21(14):44-59.

Enfield, A., E. Runkle, R. Heins, and A. Cameron. 2003. Herbaceous perennials: *Phlox paniculata*. Greenhouse Grower 21(6):66-74.

Fausey, B., A. Cameron, R. Heins, and E. Runkle. 2003. Herbaceous perennials: *Digitalis* (foxglove). Greenhouse Grower 21(10): 29-42.

Fisher, P. and E. Runkle. 2003. Lighting up profits: managing light in the greenhouse. Greenhouse Grower 21(10):66-72.
Lopez, R.G. (Advisor: Runkle, E.S.) 2003. Effects of photoperiod and temperature on growth and flowering of six orchid hybrids. M.S. Thesis, Michigan State University.
Lopez, R.G., E.S. Runkle, R.D. Heins, and C.M. Whitman. 2003. Temperature and photoperiodic effects on growth and flowering of *Zygopetalum* Redvale 'Fire Kiss' orchids. Acta. Hort. 624:155-162.
Olrich, M., D. Joeright, R. Heins, E. Runkle, and A. Cameron, 2003. Herbaceous perennials: Plant growth retardants. Greenhouse Grower 21(9): 94-106.
Pramuk, L.A. (Advisor: Runkle, E.S.) 2003. Temperature and daily light integral effects of five bedding plant species. M.S. Thesis, Michigan State University.
Pramuk, L.A. and E. Runkle. 2003. Temperature and light on bedding plants. Greenhouse Product News 13(7):32-41.
Runkle, E. 2003. Managing the environment for a better bedding plant crop. Greenhouse Management and Production 23(10):44-46.
Runkle, E. 2003. Short days promote early flowering of dahlias. Bulletin of the American Dahlia Society 90(1):88-91.
Runkle, E. 2003. The Floriculture College of Knowledge. Ohio Florists Assoc. Bull. 878:20-21
Runkle, E. and P. Fisher. 2003. Lighting up profits: the science of photoperiods and flowering. Greenhouse Grower 21(13):118-122.
Runkle, E.S. and R.D. Heins. 2003. Photocontrol of flowering and extension growth in the long-day plant pansy. J. Amer. Soc. Hort. Sci. 128(4):479-485.
Shimizu, H., R.D. Heins, and E. Runkle. 2003. Simulation study of total energy consumption required to produce a mature plant at different greenhouse temperatures. J. Soc. High Tech. in Agric. 15(3):123-129. (In Japanese.)
Whitman, C., A. Cameron, E. Runkle, and R. Heins. 2003. Herbaceous perennials: *Aquilegia* (Columbine). Greenhouse Grower 21(12):80-86.
Whitman, C., A. Cameron, E. Runkle, and R. Heins. 2003. Herbaceous perennials: *Campanula punctata*. Greenhouse Grower 21(13):104-112.
Whitman, C., A. Cameron, E. Runkle, and R. Heins. 2003. Herbaceous perennials: *Delphinium*. Greenhouse Grower 21(8):76-86.
Whitman, C. and E. Runkle. 2003. PGR rates and timing for plug production. Greenhouse Product News 13(12):38-43.