

NCERA-101: Committee on Controlled Environment Technology and Use
2006 Station Report
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New Facilities and Equipment

We completed the renovation of a greenhouse range consisting of six compartments. Renovations included: fan-and-pad systems, horizontal air flow fans, electrical systems and wiring, a Priva Intégro environmental control computer with Intégro interface panels, and a weather station. We also purchased 5 Apogee line quantum sensors, bringing our total number to 25.

Accomplishment Summaries

Michigan State University led a team of collaborators including scientists at Rutgers University, University of Georgia, and University of Florida to develop and compile resource documents that can be used by greenhouse growers to help determine options for consuming less energy and improving production efficiency. This information is available online at www.hrt.msu.edu/energy/Notebook.htm and includes articles on greenhouse lighting, temperature and scheduling, energy-saving technologies, alternative fuels, and energy grant and loan opportunities.

Impact Statements

Researchers at Michigan State University learned that flower initiation of potted *Phalaenopsis* orchids was inhibited if the day temperature was sufficiently high (>26 °C), even when the night temperature set point is cool (e.g. 17 °C). This suggests that during *Phalaenopsis* production, a cool night temperature set point could be used to inhibit flowering if the day temperature set point was sufficiently warm. This production strategy could have a significant economic impact for commercial growers because about 80% of the energy for heating a greenhouse is required at night.

Most herbaceous annual and perennial cutting propagation in the northern hemisphere occurs from December to March, when outdoor light levels are low. Researchers at Michigan State University have shown that properly managing light intensity during propagation can reduce both rooting time and subsequent time to flower by at least 3 weeks in petunia and New Guinea impatiens. Thus, providing higher light intensities during propagation has the potential to reduce cutting losses by up to 10% and propagation time by 75%.

Published Written Works

- Blanchard, M.G. and E.S. Runkle. 2006. Temperature during the day, but not during the night, controls flowering of *Phalaenopsis* orchids. *J. Exp. Bot.* 57(15):4043-4049.
- Blanchard, M.G., J.A. Chong, J.E. Faust, and E.S. Runkle. 2006. Temperature and light, p. 51-60. In: J.M. Dole and J.L. Gibson (eds.). *Cutting propagation: A guide for propagating and producing floriculture crops*. Ball Publishing, Batavia, Ill.

- Fausey, B., S. Padhye, E. Runkle, and A. Cameron. 2006. Improving perennial flowering. *Greenhouse Grower* 24(7):86-98.
- Fausey, B., S. Padhye, E. Runkle, and A. Cameron. 2006. Vernalization: Life in the cold. *Greenhouse Grower* 24(1):70-78.
- Lopez, R.G. and E.S. Runkle. 2006. Daily light integral influences rooting and quality of petunia cuttings. *Acta Hort.* 711:369-373.
- Lopez, R.G. and E.S. Runkle. 2006. Temperature and photoperiod regulate flowering of potted *Miltoniopsis* orchids. *HortScience* 41(3):593-597. JIF=0.574
- Padhye, S., B. Fausey, E. Runkle, and A. Cameron. 2006. Day-neutral vernalization. *Greenhouse Grower* 24(3):38-44.
- Padhye, S., B. Fausey, E. Runkle, and A. Cameron. 2006. Life after cold! *Greenhouse Grower* 24(5):58-68.
- Runkle, E. 2006. How to manage stock plants. *Greenhouse Management and Production* 26(12):53.
- Runkle, E. 2006. Technically speaking: Daily light integral defined. *Greenhouse Product News* 16(12):70.
- Runkle, E. 2006. Technically speaking: Do you know what your DLI is? *Greenhouse Product News* 16(13):66.
- Runkle, E. 2006. Technically speaking: Know your application techniques. *Greenhouse Product News* 16(8):82.
- Runkle, E. 2006. Technically speaking: Light it up! *Greenhouse Product News* 16(7):102.
- Runkle, E. 2006. Technically speaking: Recovering from a PGR overdose. *Greenhouse Product News* 16(9):78.
- Runkle, E. 2006. Temperatures affect growth. *Greenhouse Management and Production* 26(4):58-60.
- Runkle, E. 2006. Temperature effects on floriculture crops and energy consumption. *Ohio Florists' Association Bulletin* 894:1-8.
- Runkle, E. 2006. Temperature effects on crop timing and plant quality. *Griffin Gazette: Winter*, p. 3.
- Runkle, E. and P. Fisher. 2006. Growing crops cooler. *Greenhouse Grower* 24(3):84-85.
- Runkle, E. and R. Beaudry. 2006. Technically speaking: Avoiding ethylene problems. *Greenhouse Product News* 16(10):78.
- Runkle, E.S. and R.D. Heins. 2006. Manipulating the light environment to control flowering and morphogenesis of herbaceous plants. *Acta Hort.* 711:51-60.
- Shimizu, H., Z. Ma, S. Tazawa, M. Douzono, E.S. Runkle, and R.D. Heins. 2006. Blue light inhibits stem elongation of chrysanthemum. *Acta Hort.* 711:363-368.
- Warner R.M. and J.E. Erwin (2006). Prolonged high temperature exposure differentially reduces growth and flowering of twelve *Viola × wittrockiana* Gams. cvs. *Sci. Hort.* 108:295-302.
- Warner, R.M. (2006). Minimize bedding plant production time to offset high fuel costs. *Greenhouse Management & Production* 26(1):76-80
- Warner, R. (2006). Supplemental lighting on bedding plants – making it work for you. *OFA Bull.* 899:1, 7-10.
- Warner, R.M. (2006). Using limited inductive photoperiod for scheduling *Cosmos bipinnatus* and *Tegetes tenuifolia*. *Acta Hort.* 711:267-271.

Scientific and Outreach Oral Presentations

- Blanchard, M.G. and E.S. Runkle. 2006. Increasing stem elongation and bract size of poinsettia 'Freedom Red' with gibberellins and benzyladenine. XXVII International Horticultural Congress, Seoul, Korea.
- Fisher, P. and E. Runkle. 2006. Lighting up profits workshop. Southeast Greenhouse Conference, Greenville, SC.
- Lopez, R.G. and E.S. Runkle. 2006. Effects of temperature and pseudobulb maturity on flowering of the orchid *Miltoniopsis* Augres 'Trinity'. XXVII International Horticultural Congress, Seoul, Korea.
- Runkle, E. 2006. Controlled flowering of potted orchids. The Korean Orchid Society Special Seminar. Translation provided in Korean. Seoul, Korea.
- Runkle, E. 2006. Efficiencies and energy conservation in the greenhouse. Buyerfest 2006, West Bend, WI.
- Runkle, E. 2006. Energy: A crisis for crops – Strategies for coping. OFA Short Course, Columbus, OH.
- Runkle, E. 2006. Energy efficient greenhouse production strategies. Surviving the Looming Energy Crisis (in coordination with OFA), East Lansing, MI.
- Runkle, E. 2006. Energy efficient production of greenhouse crops. MSU Extension meetings in Grand Rapids, Hudsonville, Kalamazoo (2 locations), Monroe, and Pontiac, MI.
- Runkle, E. 2006. Environmental control of flowering of orchids. European Orchid Conference, Padova, Italy.
- Runkle, E. 2006. Flower induction of orchids. University of Florida Orchid Short Course, Gainesville, FL.
- Runkle, E. 2006. Growing it cool. Southeast Greenhouse Conference, Greenville, SC.
- Runkle, E. 2006. Lighting for growth and flowering. 2006 Perennial Production Conference, Indianapolis, IN.
- Runkle, E. 2006. One temperature does not fit all! ProGreen Expo, Denver, CO.
- Runkle, E. 2006. Overcoming poinsettia problems. Kent County MSU Extension Office, Grand Rapids, MI.
- Runkle, E. 2006. Supplemental and photoperiodic greenhouse lighting. VIII Simposio de la Floricultura, organized by Asocolflores Ceniflores (The Colombian Cut Flower Growers Association). Simultaneous translation in Spanish. Rionegro, Colombia.
- Runkle, E. 2006. The important effects of light on plant growth and flowering. VIII Simposio de la Floricultura, organized by Asocolflores Ceniflores (The Colombian Cut Flower Growers Association). Simultaneous translation in Spanish. Rionegro, Colombia.
- Runkle, E. 2006. Worldwide orchid production. The Korean Orchid Society Special Seminar. Translation provided in Korean. Seoul, Korea.
- Runkle, E. and A. Pyle. 2006. Perennials and grasses as bedding plants. OFA Short Course, Columbus, OH.
- Runkle, E.S., C.M. Whitman, and M. Olrich. 2006. Determining the effects of a uniconazole drench on *Celosia*, *Petunia*, *Salvia*, and *Tagetes*. ASHS annual meeting, New Orleans, LA.
- Runkle, E. and M. Blanchard. 2006. The latest and greatest in PGRs. Michigan Greenhouse Growers Expo, Lansing, MI.
- Warner, R.M. 2006. Growing bedding plants more efficiently. Metropolitan Detroit Flower Growers Association Education Day, Carleton, MI.

- Warner, R.M. 2006. More light, less energy: lighting strategies to reduce bedding plant production time. MSU Garden Plant Showcase, East Lansing, MI.
- Warner, R.M. 2006. Strategies to grow crops with different nutritional, pH, light and temperature needs when space is limited. New England Greenhouse Conference, Worcester, MA
- Warner, R.M. 2006. Using light and temperature to schedule bedding plants. Toledo Area Winter Greenhouse Conference, Toledo, OH.
- Whitman, C.M., E.S. Runkle, and A.C. Cameron. 2006. Short days or vernalization promote flowering in *Aquilegia ×hybrida* Sims 'Origami Blue and White'. ASHS annual meeting, New Orleans, LA.