Michigan State University 2013 Station Report
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Accomplishment Summaries

- Qingwu (William) Meng and Erik Runkle performed experiments to better understand how red, far red, and blue light provided during the middle of the night influence flowering of daylength-sensitive crops. Plants were grown in research greenhouses under different ratios of red, far red, and blue light from LEDs, as well as under white light. In most crops, red with far red, with or without blue light, was the most effective at promoting flowering. Blue light alone was not effective at promoting flowering. We conclude that the addition of blue light to red and far red lighting does not influence flowering for the crops studied.
- Qingwu Meng and Erik Runkle worked with five commercial greenhouse growers to test the efficacy of a new commercial Philips LED "flowering" lamp for flowering applications. Growers in CA, IN, MI, and NJ received plants in January and grew them under LEDs that emitted red, white, and far-red light or under one or two other conventional lighting treatments. In most instances, flowering time under the LEDs was similar to that of plants grown under traditional light sources.
- Paul Fisher (Univ. of Florida), Erik Runkle and Matt Blanchard (Michigan St. Univ.) and John Erwin (Univ. of Minnesota) developed a Microsoft Excel spreadsheet FlowersOnTime that allows users to predict the effect of modifying greenhouse temperature on crop production time. A user first selects among the 70+ floriculture crops (many of which are bedding plants) in the drop-down list, then specifies their typical finish crop time at a particular temperature. The model then predicts the effect of increasing or decreasing temperature at 2 °F intervals, assuming all other conditions are the same. Most of the crop models were based on data generated at Michigan State Univ. and the Univ. of Minnesota in controlled research greenhouses or growth chambers.
- Erik Runkle and colleagues at Michigan State University and Sonali Padhye of PanAmerican Seed developed a Wave® Smart Scheduling tool. This Excel program enables growers to predict time to first open flower for 15 Wave petunia varieties at specific average daily temperatures and daily light integrals. This tool allows growers to schedule specific petunia varieties on precise dates and help select varieties that flower uniformly under their environmental conditions.
- Ryan Warner and Nathan DuRussel quantified the impact of temperature on crop timing and quality for the Divine series of seed-propagated New Guinea impatiens for both an early-season and late-season crop. While plants generally flowered earlier as temperature increased, the influence of temperature on days to flower varied widely among cultivars and one cultivar, 'Divine Cherry Red' flowered at a similar time across temperatures. This was a result of an increase in node number below the first flower at the higher temperatures.

Impact Statements

- Growers nationwide are using our crop scheduling tools to more precisely plan the production of their crops and help weigh trade-offs between cropping time and energy inputs.

For example, Nash Greenhouse in Kalamazoo used the Wave Smart Scheduling tool to schedule all of their Wave petunias in 2013, which occupied about half of their 1.1 million ft^2 of greenhouse space. Research-based information on temperature and energy consumption was also disseminated through the Greenhouse Energy Cost Reduction Strategies website, trade magazine articles on temperature, and electronic newsletters.

- The commercial LEDs tested in our research and commercials trials consume 18 W and can replace 100- or 150-W incandescent lamps, reducing energy load and consumption by to 82 to 88%. In addition, the LEDs can last over 20 times longer than incandescent bulbs. Depending on electricity prices, usage, and utility rebates, LEDs can be a more economical way to deliver long-day lighting to ornamental crops.

Published Written Works (*denotes peer reviewed)

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