Resources for Scheduling Bedding Plants

By Erik Runkle

Bedding plants comprise about half of the total floriculture crop production value in the United States. For many greenhouses, bedding plants are the most profitable segment of their business. Profitable production requires scheduling crops in flower for predetermined market dates while minimizing inputs, such as energy for heating.

There are a number of factors that can influence finish timing of bedding plants, including the maturity of plugs and liners, the growing conditions under which the young plants were produced, average daily temperature, photoperiod, daily light integral (DLI), use of plant growth regulators and finish container size. Complicating this is that plant responses vary from crop to crop and sometimes, from one cultivar to the next. All of these factors can be controlled or modified, especially environmental conditions during finishing.

One of the major thrusts of the Floriculture Research Alliance (FRA) has been to develop crop-specific information on how bedding plants respond to temperature and light. These factors can be manipulated to improve scheduling accuracy, as well as to identify the impacts of modifying temperature on energy consumption for heating. Two new and free tools are available to growers to assist in the scheduling of bedding plant crops.

FlowersOnTime is a decision-support tool created in Microsoft Excel. It can be downloaded under the "Grower resources" tab at the Floriculture Research Alliance's website, http://floriculturealliance.org. A user first selects one of the 60+ floriculture crops (many of which are bedding plants) in the drop-down list, then based on their experience and growing conditions, specifies finish crop time at a particular temperature. Using the entered "standard crop time" and "standard production temperature," the model predicts the effect of increasing or decreasing temperature at 2° F intervals, assuming all other conditions are the same.

For example, let's assume a grower typically produces petunia 'Wave Purple Classic' in eight weeks from a 288-cell plug when grown under long days at 64° F. After entering the temperature and production time, the FlowersOnTime model estimates that lowering the temperature to 62, 60, or 58° F would delay flowering by six, 12 or 21 days, respectively. Or if the grower wanted to shorten crop timing, increasing the temperature to 68° F would shave nine days off the flowering time.

Virtual Grower 3.0 was released in August 2011, and has a new interface, added features, and can now be used on a Mac. It can be downloaded at www.virtualgrower.net. Similar to previous versions, heating costs are estimated based on user inputs such as location, greenhouse characteristics (dimensions, glazing material, heating methods, etc.) and temperature setpoints. The new version includes a crop timing tool for over 35 floriculture crops, where planting date can be identified based on the crop, average daily temperature and desired finish date. When combined with the estimated heating information, growers can run a series of simulations to determine the effect of changing temperature on crop timing and energy consumption.

Additional information on how temperature and light influence flowering of bedding plants can be found on the MSU floriculture website, http://flor.hrt.msu.edu/production-info.

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Figure 1. *FlowersOnTime is a decision-support spreadsheet to help growers determine the impact of changing temperature on typical crop production time.*

FlowersOnTime: Temperature Effect on Days to Flower

Species/Cultivar:	Petunia: Classic Wave Purple
Standard crop time (days)	56
Standard production temperature (F)	64
Temperature units (C or F)	F
Base temperature (F):	42
Optimum temperature (F):	N/A

Expected production times		
°F	°C	Days
58	14.4	77
60	15.6	68
62	16.7	62
64	***17.8***	***56***
66	18.9	51
68	20.0	47
70	21.1	44

Based on research by: Blanchard, M.G. and E.S. Runkle, 2011. Quantifying the thermal flowering rates of 18 species of annual bedding plants. Scientia Hort. 128: 30-37.

This is a guide only, based on research with limited cultivars and experimental conditions. See "instructions for use" sheet to interpret this information. Confidence in model estimates decreases the more temperature varies from normal production temperature.