Streamlining Osteospermum

Some of the new osteo varieties do not need vernalization, encouraging more mass production of the consumer favorite.

As fuel and labor costs continue to rise, growing osteospermum profitably can be challenging. Research done at Clemson University can help you improve crop uniformity and reduce costs.

By Jim Faust, Kelly Lewis and Renee Keydoszius

Floriculture is not just about growing pretty plants: It is about growing profitable pretty plants. Increasing costs and flat prices have forced growers to more closely examine their production costs. When growers do this, three facts inevitably rise to the top:

- Labor is the largest production cost.
- Price increases can quickly erode profit margin.
- Using greenhouse space efficiently is more important than ever before, i.e., more plants must be grown in the same space.

These facts force growers to make important decisions to help streamline production. First, growers must reduce labor inputs by minimizing the number of touches a crop receives. Second, growers must look for crops that can be grown at cooler temperatures without adding too much time to production schedules. Third, growers must grow plants at higher densities than ever before. These three production decisions can be addressed simply by cultivar choices.

Growing A Uniform Series

This past winter and spring, a study was conducted at Clemson University to survey osteospermum cultivars and identify a select group that could streamlined. By streamlined, we mean growing a series of cultivars that can be produced at high densities and will flower uniformly so the plants can be shipped in a bench-run fashion. To accomplish this, we grew all the cultivars in the Sideshow, Side, Cape Daisy and Crescendo series at a range of temperature treatments and then measured plant growth and flowering.

Temperature Responses

Current recommendations for osteos suggest that plants must be grown at 50° F or lower for 4-6 weeks to stimulate flower initiation, i.e., vernalization. However, our data suggest that modern osteo genetics have much more heat tolerance than in the past. For example, older genetics really did require relatively cold temperatures (50° F) to have significant flower initiation, while a new cultivar like 'Sideshow Bicolor Purple' flowers well even in a greenhouse maintained at 75° F day and 70° F night temperatures (72° F average daily temperature) (see Figure 1, right).

These results suggest the concept of vernalization no longer applies to all osteospermum. However, osteos still have a lower optimal temperature than many species. It should be noted that the longer an osteo is kept cool, the higher the flower count will be. For example, flower number per plant of 'Nairobi' decreased from 55 to 3 as the temperature increased from 48 to 72° F (see Figure 2, right). Thus, this cultivar does not produce an acceptable flower count (about 15 flowers) when grown at temperatures above 67° F.

The results shown in Figure 2, right, are derived from 12 different temperature treatment combinations. For example, we grew plants in 48, 60 and 72° F greenhouses and then moved plants among the different temperatures at two, four or six weeks after pinch. The results suggest the average temperatures from pinch to flower are more critical than the specific number of weeks at specific temperatures. This is very useful information for improving fuel efficiency, since it suggests that growers can maintain different temperatures depending on the ambient environments. In other words, the temperatures can be cooler on cold days and warmer on sunny days and the plants will still flower well. This flexibility saves money since growers do not need to cool or heat to hit a precise temperature requirement.

Height Management

Every osteospermum grower remarks that plants stretch when finished warm and thus require more growth regulator. We used no growth regulators in our experiments and observed the tallest plants occurring at the coolest temperatures, while the shortest plants occurred at the warmest temperatures (see Figure 3, right). ➧

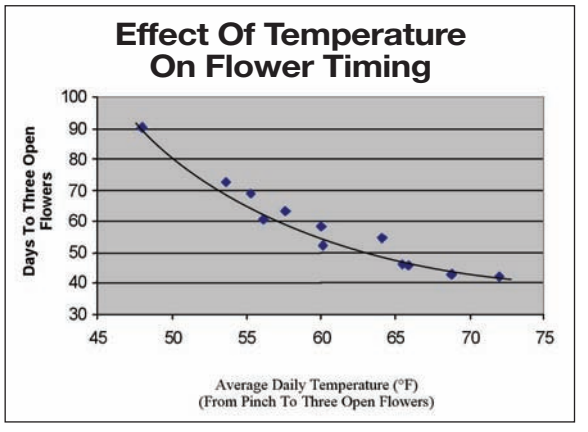

Figure 1. The number of days to three open flowers of osteospermum 'Sideshow Bicolor Purple' decreases as the average daily temperature increases from 48 to 72° F. Note the number of days to flower for less heat-tolerant cultivars begins to increase at warmer temperatures, e.g., above 65° F.

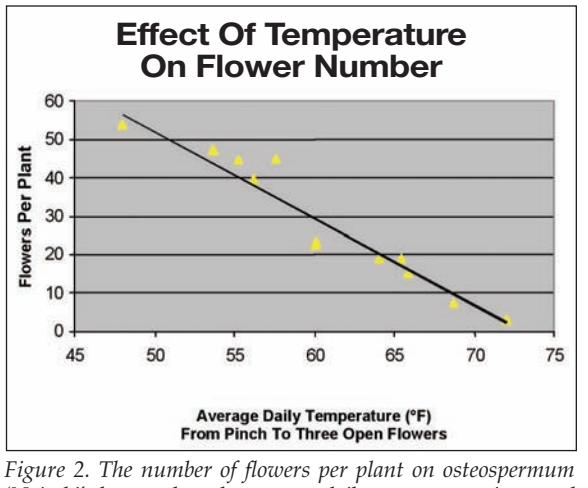

Figure 2. The number of flowers per plant on osteospermum 'Nairobi' decreased as the average daily temperature increased during the time between pinch to three open flowers.

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This is quite an interesting contrast. Our current hypothesis is this: At warmer temperatures, the plants elongate more rapidly, however, they also develop much more quickly, thus they are elongating quickly but over a shorter period of time resulting in a shorter plant. At cooler temperatures, the plants elongate more slowly, but they elongate for many more days. The result is a tall plant.

Additionally, plant growth regulator treatments are likely to be more effective on plants grown cool compared to those grown warm. The bottom line is the increase in stem elongation rate is noticeable and plant growth regulation is important at warm temperatures; however, cool temperatures alone will not keep osteospermum short. Plant growth regulation is essential at all temperatures.

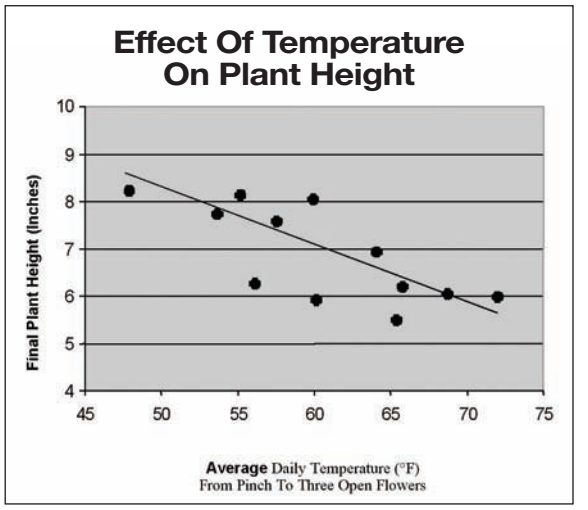

Figure 3. Osteospermum plant height (measured at flowering) decreases as temperature increases. No plant growth regulators were applied.

Days Until Open Flower

Temperature	Bud Diameter (mm)									
(°F)	3	4	5	6	7	8	9	10	11	12
48	55	49	44	38	32	26	20	15	9	3
54	42	38	33	28	24	19	14	10	5	
60	31	28	24	21	17	14	10	7	3	
66	25	22	19	16	13	10	8	5	2	
72	20	18	15	13	11	9	6	4		

Figure 4. Temperature and bud diameter affect the time remaining until an osteospermum flower bud will open. Note: this table applies to Sideshow, Side and Cape Daisy series. Crescendo series' buds open in a slightly different pattern.

Osteo Bud Meter

Predicting time to flower is critical for streamlining production, so we developed a table to help growers predict the remaining time for an existing flower bud to open at different average daily temperatures (see Figure 4, above). Visible buds are typically 3 mm in diameter (see Figure 5,

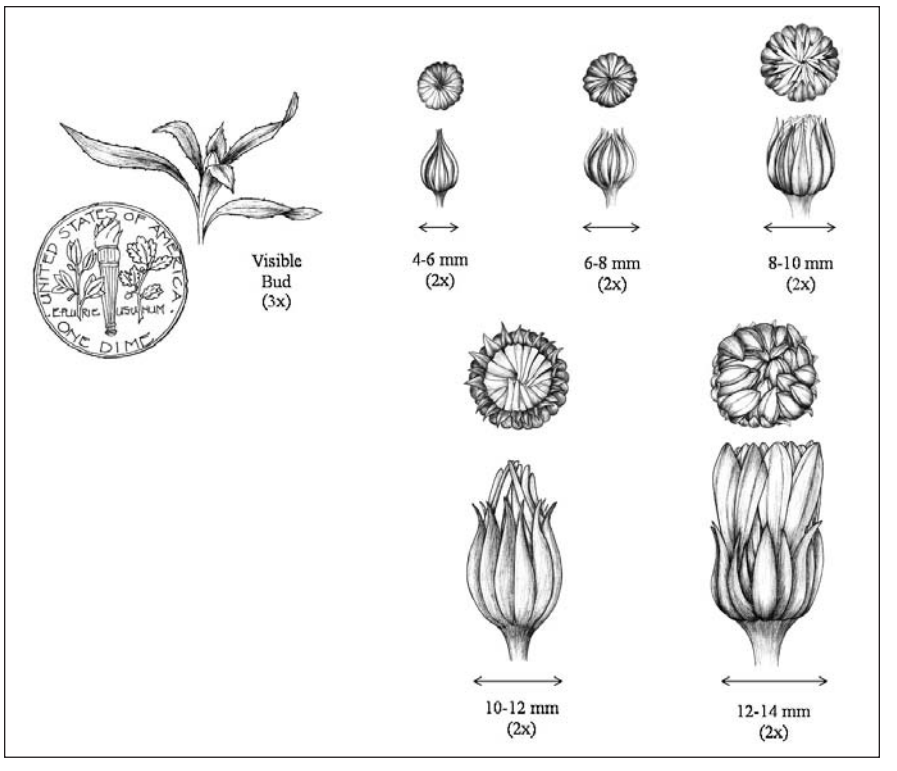

Figure 5. Shown here is the appearance of osteospermum bud development prior to open flower. Note that buds grown cool (48-55° F) proceed through the 12- to 14-mm bud stage prior to opening, while buds grown warm (65-72° F) will open directly after the 10- to 12-mm bud stage.

below). Figure 4 indicates the number of days from any bud diameter until open flower at temperatures ranging from 48 to 72° F. For example, a 3-mm bud takes 55 days to open at 48° F but only 20 days at 72° F.

Notice that buds grown at warmer temperatures do not get as large prior to opening as those grown at cooler temperatures. Thus, a bud grown at 72° F will typically reach 10 mm in diameter prior to opening, while a bud grown at 48° F will grow to 12 mm prior to opening. Also, remember that not all cultivars will flower at a constant 72° F. Most Sideshow and Cape Daisy cultivars can be finished at 72° F provided the plants were grown at 48-60° F temperatures for four weeks after pinch. The Crescendo series does not have any cold requirement.

Market Placement

We have demonstrated that many osteos will tolerate warmer conditions than perhaps many growers would expect. However, these plants may still cease to flower at hotter July and August temperatures. To deal with this, we have divided the Ultra Osteo selections into early and late season selections. The early season cultivars can be started during winter, finished early spring and marketed as spring patio plants.

In the Southeast, these cultivars perform quite well for the consumer when purchased in early spring (March) and placed outdoors on a porch or patio where they will continue to flower for several months.

The late season selections include the most heat-tolerant cultivars, such as the Crescendo series. These can be sold throughout the spring garden season and continue to flower for several months for the consumer.

The Ultra Osteo concept will help growers interested in streamlining production and reducing fuel costs. Increasing crop uniformity will help reduce the number of touches applied to the crop, and the bud meter will help to more precisely hit target market dates. Our work on the temperature responses of osteos allows growers to have more flexibility in maintaining greenhouse temperatures. Ultra Osteo do not need a precise vernalization period, so growers can have more flexibility managing their greenhouse temperatures, which should allow for improved fuel efficiencies. The bottom line is that the program helps growers maintain profitability in these competitive times. GPN

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Author's Note: The authors thank the Ecke Ranch for its support of this project. The complete list of Ultra Osteo selections will be available at the OFA Short Course.

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