

**Figure 1.**  
The influence of temperature and photoperiod on tuber formation in Yellow Royal Dahlietta dahlia.

Here's how to grow . . .

# Potted

by JENS BRØNDUM,  
ROYAL HEINS,  
and WILL CARLSON

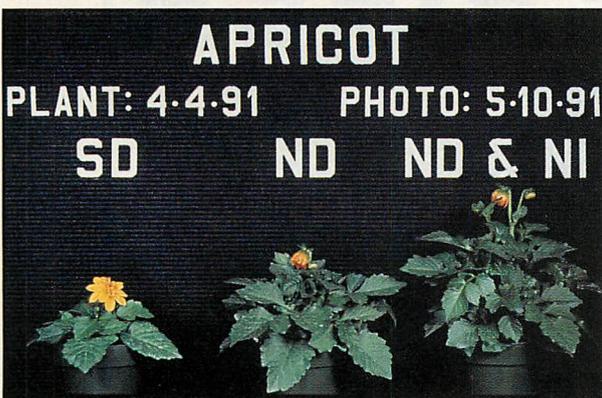
**D**AHLIAS are commercially grown from tubers or seed — but the seed type is more important as a bedding plant item. However, a market has opened up for dwarf-growing, vegetatively propagated dahlias sold as flowering potted plants.

We conducted a year-long study on the effects of photoperiod and temperature on the Royal Dahlietta dahlias from Royal Sluis. Currently, there are six cultivars in the Royal Dahlietta series (see sidebar). The following information is primarily based on results from our research which was conducted on the yellow cultivar.

## Focus On Photoperiod

Results from our trials on the yellow cultivar showed that photoperiod had a small effect on flower initiation and development. Plants flowered under photoperiods ranging from 10-24 hours of light per day. Although fastest flowering occurred on plants growing in 12- to 14-hour photoperiods, the difference between fastest flowering (12- to 14-hour photoperiods) and slowest flowering (24-hour photoperiods) was only 7 days at 70°F. Trials on the other cultivars show a greater flowering response to photoperiod but plants still flowered under long days.

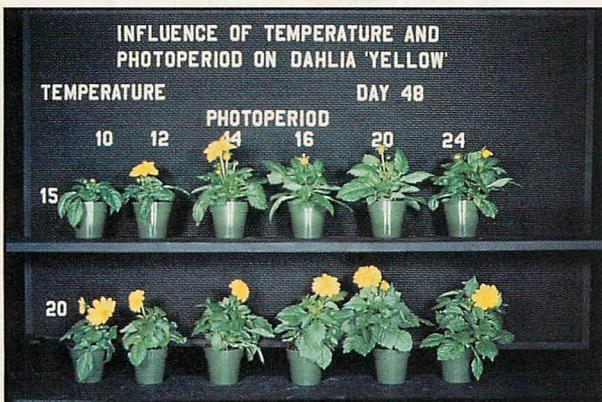
While photoperiod only has a small effect on flowering, it has a major influence on vegetative growth. Photoperiod influences tuber formation, plant height, and lateral branching. Figure 1 shows that short days (less than 12 hours of light) promote tuber formation on plants grown at temperatures of 68°F or less, while



**Figure 2.**  
The influence of short day (9 hours), natural day (11 hours), and natural day plus night lighting (14 hours) on Apricot Royal Dahlietta with mother leaves still on plant.



**Figure 3.**  
The influence of short day, natural day, and natural day plus night lighting on Apricot Royal Dahlietta with mother leaves removed.



**Figure 4.**  
The influence of temperature and photoperiod on Yellow Royal Dahlietta.

throughout the year, which is much faster than waiting for field stock to increase. However, this is an expensive process to set up and run, and it completely changes your production strategy.

One major problem is not all cultivars will remain stable in culture; mutations may be stable and become new cultivars, or revert completely or partially to the juvenile phase. Transplants must be culled rigorously to keep the line true-to-name. However, since the plants may have reverted to the juvenile phase, true mature leaf color may not be easy to determine.

In addition, tissue culture tends to disrupt the hosta's natural cycle. Such transplants often need chilling to initiate new growth, and without a cold treatment, potted plants may sit for up to 2 years without appreciable change.

Because of these problems, some customers have refused to buy tissue culture hostas, so before you invest in this process, check your markets for response. Of course, you can always use this technique to supply yourself with divisions for field planting.

#### Hostas In The Greenhouse

There are several ways hostas can be a money-maker in your greenhouse. You can play the role of finisher, taking the raw product (a bareroot hosta division) and adding value by potting and forcing growth, just as you would with chrysanthemum cuttings. In this case, all you need is a cool greenhouse with ambient light.

Supplemental lighting can speed growth somewhat and help develop leaf color, but chemicals or light regimes are not necessary. Hostas seem unresponsive to high levels of fertilization except in the poorest of soils or when very young.

Properly stored and chilled hosta divisions should be saleable 6-10 weeks after potting if the greenhouse is kept cool. Try to mimic the average outdoor May temperatures of USDA zone 5.

Don't expect much in the way of flowers from a first-year division; in fact, small plants look better with flowering scapes trimmed. It's important to remember hosta leaves are

permanent for a season and burnt edges will be obvious all summer. Yellow-leaved types are particularly susceptible to bleaching in sun. Few foliage diseases become problems if plants are given adequate ventilation.

Because hostas require such a cool greenhouse, you have another option. If you have empty space in fall and winter, consider turning down the heat and hardening off hosta transplants supplied by tissue culture or by another grower. By the time the

spring squeeze arrives, they can be put outdoors or underneath benches to initiate new growth. Hostas can be one of the first crops you ship out to eager buyers. Think creatively: There has to be a place in your schedule for an easy, reliable, low-labor, high-value plant like this!

**GG**

**About the author:** Dr. Anne Hanchek is an assistant professor in the Department of Horticultural Science, University of Minnesota, and an environmental horticulturist for the Minnesota Extension Service.

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# Royal Dahlietta Dahlias

long days (16 or more hours of light) inhibit tuber formation under all temperatures.

Short days also inhibit lateral shoot development and leaf expansion. Figures 2 and 3 show plant development under short days (9 hour days), natural days (about 14 hour days), and long days (natural day plus 4 hour night interruption). Plants grew much shorter and had little or no lateral shoot development under short days.

The reduction in lateral shoot formation under short days also reduced the number of secondary buds or flowers on the plant. Plants grown under short days (9-10 hours of light) will be short, excessively compact, will not branch, and will have a low flower bud number.

These three figures clearly show photoperiod is most important for controlling plant size and potential number of flowers, and is not critical for flower initiation.

## Temperature Tactics

Compared to photoperiod, temperature had a major effect on time to flower. Time to flower decreased as temperature increased up to an average daily temperature of 70°F. Flowering was not accelerated by temperatures above 70°F, but was progressively delayed.

There were some interesting interactions between temperature, photoperiod, and flowering. Flower "stalling" or abortion occurred above 70°F when plants were grown under long days (more than 16 hours). The flowers were also smaller above 70°F, and the flowers of certain cultivars, particularly the yellow, bronzed cultivar (see Figure 5).

Flowering did not occur above 80°-85°F. When temperatures were 65°F or less, plants were smaller because

more tubers were being formed. This was especially true if the photoperiod was less than 12 hours.

Therefore, an average daily temperature between 65° and 70°F with a 12- to 14-hour photoperiod will provide the best plant performance.

## Light Influence

The Royal Dahlietta dahlias are very sensitive to light quantity; low light causes poor flowering. Mid-winter plantings in Michigan require use of supplemental HPS lighting for satisfactory flowering (Figure 6).

When providing supplemental lighting, 400 footcandles for 14 hours per day centered during the daylight hours should provide adequate photosynthetic light for good plant qual-

ity, while simultaneously providing an optimal photoperiod for flowering.

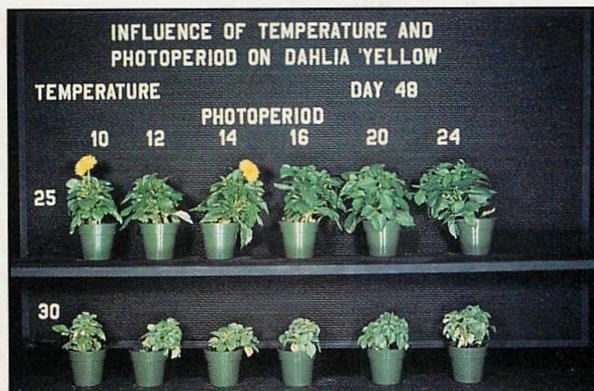
## More Helpful Tips

In addition to this information on temperature, light, and photoperiod, the following production information should be helpful:

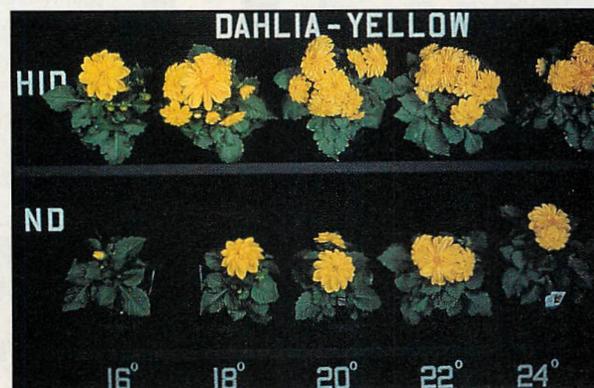
- Propagation of Royal Dahlietta dahlias is vegetative. They are sold as rooted plugs.

Plants should be transplanted deep; otherwise, the plants tend to fall over when they come into flower and the entire plant may snap off at the soil line. When planting, we have buried the first three leaves without problems. Deep planting is essential.

- Normally, pinching is not nec-



**Figure 5.**  
The influence of temperature and photoperiod on Yellow Royal Dahlietta.



**Figure 6.**  
The influence of high-intensity discharge (HID) lighting on Yellow Royal Dahlietta.

## A Share Of The Market

Currently, there are six cultivars in the Royal Dahlietta series. They are sold by color.

Colors and market share for each are:

- Violet — 15%
- Scarlet — 30%
- White — 10%
- Apricot — 10%
- Yellow — 20%
- Orange — 15%

essary in a 4- or 4½-inch pot. However, if you are producing a crop in 5-inch or larger pots, we recommend pinching, even though it delays flowering about 1 week compared to non-pinched plants.

- Keep pH between 5.8 and 6.2 and EC (electroconductivity) readings between 0.5 and 0.8 when using a 2:1 soil test.

- Maintain temperatures at 65°-70°F and photoperiods between 12-14 hours.

- The center or first bud can be removed to promote lateral flower

bud development, especially in non-pinched plants. This center bud removal on dahlia is comparable to center bud removal on spray chrysanthemums. Flowering will be delayed 5-7 days, but plants will have more blooms when they do flower.

- Plants are sensitive to aphids, thrips, and whiteflies. Do not use Dursban and Vydate for control, since growers have reported phytotoxicity with these chemicals.

- Royal Dahliettas are susceptible to Pythium, especially when plants are exposed to temperatures above 70°F. Apply fungicides as a drench shortly after potting.

### How To Grow Royal Dahliettas

The fastest schedule: Grow non-pinched plants at 68°F with 12-14 hours of light. Supplement with a minimum of 400 footcandles during low light production periods of the year. The time from planting to flower should be 5-6 weeks depending on temperature; if the center bud is removed, add 1 week to the schedule.

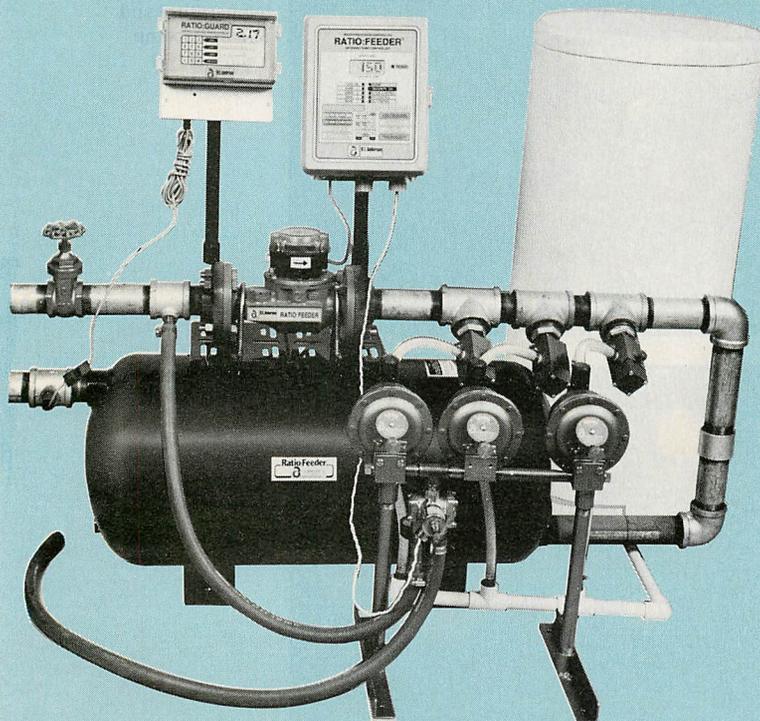
For larger plants in 4½-inch pots, grow plants under daylengths longer than 14 hours at 70°F for 2-3 weeks. Pinch plants to four nodes about 1 week before the long days end. Finish the crop at 68°F under 10- to 11½-hour photoperiods. Supplement with 400 footcandles light during the day during low light production periods. Total time to flower will be 6-8 weeks.

This schedule will promote lateral shoot formation on the mother cutting prior to pinch and will inhibit lateral formation on the lateral shoots developing from the mother plant. A balanced, compact plant will be produced. Center bud removal is not necessary or recommended.

With this cultural information, you should be able to produce quality Dahliettas year round as an interesting potted plant. **GG**

**About the authors:** Jens Brondum was a visiting scholar from Denmark; Drs. Royal Heins and Will Carlson are professors, Department of Horticulture, Michigan State University, East Lansing, MI 48824. This research project was funded by Royal Sluis.

## Stop fooling around with old-fashioned injectors!

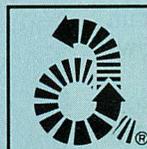


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