

Producing  
Ravishing

# Ranunculus

*University of Alaska-Fairbanks research on ranunculus varieties reveals the best production guidelines for this increasingly popular crop.*

**By Meriam Karlsson**

**R**anunculus (*Ranunculus asiaticus L.*), with the common name Persian buttercup, has primarily been produced as a field-grown cut flower, thanks to extensive breeding work in England during the 19th century that resulted in more than 500 varieties. These early, corm-propagated varieties grew at least three feet tall, making them suitable as cut flowers. In the 1960s and 1970s, efforts were intensified to develop seed-propagated ranunculus. Plants with dwarf growth habits were also singled out during the breeding process to identify suitable seed-propagated selections for bedding and potted plant markets.

In 1983, Sakata Seed America, Morgan Hill, Calif., introduced the seed-propagated F1 hybrid series Bloomingdale. The growth habit of the Bloomingdale series is particularly dwarf, with plant heights of 8-10 inches, and leaf size is reduced to complement the proportionally smaller plant. Since the Bloomingdale series tolerates temperatures as low as 23° F, winter plantings are suitable in regions with mild climates. Short and sturdy stems efficiently support the up to 3-inch-large, double flowers. The Bloomingdale series was originally available in Red, Rose, Pink, Yellow and White Shades. Additional colors have continuously been developed, and today, the assortment includes 14 shades, bicolors and mixtures. The most recently introduced color choices are bicolors and shades in deep purple.

#### CURRENT RECOMMENDATIONS

The size of Bloomingdale seed is 37,000 per ounce. To germinate the seed, a medium high in organic matter or a mixture of 30 percent peat and 70 percent perlite is suitable. Cover the seed with a thin layer of medium since light is not required for germination. Never allow the medium and germinating seeds to dry out. Recommended temperature for germination is 50-60° F; avoid temperatures above 68° F at all times. Germination is expected to take 10-14 days. Even under proper temperature and

*'Bloomingdale Pure Yellow'* (All photos courtesy of Jeff Werner, University of Alaska)



## crop cultivation

moisture conditions, germination may be slow, sporadic and uneven. When 4-5 true leaves have developed, approximately eight weeks from seeding, transplant one seedling per 4-inch pot or 2-3 seedlings into 5-inch pots. Fertilizer applications are necessary early in development, although the medium should remain low in soluble salts. Growth is often slow

immediately following transplant and regular fertigation with a complete fertilizer is necessary for good plant establishment.

Although flowering has been observed at a range of day/night combinations, 60-68° F has been recommended during the day. Dropping the night temperature to between 45 and 50° F may improve flower bud development.

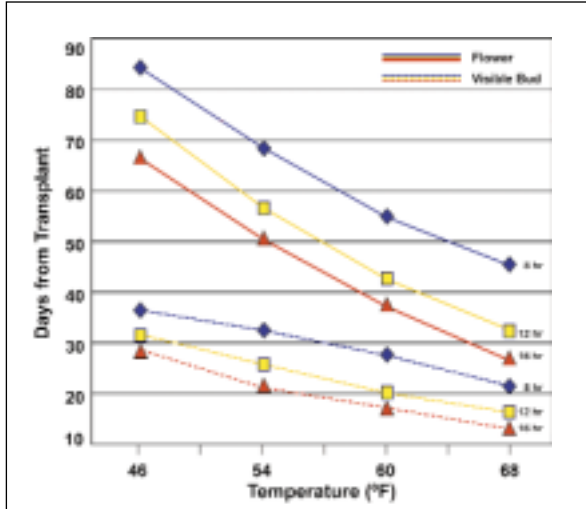


Figure 1. Days from transplant to flower buds (½-inch-large bud) and flowering.

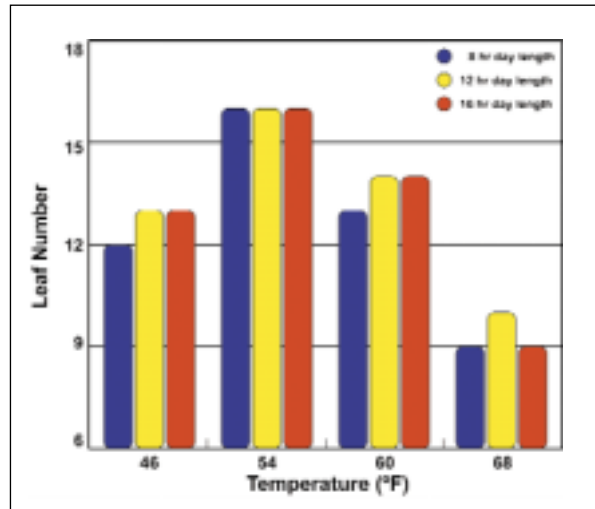


Figure 2. Number of fully developed leaves at flowering.

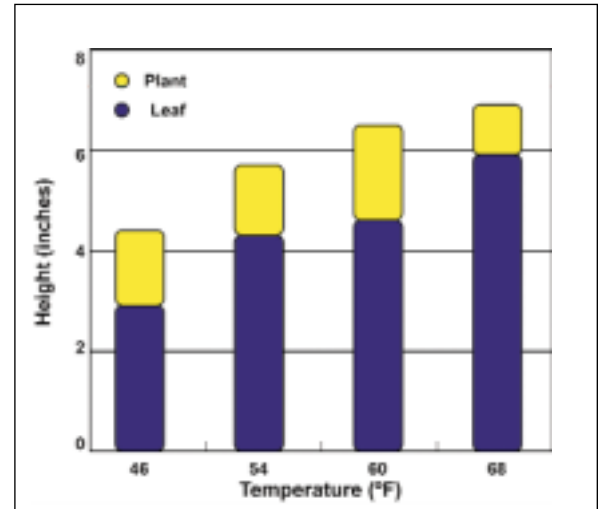


Figure 3. Height to the top of the plant and the uppermost point of the foliage (leaf height). (All charts courtesy of Jeff Werner, University of Alaska)



Excessive leaf and stem growth combined with few and small flowers are expected at temperatures above 68° F. The irradiance can be relatively high as long as temperatures are controlled. Instantaneous levels of up to 3,500 foot-candles ( $700 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ ) are suitable prior to flowering and 2,500 foot-candles ( $500 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ ) during flowering. Ranunculus is commonly produced under natural short days. Days longer than 12 hours are indicated to reduce the number of flowers and flowering plants. Earlier selections of ranunculus respond to long days with corm formation, reduced growth and dormancy.

### CONDITIONS OF THE STUDY

Current recommendations and guidelines for production are primarily based on corm-propagated ranunculus. The cultivar 'Bloomingdale Pure Yellow' was, therefore, grown under various temperatures and daylengths to determine suitable conditions for seed-propagated dwarf ranunculus. Germination and early seedling development occurred at 60° F. Light was turned on after two weeks at approximately 500 foot-candles ( $100 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ ) for 16 hours each day. The seedlings were transplanted six weeks after seeding into 4-inch pots that had been filled with a peat-lite medium. Throughout the study, the plants were watered using a fertilizer solution of 100 ppm nitrogen from a complete fertilizer amended with micronutrients. The 12 growing environments were 46, 54, 60 or 68° F with daylengths of eight, 12 or 16 hours. Plants were moved to the different conditions eight weeks after seeding. To get similar daily amounts of light, the instantaneous

levels were adjusted to 2,000 foot-candles ( $400 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ ) during the 8-hour day, 1,400 foot-candles ( $280 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ ) during the 12-hour day and 1,000 foot-candles ( $200 \mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$ ) during the 16-hour day. These light levels correspond to approximately  $12 \text{ mol}\cdot\text{day}^{-1}\cdot\text{m}^{-2}$ . In a

Midwestern United States glass greenhouse,  $12 \text{ mol}\cdot\text{day}^{-1}\cdot\text{m}^{-2}$  is expected at bench level during a cloudy summer day.

In ranunculus, the flower buds form close to the ground in the rosette of leaves. The flower stems extend during bud development to display the flowers above the foliage. Visible bud is used here to

indicate the first appearance of flower buds (approximately 1/8-inch-large bud) and flowering as the initial opening of the flowers.

### FINDINGS AND RESULTS

Temperature and daylength affected both the formation and

the development of flower buds. Visible bud and flowering were faster at longer days or higher temperatures (See Figure 1, page 46). At 68° F and 16-hour days, flower buds appeared 13 days from transplant. Two weeks later, these plants flowered. Visible bud, at 46° F and 16-hour daylengths, was observed after 29 days and flowering after 66 days. Increasing the day length from 8 to 12 hours reduced the required time for plant development more than four hours, from 12-16 hours. Flowering was 10-13



days earlier at days of 12 hours than eight hours. At 16 hours of daily light, flower time was only reduced 6-8 days compared to 12-hour days.

In this study, plants had 9-16 mature leaves at flowering (See Figure 2, page 46). The least number of leaves developed at 68° F and the most at 54° F. Ranunculus grown at 46° F or 60° F had between 12 and 14 leaves. Daylength had no effect on leaf number, and the timing of flower formation could not be correlated to any specific number of initiated leaves.

The tallest point, usually to the top of the flowers (plant height), and the distance between the soil and the upper level of the foliage (leaf height) increased with longer days and higher temperatures. The increase in plant height was similar as temperature increased at the three daylengths. Figure 3, page 46, illustrates leaf and plant heights under 12-hour days. The height to the top of the leaves increased from 2.9 inches at 46° F to 5.9 inches at 68° F, and the plant height from 4.3 to seven inches.

### CONCLUSIONS AND RECOMMENDATIONS

A few small flowers are expected to develop on tall plants at high temperatures and long days. This study was terminated at the opening of the first flower without opportunities to record total flowers per plant. Observations suggest that you can expect more and larger flowers with improved longevity at lower temperatures.

High temperatures promoted fast growth and flowering but were less favorable for plant

height and flower numbers. When temperature cannot be maintained below 60° F, a growth regulator may be needed to manage stem elongation. A B-Nine (daminozide) foliar spray at 2,500 ppm applied at initial appearance of flower buds effectively controls height of ranunculus.

Another control measure for height is DIF, or the relationship between day and night temperatures. Although earlier recommendations suggest lowering the night temperature for a positive DIF, constant temperatures satisfactorily supported flower bud development here. Further studies are required to determine the impact of alternating temperatures, especially higher night than day temperatures or negative DIF, on the development of flower buds, leaf formation and plant height. A possible schedule for producing short, high-quality and fast-growing ranunculus as bedding plants is an average temperature of 60° F with a negative DIF. Temperatures of 58° F day and 64° F night for a negative 6° F DIF at daylengths of 12 hours can potentially be recommended as a suitable temperature strategy for ranunculus production. <sup>[GPN]</sup>

*Meriam Karlsson is professor of horticulture at the University of Alaska-Fairbanks. She may be reached by phone at (907) 474-7005 or E-mail at [ffmgk@uaf.edu](mailto:ffmgk@uaf.edu).*



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