

PREMATURE BUDDING OF GARDEN MUM STOCK PLANTS

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Many valuable cultivars of garden mums may soon be discarded. They are known as "budders." This means that they form buds during the early spring months when large numbers of vegetative cuttings are required for propagation. If this problem can be averted, these cultivars may continue to be grown.

These unwanted buds form in spite of short night conditions. The usual 10 p. m. to 2 a. m. mum light program, flashlighting, and even all-night continuous lighting have proven ineffective in preventing bud initiation in some cultivars.

Temperature oscillation is one tentative explanation circulated among mum propagators. When days are unusually warm, it is thought that night temperature should not be allowed to drop to less than 20^oF below the day temperature.

This was tested in a preliminary experiment. Five chrysanthemum cultivars, 'Ruby Mound,' 'Purple Waters,' 'Lipstick,' 'Muted Sunshine' and 'Minn Yellow,' were planted in 4" pots on December 16. They were maintained in a greenhouse at three night temperatures and 70^o during the day except on sunny days when the temperature rose to 75-80^oF.

Rooted cuttings of the five chrysanthemum cultivars were supplied through the courtesy of Stafford Conservatories, Stafford Springs, Connecticut.

These temperature occurred on an estimated 12-15 occasions after differential temperature treatments were begun on December 31 and before termination on February 27.

Five varieties with three replications were then subjected to the following temperature and watering regimes beginning on December 31.

Greenhouse

- 60° day, 60° night--never allowed to become dry
- 60° day, 60° night--allowed to dry occasionally
- 60° day, 50° night--wet
- 60° day, 50° night--dry
- 60° day, 40° night--wet
- 60° day, 40° night--dry

Growth Chamber

- 70° day, 60° night--watering, wet but occasionally dry

All groups in the greenhouse were given four hours of incandescent light from 10 p.m. to 2 a.m. at ca 4 lamp watts per square foot.

The soil was 3 (composted fine sandy loam): 2 (sphagnum peat): 1 (sand) amended with 6 lbs. dolomitic limestone (to adjust pH to ca 6.5), 5 lbs. 0-20-0 and 4 lbs. Osmocote 14-14-14 per cubic yard. Plants in the greenhouse were fertilized three times with 19-4-24 at 350 ppm N. Those in the growth chamber were not fertilized but grew larger than those in the greenhouse while showing no nutrient insufficiency (at termination, nitrogen levels were very low).

Observation and Results

Moving plants to 40°F each night severely retarded growth (Figure 1). Some showed chlorosis. This was typical of mum plants that have root action impaired by any of many factors such as waterlogging of soil, ammonium toxicity or excessive soluble salts. 'Ruby Mound' set crown buds but since the plants were severely stressed, the budding can hardly be attributed to the temperature oscillation alone.

The 50°F night temperature did not depress growth as much as expected (Figure 2). Excluding 'Minn Yellow,' which grew poorly and was self-branching, the 50°F group produced 80% as many shoots long enough to be pinched by February 19 as the 60°F group. The plants were only a bit



Figure 1. Garden mums grown at 40° nights, 65-80° days, grew poorly and some were chlorotic.



Figure 2. Garden mums grown at 50° nights, 65-80° days, grew nearly as well as those at 60° nights.

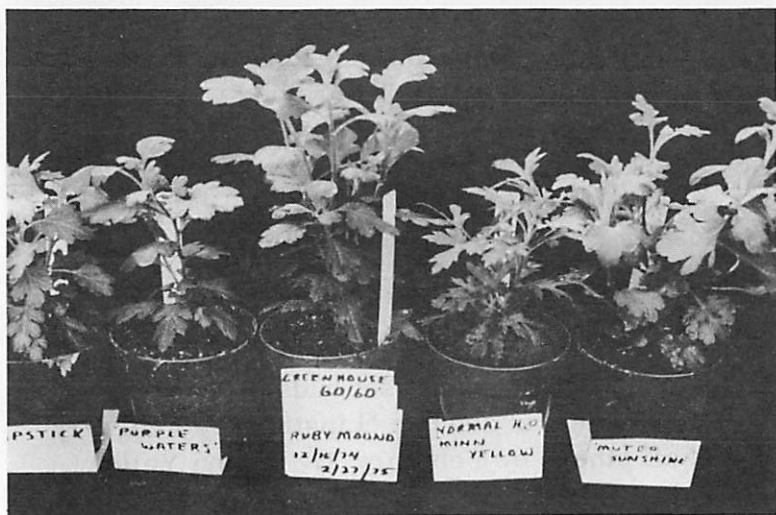


Figure 3. Garden mums grown at 60° nights, 65-80° days.

smaller than those grown at 60° (Figure 3). Even so, only one plant of 'Muted Sunshine' (out of the 30 plants at 50°F) was partially budded at termination on February 27. Growing at 50°F nights and 70-80°F days did not prompt initiation of buds.

These three temperature treatments were duplicated but the plants were allowed to dry out a bit more. This was not successful. Without sufficient water, many of the cuttings failed to grow properly. As they grew larger, it was difficult to water the wilting ones without getting some water on others. But even so, some bud formation was prompted by this treatment.

With anticipation that positive results would be obtained with temperature oscillation treatments in the greenhouse, a set of control plants was placed in a growth chamber. The temperature was controlled at 60°F for eight hours, 70°F for 16 hours during which 40 lamp-watts fluorescent plus 20 lamp-watts incandescent light were supplied per square foot. To provide water, a Vattex pad* was installed with one end dipping into a reservoir which was filled every 2 to 3 days. As the plants grew larger, capillarity was lost on several occasions and the pots became quite dry.

The plants in the growth chamber all set buds (Figure 4). 'Ruby Mound' set buds by February 8, 'Purple Waters' and one 'Lipstick' by February 12 and all others by February 27. 'Minn Yellow'

*Supplied through courtesy of Vattex Corp.,
Center Moriches, New York



Figure 4. Garden mums in a growth chamber set buds, presumably because of occasional water stress.

(which grew slowly and branched without pinching) was placed in the greenhouse and showed buds a week later.

Since an 8-hour night should be sufficiently short to prevent flower bud formation and nutrition was apparently sufficient (with no leaching), the most logical conclusion is that periodic water stress prompted bud set. This appears to agree with the consensus of colleagues that less than optimum growing conditions prompt crown bud formation in mums. Cultivars such as these are possibly more prone to trigger whatever mechanism is responsible for this response. It therefore seems probable that these cultivars might be retained by commercial propagators provided that all due attention is provided to assure as little exposure as possible to any physiological stress, particularly drying out.