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# Garden Mums: Crown Buds Induced by Cool Night Temperatures

*Fall garden mum production typically occurs outdoors exposing plants to seasonal environmental conditions. When plants are exposed to several nights of <math> < 60 \text{ }^\circ\text{F}< /math> (<math> < 15.5 \text{ }^\circ\text{C}< /math>), premature bud formation or crown buds can be induced.*

As spring 2021 comes to an end, it is time that we start thinking about challenges that may arise during summer production of fall flowering garden mums (*Chrysanthemum x morifolium*). Fall garden mums are often grown outdoors unprotected and exposed to seasonal environmental conditions (Fig. 1). Growers usually rely on natural daylength (photoperiod) and temperature to control crop timing throughout the production cycle. This is important because garden mums are short-day plants which means flower initiation and bud development occurs rapidly when the day length is short, and nights are long. However, temperature interacts with photoperiod, and can have a greater influence on flower initiation and bud development in mums, and this is where challenges can arise.



Figure 1. Fall garden mums (*Chrysanthemum x morifolium*) are often grown outdoors unprotected and exposed to seasonal environmental conditions. Photo by: W. Garrett Owen

A common challenge among fall garden mums that I often encounter on grower visits is the undesirable premature bud formation or crown buds (Figs. 2 and 3). Crown buds are often induced when nighttime temperatures fall below 60 °F (15.5 °C) for several consecutive nights. One cool night will likely not induce crown bud formation. Exposure to cool nighttime temperatures triggers flower bud initiation and ceases the vegetative growth

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Figure 2. Crown buds in an outdoor garden mum (*Chrysanthemum x morifolium*) production. Photos by: W. Garrett Owen

phase (Fig. 4). As a response, mums with often have fewer nodes and leaves, and finish small. However, abiotic stresses such as inadequate irrigation and fertility can also induce premature bud formation in fall garden mums. Growers should ensure that the crop is irrigated as needed and supplied with adequate nutrition of 150 to 250 ppm nitrogen during the vegetative phase. For more information about fall garden mum nutrition, refer to the [e-GRO Nutritional Monitoring](#) factsheet for [fall garden mums](#).

If crown budding occurs, unfortunately there is no corrective procedure. Growers must be proactive early in the production cycle to prevent early onset of flower buds, especially if unseasonably cool weather is predicted. [Guidelines](#) developed by Heins (2013) reported use of ethephon (Florel or Collate) sprays early in production to delay flowering. Before applying any chemicals, read the label and conduct in-house trials to achieve the desired response and to ensure no phytotoxicity occurs.





Figure 3. Crown buds in an outdoor garden mum (*Chrysanthemum x morifolium*) production. Photos by: W. Garrett Owen.



Figure 4. Example of crown bud (left) excised from an outdoor garden mum (*Chrysanthemum x morifolium*) exposed to several cool nights compared to an excised branch (right) of a garden mum grown under protection. Photo by: W. Garrett Owen.

### Guidelines when using ethephon on garden mums to prevent crown buds:

1. A spray application rate of 500 ppm ethephon is recommended. Adjust spray water to a pH of 5.0 before adding the ethephon and add a surfactant if the solution runs off the foliage.
2. Apply the first ethephon treatment about 10 to 12 days after transplanting cuttings. It is important that the cutting has sufficiently rooted into the container.
3. Repeat 7 to 14 days after pinch. Earlier applications (at 7 days after pinch) were found to be more important when plants were exposed to cool nighttime temperatures following pinching.

If these guidelines are followed, the number of ethephon spray applications will be dependent on the container size. According to Heins (2013), mums grown in 6-inch containers need one application before pinch; 8-inch containers require an application before and after pinch; and larger containers require an application before pinch and two applications after pinch. To prevent delayed flowering, make sure the last ethephon spray application is made 8 to 9 weeks before the desired ship week.

Finally, pinching the crop or removing crown buds will delay flowering, and the crop likely will not become sufficiently revegetated to create a nice round growth pattern. If pinching is attempted, be sure to pinch low enough so that only multi-lobed vegetative leaves remain for new shoot development (removing all the single lobed reproductive leaves).

### Literature Cited

Heins, R. 2013. The Doctor Is In! - Prevent Premature Budding with Florel. GrowerTalks. Posted 24 May 2013. <https://www.growertalks.com/Article/?articleid=20023>

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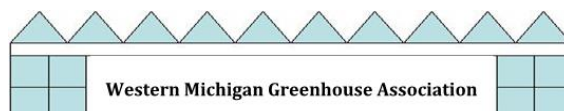
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