By Erik Runkle

MICHIGAN STATE UNIVERSITY EXTENSION FLORICULTURE TEAM

Dealing with High Temperatures

Demand for some cold-tolerant floriculture crops continues well into spring, which can make production of high-quality plants difficult when the weather gets warm. Cold-tolerant crops, also sometimes called cool-season crops, have a low base temperature, which means they develop at relatively low temperatures (40° F or lower). Another common characteristic of these crops is they have a relatively low "optimum" temperature, which is the temperature at which development (flowering) is most rapid. Many of these crops have an optimum of 65 to 70° F, and at higher temperatures, flowering is delayed. In addition, flower size is often reduced at high temperatures.

Figure 1 (above). On some crops such as alyssum, high temperatures can cause lower-leaf yellowing and a decline in crop quality. Figure 2 (right). Ivy geranium leaves can become bleached when grown at high temperatures.

What Crops Are Most Susceptible?

At some point, all crops can suffer from heat stress. Some of the most common crops that display heat-stress symptoms at moderate temperatures include (but are not limited to) alyssum, cyclamen, ivy geranium, nemesia, osteospermum, pansy, primrose, ranunculus and schizanthus. Even crops that tolerate high temperature well can still have fewer and smaller flowers, especially when excessive shading is used to help moderate greenhouse temperature.

Recognizing the Symptoms

Some of the most common heat-stress symptoms on ornamentals include lower-leaf yellowing, thin and elongated growth, delayed flowering and small flower size. These problems can be exasperated by excessive shading; the combination of high temperature and low light can lead to low-quality crops. Some specific high-temperature symptoms are listed below.

- Alyssum, primula and ranunculus: Leaves turn yellow, especially towards the bottom (Figure 1).
- Chrysanthemum: Flowering is delayed, particularly when the night temperature is high (>85° F).
- Ivy geranium: Leaves become partially or entirely bleached (Figure 2).
- Poinsettia: Leaves become elongated and "strappy" and shoots develop without axillary buds (blind shoots).
- Many crops: Although not obvious, many crops have reduced rooting when the media is kept too warm. Much of this is because a smaller root system is needed to support a smaller, less-developed shoot system that develops at high temperatures.

What Can Be Done?

Obviously, the best corrective strategy is to deliver lower temperatures, but that can be difficult when outdoor temperatures are high. When possible, grow cold-tolerant crops in a different section or greenhouse than cold-sensitive crops. Too often, I see cold-tolerant crops like ivy geranium and alyssum growing next to cold-sensitive crops like angelonia and vinca. These two types of crops are just not compatible.

When outdoor temperatures are high, ensure all of the ventilation systems are working properly (vents fully open, all fans operational, misting or pad systems are working and are not clogged, etc.) Crops can be shaded to help reduce temperature rise in the greenhouse, but generally avoid more than 40 percent shade. Whitewash on the glazing can work better than internal shading systems since solar radiation can be reflected before it enters the greenhouse. Sometimes a quick walk through the greenhouse just to look at fans, vents and shading systems can open your eyes to problems that need to be addressed. g

Erik Runkle is associate professor and floriculture extension specialist in Michigan State University's department of horticulture. He can be reached at runkleer@msu.edu or 517.355.5191 ext. 1350.