Overwintering Containerized Perennials

Tina M. Smith, Extension Floriculture Specialist, Amherst, Massachusetts

Introduction

There are several production strategies used to grow herbaceous perennials. The simplest method involves purchasing plugs and/or small cold-treated plants and potting them up in late winter or early spring for late spring sales. While the cost to the producer for plants is high, the expenses associated with overwintering, heating, watering, and pesticides are lessened. In addition, there is little risk of plant loss.

Another strategy involves planting one year old plants in 1 to 3 gallon containers in September or early October. These plants establish their root system in the fall, and then are overwintered in protective structures for early spring sales. The plants usually cost less than the spring planting method, but costs of overwintering and plant losses are incurred. The advantage here is that the producer may have more time in the fall than in the spring.

Some growers like to control their source of plants and produce perennials from propagation to finishing. This requires skill in growing as well as overwintering. Because plants are purchased when small, costs are controlled to greater extent by the finished plant producer.

If the method you choose involves overwintering container perennials, then the following article may be helpful to you.

Cold Hardiness

Unlike field grown plants, container-grown plants cannot take advantage of the temperature buffering effect of the soil. Roots are much less cold-hardy than the shoots. Since most roots of plants growing in containers tend to spiral around the inside wall of the container, the only insulation these roots have is the thin wall of plastic. Research in Oklahoma has shown that the temperature of the root ball in an unprotected container can approach that of the ambient air. These colder root zone temperatures increase the probability of cold temperature injury to roots of plants otherwise considered hardy when grown in the field. Therefore, winter protection of container plants is essential to their survival.

The key to overwintering is keeping the plants cold and alive but not actively growing. The degree of winter protection should be based on the expected minimum temperatures at a particular site and the root hardiness (the lowest temperature at which roots survive) of species being grown. Unfortunately, root and crown hardiness has not been clearly identified for most herbaceous perennial plants by researchers. Most of the current information is based on limited grower experience. As a result, most growers provide more protection to plants than is necessary. Until root hardiness is identified, growers have no choice but to apply methods to avoid losses of plants.

Massachusetts has six hardiness zones representing a wide range of temperatures. As a result, growers here use many different methods for covering or overwintering herbaceous perennials in containers.

Preparing Plants for Winter

Successful overwintering begins when plants are potted. Perennials should be potted up and allowed to establish themselves for several weeks prior to overwintering. Most potting takes place by early October to establish the plants by early November. With the onset of cold weather, top growth dies back on many perennials while others, such as *Iberis sempervirens*, and *Dianthus*, have above ground plant parts which overwinter. Dying plant debris should be removed prior to overwintering to prevent botrytis infection.

The next step is to water everything well, but let the foliage dry prior to covering. Watering is important because water is being used as a source of heat. Liquid

water has a temperature above 32°F and when it freezes it gives off heat. Therefore, we are using water as a source of heat because we know that dry soil freezes much quicker than wet soil. In an unheated polyhouse, watering may be needed as often as once every two weeks while ground beds covered with microfilm usually don't need watering. Regardless of the method of overwintering, if possible, soil moisture should be checked periodically.

Soil temperatures should be in a range of 30° to 34°F for most perennials. Temperatures cooler than 30°F may kill some sensitive species. Use a soil thermometer to verify that plants are in this range. Fluctuations always occur during the winter. If the temperatures warm up for several days above 40°F then ventilation should be provided.

The final step prior to covering plants is to provide some type of rodent control. Many growers use commercially available baits while others have reported that human hair or cut up deodorant soap works for them.

Thermal Blankets

One of the simplest techniques growers have been using recently is called the thermal blanket. Containerized herbaceous perennials that are ready for storage can be placed pot to pot in an upright position and simply covered with a material having insulating qualities. Tall plants can be leaned over just like laying shingles, exposing as much foliage as possible to light. Coverings are usually secured by tucking the edges underneath the containers or by weighing down the edges with heavy objects such as crushed stone or rocks. Two common covering materials are Microfoam and Polyfoam. The thermal blanket sheets should be oriented in a north-south direction. With some thermal blankets, sheets of white polyethylene plastic are placed over the blanket; other types do not need this extra layer of plastic. Follow the manufacturer's recommendation. At the end of the winter season, store thermal blankets in a dark area so they will last two or more years. Research at North Carolina found that thermal blankets provided winter protection comparable to more conventional practices such as laying sheets of polypropylene over the plants. With all plants tested, the thermal blanket resulted in less than 25% foliar necrosis.

Thermal blanket systems are relatively inexpensive as compared to other methods of winter protection. They also trap and contain moisture sufficiently to eliminate the need for supplemental irrigation during the winter. However, problems under the blankets are difficult to detect because the blankets are opaque. Also, containers stored under polyblanket systems tend to warm prematurely during winter thaws or near the end of the storage period. Warming may result in shoot growth that can be injured by the return of freezing temperatures. Therefore, venting may be advisable during unexpected periods of warm winter weather. Finally, thermal blankets are usually so tight in respect to air exchange that ventilation is practically non-existent. In areas where 3 to 4 months of cover are required, growers must be concerned with the possible development of molds and decay.

Quonset Polyhouses and Polyhuts

The most common technique for overwintering plants is the quonset style polyhouse. These structures are usually constructed with wooden frames to which uniformly bent galvanized pipes are attached. The pipe provides the basic structure that supports one or two (air-inflated) layers of polyethylene that are secured to the wooden baseboards to which the bows are also secured. Under average conditions, temperatures within these structures do not reach levels that result in injury to plants that are stored inside. However, during extended periods of extreme cold (more than two consecutive nights when ambient temperatures go below 0°F), plant injury may occur.

To provide added protection, an additional layer of plastic or a thermal blanket can be placed immediately over the plants in a polystructure. This technique can create a microclimate in the immediate vicinity of the plants that is 8° to 10°F warmer than air above the blanket inside of the structure. Currently, it is recommended that the poly or thermal blanket be placed over the plants only for the duration of the extremely low temperatures so as to avoid excessive moisture buildup in the container environment. Placing a layer of bagged leaves around the outside of the

overwintering house will add an extra amount of insulation to the root area. Some growers have furnaces in their polyhouses for those extreme cold periods. One grower I spoke with sets his thermostat at 28°F and fans at 34°F with good results.

The process of taking the cover off the structure in spring is critical if plant injury is to be avoided. Gradual removal of the cover in February and March is suggested. First doors and windows are opened, then small vents are cut into the ridge of the cover. Later the vents are enlarged, and finally the cover is removed in late March to April.

Plants, especially those with foliage on them, must be checked frequently for outbreaks of botrytis and sprayed with a fungicide as needed. *Phlox subulata* and *Myosotis* spp. are especially vulnerable to rotting. The best structures are those that are large enough to easily check and treat plants.

Quonset style polyethylene structures are a rather expensive alternative if one considers only the initial construction costs. However, well-constructed frames and bows will last ten or more years before any major renovations are needed. In addition, thousands of plants can be covered with plastic in a matter of hours. For large operations, this offers considerable efficiency as compared to other methods of overwintering. Finally, these structures allow the grower to inspect plants and to remedy any problems that may be noted.

Plants which are considered marginally hardy when grown in containers should get additional protection with poly or thermal blankets or a heater inside the structure. An entirely different technique such as the plastic-straw-plastic cover is described later in this article. For structures with two layers of covering, growers use white polyethylene for the outer layer and clear or white for the inner layer. This will help control the amount of light and heat in the structure. Even so, plants in houses covered with white plastic can begin to grow too early during periods of unusually warm weather. To avoid premature budbreak, orient the polyhouse in a north-south direction. North-south oriented polyhouses tend to be cooler than east-west oriented structures. If more than one type of plant is to be overwintered in the same structure, place the most cold-hardy types near the walls. This is the coldest part of the polyhouse. Plants should be spaced pot to pot to keep the temperature around the root ball from dropping below the level which would kill the roots.

Polyhuts are similar to polyhouses except they are usually only about 30 inches high and 4 to 6 feet wide. As with polyhouses, the plants should be spaced as close together as possible. Sometimes, the containers are stacked in two or more layers for space conservation as well as protection from cold temperatures. Unlike polyhouses, it is usually not feasible to water plants in polyhuts at frequent intervals, so the plants must be well-watered before laying the covering over the structure. As with polyhouses, place baits throughout the polyhut for protection against damage by rodents which would feed on the plants during the winter. Once the foliage is dry after applying water, cover the polyhut with white polyethylene plastic.

In the late winter or early spring when the days are sunny, you will need to provide ventilation for the plants and reduce the humidity under the plastic covering. With polyhouses, the end walls are often opened or rolled back to let cool air into the structure. If the structure has a door at each end, these may be used for ventilation. However, place a sheet of plywood over the lower half of the doorway. This will prevent cold, drying air currents from moving through the structure at plant height. A two-piece door which allows the top half to be opened while the bottom half remains closed is another way to minimize movement of cold, drying air through the plants. As the days begin to warm up, many growers provide ventilation to polyhouses and polyhuts by making three cuts in the plastic at about right angles to each other. Then the plastic flap is rolled back and secured with duct tape. If a drop in temperature is expected, the flap can be unrolled and sealed with duct tape.

Plastic-Straw-Plastic Covering

Some growers successfully use layers of plastic and straw for plants that have root systems usually sensitive to cold temperatures. A framing system of either

inexpensive lumber or wire is built over the beds in which the container plants have been placed. One layer of inexpensive clear plastic is draped over the structure to completely cover the plants. A 4 to 6 inch layer of straw is then placed over the first sheet of plastic which, in turn, is covered by a second sheet of white plastic.

The advantage of this type of system is that it provides the greatest degree of thermal protection of any of the unheated systems. Since the insulative barrier is suspended above the plants, an air space is provided above the plants which helps to minimize the development of molds. Plants are so well insulated that warming of plants at the end of the winter is delayed.

One disadvantage of this system is that growers cannot see inside and another is that a great deal of labor is involved in the set up and take down, making it more expensive. Growers would best use this system for their most cold sensitive species.

Other Methods

A variety of other techniques have been utilized to protect containerized herbaceous perennials during winter including covered cold frames, earthen pits, sunken frames, root cellars, barns and sheds, evergreen boughs and deep snow. Any measure that protects the plants adequately and is reasonable in an economic sense merits attention.

Timing

Most containerized perennials are covered as late in the season as weather permits. It is not uncommon to see plants being covered in late November or early December.

Just as it is impossible to determine the best possible date for covering perennials across the state, it is impossible to identify an exact date for uncovering them because of varying weather conditions each year. The goal is to obtain a compromise between preventing premature shoot growth and ensuring that unusually cold weather that can occur in late winter and early spring does not kill or injure plants. Protected plants must be inspected frequently to ensure that shoot growth is not initiated. If any signs of such activity are evident, the storage environment should be vented to introduce cool air into the system to slow plant development. Many growers will cut large holes in the sides of poly structures to facilitate ventilation. The remaining poly is left in place to provide some protection if necessary. Those using thermal blankets will roll covering back but will keep them handy in case needed.

References

Good, G. L. 1986. Implications of cold hardiness in the production and use of herbaceous perennials. Proc. 1986 Perennial Plant Symposium, Columbus, Ohio.

Gouin, F. 1983. Utilizing thermo-blankets in overwintering. Proc. 1983 Herbaceous Perennial Symposium, Columbus, Ohio.

1987 Cornell Guidelines for Production of Herbaceous Perennials for New York State.

Nau, J. 1987. A perennial primer. GrowerTalks. October issue.

Reprinted from University of Massachusetts Cooperative Extension System Floral Notes, September-October 1993, Volume 6, No. 2.