

Coldframes and Hotbeds

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Coldframes and hotbeds are perfect for gardeners and growers who want to extend or get a jump on the growing season. Find out how to build your own.

Coldframes and hotbeds are mini-greenhouses in that both use solar energy for a source of heat and light. Coldframes and hotbeds can help the home gardener start, grow and maintain plants, and help the commercial grower propagate and display plants.

The main difference between coldframes and hotbeds is that hotbeds have a supplemental heat source. This may be organic, such as manure, or nonorganic, such as an electric heating cable. Construction can be simple and inexpensive or quite sophisticated. The size of coldframes and hotbeds can vary significantly.

Uses

Coldframes and hotbeds can be used to:

- increase the length of growing season by starting plants earlier and providing protection for some plants in the fall.
- overwinter semihardy plants.
- start transplants.
- harden off plants.
- dry fruits, vegetables, and flowers.
- force flowering bulbs.
- start root cuttings.
- stratify seeds, nuts and acorns.
- vernalize plant material.

Orientation and Site

Locate the coldframe/hotbed facing south so plants receive full sun most of the day. The site should be convenient for the user, protected from the wind, close to a good supply of water and located on a well-drained site free from shade. Place electrically heated hotbeds close to a power source.

Construction

The framework for both coldframes and hotbeds is similar (*Figure 1*). Use wood boards, concrete, extruded polystyrene, cement blocks, or bricks to build the frame. Use redwood or

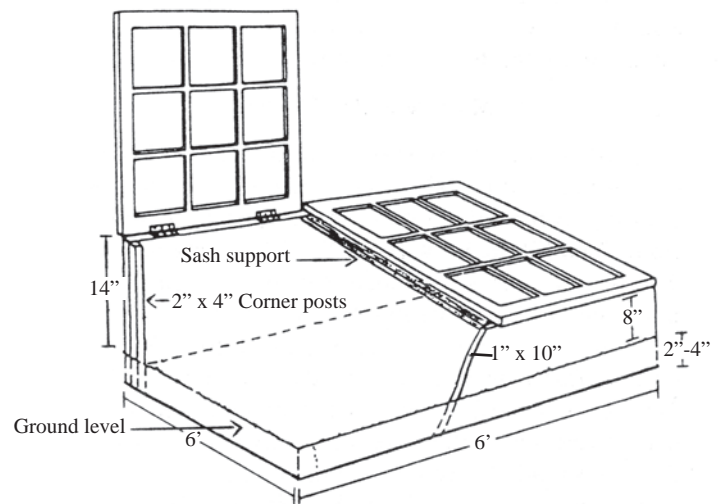


Figure 1. Coldframe/hotbed construction.

cedar for wood frames. Avoid the use of boards treated with wood preservatives because of possible injury to plants.

Determine the size of the coldframe/hotbed first. Although any reasonable size can be made, a 6 feet by 6 feet size is common with 3 feet by 6 feet as a minimum. Lengths are usually in multiples of 3 feet. The width and length also depend on the size of the sash or top panels to be used.

Construction begins with excavation to the desired depth. Hotbeds heated with manure are generally dug 16 to 24 inches deep, whereas a coldframe may only be dug 6 to 15 inches deep. If stone, brick, or concrete is used, have the footings (at least 3 inches thick) a few inches below the frost line to avoid winter “heaving.”

Most frames are built of wood. Build walls with either 1-inch or 2-inch thick lumber. Two-inch lumber may give more strength. Some frames have insulation boards inside to keep the structure warmer.

Place 2 feet by 4 feet posts in the corners to add support to the coldframe/hotbed. Slope the front of the frame lower than the back (1 inch per foot). As an example, the front of the coldframe may be 8 inches above the ground and the back 14 inches if the frame is 6 feet wide. The boards can be buried from 2 to 6 inches. Some home gardeners use a portable frame which is not buried so it can be moved or stored. If the sides are not dug into the ground, bank soil around the frame or add insulation boards to conserve heat. A coldframe also may be built as a lean-to against a house or garage. However,

care should be used to prevent damage from snow or icicles falling from the roof onto the cover of the coldframe/hotbed. With any type of construction, seal the coldframe/hotbed tightly to prevent heat loss and to prevent rodents from entering. Bank soil around the outside and slope it away from the coldframe/hotbed for good drainage.

The sashes or top panels can be made of glass, twin layers of plastic film, fiberglass, Plexiglass® or other translucent material and can be hinged to the frame or left loose. Plastic film is economical but can easily tear. Although more expensive, fiberglass will last many years with proper care. Glass has excellent light transmission qualities but can be dangerous, especially if children play in the area. If 6 feet by 3 feet window sashes are used for the top, make the frame 5 feet 8 inches long to allow overhang. On a 6 feet by 6 feet frame, two 3 feet by 6 feet sashes may be used with one sash support arm in the middle of the frame. Screen can be placed over the coldframe to keep rodents and insects out when sashes are removed or vented during warm days.

Hotbeds

A hotbed is a coldframe built over a heat source. Heat sources include fresh manure, electric heating cables, furnaces (oil, coal, or wood), steam or hot water. Manure and electric heating cables are the most common heat sources.

The advantage of manure as a heat source is its low cost. Disadvantages include cleaning out the used manure each year, odors, the inability to precisely regulate the temperature and the need to replace the manure each year. Electric heat sources are more expensive to install and operate but can be reused for several years.

Manure or Pit Hotbed

Construction of the manure or pit hotbed begins by excavating about 24 inches deep. Spread 4 inches of coarse gravel on the bottom to help drainage and aeration. Then fill the pit with 8 to 12 inches of fresh manure mixed 5 to 10 percent with straw, tamped evenly and firmly, and moistened with lukewarm water. Cover the manure with 3 to 4 inches of good quality loose, weed-free soil. As the manure decomposes, heat is released. Warm soil permits faster heating and speeds germination. Place a thermometer in the soil. When the temperature drops to 75°F, the bed is ready to seed. One word of caution: try to obtain manure, straw and soil that are free of weed seeds.

Electrically-Heated Hotbed

An easier approach to heating a hotbed is using electric cables. Excavate 6 to 12 inches of soil below the frame and put down 4 inches of carefully leveled, well-drained sand. About 60 feet of plastic covered electric heating cable is needed for a 6 feet by 6 feet bed, or about 2 feet of cable for every square foot of bed. Place the cable on the sand 3 to 4

inches from the side of the frame and loop it about 6 to 8 inches apart back and forth across the bed. Be sure that the bed is properly wired for safe operation. Attach the cable to a thermostat with a minimum range of 45° to 90°F and to a 110-volt outlet for use with an automatic control. Never splice electric heating cables. Make sure cables are properly grounded. You may want to consult a licensed electrician to be sure electrical codes are followed and that the proper heating cable and thermostat are used.

To help prevent physical damage to the cable from gardening equipment and rodents, place 2 inches of sand on the cable, cover this sand with hardware cloth, and add another 2-inch layer of sand on top of the hardware cloth. Plant seeds in containers set on the top layer of sand. Another alternative is to place 6 inches of good, weed-free soil on top of the hardware cloth, sow seeds directly into the soil and transplant the young seedlings to the garden later on.

Management of Coldframes/Hotbeds

Temperatures of 70° to 75°F are best for germinating seed. Once germination occurs, maintain the temperature in the frame at plant level at 60° to 65°F for cool season crops and 65° to 75°F for warm season crops. If temperatures get too high, ventilation is essential. Using ventilator clips or automatic-sash frame openers can accomplish this. Thermostats should also be used to control temperatures from heating cables or heat mat sources. Automatic watering or mist systems can be installed for watering if desired. Ventilation is essential on sunny days to maintain correct temperatures. As the season advances, remove the sash for most of the day and eventually during the night, too, to “harden off” the plants.

More frequent watering will be needed as the season progresses. However, overwatering and over-application of nitrogen fertilizers, coupled with high temperatures, encourage diseases and leggy growth. Avoid high nitrogen fertilizer and transplant the plants to the garden at the proper time. Do not start the transplants too early as most annuals will require 30 to 40 days from seeding to transplanting.

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