Constructing a Cold Frame Hoop House For the Backyard Gardener

Patricia R. Mokry, Travis Co. Master Gardener
Texas AgriLife Certified Greenhouse Manager

In agriculture and gardening, a **cold frame** is a transparent-roofed enclosure, built low to the ground, used to protect plants from adverse weather, primarily excessive **cold** or wet. Some cold frames are built below ground level and covered by a removable transparent glass or plastic top. The transparent top admits sunlight and prevents heat escape via convection that would otherwise occur, particularly at night. (Fig. A)

Historically, unheated cold frames were built to be used in addition to a heated greenhouse. Cold frames were frequently built as an extension of the southern wall (in northern latitudes) of the greenhouse's foundation brickwork. This allowed seeds to be germinated in the greenhouse and then easily moved to the attached cold frame to be "hardened-off" before final planting outside. One of the disadvantages of a cold frame is that it does not accommodate as many plants as a greenhouse.

Fig. A

When selecting a site for the cold frame, choose a level, well-drained plot. To ensure that the frame receives as much sunlight as possible, orient it to face south or southwest. A good location is the northern site of a deciduous tree to maximize the amount of sunlight during the winter months. Readily available running water is important.

During cold periods of the year, frost cover can be used to cover the Cold Frame Hoop House (Fig. B.)

Fig. B

If the cold frame is used to maintain plants during the late spring, summer and fall months, the amount of sunlight can be modulated by using a shade cloth (Fig. C). Open ends of the hoop covering allows free flow of air.

Fig. C

Constructing the Cold Frame Hoop House.

The cold frame described below was built as a raised bed. Because of the grade of the site, and to insure that the cold frame was level, some of the frame was below ground level. Lumber used in construction should be treated for ground/weather contact with an environmentally safe preservative. Wood will deteriorate over time, so using 2" wide boards will lengthen the life of the frame.

The sides of the frame can be anchored with metal clamps, attached to 4" x 4" wooden posts or plastic anchor joints (described below) with nails or screws.

CPVC pipe is used for the hoops as it is more flexible than PVC pipe. The width of the cold frame is 4 feet. This width ensures that the strain on the CPVC pipes will not be too great, when they are attached to the wooden frame. Since the pipes are attached at 2 foot intervals, the number of CPVC pipes needed is dependent on the length of the cold frame. To add stability to the hoops, each end of the pipe is inserted over ½" reinforcement steel rods which have been inserted into the ground through the bracket loops. The free end of the steel rod should extend 6-8" above the ground. The CPVC pipe will fit over the steel rod and into the bracket.

Materials:

- 2” x 6” treated lumber.
  - 2 boards for the sides of the cold frame. The length of the 2” x 6” boards depends on the length of the cold frame.
  - 2-4’ boards for the end pieces.
  - NOTE: If you are building a cold frame that is 12” high, you will need to double the amount of lumber.
- ½” CPCV pipe, 8’ long.
  - The number of pipes depends on the length of your cold frame. You will need 1 pipe for each 2 foot interval
- ½” PCV pipe, cut into 20.75” lengths. The number of lengths depends on the number of 2 foot intervals.
- Fittings. You will need:
  - 2-Tees for the end pipes
  - 1 Cross fittings for each ½” CPCV pipe.
  - 2-2 Hole straps for each CPVC pipe (Fig. D)

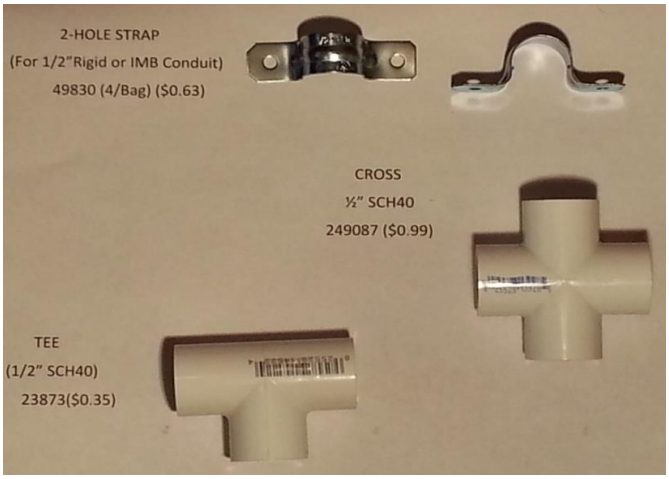

Fig. D

- Corner Brackets. Construction of the demonstration cold frame used the following corner brackets purchased from Burpee, 300 Park Ave., Warminster, Pa 18974
  The brackets are adjustable from 90° to 180°. The top of the Super Anchor Joints is notched to accommodate the ridged stake of the Stackable Joint.
  - Raised Garden Super Anchor Joints (Long serrated stake) (Figure E, #1) (2 per pkg), Item #99219 ($14.95)
  - Raised Garden Stackable Joints (short smooth stake) (Figure E, #2) (2 per pkg), Item #91065 ($14.95)

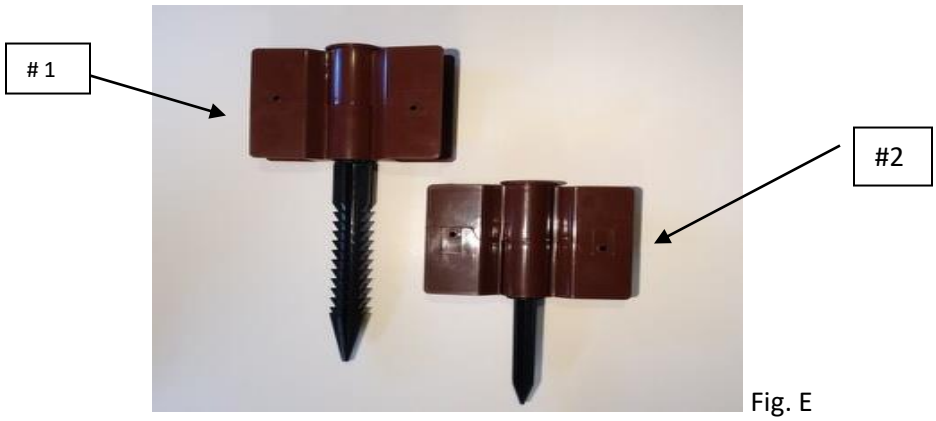

Fig. E

Building a Pre-Fab Cold Frame

Fig. F

1” x 4” Cedar planks are inserted into grooved corner posts. Each side is constructed of three, 4 foot planks. Figure F shows the assembled 4 foot square cold frame, 12 inches high. Note that the brackets are attached on the outside of the box on the middle board, one bracket at each corner and the middle bracket 2 feet from each end. If two, 1” x 6” planks are used instead of 1” x 4” planks, attach the brackets to the bottom board.

The “Tee” fitting is located at the top of the hoop of the two outer CPCV pipes (Fig. G, #1, #3) in the picture. The “Cross” fitting is located at the top of the center hoop (Fig G, #2). Only three CPVC pipes were used for this cold frame. The 20.75” lengths of PVC pipes connect each “Tee” to the “Cross”. The CPVC pipes slip easily though the “Tee” and “Cross” when installed. Figure G shows the finished 4 foot square cold frame with hoops installed. The final step is to adjust the three fittings to lie at the top of the hoops. The fittings can be glued to the pipes or taped, for ease in disassembly.

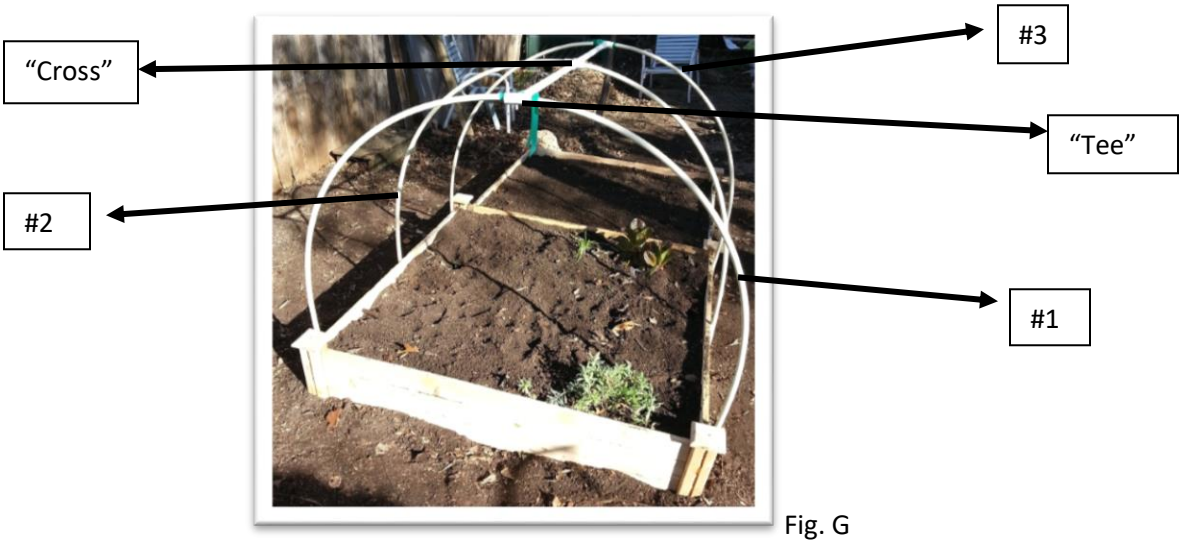

Fig. G

Once the cold frame is assembled on site, fill with quality soil such as a mixture of household compost and commercial turkey compost.

The installed cold frame pictured in Figure G has an additional 4 foot extension. Hoops to cover the extension will be added later. Since the cold frame will be used year around, a shade cloth will be installed to protect plants from the strong summer sunlight.

References

- Boyette, M.D., Extension Agricultural Engineering Specialist and Bilderback, T.E., Extension Horticulture Specialist. North Carolina Cooperative Extension Service, North Carolina State University. College of Agriculture & Life Sciences.
- Master Gardener Greenhouse Management Training, Victoria Educational Gardens Pavilion, Victoria County, Victoria, Texas.

Daphne Richards, County Extension Agent—Horticulture
Texas AgriLife Extension Service, Travis County

centraltexashorticulture.blogspot.com
twitter.com/centraltxhort
aggie-horticulture.tamu.edu/travis
www.tcmastergardeners.org

The members of Texas A&M AgriLife will provide equal opportunities in programs and activities, education, and employment to all persons regardless of race, color, sex, religion, national origin, age, disability, genetic information, veteran status, sexual orientation or gender identity. The Texas A&M University System, the U. S. Department of Agriculture and the County Commissioners' Court of Texas cooperating. Persons with disabilities who plan to attend a meeting and who may need auxiliary aids or services are required to contact Texas A&M AgriLife Extension Service-Travis County at 512-854-9600 ten working days prior to the meeting so appropriate arrangements can be made. Updated May 2016