

## HOOP HOUSE HAPPINESS by Master Gardener Paul Dennjs

Questions? University of Illinois, Winnebago County Cooperative Extension Service (CES) - 815-9877379 and ask for a Master Gardener. If the questions not answered sufficiently, ask for another Master Gardener knowledgeable in that area, the extension horticulture agent or myself for a later follow-up.

Everyone can have a greenhouse like the hoophouses so many nurseries are using. This course describes how to build a low-tech hoop house with a few tools and minimal building skills. Details will be provided on how to obtain materials locally and mail-order certain key items. Step-by-step instructions and pictures will be provided on how to build an 11 foot wide by 11 to 48 feet long hoop house for \$400 to \$1000. Even without heat, a hoophouse can extend the gardening frost-free season from five to nine months, moderate the temperature in cold snaps and increase productivity. Guidelines will be provided on how to control temperatures inside the hoop house without expensive fans and controls. We will also explore gardening tips on how to use your new hoop house to extend the season for fresh salads for Christmas dinner. Many cold sensitive plants can be over-wintered easily such as figs and hardy citrus.

1. Location - Sun shine is a necessity. Avoid shady areas. Easy access. Water drainage good? Consider How to supply electricity for fan. Consider how to heat if so desired. Orientation is probably going to be east-west for maximum heat and sunshine in the winter but could be north-south (less heat in winter). How will you water plants (need a lot of watering in summer, no rain inside hoop house).

2. Materials - 11 feet wide by 48 foot long by 6 foot high. Change quantities for other sizes. Prices are approximate and may vary over time, not meant for exact estimates.

Rebar, iron, 1/2 inch diameter, 20 foot long, lumber yards, qty 15 for hoops + 9 for purlins

Electrical Conduit, metal, 3/4 inch diameter, 10 foot long, qty 7, ground supports

Irrigation plastic piping, 3/4 or 1 inch inside diameter, 500 feet, goes over rebar

Thin wire, stainless steel or aluminum, (electrical fencing), 200 feet plus

Duct Tape, two rolls

IX4 by 8 feet long, quantity 24, CCA

Posts for door frame, CCA, two, 4X6 CCA, ten or twelve foot long

Boards for framing fill, 2X4 CCA

Galvanized nails, number 10 and number 16

8X8X 16 concrete blocks if desired (\$1 each)

Boards for door (double quantities for two doors), 4 foot wide by almost 6 foot high

Plywood, 4X8 sheet, exterior (\$12 to \$20)

2X6, 8 foot long, CCA, quantity one

2X4, 8 foot long, CCA, quantity 3

Two very sturdy hinges

Door Closure mechanism, possibly a lock for kid problems.

Plastic, Roll, Greenhouse, 20 foot by 100 foot, (about \$200), 6 mil, exterior and interior types (do not use the standard plastic available most everywhere- it tears out in a few weeks). Green house plastic will last at least three years normally.

Batten tape (\$26)

Staples and staple gun

Fan, fan mounting and hose kit (highly recommended for long life of the plastic), (\$65)

Electrical connection

### 3. How to Build

Ground supports - Cut conduit into 2 foot sections. Layout two parallel lines 11 feet apart.

Every 3 feet along each line, pound a 2 foot long electrical conduit pipe into the ground at three foot intervals, flush to the ground. Be sure the pipes in each line are directly across from each other and square. One can narrow the width and get a higher roof clearance for tall people. Note that the wooden end frames will provide the arch at each end so no 2 foot pipes and no hoops are used at each end.

Hoops - Cut four sections of irrigation pipe with a length of about 46 inches each. Slide the four pieces onto a piece of rebar. Insert one end of the rebar assembly into one of the conduits buried in the ground. Bend the rebar and insert the other end into the buried conduit exactly opposite in the other line of conduit pipes. Space the irrigation pipe so they are centered on the hoop with only about 2 inches gap between pieces; there should be about a 12 inch gap with the ground. Repeat for the other 16 hoops.

Purlins - Cut more irrigation pipe of 34 inch length. Slide six onto a piece of rebar. It is good to have about 3 people to hold the rebar assembly on location at the four foot level at the seam

of the irrigation pipes for the hoops. Position the rebar so it overlaps the end hoop by about 2 inches. Take a long length of wire and wrap the cross joint several times in both directions, wrap off the ends in both directions. Repeat for all the joints to the hoops. Install a short piece of irrigation pipe on the butt end but leave some bare rebar for splicing the next piece. Repeat the process for the next piece but start by splicing the rebar into the first piece. Repeat by wrapping wire around all of the joints. Repeat again for the last section to complete the purlin down one side. Now repeat the whole process for the four foot high purlin on the other side of the hoop house. Repeat again for the purlin down the middle of the roof of the hoop house; step ladders are very handy for this operation. Wrap every joint with several layers of duct tape to cover the bare rebar, wire and wire ends; ensure nothing rough can poke or rub against the plastic to be installed later.

Side Frame - Beginning at one end nail two 1X4 boards together sandwich around the hoop poles at about ten inches above the ground. Continue this for the whole length of each side.

End Frame - Install the two posts with a gap of about 49 inches, centered on the highest point in the arch. This requires the digging of a hole about 2 to 3 foot long. Cut the 4X6 to a length of the hole depth plus the hoop height at its location. Repeat for the second post. Use the short left over pieces for the outer locations at the hoop bases. Frame across the top of the posts and down to the ground to approximate the curve of the hoop. Wrap any splinter areas with the duct tape. Large field fencing staples can be used to fasten the purlins to the wooden end frames. After fastening the purlins, wrap these joints in duct tape.

Plastic - Anti- condensation plastic a big plus. Several people are very handy for this operation. Pick a windy day for applying the plastic (NOT!). Spread out the plastic and double it in half. Slide it onto the hoop structure. After aligning to make sure all edges can be batten taped to the boards, start stapling using the batten tape on the boards. Staple at least every 4 inches or oftener to avoid any major air leakage gaps. Do both edges and around the hoops on the ends; However, leave a small opening at one end for access for the fan installation

Fan - Mount fan. Cut a small x in the plastic in the inside layer at a location that can be reached by the hose and install the hose kit by reaching in between the two layers and screw on the end piece. Small motor uses very little electricity.

#### 4. Operation

Door - Four foot wide for wheel barrel access. Great for controlling heat when it gets cold. Also can hang strips of plastic from the frame and on door to seal around door when it is closed. Also, as the weather gets colder, want to double layer plastic over the end frame areas that are open in the summer. Seal down the outside edges of the plastic. In the heat of summer this overlap plastic can be raised to open side vents.

Open door when it is sunny and too hot inside. Close doors at night and when chilly to hold heat in. Unseal end plastic when the average temperature goes up. Seal when it goes down. Fold up plastic along edges. Fans.

#### 5. Gardening Tips

Benches along the sides made from concrete blocks and lumber.

Plant in the ground, just like regular garden.

Hang potted plants from the purl ins.

Install a permanent water garden pool especially for winter storage of hardy water lilies and fish.

Could add propane heater or kerosene heater - WARNING: In deep winter with closed hoophouse, oxygen deprivation is strong possibility!!!

Path through the middle and have 4 foot beds on each side.

Start onion plants from seed in the ground in January.

Spinach year round, lettuce most of year.

Gets very hot in the middle of summer, needs lots of water. Okra does well!

Grow much larger bedding plants.

Use large trays with many pots in the tray; maintain 2 inch water depth so do not have to water often. Without heat, water only gets 1/4 inch ice in the worst weather.

Over-winter figs, maybe some citrus, maybe genetic dwarf peaches.

#### SOURCES:

Burpee's Seeds, 1-800-888-1447

Charley's Greenhouse Supplies, 1569 Memorial Highway, Mount Vernon, VA 98273,  
Phone 1-360-428-2626, Phone Orders 1-800-322-42707, Wide variety of supplies

Crop King, Commercial Catalog, 5050 Greenwich Road, Seville, Ohio 44273-9413, Phone 330-769-2002, FAX: 330-769-2616, Greenhouse Fanning Specialists, related to Mellinger's, similar supplies but has more of the larger greenhouses and fanning supplies, similar prices, fans, meters, Tufflite III for the outside film and Infrared film for the inside layer for the highest light transmission, anti-condensation protection, energy savings,  
Fann Wholesale, 1-800-825-1925, 8X8 Greenhouse: \$829; 8X12: \$1149  
Gardener's Supply, 1-800-863-1700, Vennont, 8X6 Greenhouse: \$1000  
Hamilton Technology Corp, 14902 S. Figueroa St, Gardena, CA 90248, Order: 1-800-458-7474, Lights,  
Hydroponic supplies, CO2, some growing supplies.  
Hoop House Greenhouse Kits: 1-800-760-5192  
Hydrofann- Ohio, Gardening Products, 4967 N. High ST, Columbus, Ohio, 43214, 1-800-833-6868,  
Lights, books, supplies  
Jaderloon: 1-800-258-7171, Inno, South Carolina  
Johnny's Selected Seeds: 1-207-437-4301, IOx7xl2 Hoop House kit: \$330 plus plywood, framing lumber and fasteners  
Light Mfg. Co., 1634 S. E. Brooklyn St, Portland, Oregon 97202, 1-503-231-1582, 1-800-669-5483, lights, greenhouse kits, supplies

Mellinger's, 2310 W. South Range Road, North Lima, Ohio, 44452-9731, Phone 330-549-9861  
FAX: 330-549-3716, Order Line 800-321-7444, Hoop house frames, greenhouse plastic, shutters, air inflation kits (blowers), heaters, thermostats, batten tape, Green house kits, green house supplies, garden supplies, plants, grow mats, misting supplies, books  
Northern Hydraulics: 1-800-533-5545, Regular catalog and a greenhouse catalog; 7X13 Greenhouse: \$2000  
Powell and Powell Supply Co: 919-552-9708  
Santa Barbara Greenhouses: 1-800-544-5276, California, 7X12 Greenhouse: \$1100 to \$4400  
Stimson Marine, Inc: 1-800-373-6313  
Stokes Seeds: 716-695-6980 or toll-free FAX 1-888-834-3334  
Sunglow Greenhouses: 1-800-647-0606; 7.5X12.5 lean-to greenhouse: \$2300; 15X30 Greenhouse: \$7500 Vegetable Factory (Sun-Porch Division): 1-800-221-2550, 9x12 Sun Porch: \$4710  
Wonn's Way, 3151 South Highway 446, Bloomington, Indiana, 47401-9111, 1-800-274-9676, Wide variety of indoor gardening supplies



