

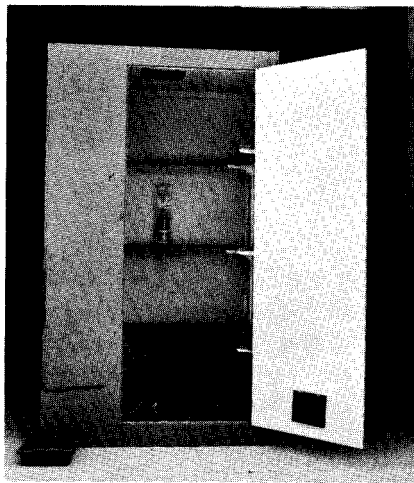
# New equipment improves pollen viability

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The North Carolina Forest Service's pine seed orchards are now producing enough pollen to permit controlled crossings for progeny testing. To complete the crossings systematically, it has been necessary to store the needed pollen for varying lengths of time. In preparing the pollen for storage, we found that drying the maturing male flowers (staminate strobilus) by exposing them to heat in a ventilated room proved unsatisfactory because there was no control of the temperature or humidity level within the drying area. Pollen from some clones had good viability while other clones showed very poor viability. To correct this, we have designed and constructed a pollen extraction chamber and male flower container.

The plywood chamber is approximately 4 x 4 x 8 feet in size. Inside, removable shelves are attached to three of the walls, and a door is constructed in the fourth wall. The walls are fastened together, as well as to the floor and ceiling, by bolts and wing nuts. With bolts and wing nuts and removable shelves, the chamber is portable and may be dismantled for storage when not in use.

A commercial dehumidifier is placed



inside the chamber to help control moisture level. An exhaust fan is built into the ceiling and thermostatically controlled to avoid excessive temperature. The thermostat is mounted in such a position as to allow a uniform flow of air around it but is not in a draft from the vent when open. A vent, cut into the lower portion of the door, activates when the fan turns on to allow cool outside air to enter the chamber, thus helping lower the temperature. The temperature level is maintained at approximately 72 degrees F. Enough heat is generated from the motor of the

dehumidifier and a 75 watt light bulb to make installation of a heater unnecessary.

Materials used in the construction of the chamber include the following:

- 4 pcs. x 4' x 8' plywood
- 2 pcs. x 4' x 3' 103/4" plywood
- 3 pcs. 2" x 4" x 4' framing
- 4 pcs. 2" x 2" x 61/2' framing
- 4 pcs. 2" x 2" x 4' framing
- 2 pcs. 2" x 2" x 3' 71/4" framing
- 3 pcs. 1" x 6" x 4' shelves
- 6 pcs. 1" x 6" x 3' shelves
- 9 ps. 6" shelf brackets
- 9 - 4' shelf hanging strips
- 18' 1" moulding
- 16 bolts 5/16" x 3" w/wing nuts
- 3 - 4" strap hinges 1 door hasp
- 1 light receptacle
- 1 female receptacle (double)
- 20' #12-2 electric wire 1/4 lb.
- #6 coated nails
- 1 - 6" exhaust fan, 50 CFM
- 1 thermostat to control exhaust fan 1
- dehumidifier: capacity 17 pints in 24 hours
- 1 hygrothermograph or a thermometer and hygrometer

<sup>1</sup> Respectively, forester, Tree Improvement Project, North Carolina Forest Service, Clayton, N. C., and orchard technician, Claridge Seed Orchard, Goldsboro, N. C.

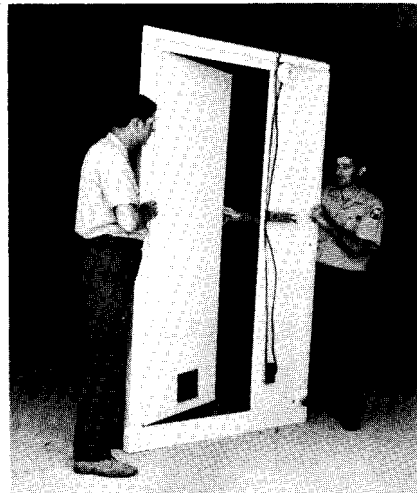


The 3 pieces of 2 inch x 4 inch x 4 foot framing and one of the 4 foot x 3 foot 10 3/4 inch plywood sheets are used as a platform or floor. One 2 x 4 is nailed to the center of the sheet of plywood parallel to the 4-foot measurement. The other two 2 x 4's are nailed (one to each) to the bottom of the plywood sheets that are used as back and front walls (see photos 3 and 4).

A frame is made of the 2 x 2's to fit on a sheet of plywood leaving a 4 3/8 inch space at the bottom, a 5/8 inch space at the top and a 5/8 inch space along each side (make two). These two panels will form the back and front of the chamber.

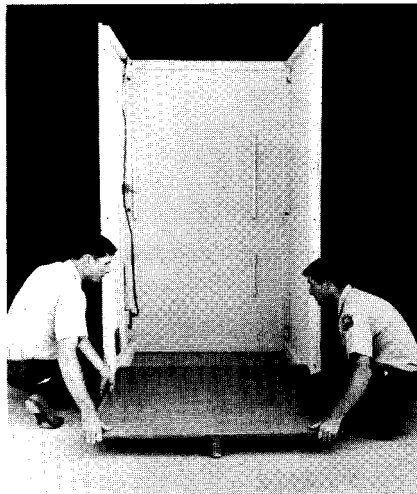


In one panel, 4 inch from the side and 4 3/8 inch from the bottom, a 6 foot 4 inch x 2 foot 4 inch section for a door is cut out. This will allow room for this panel to fit snugly against the floor. After the door has been cut, the 1 inch moulding is nailed inside the front panel to act as a stop for the door.



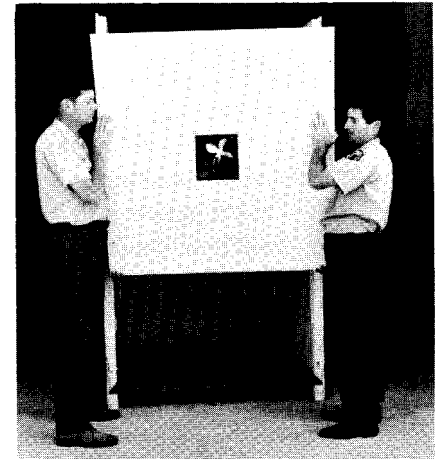
One 2 inch x 2 inch x 3 foot 7 1/4 inch section is nailed to the top of each side wall panel leaving a 5/8 inch space at the top and spaced 2 5/8 inch from the side edge of each panel (see photos 3 and 5). This 2 x 2 will help support the ceiling.

A side wall panel is attached with bolts and wing nuts to the

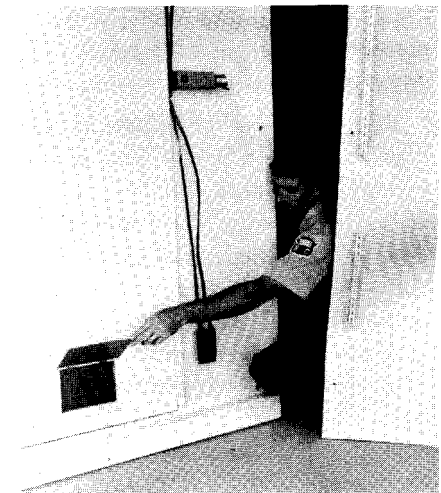


frame that has been nailed to the back and front panels; and the floor is slipped into place. After the floor is in place, the second side wall panel is attached to the front and back wall panels.

The 6 inch exhaust fan is centered in the remaining 4 foot x 3 foot 10 3/4 inch piece of 5/8 inch plywood sheeting. This piece of plywood will form the ceiling of the chamber. It is held in place by three bolts and wing nuts along the back and front of the chamber.

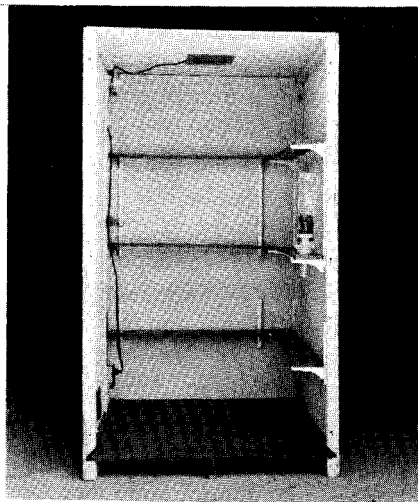


In the center of the door, and 3 inches from the bottom, a 6-inch square is cut out for the air vent. A piece of window screen is placed over this opening. On the inside of the door a 6 1/2 inch square sheet



of .021 thick sheet metal, hinged at the top to allow air to flow through when the exhaust fan is activated, is placed over the opening.

Inside the chamber, removable shelves are placed along the back, left, and right walls. Three shelves are spaced as follows from the floor of the chamber - 17 inches, 37 inches, 57 inches. These shelves are mounted on adjustable shelf brackets that are affixed to shelf bracket hanging strips. The three pieces of 7 inch x 6 inch x 4 foot boards are used as shelves across the back of the chamber. The six 1 inch x 6 inch x 3 foot boards are used as shelves on the right and left sides. The shelves have 23/8 inch holes cut out for placement of the male flower containers. These holes are spaced on 9 inch centers.



An electrical receptacle (double) is wired and attached to the front wall inside the chamber. A single socket light receptacle is attached to the inside upper part of the front wall. Instructions from the manufacturer for wiring a thermostat are normally included in the packaging of the item. When dismantling the chamber, all electrical wiring is left in place except for the exhaust fan. This electrical connection is disconnected at the fan. The chamber interior can be painted white or some other light color to give better light reflection. The dehumidifier is model 4H311 available from Dayton Electric Mfg. Co., Chicago, Ill. A White Roger 201-8 space thermostat is used for controlling the exhaust fan.

The male flower container is made from the following parts:

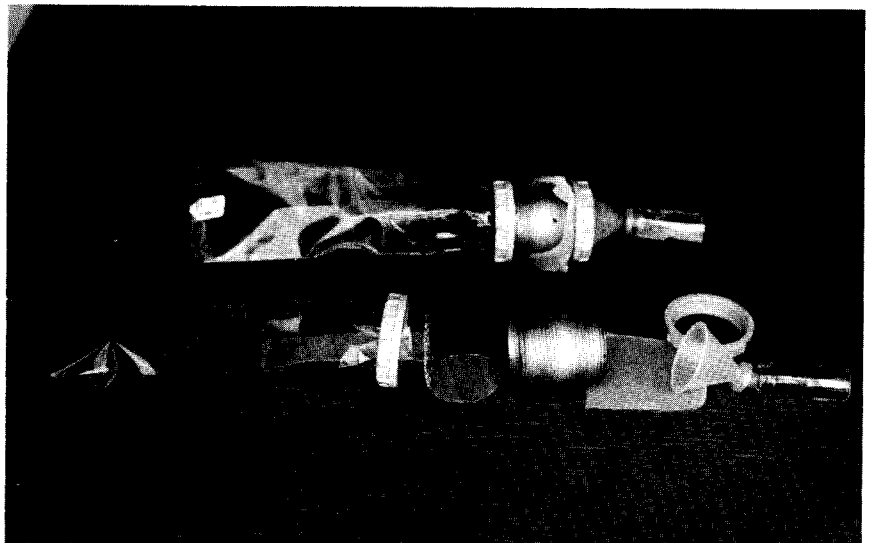
- 1 2 1/2" galv. pipe nipple (close 3 inches)
- 2 2 1/2" insulating bushing #1410
- 1 2 1/2" dia. piece of aluminum window screen
- 1 3" x 6" piece of aluminum window screen
- 1 2 1/2" dia. piece of 1/4" hardware cloth
- 1 4" dia. piece voile or organdy
- 1 3 1/4" x 15" pollination bag (sage casing)
- 1 #4252 Nalgene plastic funnel (polypropylene)
- 1 12-dram size vial plus cap

The male flower container is put together as follows:

1. A hole is cut in a vial plastic cap and the small end of a funnel is placed through the cap and glued so that the small end of the funnel will extend into the vial.
2. Some 3 x 6 inch screen wire is rolled into a tube 6 inches long and the edges secured together.

One end of tube is closed and secured. The other open end is placed on center of 1/4 inch hardware cloth and secured.

3. The plastic funnel with vial cap attached is placed through an insulating bushing with lip of funnel resting on a ridge at the base of the bushing. (The funnel lip may need to be trimmed to fit bushing properly.)
4. A piece of voile is placed between this bushing and the pipe nipple. The bushing is screwed onto the nipple locking the voile and funnel in place.



5. Over one end of a pollination bag a

second insulating bushing is placed so that the pollination bag extends beyond the bushing approximately one inch. This end of the pollination bag will be screwed onto the pipe nipple.

6. A 2 1/4 inch piece of screen wire is placed over pipe nipple opposite the attached funnel. On top of this is placed the hardware cloth with attached screen wire tube, so the tube is extending away from the nipple.
7. The screen wire and hardware cloth are held in place and the pollination bag, inserted through bushing, brought down over them so that screen wire and hardware cloth are inside of bag.
8. Second bushing is screwed onto nipple locking screen wire next to nipple opening and the hardware cloth on top of this, with

screen wire tube extending out into the pollination bag. Bushing is tightened on nipple and the pollination bag secured to the pipe nipple.

9. The open end of the pollination bag is closed after fresh male flowers (catkins) are placed in side.

With everything put together, the container is set upright in the chamber. When the flowers begin to dry, the pollen will fall into the attached vial, sifted and ready for storage. The vial can be removed and another attached very easily. All parts of the container can be cleaned in hot water or alcohol.

Most of the materials used can be purchased from local sources. The insulating bushings were purchased from a local electrical wholesaler and are manufactured by Raco Division, All Steel Equipment Inc., South Bend, Ind. The plastic snap cap vials are available from Fisher Scientific Company. The plastic funnels are available from Scientific Products Company and are listed as funnel, Nalgene 4252, powder, polypropylene, 65mm ID top, \$4.08/pkg 12.

Birds, animals and flowers are dying\_ to tell us... no pollution, please!

