

## AIR-POLLINATION CHAMBER FOR USE IN *POPULUS* BREEDING

**Gary W. Wyckoff**

Research Fellow,  
Forest Biology Section,  
The Institute of Paper Chemistry,  
Appleton, Wis.

For the past 23 years the Institute of Paper Chemistry (IPC) has had a tree improvement program, working with *Populus* spp. and *Populus* hybrids. To evaluate prospective parent trees, it is necessary to progeny-test, using seed from controlled crosses. Until recently, these crosses were done by hand, a laborious, time-consuming procedure. Now that proven parent trees have been selected through a vigorous testing program, it has become necessary to produce large quantities of seed to meet requests.

During the past 3 years a method has been developed to air-pollinate cut branch collections and small potted grafts. The technique makes possible the handling of large numbers of female catkins and reduces the amount of pollen used. Preliminary pollination trials demonstrated that seed set is equivalent to and in many cases greater than comparable hand pollinations.

A 31-inch-diameter cylinder fashioned from a single sheet of Plexiglas is capped at one end with an additional piece of Plexiglas. The cylinder rests on a specially made table that accommodates a vase and branch collection (fig. 1). After the cylinder and branch collection are in place, pollen is circulated around the collection by means of an air line and glass tube inserted through a rubber diaphragm in the table top. Pollen is

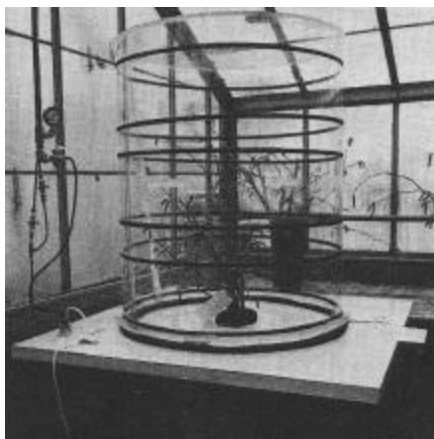
applied by placing it in a small vial connected to the air line. The rate at which it is introduced into the cylinder is controlled by varying the air pressure. Once all of the pollen is in the cylinder, it is forced to circulate around the collection for 1 to 2 minutes. At that point the cylinder is carefully lifted from the table and the catkins examined with a hand lens to determine the amount of pollen on the stigmas. When pollination is found to be adequate, the collection is removed and a second one is placed in position and the cylinder replaced. After the initial vase of flowers is pollinated, the amount of pollen available for each subsequent vase is reduced.

One of the problems encountered with the procedure was a static charge on the Plexiglas that attracted most of the pollen

blown into the cylinder. This was overcome by wiping the inside of the cylinder with a commercial antistatic compound.

Because of the destructive nature of a cut branch technique and the limited amount of flowering material available from specific clones, work is underway to develop a nondestructive seed production technique utilizing grafted materials grown in large redwood boxes. The materials in boxes will be placed in a chamber and pollinated, using techniques similar to those applied in the small pollination chamber presently being used in the IPC greenhouse.

More specific information can be obtained by contacting the Forest Genetics Group at The Institute of Paper Chemistry in Appleton, Wis.



**Figure 1.**—Air-pollination chamber used in *Populus* breeding.