U. S. Forest Service Research Note SE- 40 February 1965

A SIMPLE, INEXPENSIVE POLLEN TRAP

Pollen plays a role of vital importance in the sexual reproduction of all plants but it is especially important in forestry. With few exceptions, sexual reproduction is the only link between succeeding generations in the forest. To be sure, vegetative reproduction is important for special purposes, but it will probably not be used on a mass scale in timber production.

Somewhat low on the evolutionary ladder, most of our commercially important trees--virtually all coniferous and many deciduous species--depend on the wind for pollination. Other species, deciduous trees that have evolved a little further, are pollinated by insects. The insect vector is the proper object for study with insect-pollinated species and is the province of entomologists. With wind-pollinated plants, however, interest is focused on the pollen itself. There is much to be learned yet about wind-borne pollen of forest trees. Only in the last decade or so has a strong interest in seed production caused us to wonder about the role that pollen plays in various species that are commercially important. We should know more about the volume of pollen produced and its fluctuation from year to year, the timing and duration of pollen flight, the distance it travels from stand to stand and from tree to tree. We should know more about the way climate, physiography, stand characteristics, and physiological processes affect all or some of these phenomena. We need to learn more about identification of specific pollens and the mechanics of pollination. Many aspects of sexual reproduction invite study.

Despite the lack of interest, some studies of tree pollen have been made in Europe and in this country. Pollen has been collected in petri dishes, glass slides, cylinders, and spheres. These devices were either stationary or could move with the wind direction, or could revolve like a thermograph. The traps were coated with sticky substances such as vaseline, glycerin, or glycerin-gelatin. Some researchers used vacuum-cleaners and the Zeiss-conimeter to sift pollen from known volumes of air. Pollen has been trapped on tops of buildings for convenience' sake, in pastures, on the forest floor, and also in the canopy of mature forest stands. In extreme cases pollen has been trapped on ships far out at sea and airplanes high in the air.

The vaseline-coated glass slide has most often been used to trap pollen because the components are readily available and do not cost much. The disadvantages, however, are that the slide is fragile and can easily be broken in transport or handling and that the pollen grains sink into the vaseline so that the outline becomes fuzzy and the grains hard to distinguish.

Southeastern Forest Experiment Station - Asheville, North Carolina
U.S. Department of Agriculture - Forest Service

In the place of a glass slide, Illy and Sopena[1] used an aluminum strip with holes backed by adhesive tape. They determined that the tape remained sticky after exposure to the elements for several days but they did not compare the efficiency of the aluminum strip and the glass slide.

At the Shortleaf-Virginia pine research project in Charlottesville, Virginia, we are using a simple and inexpensive pollen trap made of a plastic strip, clear cellulose tape, and a clothespin (fig. 1). The plastic strip is a commercially available tag used in nurseries. It is 9 cm. long, 0.7 cm. wide and about 0.5 mm. thick. Two holes are punched at one end of the tag with an office paper punch, and tape is applied on one side over both holes to expose the sticky side of the tape through the holes (figures 2 and 3). The other end of the tag is then clamped in a clothespin at a 45° angle from the vertical and the trap is ready for use.

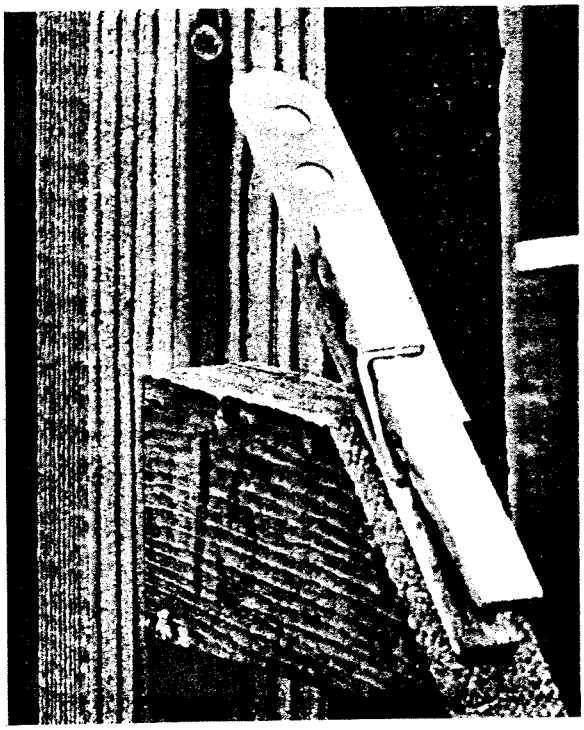

Figure 1.--A pollen trap composed of a plastic tag with 2 holes backed with clear cellulose tape. The trap is held by a clothespin at a 45° angle.

These traps are cheaper and easier to assemble than vaseline-covered glass slides and do not break in handling. The plastic tags can be easily marked. They can be used many times without the time-consuming cleaning needed when glass slides are reused.

A test was made to compare the relative efficiency in trapping pollen on tags and on slides. Twenty pairs of slides and tags were exposed to shortleaf pine pollen from 11 a.m. on May 8 until 11 a.m. on May 9, 1964, in Buckingham County, Virginia. The slides and tags were then examined under a microscope.

---

[1] Illy, G., and Sopena, J. La dispersion du pollen de pin maritime. Rev. for. franc. 15(1): 7-18. 1963.

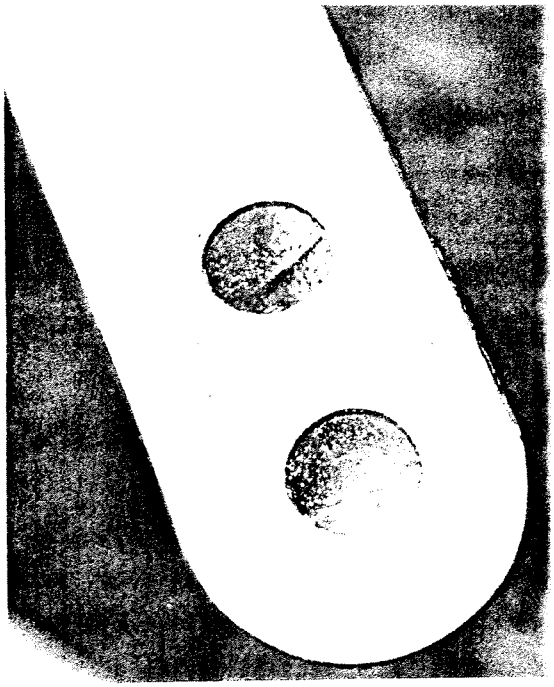

Figure 2.--Closeup of the upper side of the pollen trap showing position of the punch holes.

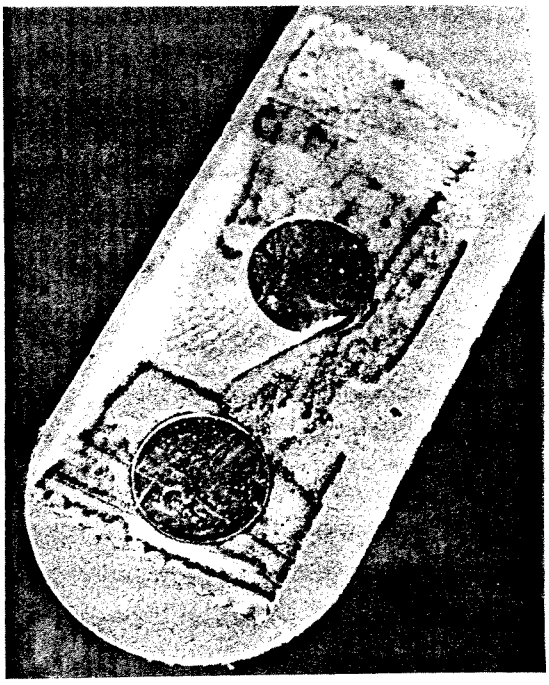

Figure 3.--Closeup of the under side of the pollen trap showing the cellulose tape backing.

Pollen counts were made by systematically shifting the microscope field of view (100 X) four times for the slides and twice for each punch hole in the plastic tags. Normally a 40 X magnification would have been enough but the catch was so great (at the peak of pollen flight) that a smaller counting field was chosen. Counting was much easier on the tags than on the slides. On the tags the pollen stood out in bold relief, with a fluorescent desk lamp as incident light source. The bright yellow color of the pine pollen contrasted strongly with the indeterminate colors of dust particles and other pollens. The color and the two air-sacs of the pine pollen were easy to distinguish and served for unmistakable identification. On the vaseline-covered glass slides no color distinction was apparent nor did the pollen stand out. The grains had sunk into the vaseline, which made their hue disappear and diffused their characteristic outline. It was difficult to distinguish between the dorsal aspect of pine pollen and the pollen of an unidentified species of oak of about the same size.

The period of exposure was fairly representative of the climatic conditions that can be encountered. The day started off with bright sun and no wind and later became overcast with strong wind. It did not rain, however. The data were analyzed as a randomized block experiment with each pair of slide and tag a block. The sum of the four field counts was used as unit observation.

Both methods of trapping, presumably, give estimates of equal precision since there was no difference between them of statistical significance. The plastic tags with cellulose tape have the advantage, however, that they are simpler to use, more rugged, and easier on the eyes.

P. E. Hoekstra
Division of Timber Management Research
Charlottesville, Virginia