SOUTHERN FOREST EXPERIMENT STATION

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T-10210 FEDERAL BLDG. 701 LOYOLA AVENUE NEW ORLEANS, LA. 70113

LONGLEAF PINE SEED DISPERSAL

William D. Boyer

SOUTHERN FOREST EXPERIMENT STATION

Production and dispersal of longleaf pine (*Pinus palustris* Mill.) seeds were sampled in 1955, 1957, and 1958 on the Escambia Experimental Forest in southwest Alabama.

Two transects of seed traps were established at right angles to each of four forest walls enclosing a rectangular 80-acre clearing. Walls were oriented in the cardinal directions, and consisted of second-growth longleaf pines 40 to 50 years old. Dominant trees averaged 65 feet in height.

Each transect consisted of 15 quarter-milacre paperboard seed traps spaced ½ chain apart. Transects began ½ chain inside forest walls and extended 6½ chains into the clearing. All traps were visited at least once a week during seedfall. Seeds were removed, counted, and cut to determine soundness. Counts of both total seeds and sound seeds were recorded for each trap at each visit.

In 1955 cones were counted on all trees in a 0.6-acre area at the head of each transect.

Seed production.—As sampled by traps under and within the walls, the crop averaged 104,000 sound seeds per acre in 1955 and 1958, and 19,000 per acre in 1957. There was no longleaf seed crop in 1956. Each year, seedfall began in October and peaked in November. Weekly totals of sound seeds trapped are shown in figure 1.

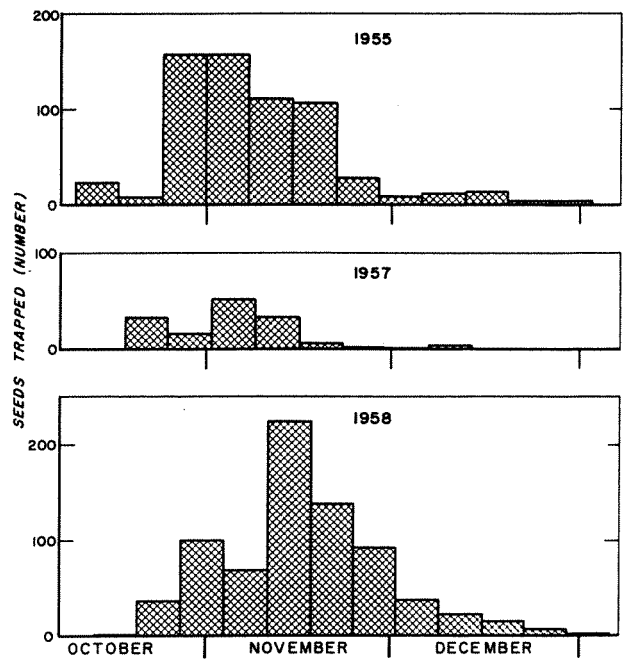

Figure 1.—*Time of longleaf pine seedfall. Data are from 120 quarter-milacre traps, and include sound seeds only.*

Production by forest walls varied considerably from year to year and wall to wall. Each year, different walls were the best and poorest producers, but the 3-year average did not differ significantly among the four walls.

Cone count in 1955 rose rapidly with tree size, going from an average of 7 cones per tree in the 8-inch d.b.h. class up to 67 cones per tree in the 13-inch d.b.h. class, at which point it leveled out.

Distance of seed dispersal.—Of all sound seeds trapped beyond the edge of forest walls, 71 percent fell no farther than one chain from the base of parent trees. Trap catches followed an exponential curve. The computed regression, for all years and walls combined, was significant at the 0.01 level, with a coefficient of determination $r^2 = 0.9932$ (fig. 2). According to the curve, the number of sound seeds dispersed was halved with each 55-link increase in distance from the seed source.

The dispersal curve is based on data from all four walls, and thus minimizes the effects of winds. The east wall dispersed a much lower proportion of seeds into the clearing than did the other walls, because the prevailing winds were westerly. While the regression formula estimates dispersal under the conditions of this study, its applicability is limited because tree heights and prevailing winds vary from place to place. The analysis does, however, define the model for the relationship of seed dispersal and distance from the forest wall: $\text{Log } Y = a + bX$.

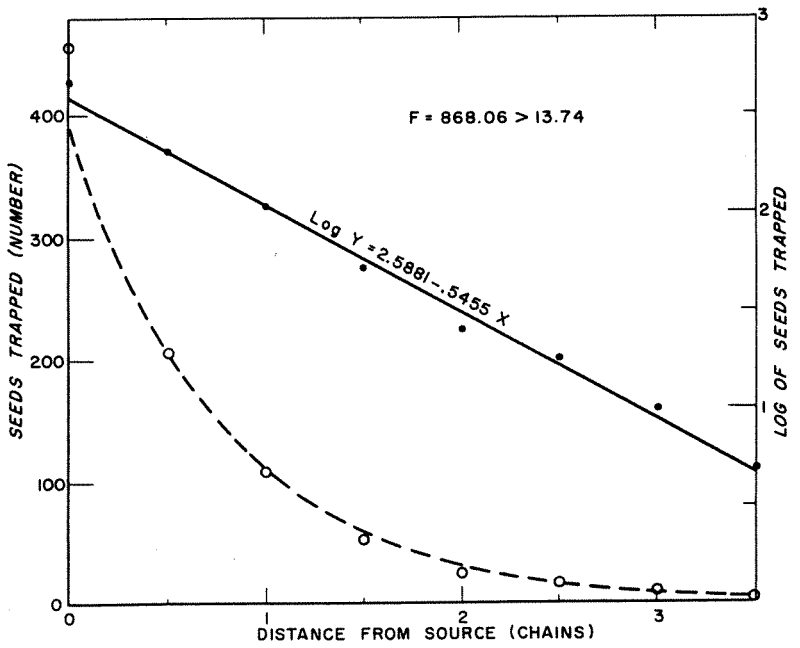

Figure 2.—*Dispersal of sound longleaf pine seeds from forest walls; 3-year total for 16 seed traps at source, and 8 traps at each location beyond source.*