Wind Damages
Improperly Planted Slash Pine

By RALPH A. KLAWITTER*

Planting techniques can affect the growth and development of tree seedlings, as well as their susceptibility to damage by wind. Sometimes the first sign of improper planting techniques is early mortality. In other situations, the rate of growth begins an inexplicable decline. In a water control study in northwest Florida, however, some planted slash pine seedlings reacted differently—they developed noticeable lean after being exposed to wind and weather only two years.

The leaning-tree problem came to light during a study of water levels on the Apalachicola National Forest. Since 1961, the National Forests in Florida and the Southeastern Forest Experiment Station had been investigating the response of wet, sandy flatwoods to water control. In one wet area, ditches with control structures in them were installed in an attempt to save a two-year-old slash pine plantation. Mortality was high because the soil was excessively wet and because brisk breezes caused some of the trees to lean. Moreover, many of the crowns were sparsely foliaged and the trees grew slowly. The controlled drainage system lowered the water table enough to allow the surviving trees to recover. After two years, the rate of growth had improved considerably. It was therefore assumed that wet soil and wind were the only factors responsible for the leaning trees.

To lower water levels and improve soil conditions for pine growth, deep ditches with control structures were installed on either side of the half-mile-wide flat. Water movement to these ditches was expedited by a series of shallower collection ditches across the flat and perpendicular to the deep ditches. Within six months, water levels were controlled sufficiently to allow prescribed burning of the grassy cover prior to planting.

In January 1962, slash pine seedlings were machine-planted at 8x8-foot spacing. After two growing seasons, survival averaged about 90 per cent on sampled plots—but nearly 10 per cent of the survivors had a pronounced lean. Closer examination revealed that the base of each leaning tree was encircled by a cavity (fig. 1). Also, for several inches above the root collar, the stem was swollen and scraped. Excavation of a number of trees showed that the leaners all had L-shaped root systems. This shape is characteristic of seedlings whose roots are dragged in the planting slit rather than being inserted properly (fig. 2).

Further experimentation and observations led to the conclusion that the combination of improper planting, wet sandy soil, and strong winds caused the trees to lean. Winds sweeping across the open ground whipped the tree tops. When the roots were planted parallel to the surface in wet sandy soil, the whipping of the stem caused them to rotate back and forth. The tree stem, whipping in an elliptical fashion, scraped the ground around the root collar and packed it into a circular depression leading to the roots.

How serious is the problem? Our experience showed that about 75% of the leaning trees died. Those that sur-

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The problem of leaning trees was encountered again in another part of the study area that was primarily open, unforested wetland. The cover consisted mainly of mixed grasses and an abundant supply of pitcher plants. In addition, clumps of St. Johnswort and black-gum and a few stunted slash pines were scattered about. Soils were sandy and saturated to the surface for much of each year. Water movement over the surface and through the soil was slow because the land was level and lacked dissection by streams.

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