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IDEAL SOWING DEPTH FOR SWEETGUM SEED

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This paper reports the sowing depths from which sweetgum (*Liquidambar styraciflua* L.) seedlings can emerge under near ideal conditions. Little is known about the seedbed conditions required for successful direct seeding of sweetgum, and the information presented here will be useful in planning field trials.

Methods

Seed was collected from a sweetgum tree in Washington County, Miss., in the fall of 1964 and stored at 35° to 40° F. for 4 months. Prior to sowing, the seed was stratified moist for 30 days at the same temperature.

About 4 inches of loose silt loam was placed in 4-inch clay pots. The soil was settled by sprinkling lightly with water and then leveled. Fifty seeds were placed in each pot and covered with one-eighth, one-fourth, one-half, three-fourths, 1, or 1½ inches of loose soil. This soil was also settled and leveled. In a seventh treatment seeds were not covered.

The treatments were replicated four times, and the pots were placed in a greenhouse in a randomized block design. Each block of seven pots was in a metal pan lined with polyethylene, and the pots were watered from below with ¼- to ½-inch of water, as needed. When evaporation was high, water was applied daily. Although soil moisture tension was not measured, it probably seldom exceeded 1 bar.

The emerging seedlings were counted daily for 30 days. A seedling was considered emerged when its cotyledons were free above the surface of the soil. Seedlings germinating on the surface were considered emerged when hypocotyl development lifted the cotyledons and seedcoat completely free of the soil and when the radicle penetrated the soil.

After 30 days, seedling emergence and emergence energy were calculated. Emergence energy is the highest value obtained when percent of emergence on each day is divided by the number of days since the test began. This number is comparable to Czabator's [2] peak value for germination tests.

Results

Differences in percent of emergence among the three best depths, ⅛, ¼, and ½ inch, were not significant at the 5 percent level of confidence. But the ⅛- and ¼-inch depths were significantly better than sowing depths greater than ½ inch (table 1). Emergence energy was higher for seeds sown at ⅛ and ¼ inch than at other depths. Both emergence and emergence energy were lower for seeds sown at 1½ inches than those for any other seeds.

Planting at any depth below ½ inch was clearly detrimental. Many cotyledons barely emerged from the ¾- to 1½-inch depths, and many seeds that germinated at these depths were unable to push their cotyledons to the surface.

Many nurserymen cover sweetgum seed with soil or sawdust to a depth of about ¼ inch. As shown in this study, where moisture conditions are closely controlled, this is a good planting depth. In the field, losses at shallow depths would probably be much greater than under the ideal conditions of this test.

TABLE 1.—*Emergence 30 days after sowing and emergence energy of sweetgum seed, by sowing depth*

Depth (inches)	Emergence	Emergence energy
	Percent	
⅛	[1] 74.5	3.5
¼	67.5	3.2
½	57.0	2.5
¾	43.5	1.8
0	37.0	1.4
1	32.0	1.2
1½	5.0	.2

[1] Values enclosed in the same bracket are not significantly different at the 5 percent level of confidence.

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[2] Czabator, F. J. Germination value: An index combining speed and completeness of pine seed germination. Forest Sci. 8: 386–396, illus. 1962.