SURVIVAL OF TRANSPLANTED YELLOW-POPLAR SEEDLINGS AND ROOT FOOD RESERVES

A. R. GILMORE
University of Illinois, Urbana

ABSTRACT. — Carbohydrate reserves in the roots of one-year-old yellow-poplar seedlings were not related to subsequent survival of the transplanted seedlings.

The ability of a seedling to produce new roots after being transplanted from the nursery affects its survival. A high carbohydrate content in the roots of a seedling at the time of transplanting could indicate a high capacity to supply energy necessary for the production of new roots. Previous investigations (Gilmore, 1962, 1964) have shown that food reserves in the roots of transplanted loblolly pine seedlings are not related to either survival or growth.

The results of a study to determine the effects of food reserves in roots of yellow-poplar (*Liriodendron tulipifera* L.) seedlings on subsequent survival are presented in this note.

METHODS

A lateral root segment was removed from each of 85 one-year-old yellow-poplar seedlings; the seedling and root segment were numbered and the seedling transplanted in builders sand. The sand was well watered for one month after planting and then the plants were subjected to drought. When about one-half of the seedlings appeared to be dead, the sand was watered to field capacity and kept at this level for two weeks. At the end of this two week period, each plant was examined to determine if it was alive. A modified randomized procedure was used to select 24 dead and 24 living seedlings for the test.

Sugars and starches were determined on each lateral root segment of the 48 seedlings used in the test. Sugars were extracted with 80 percent ethanol and determined by the phenol-sulfuric acid method according to Dubois et al. (1956). Starches in the residues from the alcohol extract were extracted with amalyase and determined by the phenol-sulfuric acid method.

RESULTS AND CONCLUSIONS

Table 1 shows percentages of various carbohydrate fractions found in the two groups of seedlings. There are no statistical differences in the carbohydrate fractions between the living and dead seedling groups. The wide range in the

TABLE 1. — Levels of Carbohydrates, in Percent, in Roots of Yellow-poplar Seedlings when Lifted from Nursery.

	Reducing sugars		Other sugars		Starches		Total
	Average	Range	Average	Range	Average	Range	Average
Living seedlings group	5.30	2.75–9.42	1.14	0.46–3.11	12.75	3.99–26.75	19.19
Dead seedlings group	5.36	2.25–12.66	1.38	0.36–2.81	13.81	3.61–35.10	20.55

various carbohydrate fractions within the two groups substantiate results obtained with loblolly pine (Gilmore, 1964). From this experiment, it is concluded that root food reserves do not influence subsequent survival of transplanted yellow-poplar seedlings.

Literature Cited

Dubois, M., K. A. Gilles, J. K. Hamilton, P. A. Rebers, and F. Smith. 1956. Colormetric method for determination of sugars and related substances. Anal. Chem. 28: 350-356.

Gilmore, A. R. 1962. Root growth of transplanted loblolly pine (*Pinus taeda* L.) seedlings in relation to chemical root reserves. Trans. Ill. State Acad. Sci. 55: 38-41.

———— —. 1964. Food reserves of transplanted loblolly pine seedlings and root growth. Tree Planters' Notes 66: 15-16.

Manuscript received July 23, 1966.