

An Abnormal Variant of Sweetgum (*Liquidambar styraciflua* L.) from Caroline County, Virginia

Bruce L. King

Department of Biology
 Randolph Macon College
 Ashland, Virginia 23005

Leaves of individuals of *Liquidambar styraciflua* L. (sweetgum) are predominantly 5-lobed, occasionally 7-lobed or 3-lobed (Radford et al., 1968; Cocke, 1974; Grimm, 1983; Duncan & Duncan, 1988). The tips of the lobes are acute and leaf margins are serrate, rarely entire.

In 1991, I found a seedling (2-3 yr old) that I tentatively identified as a specimen of *Liquidambar styraciflua*. The specimen occurs in a 20 acre section of deciduous forest located between U.S. Route 1 and Waverly Drive, 3.2 km south of Ladysmith, Caroline County, Virginia. The seedling was found at the middle of a 10% slope. Dominant trees on the upper slope include *Quercus alba* L., *Q. falcata* Michx., and *Liriodendron tulipifera* L. On the lower slope, *L. styraciflua*, *Q. phellos* L., and *Acer rubrum* L. are dominant. Leaves of the seedling were 3-lobed, seemed smaller than normal for older seedlings of *L. styraciflua* and the tips were broadly rounded rather than acute. I reexamined the plant in the winter and early fall of 1996 to verify the identification and to measure leaf characteristics at the early sapling stage for this atypical specimen and for individuals in three height classes of normal sweetgum. Identification was made using Grimm (1983) and by direct comparisons with typical sweetgum saplings and mature trees and with other lobe-leaved species in the area (e.g., *Acer rubrum* L. and *Platanus occidentalis* L.). A voucher specimen (summer condition) has been deposited in the Randolph-Macon College herbarium.

Height of the specimen in late August 1996 was 116 cm and based on observations of terminal bud scars and the year in which it was first seen, the plant is estimated to be 7-8 yr of age. Fifty leaves were measured (cm) for maximum leaf blade width, leaf blade length, and petiole length. The number of lobes per leaf and the state of the leaf margins (entire, remotely serrate, serrate) were also recorded.

Similar measurements were made from surrounding plants in three height classes: early sapling, 61-134 cm; large seedlings, 10-23 cm; and small seedlings (mostly first year), 3-8.5 cm. All of the small seedlings were within 5 meters of the atypical specimen and most of the large seedlings and saplings were within 10 meters. The greatest distance between any two plants was 70 meters. All of the plants measured were in dense to moderate shade. In the seedling classes, three leaves were measured from each of ten plants (n = 30 leaves). In the sapling class, counts of leaf lobes and observations of lobe tips and leaf margins were made from ten leaves from each of 20 plants (n = 200 leaves) while five plants were used for the other measurements (n = 50 leaves). Means (cm) for maximum leaf blade width (BW), blade length (BL), and petiole length (PL) for each of the size classes and the atypical specimen were: small seedlings (BW 2.4; BL, 2.4; PL, 1.0); large seedlings (5.7, 4.5, 2.4); early saplings (9.6, 7.3, 5.9); atypical saplings (5.0, 4.5, 3.4). The percentage of leaves with 3, 5, and 7 lobes in each class and the unusual specimen was: small seedlings (3 lobes, 100%; 5 lobes, 0%; 7 lobes, 0%); large seedlings (10%, 90%, 0%); young saplings (0.5%, 92%, 7.5%); atypical specimen (82%, 18%, 0%). All of the leaves in all size classes were serrate and the lobe tips were acute. In the atypical specimen the leaves were mostly entire, occasionally remotely serrate and the lobe tips were broadly rounded, rarely truncate or obtuse. Silhouettes of leaves from the atypical and normal specimens are shown in Figure 1. They were produced by photocopying dried and pressed leaves. The unusual sapling most closely resembles the seedling stages in most of the characters examined and thus may be simply retaining seedling characteristics, however, it is quite distinct with respect to the shape of the lobe tips and the predominantly entire leaf margins. Growth rates were estimated by measuring distances between terminal buds and terminal bud scale scars and rates calculated as

cm per year. The growth rate for the atypical specimen was 15.6 cm per yr which is comparable to the mean growth rate from 10 young saplings (15.0). The plant will be reexamined in later years to determine if the unusual traits are maintained.

A horticultural cultivar of *L. styraciflua* with rounded leaf lobes is known as 'Rotundiloba' (Dirr 1990). Dirr indicated that it had been incorrectly listed as 'Obtusifolia' in a 1983 edition of his work. He described the summer leaves as lustrous dark green above and the typical fall color as reddish-purple. Measurements of leaf

size or other leaf characteristics were not given. Fall color for the sapling I have described was yellow (1996) and the summer leaves were glossy green; however this was also true of all other saplings in the study site. The fall color and summer appearance of the leaves of many tree species are subject to environmental variation and Dirr reported yearly variation in 'Rotundiloba' from reddish-purple to yellow. The summer and fall appearance of the leaves of the cultivar are within the range of normal variation for *L. styraciflua*. The cultivar is known to be sterile. The history of 'Rotundiloba' is not explained in Dirr (1990) but the

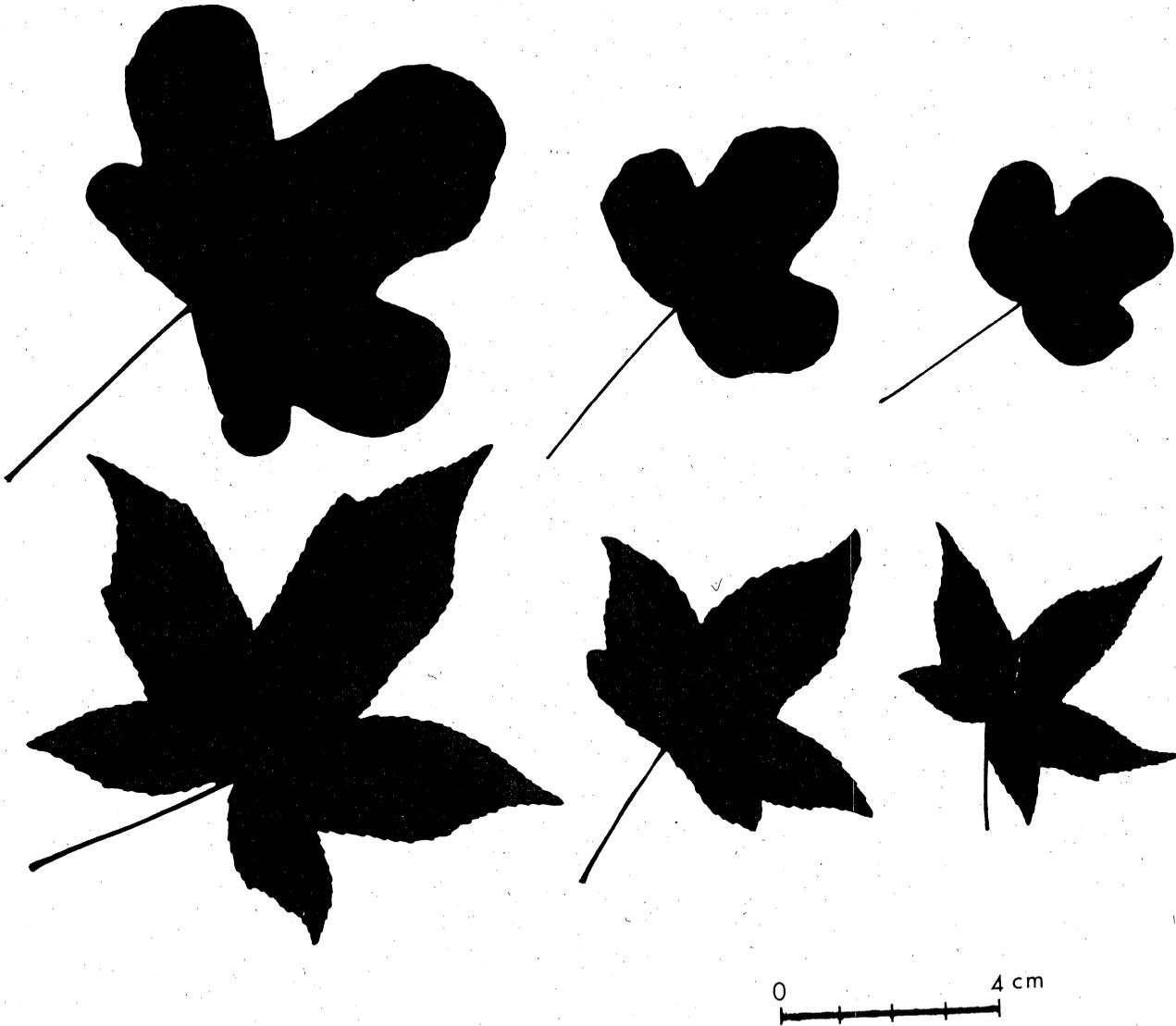


Figure 1. Leaves from an atypical sapling of *Liquidambar styraciflua* from Caroline County, Virginia (top) and from typical saplings in the same height class (bottom).

description seems to be based on a single tree now growing on the campus of North Carolina State University (Raleigh) which was discovered in the wild in North Carolina in 1930. Apparently the cultivar is not being asexually propagated for the horticultural trade. Taxonomically, 'Rotundiloba' and the specimen I have described might best be treated as a single form. I have found no reports of the round-lobed forms from natural habitats in Virginia. It is possible that round-lobed variants of *L. styraciflua* result from a single recurring mutation with pleiotropic effects. Dirr (1990) reported a branch reversion to the typical leaf shape in 'Rotundiloba' so the mutation may be somatic.

LITERATURE CITED

Cocke, E. C. 1974. Trees and shrubs of North Carolina.

Edwards Brothers, Inc., Ann Arbor, Michigan. 186 pp.

Dirr, M. A. 1990. Manual of Woody Landscape Plants: Their Identification, Ornamental Characteristics, Culture, Propagation, and Uses. 4th Ed. Stipes Publ. Co., Champaign, Illinois. 826 pp.

Duncan, W. H. & M. B. Duncan. 1988. Trees of the Southeastern United States. The University of Georgia Press, Athens, Georgia. 322 pp.

Grimm, W. C. 1983. The Illustrated Book of Trees. Stackpole Books, Harrisburg, Pennsylvania. 493 pp.

Radford, A. E., H. E. Ahles, & C. R. Bell. 1968. Manual of the Vascular Flora of the Carolinas. The University of North Carolina Press, Chapel Hill. 1183 pp.
