IN VITRO PROPAGATION OF LIQUIDAMBAR STYRACIFLUA L.

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We reported on the propagation of Sweetgum (Liquidambar styraciflua L.) by tissue culture at the 16th Southern Forest Tree Improvement Conference (P. 184-188). A modified Risser and White's medium with 0.01 PPM NAA and 0.5 PPM BA, solidified in agar, yielded 2.1 to 3.9 buds differentiated on organogenic hypocotyl sections. Only about 33% of the buds reached the plantlet stage. Recently we have improved on the method by explanting the hypocotyl sections onto modified Risser and White's medium with 1 PPM IAA and 5 PPM 2iP and agar. As before, only a few buds were differentiated on organogenic hypocotyl sections. However, when transferred to a liquid Blaydes' media with 0.01 PPM NAA and 0.5 PPM BA, numerous shoots were differentiated. A single harvest of shoots from a 125 ml flask ranged from 25-100 shoots. With repeated harvest over the period of 1 year as many as 571 shoots have been obtained. More than 90% of the shoots obtained from liquid culture root on basal modified Risser and White's medium.

The anatomy of the plantlets and shoots obtained by both methods have been studied in relation to prospects for hardening-off the plantlets. Observations using light, scanning and transmission electron microscopy showed differences in general morphology of the leaves. Plantlets differentiated on agar had atypical anatomical characteristics which we have reported (Amer. J. Bot. 69:1579-1586). Leaves of plantlets on agar had undifferentiated mesophyll cells with extensive intercellular spaces, large vacuoles, flattened chloroplast with an irregularly arranged internal membrane system, and superficial, circular stomata. Shoots differentiated in liquid culture, however, had characteristics more like noncultured plants. Leaves of liquid cultured shoots had a more compact mesophyll, although a palisade layer was still not differentiated. Chloroplast had evident grana and stomata were flattened and ellipsoid.

Our system of liquid culture has several advantages over previous agar methods. A much more rapid shoot multiplication rate is possible and high rooting percentages have been obtained. In addition, shoots differentiated from liquid culture appear more typical structurally and plantlets from these shoots are expected to be more easily acclimatized.

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