SCALING UP HYBRID SWEETGUM SOMATIC SEEDLING PRODUCTION

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Fast-growing hybrid southern hardwood trees should make excellent material for woody biomass production in the Southeastern U.S., if elite clones can be identified and efficiently propagated. We have enhanced the potential of sweetgum (*Liquidambar styraciflua*) as a biomass species by generating hybrids between the tree and its Chinese relative, *Liquidambar formosana*, and propagating the most promising clones via somatic embryogenesis. Some of the hybrid clones have already demonstrated superior biomass productivity compared to elite *L. styraciflua* trees. However, production of somatic seedlings from these clones remains labor-intensive. Bioreactors, specifically temporary immersion designs, such as the RITAÂ®, have been applied to improve in vitro propagation of a number of woody species. We tested RITAs for their potential to improve the production efficiency of high-quality hybrid sweetgum somatic seedlings. Somatic embryos of a single hybrid sweetgum clone were inoculated either onto semi-solid germination medium in plastic Petri plates (control) or into RITAs containing liquid germination medium at three inoculation densities (50, 100 or 200 embryos/RITA). RITAs were operated to provide immersion in liquid germination medium for 1 min every 12 hours. After 45 days, the germination rate for the control treatment was 81.3%, while the germination rates for the 50 embryos/RITA, 100 embryos/RITA and 200 embryos/RITA treatments were 85.3%, 87.7% and 88.3%, respectively. Embryos germinated in the RITAs had longer roots than those germinated on plates after 45 days. Selected somatic seedlings from all treatments were potted and grown in a hardening-off chamber. The survival rate of somatic seedlings germinated in the RITAs was almost double the survival rate of somatic seedlings from the control treatment, and the RITA-derived plantlets were also larger and more vigorous. Following acclimatization to greenhouse conditions, somatic seedlings from all treatments continued growth, with 100% survival.