# COPPICE CULTURE FOR BIOMASS PRODUCTION IN SOUTHEASTERN UNITED STATES

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Coppice culture of hardwood trees is common in cool climates using willow, and in tropical regions using eucalyptus. However, coppice culture is rare in the southeastern United States, despite Klaus Steinbeck's successful applications using American sycamore (*Platanus occidentalis*) three decades ago. Sycamore, poplar, willow, and eucalyptus are candidate species for coppice culture in the southeastern United States. Southern latitude willow varieties are undomesticated, yet widespread distribution of the native *Salix nigra* indicates development potential. Sycamore's rapid early growth is a great advantage during coppicing. However, sycamore has been discounted as a biomass producing crop because dieback inevitably occurs during years 3 to 6. Coppicing sycamore may avoid disease establishment. Similarly, eucalyptus is easily killed aboveground by winter frosts in temperate climates, but roots are rarely damaged. Annual removal of frost-damaged eucalyptus tops would allow regrowth from protected rootstock. To collect information on biomass production and regrowth capacity for southeastern coppice culture, high-density test plots were installed at the Savannah River Site, near Aiken, SC. Plots were designed to include two hybrid poplar clones (OP-367, 15-29, *Eucalyptus grandis*, *E. amplifolia*), sycamore seedlings, and locally collected *Salix nigra*. Trees were planted at 14,815 trees $ha^{-1}$ arranged in dual-row plantings developed for willow coppice culture. During the establishment year, sycamore and poplar clone OP-367 were top producers (3.4 ± 1.1 and 2.1 ± 0.9 Mg $ha^{-1}$, respectively). Stock quality negatively impacted willow and poplar clone 15-29 productivity (0.5 ± 0.2 and 0.8 ± 0.3 Mg $ha^{-1}$, respectively). We could not plant eucalyptus because of non-native planting restrictions at the Savannah River Site. However, frost damage and regrowth information collected for unmulched, styroblock-held seedlings indicates that survival and regrowth potential was greatest for *E. amplifolia*. Few *E. grandis* survived the 469 freezing hours that occurred, while most of the E. amplifolia survived with vigorous regrowth, thus demonstrating potential for coppice as a frost-avoidance biomass culture method.

KEY WORDS: sycamore, eucalyptus, willow, hybrid poplar, short-rotation woody crop, frost damage

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