

# RED MAPLE DYNAMICS IN APPALACHIAN HARDWOOD STANDS IN WEST VIRGINIA

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Red maple (*Acer rubrum* L.) is increasing in understory abundance in Appalachian Hardwood forests in the eastern United States. Partial cutting practices are typically used to harvest the mature, second generation forests. These partial overstory removals may increase the importance of red maple in the overstory of the next forest generation. The ability of understory red maple to respond to minor disturbances may give it a competitive advantage over new regeneration. The growth strategies red maple uses to attain overstory canopy positions were investigated on mesic and dry sites, in two West Virginia Appalachian hardwood stands. In both stands, red maple comprised a small percentage of overstory basal area but was the most abundant understory species. Stem analysis and increment cores were used to determine disturbance history and to examine height and diameter growth relationships among species. The stands originated after a stand-replacing disturbance around 1925. During stand initiation, red maple invaded the sites for 10-15 years longer than most other species, however, all of the codominant red maples sampled were similar in age to other codominant species. Even though stump sprouting is a typical regeneration mechanism for red maple and other species in the region,

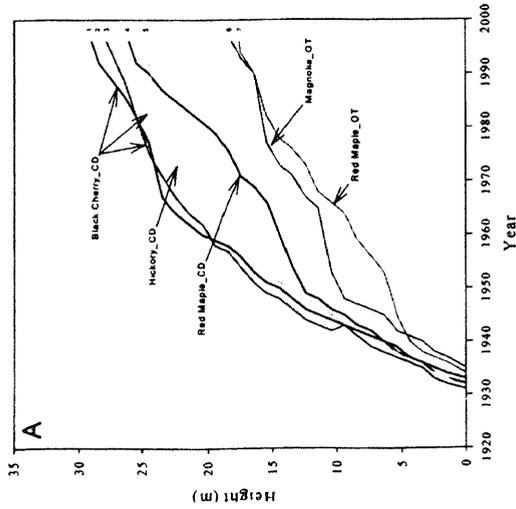
none of the sampled stems showed evidence of sprout origin. Red maple may have been a better competitor on the dry site because even though red maple grew faster on the mesic site, the drier site had a higher percentage of codominant red maples. Regardless of site, codominant red maples had height growth rates similar to codominant oaks (*Quercus* spp.) throughout stand development. The height growth rates of codominant yellow-poplars (*Liriodendron tulipifera* L.) were usually higher than other species, especially during the first 20 years of development. Only one sampled codominant maple achieved codominance after being overtopped for 20 years (Figure 1a). Stem analyzed understory maples showed fluctuating height growth rates in response to small disturbances in the overstory. Age did not appear to decrease red maple's ability to respond to canopy disturbance. Three understory maples showed significant height growth increases when they were 40-50 years old (Figure 1c,e). Red maple's shade tolerance, understory abundance, and ability to respond to minor canopy disturbances, suggests that partial harvesting increases the likelihood that future stands could have a higher overstory red maple component.

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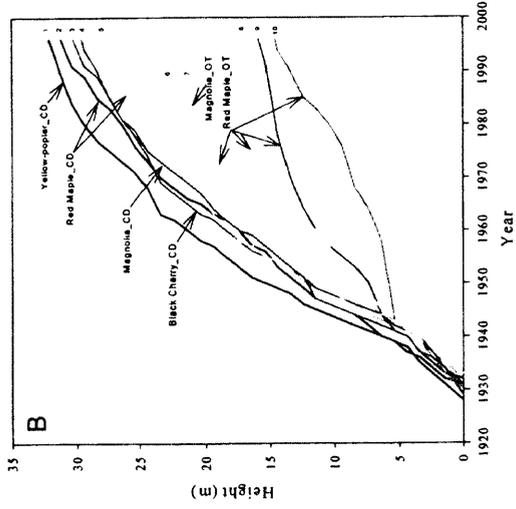
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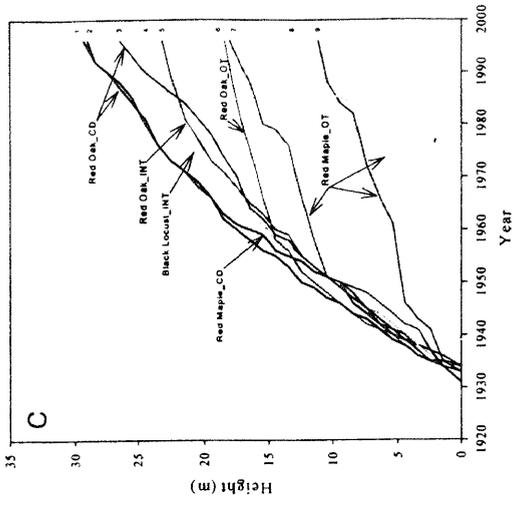
**Plot 27-M**



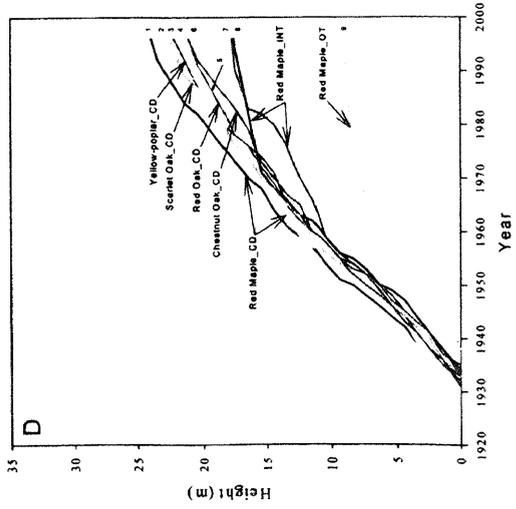
**Plot 18-M**



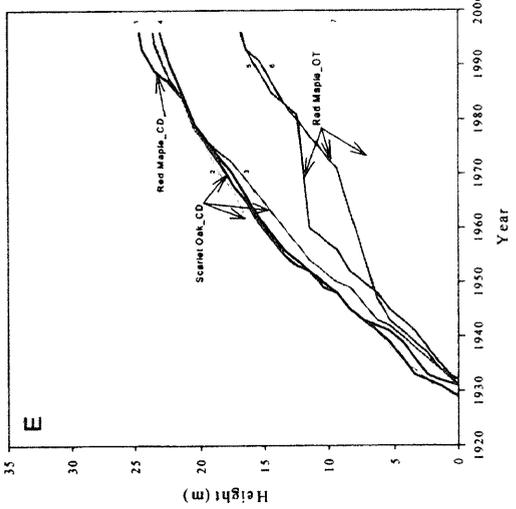
**Plot 22-M**



**Plot 10-D**



**Plot 18-D**



**Plot 44-D**

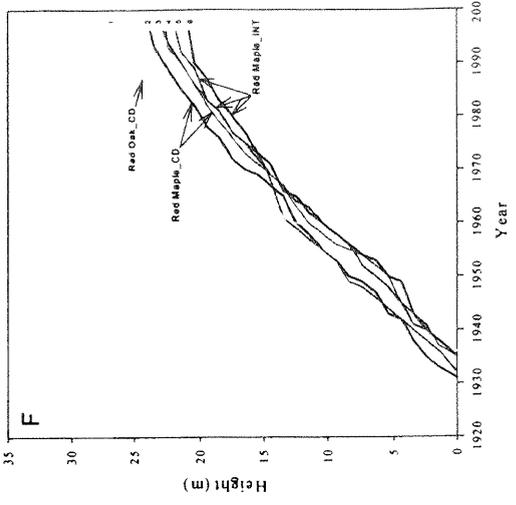


Figure 1— Height growth trajectories for stem analysis plots. Crown class designations CD=codominant, INT=intermediate, OT=overtopped.