Widespread Sugar Maple Decline and Regeneration Failure in the Adirondacks

Jerry C. Jenkins, Elizabeth Moffett, and Daphne Ross[1]

Poster Abstract

Over large areas of the Adirondacks, hardwood stands whose canopies are dominated by or contain abundant mature sugar maple (*Acer saccharum* Marsh.) have almost no sugar maple saplings or seedlings in the understory. Coring shows that most (>80%) of these stands reproduced well in the first half of this century but have added few or no trees to the canopy or subcanopy since 1950. Such forests contrast sharply with maple stands elsewhere in the state and the northeast, which typically have a persistent bank of suppressed seedlings, abundant maple saplings in small gaps, and continuing recruitment of young maples to the canopy and subcanopy. Our research has been designed to assess the incidence, chronology, and ecological correlates of this problem. We find that sugar maple regeneration failure is a) widespread in the east Adirondacks and almost ubiquitous in the western Adirondacks; b) equally common in commercial, ex-commercial, and old-growth forests; c) characterized by the early death of seedlings and hence by sparse seedling banks; d) commonly associated with an abundance of young beech but not restricted to points at which beech is locally abundant; e) found across a range of light levels and not restricted to extremely dark forests; and f) most likely to occur on soils with low (<300 ppm) amounts of exchangeable calcium and least likely to occur on soils with high (>700 ppm) amounts of exchangeable calcium. Our results are consistent with studies from Pennsylvania showing high sugar maple seedling mortality on soils with depleted calcium pools. We suggest that the remarkably uniform occurrence of regeneration failure is ecologically and economically alarming and that our results are consistent with, but do not establish, a central role for soil cation changes, possibly caused by acid rain.

[1]White Creek Field School and Wildlife Conservation Society, White Creek, NY 12057, and Bard College, Annandale-on-Hudson, NY 12504, respectively.