Oral Session #24: **Forests: Carbon allocation, carbon budgets.** Presiding: C. Reid.
Tuesday, August 7, 2001. 8:00 AM to 11:15 AM. Hall of Ideas F.

Leaf energy and resource investment of *Acer rubrum* and *Quercus* spp. within a forested watershed.

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ABSTRACT- Despite its expansion in eastern U.S. forests, leaves of red maple (*Acer rubrum* L.) generally exhibit relatively low photosynthetic rates, mass per area and nitrogen content. Conversely, oaks (*Quercus* spp.), which have been expected to decline with red maple expansion, typically have higher photosynthetic rates, mass per area and nitrogen content. While the influence of these leaf traits on carbon assimilation may seem contradictory to red maple's success in many oak-dominated forests, we consider these characteristics from a leaf energy and resource investment perspective. We hypothesize red maple leaves are relatively inexpensive to construct compared to leaves of co-occurring oaks, which could effectively enable this species to compete successfully despite comparatively low photosynthetic rates. Leaf construction cost (CC), photosynthetic rates (A_{max}) and related characteristics were measured in red maple, red oak (*Quercus rubra* L.) and chestnut oak (*Quercus prinus* L.) upper-canopy leaves at two sites differing in soil moisture availability and species composition in the Black Rock Forest, Cornwall, NY. Mean leaf CC, A_{max}, nitrogen and carbon per area were statistically lower in red maple leaves than those of either oak species at both sites, suggesting the reduced leaf-level photosynthetic capacity in red maple may be balanced somewhat by lower energy and resource requirements for leaf biomass construction. We stress the importance of considering energy and resource investment, in addition to photosynthesis, when evaluating the competitive success of co-occurring species.