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THE GEOGRAPHIC INFLUENCE OF WINTER TEMPERATURES ON OAK AND HICKORY SPECIES

Temperature has a strong influence on altitudinal and latitudinal treeline ecosystems. Little is known, however, of its influence on temperate ecosystems. The goal of this research is to explore the importance of temperature on temperate ecosystems. We focus on northern range margin species (NRM) since they offer the best opportunity to determine the influence of temperature because they represent a treeline, albeit a "species treeline." Four species (*Carya glabra*, *Quercus alba*, *Q. prinus* and *Q. rubra*) are studied covering the Hudson River Valley lowland (HRV) in eastern New York State. Three tree-ring growth chronologies per species are developed and correlated to average monthly minimum and maximum temperatures from 1897–1994. Of the temperature response, winter temperatures are found to be most important factor of growth. *Q. alba* and *Q. prinus* are more sensitive to winter temperatures than *C. glabra* and *Q. rubra*. The dominant mode of growth of the oak-hickory ecosystem across the HRV and the northern and southern HRV is extracted using principal component analysis. These dominant modes of growth are correlated to the same climatic variables as the species' populations. Cold January temperatures limit growth of the oak hickory ecosystem across the study region. Unexpectedly, cold January temperatures most strongly limit growth in the southern HRV. It is hypothesized that an interaction between snow cover and fine root mortality may be the primary factors of this geographic pattern. These results suggest that temperature at species and ecosystem levels may influence radial growth differently at varying geographic scales.