

MARK LESSER, and ANDREW SEIFERT, Department of Biology, Shepherd University, Shepherdstown, WV, 25443, Department of Biology, Syracuse University, Syracuse, NY 13210. **Up the mountain, north to the pole: Do species' elevational and latitudinal limits match?**

It is a long-held assumption that species' upper elevational and latitudinal range limits are correlated-i.e., species that grow at higher latitudes also reach higher elevations-but the degree to which these limits match and the climatic factors controlling them have rarely been quantitatively assessed. We compared the upper range limits of tree species along latitudinal and elevational gradients to assess the influence of specific climatic factors-winter temperature, summer temperature, and growing season length-in determining species' range limits. We determined the climatic limits for each of 28 common tree species along a latitudinal gradient in Eastern North America and across an elevational gradient in the Great Smoky Mountains. We calculated the degree of climatic mismatch between species' limits along the two gradients. We found strong positive relationships between species' latitudinal and elevational climatic limits. Winter temperatures were much lower at species' poleward, compared to upper elevational, range limits, but there were close matches between limits for variables related to summer temperature and growing season length. Results suggest that low summer temperatures and short growing season length limit species' distributions along both latitudinal and elevational gradients, whereas winter temperature does not play a critical role. Narrower ranges along elevational gradients may be due to a lack of local adaptation caused by increased gene flow along "shorter" gradients, where upslope dispersal of individuals maladapted to cold restricts upward expansion. Narrower ranges along the latitudinal gradient may be due to limited migration northward from historical range centers in the southern Appalachians.