

# Biology Seminar

Co-Sponsored by the UNT Research Cluster in Subantarctic Ecosystems and Biocultural Conservation

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### What can the study of island speciation tell us about dispersal and evolutionary rates in early land plants?

Recent advances in phylogenetics and, in particular, molecular dating, indicate that transoceanic dispersal has played an important role in shaping plant and animal distributions, obscuring any effect of tectonic history. Taxonomic sampling in biogeographic studies is, however, systematically biased towards vertebrates and higher plants and the possibility remains that a much stronger signature of ancient vicariance might be evident among other organisms, particularly among basal land plants. In fact, analyses of worldwide bryophyte distribution patterns contrast with the idea that, in spore-dispersed organisms, dispersal obscures evidence of vicariance. Extant species distribution patterns, which at first sight are congruent with the expectations of the continental drift theory, may, however, conceal a complex mixture of relictual distributions and more recent dispersal events. The scarcity of the fossil record in non-vascular organisms like bryophytes hampers, however, the possibilities of calibration of the molecular clock. Even when fossils exist, their use to calibrate phylogenetic trees is limited because their morphology often does not allow for their definitive placement in the phylogeny, hence increasing the error associated with the estimate of the divergence dates. In this context, calibration dates derived from major geological events assumed to have been responsible for lineage divergence, and the use of island neo-endemic speciation events in particular, appears as a promising alternative possibility. Therefore, island biogeography provides the appropriate framework for describing and understanding evolutionary patterns and processes in bryophytes and in particular, the significance of dispersal and cryptic diversification.



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