



UNIVERSITY OF COLORADO DENVER
DEPARTMENT OF INTEGRATIVE BIOLOGY



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Masters Thesis Defense

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Where: SI 3069

“Population Genomics and Soil Niche Assessment of a Rare Edaphic Endemic”

Range-limited rare endemic species are threatened by loss of genetic diversity, which may lead to extirpation and extinction. *Carex scirpoidea* Michx. subsp. *convoluta* (Kük.) Dunlop (Cyperaceae) has a narrow geographic distribution—limited to disjunct, fragmented habitats on the Northeastern shores of Lake Huron. The majority of populations grow in alvar habitats, characterized by thin soils on limestone bedrock. Conversely, *C. scirpoidea* subsp. *scirpoidea* is distributed on diverse habitats and soil types across Northern North America, and Greenland, with few populations in Norway and Russia. Though an apparent edaphic (soil) endemic, it is unclear whether subsp. *convoluta* has differentiated genetically from subsp. *scirpoidea*. We used double digest restriction-associated DNA sequencing to measure genetic differentiation, and test whether subsp. *convoluta* harbors lower genetic diversity than subsp. *scirpoidea*. Overall, subsp. *convoluta* exhibits higher genetic diversity than its conspecific—likely due to nearly-obligate outcrossing. Subsp. *convoluta* shows little genetic differentiation from Eastern North American populations of subsp. *scirpoidea*, suggesting that, if occurring, speciation is at an early stage. In another study, we measured chemical and physical properties of the soil for each taxon to test whether subsp. *convoluta* exhibited a distinct, narrow niche compared to the widespread subsp. *scirpoidea*. When multiple parameters were considered, neither taxon exhibited an affinity for a distinct edaphic niche. Populations in both taxa were shown to inhabit adverse soil types, including saline and calcareous soils. Further research will investigate whether local genomic adaptation has facilitated the inhabitation of unique soil types in both taxa.