

Thursday, October 8, 2:20-3:10 p.m.

Michael Moore, Ph.D., Oberlin College

Staying Alive: Evolution, ecology, and climate change on a gypsum archipelago

Botanists have long been fascinated with understanding the biotic and abiotic mechanisms that are thought to control plant distribution on unusual substrates, but major unanswered questions concerning the origin, assembly, and evolution of edaphic endemic floras remain. The highly diverse and species-rich endemic flora of gypsum exposures in the Chihuahuan Desert represents an excellent, if underappreciated, system for addressing such questions. Through ongoing molecular phylogenetic and phylogeographic studies of most of the dominant gypsum endemic taxa in the Chihuahuan Desert, a much clearer idea of the origin and assembly of the flora has emerged. These studies show that multiple, non-contemporaneous origins of gypsum endemism within gypsum-tolerant lineages are routine, that allopatry drives speciation in gypsum endemic clades, and that the morphological distinctiveness and geographic extent of such clades is positively correlated with their age. Moreover, patterns of phylogenetic and haplotype diversity suggest long-term persistence of gypsum endemic taxa throughout much of the Chihuahuan Desert during climatically unfavorable full-glacial periods of the Pleistocene. More recent collaborations with physiological ecologists have revealed exciting, phylogenetically correlated patterns in nutrient balance between gypsum endemic plants and their non-endemic congeners, suggesting common modes of adaptation (and preadaptation) to gypsum, with strong implications for historical community assembly.