Public Abstract

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Species radiations are events of rapid speciation that are often observed in highly structured environments, such as between islands or lakes that provide isolation among which species differentiation can occur. Evidence of radiation events occurring across less structured, continental scales has also been observed. The isolating mechanisms across these scales however are not well understood in most groups. Neoconocephalus katydids have undergone a recent radiation across temperate North America. We investigated the influence of several types of isolating mechanisms within wide ranging species of Neoconocephalus.

N. melanorhinus is a salt marsh specialist restricted to a narrow corridor along the Atlantic and Gulf Coasts. We saw evidence that the gene flow between populations decreased with distance across the range. Distance seemed to have the larger effect, but barriers to movement also shaped the species genetic structure. Coastal areas that had large gaps in salt marsh habitat inhibited gene flow between populations as well.

The patchiness of habitats, or isolation by resistance, can also influence a species' gene flow. We examined gene flow across the patchily dispersed prairie habitat of N. bivocatus and compared it to gene flow within the generalist N. robustus. We predicted N. bivocatus would show evidence of less gene flow across the same distances, however both species showed evidence of significant gene flow. Neoconocephalus' are strong fliers and the distances between prairie patches evidently do not restrict gene flow to any great extent.

We also investigated the possible influence of epigenetic incompatibility as a mechanism of genetic isolation between N. bivocatus and N. robustus. Epigenetic differences between populations could make gene flow between groups impossible; however we found that while there was epigenetic differentiation between these species, genetic differentiation was greater.