

A Method for Comparing Song Repertoires in Urban vs. Rural Northern Cardinals

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Anthropogenic noise may force animals to adjust aspects of their vocalizations like frequency, syllable usage, and speed. The impacts of human noise pollution must be studied in order to mitigate possible negative effects in the future. Northern Cardinals (*Cardinalis cardinalis*) are an ideal subject because they have a song that is masked by anthropogenic noise like traffic and human speech, and frequently rely on their song to intimidate other males, claim a territory, or attract a female. Previous studies have shown that males in urban areas that sing at higher frequencies claim better territories than competing males, while males in rural areas that sing lower, simpler songs claim better territories than their competitors. While a change in frequency in urban vs. rural areas has been studied, a difference in the size of song repertoire between the two habitats, which on average spans between 8-12 songs, has not. We studied the effect of anthropogenic noise on the size of song repertoires of two separate populations of cardinals from urban (Barry Park, Syracuse) and rural (Rice Creek Field Station, Oswego) areas using automatic recording units (ARU) placed on male territories. The ARUs recorded 30 hours of audio from each territory of 11 males at Rice Creek Field Station and 12 males at Barry Park. Each bird's audio recordings will be separately analyzed using Kaleidoscope Pro, a program that can be trained to detect different cardinal song types. Song types will be differentiated based on syllable type/usage and trill type/usage. Preliminary results have yielded a male from Barry Park singing 12 song types, and a male from Rice Creek Field Station singing 7 song types. Future analysis will consist of building song repertoires for each recorded cardinal, comparing repertoire size, and analyzing the impact a change on repertoire size has on male fitness.