Pitch Perfect: Song Sparrows (Melospiza melodia) Adjust the Frequency of Their Song in Response to Anthropogenic Noise

Caparelli, Reese (School: Ossining High School)

Anthropogenic noise masks avian acoustic communication, leading to decreased reproductive success and delayed territorial defense behaviors. To compensate for acoustic masking, birds can adjust their vocalizations by altering the frequency and length of their strophes. However, these adjustments are not well documented, and more research is necessary to better comprehend how specific bird species alter their song. This study investigated the influence of traffic noise on frequency adjustment and strophe length in song sparrow (Melospiza melodia) vocalizations in Westchester County, NY. Birdsong was recorded at six study sites at varying distances from roads using a MicW iShotgun II microphone and two Audiomoth v1.2.0 field microphones. The SPLnFFT noise meter was utilized to measure sound pressure levels (SPL) after each recording. Songs were analyzed with Audacity and spectrograms were used to make frequency and strophe length measurements. Song sparrows increased the minimum frequency of their song as background SPL increased ($r = .49$, $p < .05$) and subsequently, significantly decreased their frequency bandwidth ($r = -.46$, $p < .05$). However, song sparrows did not significantly adjust the maximum frequency of song ($r = -.30$, $p > .05$) or strophe length ($r = -.01$, $p > .05$). These findings elucidate the impact of anthropogenic noise on song sparrow communication and vocal plasticity, providing a greater understanding of avian responses to noise pollution. Additionally, the results of this research encourage the implementation of noise regulations to help mitigate and manage noise pollution to protect avian species and their ecosystems.

Awards Won: