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Eavesdropping on Birds: The Effect of Distance and Directionality on the Detectability of Avian Vocalizations by Autonomous Recording Units

Autonomous recording units (ARUs) can record vocalizations without human intervention. Because of this, ARUs have the potential to become invaluable as a tool for population monitoring and research. In order to more effectively implement the use of ARUs, it is important to understand how the distance and directionality of a call affects its detectability by ARUs. We had two hypotheses: 1.) The calls would be more detectable from greater distances on a 0° bearing relative to the ARU compared to 90° , 180° , 270° bearings and 2.) calls played with the speaker facing away from the ARU would be less detectable at greater distances than calls played toward the ARU. We designed an experiment in which 2 AudioMoth ARUs were mounted onto trees. We then played audio of an Acadian Flycatcher call on 4 bearings: 0° , 90° , 180° , and 270° . On each bearing, the call was played at 25m, 50m, 75m, and 100m. Detectability was quantified using relative amplitude. We found that the calls on a 0° bearing had the highest relative amplitude, and thus greatest detectability, at 75 and 100 meters. Additionally, calls played with the speaker facing toward the ARU had a higher relative amplitude than calls played facing away from the ARU. These findings should be used to inform researchers on the effects of directionality and distance on the detectability of avian vocalizations by ARUs, which should be considered in order to optimize avian vocalization detection.