

(P4) Comparing two genetic markers used in the identification of diving ducks (Aythyinae) involved in Birdstrikes

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Knowing the species of birds involved in damaging collisions with U.S. military and civil aircraft (birdstrikes) is paramount to understanding and preventing human-wildlife conflicts in this field. The Feather Identification Lab, Smithsonian Institution, identifies over 9,000 birdstrike cases each year using feather morphology and DNA barcoding. While the DNA barcode marker (CO1) is successful at identifying many species of birds, it falls short in species that are very closely related or hybridize frequently. This project tested the effectiveness of two mitochondrial genetic markers, cytochrome oxidase 1 (CO1) and NADH dehydrogenase subunit 2 (ND2) used for identifying species of waterfowl within the genus *Aythya*. Because these diving ducks are commonly involved in damaging birdstrikes, the most reliable method of DNA identification is needed for species designation of birdstrike samples. To compare CO1 and ND2 markers, we sequenced 19 specimens from the 9 different species of *Aythya* that are commonly involved in birdstrikes. We obtained additional sequences from GenBank to increase sample size and geographic coverage. We then constructed gene-specific phylogenetic trees and compared genetic distances between closely related species and support for monophyly of species-specific clades. While neither genetic marker was 100% effective at DNA identifications of all taxa within this group, ND2 was significantly more effective than CO1 at genetic separation of *A. fuligula* (Tufted Duck), *A. nyroca* (Ferruginous Duck), *A. australis* (Hardhead Duck), *A. americana* (Redhead), *A. collaris* (Ring-neck Duck), *A. affinis* (Lesser Scaup) and *A. marila* (Greater Scaup). *Aythya valisineria* (Canvasback) and *A. ferina* (Common Pochard) formed a single clade and could not be distinguished in either tree. Understanding the reliability of the two genetic markers in this group of birds improves lab efficiency and DNA identification success of diving ducks involved in birdstrikes.

Eubanks, D., C. Dove, F. Dahlan and S. Drovetski. 2015. Comparing two genetic markers used in the identification of diving ducks (Aythyinae) involved in Birdstrikes. Proceedings of the North American Birdstrike Conference 15. Poster.