Listening for Silent Flight: The Morphology of Trailing Edge Fringe in Birds of Prey

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An owl wing is a mechanical marvel built for silent flight. The posterior margin of each feather has trailing edge fringe which is key to reducing air vortexes resulting in dramatically quieter flight. Research on trailing edge fringe has mostly focused on how it works rather than who has it. This project aims to answer the following question: Are fringe presence and length based on phylogeny (who you're related to) or on ecology, specifically hunting behavior? To address this, a diversity of wing specimens from various birds of prey were measured. Fringe measurements were taken at five points along several feathers per wing to determine fringe length. The data revealed that fringe length was correlated more with ecology than phylogeny. An example of this is the Buffy Fishing Owl. This owl is closely related to the Great Horned Owl; however, the fringe length was closer to that of an Osprey, another bird that hunts fish. Thus, ecology, especially hunting habits, rather than phylogeny, seem to be the greatest factor in whether or not a bird will have fringe. This study revealed the more complex factors behind fringe presence and silent flight in birds of prey. Further research will explore the possibility of an evolutionary cost to fringe because owls like the Buffy Fishing Owl lost their fringe. Silent flight also has profound implications for engineering. Understanding how to make our inventions like windmills and airplanes silent could help reduce noise pollution and its effects on native habitats.

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