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# AVIAN SENSORY PERCEPTION: WHAT DO WE NEED TO KNOW TO IMPROVE AVIAN DETECTION OF AIRCRAFT?

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## Abstract

Aircraft collisions with birds are an increasingly frequent problem. This increase is the result of increased populations of many species of problem birds and an increase in the number of aircraft with quieter, fewer engines. While much research and progress has been made in modifying airfield habitats and controlling bird populations, almost no research has been directed towards increasing the detection of aircraft by birds. The sensory capabilities of birds do not match those of humans. Typically, when researchers design experiments to test the abilities of birds to detect aircraft or scare devices they assay the device using human senses and do not allow for taxonomic differences. In general, human sensory capabilities are more limited that those of birds. This means birds might detect information or perceive a pattern that humans are unable to detect. On the other hand humans might perceive a stimulus as threatening but to birds it might appear neutral. In order to exploit the sensory and perception capabilities of birds, we must first quantify them. The spectral sensitivity, auditory range, chemical sensitivity, and other sensory abilities are known for only a few species; most of these are either small songbirds or domestic species (e.g. chickens, ducks, pigeons). Avian cognition has received even less study. In order to warn or scare birds away from aircraft researchers need to understand how birds decode the messages they detect. For example, birds have 4 or 5 classes of cones for colour vision; what message to they receive when two cones are illuminated that have non-contiguous spectral sensitivity (e.g. ultraviolet and green)? Such knowledge might allow aircraft to be painted so it is offensive to birds but not humans. The research agencies responsible for aviation safety need to broaden their perspectives and incorporate projects to study both aspects of avian sensory perception: sensory capabilities and cognition.

**Key words:** sensory perception, aircraft, hearing, vision, smell, taste, warning