

Functional implications of species differences in the size and morphology of the isthmo optic nucleus (ION) in birds

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In birds, there is a retinofugal projection from the brain to the retina originating from the isthmo optic nucleus (ION) in the midbrain. Despite a large number of anatomical, physiological and histochemical studies, the function of this retinofugal system remains unclear. Several functions have been proposed including: gaze stabilization, pecking behavior, dark adaptation, shifting attention, and detection of aerial predators. This nucleus varies in size and organization among some species, but the relative size and morphology of the ION has not been systematically studied. Here, we present a comparison of the relative size and morphology of the ION in 81 species of birds, representing 17 different orders. Our results show that several orders of birds, besides those previously reported, have a large, well-organized ION, including: hummingbirds, woodpeckers, coots and allies, and kingfishers. At the other end of the spectrum, parrots, herons, waterfowl, owls and diurnal raptors have re