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Pelvic Sexual Dimorphism in Modern Birds (Aves: Neornithes) and Its Evolutionary Relationship with Relative Egg Size

Pelvic evolution from non-avian to avian dinosaurs (modern birds) is often assessed biomechanically, with functions ranging from weight-carrying, ventilation, and locomotion/flight. Recently, reproduction has been hypothesized to have constrained and shaped pelvic morphology along this lineage. Opening of the pelvis by separating the pubes is thought to have allowed an increase in relative egg size and changes in the egg shape. Since reproductive ability would be advantageous for females, pelvic dimorphism may have evolved in this group. Pelvic dimorphism and its correlation with reproduction in non-avian reptiles and mammals have been extensively studied, but not in modern birds. We are currently investigating pelvic size dimorphism using a multiple regression on representative species from the major group of modern birds (n=30). This will test if there is a significant difference in pelvis dimensions between sexes after accounting for body size. We will also use phylogenetic regression to test for a correlation between dimorphism and relative egg size. Completion of this study will not only result in a better understanding of how the avian pelvis evolved, but also of how sexual selection modifies skeletal anatomy. It is possible that the outcomes of this research will produce a reliable method for determining the sex of extinct dinosaurs, which has been a major hurdle to paleobiological research.

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