COLORATION AND THE EVOLUTION OF LIVE BIRTH

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Organisms have a finite amount of energy with which to invest in survival, growth, and reproduction. Reproductive strategies can range from those that require minimal energy to produce eggs (oviparity) that then develop unassisted, those that require some energy to produce eggs that then hatch internally (ovoviviparity), and those that require significant energy to fully develop internally before birth (viviparity). Females of species that invest large amounts of energy to give birth to live young (viviparous species) may thus have more to lose in choosing low-quality mates than females of species that lay eggs (oviparous species). These females may therefore invest more energy in choosing high-quality males, increasing the competition between males for mates selecting for males with traits that advertise quality. Female choosiness is known to lead to more male-male competition and thus larger males, as well as more colorful and more ornamented males. Thus, we used coloration and body size as a proxy for female mate choice to investigate the correlation between female choosiness and the evolution of viviparity. However, oviparity and viviparity are nearly ubiquitous in birds and mammals, respectively, making it difficult to resolve questions about the evolution of viviparity. Squamate reptiles (lizards and snakes) present a unique opportunity to assess the evolution of live birth because viviparity appears to have evolved multiple times within these groups. Using phylogenetically controlled methods and a well-resolved but diverse group of squamate reptiles, we assessed whether the evolution of viviparity led to more colorful males across 248 species. For a subset of individuals for which sexual size dimorphism was quantified, we also determined whether the evolution of viviparity impacted the degree of size dimorphism. Finally, we determined the average estimated length of time required for males to evolve ornaments and estimated the rate of evolution of coloration across reptiles. These data are important for understanding the evolution of color across multiple groups of animals, as well as for understanding the consequences of viviparity in endothermic groups such as mammals. For example, viviparous lineages have significantly higher speciation and extinction rates than oviparous lineages, and our study suggests that sexual selection for male colorfulness may be one of the drivers of these high rates.