Sexual Size and Shape Dimorphism in an Agamid Lizard, *Japalura swinhonis* (Squamata: Lacertilia: Agamidae)

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(Accepted August 7, 2008)

Chi-Yun Kuo, Yu-Teh Lin, and Yao-Sung Lin (2009) Sexual size and shape dimorphism in an agamid lizard, *Japalura swinhonis* (Squamata: Lacertilia: Agamidae). *Zoological Studies* 48(3): 351-361. Sexual dimorphism in size and shape is a widespread phenomenon in the animal kingdom. Sexual dimorphism in morphology can be explained in proximate (growth pattern/sampling effects) and ultimate (evolutionary payoffs) contexts. There are 3 mutually non-exclusive hypotheses for the evolution of sexual dimorphism: fecundity advantage, intersexual resource partitioning, and sexual selection, each of which can make specific predictions regarding a lizard’s morphology. In this study, we describe sexual dimorphism in size and shape in an agamid lizard, *Japalura swinhonis*, with discussions from both proximate and ultimate perspectives. The results showed that all body parts of males were larger than those of females. After the effect of body size was accounted for, males had proportionately longer and wider heads, and shorter limbs and body length. Sexual shape dimorphism can be proximately explained by different growth patterns between the 2 sexes. We found a correlation between morphology and perch habitat, but not between morphology and diet since the 2 sexes exhibited extensive dietary overlap. Our results rejected the resource partitioning hypothesis and provided support for the fecundity advantage hypothesis as the underlying mechanisms of sexual dimorphism in *J. swinhonis*.


Key words: Allometry, Intersexual resource partitioning, Life history adaptation, Morphometrics, Sexual selection.

Sexual dimorphism is a widespread phenomenon in the animal kingdom (Andersson 1994). Morphological differences between the 2 sexes; however, have 2 aspects: size and shape. Sexual size dimorphism (SSD) describes the situation in which the 2 sexes differ in measured values of certain morphological traits. SSD has been extensively described in reptiles (Andersson 1994). Early studies of SSD in reptiles focused on overall body size and used single traits (body weight or snout-to-vent-length in most cases) to stand for overall body size (Stamps 1993), with less emphasis on SSD of separate body parts that also have ecological relevance. Shape dimorphism, on the other hand, can have diverse meanings depending on how “shape” is defined (Bookstein 1989). In a majority of the literature, the shape of a body part is defined as the trait value after the effect of body size is removed, expressed in the form of a proportion to or regression residual of overall body size. Shape dimorphism was not extensively studied until recently (e.g., Malhotra and Thorpe 1997, Butler and Losos 2002, Irschick et al. 2005, Schwarzkopf 2005), although there is no reason to believe that it is any less important than size dimorphism (Butler and Losos 2002).

Sexual dimorphism can be explained by both proximate (growth patterns) and ultimate