Short Communication

Testing the phylogenetic affinities of Southeast Asia’s rarest geckos: Flap-legged geckos (*Luperosaurus*), Flying geckos (*Ptychozoon*) and their relationship to the pan-Asian genus *Gekko*

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*The conservation crisis facing Southeast Asian biodiversity (Brooks et al., 2002; Sodhi et al., 2004) is a problem not only of underestimation of species diversity in the face of catastrophic habitat loss and degradation, but also a frustratingly slow accumulation of knowledge concerning the evolutionary process that produced the region’s staggering levels of vertebrate diversity (Lomolino et al., 2010; Woodruff, 2010). An understanding of the evolutionary processes that produced the region’s land vertebrate diversity has been slow to precipitate for several reasons. These include a lack of comprehensive biodiversity surveys in many inaccessible forests of Southeast Asia (e.g., Lim et al., 2008; Brown and Diesmos, 2009), the slow pace of subsequent taxonomic work, logistical and legal obstacles to field work, and a dearth of well sampled robust phylogenies with which to infer stable evolutionary classifications and determine the content of higher taxonomic entities. At the same time, the pace of Asian forest destruction has been higher than anywhere else on the planet (Bawa et al., 1990; Whitmore and Sayer, 1992; Sodhi et al., 2004). We initiated this study to understand the evolutionary relationships of some of Southeast Asia’s most rare and enigmatic groups of land vertebrates, the “Flap-legged” and “Parachute” geckos (or “Flying” geckos) of the genera *Luperosaurus* and *Ptychozoon*. With a few exceptions, most species are poorly known forest obligates that seldom are encountered by field biologists (Russell, 1979; Brown et al., 1997, 2000; Brown and Diesmos, 2000; Ota et al., 1996; Das et al., 2008). This situation is taken to the extreme in the case of the genus *Luperosaurus*, in which the entire genus (13 or 14 species) is known from fewer than 30 specimens, with roughly half of these species represented only by one or two specimens in research collections (Ota et al., 1996; Brown and Diesmos, 2000; Brown et al., 2000, 2007, 2010, 2011; Das et al., 2008). Collections are made rarely and unpredictably, such as when high canopy species are dislodged from their perches during strong storms (Brown et al., 1997, 2000; Das et al., 2008).

Two fundamental questions of taxonomy and classification have persisted with respect to these rare forest species. First, a variety of authors have debated the systematic affinities and content of these genera, particularly with respect to the remaining, morphologically generalized gekkonines of Southeast Asia: e.g., members of the genera *Gehyra*, *Hemidactylus*, *Hemiphyllodactylus* *Lepidodactylus*, *Pseudo gekko* and *Gekko* (Boulenger, 1885; Taylor, 1922; Wermuth, 1965; Kluge, 1968; Brown and Alcala, 1978; Russell, 1979; Brown et al., 2000). Second, reliable and stable