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— Gleanings —

Viseshakul, N., W. Charoennitikul, S. Kitamura, A. Kemp, S. Thong-Aree, Y. Surapunpitak, P. Poonswad & M. Ponglikitmongkol. 2011. A phylogeny of frugivorous hornbills linked to the evolution of Indian plants within Asian forests. *J. Evol. Biol.* 24: 1533–1545.

With their large size, spectacular beaks, and unique nesting habits, hornbills are charismatic members of the bird world. They also attract our interest because of their important role in consuming fruits and thus dispersing seeds produced by trees in the forests of Asia.

The paper under review considers not only Asian hornbills, which are relatively large and consume mainly fruits, but also African hornbills that are generally smaller than the Asian ones and have a more carnivorous/insectivorous diet. The study is the most comprehensive ever attempted concerning the phylogenetic relationships between hornbills. For the first time all 15 genera of hornbills were included and of the total number of 54 species, 31 were covered in this study. The investigation employed two different approaches analyzing mitochondrial DNA cytochrome b sequences of 1143 base pairs. There have been many other studies concerning the phylogenetic relationships among hornbill species using, in total, many different types of characteristics including DNA, but no previous study has included all the genera and so many species.

The diagrams presented showing relationships between hornbills nicely separate the present African and Asian species with minimal overlap. By dating the phylogeny it was determined that the initial radiation of hornbills began 53 million years ago (mya) in the early Eocene, and that this led to the origin of frugivorous hornbills around 48 mya in mid-Eocene, which was followed quickly by an explosive radiation of the suite of hornbill genera and species that presently exist in Africa and in Asia. It is unusual among vertebrate animals for taxonomic forms that arise early (~48 mya) in geological time to persist to the present, as in the case of the hornbills.

An especially fascinating aspect of this study is the timing of the explosion in hornbill diversity with the arrival in Asia of the Indian flora ~48 mya (mid-Eocene). The authors find this more than a coincidence and invoke a convincing scenario. This incorporates the fact that the plate transporting more tropical India had by then drifted close to what constituted less tropical Asia, but the two subcontinents had not made actual contact. It is noted that an abundance of frugivorous hornbill species inhabited the regions then and that hornbills are relatively large birds that are capable of flying great distances. The authors suggest that hornbills, employing a combination of long distance flights and island hopping strategies between the two landmasses, were the dispersers of forest tree seeds between the Indian and Asian landmasses. A second invasion of Asia by floristic elements from India occurred ~39 mya (late Eocene) when India had drifted even closer to Asia, thus requiring shorter seed dispersal flights by frugivorous hornbills.

—Douglas A. James & Ragupathy Kannan