



# Frugivory and seed dispersal by vertebrates in tropical and subtropical Asia: An update



Richard T. Corlett

Center for Integrative Conservation, Xishuangbanna Tropical Botanical Garden, Chinese Academy of Sciences, Menglun, Yunnan 666303, China

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## ABSTRACT

Seed dispersal is a key process in plant communities and frugivory is very important in vertebrate communities. This paper updates a review of frugivory and seed dispersal by vertebrates in the Oriental Region (tropical and subtropical Asia) published in 1998. The major conclusions remain the same. Small fruits are consumed by a wide range of potential seed dispersal agents, including species that thrive in small forest fragments and degraded landscapes. Larger and larger-seeded fruits are consumed by progressively fewer dispersers, and the largest depend on a few species of mammals and birds which are highly vulnerable to hunting, fragmentation, and habitat loss. Controlling hunting in both forest areas and the agricultural matrix must be a top priority for conservation. A lot more natural history information has been added to the literature since 1998. This reinforces previous evidence for the importance of hornbills, bulbuls, elephants, gibbons, civets, and fruit bats in seed dispersal, and suggests that the roles of green pigeons, macaques, rodents, bears, and deer were previously underestimated. The taxa for which additional natural history observations would be most valuable include fish, pheasants, pigeons, babblers, rodents, and even-toed ungulates. For other animal taxa, future frugivory and seed dispersal studies need to focus more on the fitness consequences for both the plants and the animals.

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E-mail address: [corlett@xtbg.org.cn](mailto:corlett@xtbg.org.cn).

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## 1. Introduction

Seed dispersal is a key process in plant communities. Dispersal away from the parent plant reduces competition and the impact of species-specific herbivores and pathogens, while dispersal towards a suitable site for germination and establishment increases the likelihood of growing to adulthood (Corlett, 2014). Infrequent, long-distance dispersal events connect fragmented populations and allow the colonization of new habitats (Jordano, 2017). Between 65% and 90% of woody species in tropical and subtropical Asia (hereafter the Oriental Region) are dispersed by vertebrates, with birds dispersing more species than mammals (Ganesh and Davidar, 2001; Chen et al., 2004; Datta and Rawat, 2008; Du et al., 2009; Corlett, 2011a; Li

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