



Crossing the (Wallace) line: local abundance and distribution of mammals across biogeographic barriers

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ABSTRACT

Past and ongoing vertebrate introductions threaten to rearrange ecological communities in the Indo-Malay Archipelago, one of Earth's most biodiverse regions. But the consequences of these translocations are difficult to predict. We compared local abundance and distributions in four tropical mammal lineages that have crossed from Asia to Wallacea or New Guinea. The local abundance of macaques (*Macaca* spp.), which naturally crossed Wallace's Line, was higher in Sulawesi (east of the line; mean = 3.7 individuals per camera station, 95% CI = 2.2: 5.1) than in Borneo (west of the line; mean = 1.1, CI = 0.8: 1.4), but the local abundance of Malay civets (*Viverra zibetha*), *Rusa* deer, and *Sus* pigs was similar in their native ranges and where they had been introduced by humans east of Wallace's Line. Proximity to rivers increased Malay Civet local abundance and decreased the local abundance of pigs in parts of their introduced ranges (Maluku and New Guinea, respectively), while having no effect on local abundance in their native ranges (Borneo) or other areas where they have been introduced (Sulawesi). That local abundance was higher east of Wallace's Line in just one of four mammal lineages is consistent with findings from plant invasions, where most species have similar abundance in their native and introduced ranges. However, species' ecology may change as they enter new communities, for example, their patterns of abundance at local scales. This could make it difficult to predict community structure in the face of ongoing species introductions.

Key words: biogeography; exotic species; Great Australasian Interchange; introduced species; native range.

THE INDO-MALAY ARCHIPELAGO STRADDLES ONE OF EARTH'S GREAT ZOOGEOGRAPHIC TRANSITION ZONES. On the western side of the chain, the islands on the Sunda continental shelf contain a fauna very much Asian in origin. On the eastern side, on the Sahul continental shelf, the fauna is Papua-Australian. In between, the islands forming the region known as Wallacea contain different mixtures of these faunas. Wallace (1876) famously demarcated the boundary between these realms with a line separating Borneo and Bali to the west from Sulawesi and Lombok to the east

(Fig. 1). This is a dispersal barrier to many terrestrial animals because of deep oceanic trenches (Lomolino *et al.* 2006).

But this dispersal barrier has been circumvented for many species through natural and human-assisted dispersal of Asian animals into Wallacea and New Guinea. Sulawesi was naturally colonized by several mammal lineages. It now contains pigs (two species in different genera), bovids (two endemic congeners), carnivores (one species), and primates (two lineages); all of those species are endemic to that island, and in some cases (macaques, *Macaca*, and tarsiers, *Tarsius*), have undergone evolutionary radiations there. Indeed, although Wallace initially put his Asia-Australasia boundary between Borneo and Sulawesi

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