The Wallace Line

Alfred Wallace, one of the premier zoobiogeographers, wrote the definitive treatise “Distributions of Animals” in 1876 where he summarized the known distributions and causes of their biogeographical patterns.

“In the archipelago . . . there are two distinct faunas rigidly circumscribed, which differ as much as those of South America and Africa, and more than those of Europe and North America” [Letters to Henry Bates in London (1858)]

“..._boundary line often passes between islands closer than others in the same group. I believe the western part to be a separated portion of continental Asia, the eastern the fragmentary prolongation of a former Pacific continent”

Looking east from Bali across the Lombok Straits.

The Wallace Line

Alfred Wallace’s main interest was in the vertebrate fauna of the Indo-Malay Archipelago from Asia to Australia where he clearly saw a sharp faunistic break.

“...probably the most important trip he ever made was a 6 km ferry ride from Bali to Lombok.

Wallace’s trips

Sclater’s & Wallace’s faunistic regions
The Wallace Line

Wallace graphically depicts what has since been termed the “Wallace Line” in his book by showing birds and mammals that are found in the Oriental (Borneo, left) and Australian (New Guinea, right) sides.

Oriental Fauna

Cover plate from Distributions of Animals

Australian Fauna

The Wallace Line

Several other lines have been proposed in the region based on particular groups of animals or plants.

Main issue with most lines is what do with Sulawesi (Celebes).

The Wallace Line

Sulawesi, with its mixture of Oriental and Australian fauna, was so perplexing to Wallace, that he vacillated back and forth on where to place the island.

The Wallace Line

Now know that the two regions are different continental plates that have been moving independently — the Asian and Australian plates.

The Wallace Line

Wallace Line — the imaginary line separating the Oriental and Australian biotas — extends between Bali and Lombok and between Borneo/Philippines and Sulawesi.

The Wallace Line

The IndoMalay - New Guinea Archipelago area includes island groups mostly confined to either of two continental shelves:

- Sunda shelf — Asian
- Sahul shelf — Australian
The Wallace Line

Collision of the Australian plate with the Asian plate occurred between 15-5 mya

Note the origins of Bali and Lombok, forming the Wallace Line

The Wallace Line

Sulawesi is a hybrid island from both plates!

The Wallace Line

Tree shrews (family Tupaiidae) were indicated by Wallace as honoring this biogeographical line. An Asian group whose entire range gets as far east as Bali and Borneo but not to Lombok or Sulawesi

The Wallace Line

Greatest center of diversity of palms is in the IndoMalay archipelago — how do they respond to the Wallace Line?

The Wallace Line

Do plants honor the Wallace Line?

Examples from palms
Rattan palms are essentially Asian with all but 3 genera restricted west of Lombok and Sulawesi.

For the 3 genera east of Wallace Line, only 1 species each crosses the line.

The genus Caryota (fishtail palms) is widespread across the Indo-Malay - New Guinea region.

Does it not support the Wallace Line?

The genus Caryota (fishtail palms) is widespread across the Indo-Malay - New Guinea region.

The Wallace Line

Species relationships within two different groups of fishtail palms and their biogeographical distributions.

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Species relationships within two different groups of fishtail palms and their biogeographical distributions.
Eucalyptus (Myrtaceae) is an Australian genus and basically honors the Wallace Line from the east.