

Madagascar: biodiversity and culture

1. Introduction to the great red island: brief history of the people and cultures of Madagascar
2. What is biodiversity? What is it a function of?
3. Island biogeography: explaining current distributions of organisms, especially on islands
4. Examples of Madagascar biota

1. Madagascar is the 4th largest island in the world, and is remote, hard to access, and has been closed to outsiders until quite recently, so it is not well known outside of its own borders.

Brief anthropological history

- Where the Malagasy came from is an unresolved question.
- *Known*: the Malagasy are *not* primarily from Africa.
- *Posited*: the original Malagasy were a mix of south Pacific islanders, with some southeast Asian and Arab blood picked up during the long raft trip west.
- The language (also called Malagasy) is not closely related to any other, but it bears resemblance to both Hindi and Indonesian.

Brief cultural history

- Today there are more than 20 distinct tribal groups, the members of which practice several variations on a theme of animist religion.
- Racism and ethnic division plague the Malagasy. In particular, the Betsileo, who are the people of the *haut plateau*, look down on the many coastal peoples.

Colonial history

- Madagascar was a stopping point on trade (and pirate) routes throughout the age of colonial Europe
- Colonized by the French in the late 19th century.
- The French were ousted in a democratic vote in 1958. From shortly thereafter until the early 1990s, Madagascar was under socialist rule, and kept outsiders out. Since 1992, Madagascar has been a nominal democracy, with a brief socialist-military coup early in 2001.

fady (taboo)

All of the Malagasy tribes have extensive *fadys* that affect all aspects of life. A few of them include:

- A young man may not wear shoes while his father is still alive. (To wear shoes is to act French, and therefore rich and powerful, and would constitute a son acting disrespectfully towards his father.)
- It is *fady* to wear a basket, turned upside down, on the head.
- When food is prepared, and a stranger enters the realm, he must be invited to eat, even if there is not enough for him. It is *fady* not to. In turn, it is *fady* for the stranger to accept such food.
- It is *fady* to use a rice straw as a flute.

Standard Malagasy greetings

"*Inona no vaovao?*" "What's the news?"

"*Tsy misy vaovao. Inona no vaovao?*" "No news. What's the news with you?"

"*Tsy misy vaovao.*" "No news." Then the conversation proceeds to encompass the news.

Another somewhat less common greeting: "I've had (*N*) bowls of rice today. How many bowls of rice have you had?"

The Betsimisaraka

- ...are the largest tribe on the east coast of Madagascar.
- Betsimisaraka means "numerous and inseparable".
- Traditionally, the Betsimisaraka are traders, seafarers, fishers, and cultivators of lowland forests.
- Practice *tavy* (slash and burn) rice farming in rainforests.
- Like all 18 Malagasy tribes, the Betsimisaraka are animists, who worship their ancestors.

Retournement

The turning of the bones ceremony, practiced by all of the Malagasy tribes, as part of the celebration and ritual of animism and ancestor worship. The timing of the ceremony differs between tribes. Among the Betsimisaraka, it occurs after the successful rice harvest each May.

City life in Madagascar

- Country population: approximately 15 million.
- Very little industrial or technological development.
- At or near the bottom of global indices of wealth.
- The capital Antananarivo once had a single movie theatre (the Rex). That is now gone. Madagascar is a large country without a movie theatre.

2. What is biodiversity?

- Biodiversity = speciation rate - extinction rate
- In managing ecosystems, we have a hard time making conditions ripe for speciation. It is far easier (but certainly not easy) to act to prevent extinctions, especially anthropogenic extinctions.
- But speciation is an equally (if not more) important part of the equation, in terms of explaining current biodiversity.

A reminder: Biogeography: vicariance vs. dispersal

Biogeography is the study of how organisms ended up where they are today. There are two main kinds of biogeographical explanations:

Modern Madagascar

- Isolated landmass for at least 75 million years.
- More than 90% of its species are endemic. Birds less so (~50%), herps as high as 99%.
- Many organisms are more closely related to those in either South America (e.g. boas) or India (e.g. some frogs) than to organisms in mainland Africa—even though Africa is currently much closer. Historical movement of continents helps us understand these findings.
- In those 75 million years of isolation, many lineages have diversified (e.g. lemurs, frogs, gekkos, tenrecs, weasely critters like the fossa).
- And, conversely, many “mainland” lineages are completely absent (e.g. poisonous snakes, cats, dogs, monkeys, ungulates of any sort).

3. Theory of Island Biogeography

- Developed in 1967 by biologists MacArthur and Wilson to address the question: **Why do some islands have high biodiversity, while others do not?**
- For the purposes of this theory, continents are basically just very big islands.
- Basic assumption of the theory: Biodiversity on islands is primarily a factor of two things: immigration and (local) extinction.
- Two main predictions:
 1. Islands close to a source area should have a higher number of species than islands further from the source area (for islands of equivalent areas). *Why?*
 2. Larger islands should have more species than smaller islands (for islands located at similar distances from the source area). *Why?*

Biodiversity on islands

We still don't have a complete understanding of how ecological circumstances and population genetics have fostered such rapid diversification on islands.

But there are several broad types of explanations:

- For some islands, fluctuating sea levels repeatedly connect and disconnect islands, and therefore populations on them.
- Speciation also occurs on islands as a result of new habitat parameters, such as reduced predator risk.
- Biologically speaking, lakes and other isolated bodies of water act analogously to islands, but for the aquatic rather than terrestrial biota.

Diversity of ecotypes on Madagascar

- While not more diverse than other tropical ecosystems, per se, more than 90% of all the flora and fauna of Madagascar is endemic, making it, perhaps, more valuable.
- The lowland rainforests of the East coast (Masoala peninsula) are some of the most diverse ecosystems in Madagascar. Less than 10% of these are still standing.

A sampling of Malagasy primates:

Lemurs

- Group of primates wholly distinct from all others on the planet.
- Most are arboreal, either pair-bonded or live in social groups, and have female dominance.

The mouse lemur

- World's smallest primate.
- Thought to be solitary; anecdotal evidence suggests pair-bonding.
- Nocturnal.
- Ferocious bite.

The aye-aye

- Fills the woodpecker niche.
- Once thought extinct, actually doing okay.
- In some regions, it is *fady* to "mock, deride, kill or eat" the aye-aye. In others, it is considered bad luck not to kill one if you see it, as otherwise someone in your village will die.

Sifakas

- Member of the Indriidae, all of which locomote with "vertical grasping and leaping."
- When forests are cut, and there are no vertical stems left to grasp, they try terrestrial locomotion, which they are not equipped to do with any grace.

Indri

- Largest extant lemur (10 kg). Pair-bonded individuals call at dawn and dusk, their songs echoing off the hilltops.
- *Babakoto*, Betsimisaraka for indri, means "ancestor of man."
- The story goes that an indri once saved a man stuck high in a tree, taking him gently to the ground. It is thus *fady* to kill indri, as it would disrespect both their helpfulness, and their position as members of our extended family.

Other animals: birds, boas, gekkos, chameleons and tiny chameleons, frogs...