

MA45 Demography and spatial ecology of the critically endangered Coquerel's sifaka (*Propithecus coquereli*)

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Introduction:

Madagascar contains a large diversity of primate species, with over 100 currently recognized species of lemur across the island. At the same time many of these species are undergoing rapid population declines as a result of large scale habitat loss and human encroachment. The majority of lemur species are threatened with extinction, making lemurs the most endangered group of mammals on earth (Schwitzer et al., 2014). However, despite this widespread decline, many lemurs possess adaptations to survive and thrive in human altered environments (Lehman et al., 2006). An important area of research in Madagascar is what biological traits or social/environmental conditions allow some lemurs to persist in degraded habitat while others disappear.

Coquerel's sifaka (*Propithecus coquereli*) are one of the most endangered lemur species in Madagascar, listed as critically endangered by the IUCN. Sifaka are a mid-sized lemur, that primarily feed on leaves, but have a varied diet. Group size and home ranges are varied, but generally groups are composed of 3-7 individuals who occupy a home range of between 5-20 ha (McGoogan, 2011; Salmona et al., 2014). Coquerel's sifaka, as with many other lemurs, have a strict breeding season, and females will give birth primarily in the month of July (Ross and Lehman, 2016). They are only found in the Northwest of Madagascar, one of the areas of Madagascar hardest hit by deforestation. In certain sites across the Northwest, such as Mariarano village, sifaka are known to utilize highly degraded anthropogenic habitat (Salmona et al., 2014). This is in stark contrast to other studies on Coquerel's sifaka which have found them to be restricted entirely to interior areas of large forests (McGoogan, 2011; Kun-Rodrigues et al., 2014). What biological, environmental, and social factors that lead to this discrepancy remains to be seen.

The aim of this project is to determine how sifaka cope with living in highly degraded habitat. Using spatial data, the distribution, abundance, demographic composition, and ranging patterns of sifaka will be examined in order to determine how sifaka use degraded habitat.

Sifaka groups will be studied in highly degraded habitat, such as in villages and adjacent to crop fields, as well as comparative samples from continuous forests in order to examine how groups living in different habitats co-exist with humans.

Methods:

Sifaka groups located around two camps will be studied: Mariarano (main camp) and Matsedroy. Mariarano groups are found in close proximity to the village of Mariarano and in the interior of the forest, where there is less human presence. Matsedroy groups will be followed in the interior forest, where there is higher human presence due to high levels of deforestation and fragmentation. Groups will be found by searching the routes with the highest frequency of sifaka sightings based on Operation Wallacea's long-term data from the Mahamavo region. Once a group is found all individuals within the group will be assessed for a) sex, b) age class, c) general health/ body condition, d) unique identifying features. After a suitable number of unique groups have been identified a portion of the groups (4-6 per camp) will be selected for intensive study. Groups will be selected in order to represent a diversity of habitat types, demographic composition, and based on logistical constraints (such as distance from camp or level of habituation).

During intensive data collection groups will be tracked from their sleeping site early in the morning before movement occurs (usually before 7 am) until they return to their sleeping site before dusk. The chosen group's location will be tracked using a handheld GPS device. Every 30 minutes a GPS point will be taken as close as possible to the exact location of the group. At each 30-minute point data will also be recorded on a) height in tree, b) group spread, c) tree species utilized. Additionally, extra GPS points and data will be collected *ad libitum* on any extraneous factors influencing ranging such as presence of dogs or people, intergroup conflict, potential predators, or extreme weather conditions. These data will be used to compare sifaka movement patterns in habitats of various types.

Habitat type will be measured in a number of ways and will be adapted before fieldwork based on student's interest in finer-scale questions on habitat use. Broadly, we will use boundaries of forest and villages to determine the ranging patterns of sifaka in interior forest

(areas >600 m from forest edge), forest edge (areas within 600 m of forest edge), and agricultural/village locations (areas outside of continuous forest). We will also make comparisons between groups living in continuous versus fragmented forests (i.e. Mariarano vs. Matsedroy forests). During follows of sifaka groups we will be collecting data on tree species utilized in order to quantify the use of native and introduced species. Additional methods that can be utilized are vegetation plots, fine scale habitat mapping with GIS, or other methods to be discussed before data collection begins.

We will also be piloting behavioural data collection based on instantaneous scan samples and opportunistic recordings of lemur-human interactions. However, sufficient data for analysis will not be available this year, and so potential research questions should focus on the spatial data and include, but are not limited to:

1) How does group size and composition differ between different habitat types?

Potential Variables: group size, male:female ratio, presence of infants, habitat type

2) Do group ranging patterns shift in response to anthropogenic influence?

Potential Variables: home range, habitat type, human presence, distance from forest edge

3) How do demographics impact group ranging patterns?

Potential Variables: group size, male:female ratio, presence of infants, home range

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