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# Habitat Use and Population Densities of Rain Forest Chameleons in the East Usambara Mountains of Tanzania [poster]

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# HABITAT USE AND POPULATION DENSITIES OF RAIN FOREST CHAMELEONS IN THE EAST USAMBARA MOUNTAINS OF TANZANIA



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## Introduction

- Unsustainable harvesting by humans is a principal cause of species declines and extinctions worldwide.
- Biodiversity hotspots, such as the East Usambara Mountains of Tanzania, are especially threatened by harvesting.
- The Usambaras are home to a diverse assemblage of chameleons, including many endemic species.
- Villagers in the Usambaras have identified chameleons as the most collected vertebrates.
- Insufficient knowledge of many species hinders efficient management, which is necessary to ensure non-detrimental collection levels.
- I conducted chameleon density surveys in part of Amani Nature Reserve and used radio-tracking to enhance density estimates.



## Methods

### 1) Radio-tracking

- Attached radio-transmitters weighing <10% body weight to 16 *T. deremensis* (4 adult female, 6 adult male, 2 juvenile female, 4 juvenile male).
- Nightly tracked chameleons (avg. of 32 locations / chameleon) and recorded their roost height and the distance from previous roost.

- Used ANOVA to identify differences between age and sex classes in distance moved and the % of time spent above 7m (the cutoff for density surveys).

- Used results to adjust density estimates for large-bodied chameleons.

### 2) Density Surveys

- Randomly placed 200-meter transects in a 722 ha block of Amani Nature Reserve (N=30) and at random distances along trails (N=16) using Hawth's Tools in ArcGIS.
- Conducted surveys at night during October and repeated in April (rainy season). For each chameleon, the distance from the transect, perch height, species, sex, age class, length, and weight were recorded.
- Used Distance 6.0 to estimate densities. Combined similar species and excluded several species because of low numbers.



## Conclusions

- *Chamaeleo dilepis* and *Ri. breviceaudatus* are absent from forest at this elevation (852-1103m), while *K. matschiei*, *K. vosseleri*, *K. tenuis*, and *R. spinosus* are relatively scarce in the forest. *Trioceros deremensis* and *R. temporalis* are common, but density varies greatly.
- The endemic and scarce *K. matschiei* and *K. vosseleri* may be of concern given their scarcity in forest habitat. Density estimates in other habitat types are needed to determine status.
- For accurate density estimates, it is important to consider seasonal variation in density and animals too high to be observed in surveys.

## Results

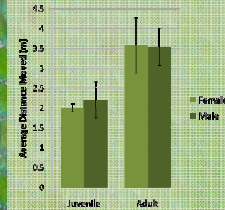


Figure 1. Distance moved between roosts by age class and sex. Error bars represent 1 st. dev.

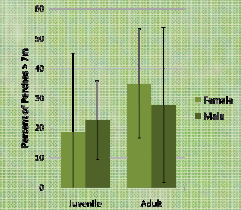


Figure 2. Percent of perches above 7m by age class and sex. Error bars represent 1 st. dev.

- Juvenile *T. deremensis* moved less between sightings than adults ( $p=0.013$ ); otherwise movement among ages and sexes was very similar ( $p=0.564$  to  $0.967$ ).
- Density estimates of large-bodied chameleons were adjusted to account for the 27% of roost sightings above 7m.

Table 1. Densities of large-bodied (*T. deremensis*, *K. matschiei*, & *K. vosseleri*) and pygmy chameleons (*R. temporalis*) in Amani Nature Reserve during October and April (rainy season).

| Analysis               | # Transects | Effort (m) | # Observations | Density (per ha) | Density CV (%) | Density Lower 95% CL | Density Upper 95% CL |
|------------------------|-------------|------------|----------------|------------------|----------------|----------------------|----------------------|
| Large + Forest - Oct.  | 27          | 5400       | 95             | 16.26            | 27.6           | 9.35                 | 28.29                |
| Kmat                   | 8           |            | 1              | 1.37             | 50.7           | 0.51                 | 3.65                 |
| Kvos                   | 1           |            | 1              | 0.17             | 100.2          | 0.03                 | 0.95                 |
| Tder                   | 85          |            | 14.55          | 30.0             | 7.97           | 26.55                |                      |
| Large + Forest - April | 30          | 5905       | 46             | 6.94             | 28.8           | 3.93                 | 12.25                |
| Kvos                   | 2           |            | 0.30           | 70.5             | 0.08           | 1.10                 |                      |
| Tder                   | 44          |            | 6.63           | 29.7             | 3.69           | 11.93                |                      |
| Large + Trail - Oct.   | 16          | 4200       | 68             | 20.56            | 25.8           | 12.08                | 34.98                |
| Kmat                   | 7           |            | 2.12           | 88.7             | 0.42           | 10.70                |                      |
| Kvos                   | 1           |            | 0.30           | 102.4            | 0.05           | 1.83                 |                      |
| Tder                   | 59          |            | 17.84          | 23.6             | 10.99          | 28.96                |                      |
| Large + Trail - April  | 16          | 4200       | 28             | 13.10            | 35.7           | 6.49                 | 26.44                |
| Kvos                   | 4           |            | 1.87           | 48.9             | 0.72           | 4.88                 |                      |
| Tder                   | 24          |            | 11.23          | 38.7             | 5.23           | 24.10                |                      |
| Pygmy + Forest - Oct.  | 27          | 5400       | 81             | 22.27            | 28.2           | 12.65                | 39.20                |
| Pygmy + Forest - April | 30          | 5905       | 284            | 79.50            | 12.9           | 61.49                | 102.79               |
| Pygmy + Trail - Oct.   | 16          | 4200       | 49             | 15.92            | 23.1           | 9.93                 | 25.51                |
| Pygmy + Trail - April  | 16          | 4200       | 140            | 92.65            | 21.8           | 59.16                | 145.10               |

- Density varied more temporally than between forest and trails.
- Density of *R. temporalis* increased greatly by April, but not due to new hatchlings.

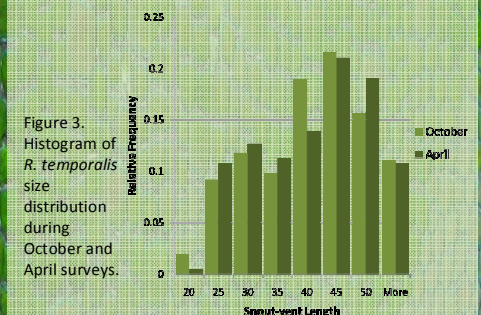
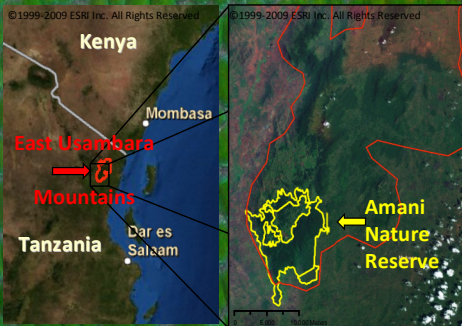


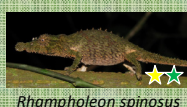
Figure 3. Histogram of *R. temporalis* size distribution during October and April surveys.

## Acknowledgements

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## Chameleon species



- ★ = endemic to East Usambara Mountains
- ☆ = near endemic
- ☆★ = associated with forest