Hunting chameleons in the highlands of Kenya

Jan Stipala

East Africa – high chameleon species diversity


Rhampholeon spinosum


Kinyongia mutituberculatum


Kinyongia tenue


Kinyongia xenorhinum


Trioceros hoehnelii

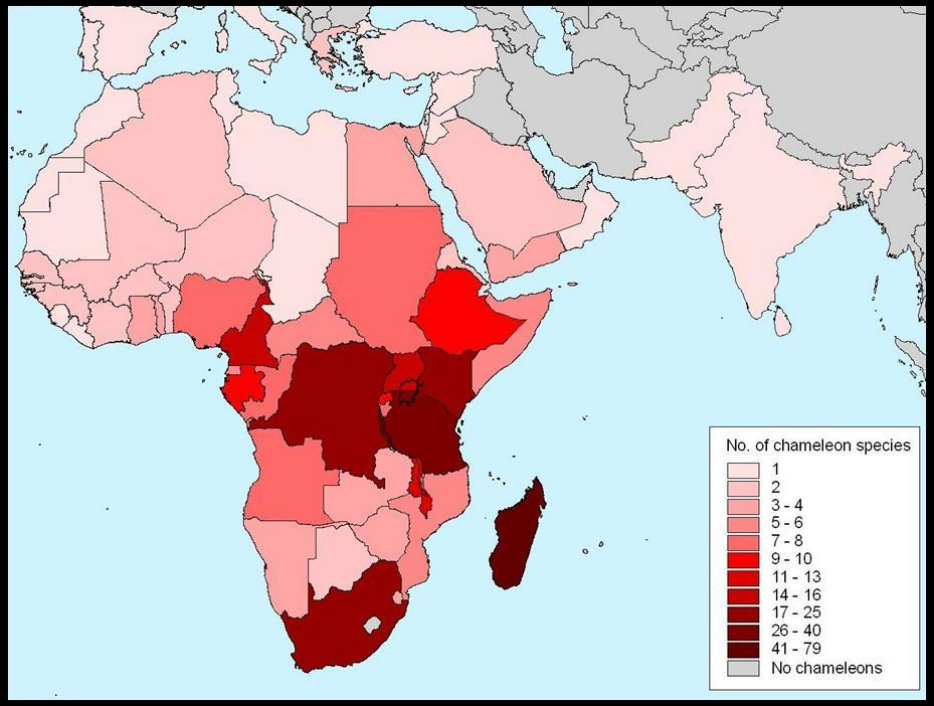

Trioceros melleri

Trioceros johnstoni

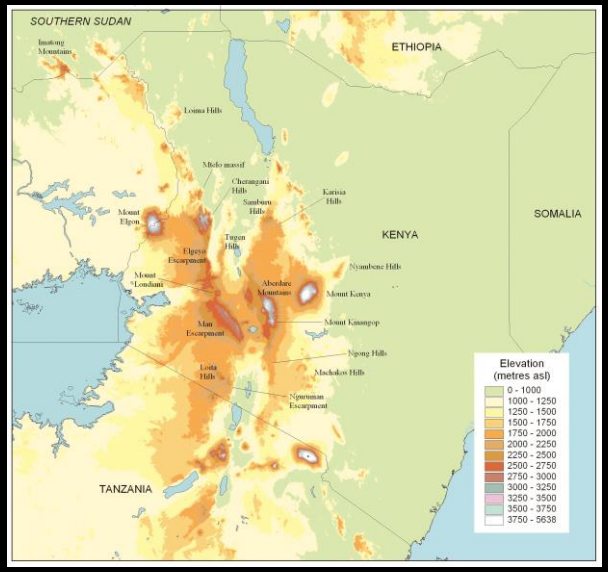

Rhampholeon temporalis

50+ species
Most are endemic to East Africa

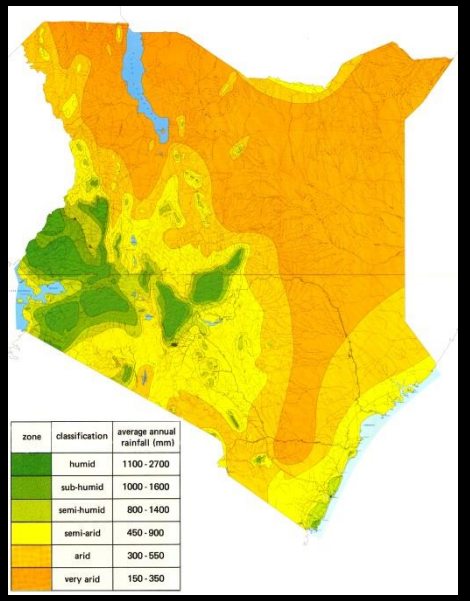
Distribution of chameleon species diversity



Global distribution of chameleon species diversity

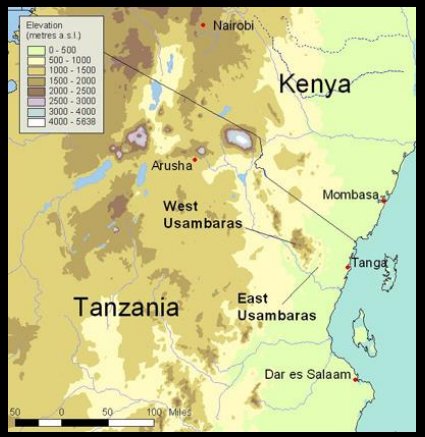


Topology of Kenya

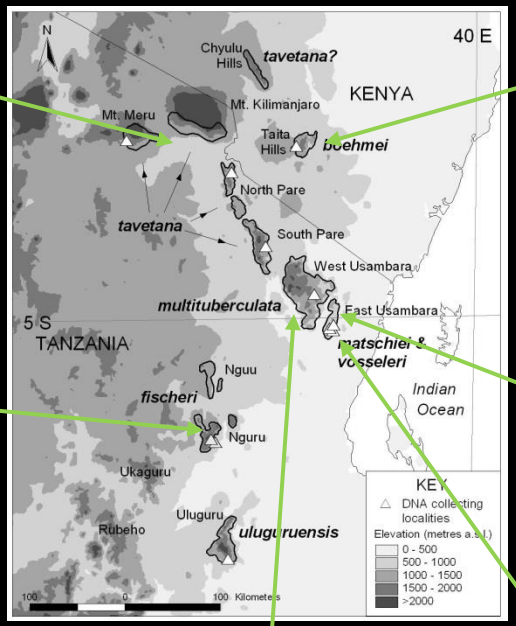


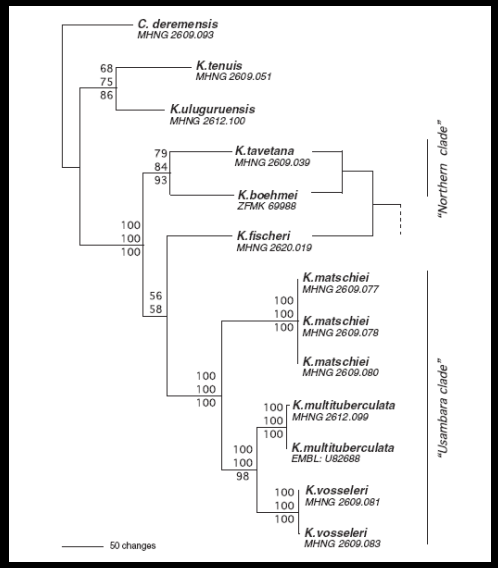
Rainfall patterns in Kenya

Usambara Mountains, Tanzania 2002



Review of the *fischeri* - complex



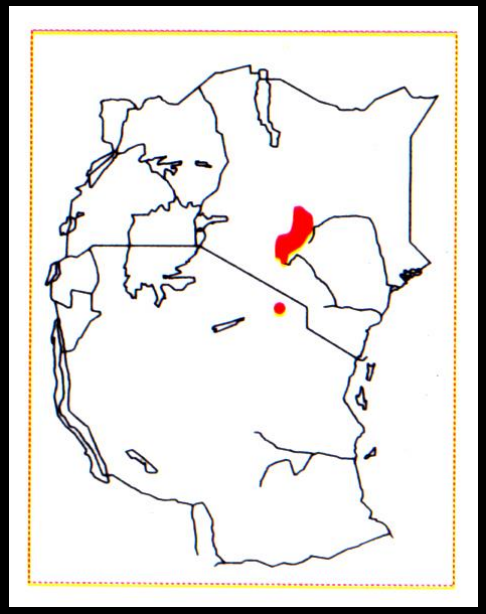


Mariaux, Lutzmann & Stipala (2008). The Two-horned Chameleons of East Africa. *Zool. J. Linnean Soc.* **152:** 367–391.

Mt Kenya 1992 - *Trioceros schubotzi*

Trioceros jacksonii 2500-3000m

Trioceros jacksonii – subspecies



Predicted distribution of *Trioceros jacksonii*

(Field Guide to the Reptiles of East Africa, Spawls *et al*. 2002)

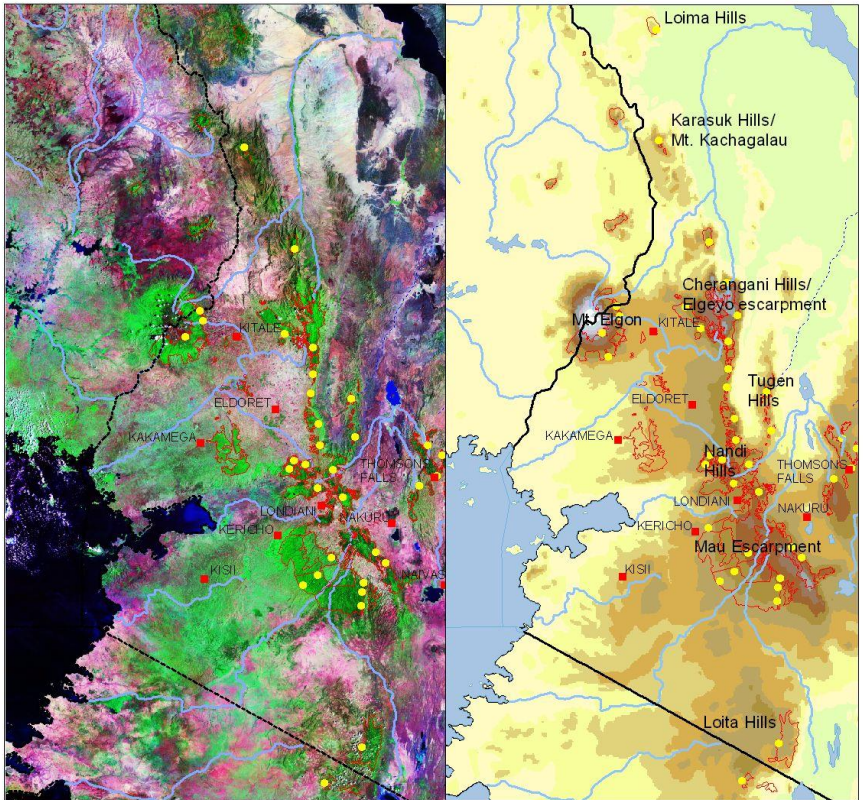
Trioceros jacksonii – unusual variation

Naro Moru route (3000m), west Mt. Kenya

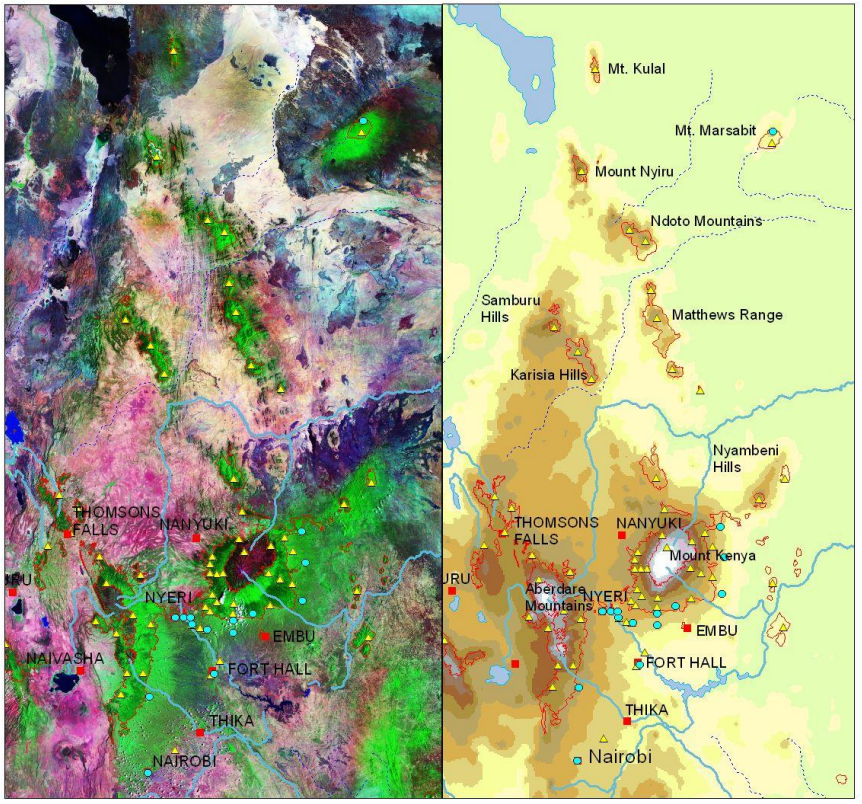
East Mt. Kenya

Mysterious '*willigensis*' in the pet trade
Geographic origin: unknown

Survey plan



Western highlands



Central highlands

KEY

- Collecting localities of museum specimens
- Proposed survey sites
- Forest

Elevation (metres a.s.l.)

- 0 - 1000
- 1000 - 1250
- 1250 - 1500
- 1500 - 1750
- 1750 - 2000
- 2000 - 2250
- 2250 - 2500
- 2500 - 2750
- 2750 - 3000
- 3000 - 3250
- 3250 - 3500
- 3500 - 3750
- 3750 - 5638

- **Survey mountains of known distribution - on different sides and across a wide range of elevations**
- **Survey suitable habitat beyond known distribution**
- **Survey habitats other than montane forest**
- **Sample across hybrid zone between *T. j. jacksonii* and *T. j. xantholophus***

Project collaborators – NMK, KWS and forestry department

A few problems…

Montane forests

Afroalpine zone

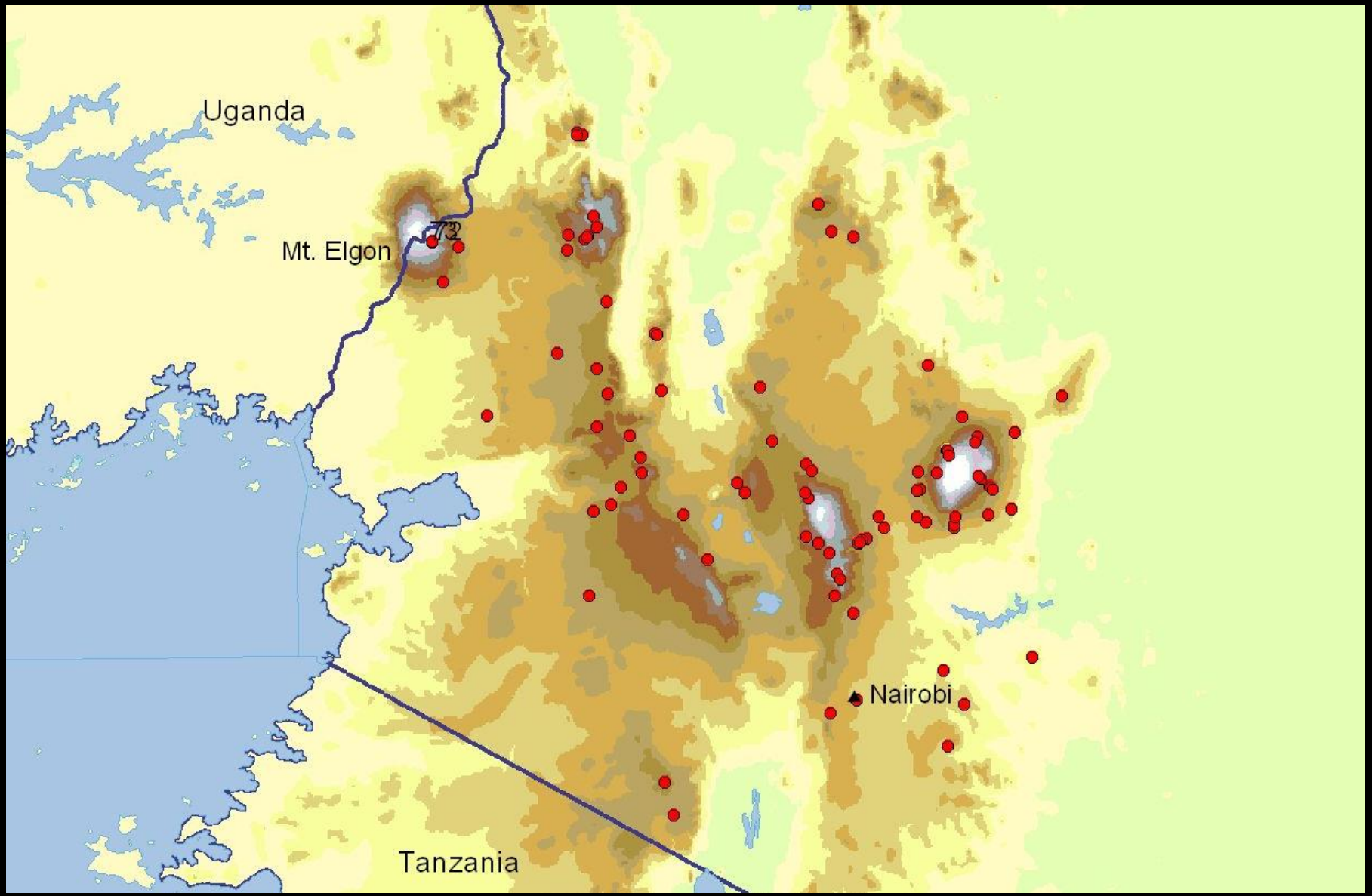
Working day - set up camp, have a cup of tea and wait for darkness.

Finding chameleons

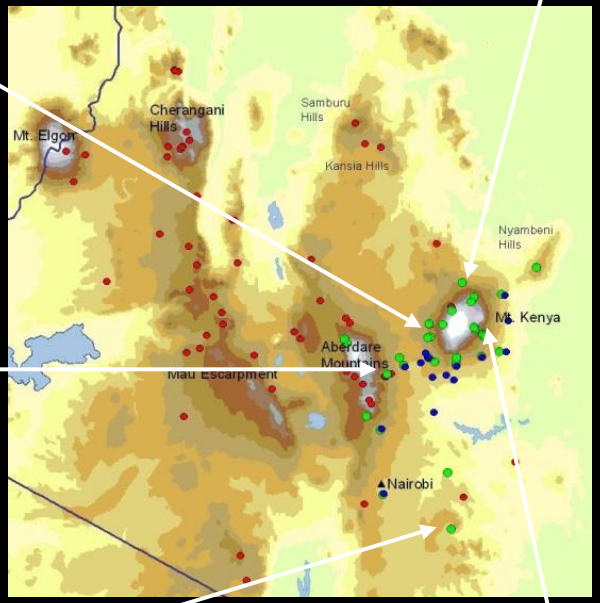
Fishing for tree-dwelling chameleons

Chameleons in man-modified habitats

Sites surveyed



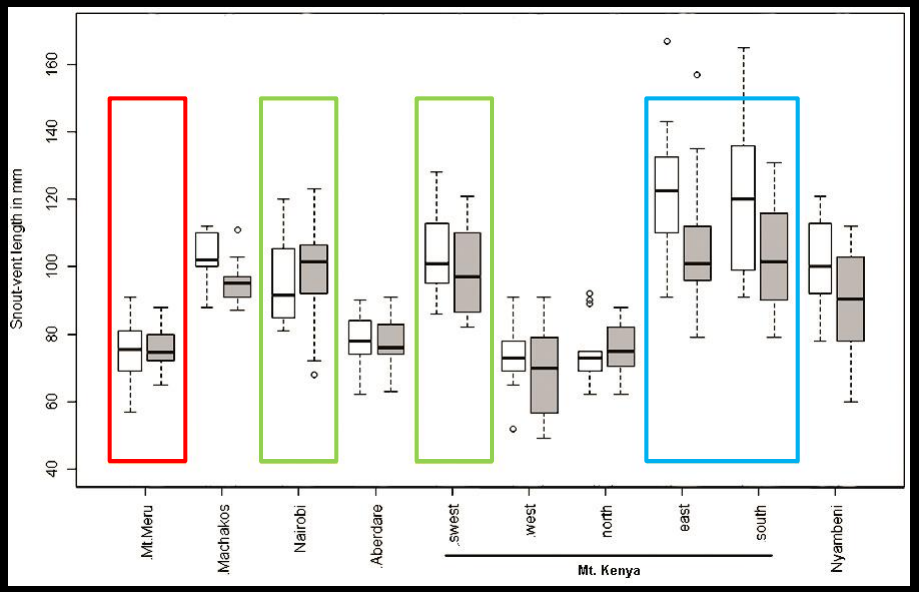
Trioceros jacksonii



Main findings:

- Wider distribution than reported
- Lives at high elevations <3200m
- Absent from western highlands
- Morphological variation more complex than subspecies descriptions
- Distinct male colour patterns in some geographic areas

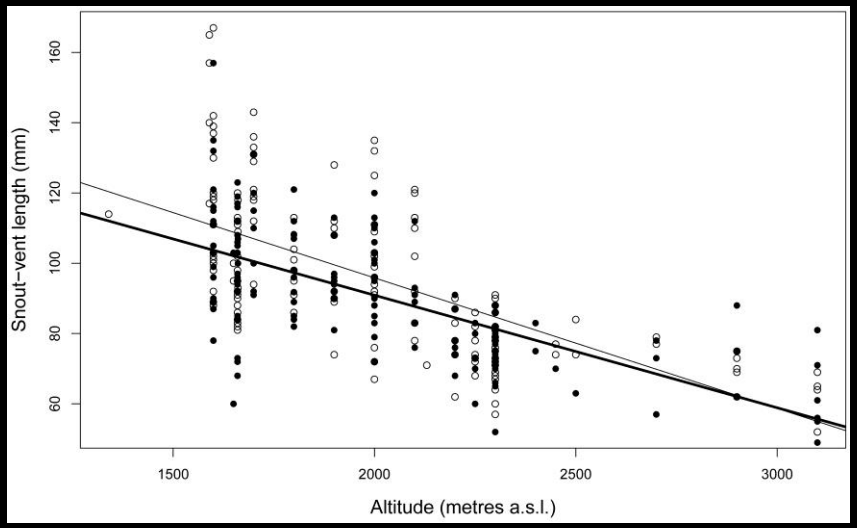
Trioceros jacksonii - body size variation



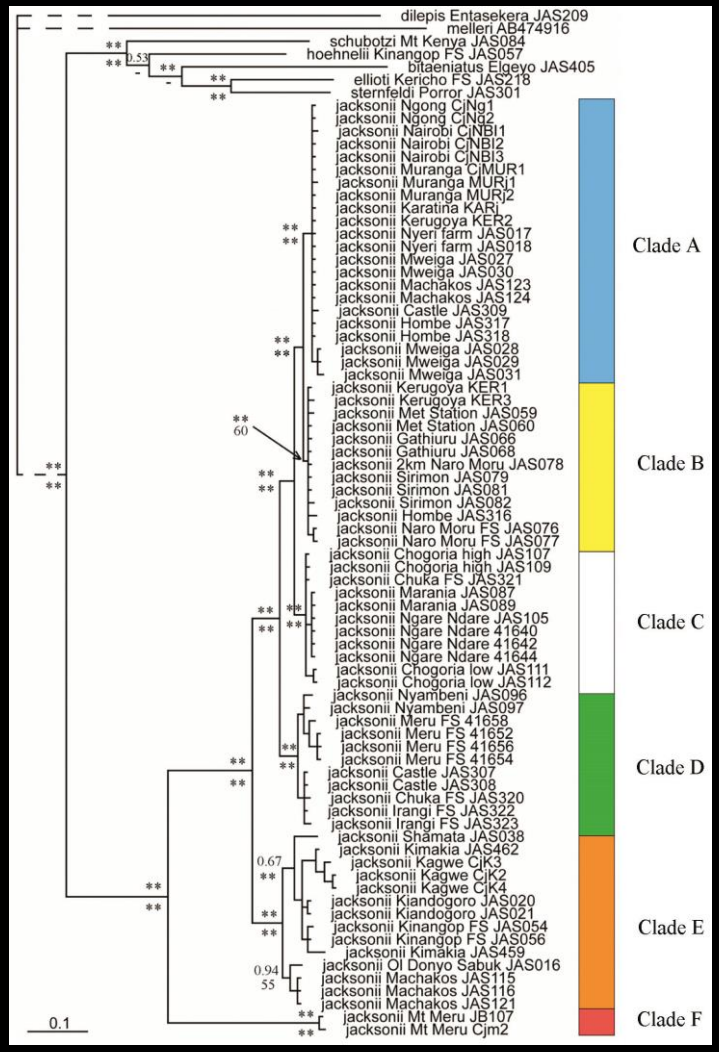
SVL variation by region
Males – white boxes
Females – grey boxes

Red line – *T. j. merumontana*
Green lines – T. j. jacksonii
Blue line – T. j. xantholophus

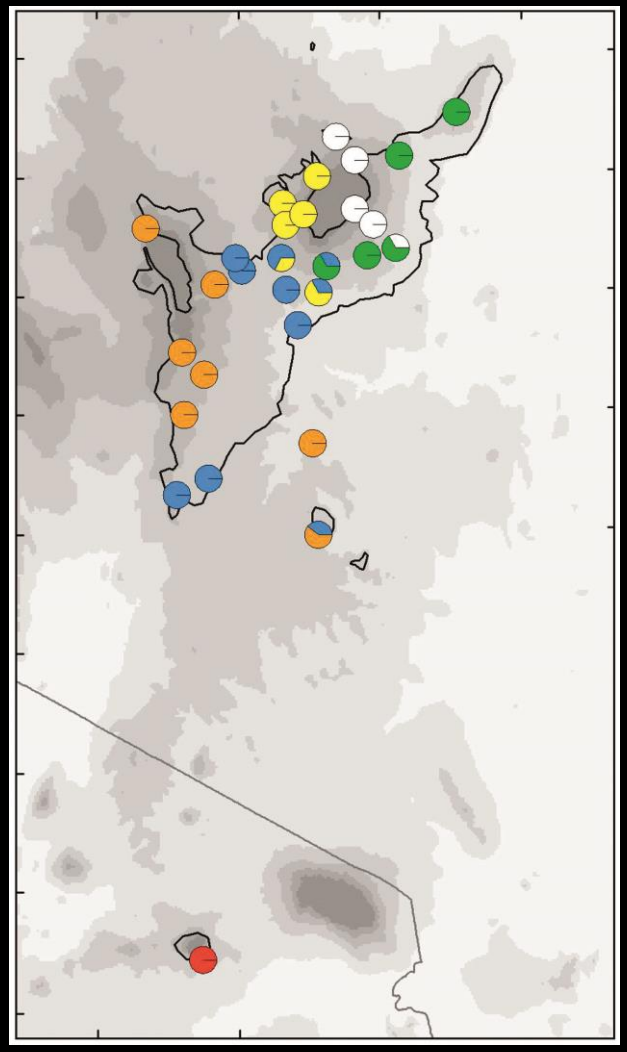
SVL variation with elevation (metres asl)
Males – white circles
Females – black circles



Genetic variation in *Trioceros jacksonii*

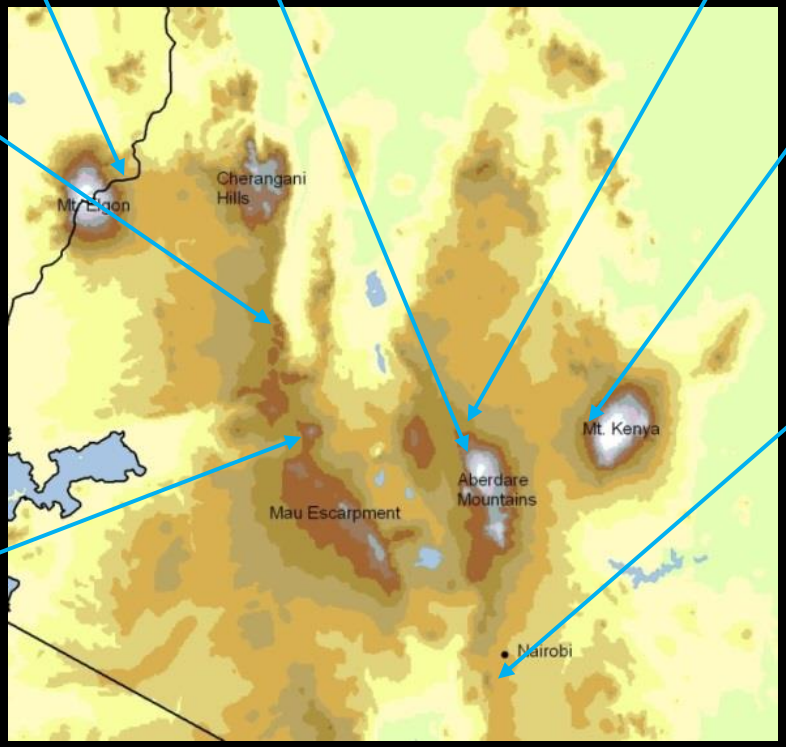


Bayesian tree generated using mtDNA markers (16S and ND4)

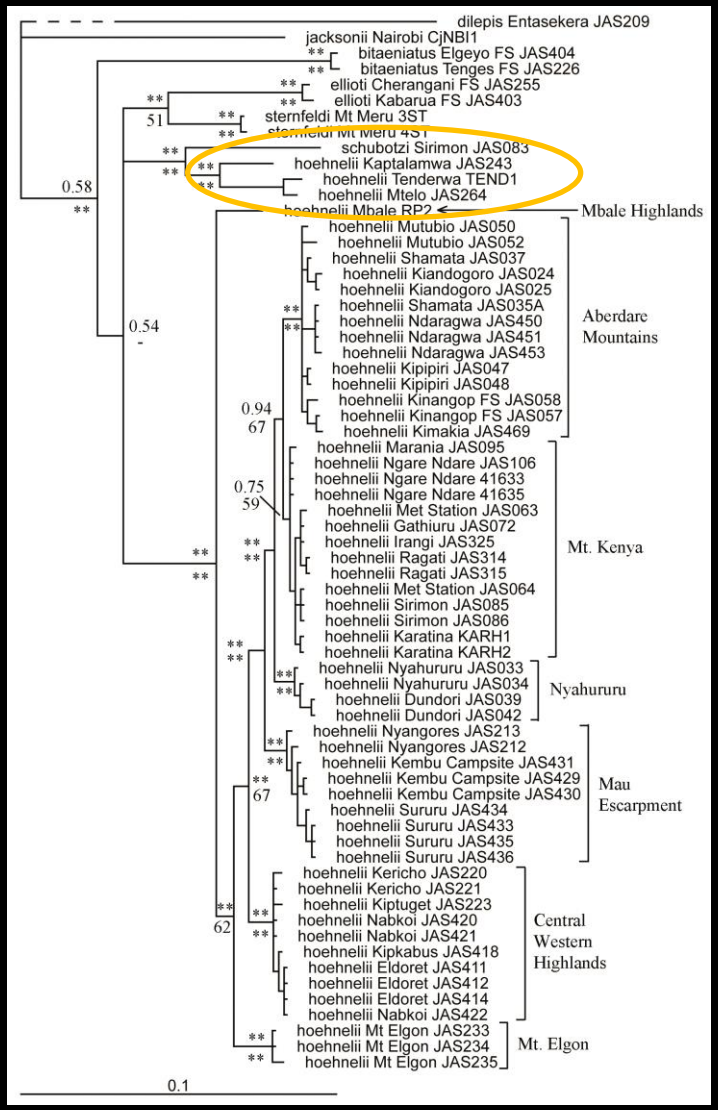


Distribution of mtDNA haplotypes

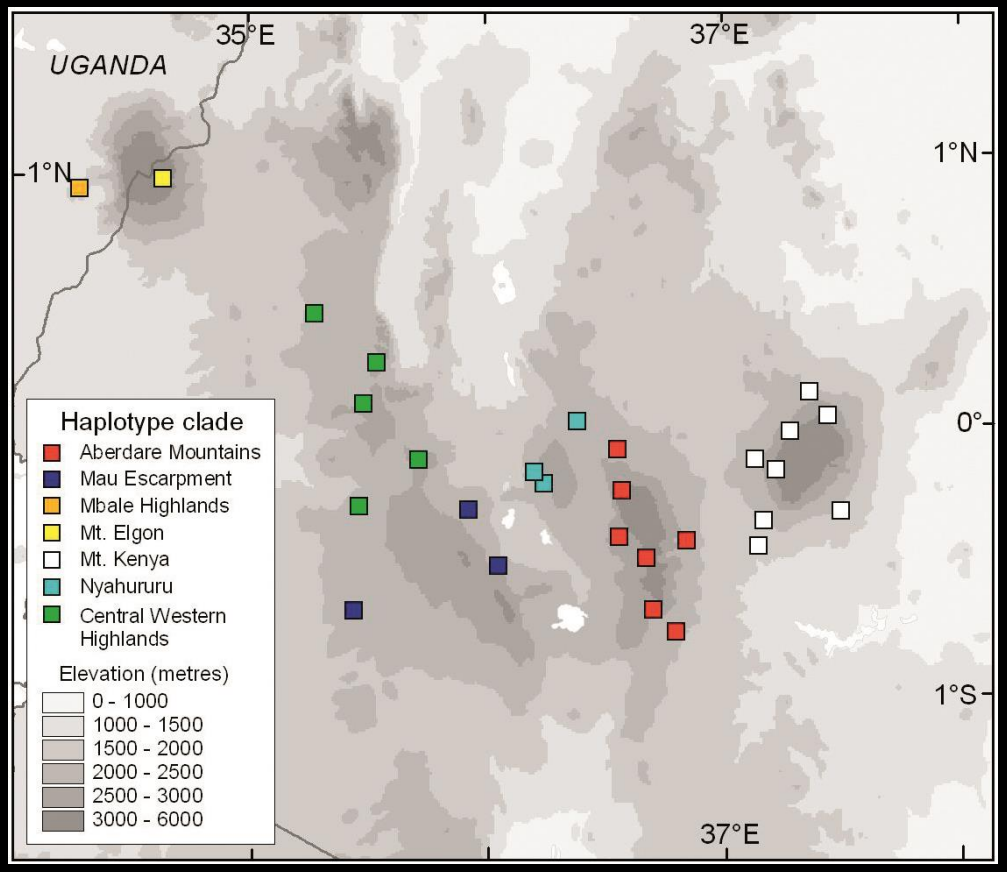
Morphological variation in *Trioceros hoehnelii*



Genetic variation in *Trioceros hoehnelii*



Bayesian tree generated using mtDNA markers (16S and ND4)

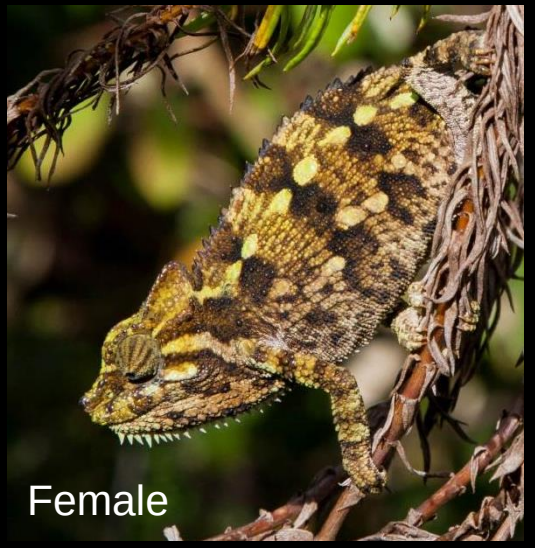


Distribution of mtDNA haplotypes

Cherangani Hills

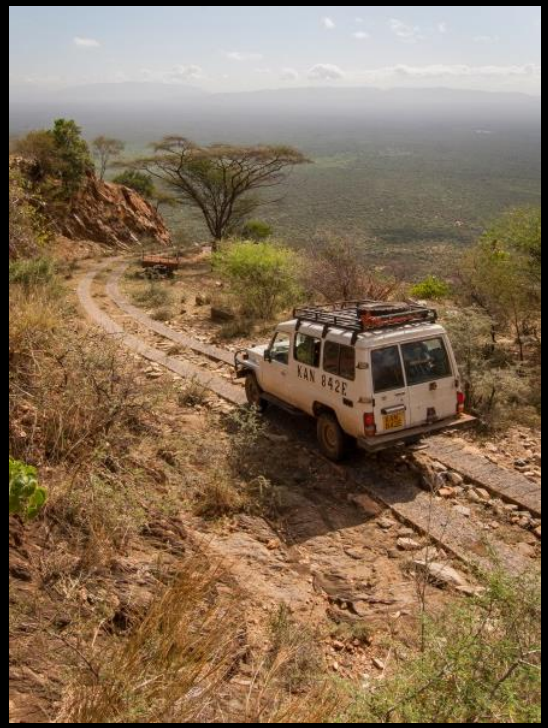
Male

Male



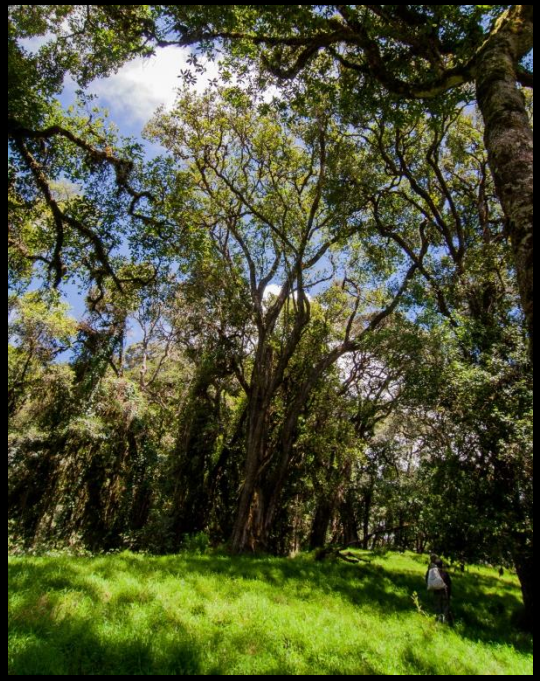
Female

Mtelo massif



Trioceros conirostratus

Mtelo massif



Trioceros nyirit

Stipala, J., Lutzmann, N., Malonza, P.K., Borghesio, L., Wilkinson, P., Godley, B. & Evans, M.R. (2011)
A new species of chameleon (Sauria: Chamaeleonidae) from the highlands of northwest Kenya. Zootaxa, 3002, 1–16.

Mount Kinangop, Aberdare Mountains

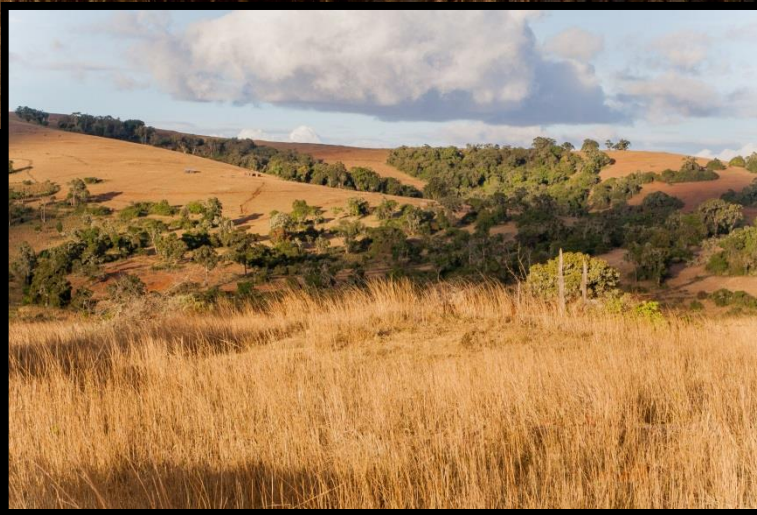
Mount Kinangop, Aberdare Mountains

Mount Kinangop, Aberdare Mountains

Trioceros kinangopensis

Stipala, J.A., Lutzmann, N., Malonza, P.K., Wilkinson, P., Godley, B. & Evans, M.R. (2012)
A new species of chameleon (Sauria: Chamaeleonidae) from Aberdare Mountains in the central highlands of Kenya. Zootaxa, 211, 1-21.

Loita Hills



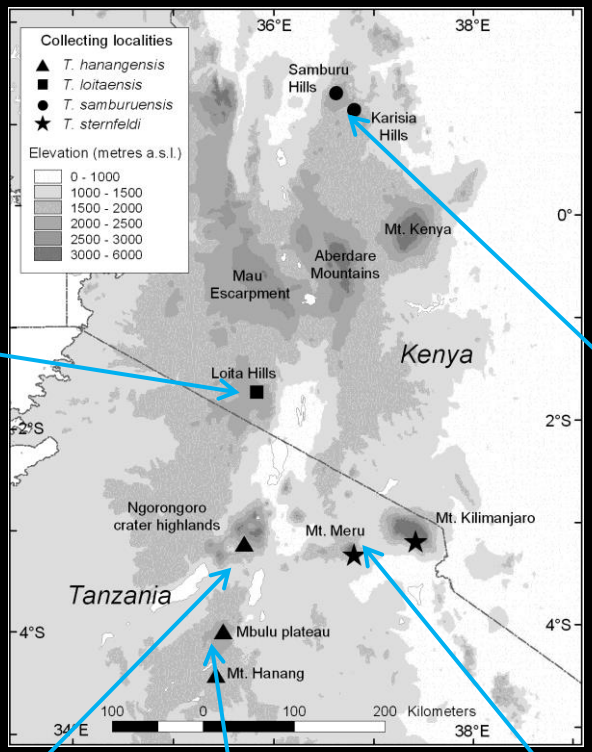
Loita Hills

Samburu Hills

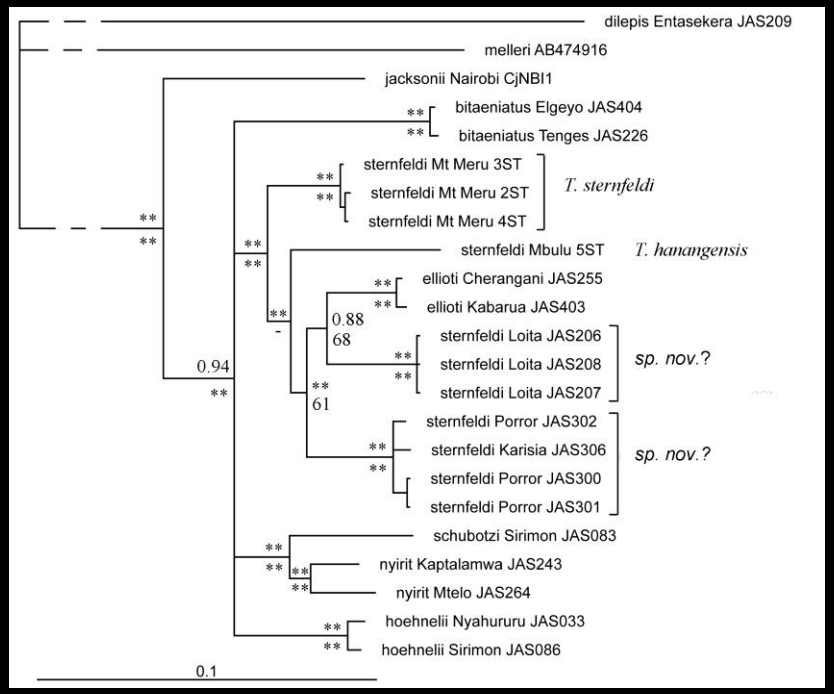
Samburu Hills

Samburu Hills

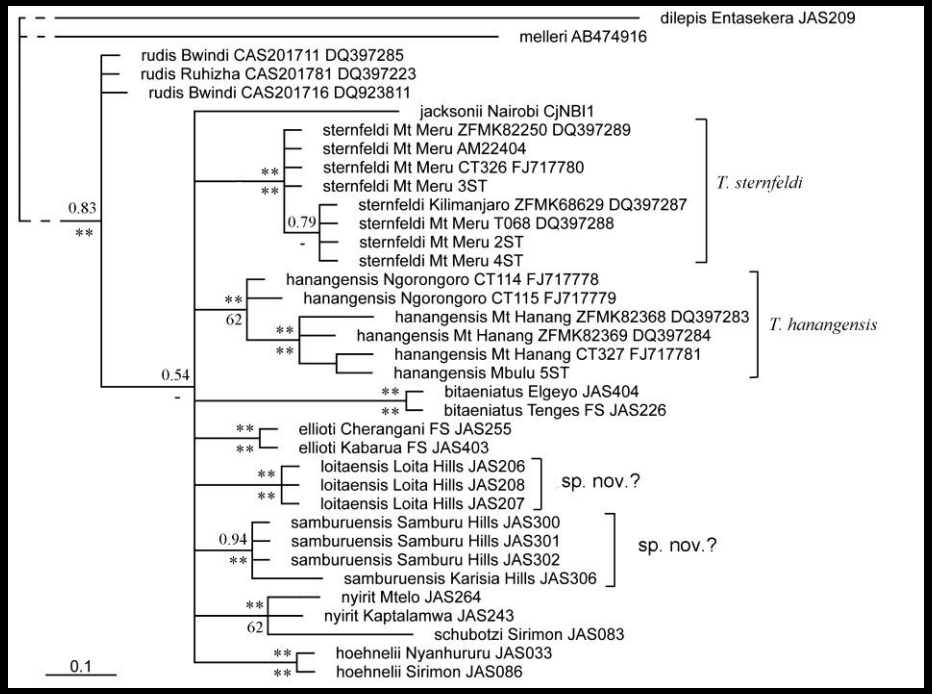
Trioceros sternfeldi



Molecular variation in *Trioceros sternfeldi*



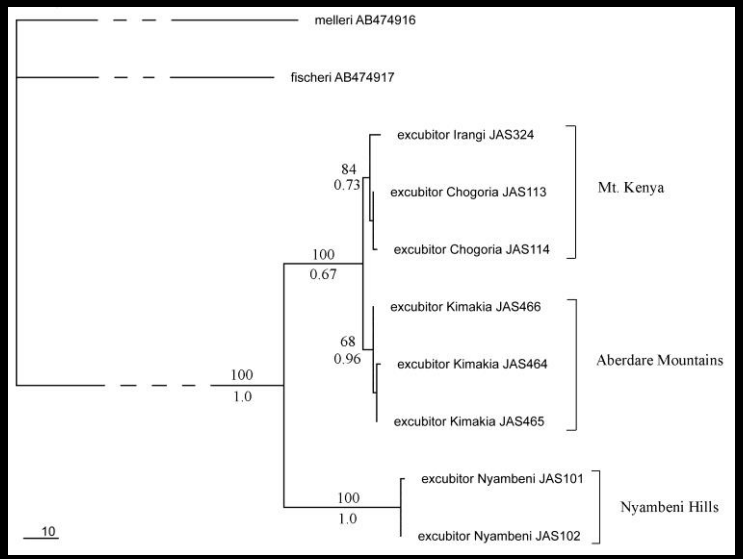
Bayesian tree using mtDNA (16S + ND4).

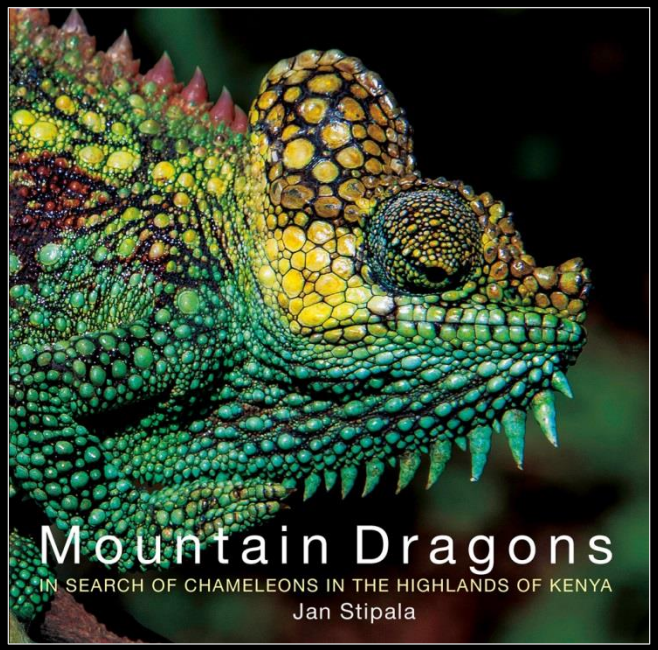


Bayesian tree using mtDNA (16S).
Additional sequences from GenBank

Values above nodes Bayesian probabilities, below nodes Maximum Parsimony bootstrap support.
Asterisk indicates > 0.95 (Bayesian) or 100% (MP)

Kinyongia excubitor





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Thank you listening