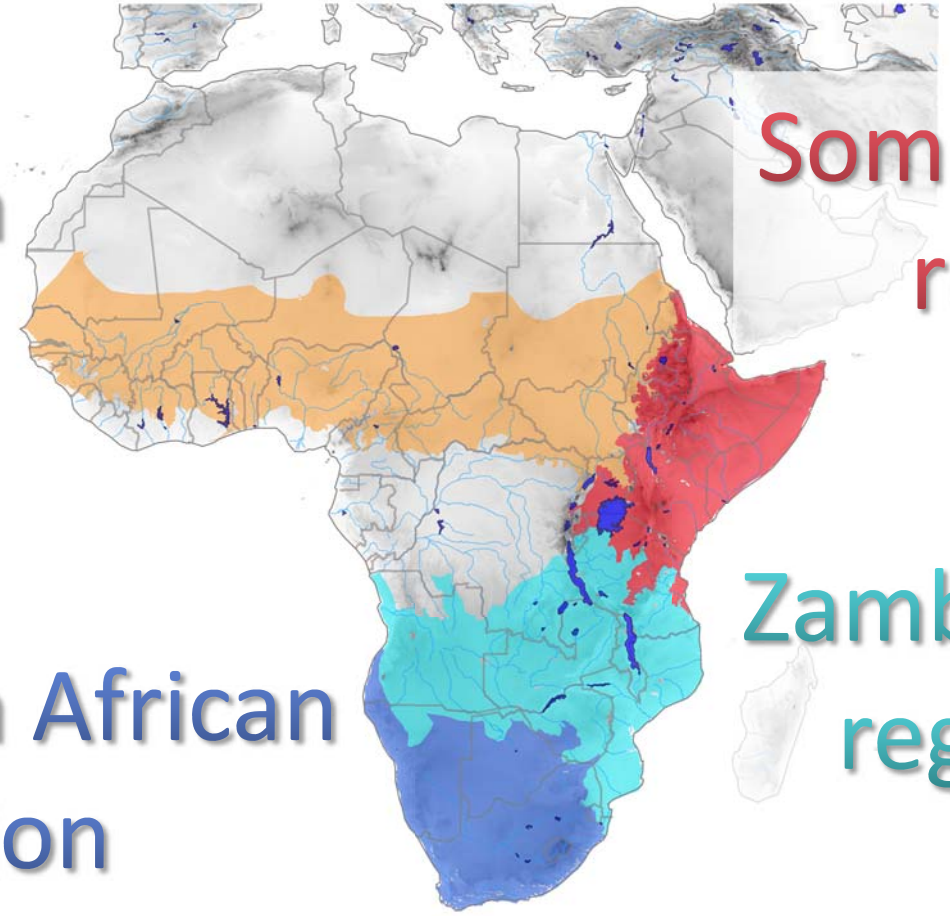
Integrative phylogeography of Sudanian savanna using rodents as a model

Aghová, T., Bryja, J., Dobigny, G., Granjon, L. & Kergoat, G.J.

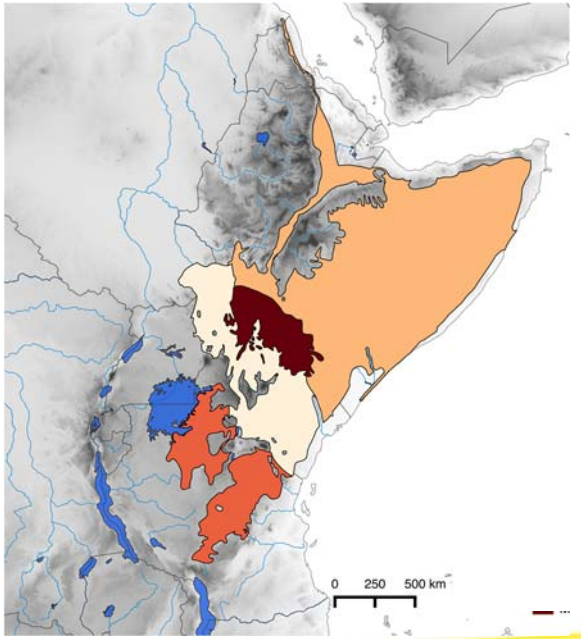
Savannas in Africa



Linder et al. (2012, *J. Biogeography*): Biogeographic regions (vertebrate+flowering plants)

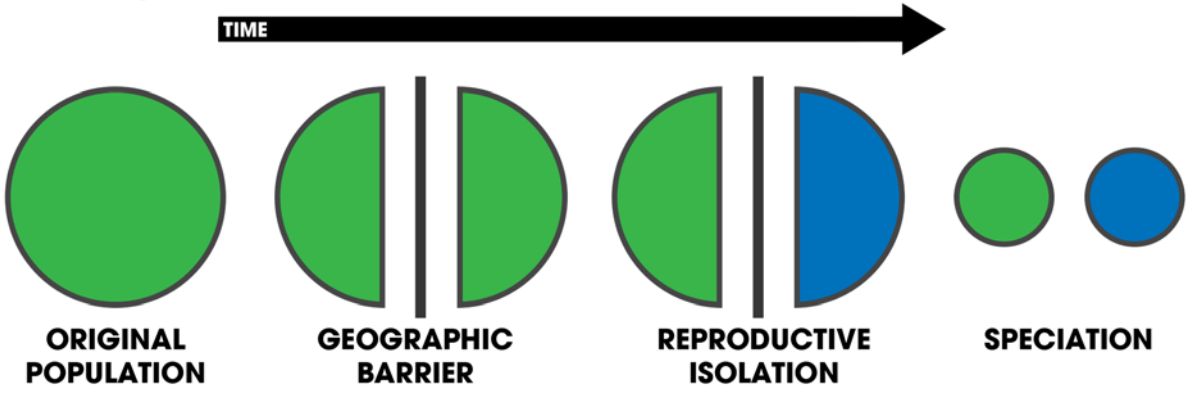
Comparative phylogeography

Which factors influenced diversification of rodents in the Somali-Masai savanna in Plio-Pleistocene?



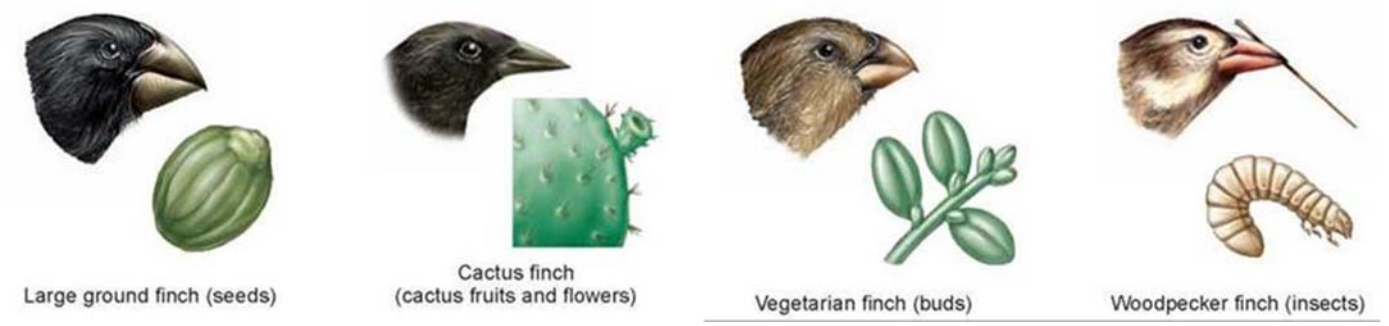
PHYLOGEOGRAPHIC STRUCTURE

Allopatric diversification



Mountains
Forests
Rivers
Lakes

Ecological diversification



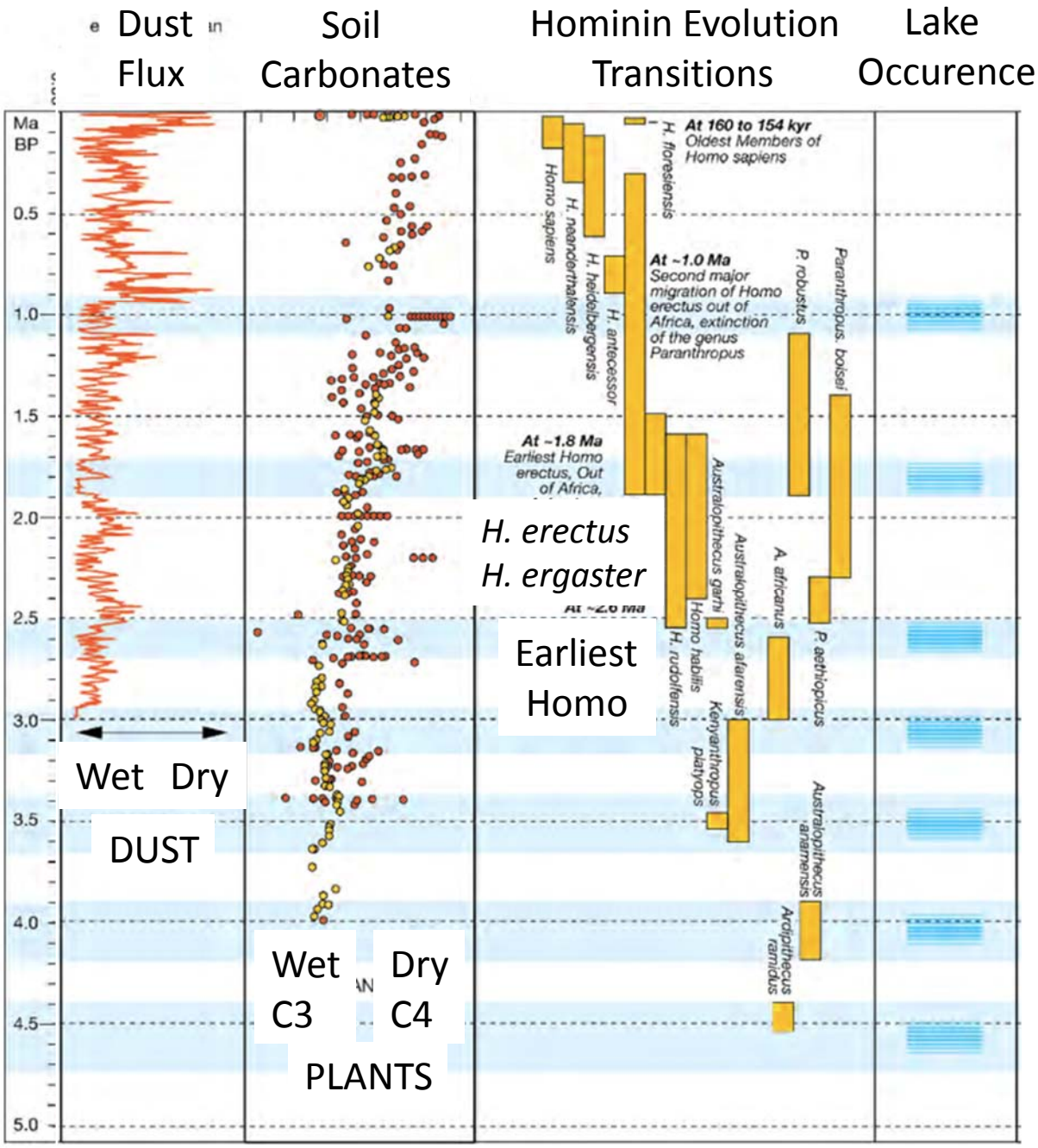
https://www.thinglink.com/scene/781393857458733058

CLIMATIC FACTORS

Climate oscillations

Shift from C3 to C4 plants

Amplifier lakes

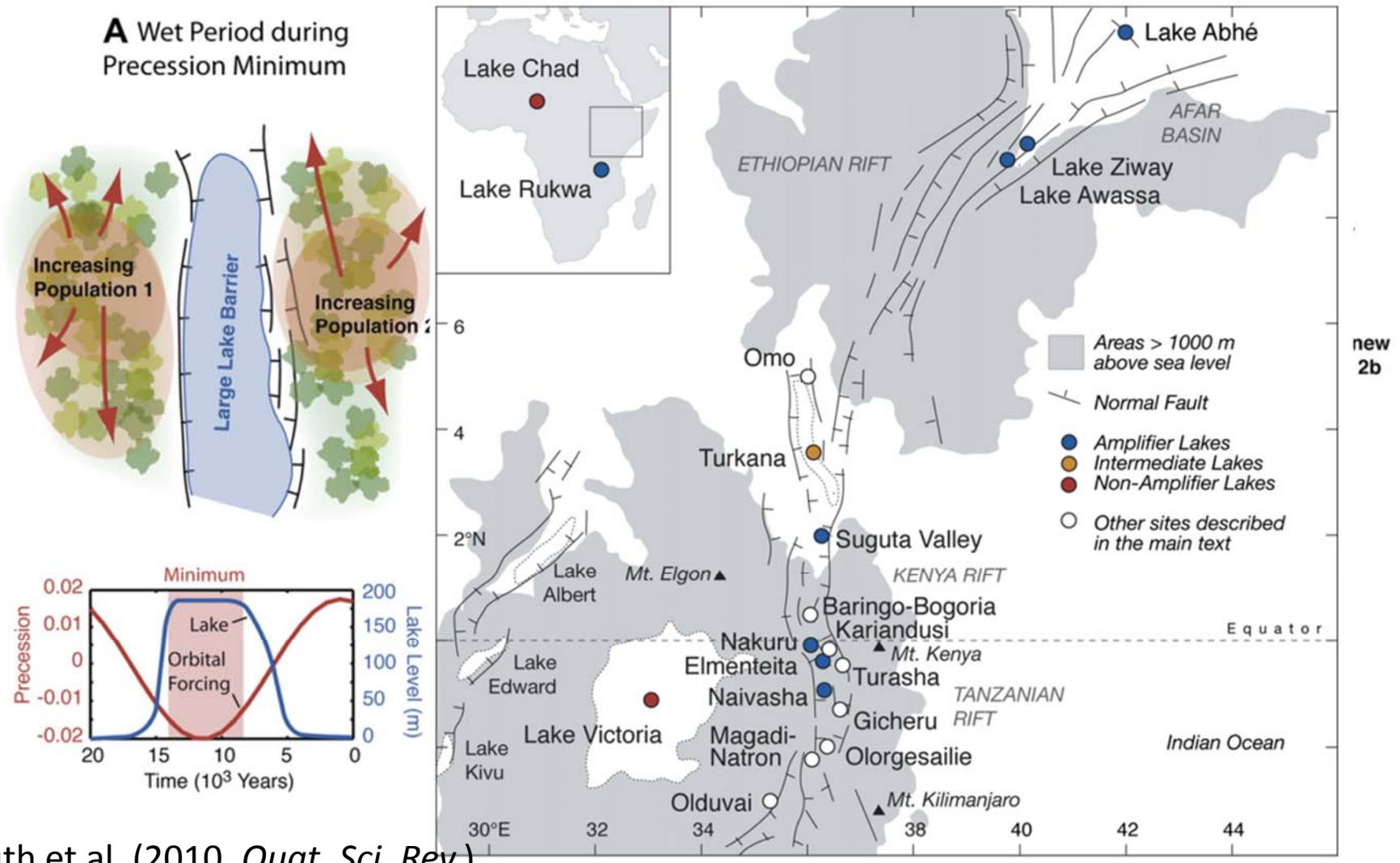


Maslin & Trauth (2009, The First Humans: Origin and Early Evolution of the Genus Homo)

Amplifier Lakes

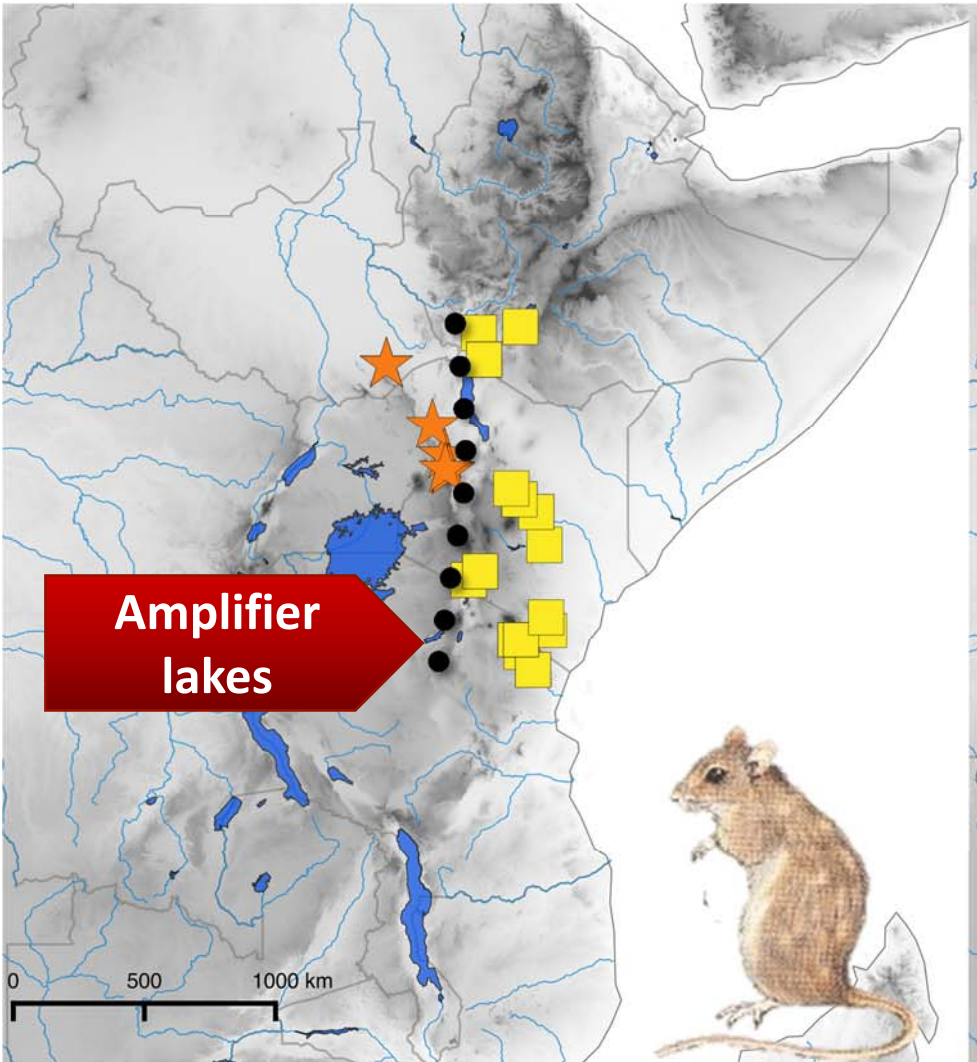
Lake Turkana, Kenya

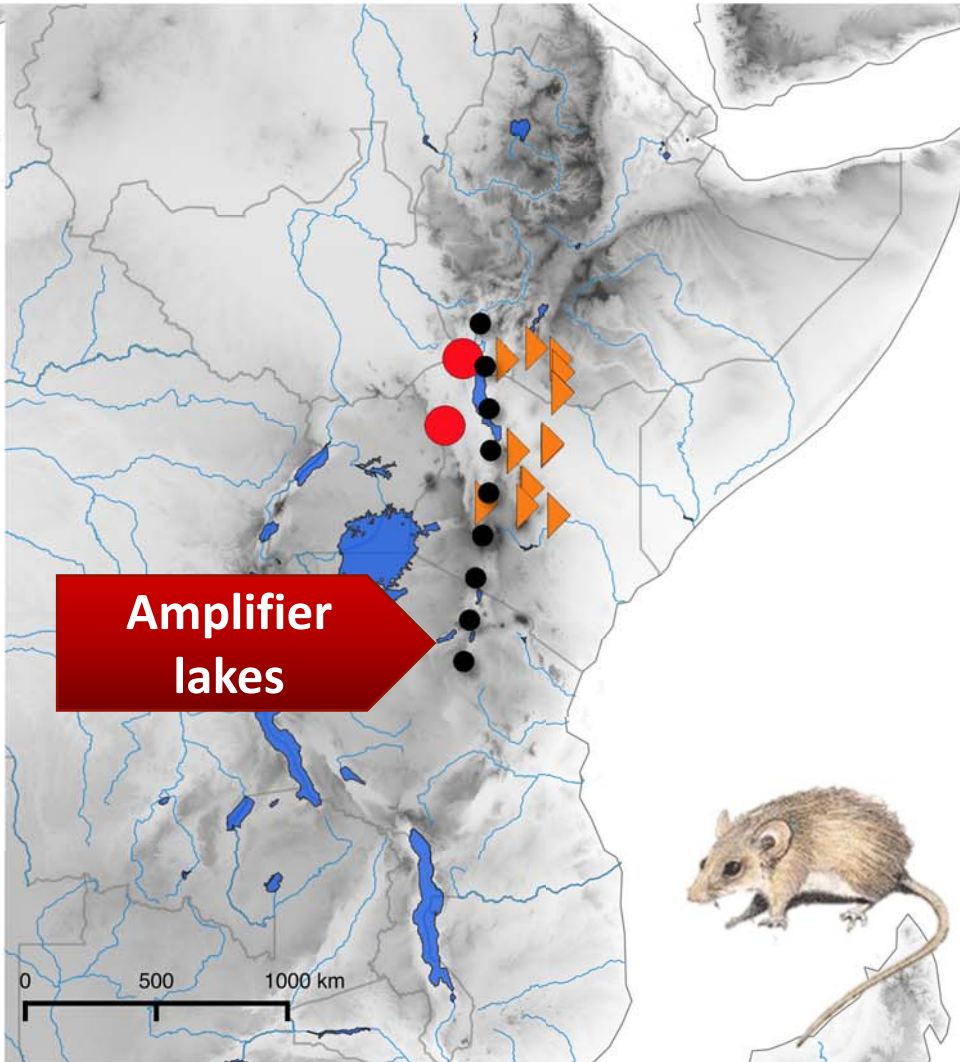
AMPLIFIER LAKES



Trauth et al. (2010, *Quat. Sci. Rev.*)

Amplifier Lakes

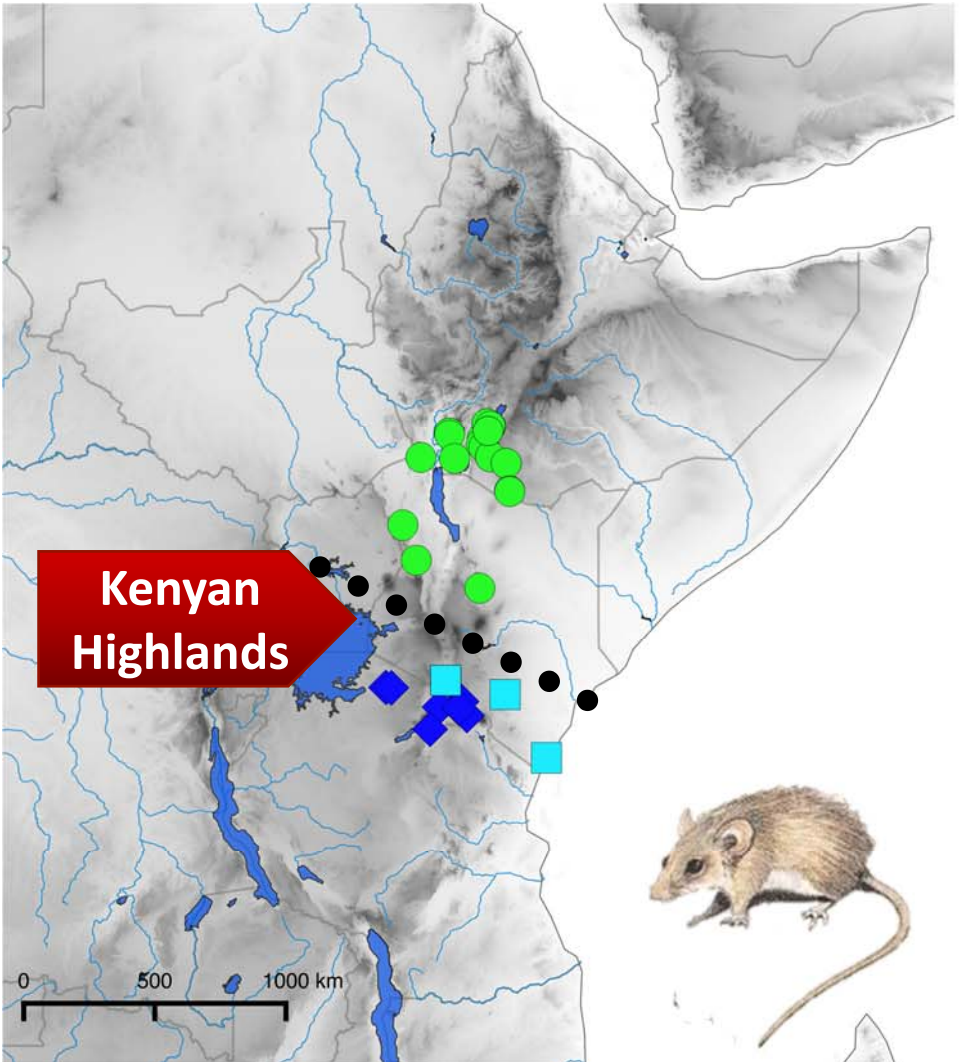


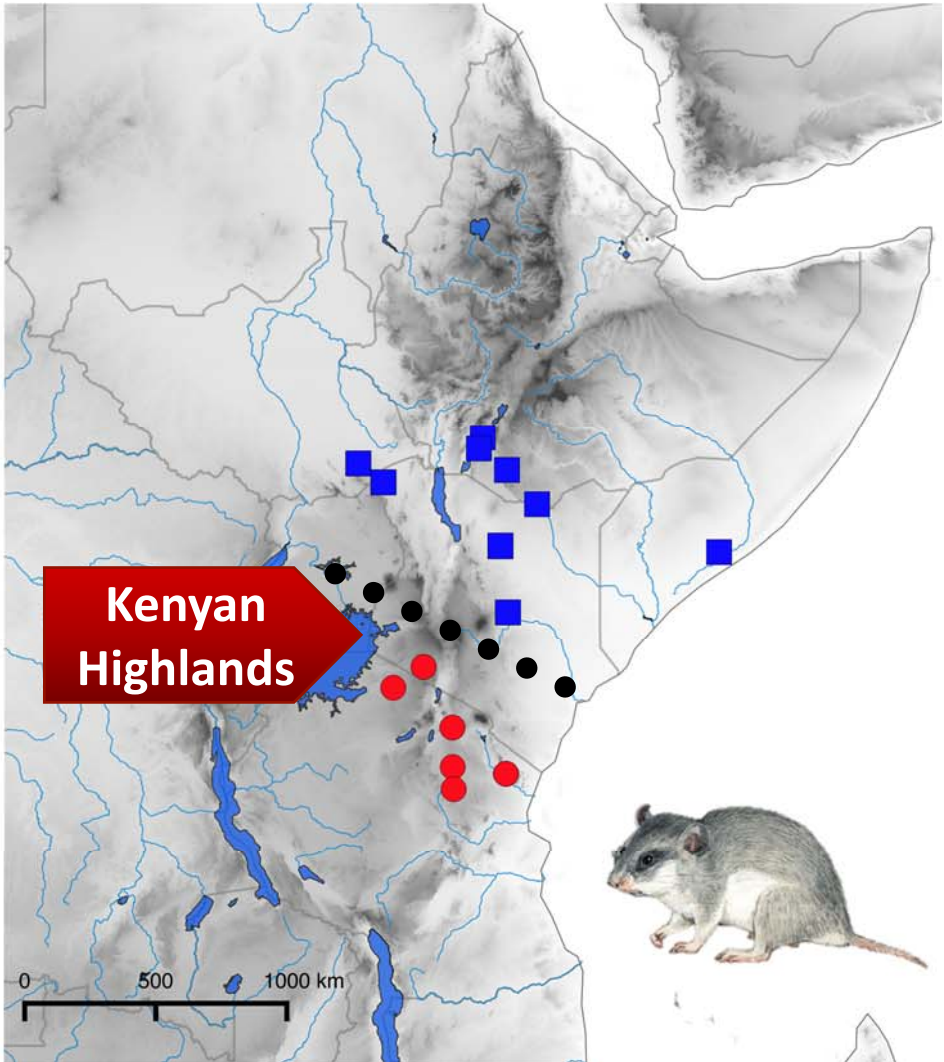


HIGHLANDS

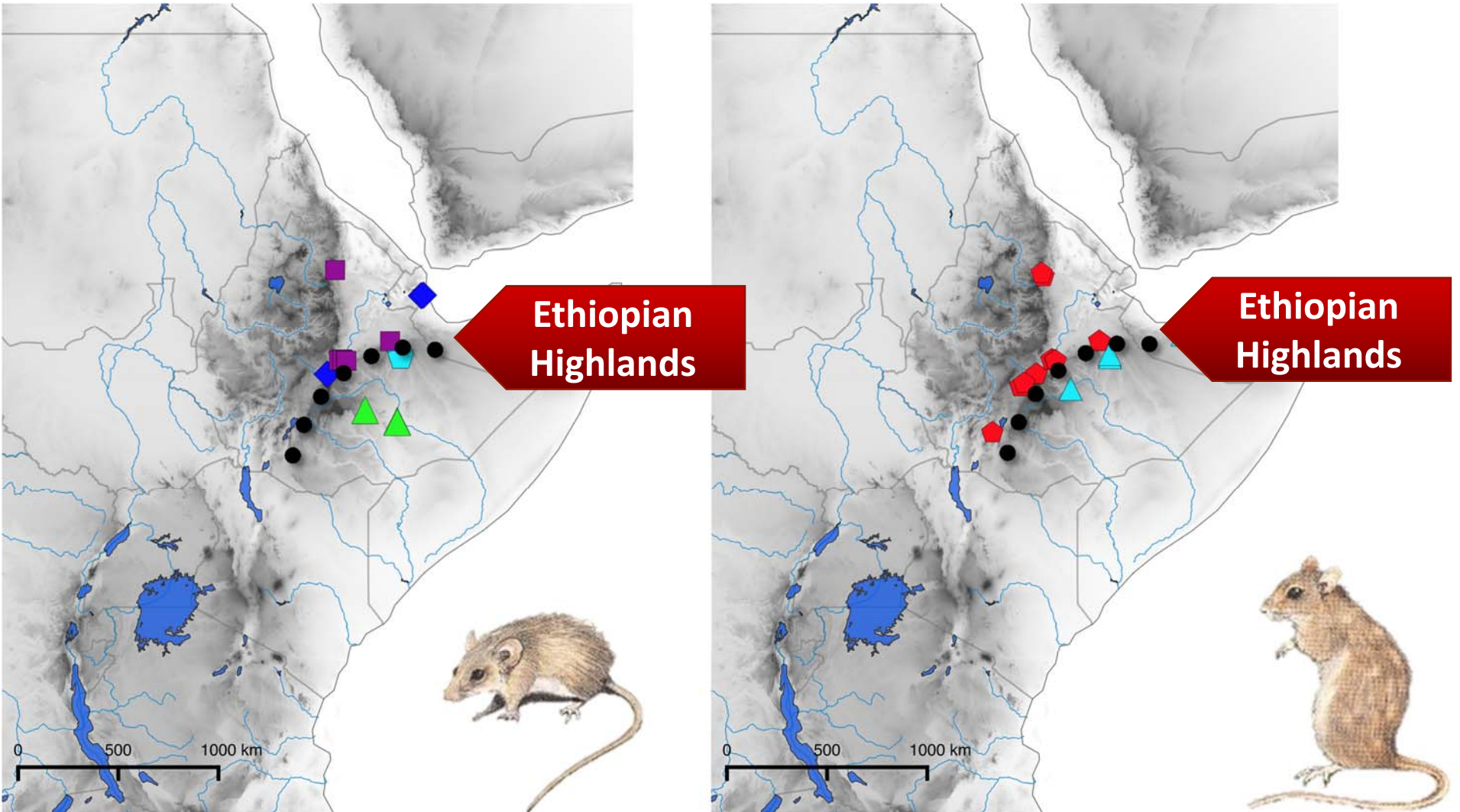
Mt. Elgon, Kenya

KENYAN HIGHLANDS





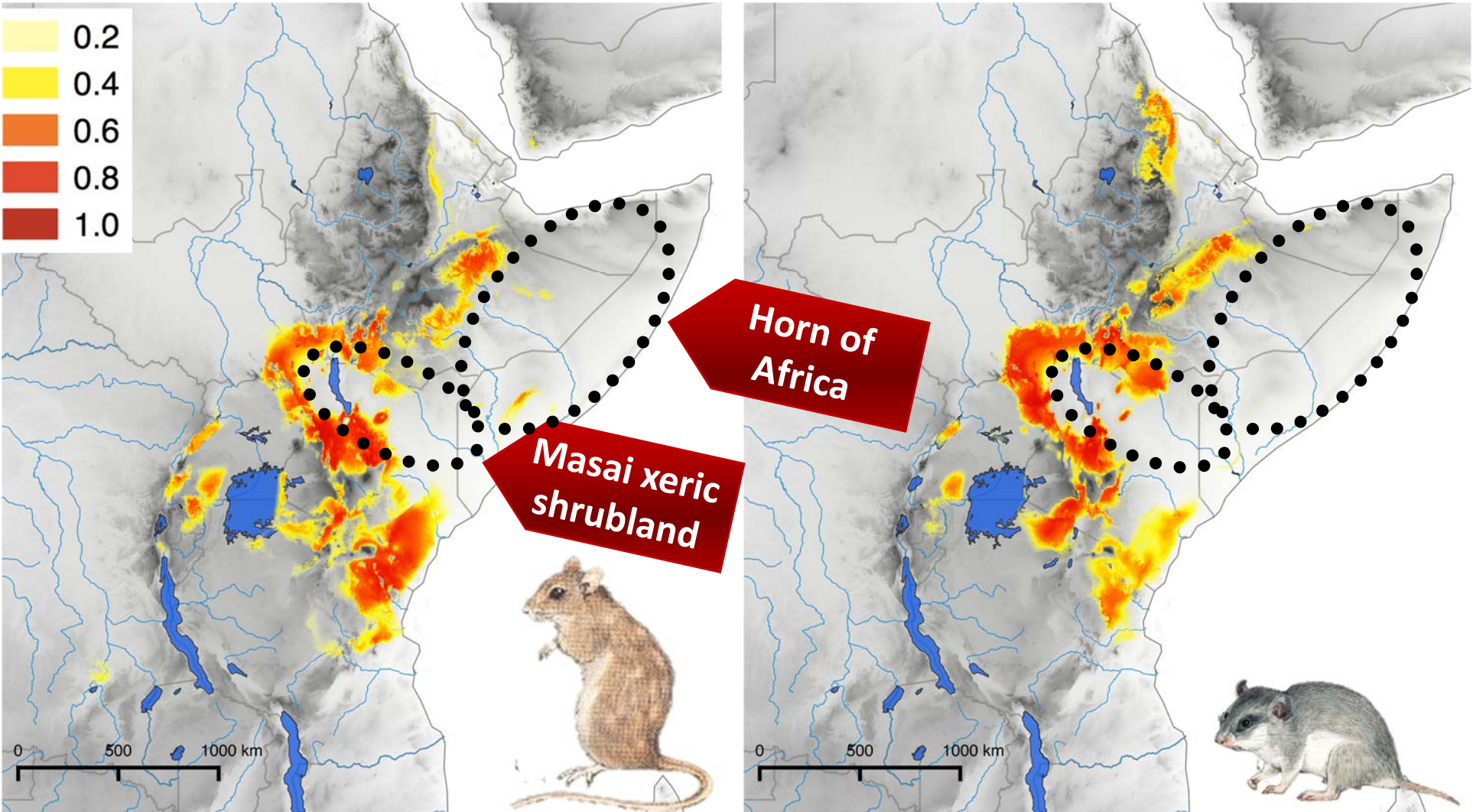
Ethiopian Highlands



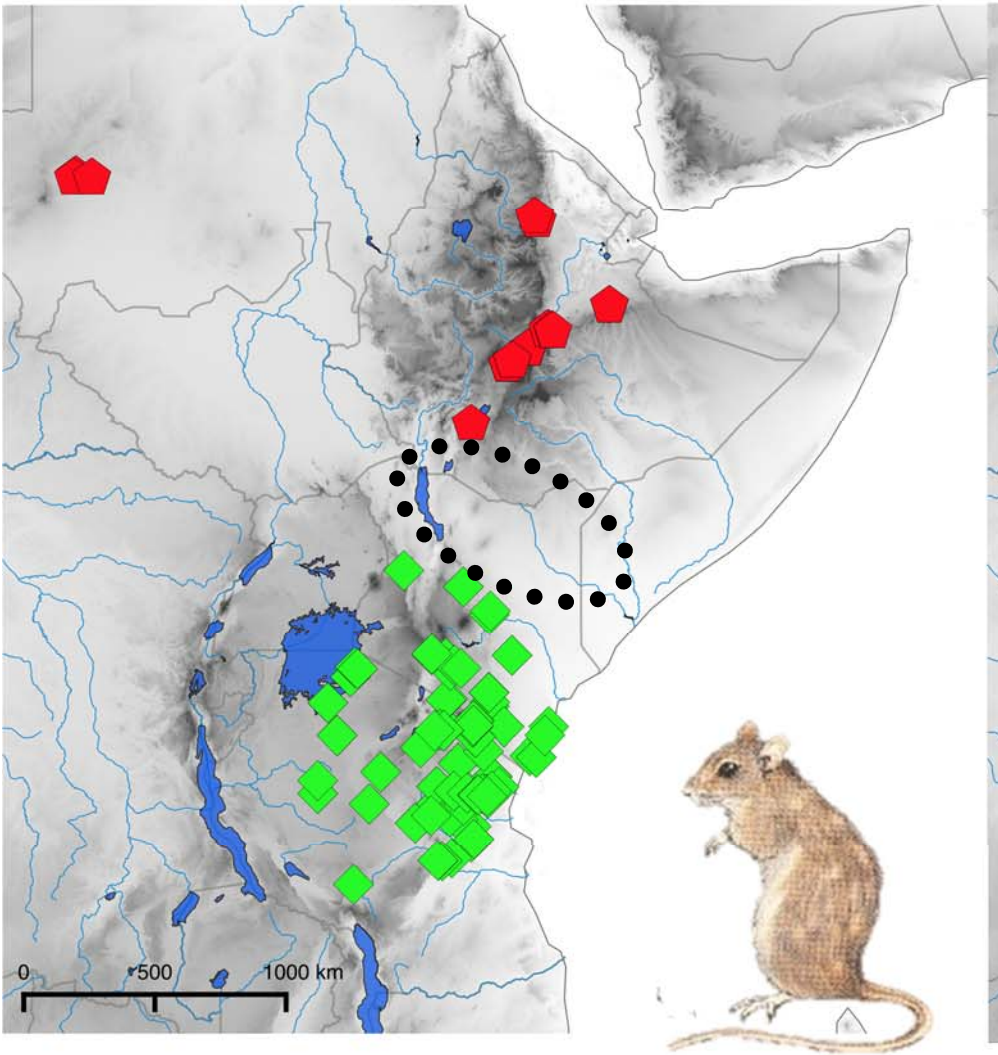
Hyper-Arid Regions

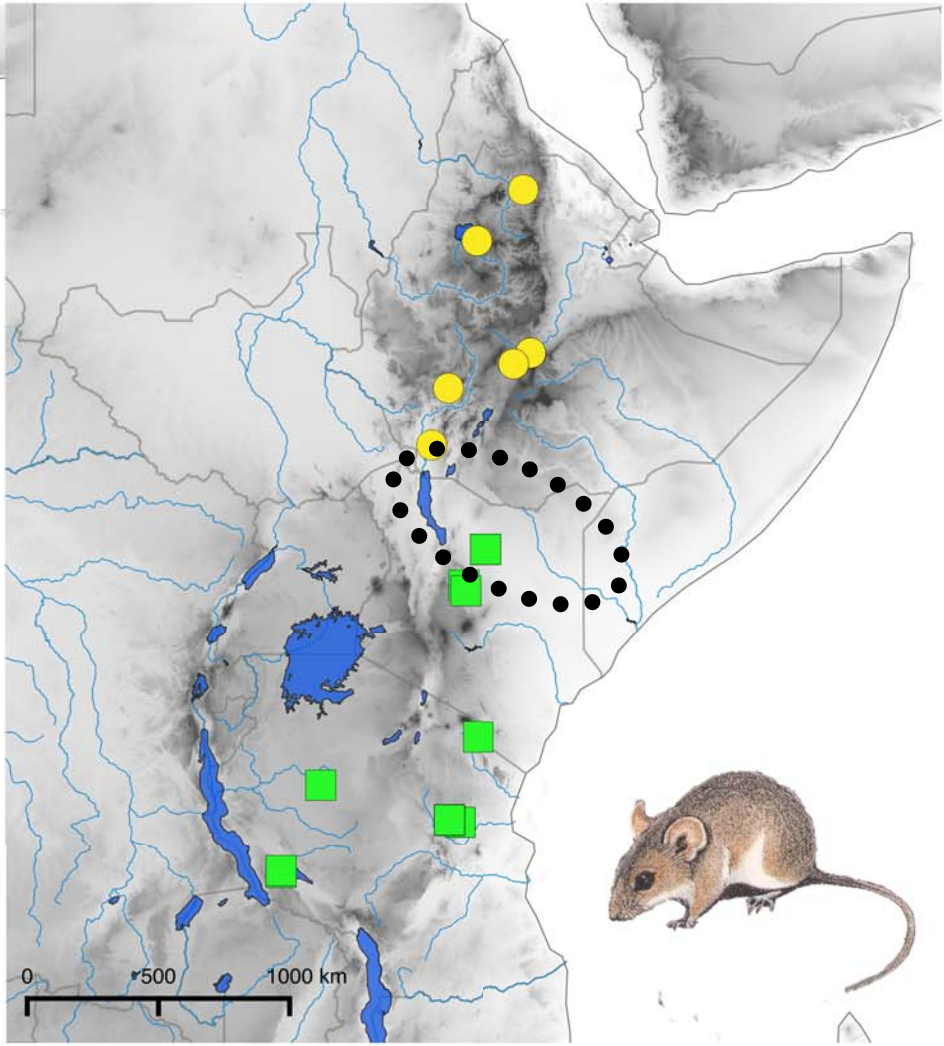
Hyper-Arid Regions

Species distribution modelling (current climatic conditions)



Hyper-Arid Regions





CONCLUSION

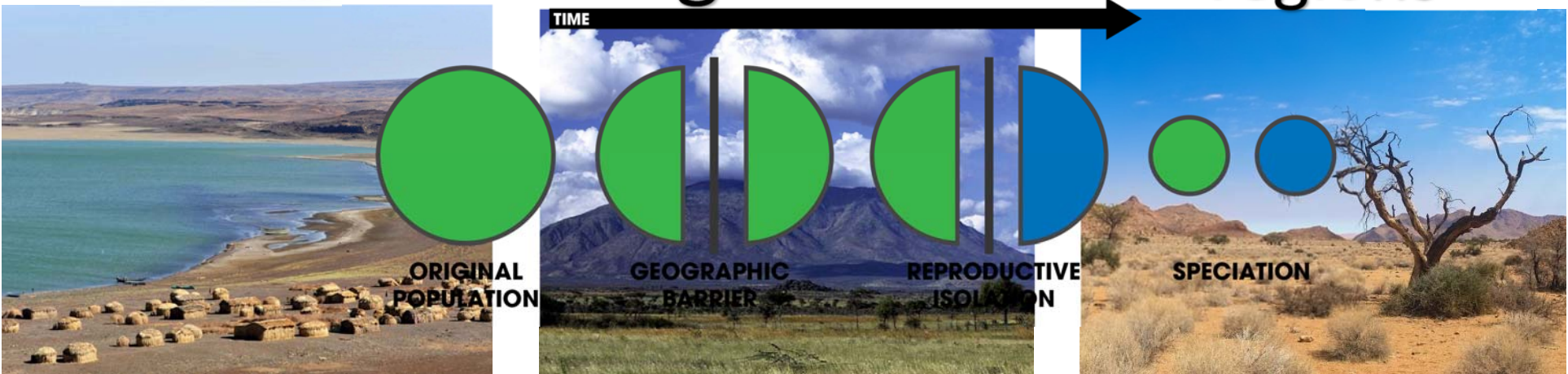
Which factors influenced diversification of rodents in Somali-Masai savanna in Plio-Pleistocene?

ALLOPATRIC DIVERSIFICATION
Climate transitions
Geomorphology

Lakes

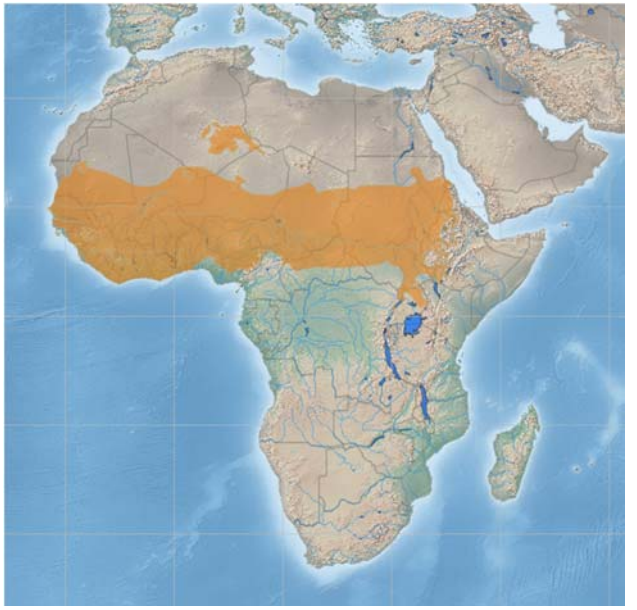
Highlands

Hyper-arid regions



Comparative phylogeography

Which factors influenced diversification of rodents in the Sudannian savanna in Plio-Pleistocene?



METHODS

7 genera

16 species

47 lineages

620 haplotypes

Cytb

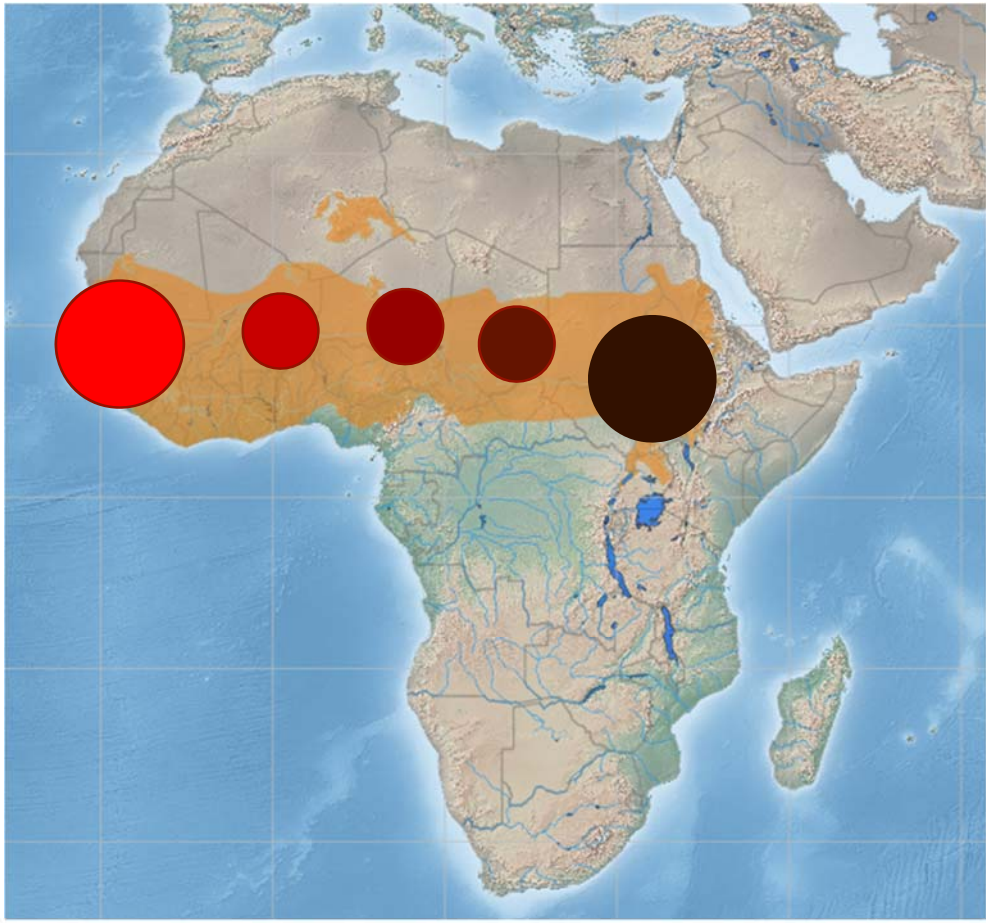
branch-cutting approach
(Mikula, 2018)

secondary calibration based on fossil phylogeny

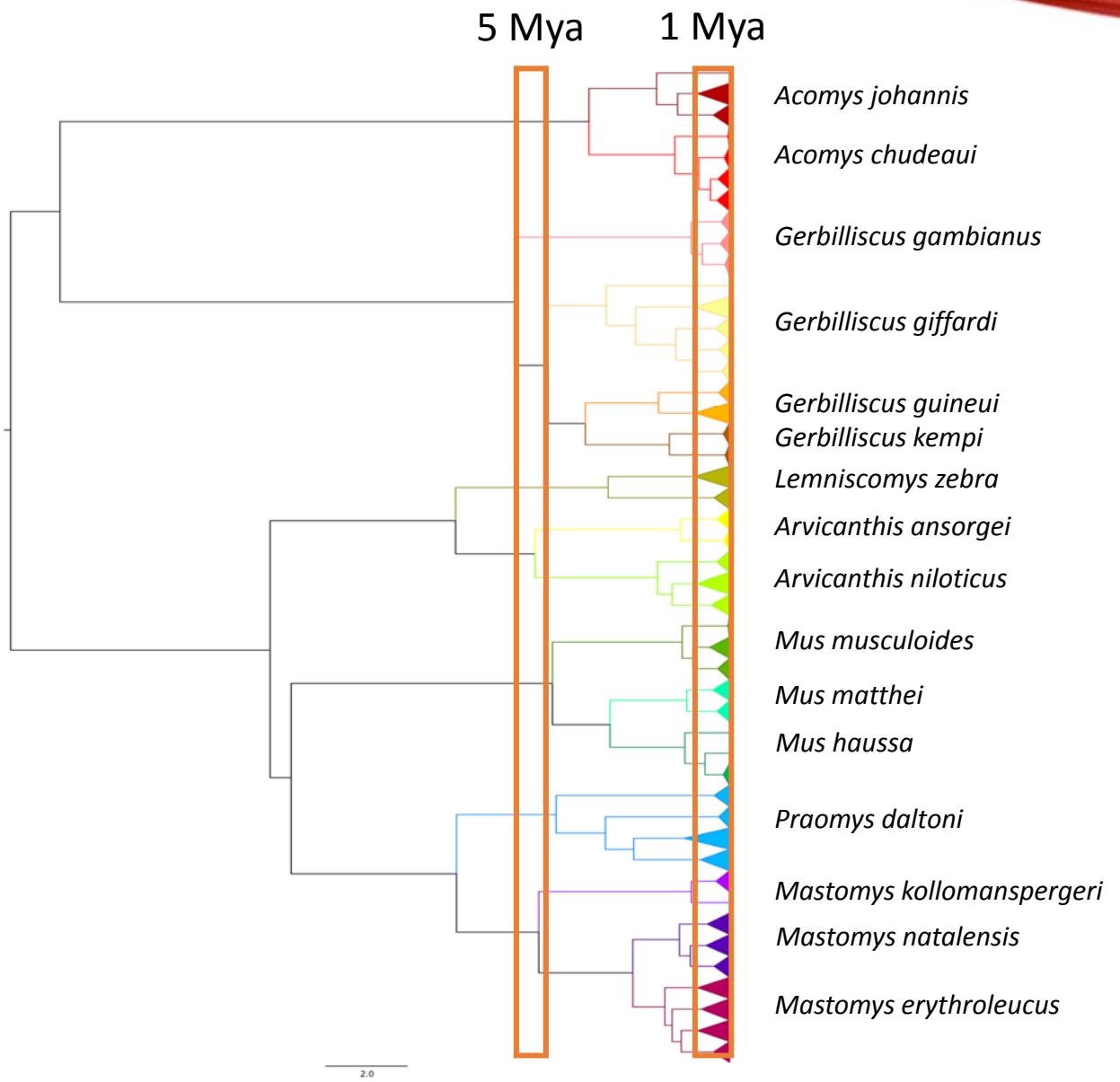
HYPOTHESIS

H1 diversification was synchronous

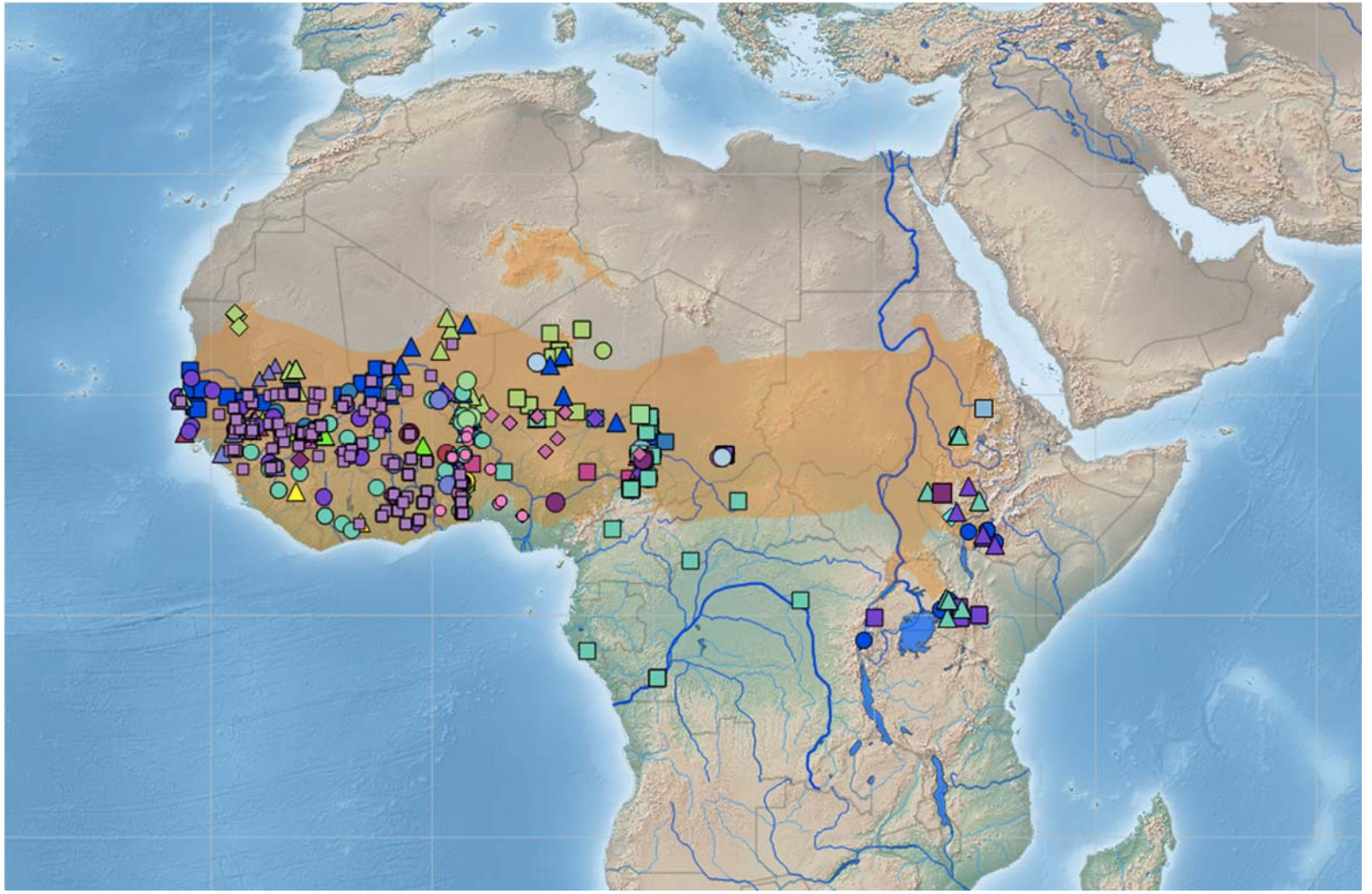
H2 repeated diversification "in waves"



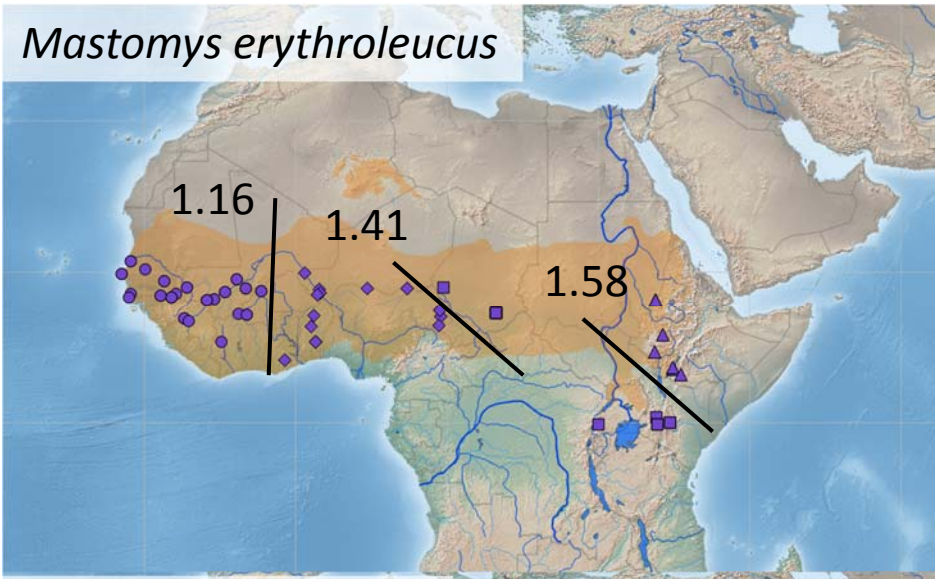
RESULTS

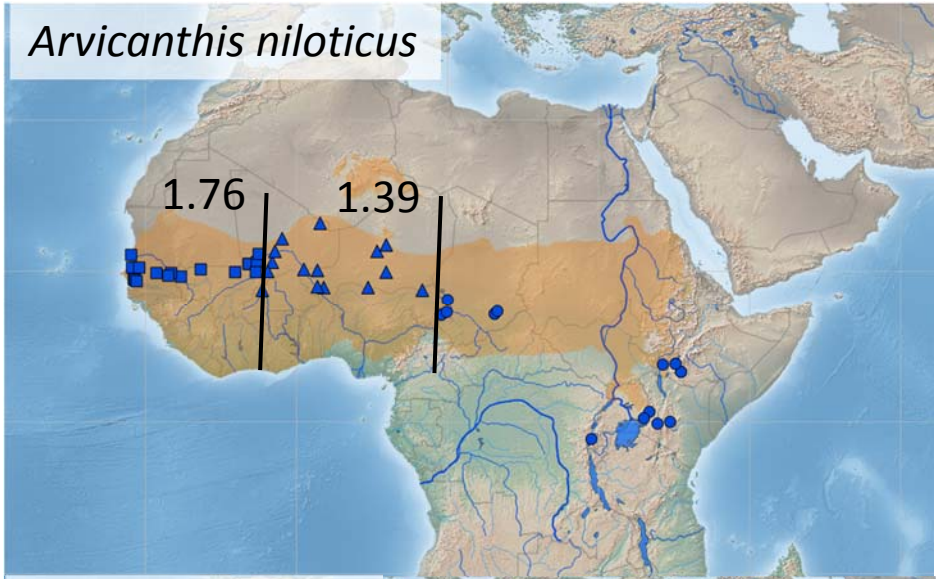

5 Mya
1 Mya
Acomys johannis
Acomys chudeaui
Gerbilliscus gambianus
Gerbilliscus giffardi
Gerbilliscus guineui
Gerbilliscus kempi
Lemniscomys zebra
Arvicanthis ansorgei
Arvicanthis niloticus
Mus musculoides
Mus matthei
Mus haussa
Praomys daltoni
Mastomys kollomanspergeri
Mastomys natalensis
Mastomys erythroleucus
2.0

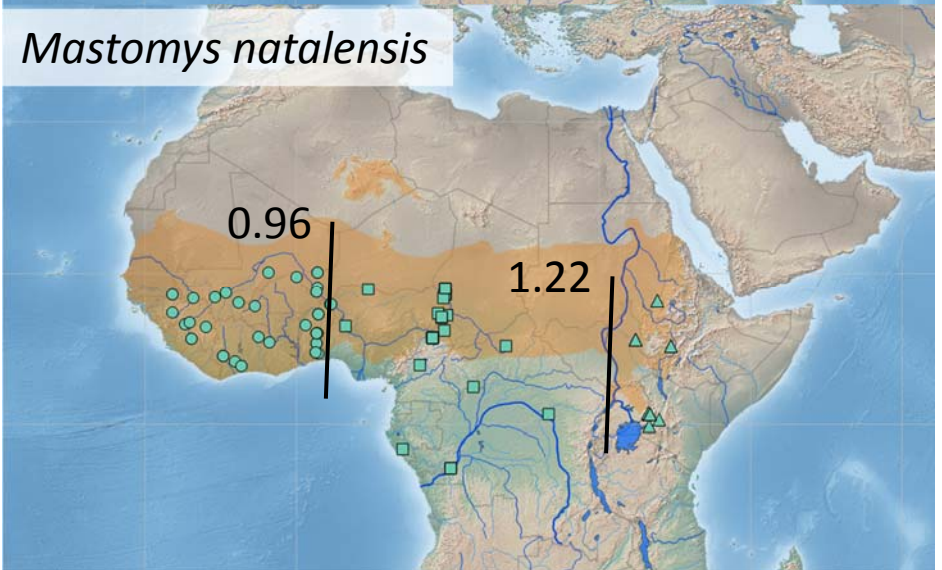
DISTRIBUTION

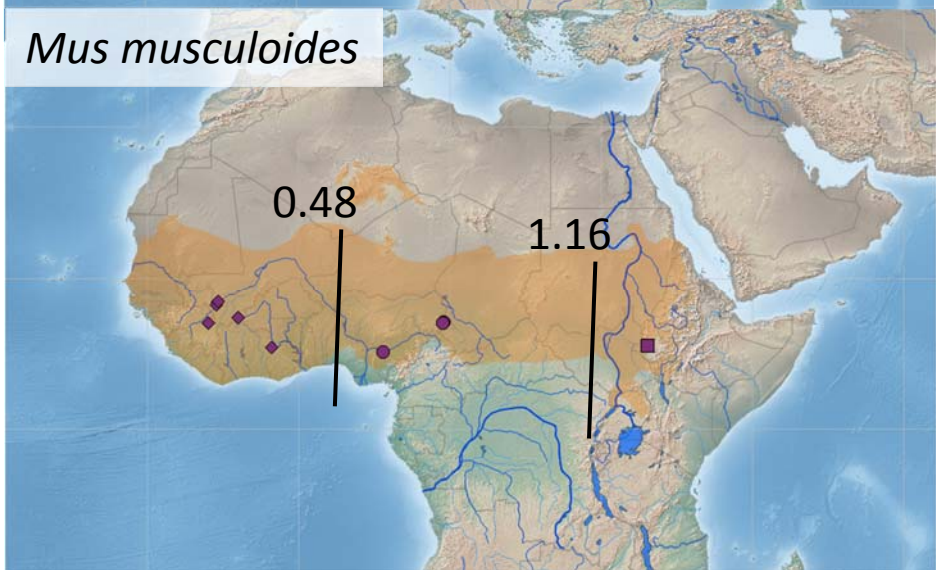


FULL DISTRIBUTION

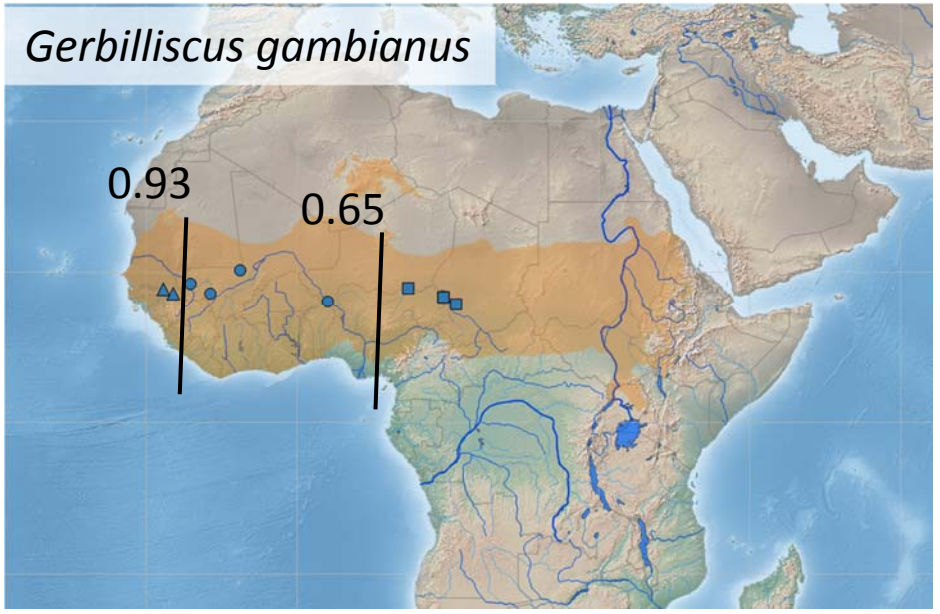


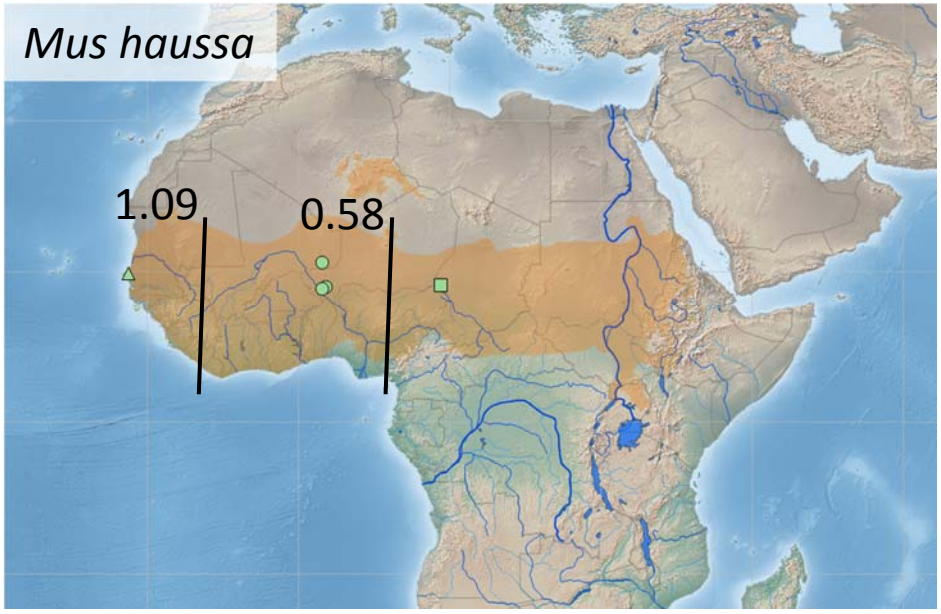




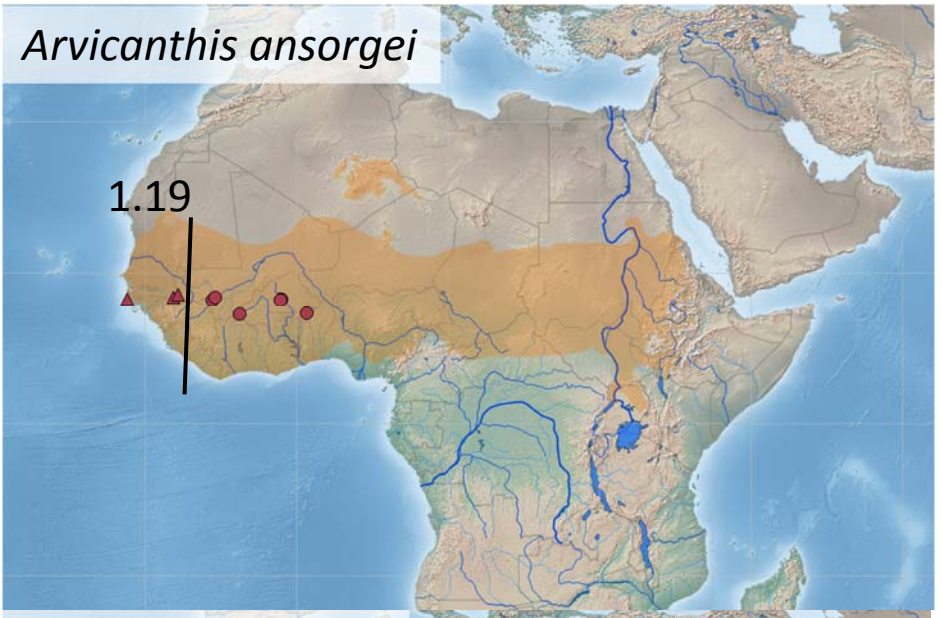


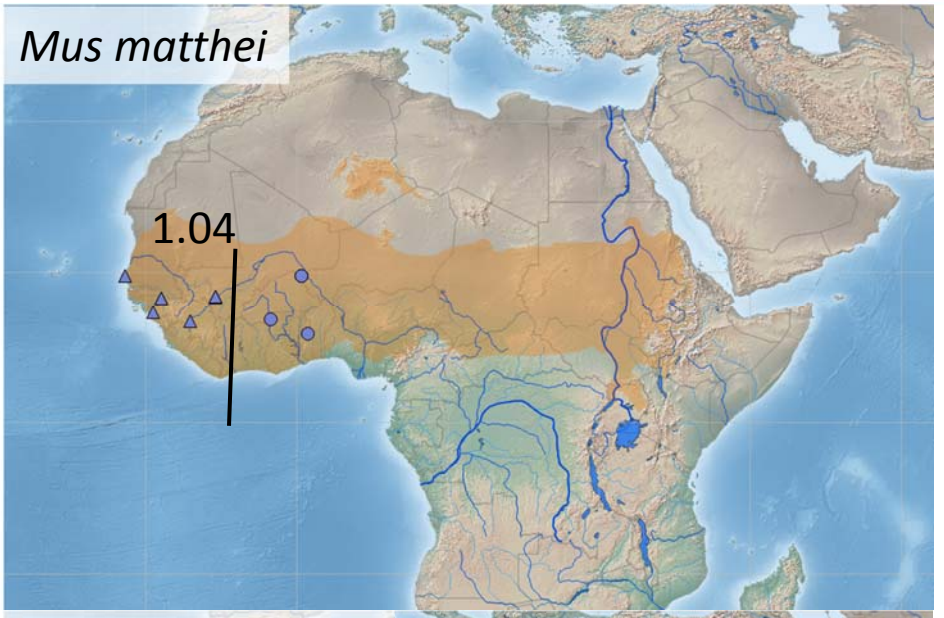
HALF DISTRIBUTION

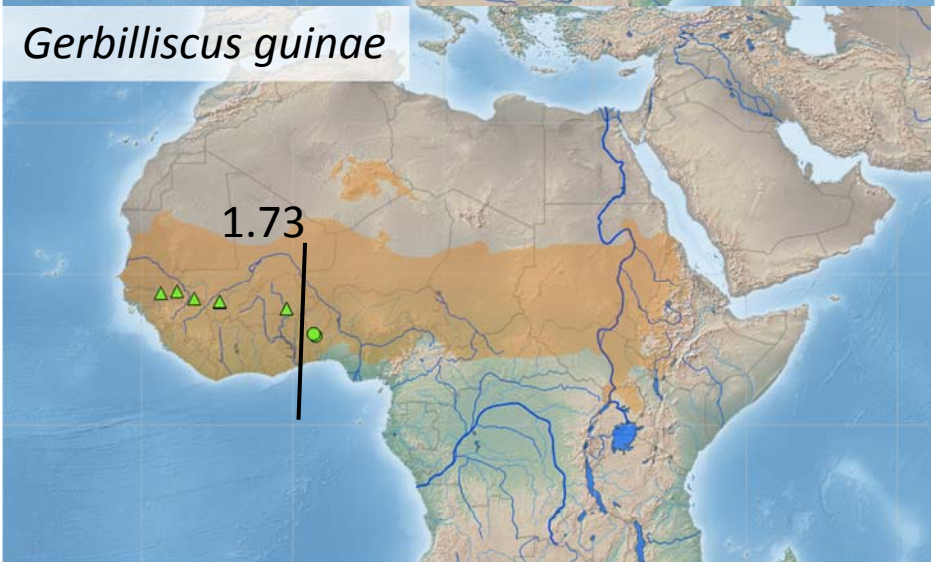


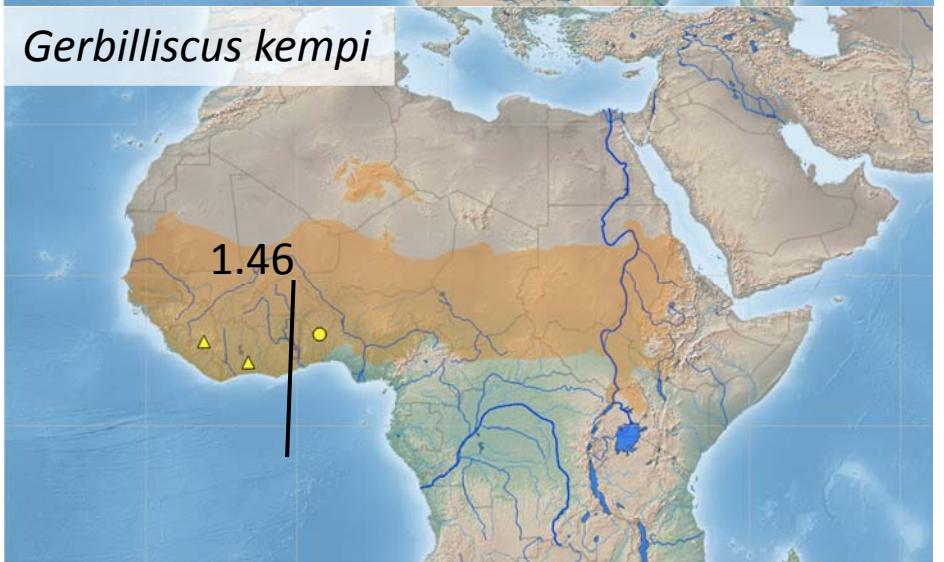


Western Distribution

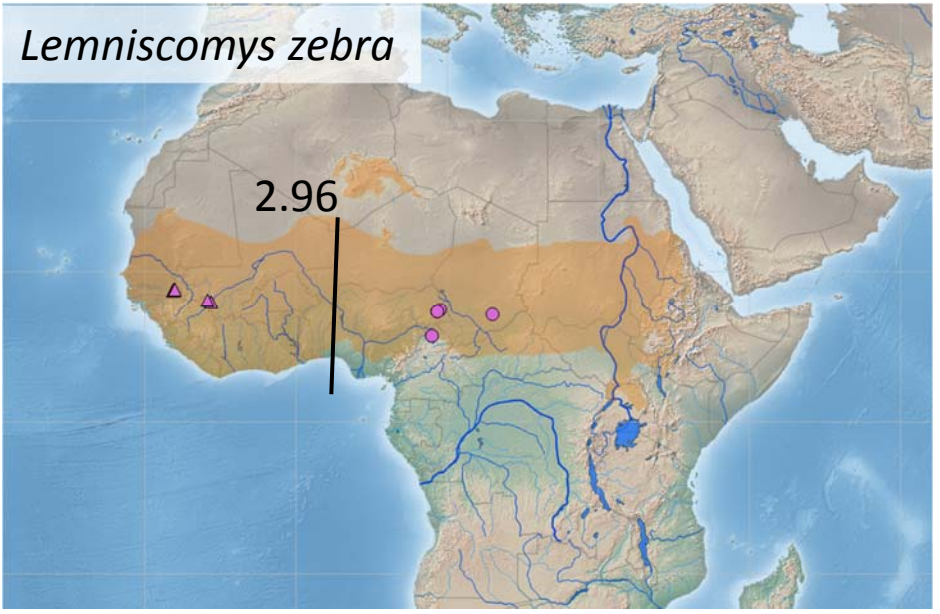


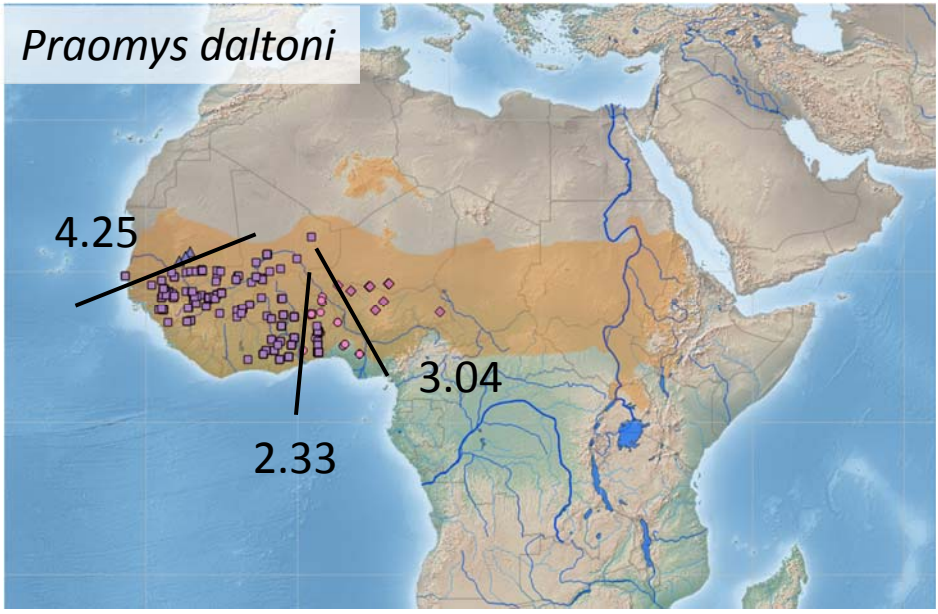






The Oldest Lineages





INFOMAP

Bioregion 1

21 taxa, 9 species

Bioregion 2

17 taxa, 7 species

Bioregion 3

14 taxa, 8 species

Bioregion 4

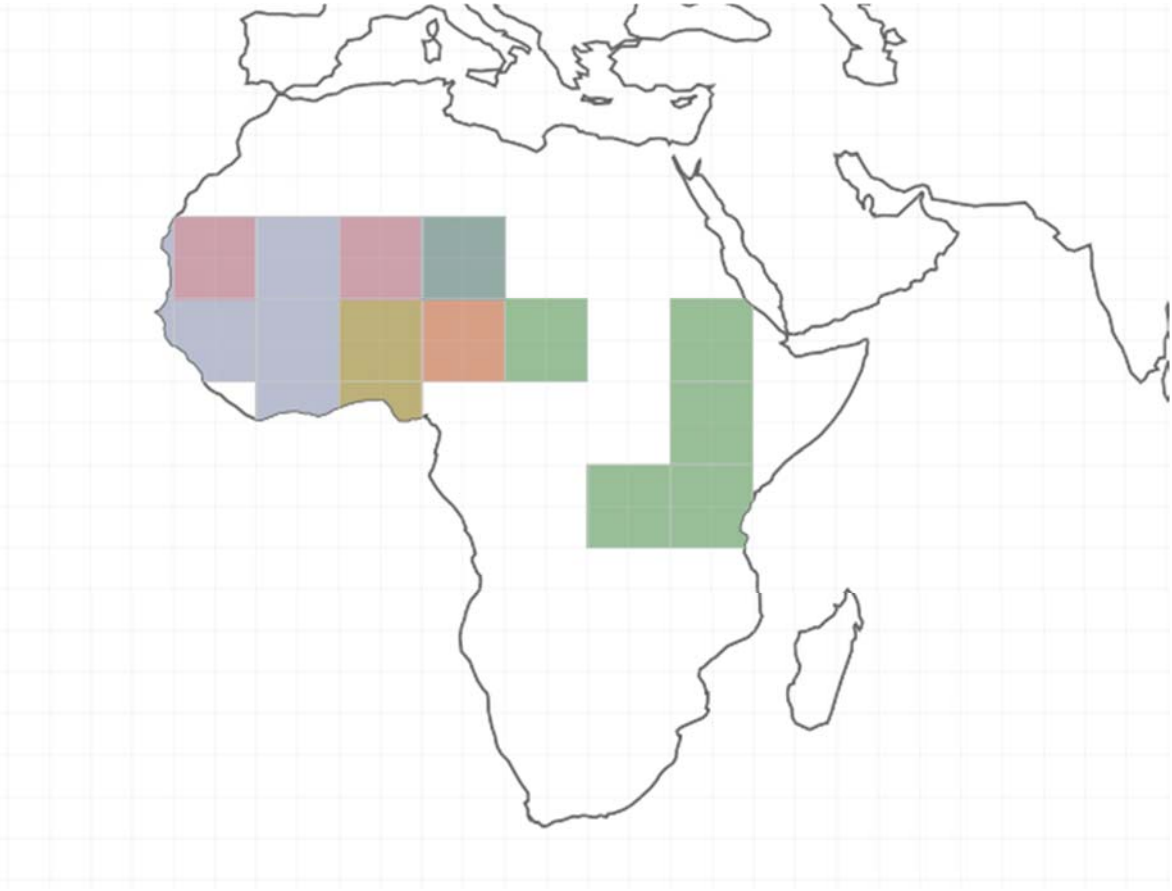
13 taxa, 7 species

Bioregion 5

7 taxa, 4 species

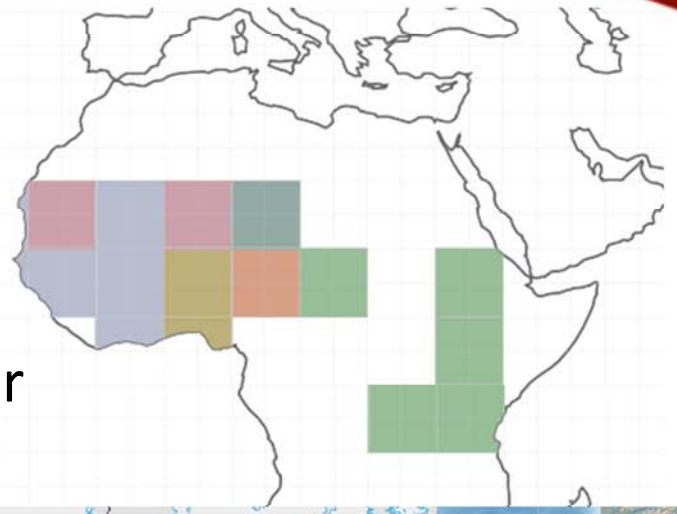
Bioregion 6

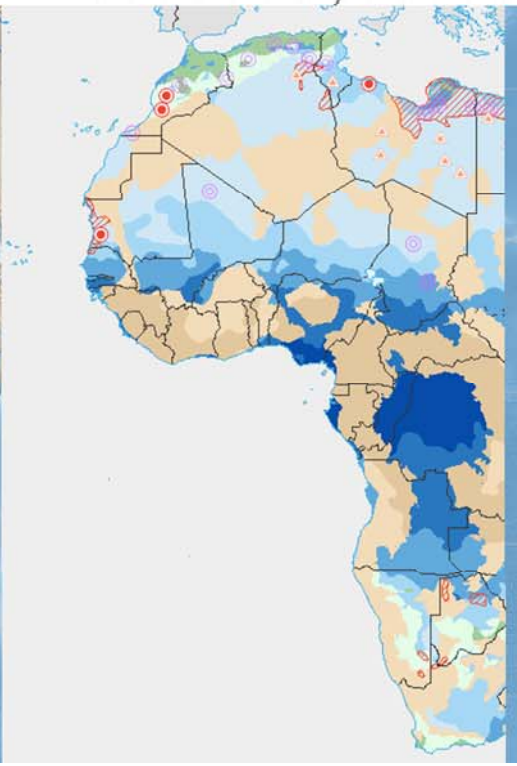
3 taxa, 2 species

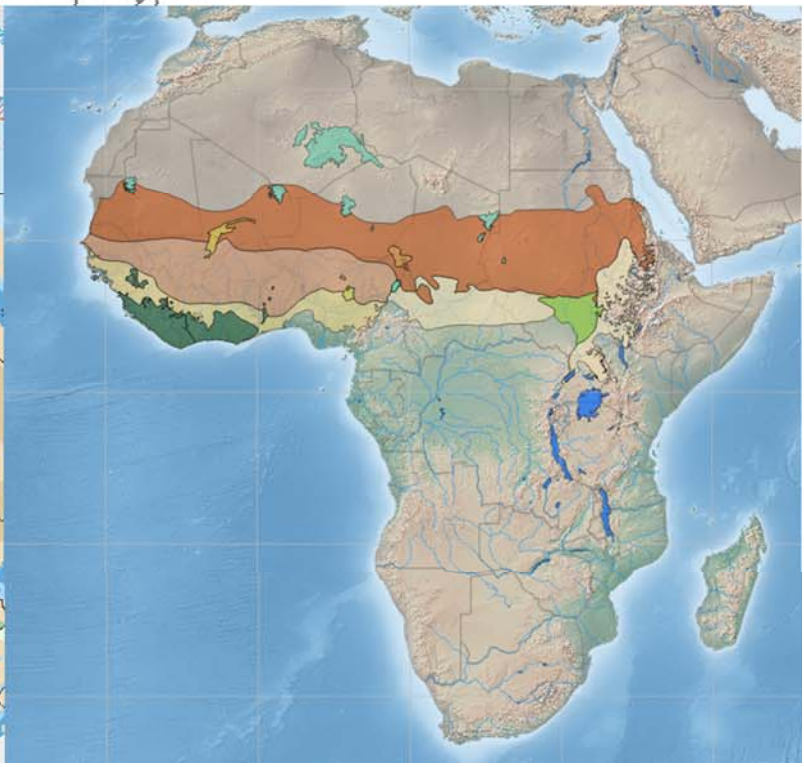


RESULTS

- Rivers
- Undeground watter
- Flora



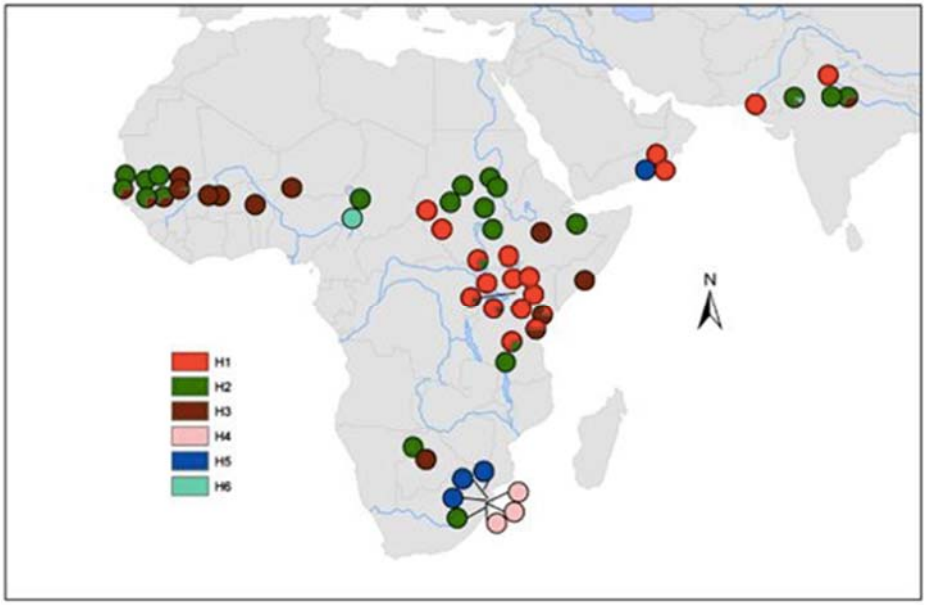




CONCLUSIONS

- Very complex dataset
- Synchrotonous diversification (with exceptions)
- 6 biogeographical regions
- Need of comparison with other organisms

Acacia senegal



Odee et al. (Heredity, 2012)

Thank you for your Attention