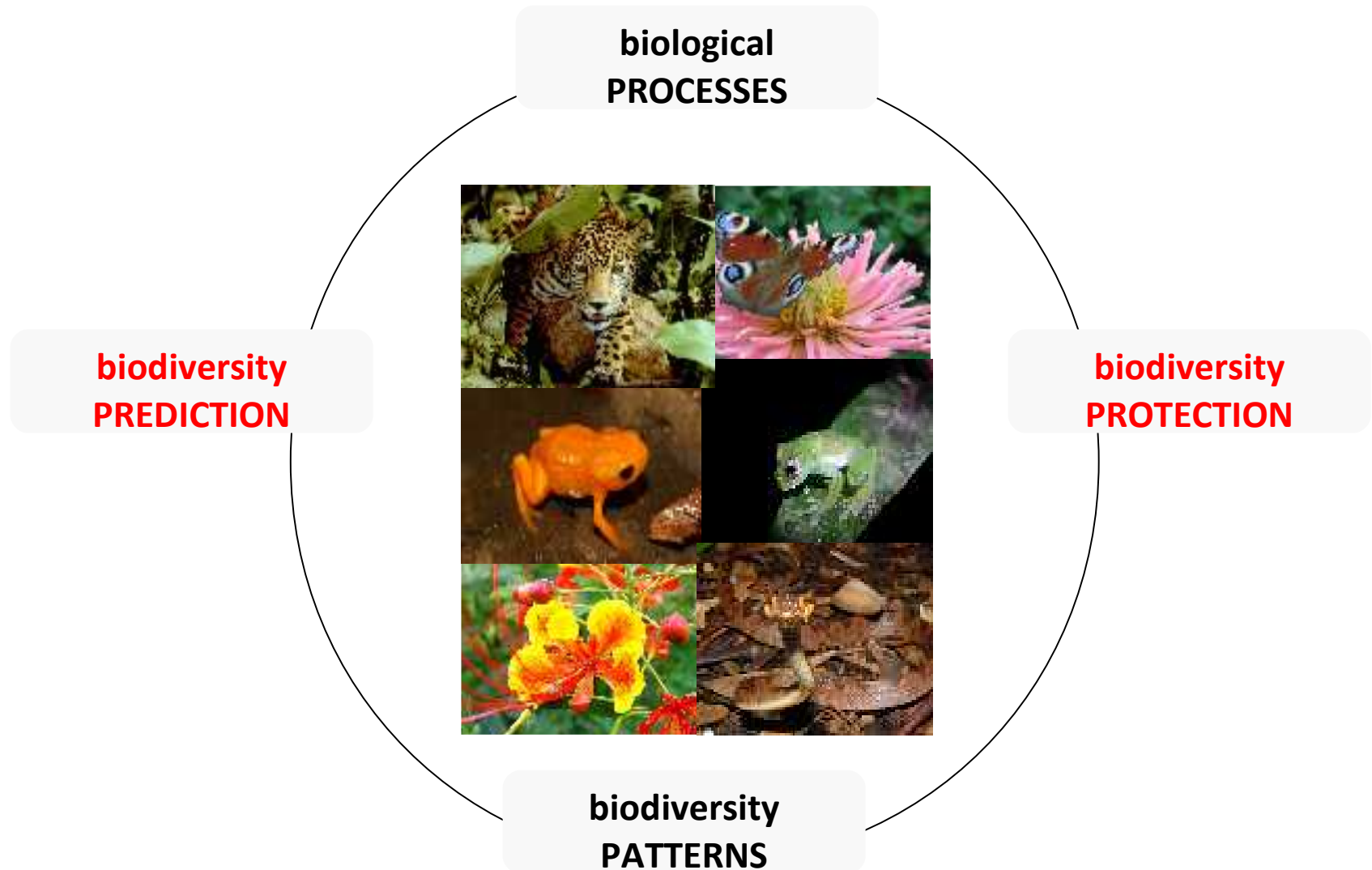
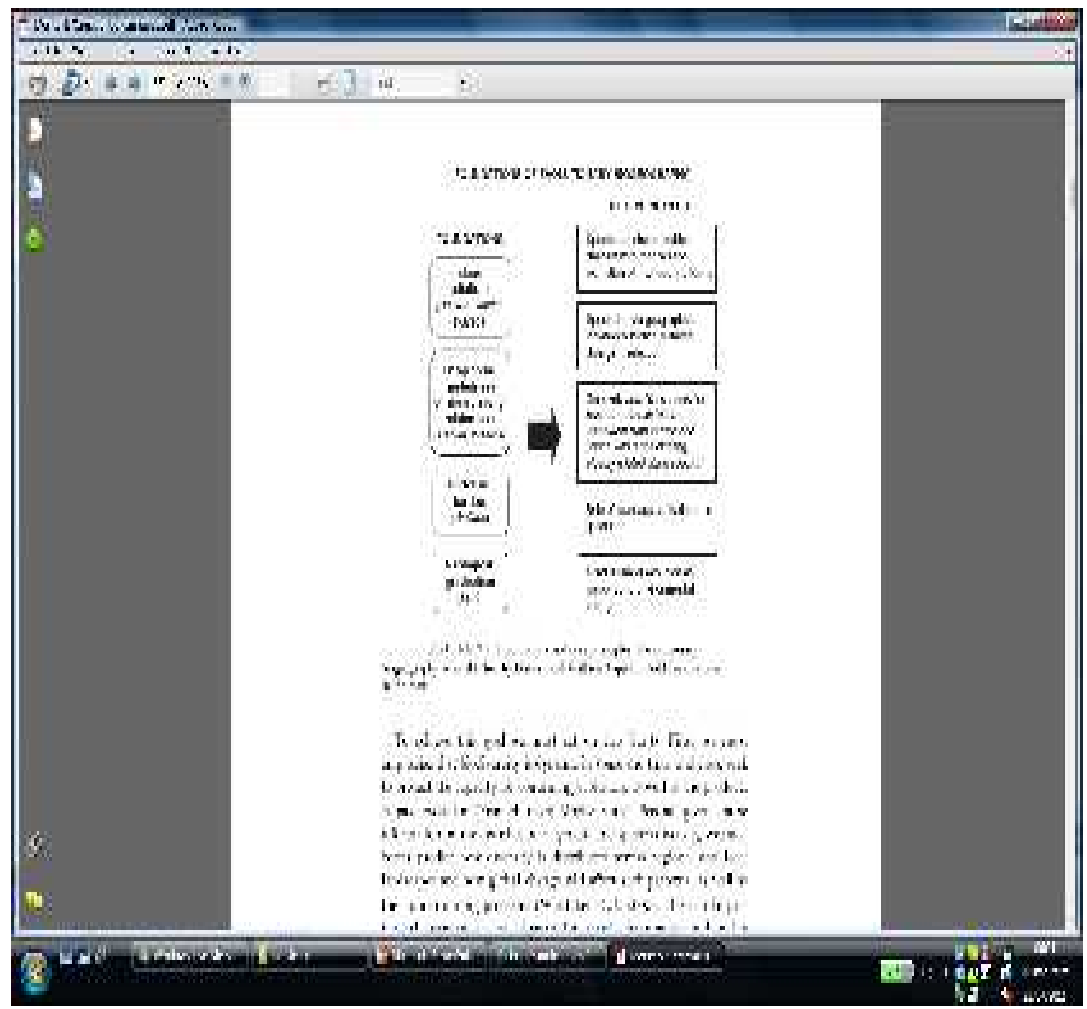
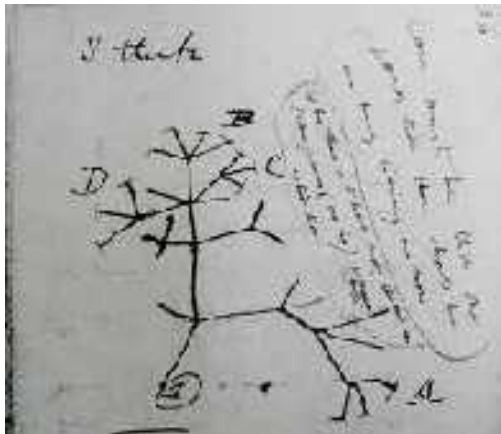


Evolutionary biogeography and biodiversity prediction in the Atlantic forest hotspot

An example of a successful
Brazil-US partnership

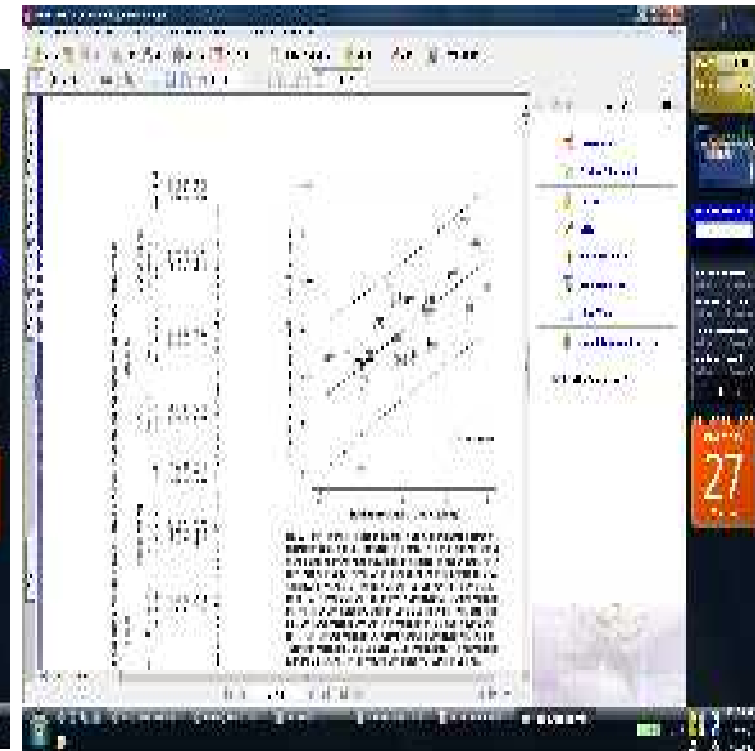
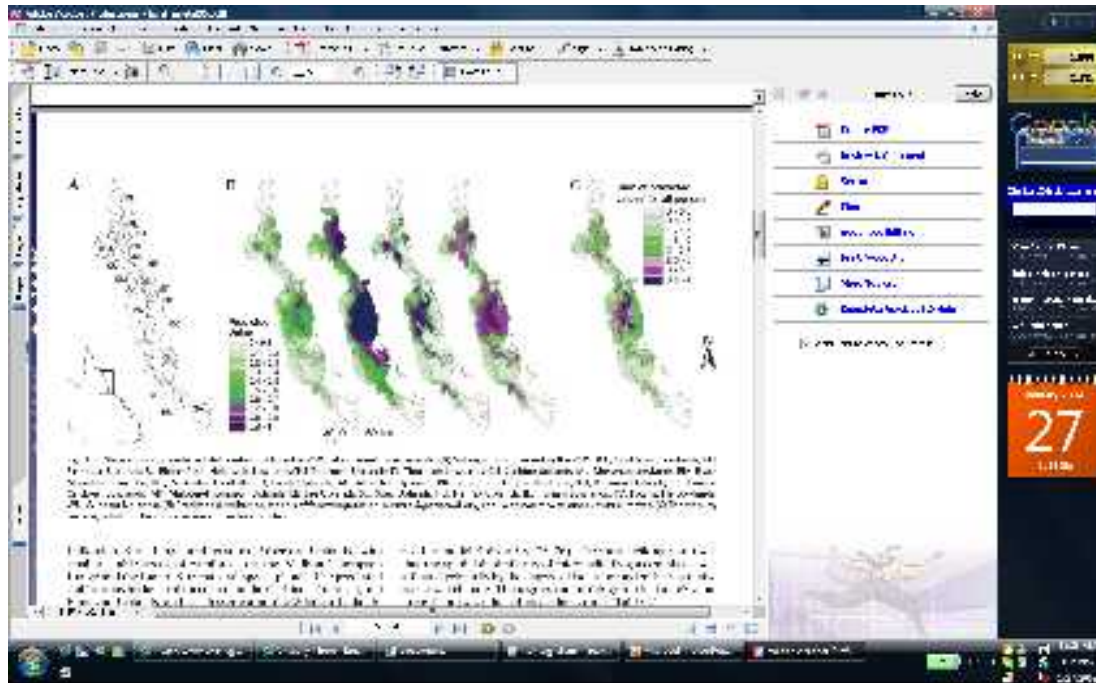


Evolutionary biogeography studies diversity patterns and underlying processes

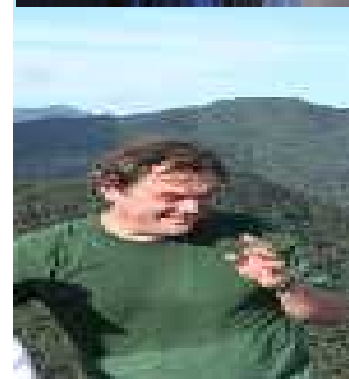
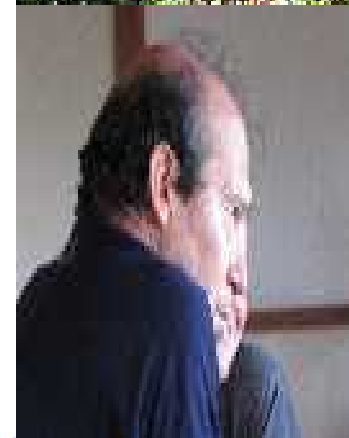
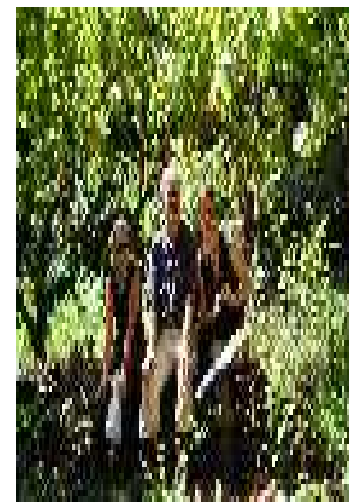


Moritz & Carnaval
2010

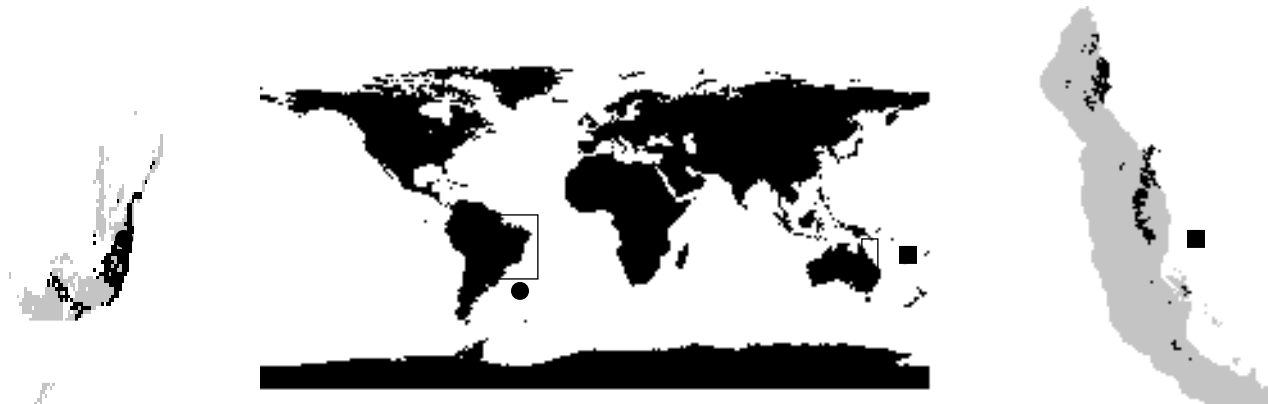
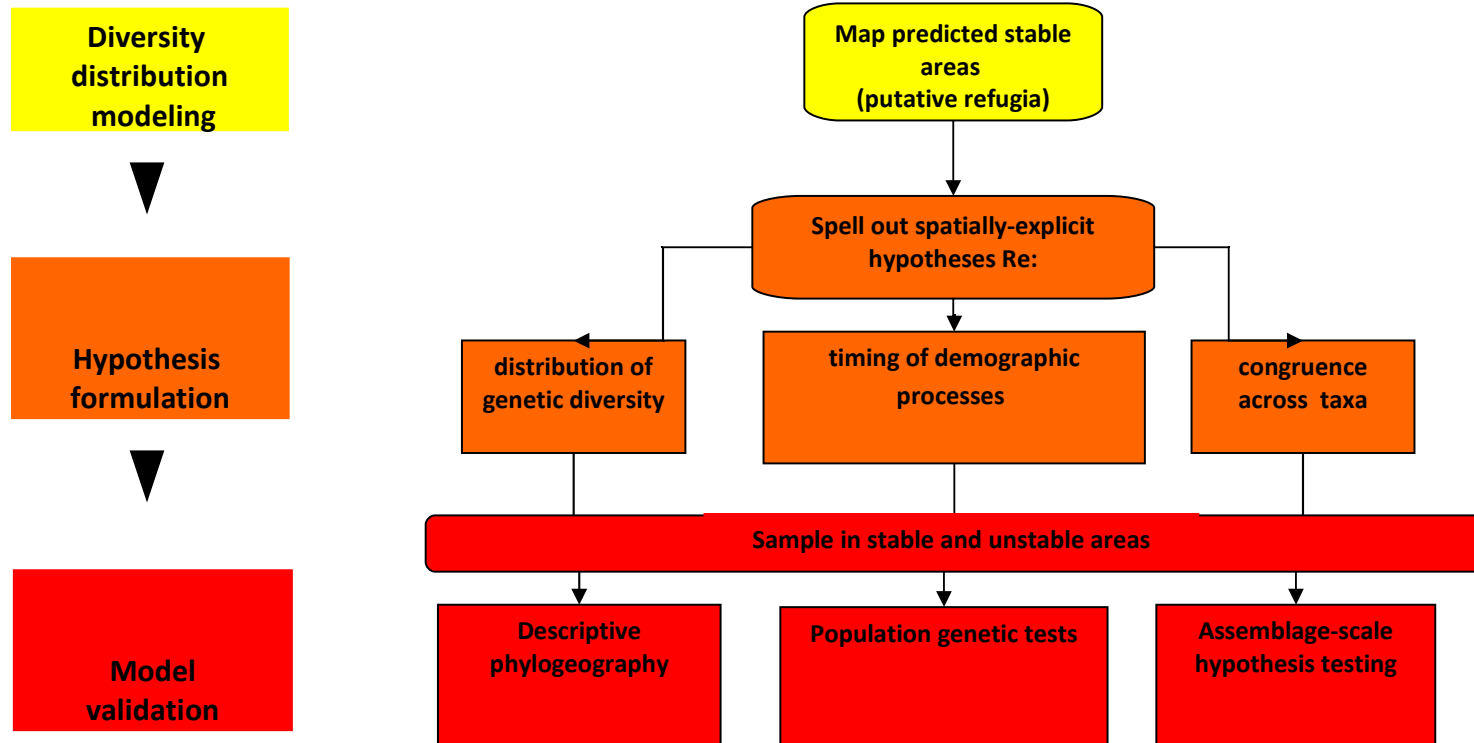
Models of evolutionary processes help to understand biodiversity distribution



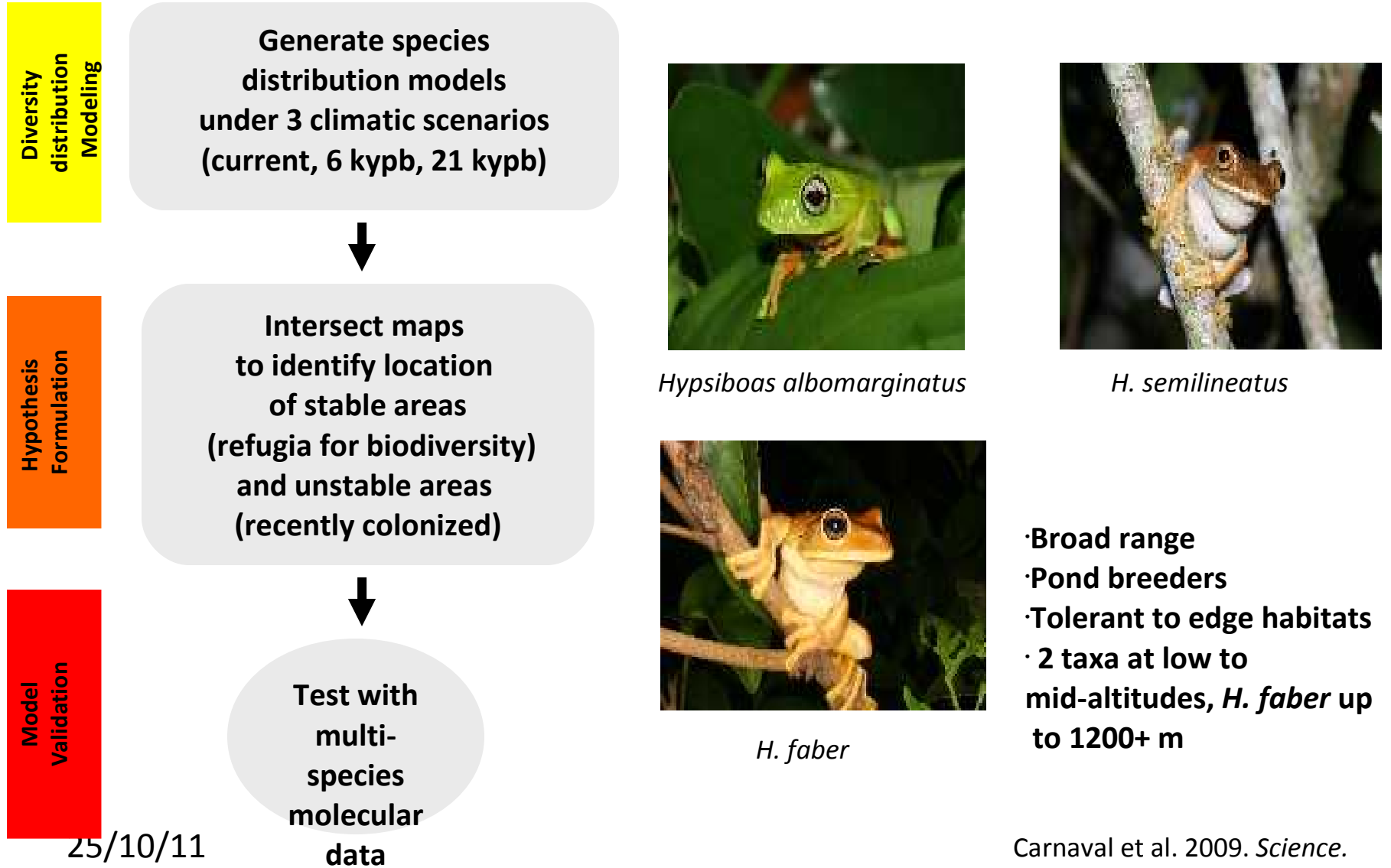
The Brazilian Atlantic forest as study system



AN EVOLUTIONARY BIOGEOGRAPHIC APPROACH TO BIODIVERSITY PREDICTION IN HOTSPOT AREAS



Testing hypotheses of historical stability and biological responses to past climate change



Modeling amphibian response to former climate change



Now



Modeling amphibian response to former climate change



Now



21 kya



Modeling amphibian response to former climate change



Now



21 kya



6 kya

25/10/11



Modeling amphibian response to former climate change



Now



21 kya



6 kya

25/10/11





Current



21 kya



6 kya

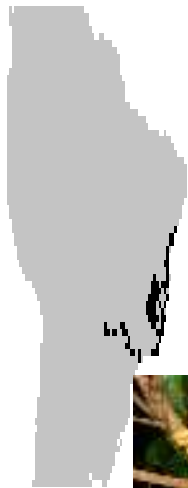
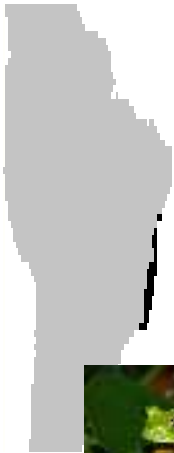
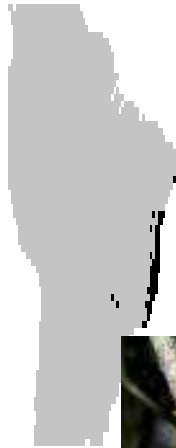


**proposed
refugia**

INTERSECT

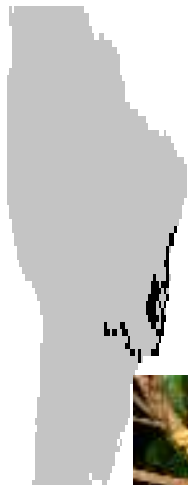
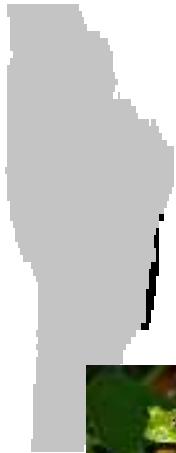
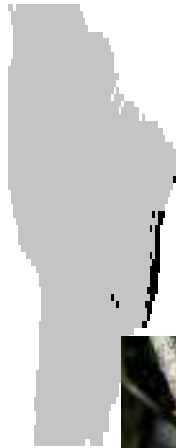


**INFERRED
STABLE
AREAS
(REFUGIA)**



Expected genetic patterns given the palaeomodels

**INFERRED
STABLE
AREAS
(REFUGIA)**



Some expected outcomes from molecular data

Comparatively higher genetic diversity within and among pops in refuge areas

Population expansion out of refugia

Genetic structure among refugia



·43 localities included,
28 visited; 1800+ miles

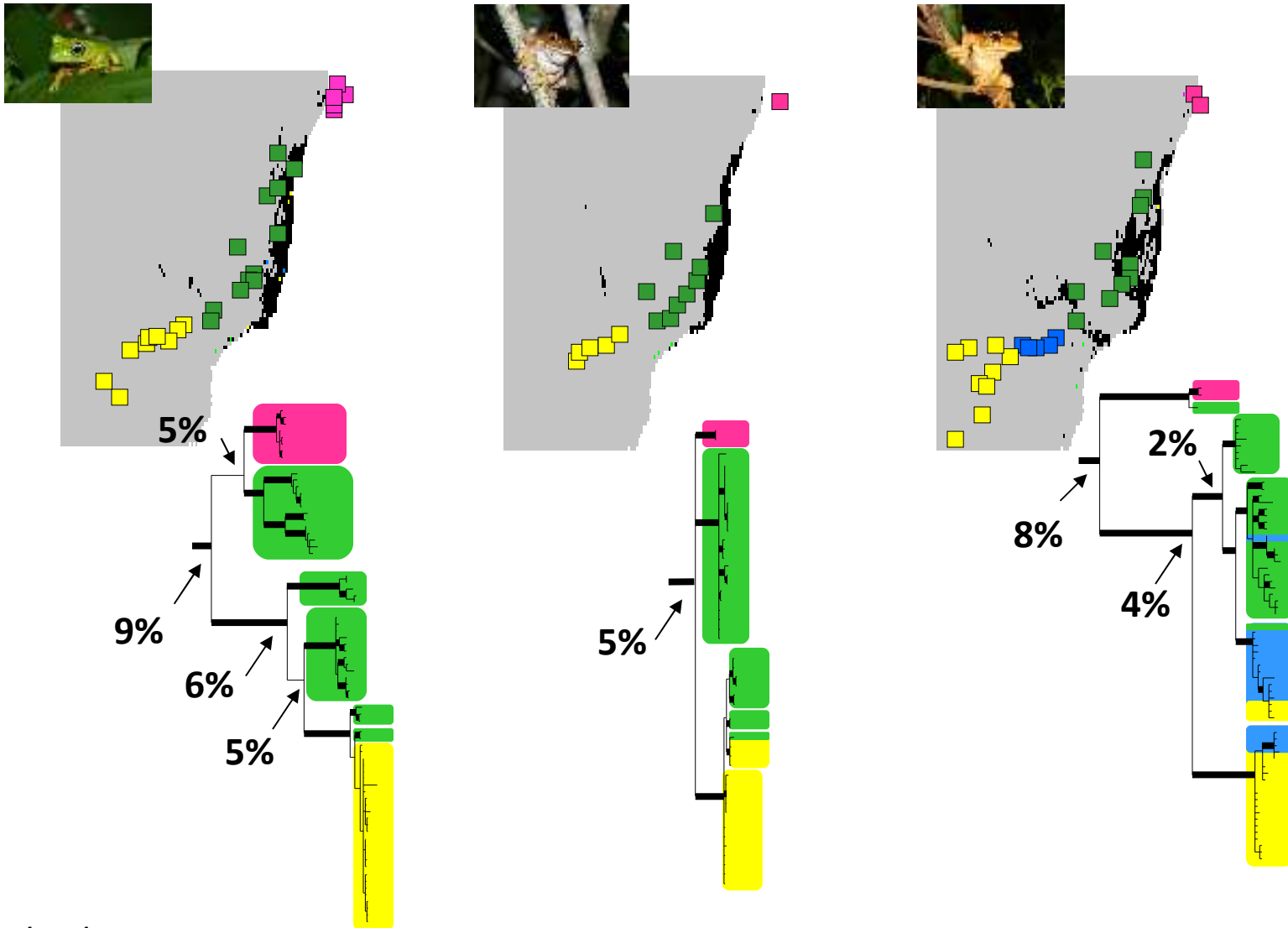
·Tissues & vouchers in
herpetological collections

25/10/11



Comparative phylogeography of Atlantic rainforest frogs

Mitochondrial (mtDNA) data





Stable area

Unstable area



Stable area

Unstable area

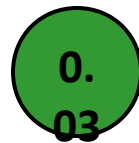
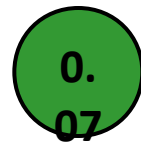


Stable area

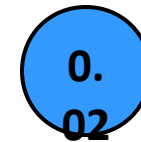
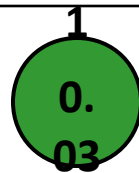
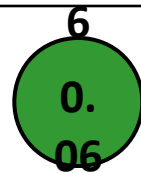
Stable area

Unstable area

Genetic Diversity (theta)



Net divergences across localities (Da)



Population expansion (Hs, p<0.05)

2
—

?

6
?

—

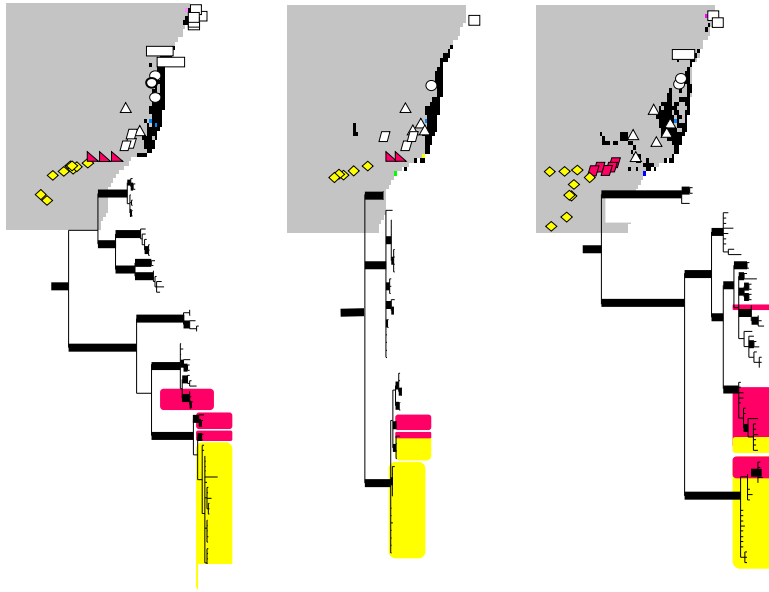
6
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8
?

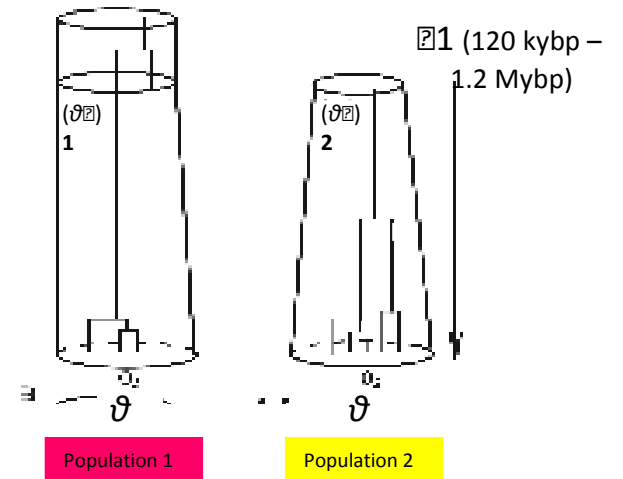
?

Testing for “assemblage-wide” responses to climate change with ABC

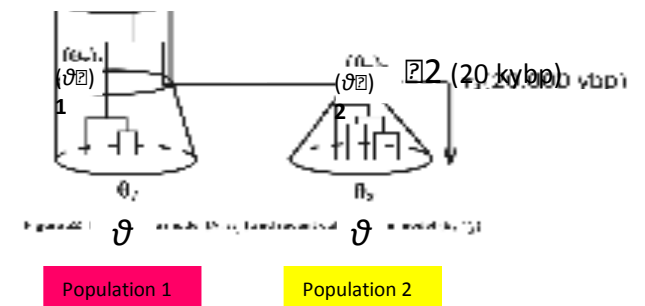
Population expansion into unstable areas



H1: long-term persistence



H2: recent colonization

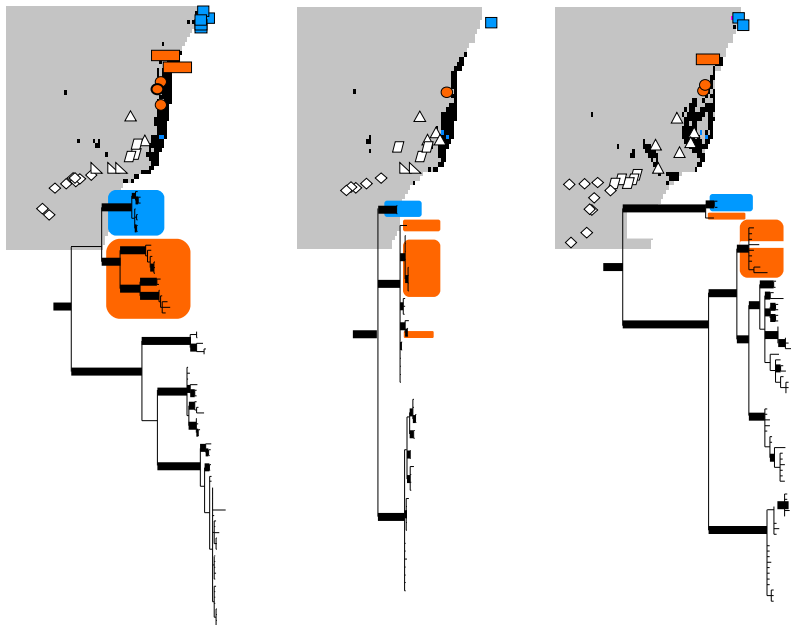


Where $Z2 = \#$ of species evolved under H2

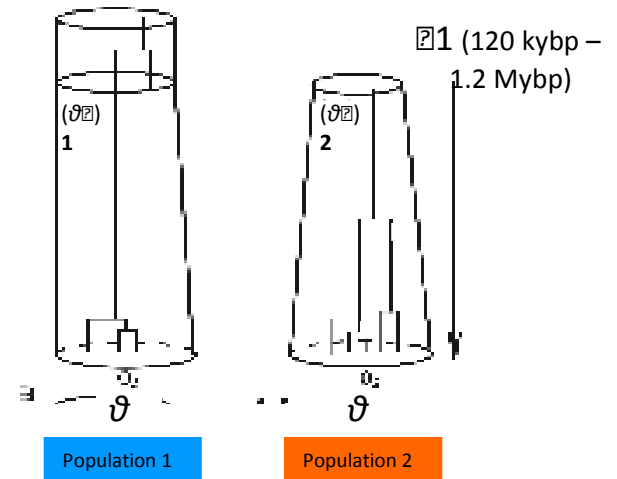


Testing for “assemblage-wide” responses to climate change with ABC

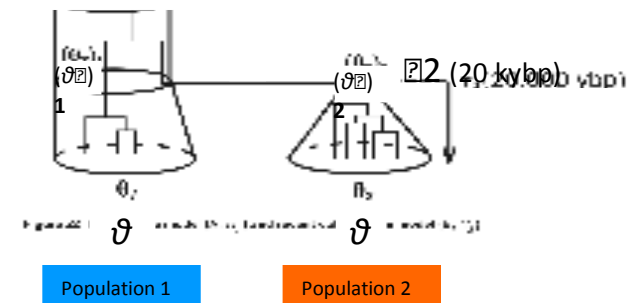
Long-term persistence in isolated refugia



H1: long-term persistence



H2: recent colonization



Where $Z2 = \#$ of species evolved under H2



Results support both model-driven hypotheses of

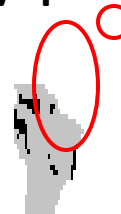
(i) simultaneous, multi-species colonization of unstable areas from adjacent refugial populations since the LGM

(ii) assemblage-scale, long-term persistence of populations in isolated refugial areas

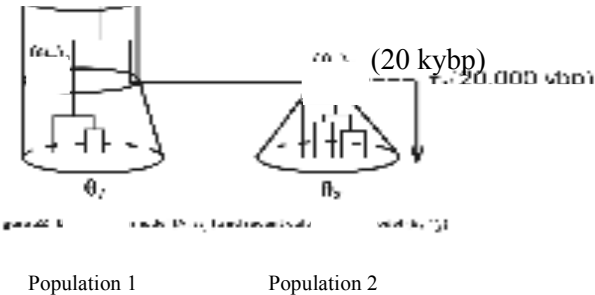
21 kybp



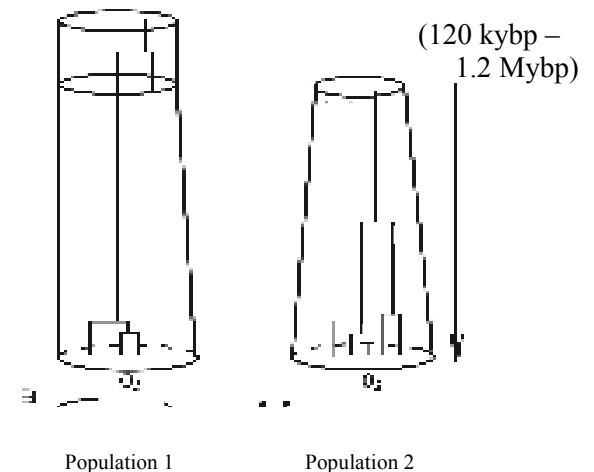
21 kybp



recent colonization



long-term persistence



Expected genetic patterns given the palaeomodels

**INFERRED
STABLE
AREAS
(REFUGIA)**



Expected outcomes from molecular data

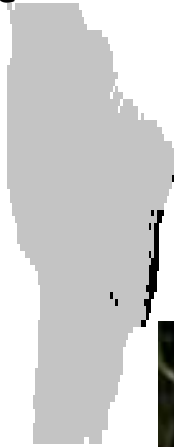
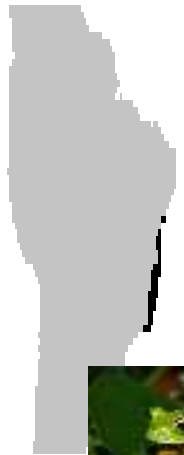
Comparatively higher genetic diversity within and among pops in refuge areas ?

Population expansion out of refugia ?

Genetic structure among refugia ?

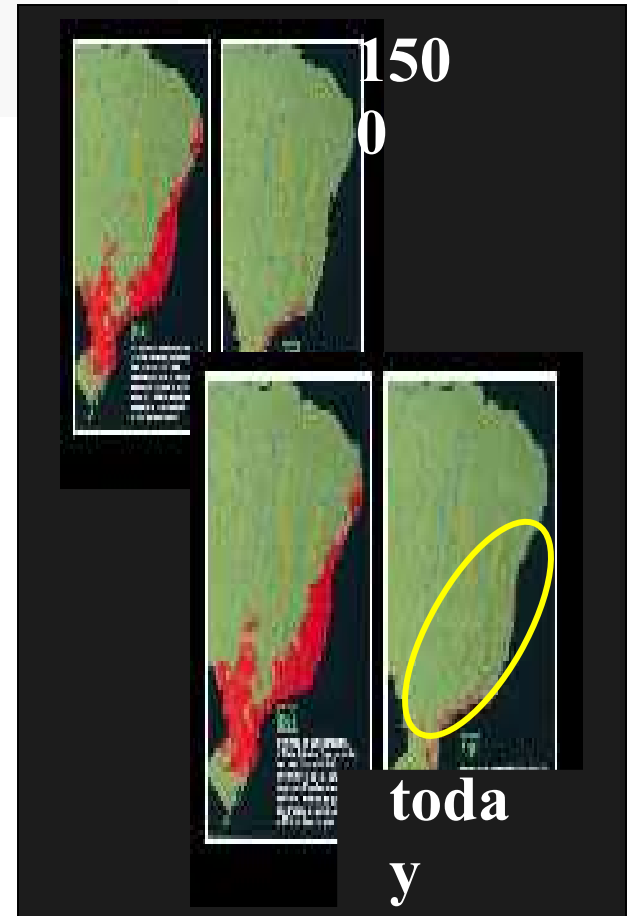
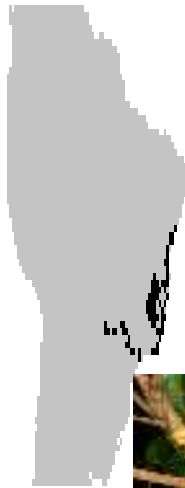
Central corridor
functioned as a large
refuge for lowland
forest taxa

Yet, it is poorly known and
under much higher threat
relative to
southern forests



click t

ibtitle style



Prediction: genetic diversity and narrow endemism have been substantially underestimated in central corridor of the Atlantic rainforest. True?



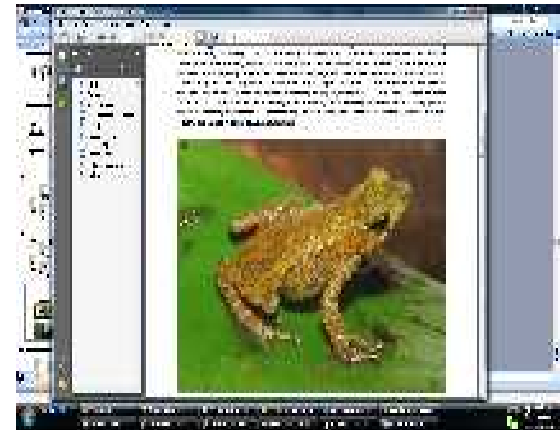
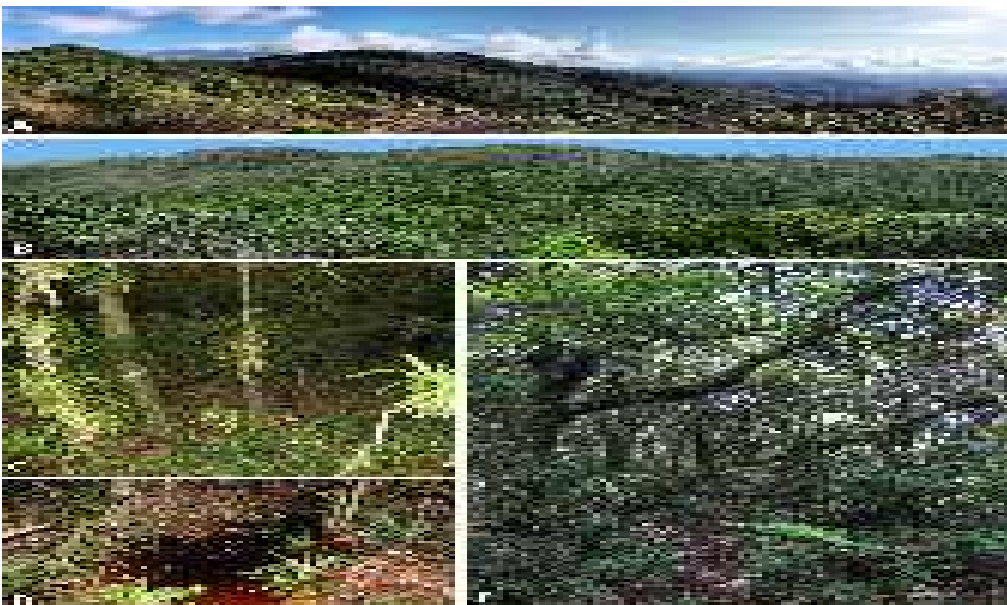
The Museum of Vertebrate Zoology at Berkeley



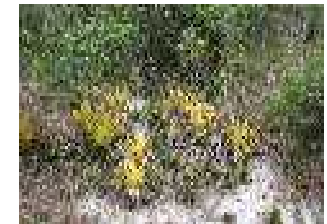
23/10/11



YES!



25/10/11

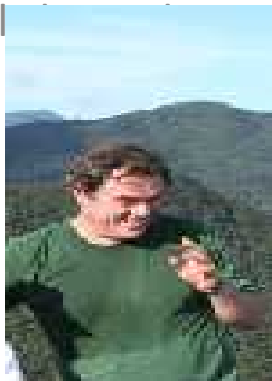


The screenshot shows a web browser window displaying the title page of a journal article. The browser's address bar shows the URL: <http://www.blackwell-sydney.com/doi/full/10.1111/j.1365-3113.2011.04611.x>. The page header includes the logo for the **COENEA SOCIETY** and the **BIOLOGICAL Journal**. The article title is **Historical biogeography of the Brazilian Atlantic forest and the Carnaval-Moritz model of Pleistocene refugia: what do phylogeographical studies tell us?**, authored by **FELIPE DE MELLO MARTINS***. The journal information is *Biological Journal of the Linnean Society*, Volume 104, Issue 2, pages 209–221, published in 2011. The abstract begins with: "The present study aims to utilize phylogeographical studies to test the Carnaval Model (CM) model of forest dynamics in the Atlantic forest of Brazil. The model predicts that refuge locations in the world's coastal region of this biome have remained low during the last glacial maximum, and may reflect its current low latitudinal distribution. All results are discussed in phylogeographical studies on refugia in the Atlantic forest area."

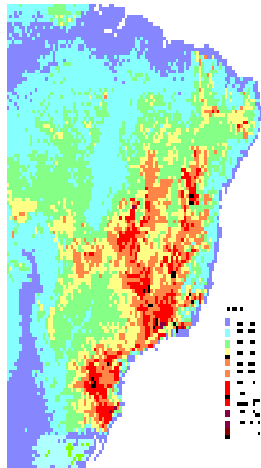
Why are tropical mountains unique? Evolutionary biogeography and herpetological inventory in the montane Brazilian Atlantic forests



Cl... aster subtitle style



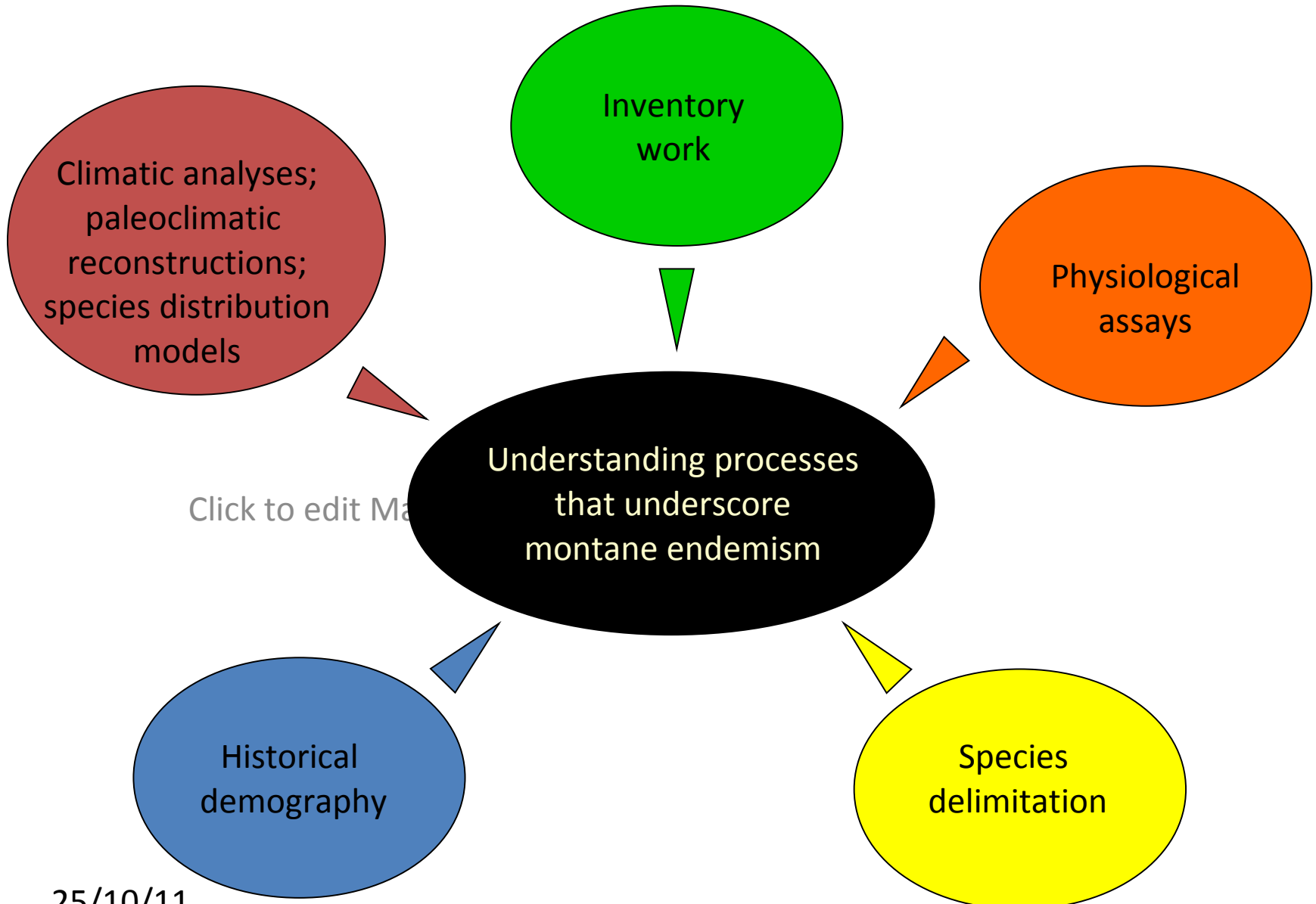
Why are tropical mountains unique? Evolutionary biogeography and herpetological inventory in the montane Brazilian Atlantic forests



subtitle



Why are tropical mountains unique? Evolutionary biogeography and herpetological inventory in the montane Brazilian Atlantic forests



5 years of collaborative work: many opportunities for education and outreach

CUNY: Zoe Spanos (undergraduate)
Barbara Rizzo (undergraduate)
Danielle Rivera (undergraduate)
Ivan Prates (Ph.D.)
Eric Waltari (postdoc)



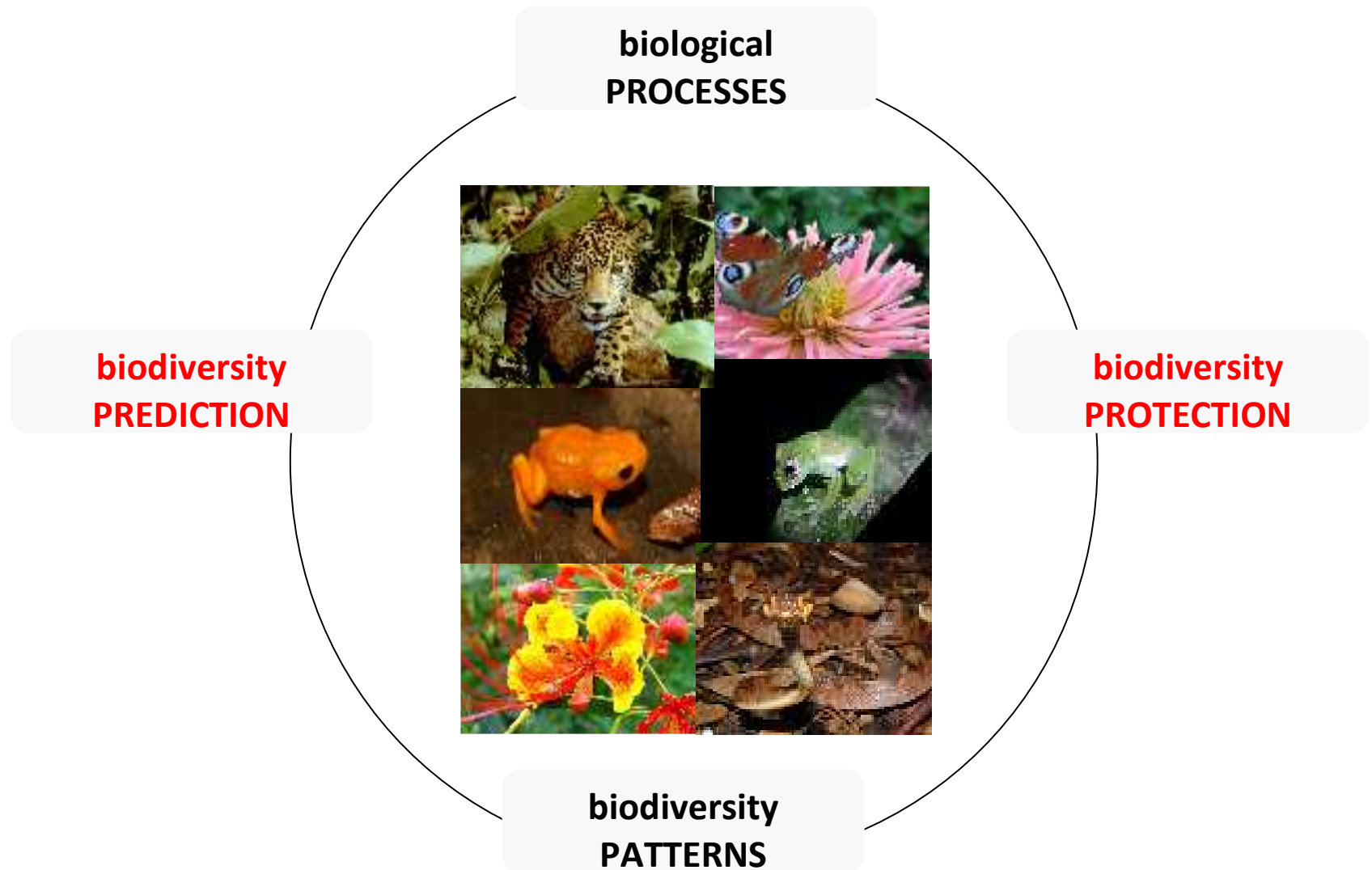
MVZ: Diane Truong (undergraduate)
Jun Gu (undergraduate)
Lauren Zeidler (undergraduate)
Roberta Damasceno (Ph.D.)
Ana Carnaval (postdoc)



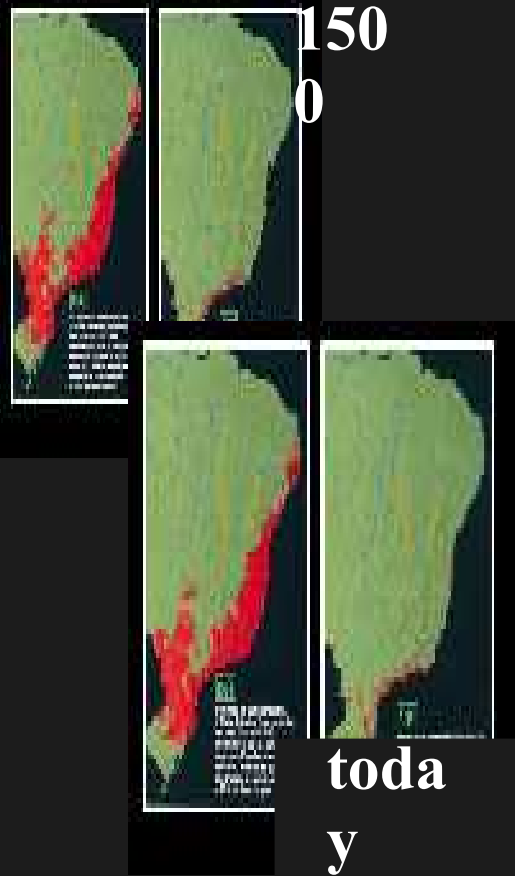
USP: Renato Recoder (MSc)
Mauro Teixeira (MSc)
Marcia Laguna (MSc)
J. Cassimiro da Silva Jr. (Ph.D.)
Renata Cecilia Amaro (postdoc)

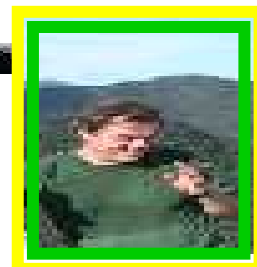
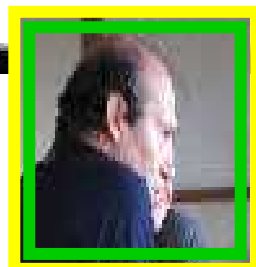
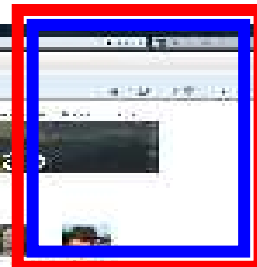
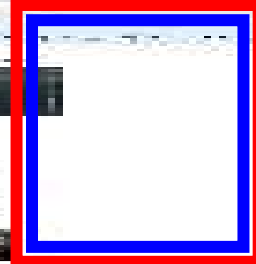
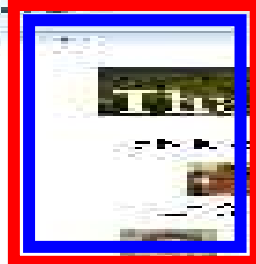
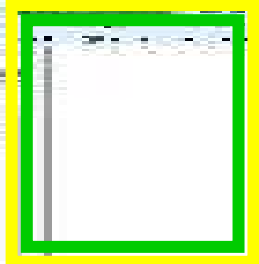
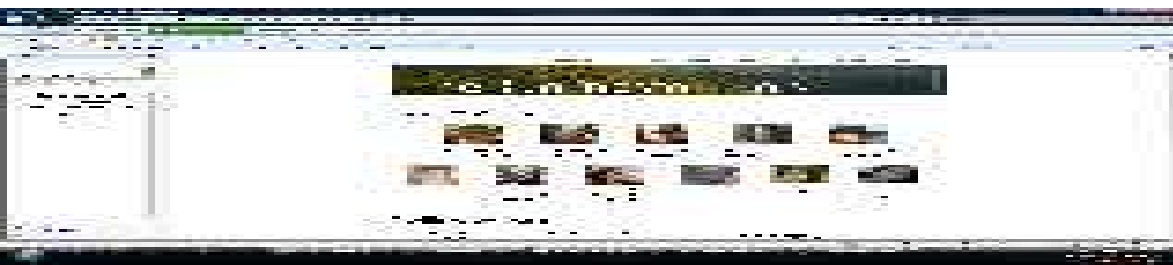


UFBA: Rodrigo de Vasconcelos (Ph.D.)
Tiago Porto (MSc.)
Clarissa Machado (MSc.)



Scope of our work: linking evolutionary biogeography and conservation





25/10/11

