

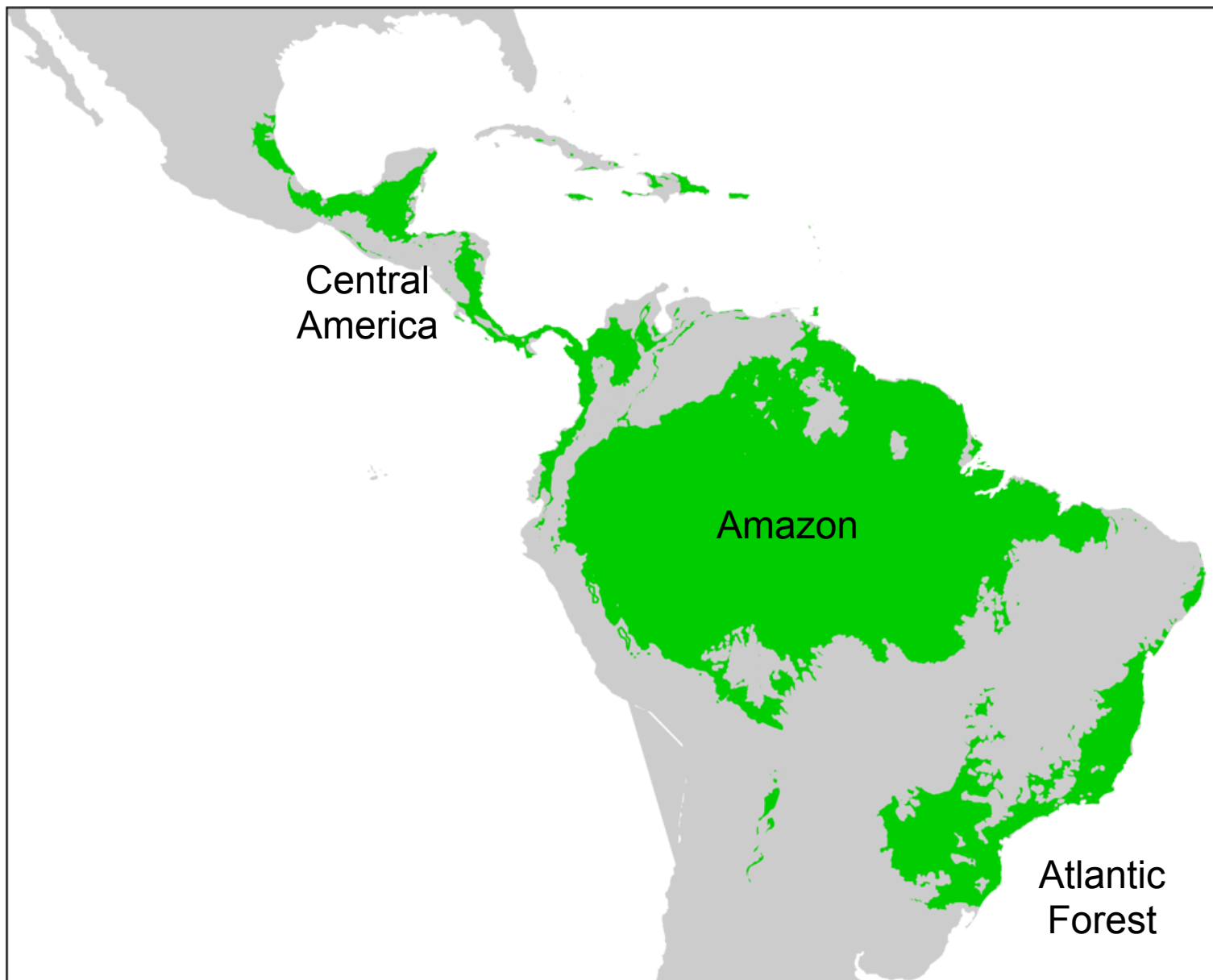
Biogeographic filtering and the assembly of Neotropical rainforests

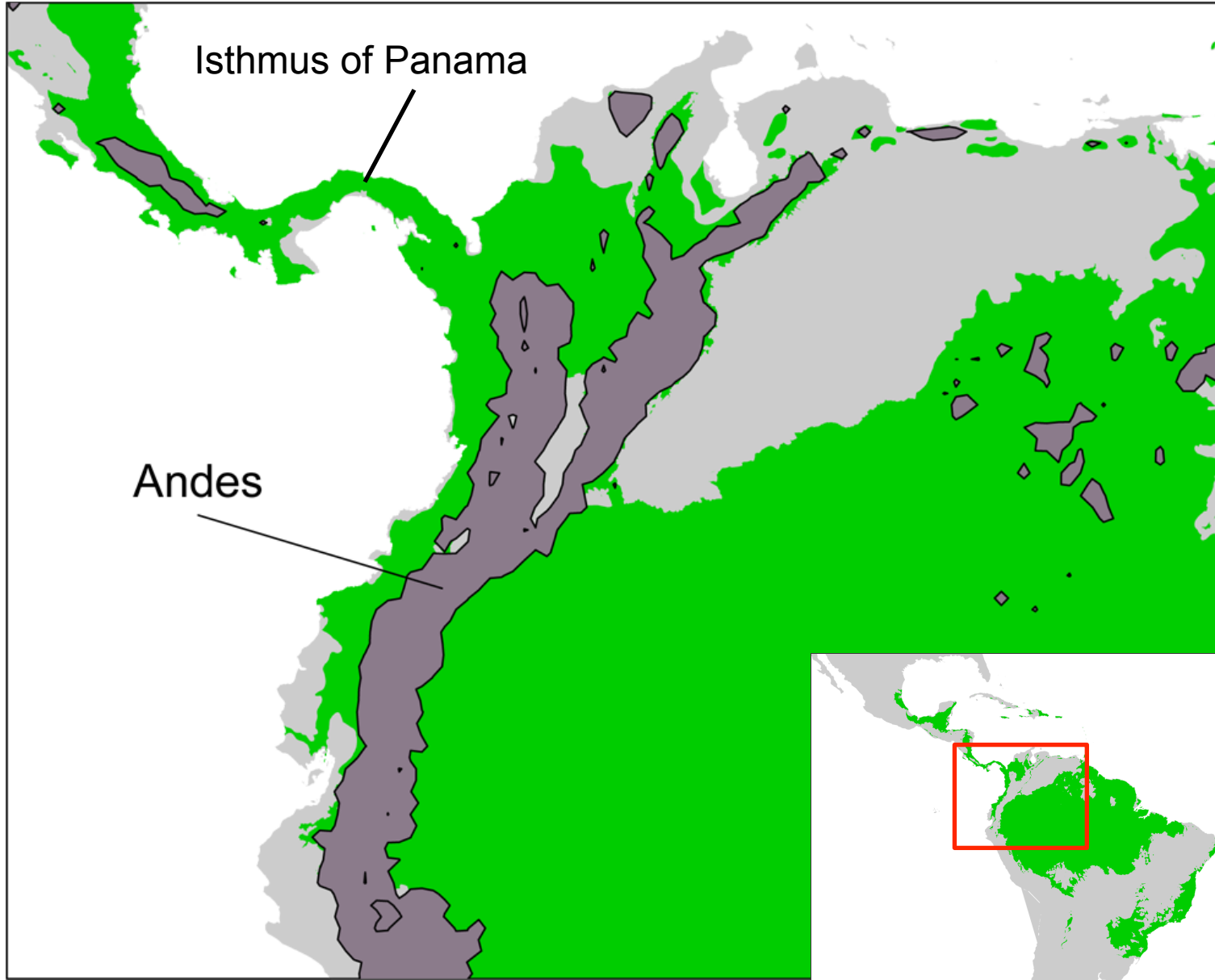
Insights using ecological traits derived from
digital biodiversity data

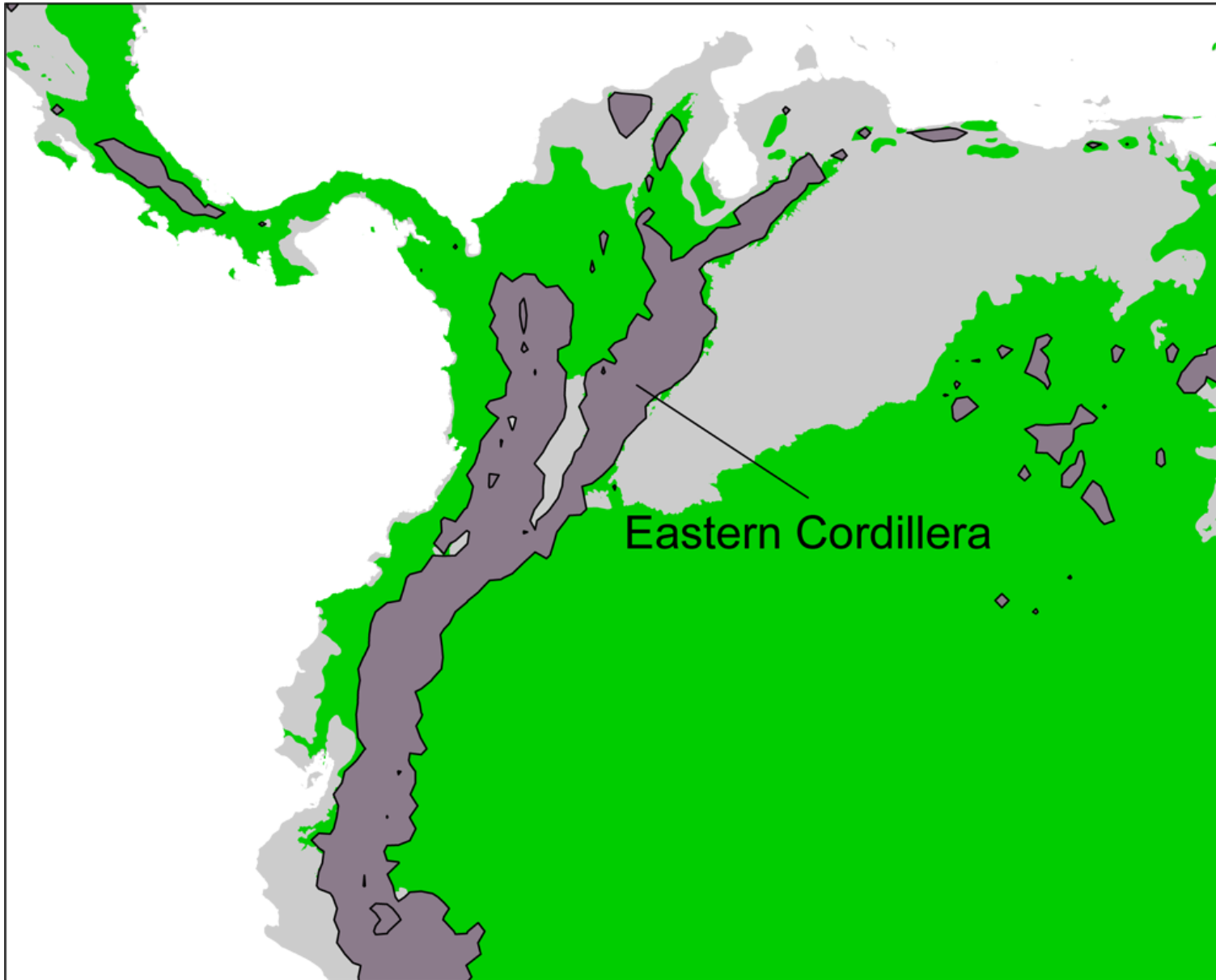


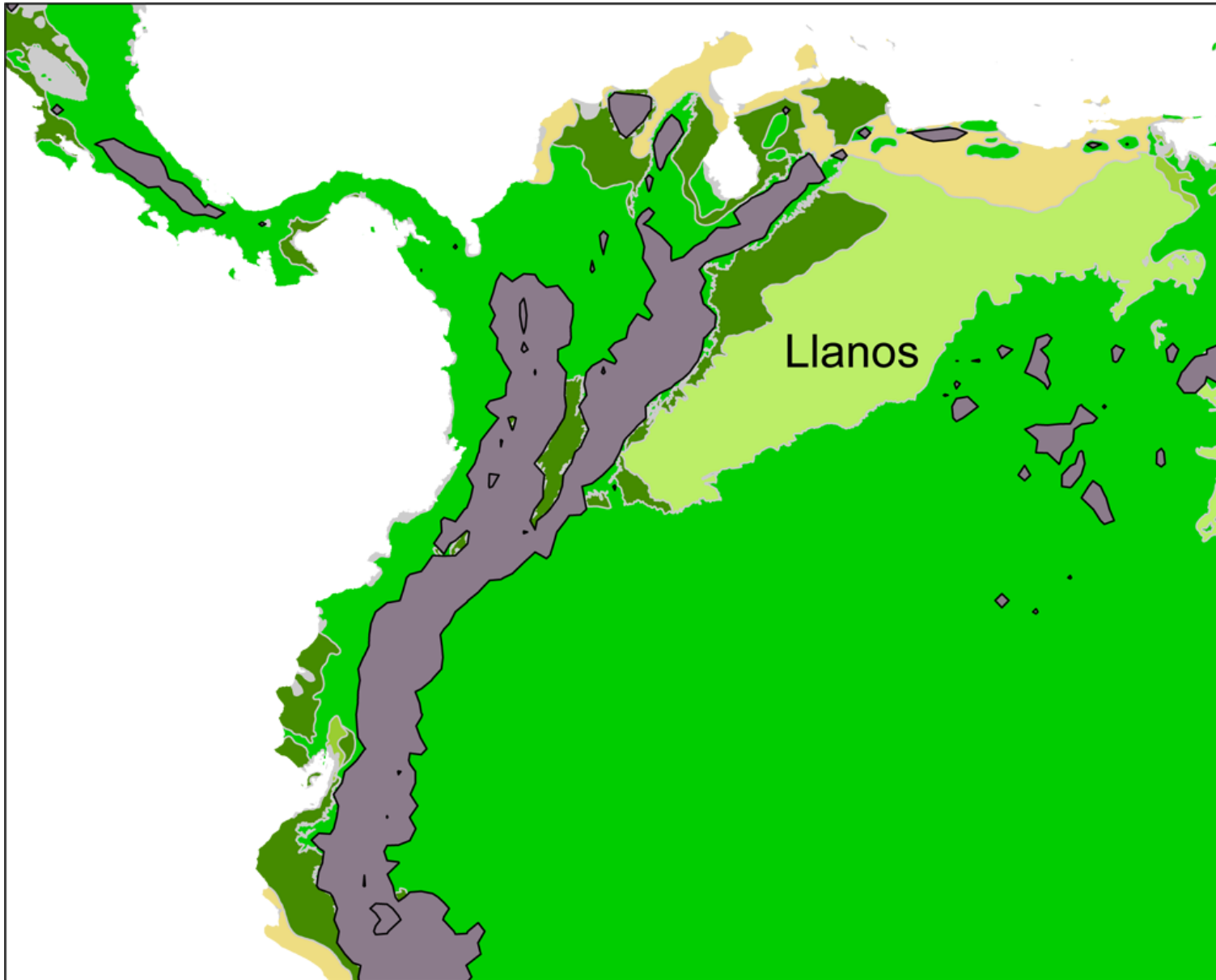
Jordan B. Bemmels, S. Joseph Wright, Nancy C. Garwood,
Simon A. Queenborough, Renato Valencia, Christopher W. Dick

Inaugural Digital Data in Biodiversity Conference, June 5th 2017









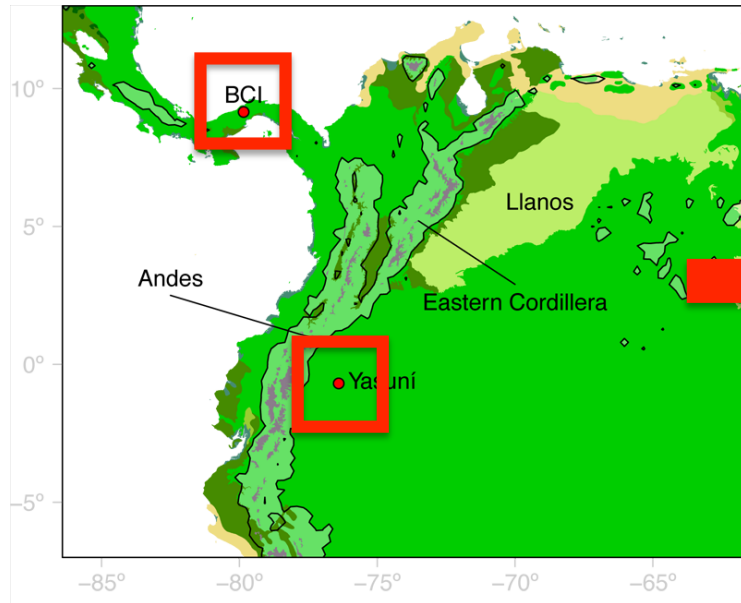
Why are some rainforest woody plants widespread (across the Andes)?

1) Broad elevational range

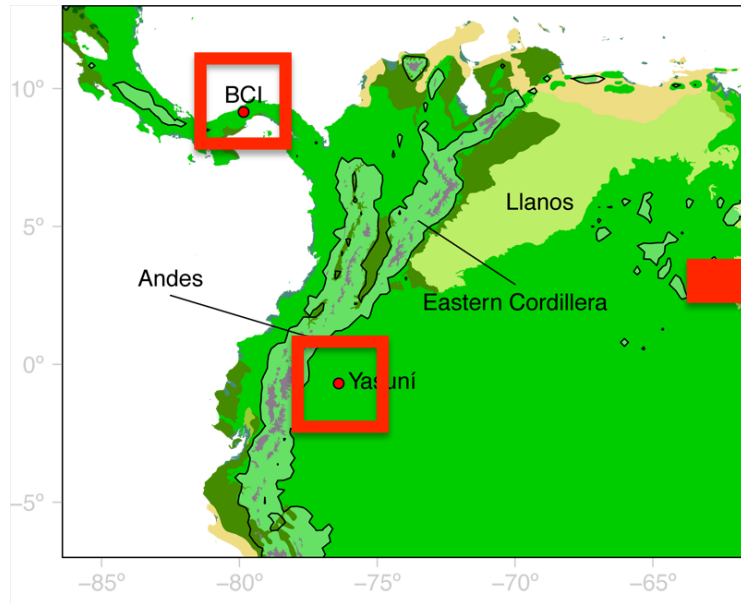
2) High drought tolerance

3) High dispersal-colonization ability

- Dispersal distance:
 - small seeds, large maximum height, wind dispersal
- Rapid/pioneer life history (colonization):
 - low wood density, low leaf mass per area (LMA), small seeds, small maximum height

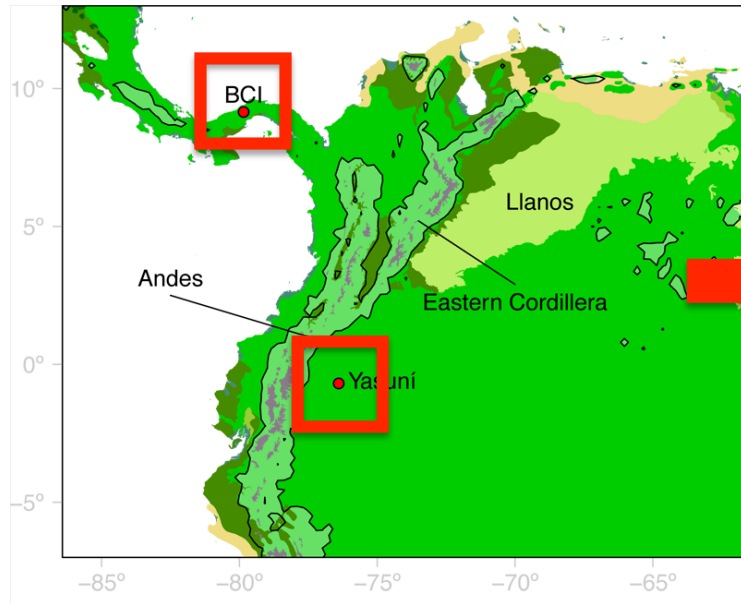


810 Yasuní species
621 BCI species
disp.-col. traits

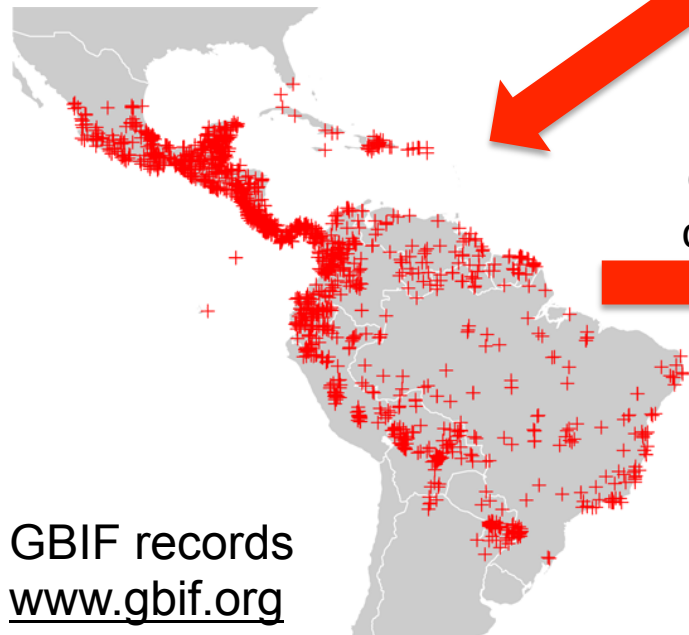


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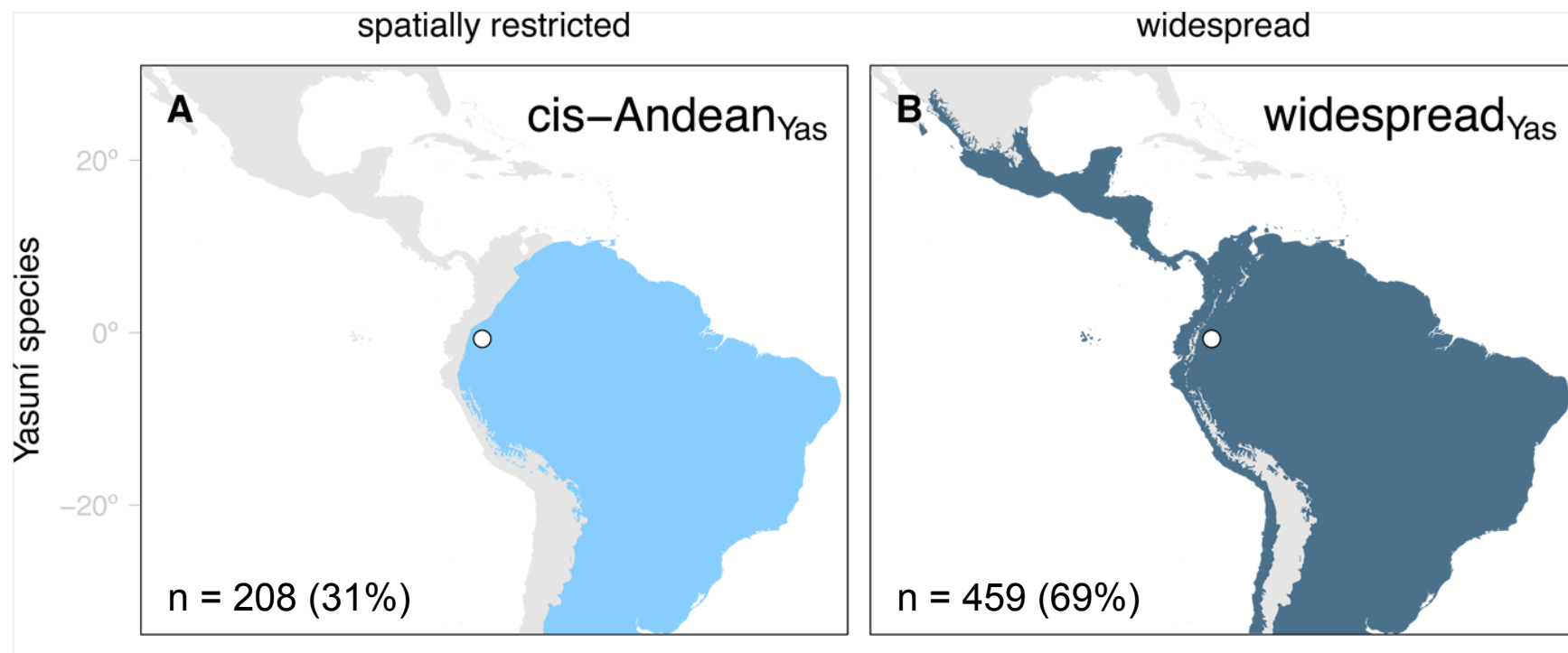


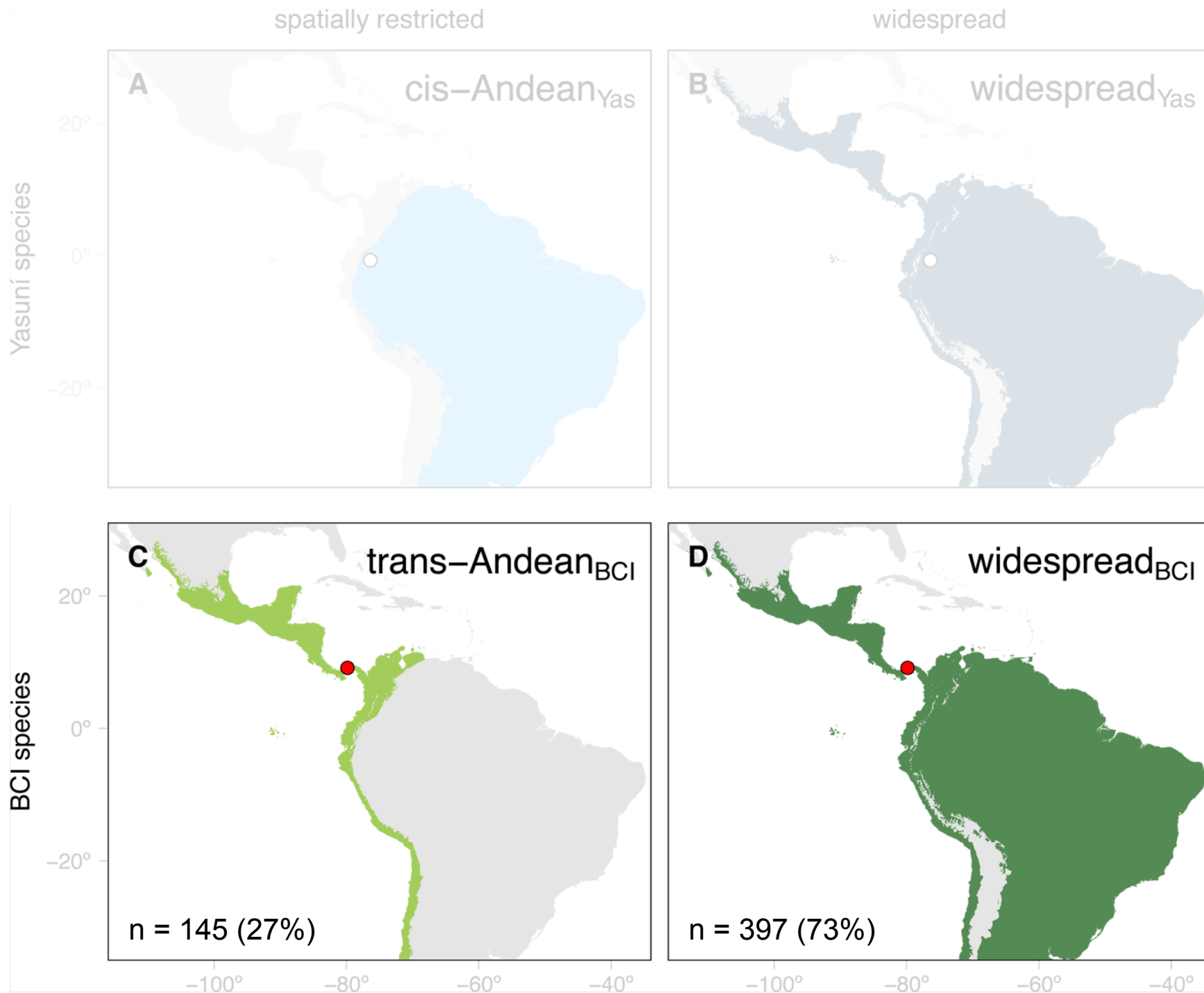
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quality
control

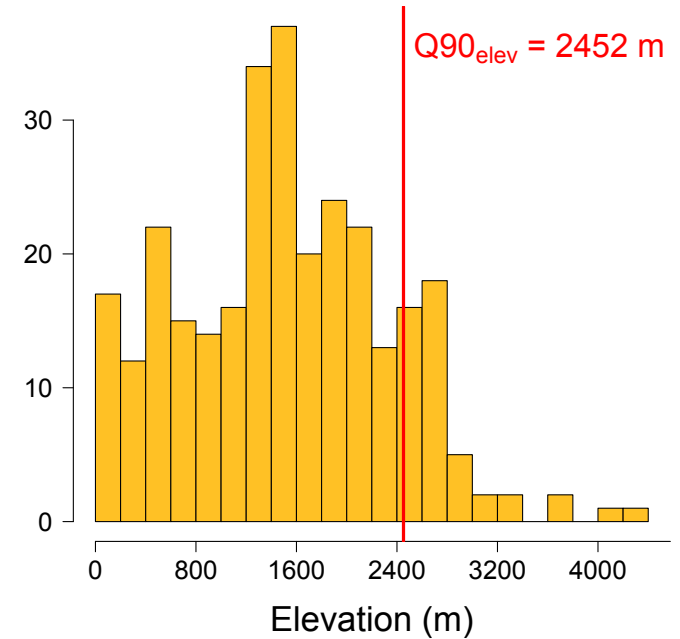
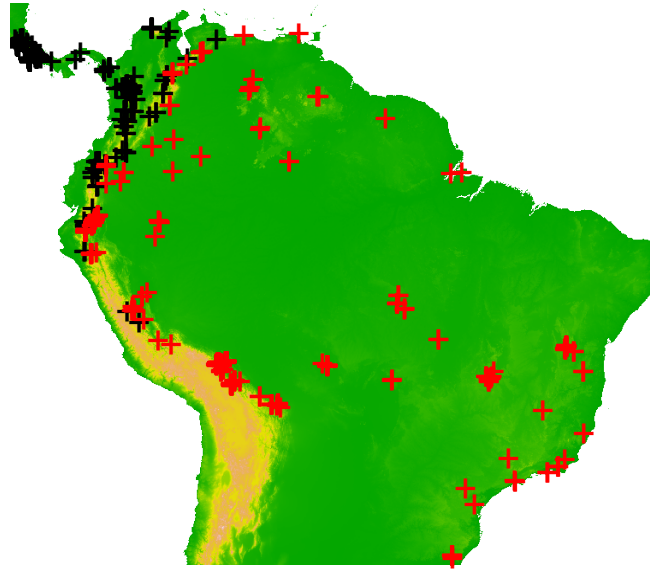
- 1) geographic distribution
- 2) elevational range
- 3) drought tolerance



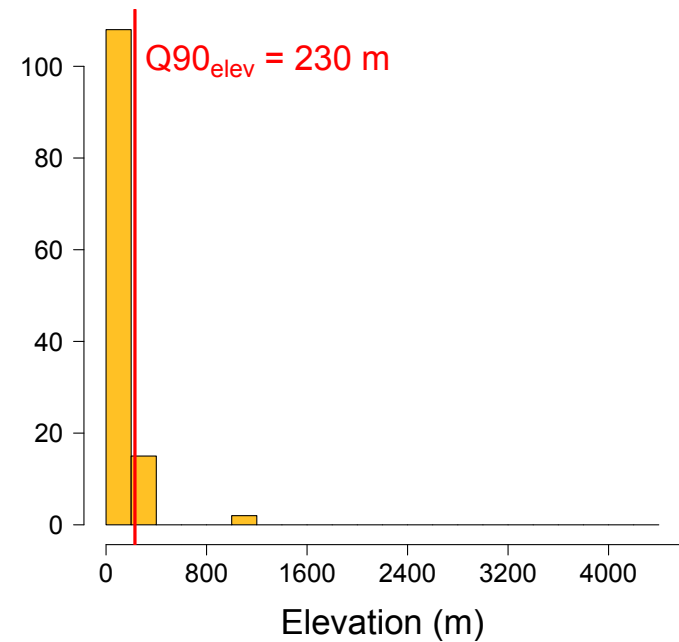
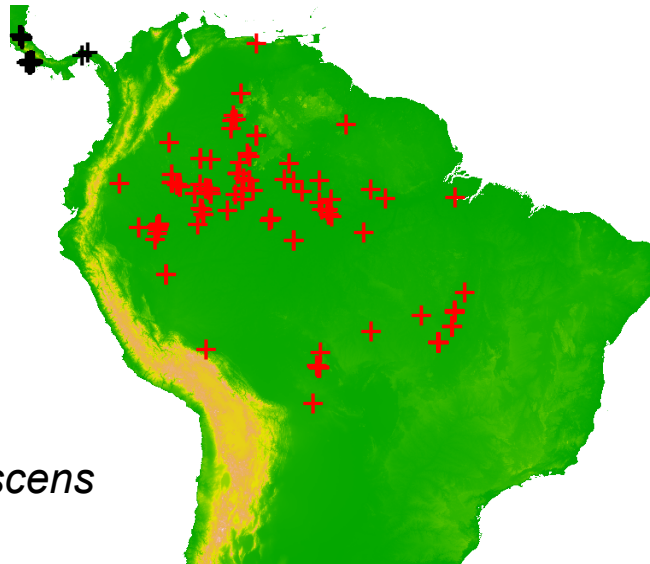


Elevational range

Gordonia fruticosa
(Theaceae)

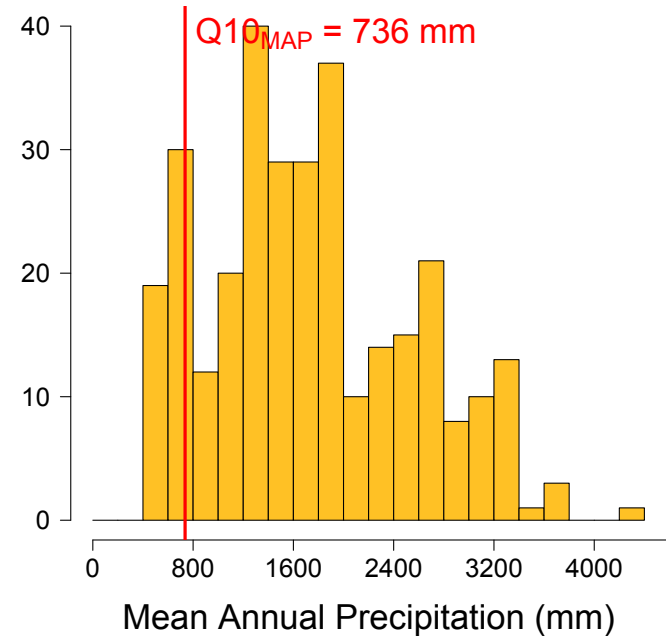
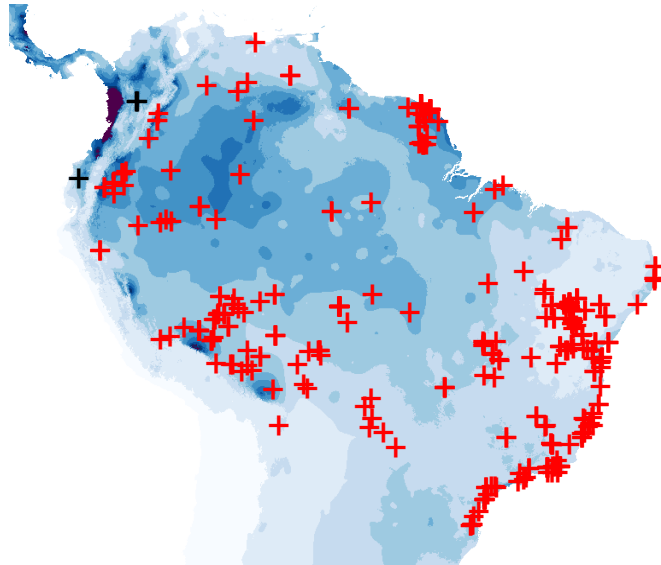


Elaeoluma glabrescens
(Sapotaceae)

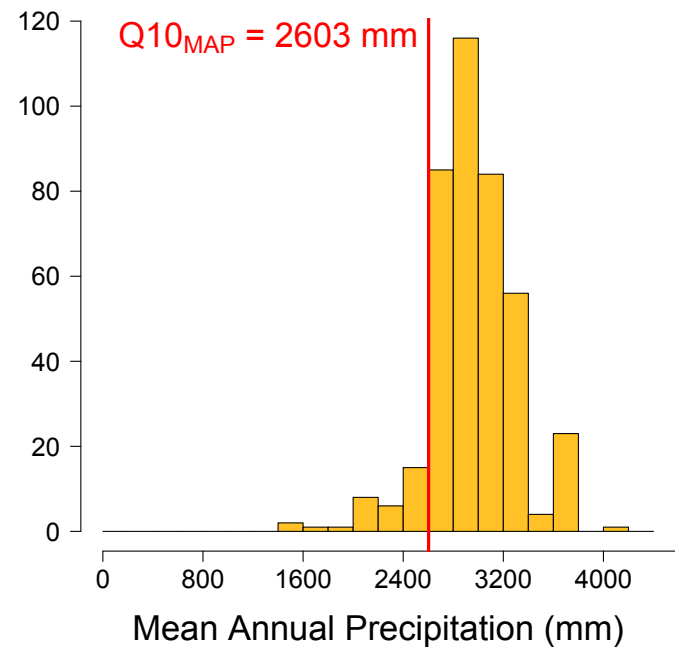
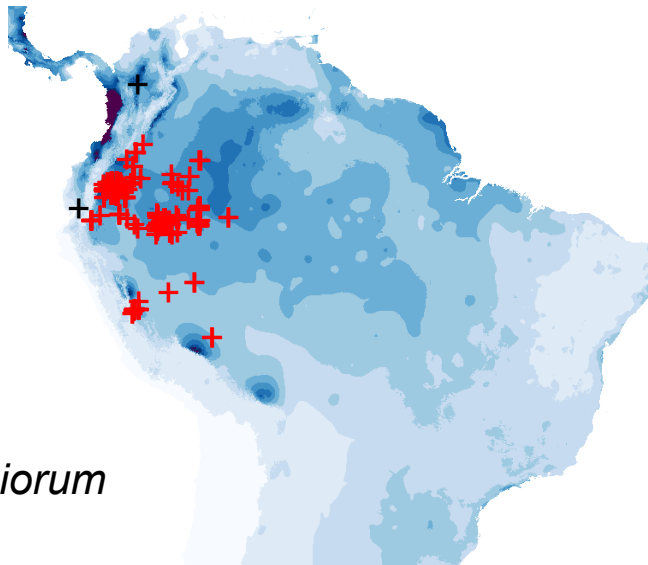


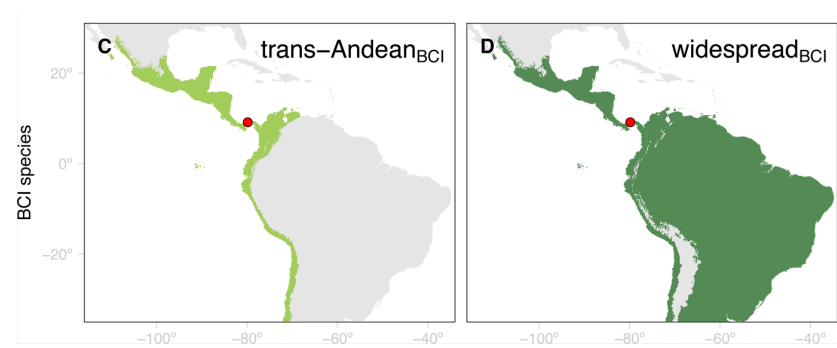
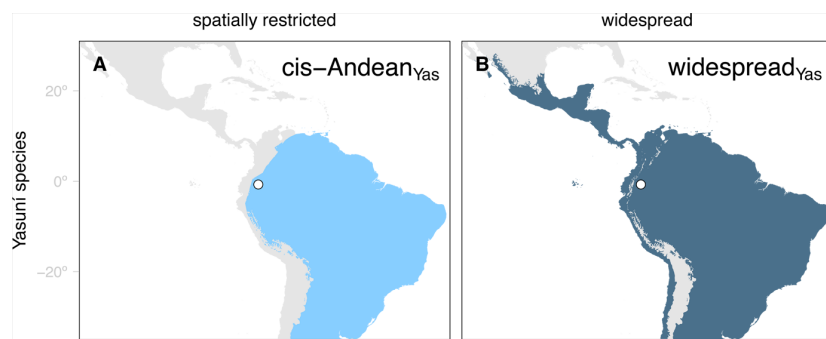
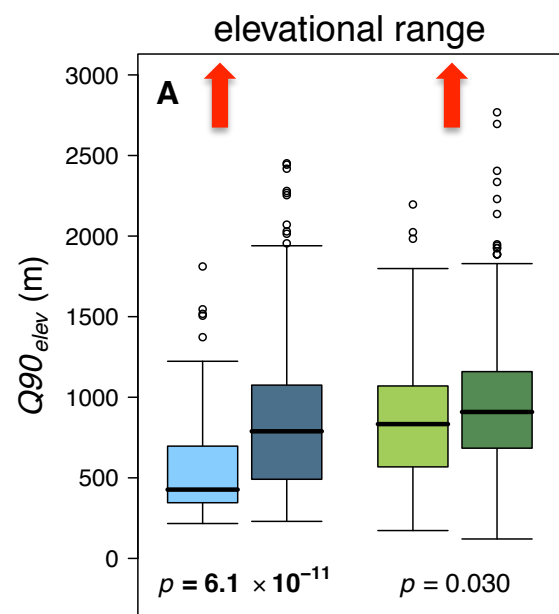
Drought tolerance

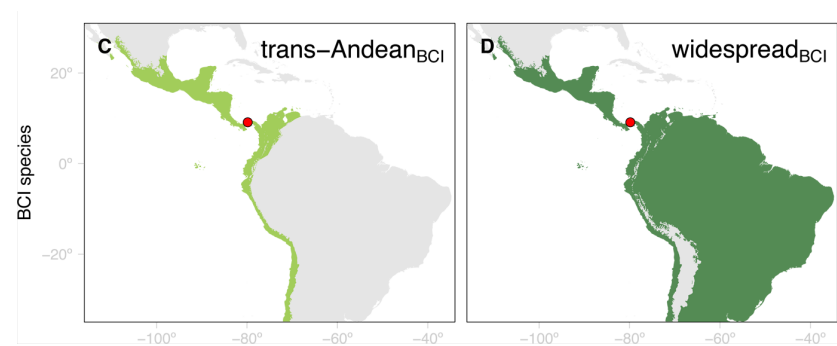
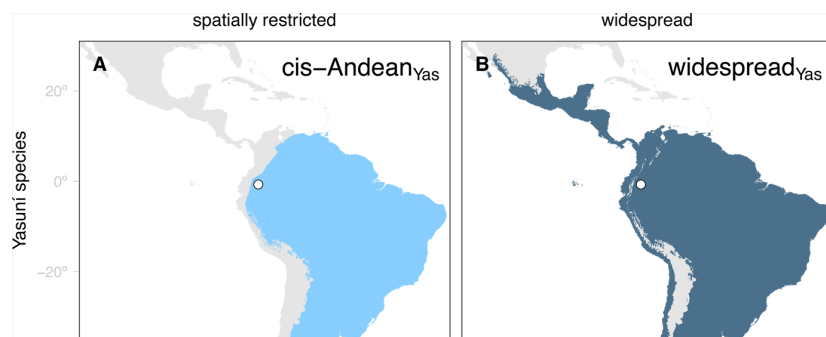
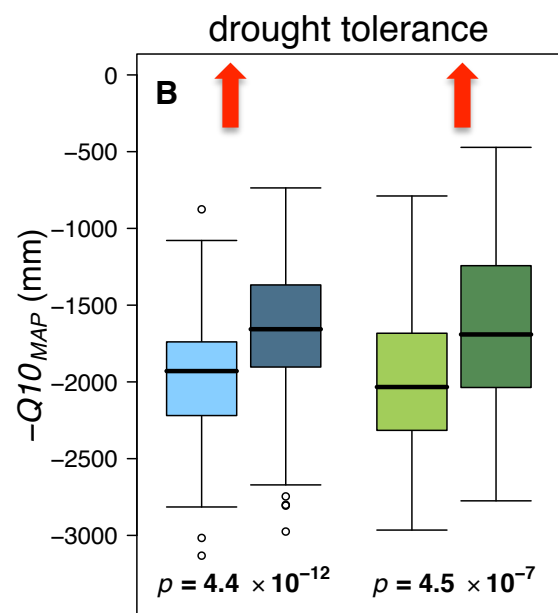
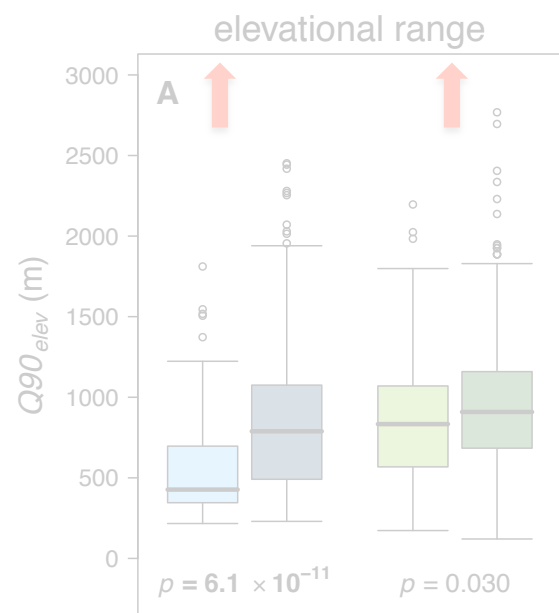
Ficus gomelleira
(Moraceae)

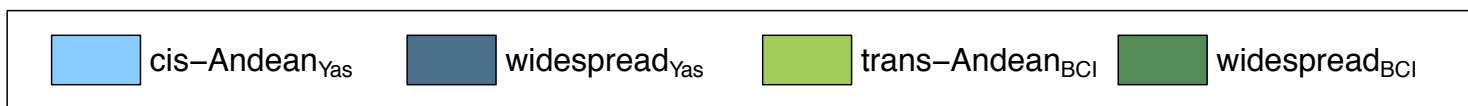
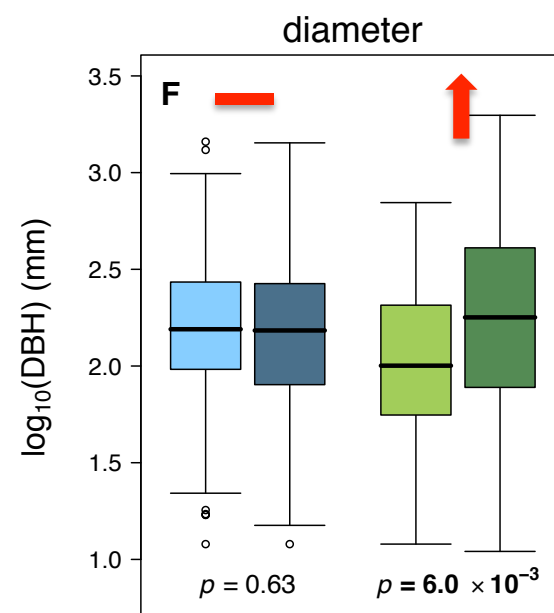
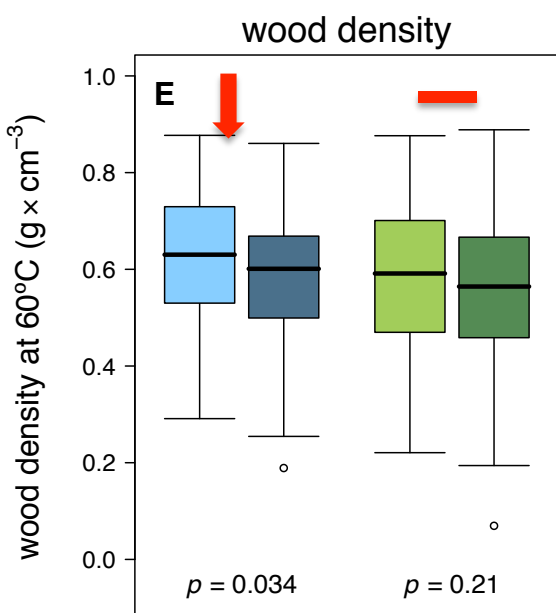
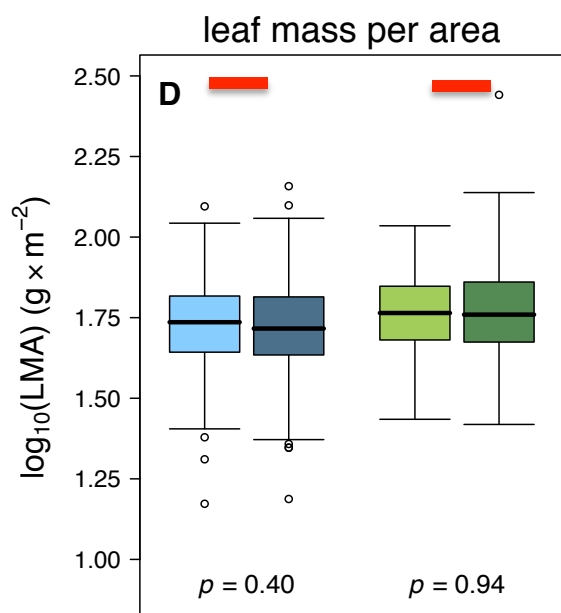
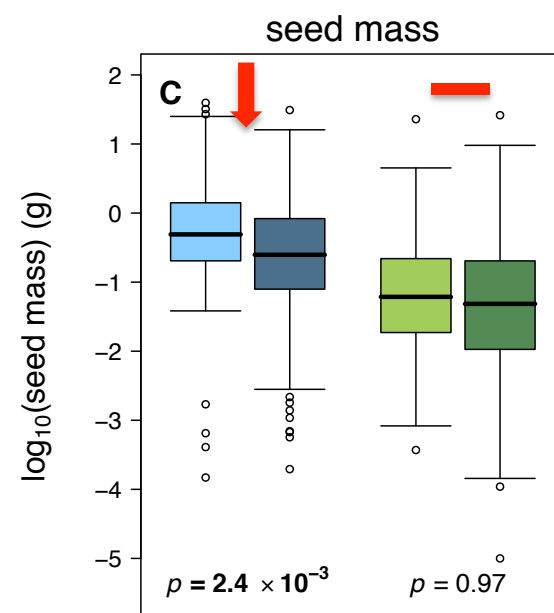
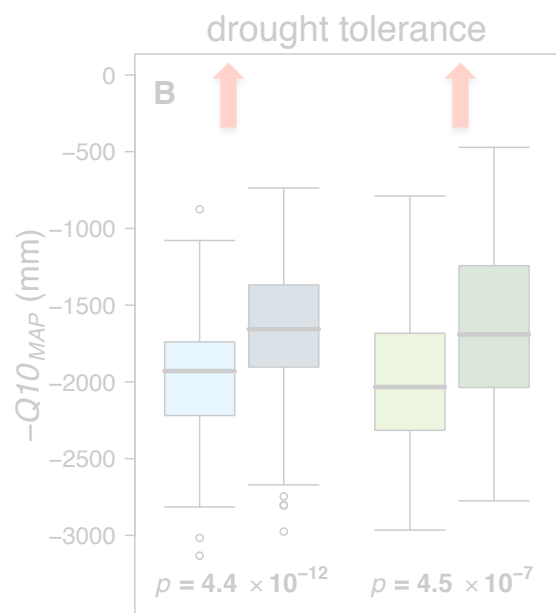
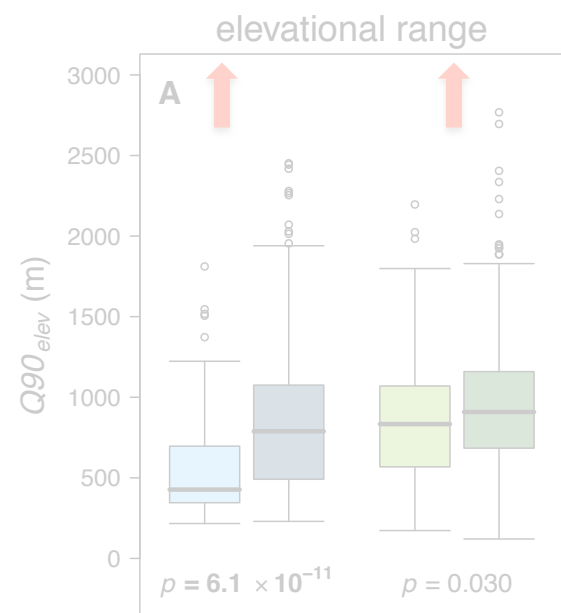


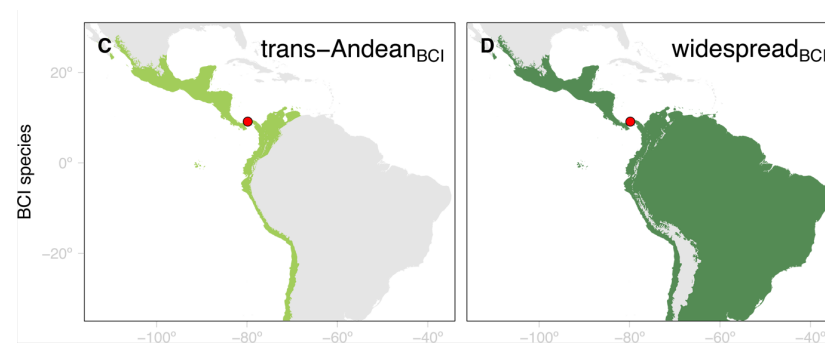
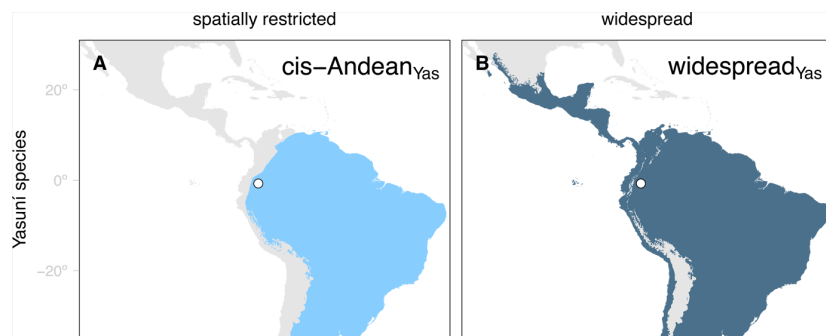
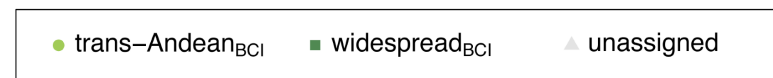
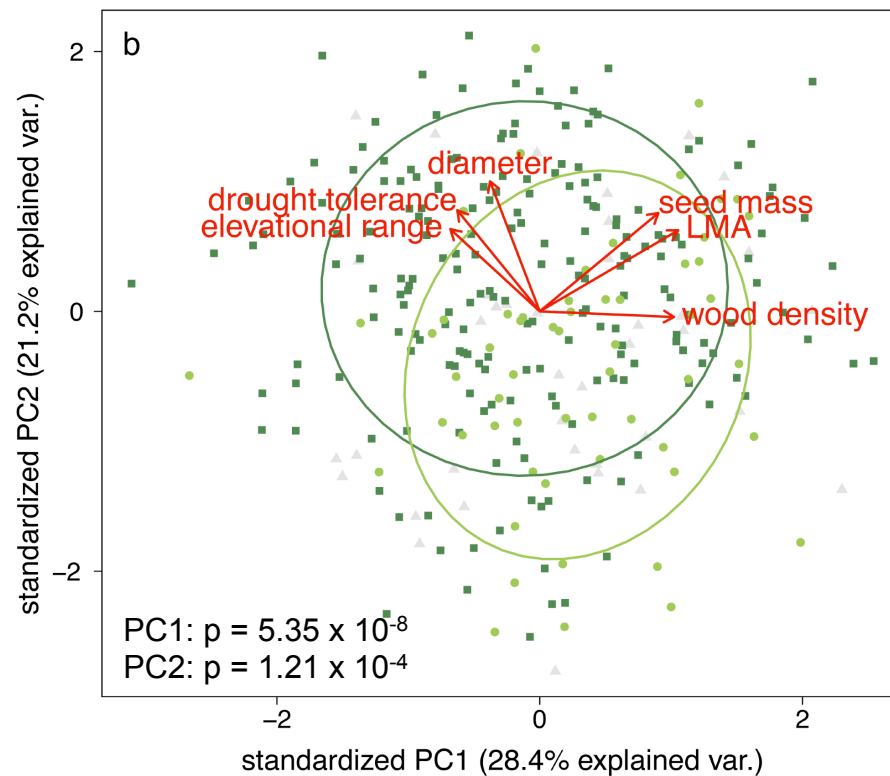
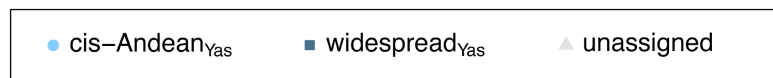
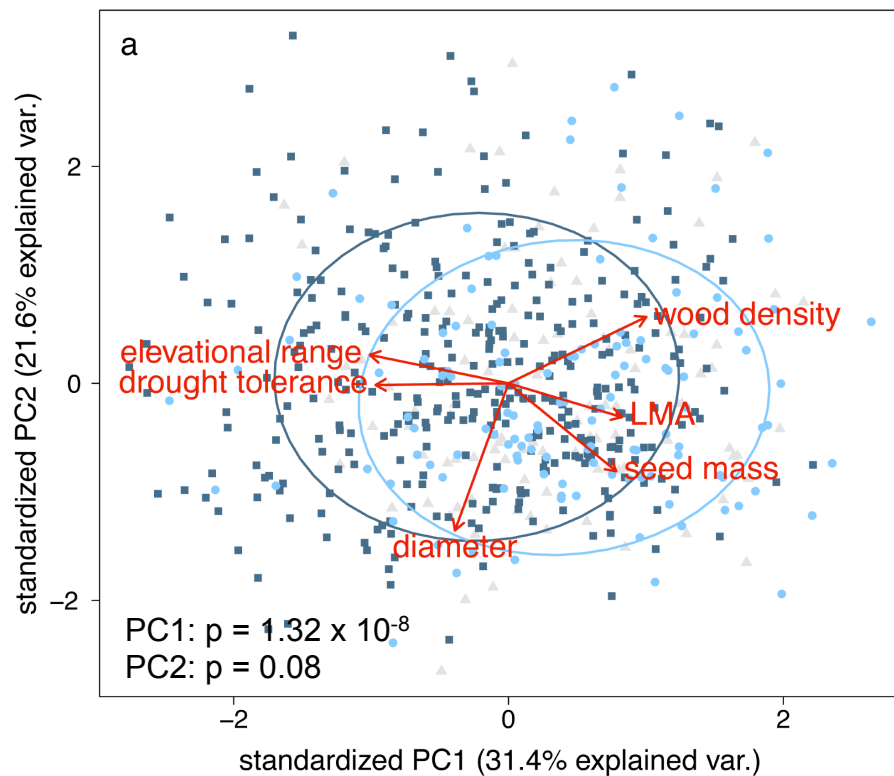
Unonopsis veneficiorum
(Annonaceae)











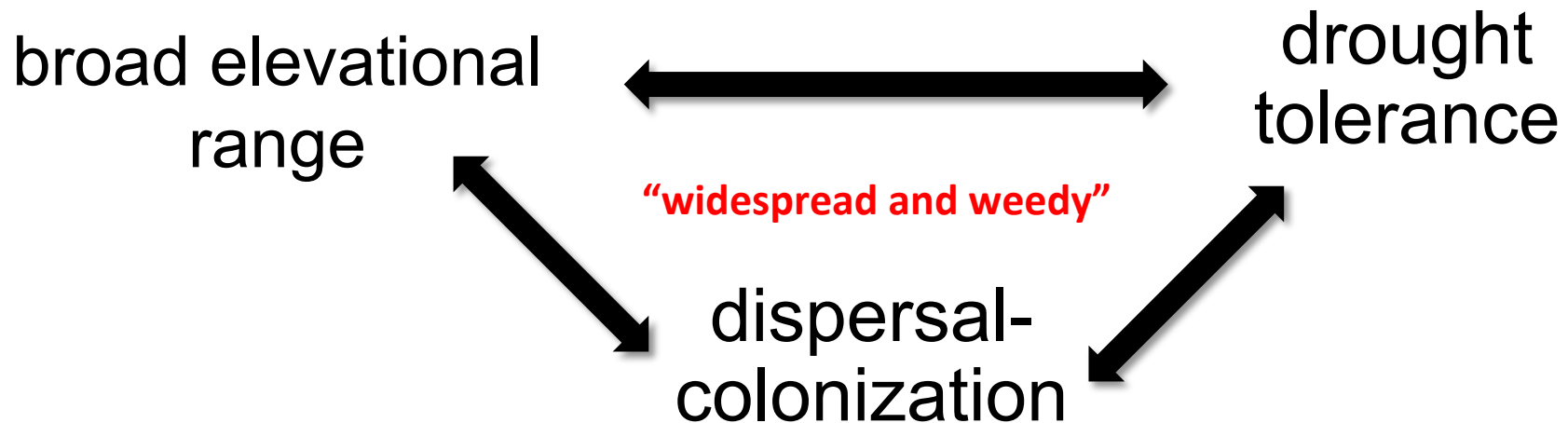
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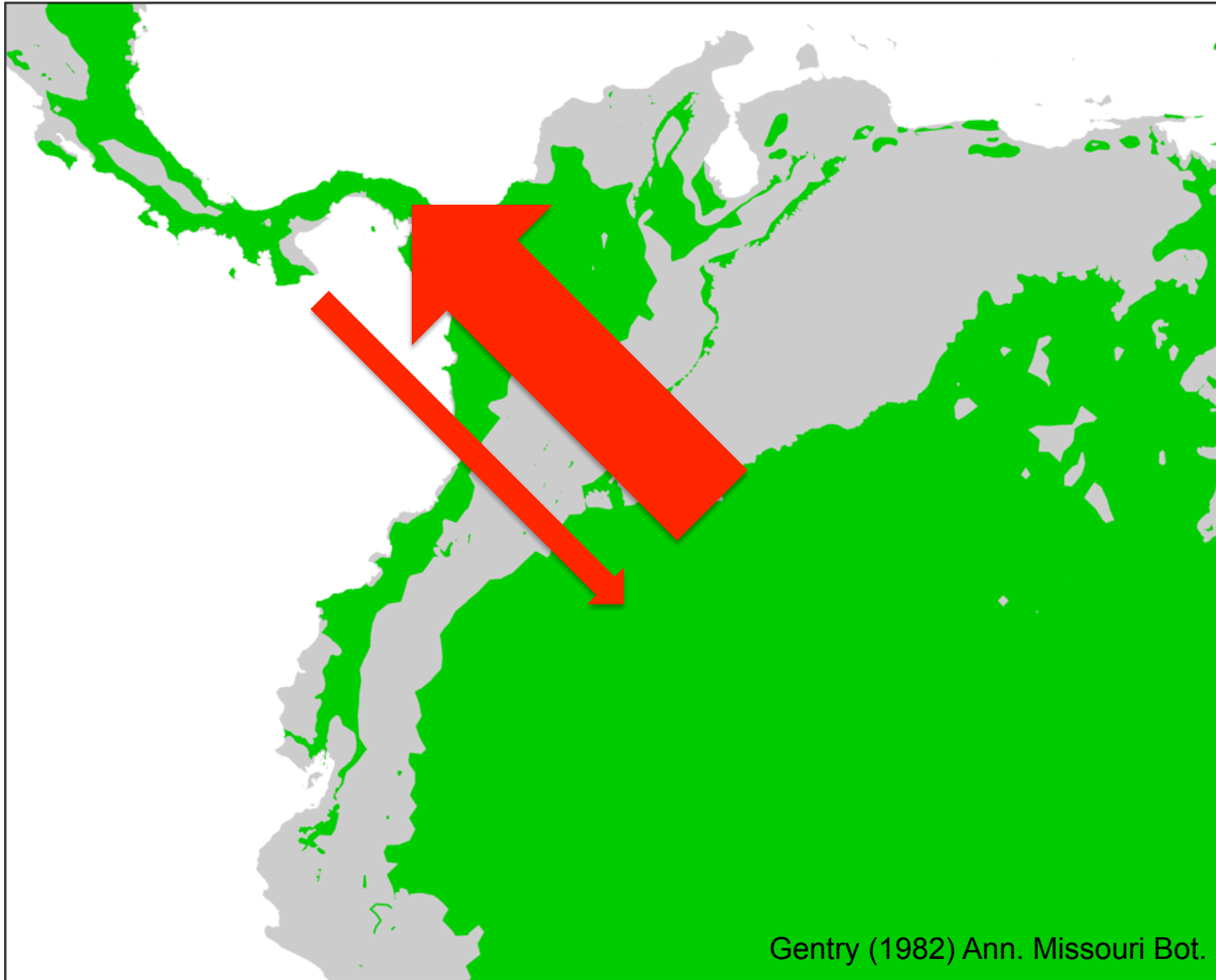
Northern Andes biogeographic filter



photos: Wikipedia



Filter-dispersal assembly

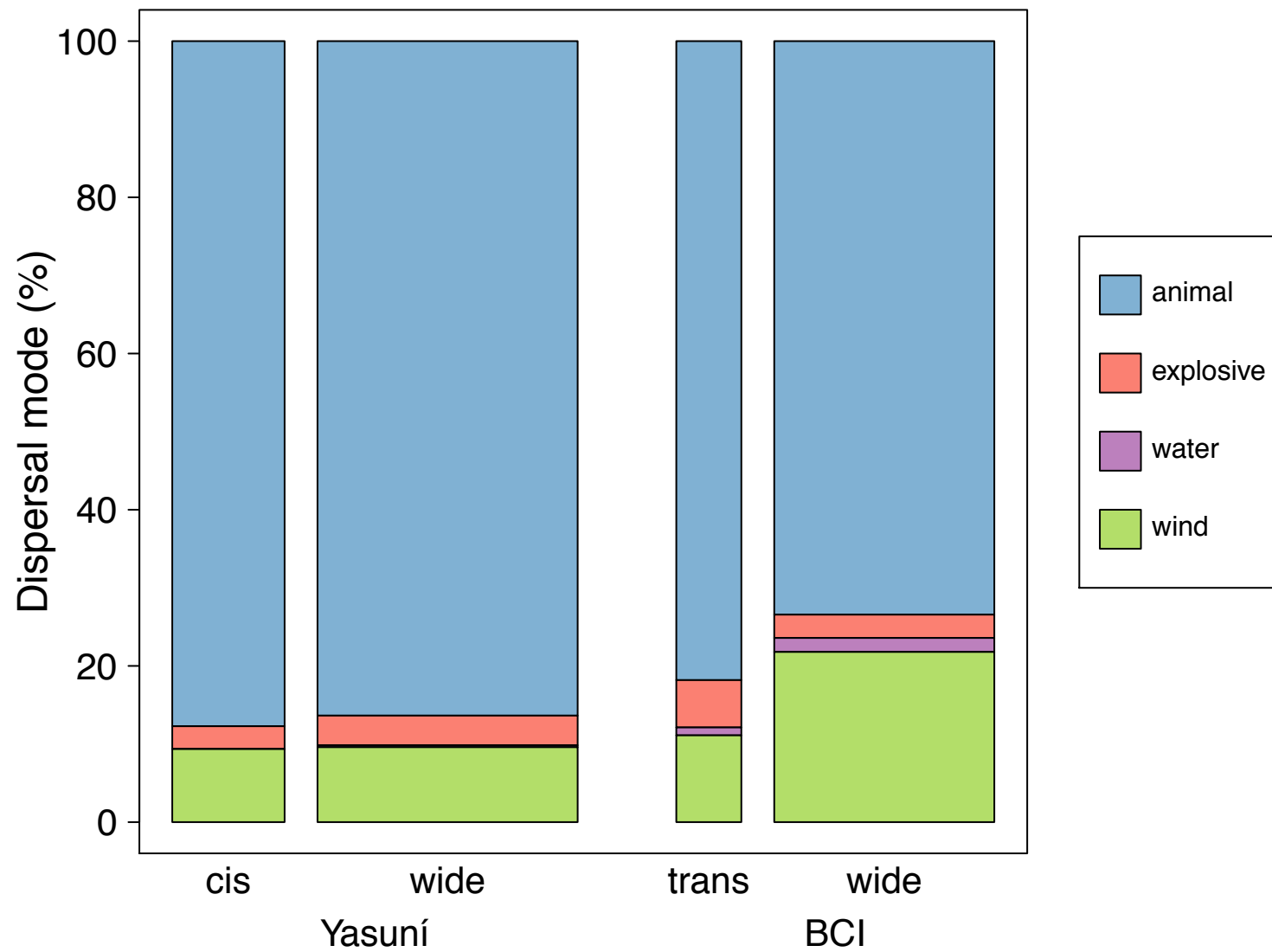


Conclusions

- the northern Andes region is a biogeographic filter
- widespread and weedy traits
- filter-dispersal assembly (esp. of Central American rainforests)
- use of digital biodiversity data
 - geographic distributions
 - novel ecological traits (e.g., drought tolerance)

Automated filtering of GBIF occurrence records

- exclude suspected errors
 - R package *rgbif()* (Chamberlain et al. 2015)
- exclude low-precision coordinates
- spatial thinning
- assume some errors still exist
 - consider only 10-90% of ecological amplitude
 - require min. numbers of unique records



wind: $p = 0.027$