BIOL 548O
Dealing with Data

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Biodiversity Research Centre 208

Office Hours:
pretty much anytime
(just send me a quick email first)

Our purpose is to develop the skills needed to solve scientific problems (as efficiently as possible)

Can we characterize the long term evolutionary dynamics of ecologically important traits?

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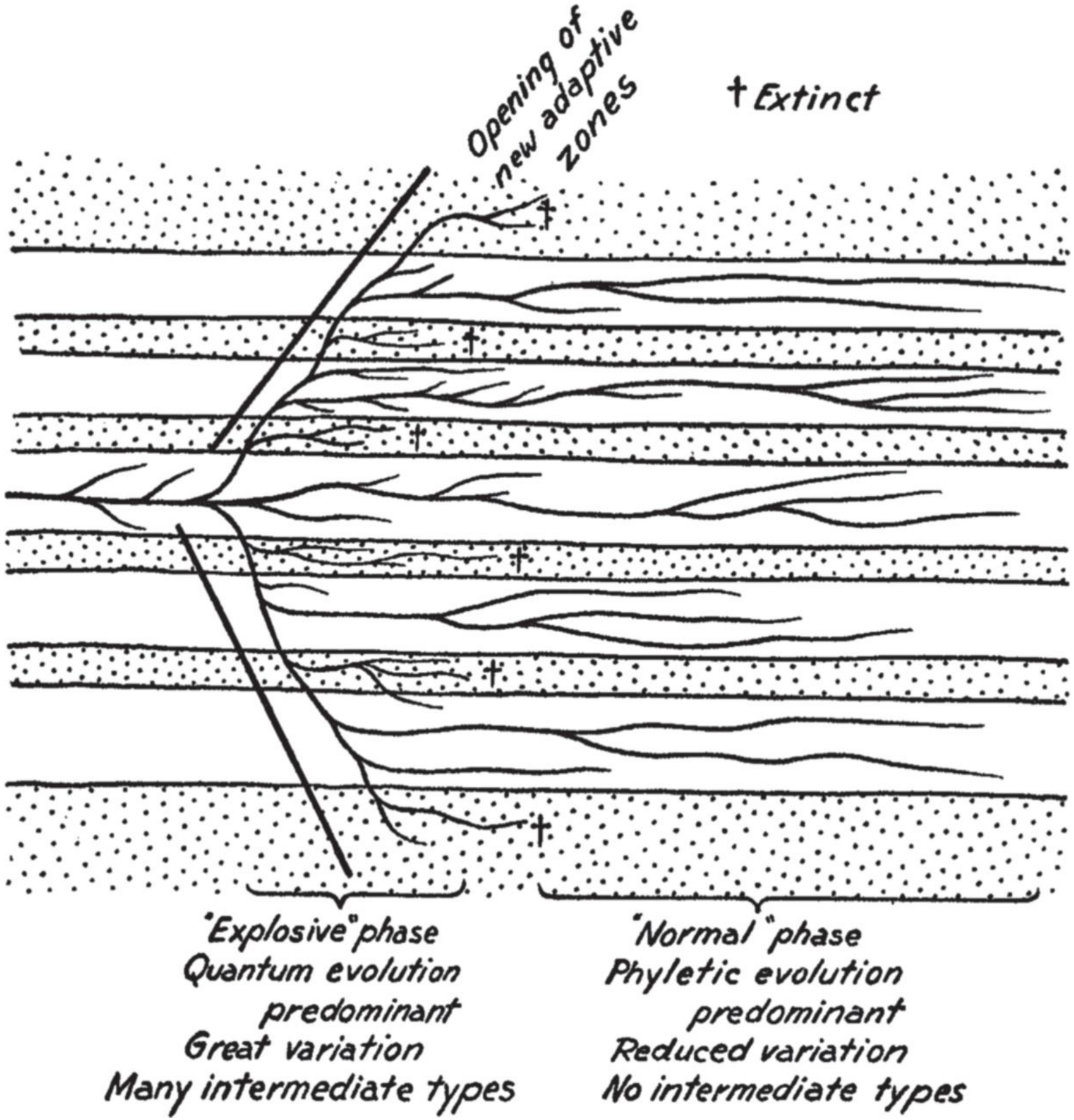
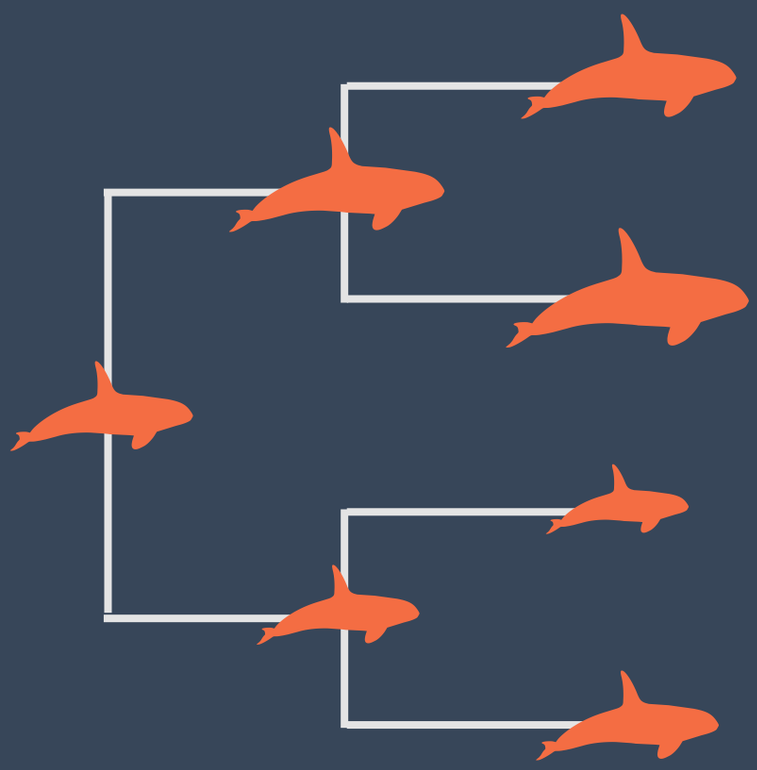
What can these dynamics tell us about ecological processes?



Simpson 1944

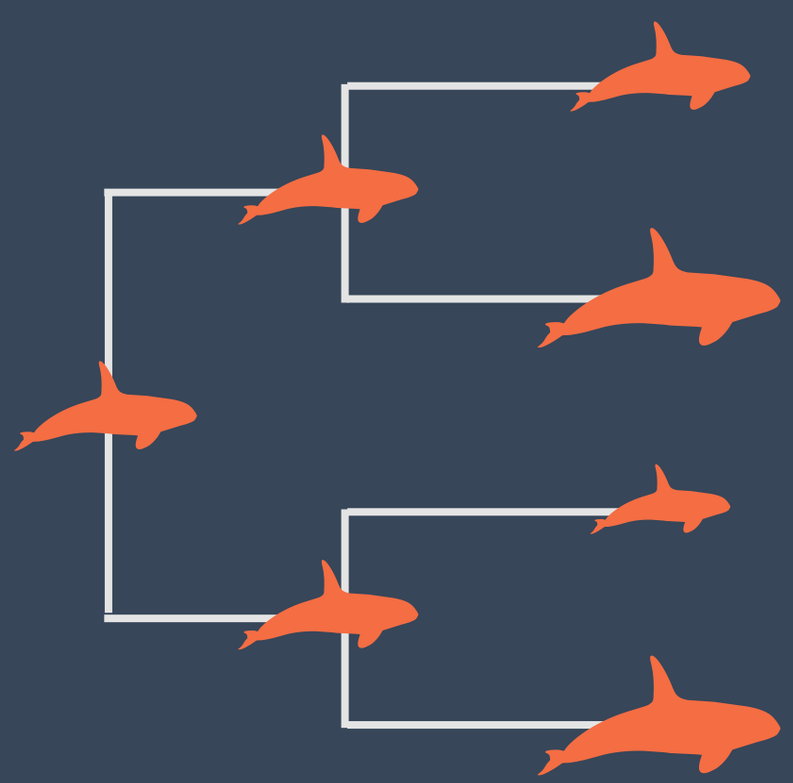
Also predict early bursts of trait evolution

Brownian motion



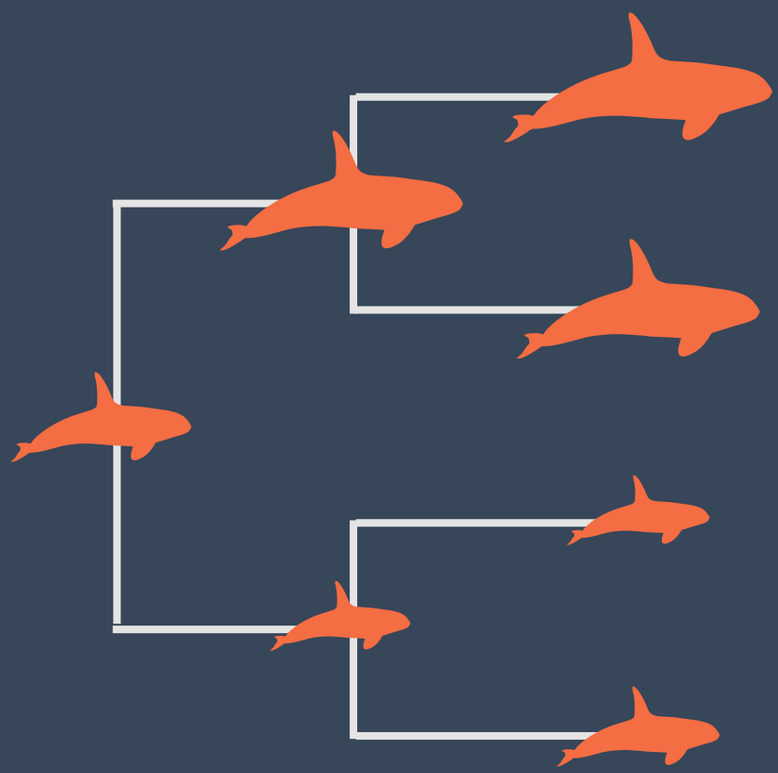
Constant rate
“random evolution”

Ornstein-Uhlenbeck



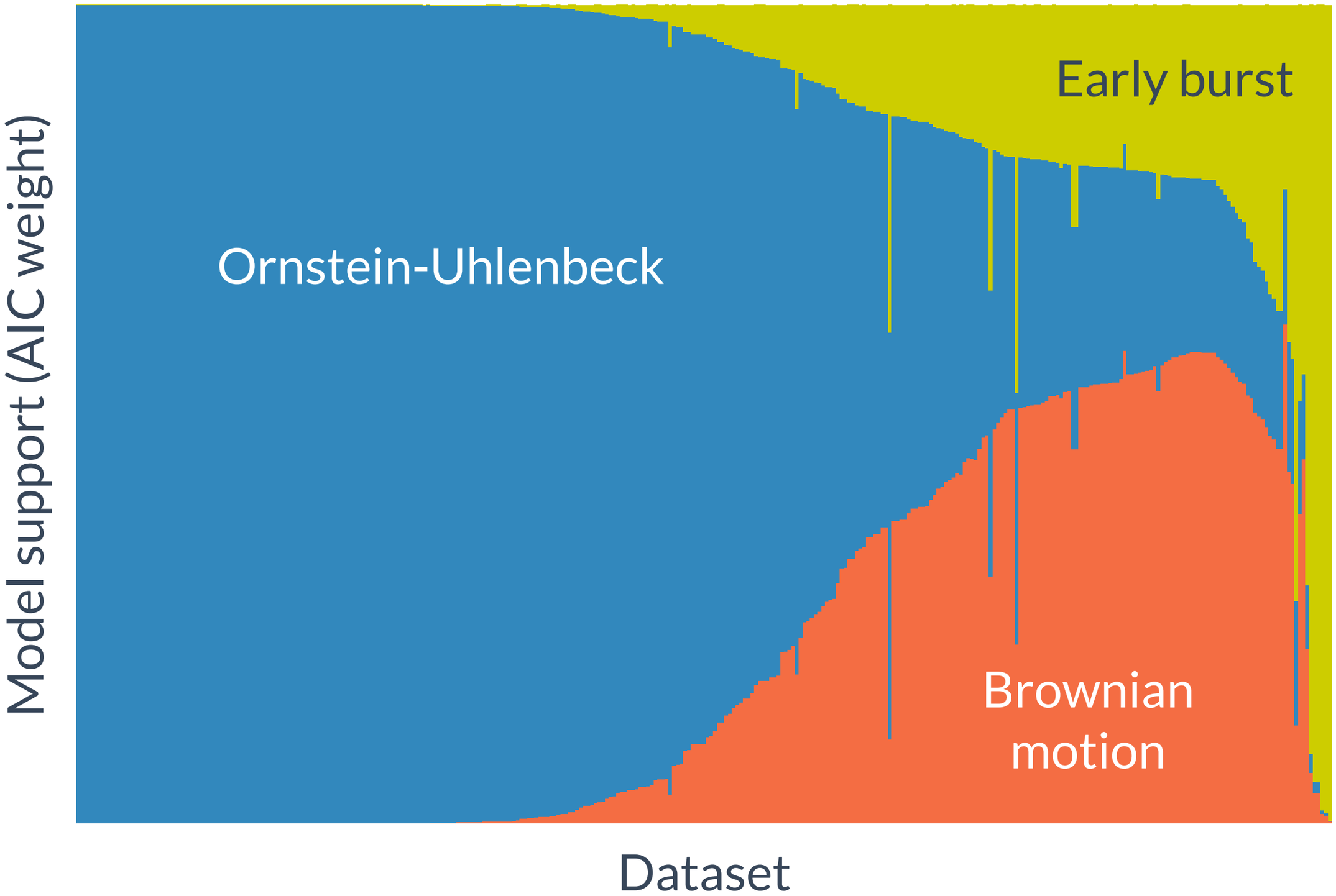
Most variance recent
“clade optimum”

Early burst



Most variance early
“adaptive radiation”

Also predict early bursts of trait evolution

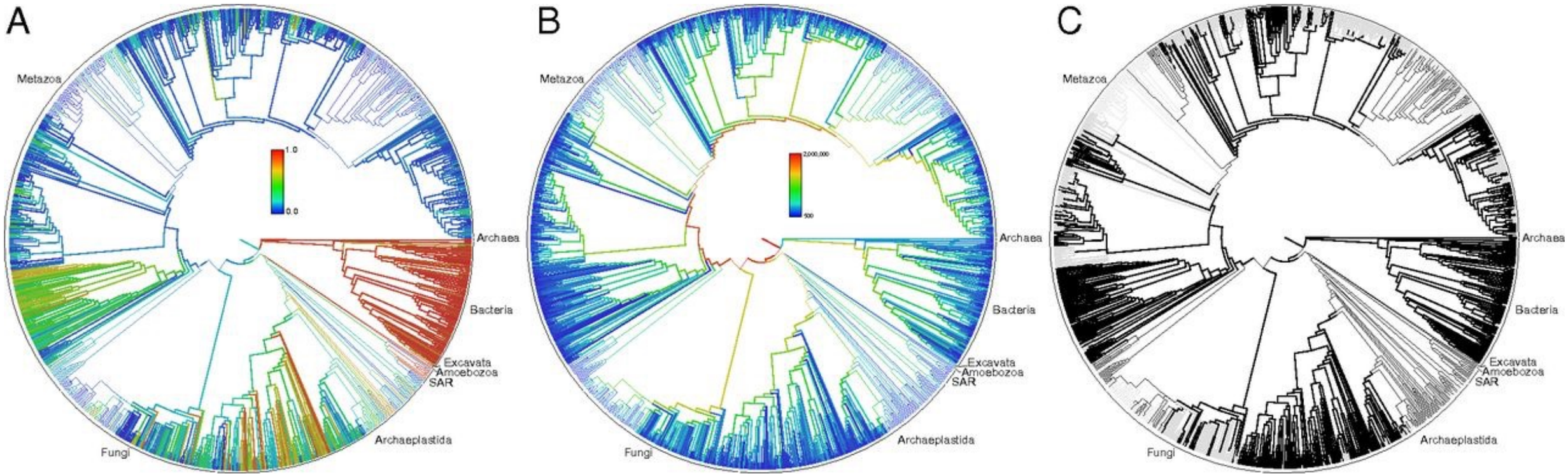


Pennell et al. 2015 Am Nat

Slater and Pennell 2014 Sys Bio

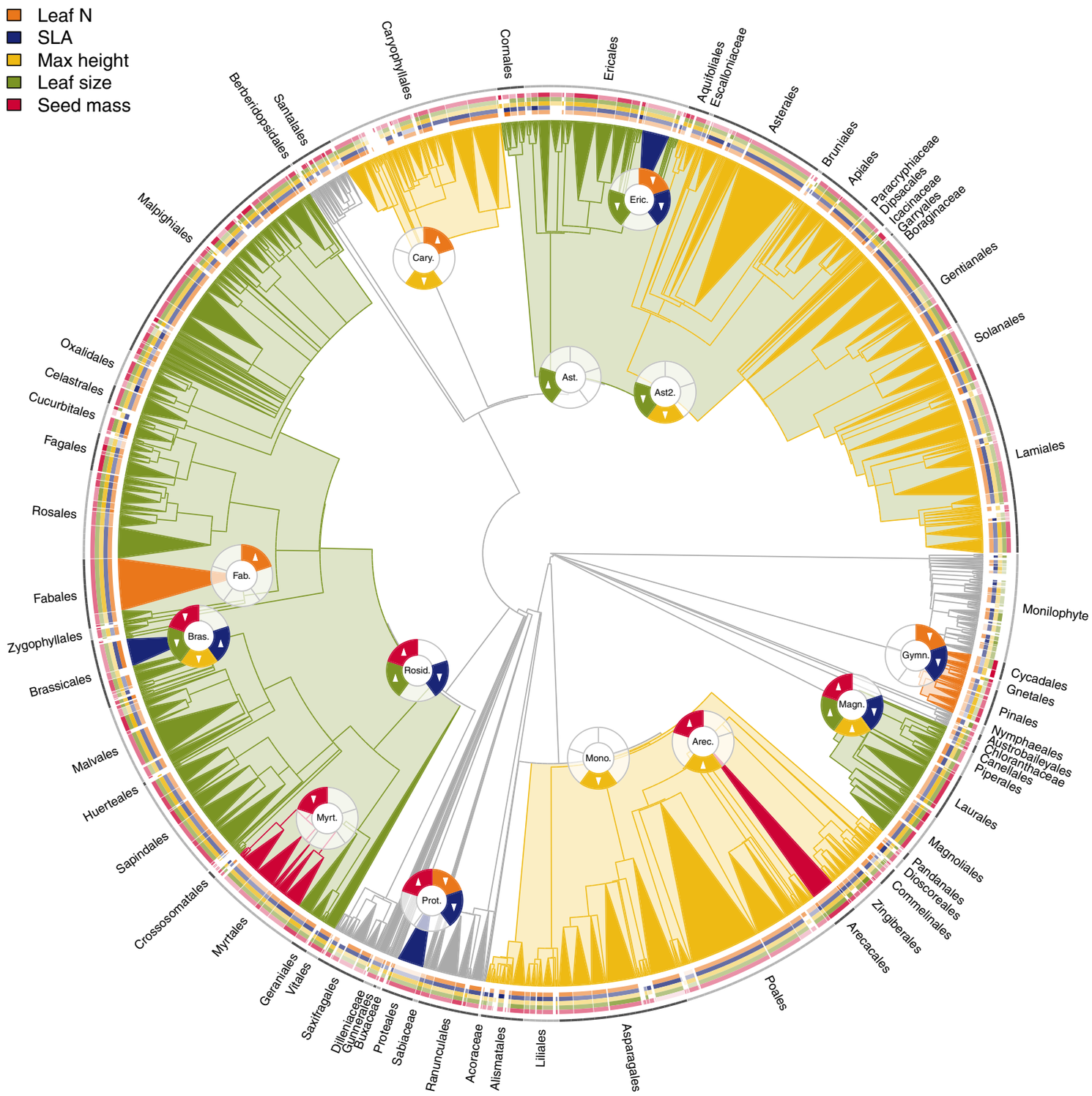
Phylogenies including 2,339,460 (!!!!) taxa

OPEN Tree of Life



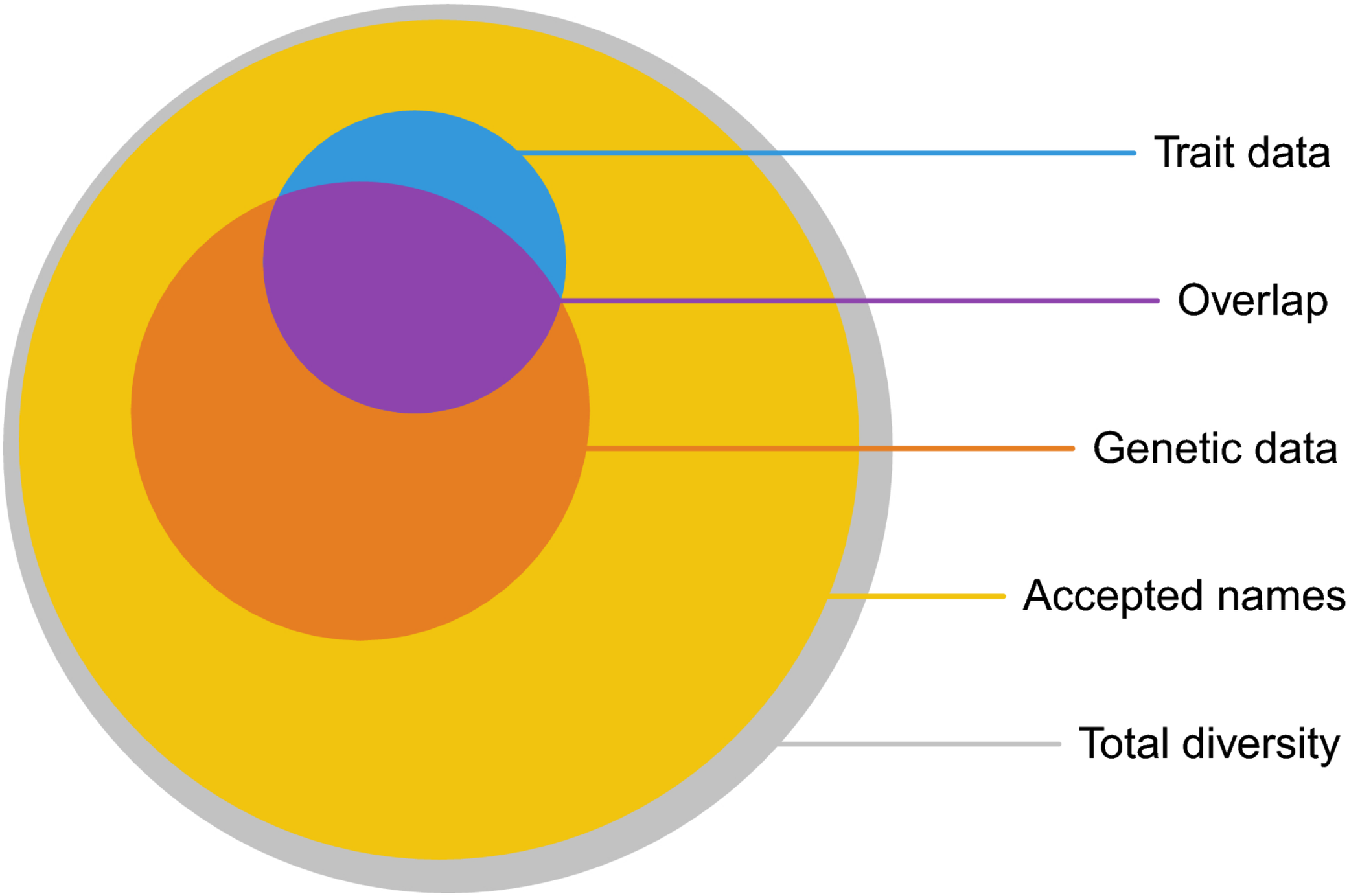
Hinchliff et al. 2015 PNAS

Shifts in functional trait disparity across 48,324 angiosperms



Cornwell et al. 2014 J Ecol

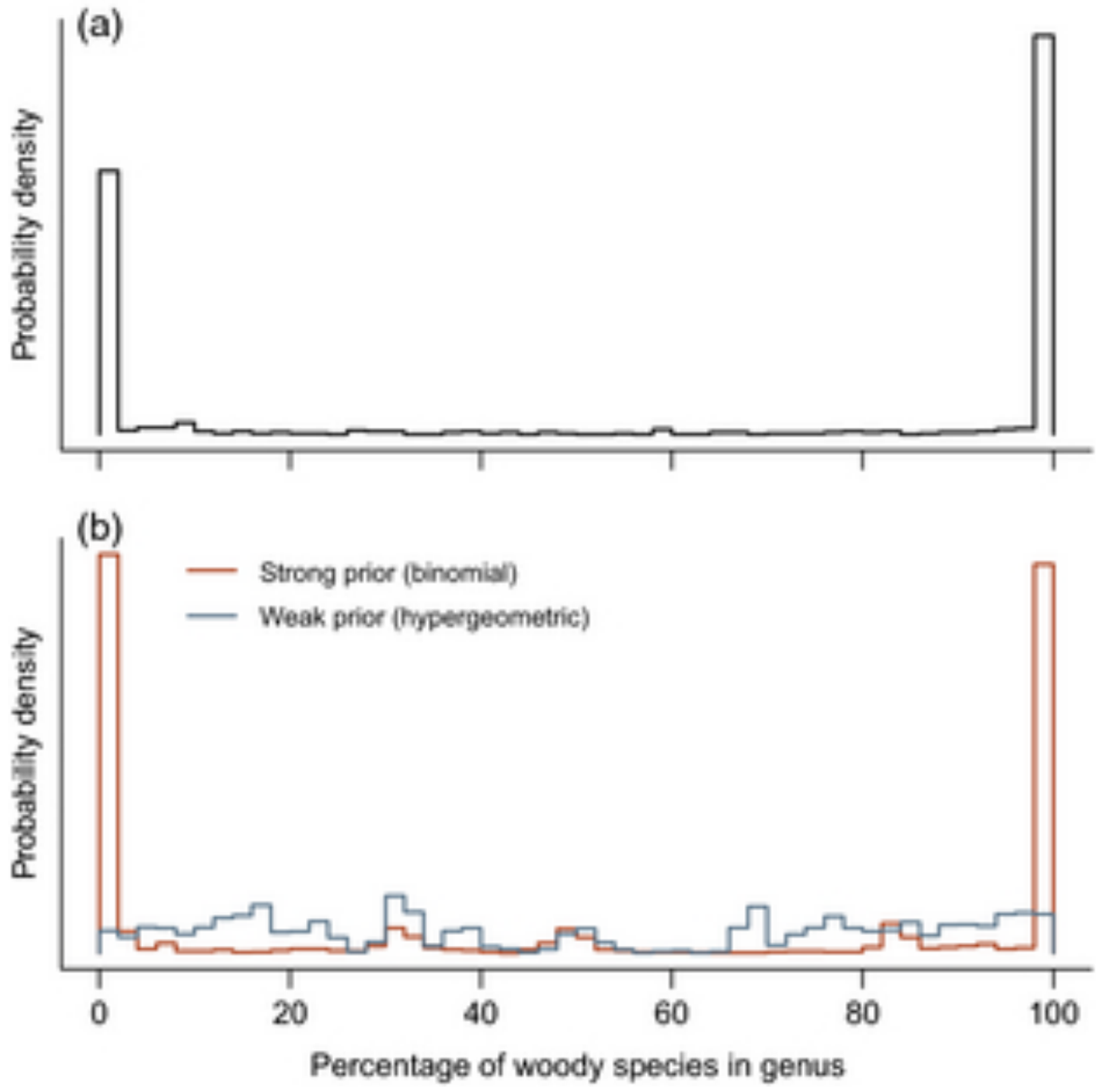
Curating data at this scale is challenging — we need new tools



Pennell et al. 2016 Methods Eco Evo

Curating data at this scale is challenging — we need new tools

Imputing values for missing traits

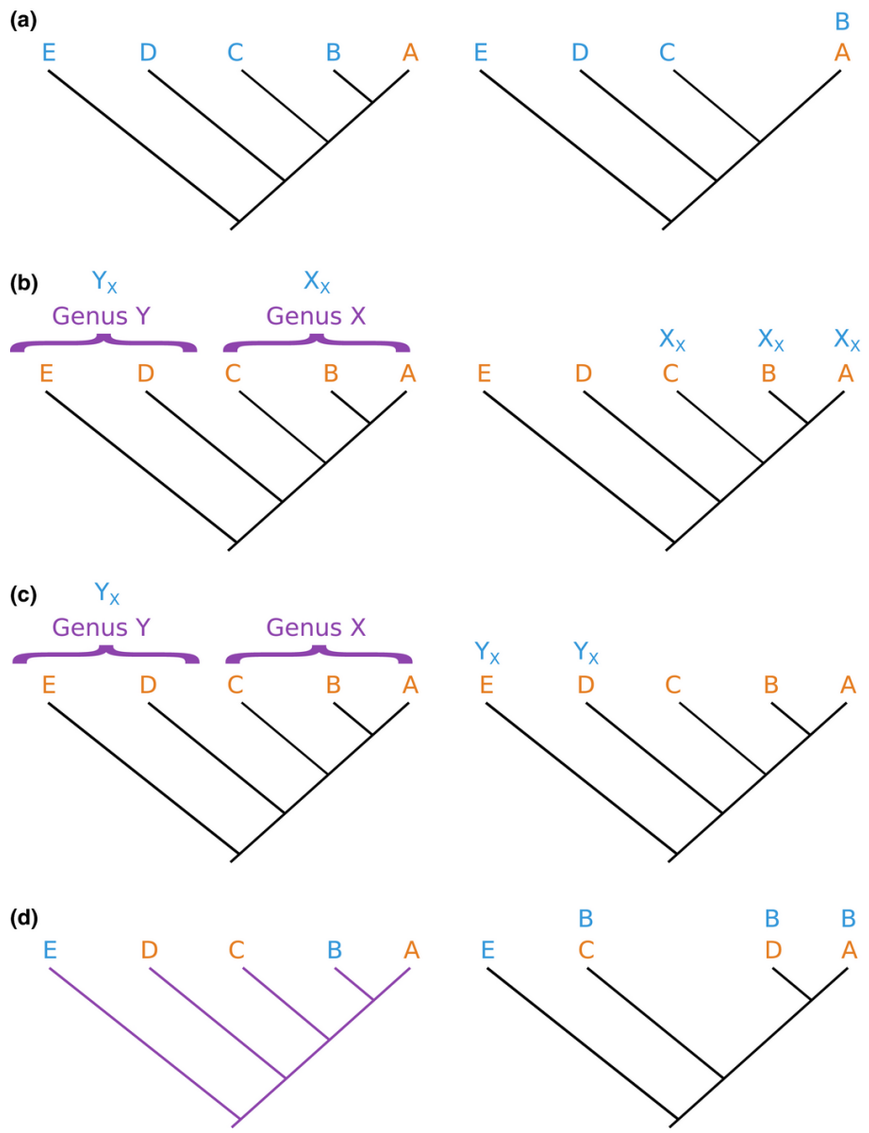


https://github.com/traitecoevo/traitfill

FitzJohn, Pennell, et al. 2014 J Ecol

Curating data at this scale is challenging — we need new tools

Matching up phylogenetic and trait data

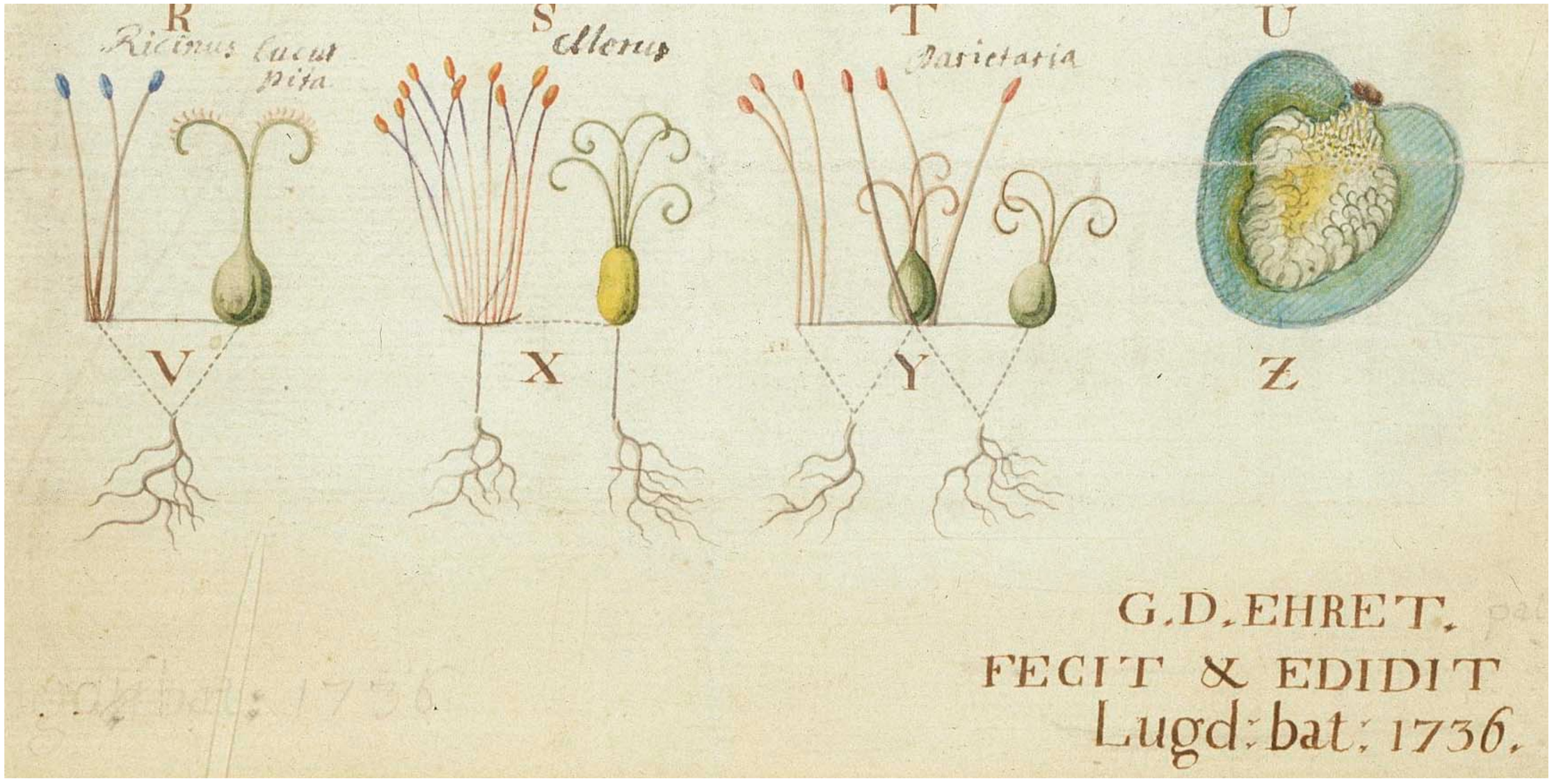


https://github.com/traitecoevo/phyndr

Pennell et al. 2016 Methods Eco Evo

Curating data at this scale is challenging — we need new tools

Reconciling taxonomic data



https://github.com/traitecoevo/taxonlookup

Pennell et al. 2016 Methods Eco Evo

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Open Source

Open Data

Open Science

Reproducible Research