An introduction to *natdb*

USU Biology Nerd Group March 1, 2017

Contents

jjinclude=FALSE;;= require(pez) options(width=40) @

1 Preamble

You can install *natdb* by typing install.packages("natdb"), and get a listing of the functions in the package by typing library(help=natdb). If you find any bugs, or have any feature requests for the package, please use the online tracker. Indeed, please contribute to the package using at its GitHub site—help is always welcome!

While natdb contains much novel code, it relies heavily on the R ecosystem. In the development of natdb we wrote a great deal of code to help with fulltext as well.

2 Quickstart: getting some data and using it

A short overview of how to download all the data, save it somewhere sensible, susbet it to whatever species you want, and then use it.

- 3 Details: saving data
- 4 Details: cleaning data
- 5 Details: subsetting data

References

- Ackerly, D. (2009) Conservatism and diversification of plant functional traits: evolutionary rates versus phylogenetic signal. *Proc. Natl Acad. Sci.* **106**, 19699–19706.
- Bryant, J.A., Lamanna, C., Morlon, H., Kerkhoff, A.J., Enquist, B.J. & Green, J.L. (2008) Microbes on mountainsides: contrasting elevational patterns of bacterial and plant diversity. *Proceedings of the National Academy of Sciences* **105**, 11505–11511, URL http://www.pnas.org/content/105/suppl.1/11505.abstract.
- Cadotte, M., Albert, C. & Walker, S.C. (2013) The ecology of differences: assessing community assembly with trait and evolutionary distances. *Ecology Letters* **16**, 1234–1244.
- Cavender-Bares, J., Ackerly, D.D., Baum, D.A. & Bazzaz, F.A. (2004) Phylogenetic overdispersion in Floridian oak communities. *The American Naturalist* **163**, 823–43.
- Cavender-Bares, J. & Wilczek, A. (2003). Integrating micro- and macroevolutionary processes in community ecology. *Ecology*, **84**, 592-597.
- Cavender-Bares, J., A. Keen & B. Miles (2006) Phylogenetic structure of Floridian plant communities depends on taxonomic and spatial scale. *The American Naturalist* 87, S109–S122.
- Cavender-Bares, J., Kozak, K., Fine, P. & Kembel, S. (2009). The merging of community ecology and phylogenetic biology. *Ecology Letters*, **12**, 693-715.
- Evans, M.E.K., Smith, S.A., Flynn, R.S. & Donoghue, M.J. (200) Climate, niche evolution, and diversification of the "Bird-cage" evening primroses (Oenothera, sections Anogra and Kleinia). *Am. Nat.* 173, 225–240.
- Helmus, M.R. & Ives, A.R. (2012) Phylogenetic diversity-area curves. *Ecology* **93**, S31–S43.

- Helmus, M.R., Mercado-Silva, N., & Zanden, M.J.V. (2014) Subsidies to predators, apparent competition and the phylogenetic structure of prey communities *Oceolo-gia* 173, 997–1007.
- Ives, A.R. & Helmus, M.R. (2011) Generalized linear mixed models for phylogenetic analyses of community structure *Ecological Monographs* 81, 511–525.
- Kembel, S.W., Cowan, P.D., Helmus, M.R., Cornwell, W.K., Morlon, H., Ackerly, D.D., Blomberg, S.P. & Webb, C.O. (2010) Picante: R tools for integrating phylogenies and ecology. *Bioinformatics* 26, 1463–1464.
- Letten, A.D. & Cornwell, W.K. (2014) Trees, branches and (square) roots: why evolutionary relatedness is not linearly related to functional distance. *Methods in Ecology and Evolution*.
- Orme, D., Freckleton, R., Thomas, G., Petzoldt, T., Fritz, S., Isaac, N. & Pearse, W.D. (2013) caper: comparative analyses of phylogenetics and evolution in R. URL http://CRAN.R-project.org/package=caper, r package version 0.5.2.
- Pearse, W.D., Cavender-Bares, J., Puvis, A. & Helmus, M.R. (2014) Metrics and models of community phylogenetics. *Modern Phylogenetic Comparative Methods and their Application in Evolutionary Biology—Concepts and Practice* (ed. L.Z. Garamszegi), Springer-Verlag, Berlin, Heidelberg.
- Rafferty, N.E. & Ives, A.R. (2013) Phylogenetic trait-based analyses of ecological networks *Ecology* **94**, 2321–2333.
- Webb, C.O., Ackerly, D.D., McPeek, M.A. & Donoghue M.J. (2002). Phylogenies and community ecology. *Annual Review of Ecology and Systematics*, **33**, 475-505.