Phylogenies and community structure

November 19, 2014

[...] the struggle will generally be more severe between species of the same genus, when they come into competition with another, then species of distinct genera [2]

0.1 Teaching goals

- What does a phylogeny show?
- Intermezzo: what is competitive exclusion?
- What can a phylogeny tell about species composition?

0.2 Planning

- 5: self-test
- 10: part 1 (+2: reflect): phylogenies
- 10: part 2 (+2: reflect): competitive exclusion and/or habitat filtering
- 10: part 3 (+2: reflect): phylogenies and inferring species communies
- 5: test

0.3 Goal

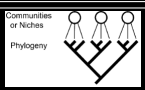
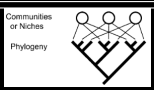
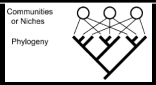
Integrating phylogenetic knowledge into studies of commity organisation [3]

- Examining the phylogenetic structure of species assemblages
- Exploring the phylogenetic basis of community niche structure
- Adding a community context to studies of trait evolution and biogeography

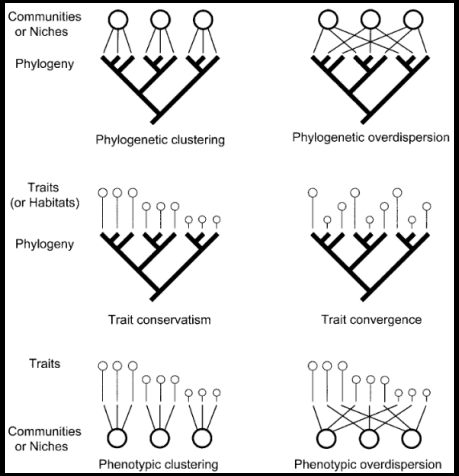
0.4 Predictions[3]

		Ecological traits phylogene	
		Conserved	Converg
Dominant ecological force	Habitat filtering	Clustered	Overdisp
	Competitive exclusion	Overdispersed	Rando

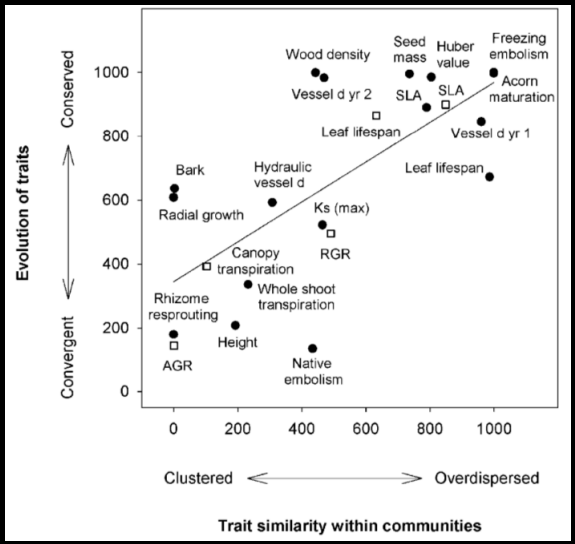
0.5 Predictions[3]

Dominant ecological force	Ecological traits phylogenetically	
	Conserved	Convergent
Habitat filtering		
Competitive exclusion		Random

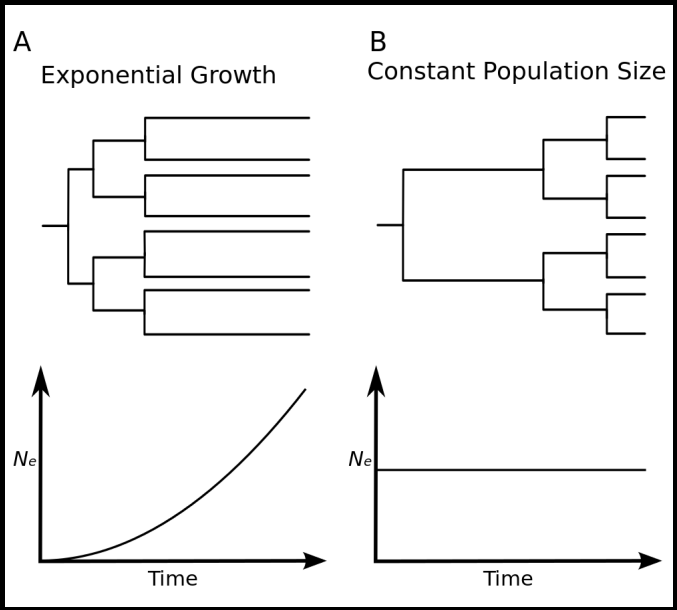
0.6 Predictions[1]



0.7 Predictions[1]



0.8 Predictions



Habitat filtering

From 'Habitat filtering and niche differentiation jointly explain species relative abundance within grassland communities along fertility and disturbance gradients' Vincent Maire 1,2 * , Nicolas Gross 3,4 * , Luca Bo¨ rger 3,4 , Raphae¨ l Proulx 5,6 , Christian Wirth 5 , Laı´ se da Silveira Pontes 7 , Jean-Franc¸ois Soussana 1 and Fre´ de´ rique Louault :

However, recent studies (Shipley, 2009; Adler et al. , 2010; Cornwell & Ackerly, 2010) suggested that biodiver- sity within communities cannot be understood without taking into account deterministic processes such as habitat filtering (HF; Keddy, 1992) and niche differentiation (ND; MacArthur & Levins, 1967; Silvertown, 2004).

Keddy PA. 1992. Assembly and response rules – 2 goals for predictive community ecology. Journal of Vegetation Science 3 : 157 – 164.

Bibliography

[1] J Cavender-Bares, D D Ackerly, D A Baum, and F A Bazzaz. Phylogenetic overdispersion in floridian oak communities. *The american naturalist*, 163:823–843, 2004.

[2] Charles Darwin. On the origin of species by means of natural selection, or the preservation of favoured races in the struggle for

life. 1859.

[3] O C Webb, D D Ackerly, M A McPeek, and M J Donoghue. Phylogenies and community ecology. *Annu. Rev. Ecol. Syst.*, 33:475–505, 2002.