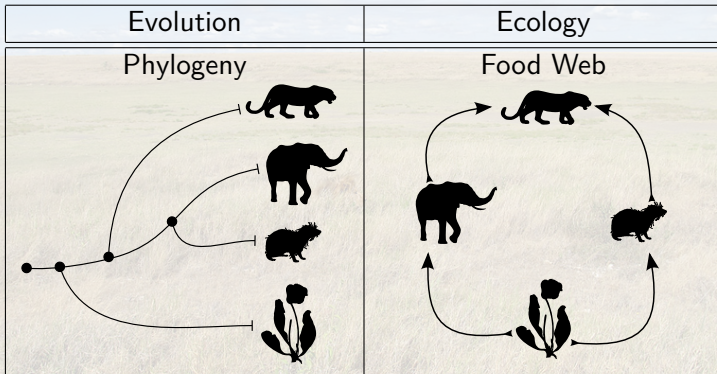


# Stochasticity and Evolution in Food Webs

Giulio Dalla Riva  
University of Canterbury, NZ

Granada Seminar June 16, 2015  
[gvdr16@uclive.ac.nz](mailto:gvdr16@uclive.ac.nz) - [gvdr.github.io](https://github.com/gvdr)

species ARE related



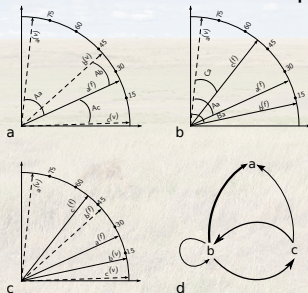
# Evolution in/of Ecology

Evolution shaped the stochastic backbones of Food Webs

[Two images: Serengeti and Weddell]

# Food Webs embedded

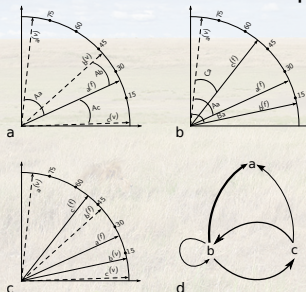
## ► Random Dot Product Graphs





# Food Webs embedded

## ► Random Dot Product Graphs



## ► Phylogenetic vs. Observed traits

$$\text{vcv}(\hat{X}|\tau, \text{model}) \text{ vs. } \text{vcv}(x)$$

# More questions (than answers)

- There is phylogenetic signal

p-values anybody?

# More questions (than answers)

- ▶ There is phylogenetic signal

p-values anybody?

- ▶ It is quite weak

20% 30% of variation explained

# More questions (than answers)

- ▶ There is phylogenetic signal

p-values anybody?

- ▶ It is quite weak

20% 30% of variation explained

- ▶ It saturates with dimensionality

$d \in \{2, \dots, 8\}$



# More questions (than answers)

- ▶ There is phylogenetic signal

p-values anybody?

- ▶ It is quite weak

20% 30% of variation explained

- ▶ It saturates with dimensionality

$d \in \{2, \dots, 8\}$

- ▶  $\therefore$  “fine wirings” may be deceiving

# More questions (than answers)

- ▶ There is phylogenetic signal

p-values anybody?

- ▶ It is quite weak

20% 30% of variation explained

- ▶ It saturates with dimensionality

$d \in \{2, \dots, 8\}$

- ▶  $\therefore$  “fine wirings” may be deceiving

- ▶ Evolutionary model is inadequate

no interaction effects

# (Not a) Conclusion

- Spoiler 1: Evolutionary distinctiveness vs. Web Centrality  
Do evolutionary unique species play a keystone role in Food Webs?

# (Not a) Conclusion

- ▶ Spoiler 1: Evolutionary distinctiveness vs. Web Centrality  
Do evolutionary unique species play a keystone role in Food Webs?
- ▶ Spoiler 2: An ecological informed model of species evolution  
maybe it's (almost) there.  
I am looking at you, Ornstein and Uhlenbecki ...



# Thanks!

Joint work with Daniel B. Stouffer (University of Canterbury)

Many thanks to Mike Steel; Carey Priebe; A. Mooers', D.B. Stouffer's & J. Tylianakis's labs; ...

Funds by the Allan Wilson Centre for Molecular Ecology and Evolution.

By the way, I'm looking for a postdoc.  
[gvd16@uclive.ac.nz](mailto:gvd16@uclive.ac.nz) - [gvdr.github.io](https://github.com/gvdr)