

TEMPORAL TURNOVER OF PLANT-POLLINATOR INTERACTION NETWORKS

Imperial College London

Jia Le, Lim

jialelim@hotmail.com

Department of Life Sciences, Silwood Park Campus, Imperial College London



Dynamics of bee-flower interactions

Understanding how and why plant-pollinator networks (e.g., bee-flower) interactions vary over time is crucial in the conservation of pollinators, and in the continuation of their pollination services. Moreover, climate change can result in fluctuating flowering times, therefore affecting or driving turnover in plant-pollinator interactions. The structure of bee-flower interaction networks are likely to differ between seasons or even shorter timescales of weeks to months. However, this interaction turnover has been largely been ignored by previous research on plant-pollinator networks, which assume a static picture of pollination networks.

I ask...

- Does temperature, precipitation or humidity affect bee-flower interaction turnover?
- Does bee-flower interaction turnover differ between seasons?
- Does bee-flower interaction turnover of the tropics differ from those of the temperate regions?

Aim: To investigate the effect of climate on bee-flower interaction turnover.

Calculating turnover

Whittaker's dissimilarity index, β_{int} , reflects the difference between two successive monthly networks.

$$\beta_{int} = \frac{a + b + c}{(2a + b + c)/2} - 1$$

where:

- a is the number of interactions shared between the two networks
- b and c are the number of unique interactions in the two networks

β_{int} ranges from 0 to 1. A higher β_{int} reflects a higher difference between monthly networks.

Preliminary Results

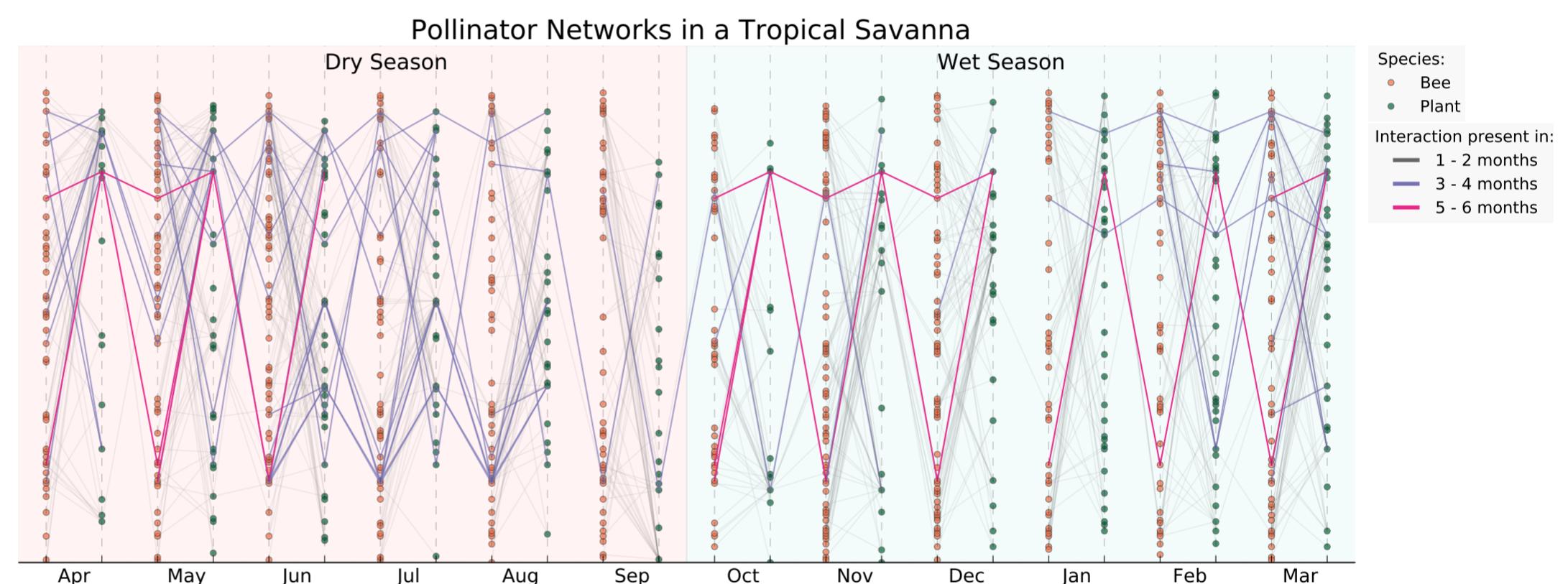
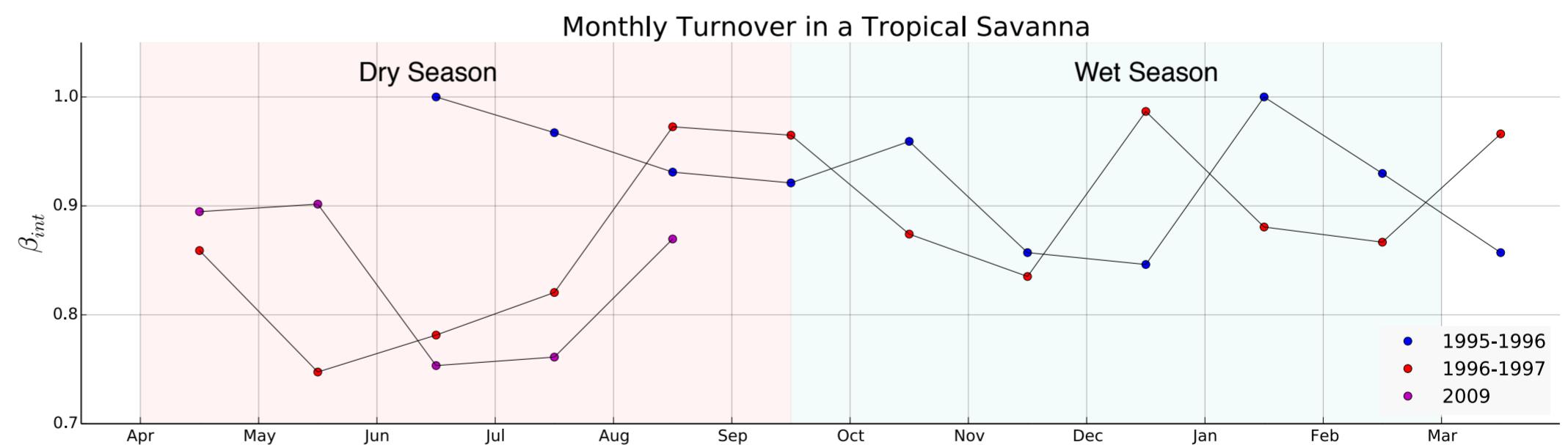


Figure 1: Monthly bee pollinator networks from April 1995 to Mar 1996.
Average monthly precipitation sum = 22.84 mm(Dry Season), 239.6mm (Wet Season)



Conclusions and Ongoing work

- Monthly bee-flower interaction turnover is higher than ever reported before. Mean turnover rate is
- There are no significant differences between turnover rates within seasons and between seasons.
- There is a periodic pattern in turnover of bee-flower interactions.
- Currently determining if precipitation and temperature are strong drivers of bee-flower interaction turnover.

Possible challenges

- Insufficient data; However, β_{int} is rarely affected by small sample sizes.
- If climate does not affect bee-flower interaction turnover, other factors to be considered include bee body size and lifespan.

References:

- CaraDonna, P. J., Petry, W. K., Brennan, R. M., et. al. (2017). Interaction rewiring and the rapid turnover of plant-pollinator networks. *Ecol. Letters*, 20: 385-394. doi:10.1111/ele.12740