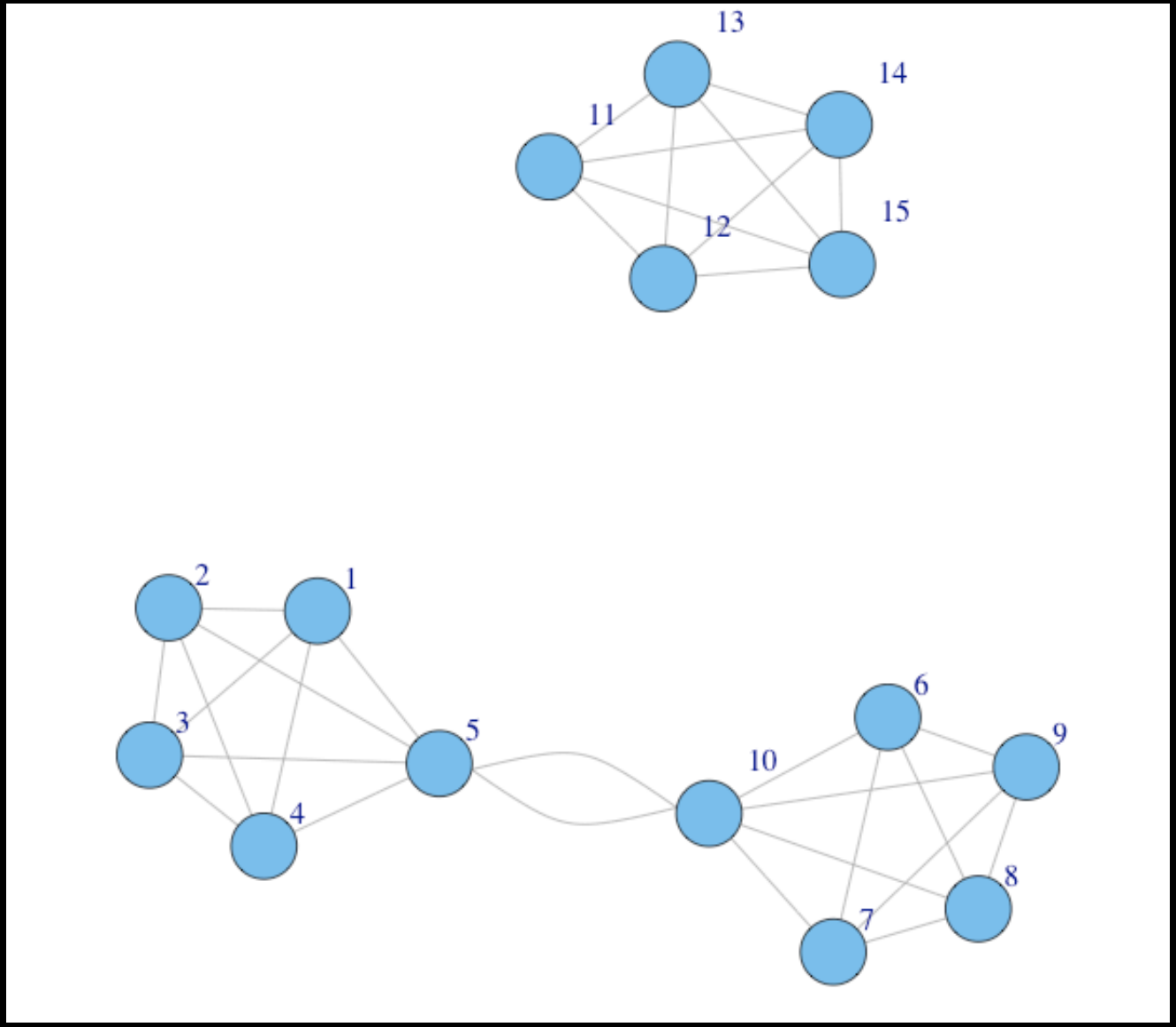
Contribution of traits and phylogenetic history to plant-pollinator network

Scott Chamberlain (@recology_)
Simon Fraser University/rOpenSci

Co-authors: Elizabeth Elle, Jana Vamosi, Ralph Cartar, Sarah Semmler, Anne Worley

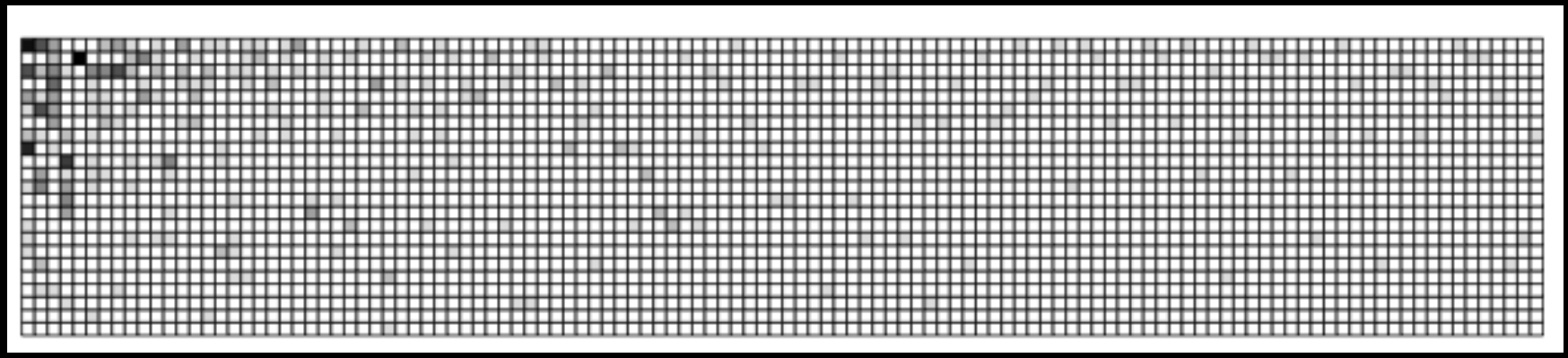
Species in communities form networks

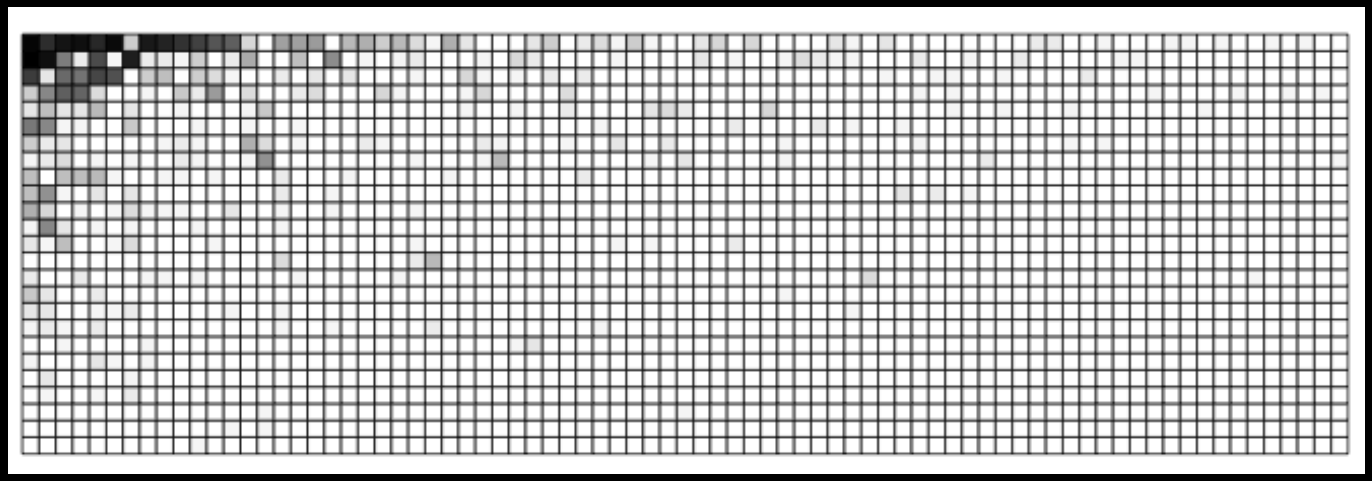


Patterns often similar among networks

Pollinators

Plants

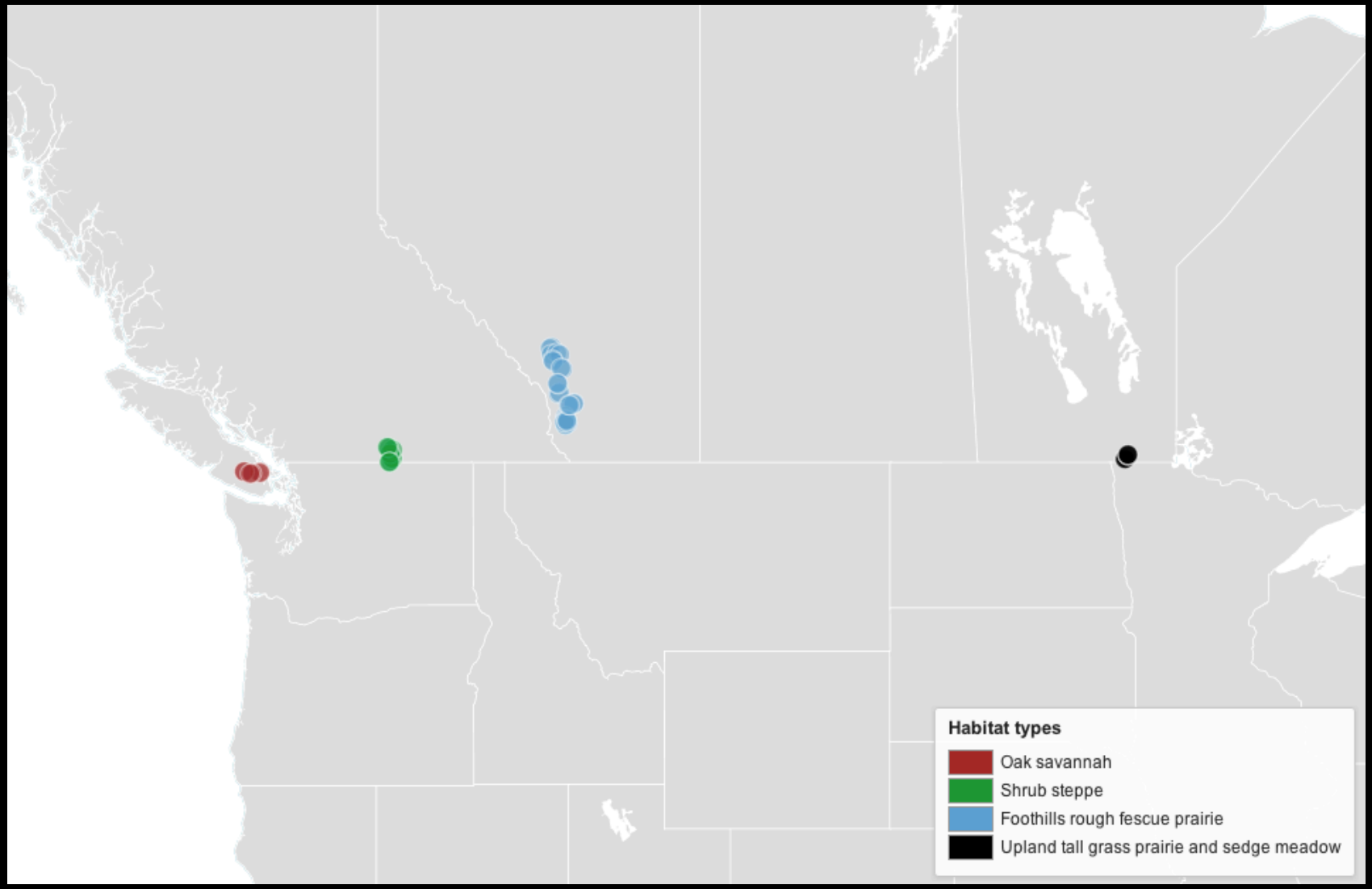




What drives network structure?

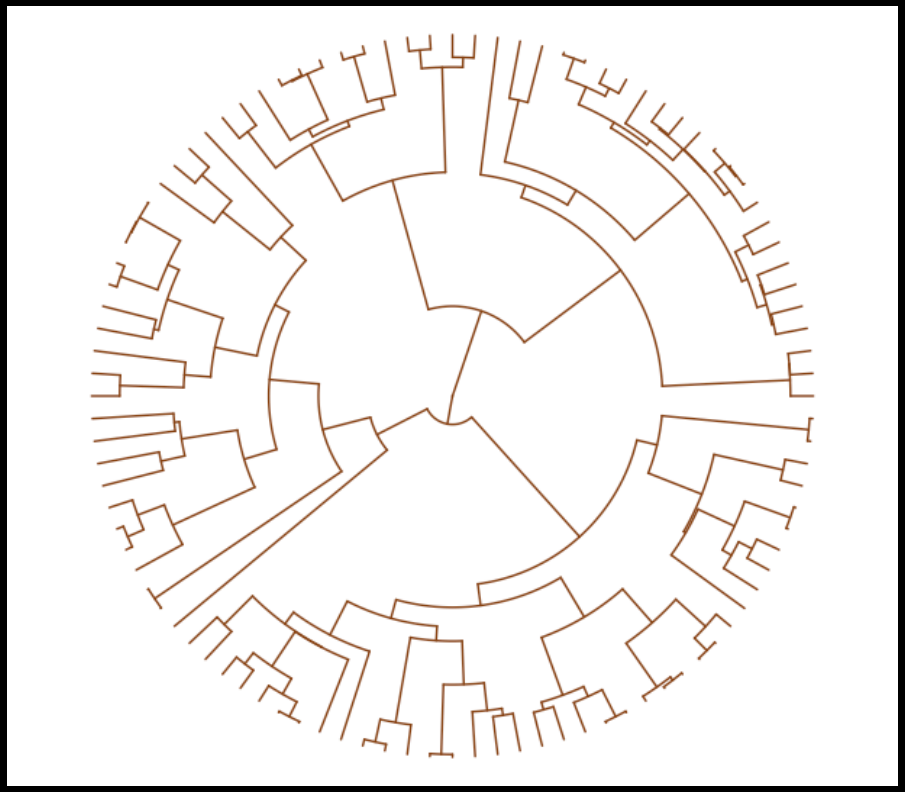
- Traits
- Phylogeny
- Phenology

Study sites

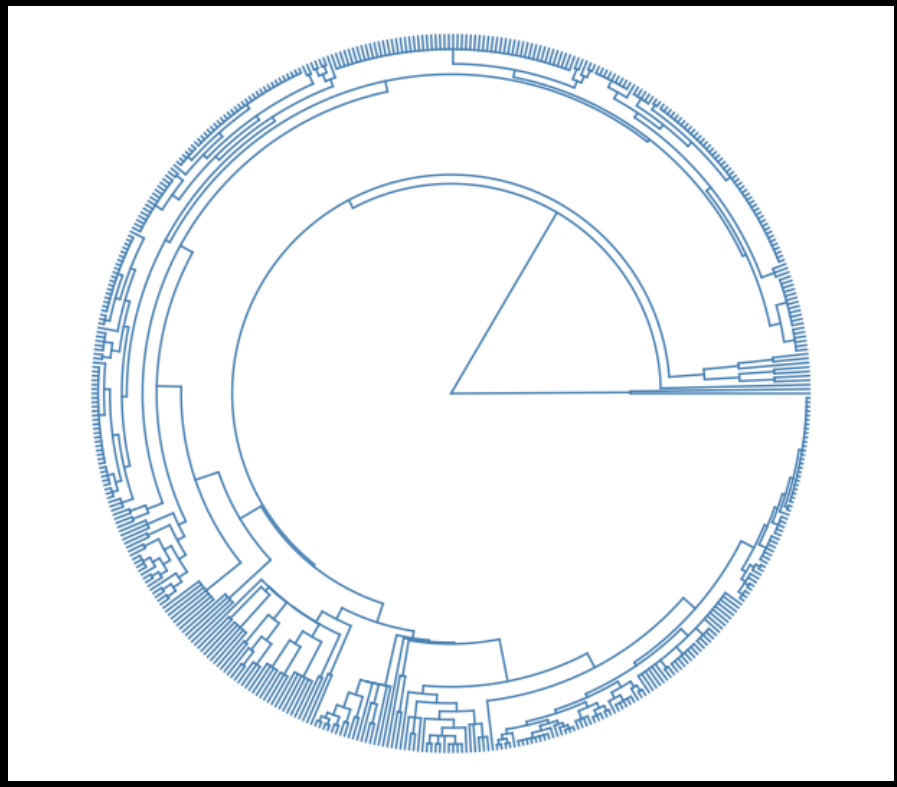

Habitat types
Oak savannah
Shrub steppe
Foothills rough fescue prairie
Upland tall grass prairie and sedge meadow

Phylogeny

Plants

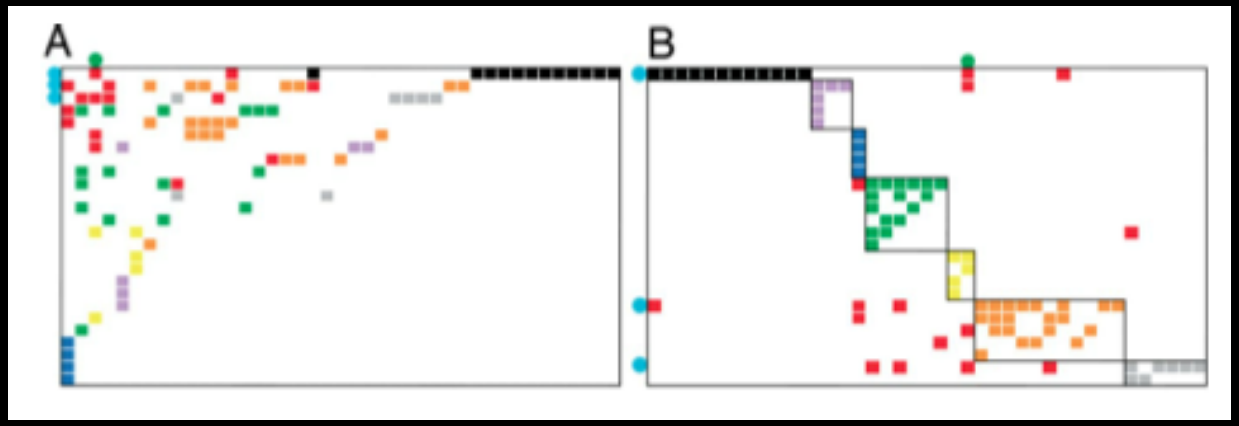


Pollinators



Species level metrics

- Degree
- Specialization
- Within module degree
- Among module connectivity



Traits - Pollinators

- Nest location: above/below ground - NS
- Nest type: excavator/renter - NS
- Parasitic: yes/no - NS
- Social: solitary/social –
  - Within module degree: social (module hubs), solitary (peripherals)
  - Among module connectivity: social (connectors), solitary (peripherals)
  - Degree: social (higher), solitary (lower)
- Body size – larger spp. w/ larger degree

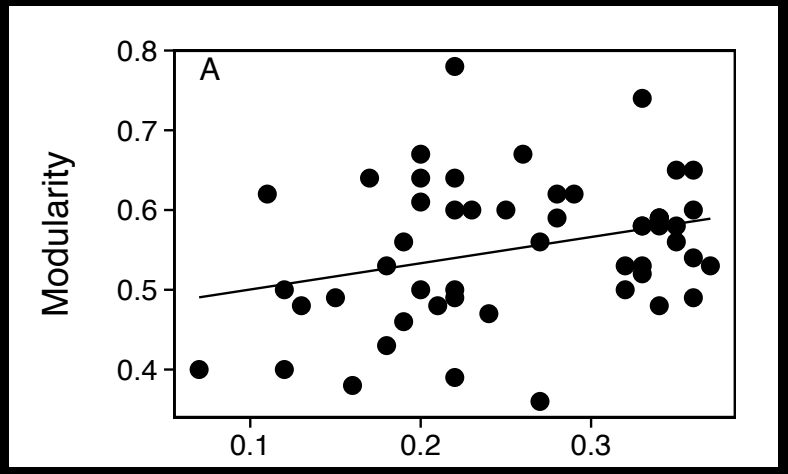
Traits - Plants

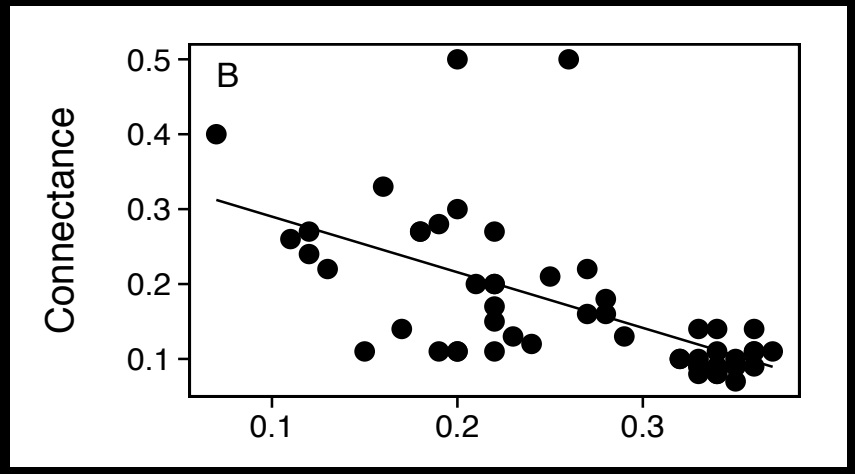
- Breeding system
  - Gynomonoecious: less specialized, higher degree
  - Hermaphrodites: more specialized, lower degree
- Growth form
  - Herbaceous: lower within module degree
  - Woody: higher within module degree
- Flower symmetry:
  - Bilateral: lower within module degree, lower degree
  - Radial: higher within module degree, higher degree
- Flower size: smaller flowers higher within module degree

Network level

network structure ~

FDisPO + FDisPL + MPDPO + MPDPL

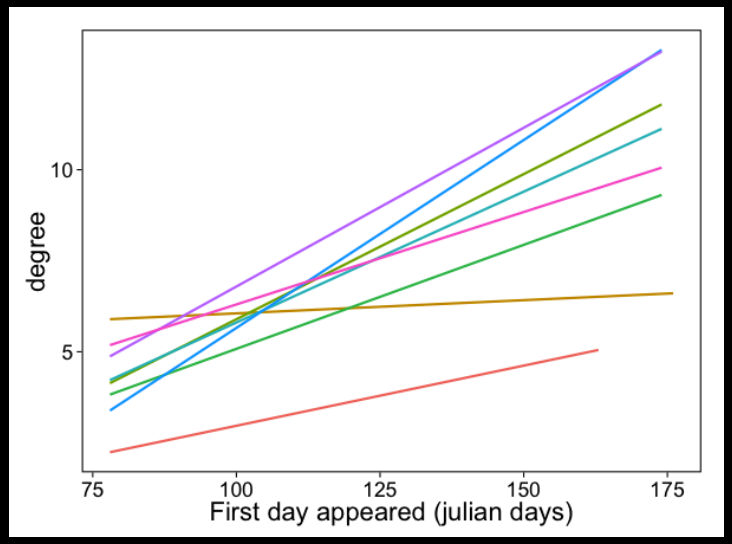


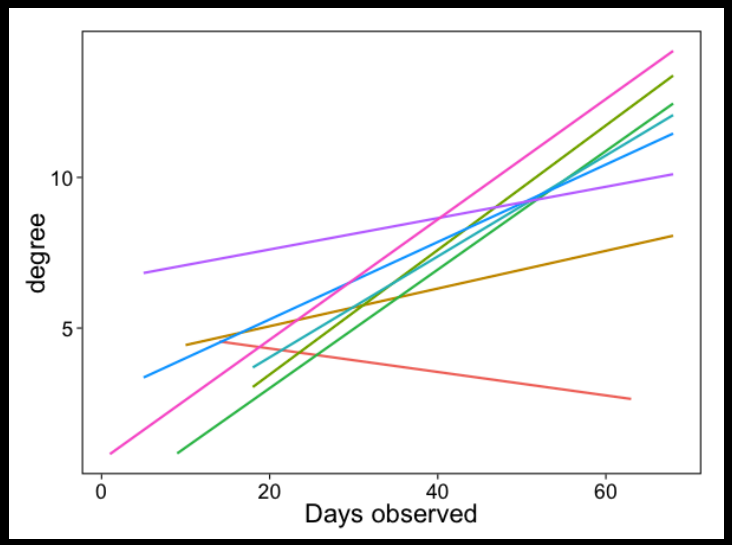


Pollinator Functional Trait Dispersion

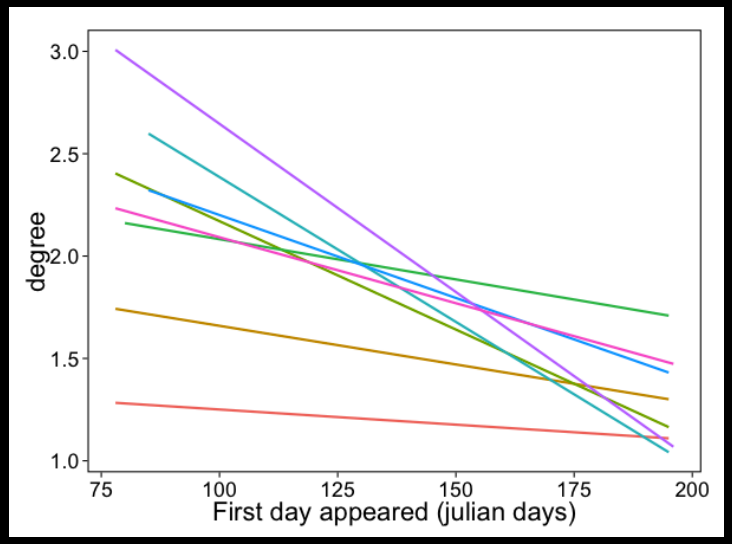
Phenology

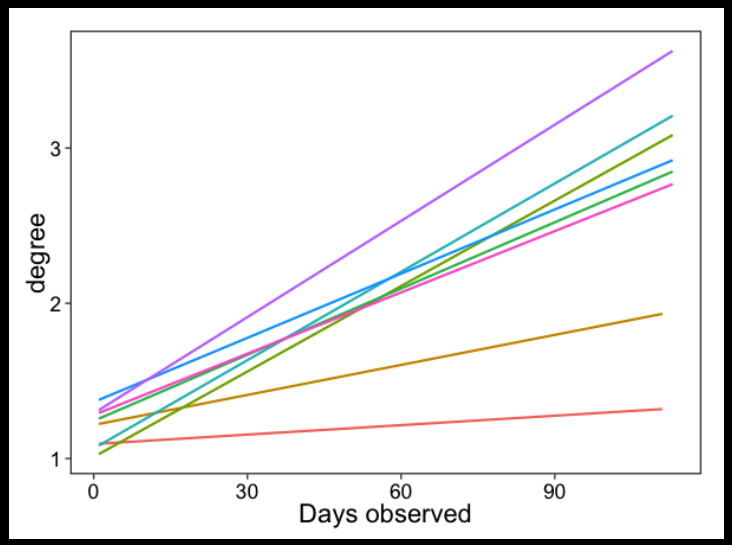
Plants





Pollinators





Conclusion

- Network level
  - At network level, ↑ pollinator functional diversity w/ ↑ modularity & ↓ connectance
  - Pollinator traits bigger drivers of network structure relative to plants
- Species level
  - Sociality important in pollinators
  - Mating systems, flower symmetry & growth form important in plants
  - Phenology playing role - will explore more

Thanks to

Coauthors
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- Jana Vamosi
- Ralph Cartar
- Sarah Semmler
- Anne Worley

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