Dispersal as a stabilizing mechanism



Dispersal as a stabilizing mechanism

- Dispersal is a fundamental process that links individuals, populations, and communities (genes/traits)
- Impacts population characteristics, ecosystem functions and ecosystem services
- Critical in determining overall system resilience and sustainability





Dispersal in agricultural systems

- Managed
 - Selected cultivars are planted in particular fields
 - Microbial inoculations (e.g. Rhizobia)
 - Planned releases of natural enemies
- Semi-managed
 - E.g. attempts to limit weed seed dispersal
- Unmanaged
 - Organisms move at field, landscape and regional/continental scales



Dispersal patterns are likely to change

- Climate change
- Land use change
- Landscape design



Research Question

 How does the dispersal of organisms vary within cropping systems and across landscapes and how does this affect resilient delivery of ecosystem services?

Links to Ecological Theory

- Population dynamics
- Metapopulation dynamics
- Metacommunity dynamics
- Biodiversity and ecosystem function



Liebold et al. Ecology 2017

Links to Existing data

- Long-term
 - Plant community productivity
 - Lady beetle pest suppression



Potential research

- 1. How does climate and agricultural landscape change influence dispersal trait diversity in arthropods and what is the impact on the resilience of ecosystem functions?
- 2. To what extent are aerially-deposited microbes at KBS present and active in soils and on plants?

Distribution of abundant microbial phyla deposited on soils through air/rain at KBS (aggregated over events within a month).



New Data, New experiments?

- 1. To what degree can plant diversity in conservation/unmanaged lands increase resilience to biodiversity and ES losses in agricultural lands?
 - Spillover effects
 - Corridor effects
- 2. Characterize microbial sources and sinks of different land use types (main cropping system) and how immigrants influence resilience of ecosystem functions







Questions?