An update on ongoing isotopic studies of Rusty Blackbirds

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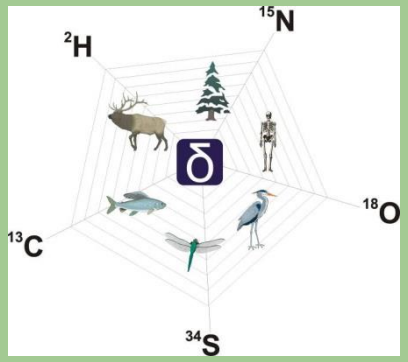
Background

- Stable isotope measurements of bird tissues can be used to infer:
  - *1) Geographical origins (Primarily $\delta^{2}H$, but also $\delta^{13}C$, $\delta^{15}N$, $\delta^{34}S$ ...).*
  - *2) Source of feeding and trophic level (Primarily $\delta^{13}C$, $\delta^{15}N$, $\delta^{34}S$ ...).*



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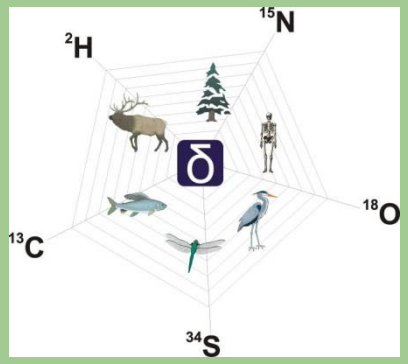
Advantages:

- Geographic origins:
  - *Endogenous signals do not require recapture!*
  - *So, not biased to an initial marked population*
    - *Suited to broadly dispersed breeding populations.*
- Diet:
  - *Non-destructive*
  - *Time integrated*



Motivation for RUBL conservation?

- Geographic origins:
  - *Migratory connectivity*
  - *Which regions are producing recruits to (wintering) populations?*
  - *Migratory divides?*
  - *Historical changes?*
  - *NAO, ENSO?*
- Diet:
  - *Importance of masting (acorns etc)*
  - *Importance of agriculture?*
  - *Relevance to contaminant exposure?*

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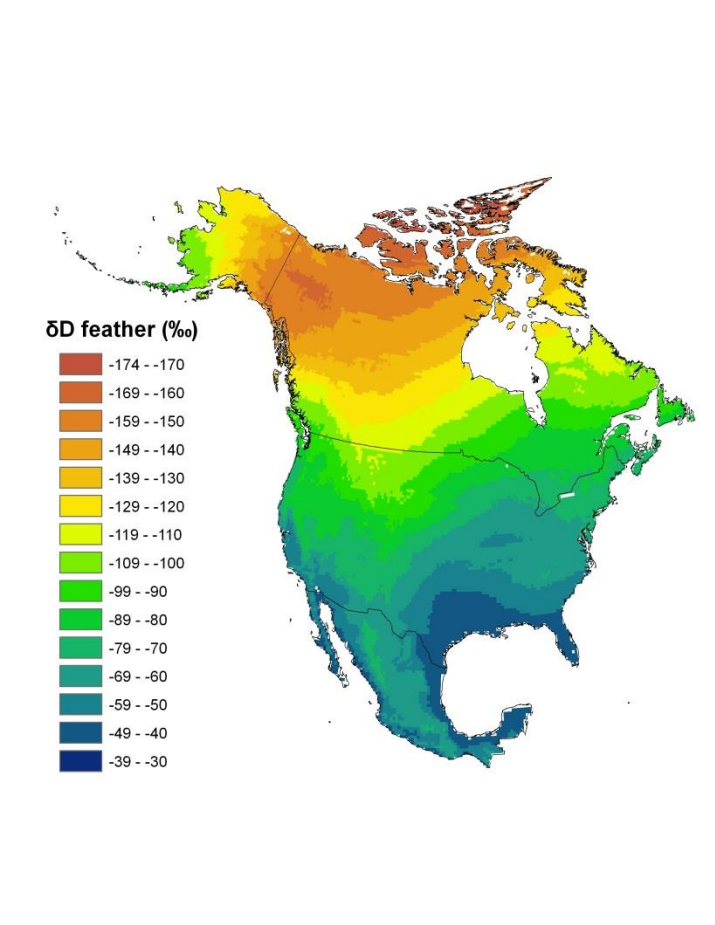
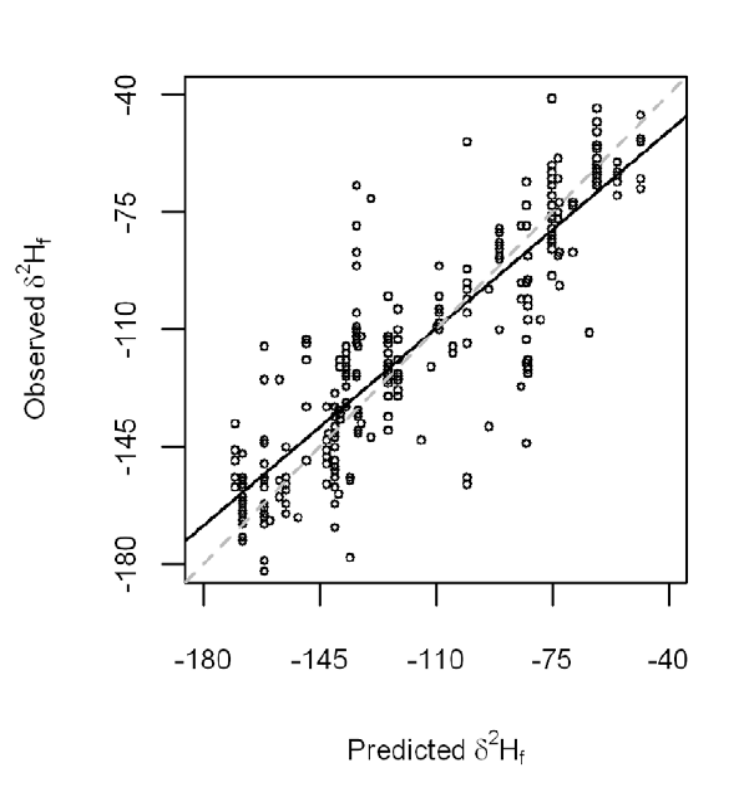
We have a feather (δ^2H) basemap!



N > 1500 feathers of known origin



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Has there been a shift in migratory connectivity over the last 100+ years?

1879-1990:

Mississippi Alluvial Valley (n=255)

Coastal Plain (n=281)

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MIGRATORY CONNECTIVITY IN THE RUSTY BLACKBIRD: ISOTOPIC EVIDENCE FROM FEATHERS OF HISTORICAL AND CONTEMPORARY SPECIMENS

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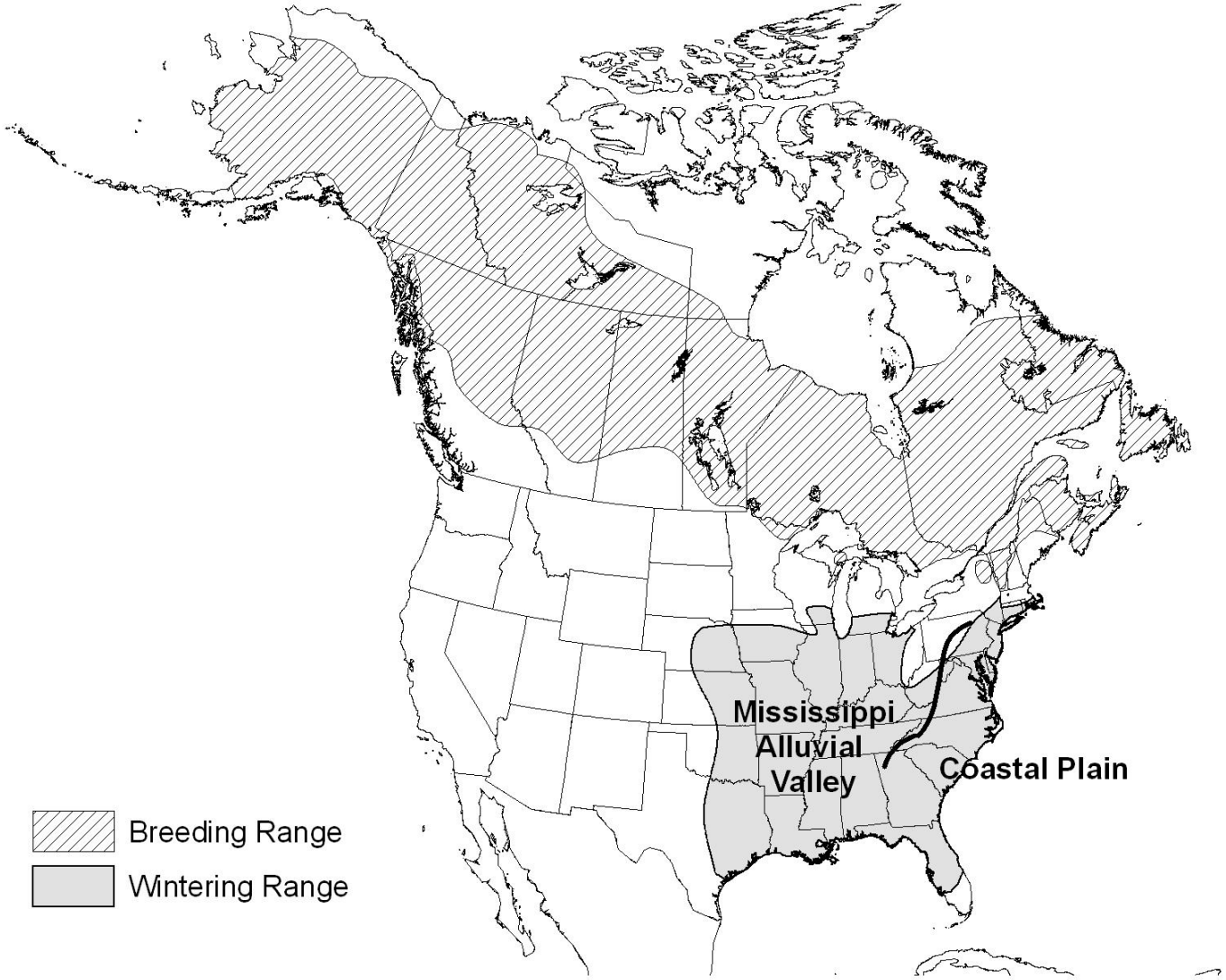

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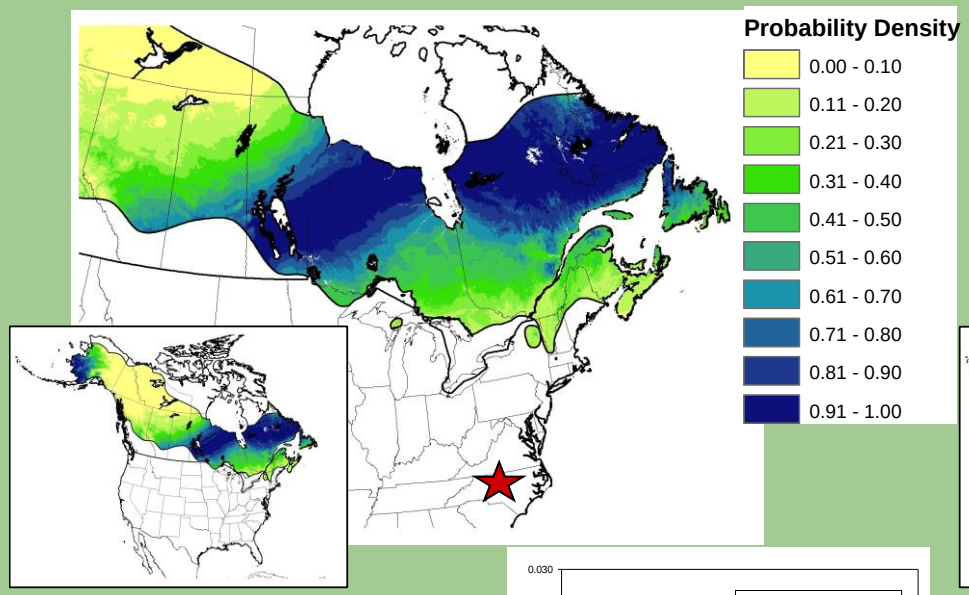
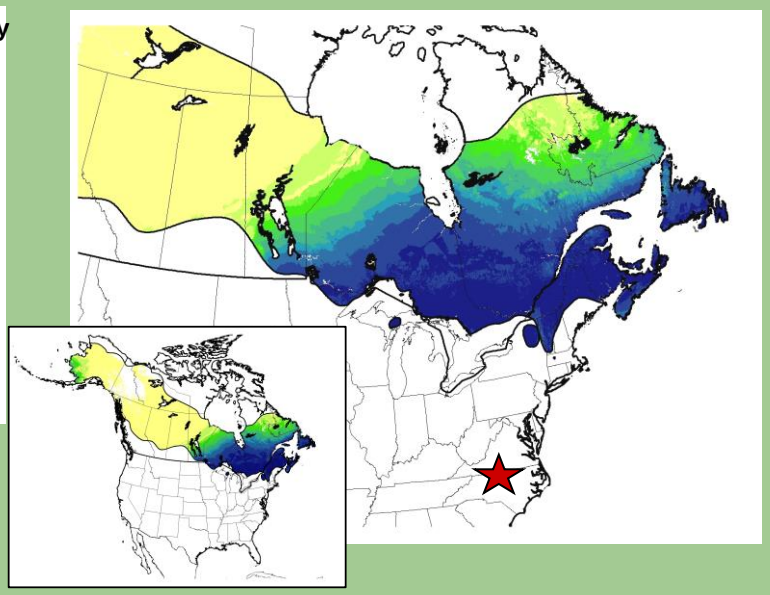
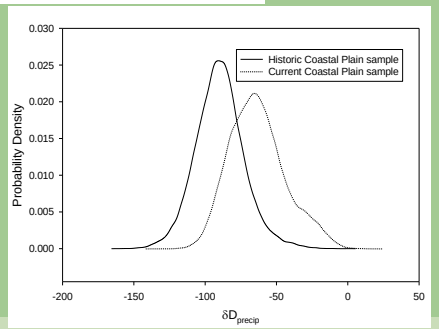
Coastal Plain

Historic



Modern





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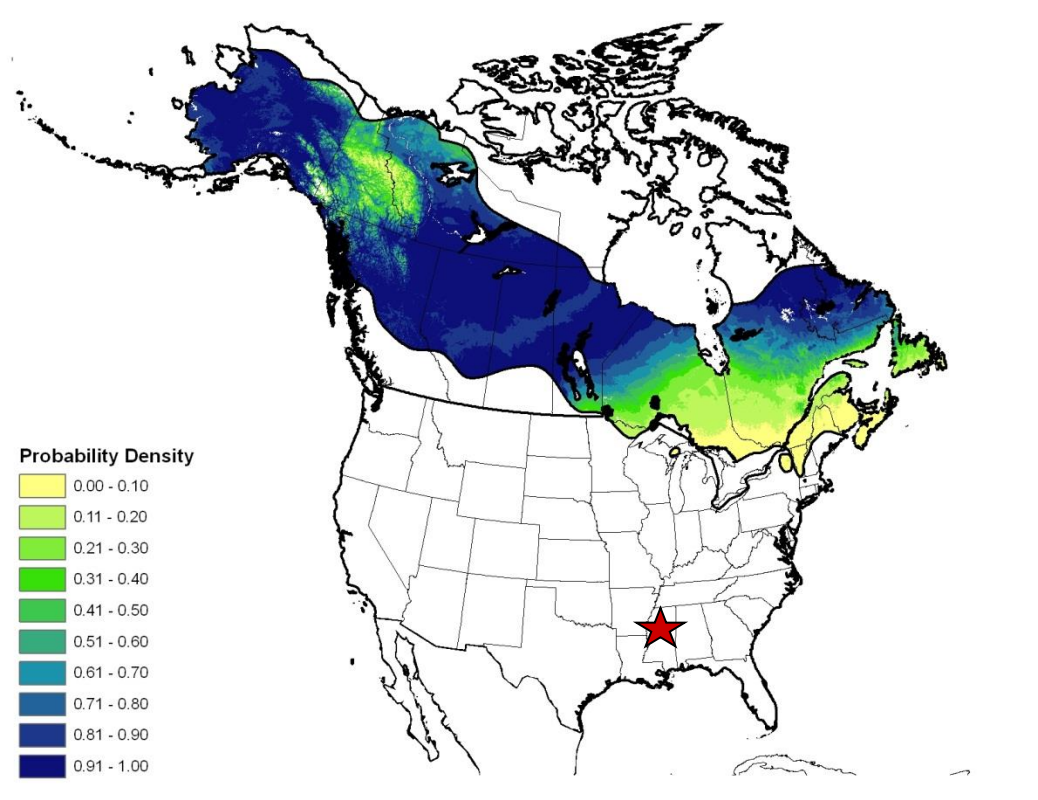
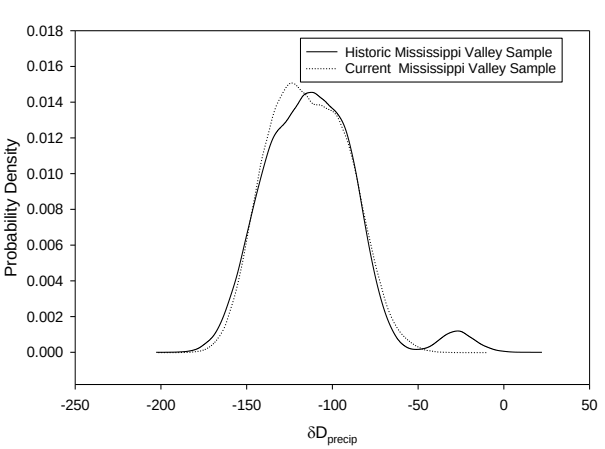
Mississippi Alluvial Valley





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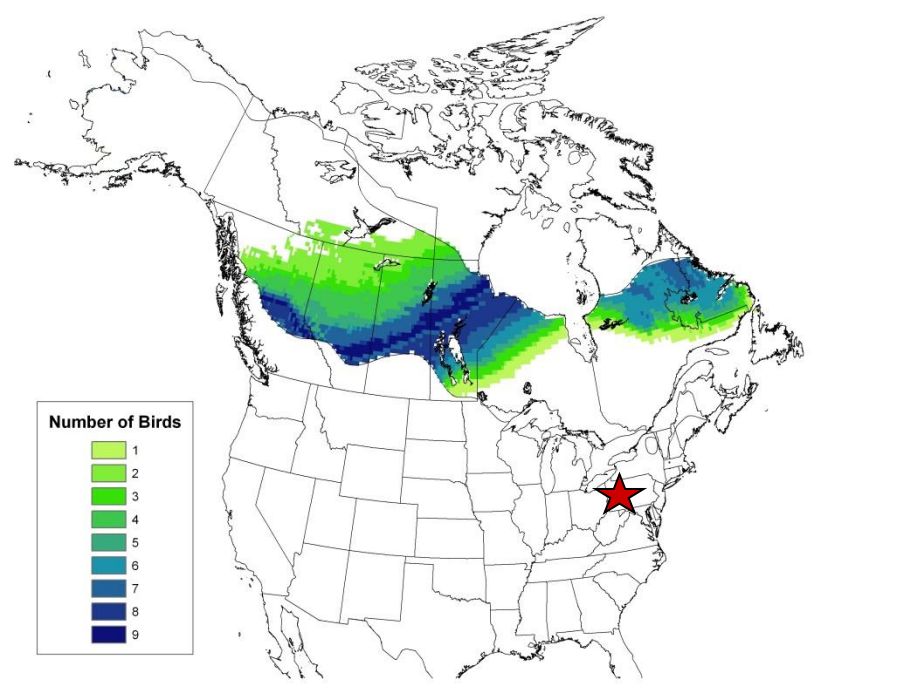
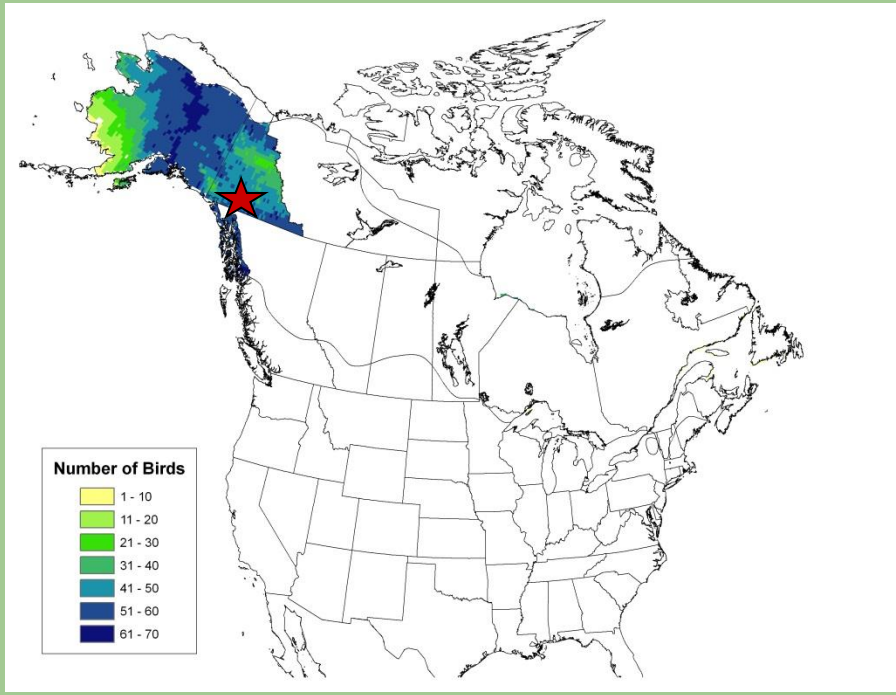
Powdermill (10) vs. Whitehorse (153)





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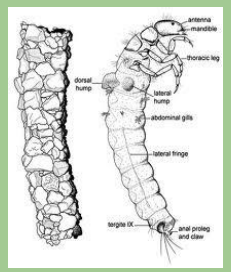
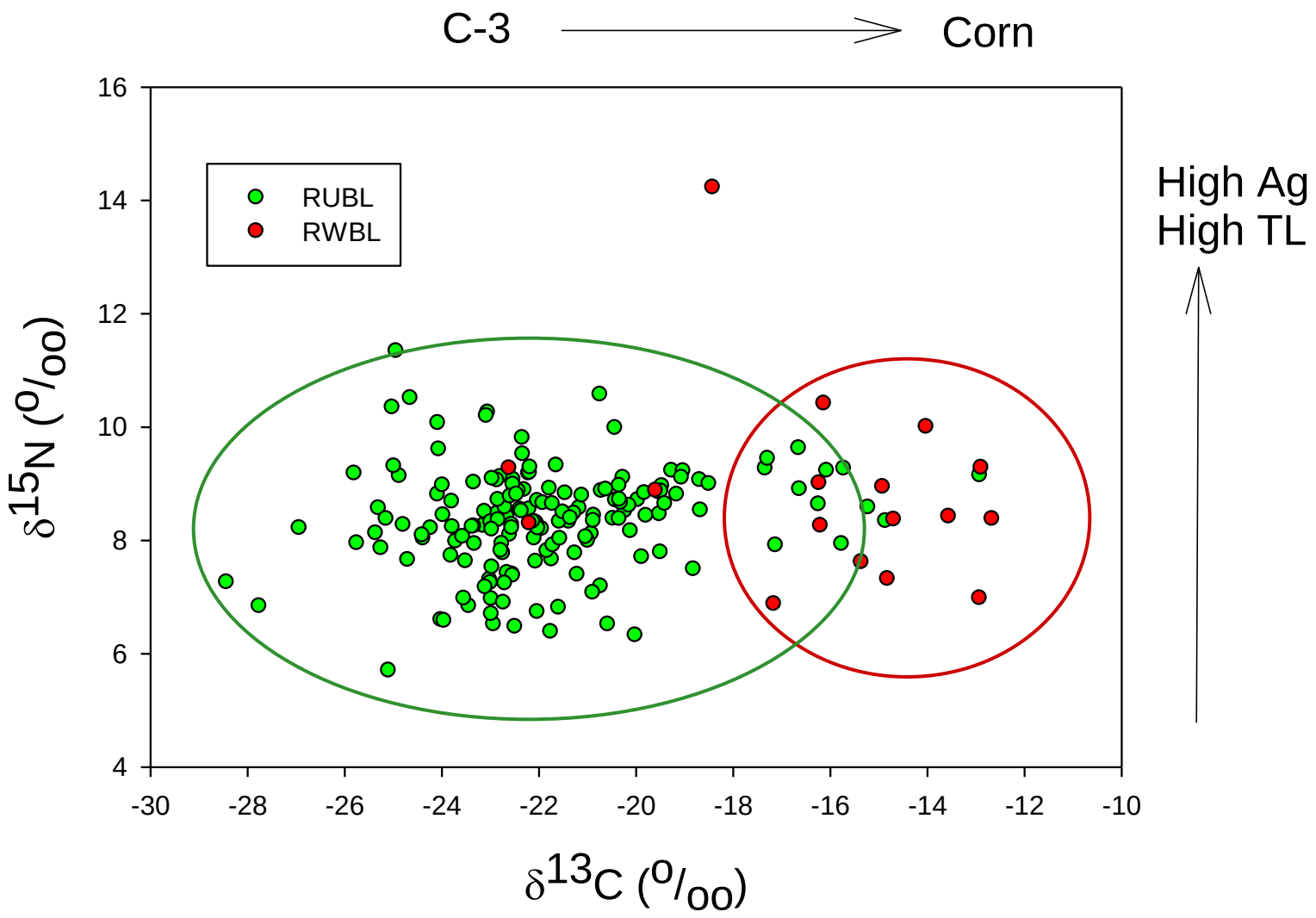
Diet studies using isotopes

- Rely on different foods being isotopically different.
- Require knowledge of how isotopes change between diet and RUBL tissues (blood).
- Now make use of sophisticated (Bayesian) models.





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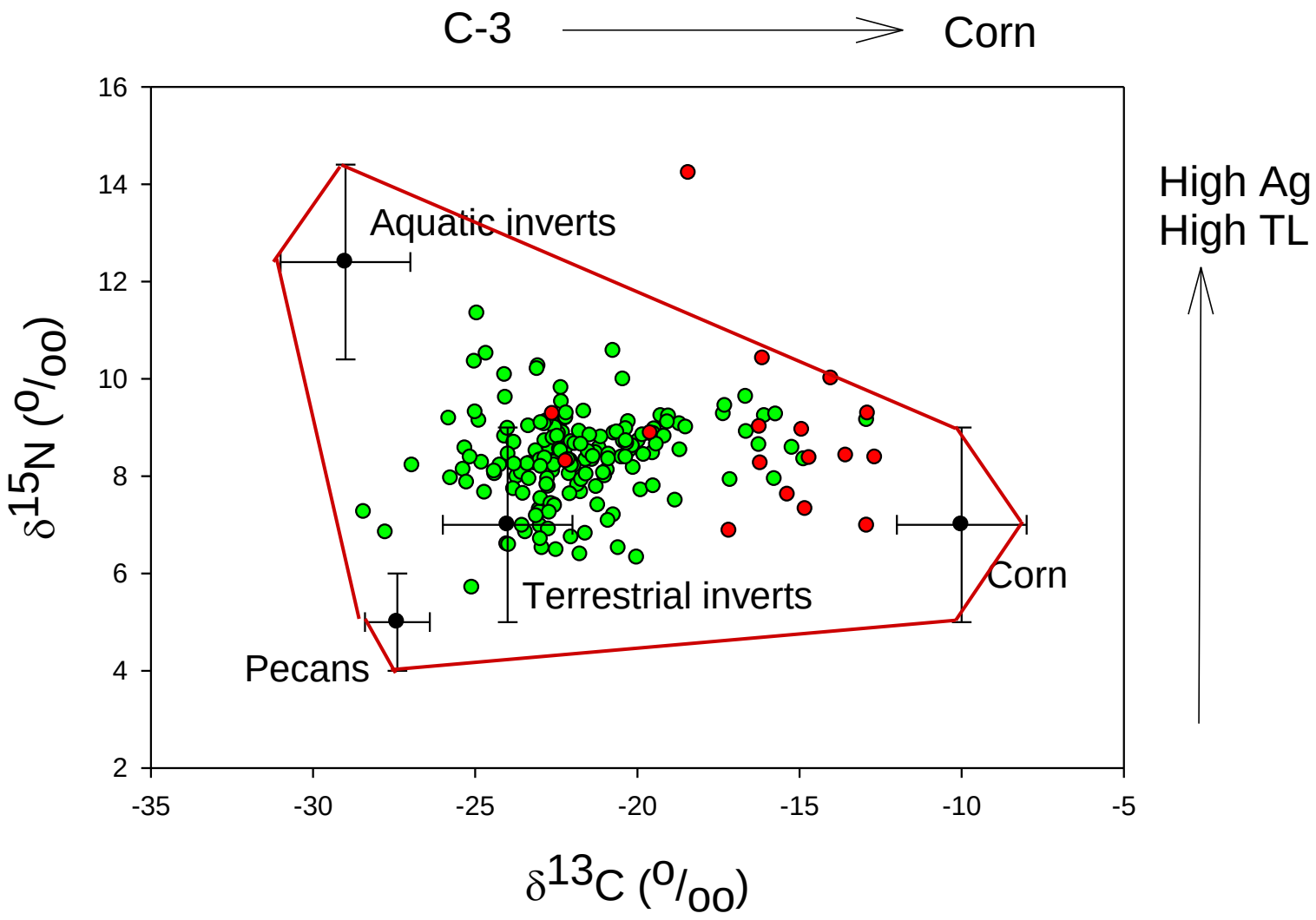

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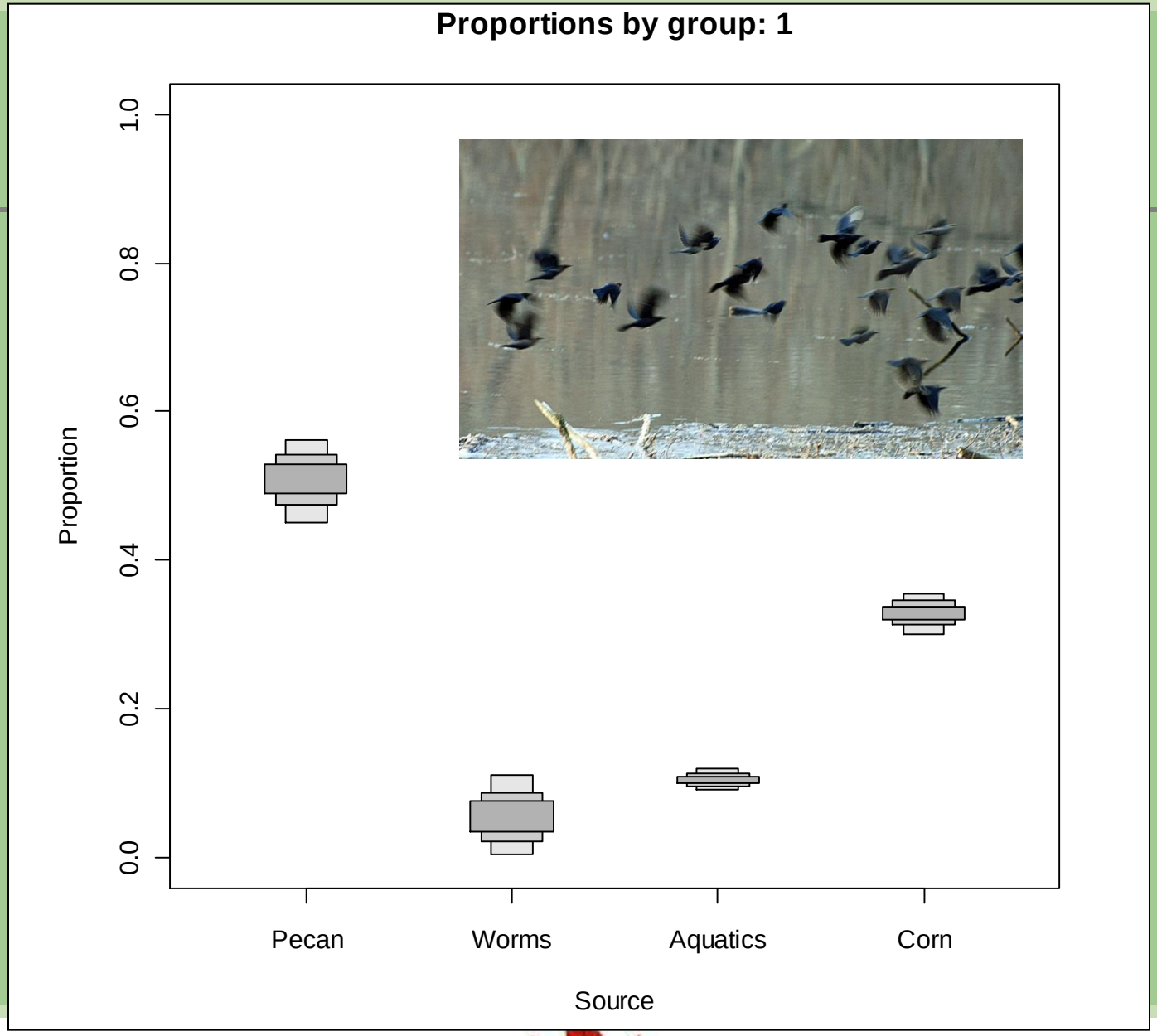

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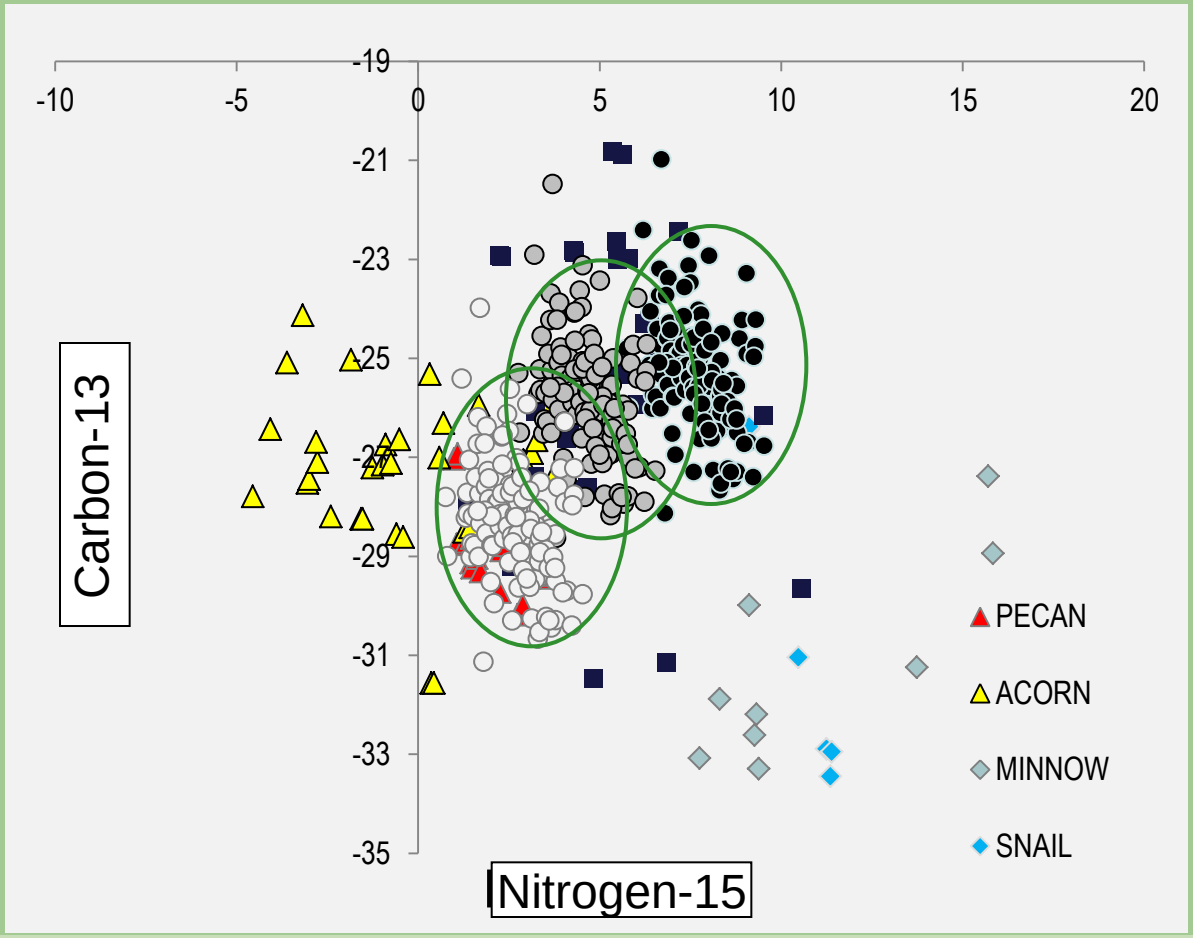
Patti Newell's thesis research:



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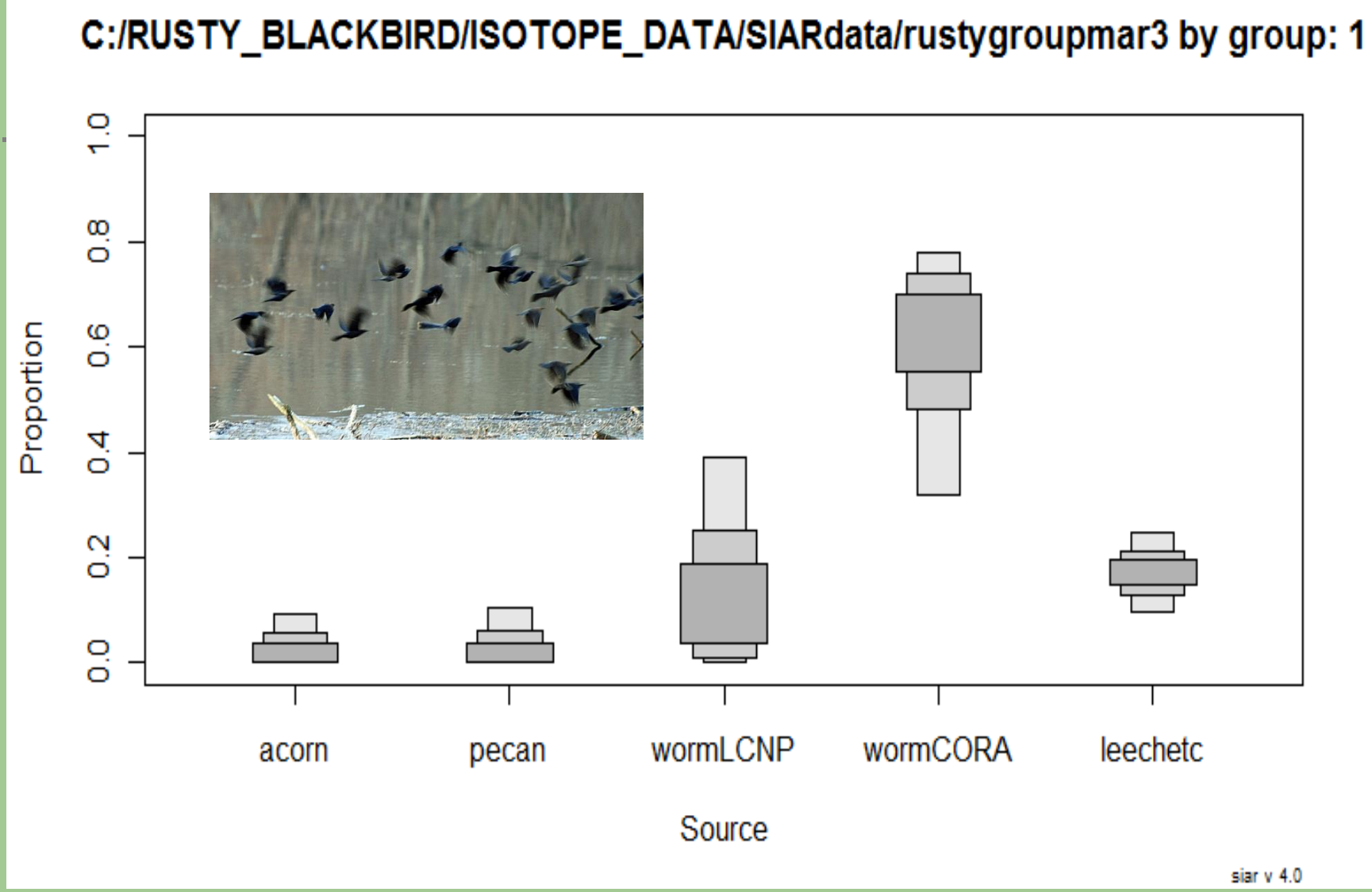

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The (isotopic) path ahead:

- Migratory connectivity
  - *Define (breeding) catchment areas for key migration monitoring stations.*
  - *Refine regional isotopic basemaps of interest.*
- Diet
  - *Diet and bird sampling for key wintering areas.*
  - *Combined contaminants and isotope datasets.*
  - *Refine isotope discrimination factors for RUBL.*

Questions?