Seasonal Shifting of the Trophic Niche in a Generalist Apex Predator

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Chinese praying mantis
Tenodera aridifolia sinensis

- Semelparous
- Exert top-down trophic control
- Feed on three trophic levels
Body size increases over the growing season
Stable isotope analysis

- Carbon 13 and Nitrogen 15 become incorporated into an organism’s tissues
- Gives insight into how an organism’s diet changes over time
Stable isotope analysis shows trophic enrichment
Signatures of prey items show trophic position

- Sap Feeders
- Plant Chewers
- Pollen
- Mantid hatchlings
- Carnivores
- Parasitoids
- Mycophages
Mantid isotopic values depend on isotopic values of prey.
Field-caught mantids fed on a range of trophic levels
Change in isotopic composition during mantid development reveals change in trophic level in field.
Summary

- Trophic level of prey can be determined from SIA
- Isotopic signatures of mantids depend on signatures of prey
- Trophic level of mantids changes with increasing body size over the season
- Nitrogen enrichment corresponds to increasing trophic levels over the growing season
Further Directions

- Spiders: Field vs. Forest
  - Productivity in different areas
  - Different communities of spiders

Fig. 2 from Hurd 1992
Collect spiders via pitfall traps
- Run SIA on Carbon and Nitrogen
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Arthropod guilds change in abundance throughout the growing season