



# Seasonal Shifting of the Trophic Niche in a Generalist Apex Predator

Meredith Campbell, Joseph M. Taylor  
Lawrence E. Hurd, and Pieter A.P. deHart



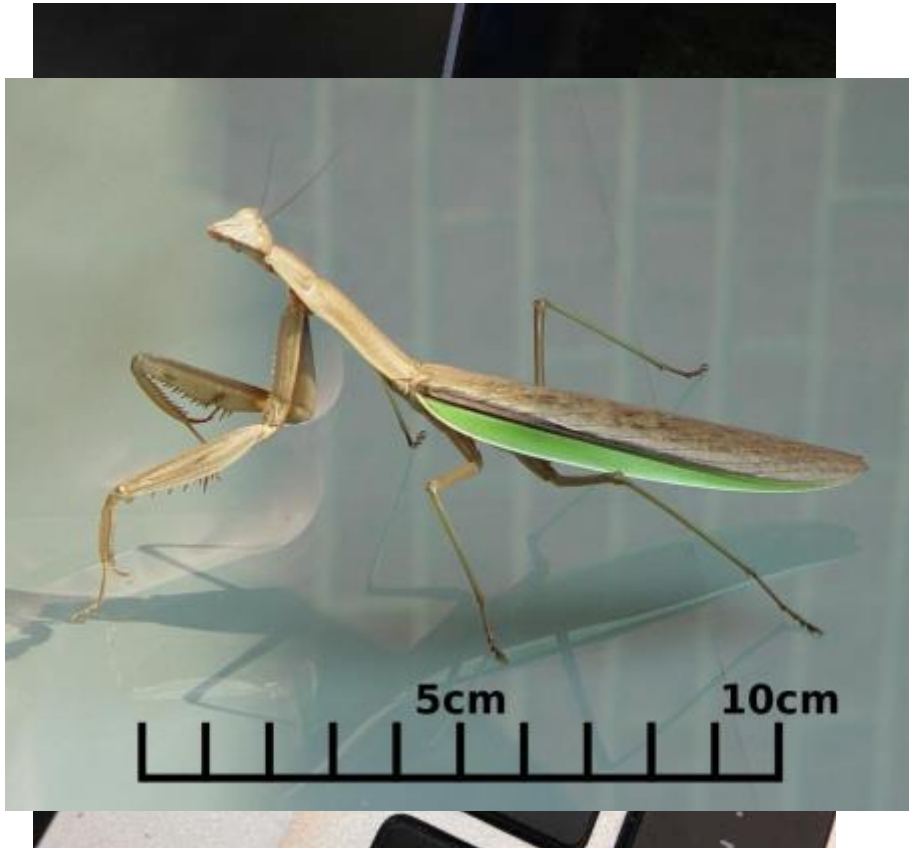
Washington and Lee University  
and  
Virginia Military Institute



# Chinese praying mantis

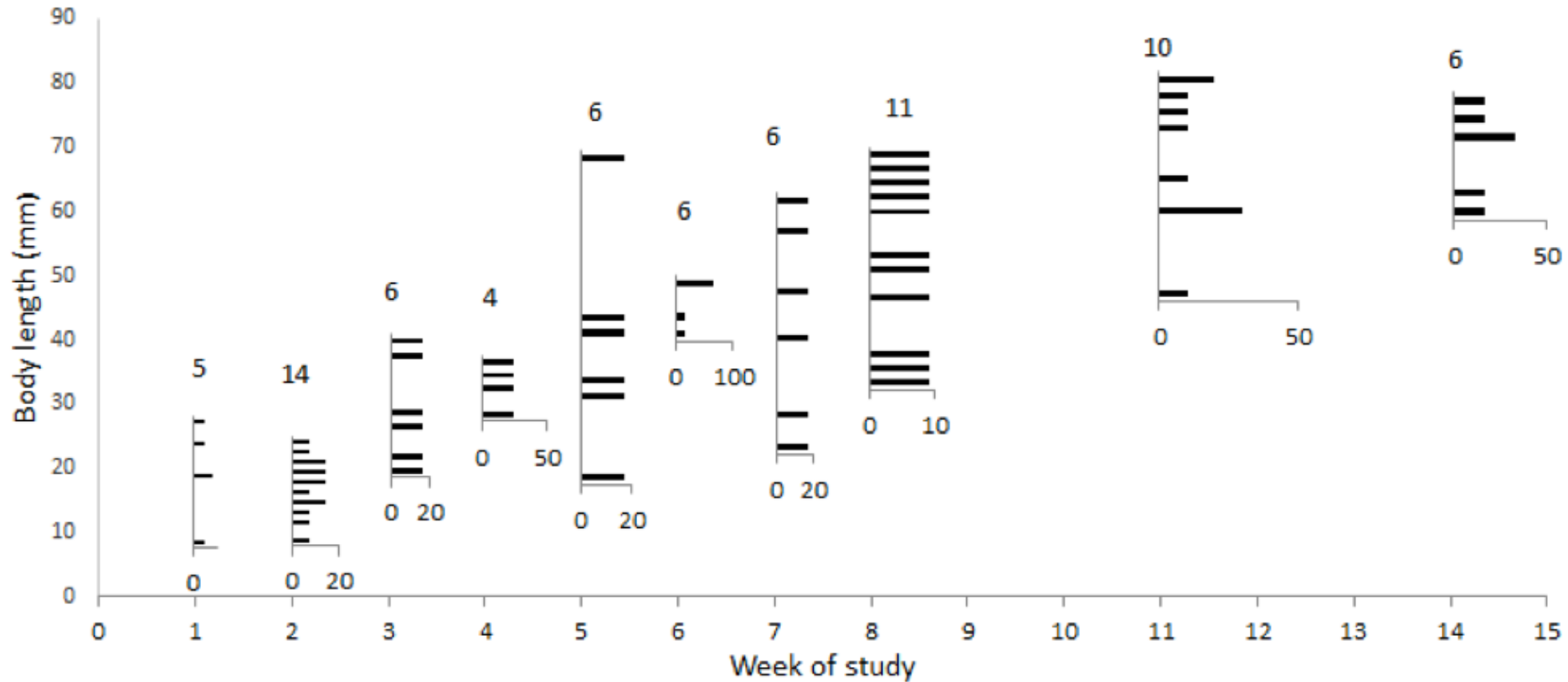


# *Tenodera aridifolia sinensis*



- Semelparous
- Exert top-down trophic control
- Feed on three trophic levels

# Body size increases over the growing season

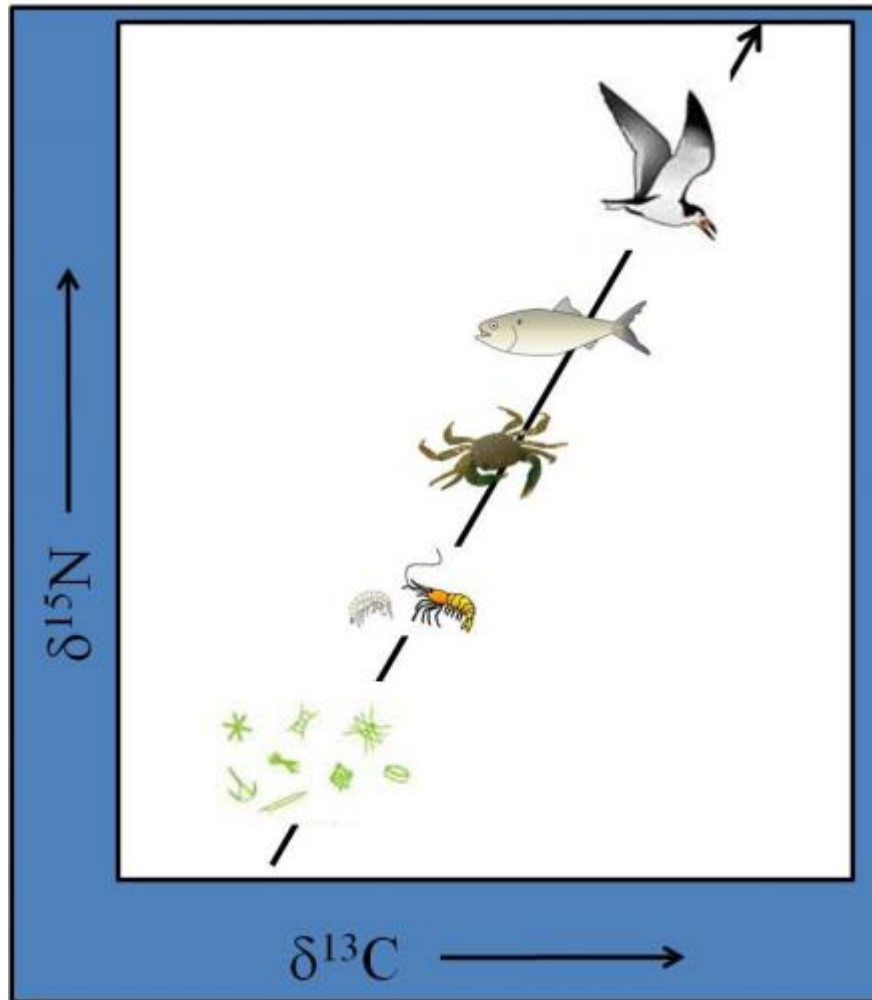


# Stable isotope analysis

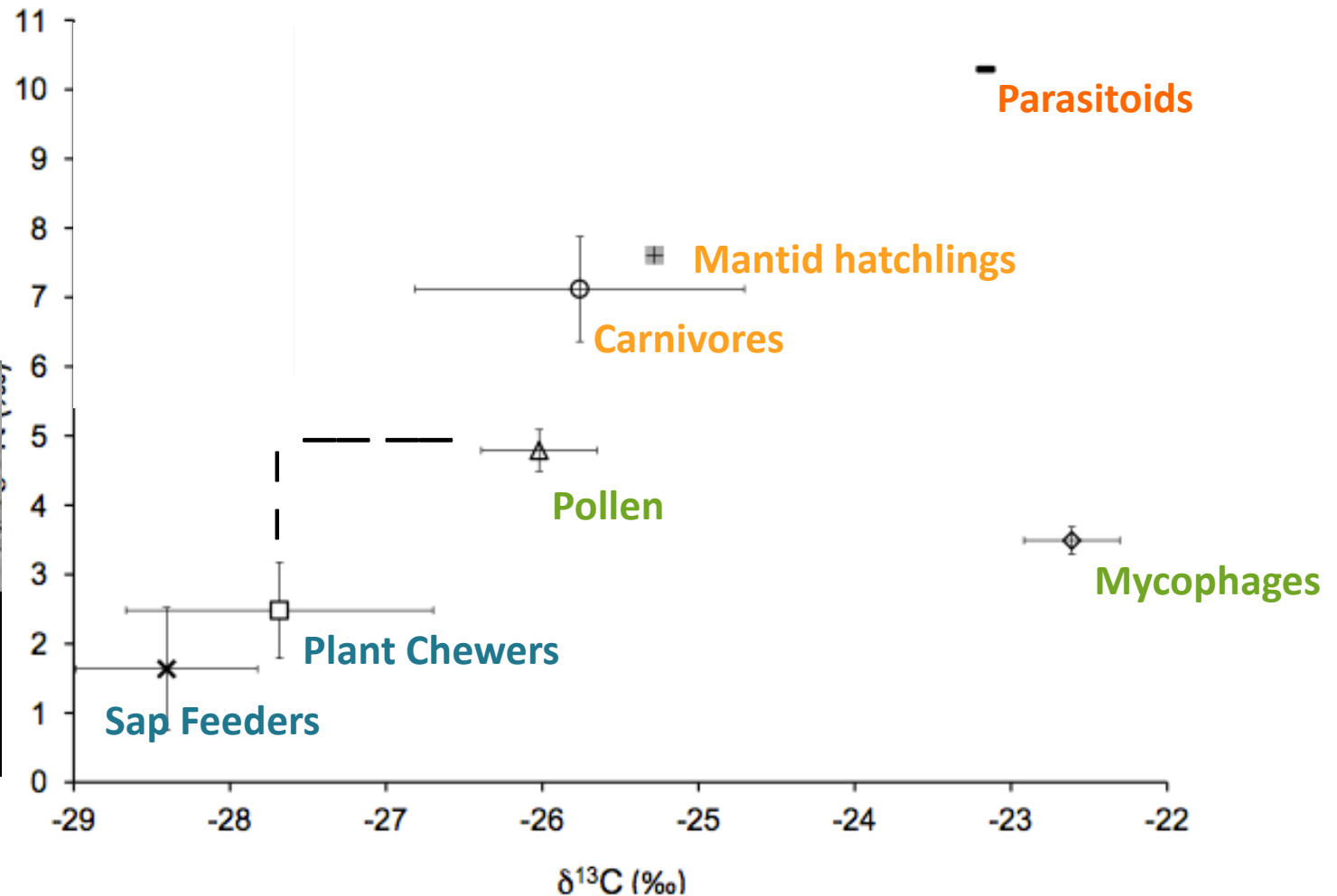


- ➔ Carbon 13 and Nitrogen 15 become incorporated into an organism's tissues
- ➔ Gives insight into how an organism's diet changes over time

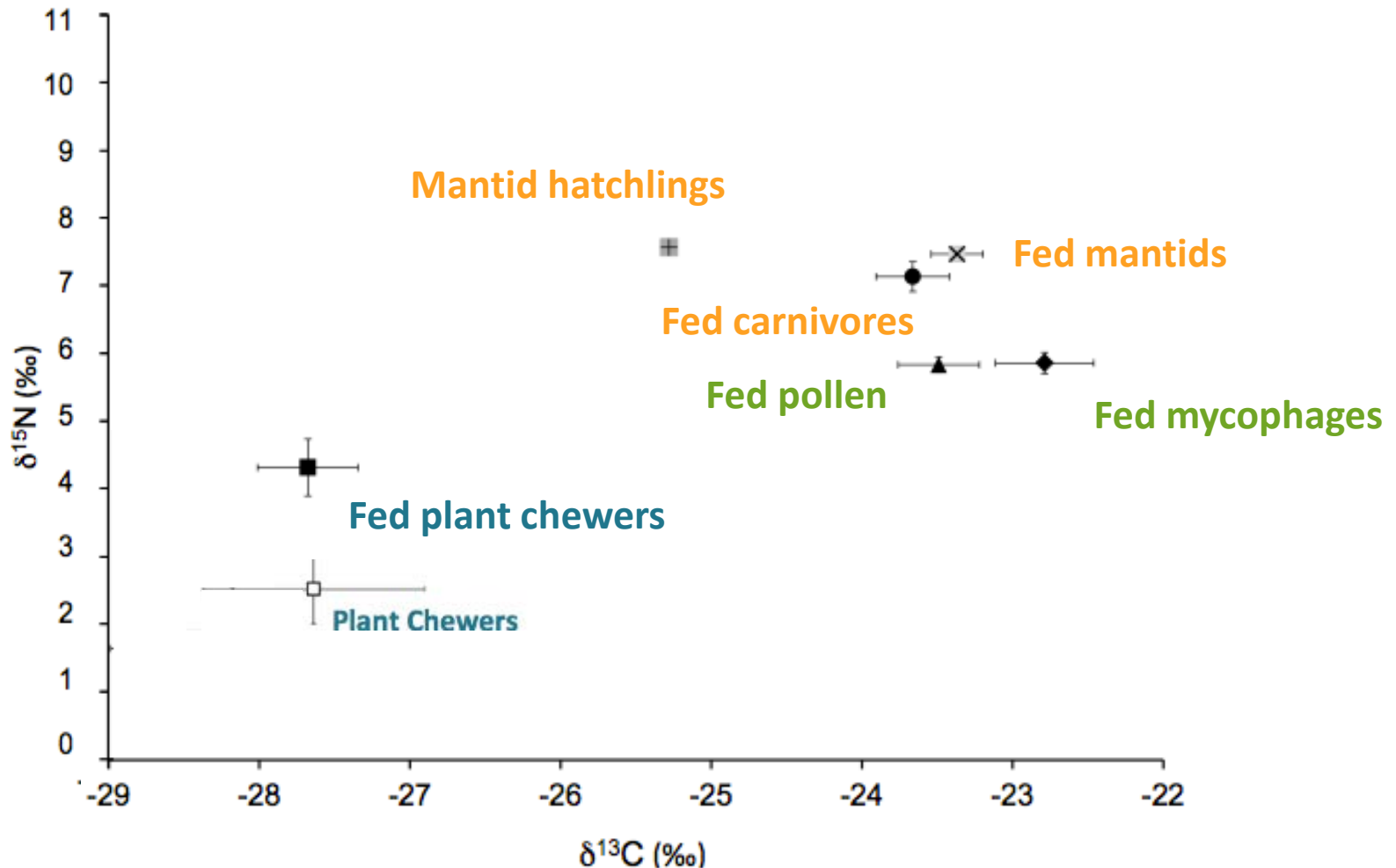
# Stable isotope analysis shows trophic enrichment



# Signatures of prey items show trophic position

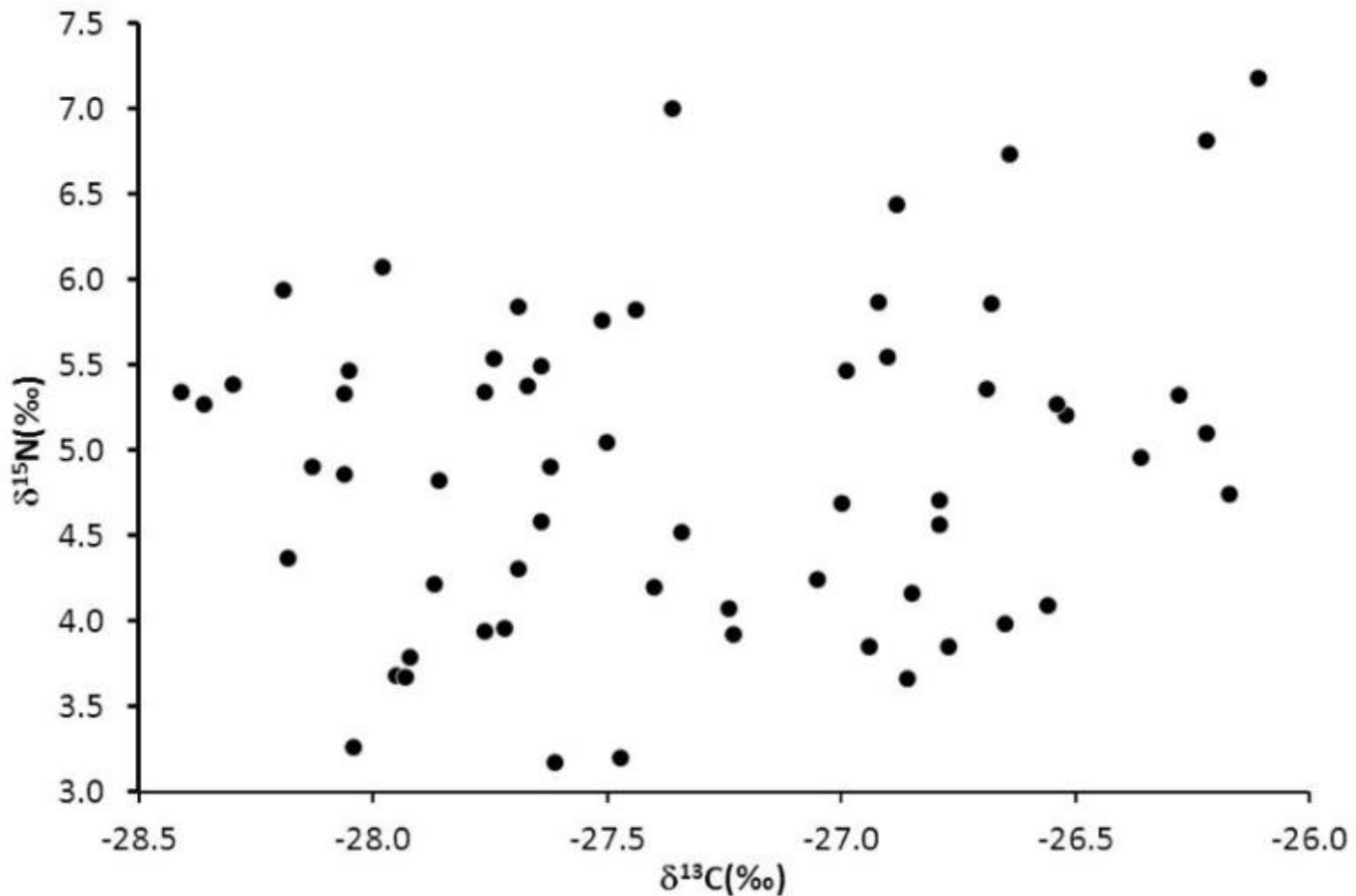


# Mantid isotopic values depend on isotopic values of prey

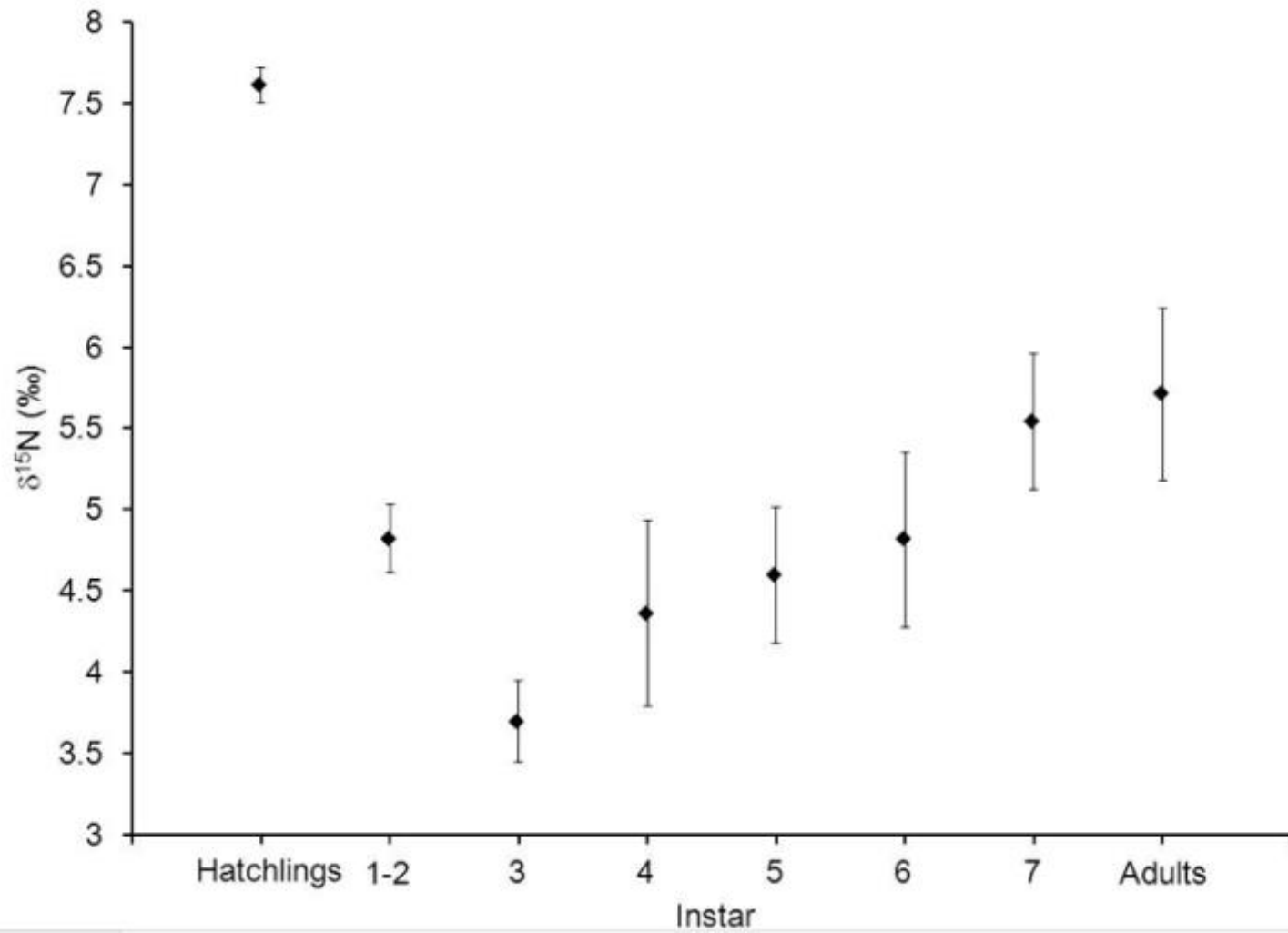




# Field-caught mantids fed on a range of trophic levels



# 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

Running spiders

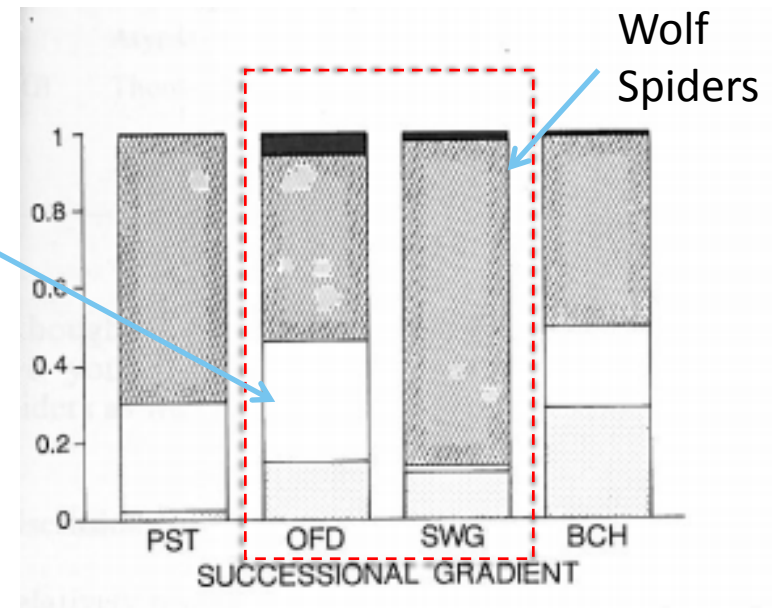


Fig. 2 from Hurd 1992

- Collect spiders via pitfall traps
- Run SIA on Carbon and Nitrogen



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# Arthropod guilds change in abundance throughout the growing season

