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
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The Diet of the Cumberland Plateau Salamander (*Plethodon kentucki*) in an old growth forest of southeastern Kentucky

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Introduction

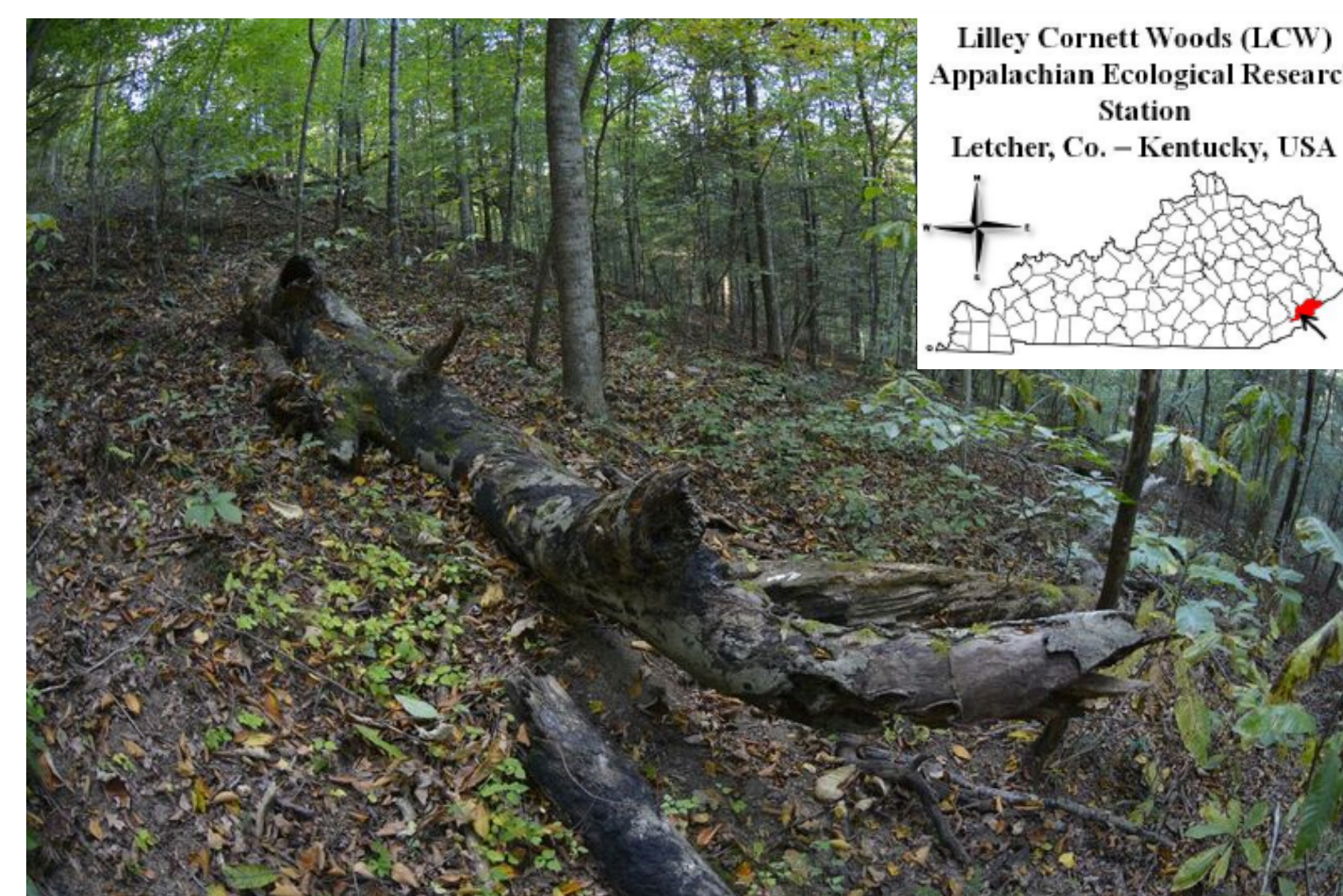
- Terrestrial lungless salamanders are known to reach very high densities in forested ecosystems of the United States
- They can be important for the top down regulation of invertebrates
- Diets of 57% (31 of 54) *Plethodon* salamanders are still poorly known
- The Cumberland Plateau Salamander (*Plethodon kentucki*) is a large plethodontid common in the Central Appalachians, however, its diet is only known from West Virginia



Objectives

- 1) Non-lethally examine the diet of *P. kentucki* in SE KY
- 2) Report the first description of *P. kentucki* diet to family and genus

Methods



- Adult *P. kentucki* were collected on a ridgetop within the forest of EKU's Lilley Cornett Woods Appalachian Ecological Research Station (LCW)
- Eight sampling events from 26 April to 27 May 2016
- Salamanders were anesthetized in a Benzocaine solution (Cecala et al. 2007)
- 1.3 mm OD tubing and syringes were used to pump water into the stomach
- Salamander were placed in a recovery container of aged tap water and returned
- Prey items were identified to the lowest taxonomic level and placed in 70% ethanol

Results

Table 1. Prey types found in the stomachs of adult *Plethodon kentucki* identified beyond the level of order and their percent occurrences

| Prey category | Occurrence (%) | Total items (%) | Occurrence (%) | Total items (%) |
|-------------------------|----------------|-----------------|---------------------------------|-----------------|
| Araneae | | | Formicidae | |
| Unidentified Spider | 81.82 | 70.89 | <i>Pheidole</i> sp. | 71.15 |
| Theridiidae | 25.00 | 16.46 | Unidentified Formicidae | 42.31 |
| Thomisidae | 9.09 | 7.59 | <i>Amblyopone</i> sp. | 15.38 |
| <i>Xysticus</i> sp. | 2.27 | 3.80 | <i>Lasius</i> sp. | 13.46 |
| Salticidae | 2.27 | 1.27 | <i>Camponotus</i> sp. | 9.62 |
| Coleoptera | | | <i>Formica</i> sp. | 7.69 |
| Unidentified Larvae | 46.34 | 30.26 | <i>Aphaenogaster</i> sp. | 7.69 |
| Unidentified Adult | 24.39 | 14.47 | <i>Temnothorax</i> sp. | 5.77 |
| Scarabaeidae | 17.07 | 18.42 | <i>Myrmecina americana</i> | 5.77 |
| Curculionidae | 17.07 | 9.21 | <i>Stenamma</i> sp. | 1.92 |
| Carabidae | 7.32 | 6.58 | <i>Hypoponera</i> sp. | 1.92 |
| Staphylinidae | 7.32 | 3.95 | <i>Ponera pennsylvanica</i> | 1.92 |
| Tenebrionidae | 7.32 | 9.21 | <i>Pyramica</i> sp. | 1.92 |
| Silphidae | 4.88 | 2.63 | Gastropoda | |
| Elateeridae | 2.44 | 1.32 | Unidentified Snail | 52.94 |
| Elateeridae Larvae | 2.44 | 1.32 | <i>Glyphyalinia indentata</i> | 17.65 |
| Dytiscidae | 2.44 | 1.32 | <i>Ventridens suppressus</i> | 11.76 |
| Nitidulidae | 2.44 | 1.32 | <i>Discus</i> sp. | 5.88 |
| Collembola | | | <i>Glyphyalinia</i> sp. | 5.88 |
| <i>Sminthuridae</i> | 46.67 | 29.49 | <i>Polygyridae</i> sp. | 5.88 |
| Isotomidae | 40.00 | 33.33 | <i>Punctum minutissimum</i> | 5.88 |
| Unidentified Collembola | 40.00 | 25.64 | <i>Strobilops labyrinthicus</i> | 5.88 |
| Hypogastruridae | 13.33 | 11.54 | <i>Ventridens</i> sp. | 5.88 |
| Diptera | | | Isoptera | |
| Unidentified Adult | 80.00 | 65.38 | Rhinotermitidae | - |
| Unidentified Larvae | 30.00 | 30.77 | | |
| Tabanidae | 5.00 | 3.85 | | |

- 763 prey items were recovered from 71 salamanders, 10.75 items /salamander
- 58 prey types from 20 orders (Table 1)
- Ants, spiders, beetles, and springtails comprised 75% of all prey items (Fig. 1)
- Ants made up 45% of all prey items and were consumed by 73% of the salamanders; *Pheidole* were the most numerous
- Nearly 70% of the beetles were adults, but adults and larvae were each found in 50% of the salamanders that consumed beetles
- Among flies found in salamanders: adults occurred in more than 80% and larvae in 30%
- Larval prey made up 6% of all items

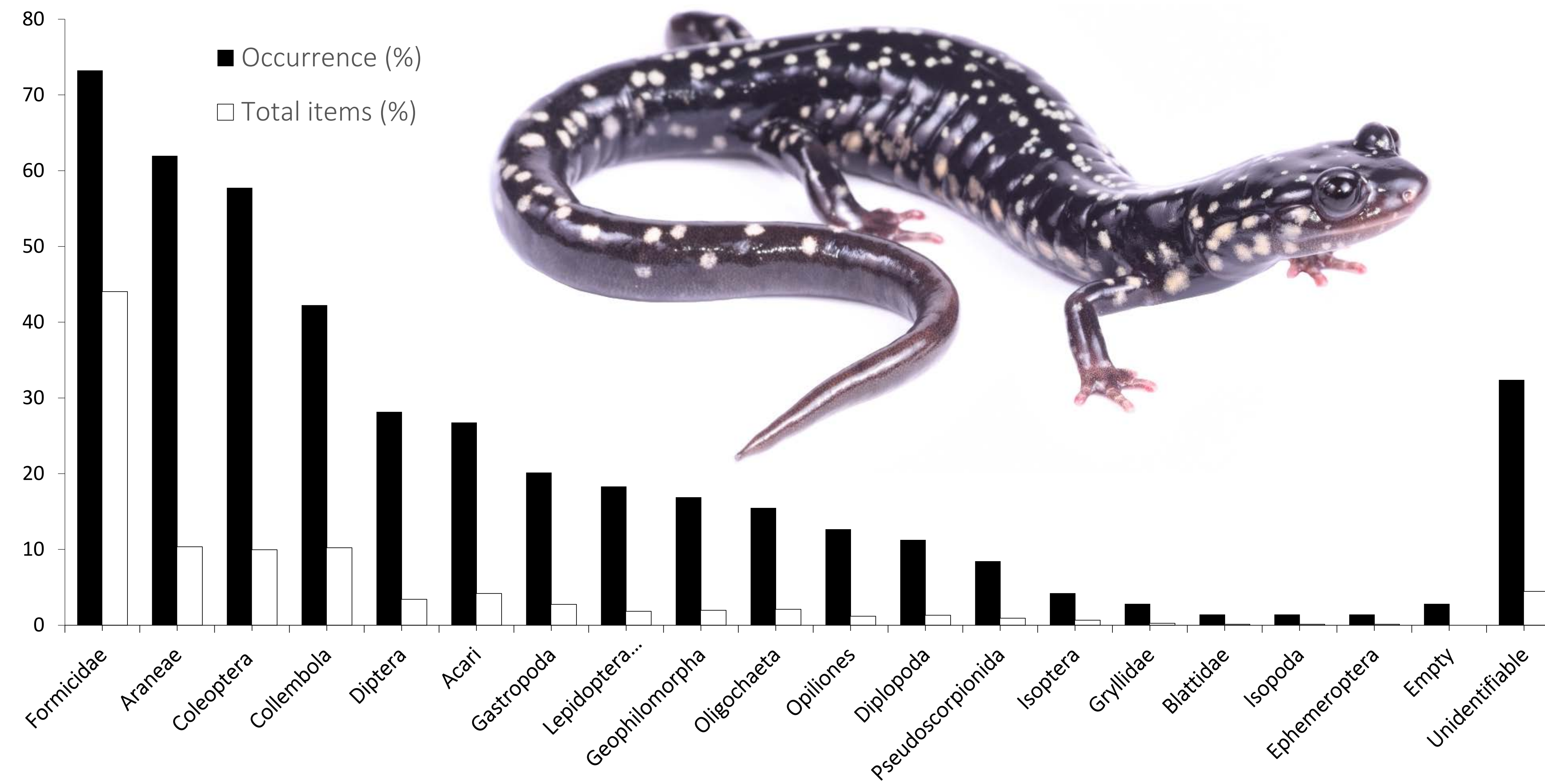


Fig. 1. Prey categories found in adult *Plethodon kentucki* (n = 73), expressed as percent occurrence and percent of total diet

Discussion

- The most important prey in *P. kentucki* from West Virginia (listed in order) were ants, beetles, micro-gastropods, spiders, pseudoscorpions, collembolans, mites, and dipterans (Bailey 1992)
- In West Virginia, micro-gastropods, pseudoscorpions, and diplopodans were eaten more frequently. Whereas in Kentucky, coleopterans, spiders, and collembolans were eaten more frequently
- Since Bailey (1992) did not include the life stages of prey items or sampling periods, we are unable to make any comparisons beyond the order level or explore the influences of seasonality on prey composition
- Lewis et al. (2014) found the ants *Aphaenogaster fulva* and *A. rudis* most frequently in *P. shermani* from North Carolina and Paluh et al. (2015) found *A. picea* the most in *P. cinereus* from Ohio
- The majority of the ants found in *P. kentucki* belonged to the genus *Pheidole*. Sympatric *Plethodon richmondi* and *P. glutinosus* also sampled in our study area, both consumed a large diversity of ant genera, the majority of which were also *Pheidole*
- Similarly to our study, beetles from Scarabidae and Carabidae were among the most frequently consumed in *P. albagula*, *P. amplus*, and *P. shermani* (Lewis et al. 2014; Milanovich et al. 2008; Rubin 1969)
- Larval flies have been reported more frequently than adults in the stomachs of *P. albagula*, *P. metcalfi*, *P. shermani*, *P. petraeus*, and *P. glutinosus* (Jensen and Whiles 2000; Oliver 1967; Whitaker and Rubin 1971)
- In *P. kentucki* however, larval flies were less important than adults, which could be attributed to seasonal differences
- Future studies should non-lethally examine salamander diet beyond order across their known ranges and sample through the various seasons in order to better understand the mechanisms behind prey acquisition, composition, and possible selection



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