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A Survey of Hydra Species in Selected South Central Pennsylvania Lakes

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A Survey of *Hydra* Species in Selected South Central Pennsylvania Lakes

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Introduction

- Common freshwater invertebrate predator
- Little research on ecology in last few decades; of interest to identify current species distribution
- Four major species groups identified (1)
 - Members of *H. oligactis* group are less tolerant of stressors including high temperature (2)
- Species have broad geographical ranges, and *H. vulgaris* has been found in vernal pools. But means of dispersal between water bodies is unknown (1,3)
- Preliminary surveys had identified *H. vulgaris* and *H. oligactis* in Lake Placida

Methods

- 6 locations in Lancaster and Dauphin counties were sampled in June 2021 once a week for 4 weeks (at 2 sites per location, except at Middle Creek)
- 1 L collection bottles were filled with leaves from lake bottom and aquatic plants at each site 1-5 feet from shore
- Samples were examined for *Hydra* using dissecting microscopes
- Species were identified based on nematocysts and order of tentacles arising on buds (4)
- Detection probability was calculated in MARK

Questions

- What species of *Hydra* are present in south central Pennsylvania?
- Are different species present in different lakes?

Hypothesis

- *H. oligactis* and *H. vulgaris* would be present in each of the six locations based on past survey data

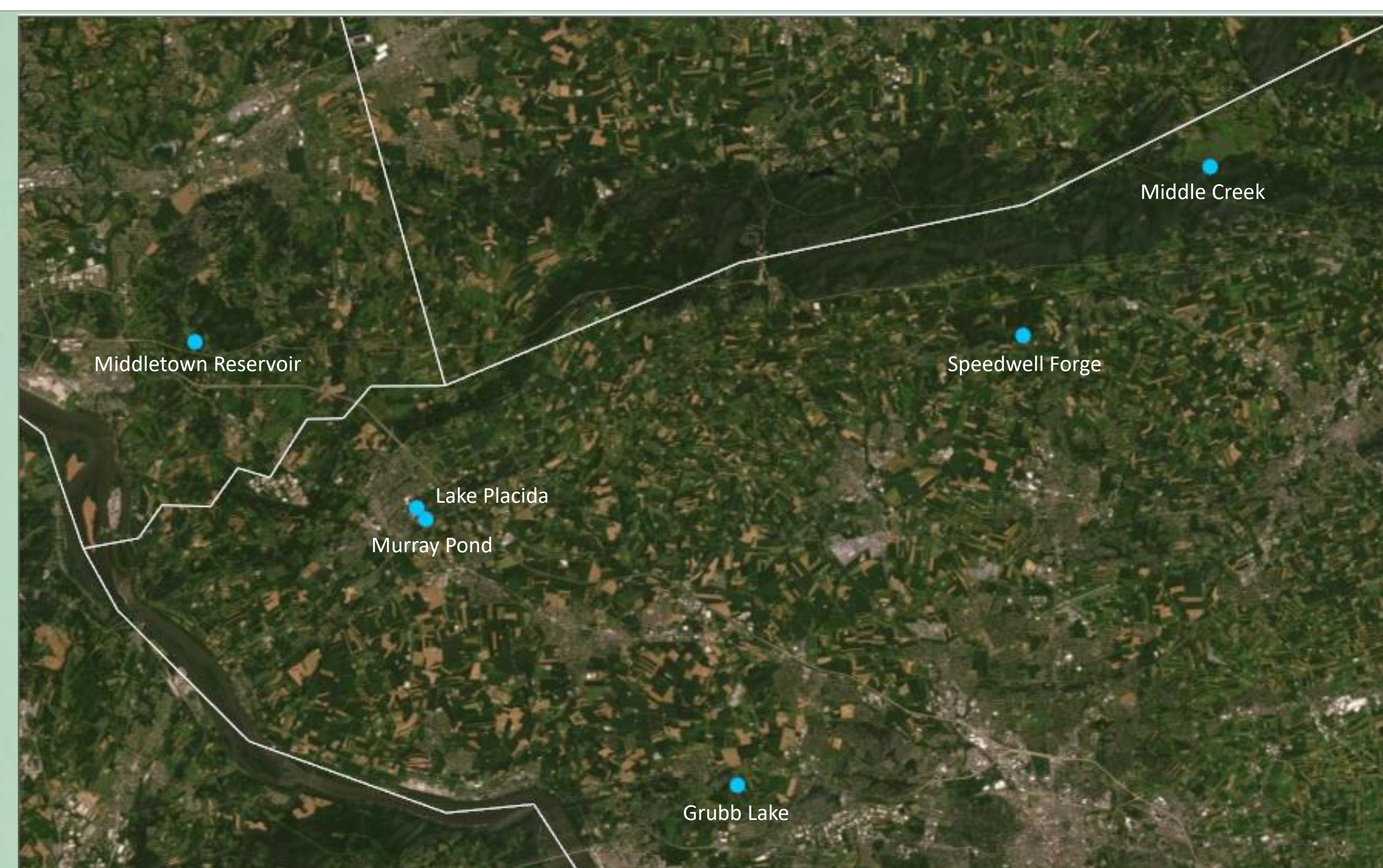


Figure 1. Locations of lakes sampled

H. vulgaris *H. oligactis* *H. hymanae*



Figure 2. Holotrichous isorhiza nematocysts used to distinguish species, 1000X magnification

H. vulgaris *H. oligactis*

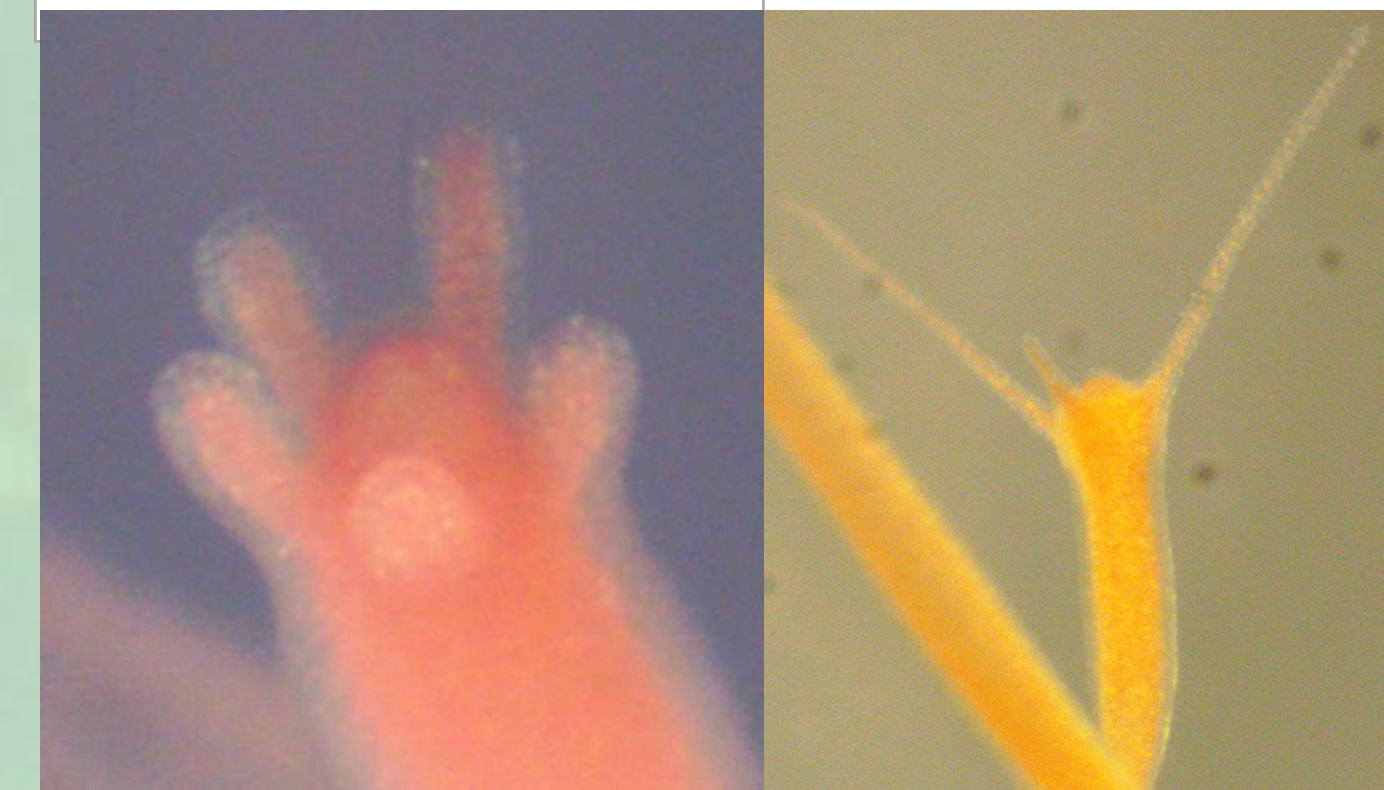


Figure 3. Tentacle formation on buds used to distinguish species. Two tentacles form first in *H. oligactis*

Results

- *Hydra* from all four major species groups were found
- *Hydra* were found even in lakes with no stream inflow
- The stress-sensitive species *H. oligactis* was found in four of the lakes sampled

	Detection probability (p) +/- SE			
	Week 1	Week 2	Week 3	Week 4
All species	0.833 +/- 0.152	1.0 +/- 0.0	0.667 +/- 0.192	0.50 +/- 0.204
<i>H. vulgaris</i>	0.621 +/- 0.293	0.311 +/- 0.264	0.311 +/- 0.264	0.621 +/- 0.293
<i>H. hymanae</i>	0.667 +/- 0.272	1.0 +/- 0.0	0.333 +/- 0.272	0.333 +/- 0.272
<i>H. oligactis</i>	0.480 +/- 0.251	0.480 +/- 0.251	0.721 +/- 0.234	0.480 +/- 0.251

Conclusion and Future Research

- Detection probability estimates suggest that more sampling is needed for conclusions about whether a species is absent from a specific lake
- Sampling will continue during the fall
- DNA is being extracted from collected *Hydra* which will enable investigation of relatedness between animals in different locations

References

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Acknowledgments

We thank E. Jane Valas and Elizabethtown College SCARP for project funding and Dr. David Bowne for assistance with data analysis

Location	<i>H. oligactis</i>	<i>H. vulgaris</i>	<i>H. hymanae</i>	<i>H. viridissima</i>	Average Temp. (C)	Average Dissolved Oxygen (mg/L)	Inflow/Outflow
Grubb Lake	✓	✓	✓	✓	24.4	7.73	No
Middletown Reservoir	✓	✗	✓	✗	26.2	9.55	Yes
Lake Placida	✗	✓	✗	✗	24.9	5.03	Yes
Murray Pond	✗	✗	✗	✗	21.1	1.02	No
Speedwell Forge Lake	✓	✓	✗	✗	25.3	13.1	Yes
Middle Creek Reservoir	✓	✗	✓	✗	25.9	9.17	Yes