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Determining the Abundance and Range of the Invasive Terrestrial Planarian *Bipalium adventitium*

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Determining the Abundance and Range of the Invasive
Terrestrial Planarian *Bipalium adventitium*

By Samantha Robbins

Outline



Background



Methods



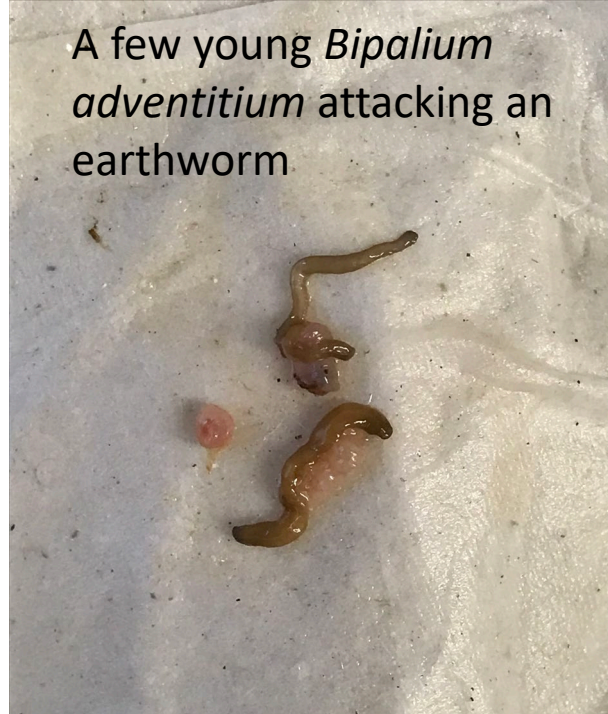
Sampling techniques for determining abundance



Biogeography: Where are *Bipalium* in the US and where did they originate from?



Adult *Bipalium adventitium* attacking an earthworm



A few young *Bipalium adventitium* attacking an earthworm



Adult *Bipalium adventitium* attacking an earthworm

Bipalium adventitium

- Voracious earthworm predator
- Nonnative and has spread from coast to coast
- Invertebrate that relies on moist environments
- No known predators
- Asexual and sexual reproduction

Why care?

We have no understanding of the ecological impacts these invaders could be having.

We do not know their exact abundance or from where they originated.

Currently no studies on which techniques are the best for locating and determining the abundance of *B. adventitium*.

Sampling Techniques

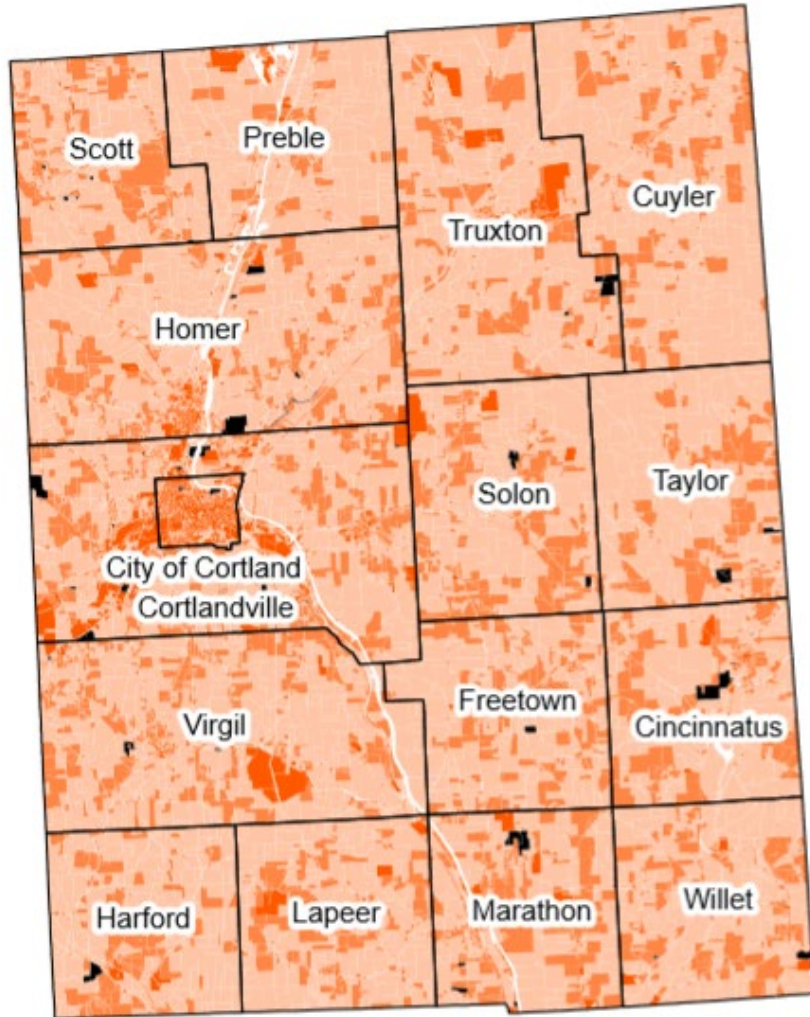


Human activity in Cortland County

Where might *B. adventitium* be found?

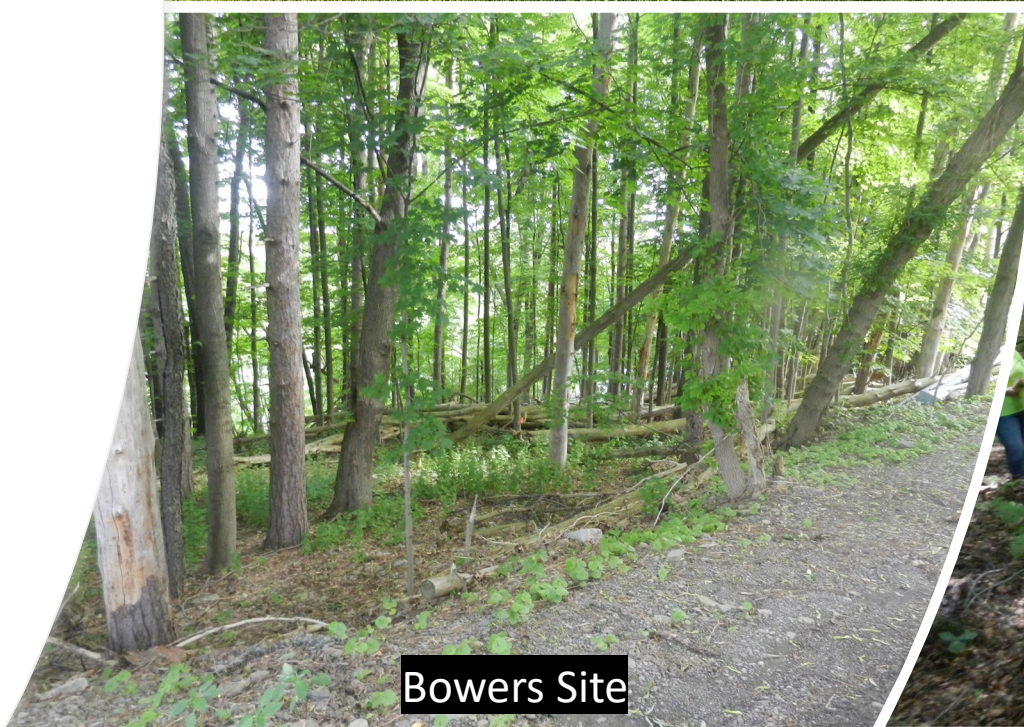
Most likely in areas with high human density and human activity.

Figure 1: Human activity in Cortland NY. Data are obtained from NY GIS Clearinghouse. Original data received was tax parcels. Areas of high human activity were determined to be: industrial, multifamily residences, commercial, recreational and entertainment, community services, and public services. Areas of medium human activity were determined to be: single, two and three family residences. Areas of low human activity were determined to be: agricultural land, vacant land, and forested and conservational lands.



Methods- Site Selection and Categorization

- Took place from June through September
- 8 sites total
 - 4 inside source range (within 500m of a possible source of introduction)
 - 4 outside source range (over 500m from a possible source of introduction)
- Three types of terrain:
 - Forest
 - Field
 - Lawn



Sites

Sites inside Source range	D-1	F-1	Van Hoesen	Bowers
Terrain	Lawn	Lawn	Forest	Forest
Sites outside the Source range	R-1	Hoxie Gorge-1	Hoxie Gorge-2	Donahue State Forest
Terrain	Lawn and Forest	Field	Forest	Forest

Techniques used

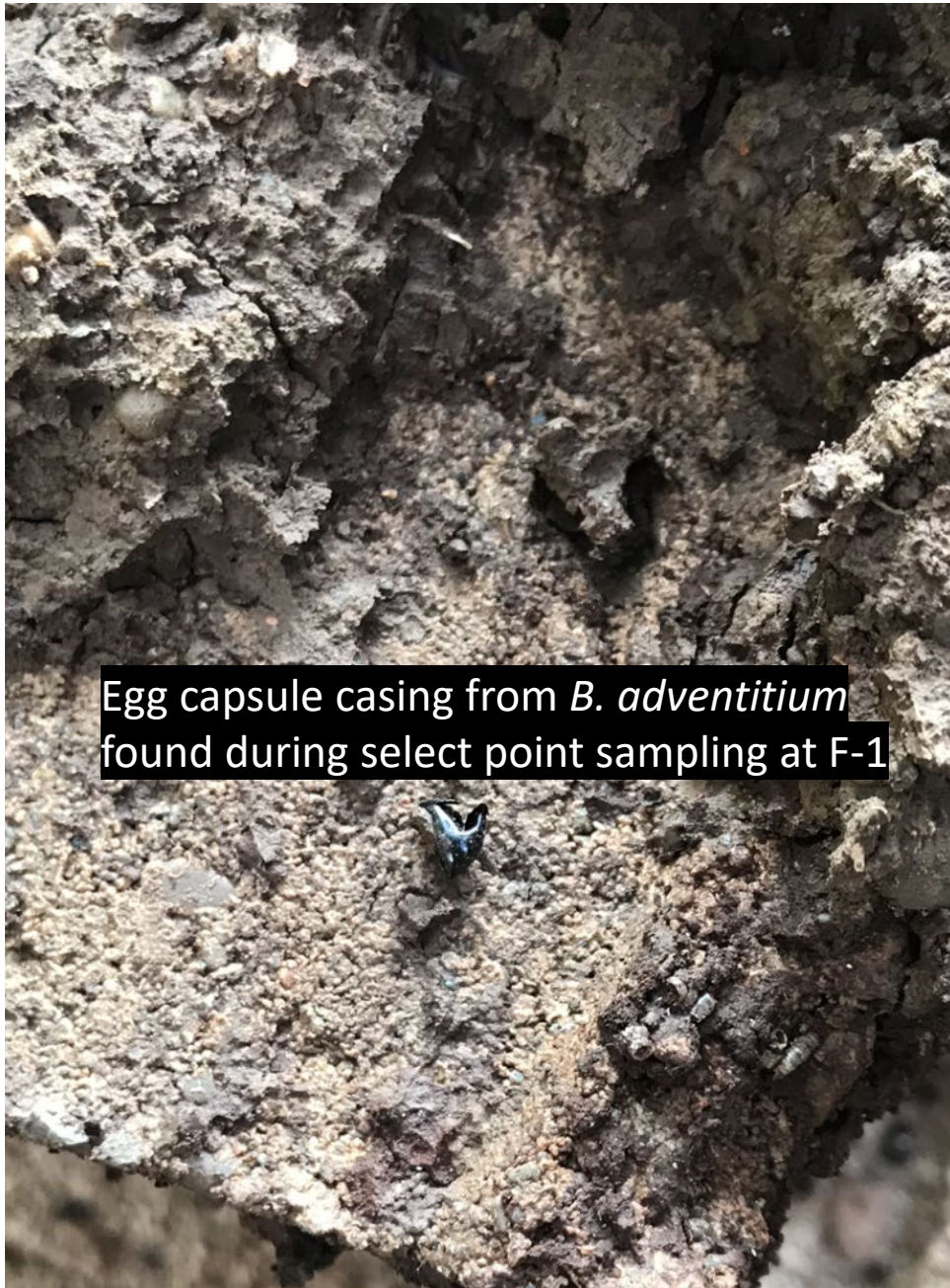


- Techniques were chosen based on their use on terrestrial planarians and organisms of similar microhabitat
- Select point sampling
- Cover objects
- Mustard applications
- Hand sorting leaf litter and soil
- Pitfall traps

Results

Technique	Select point sampling	Cover objects	Mustard applications	Hand sorting leaf litter	Pitfall traps
<i>B.a</i> found using this technique in the field	Yes	Yes	No	No	NA
<i>B.a</i> found using this technique in the lab	NA	NA	Yes	NA	Yes
Sites where <i>B.a</i> were found using this technique	D-1 F-1	D-1 F-1 R-1	None	None	NA

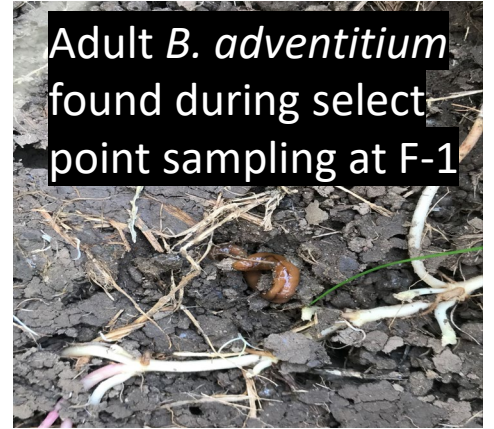
Note: an unknown planarian was discovered at the Van Hoesen site under a cover object



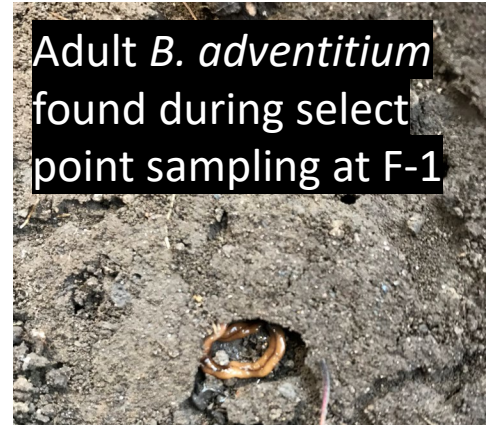
Egg capsule casing from *B. adventitium* found during select point sampling at F-1



Young *B. adventitium* found during select point sampling at F-1



Adult *B. adventitium* found during select point sampling at F-1



Adult *B. adventitium* found during select point sampling at F-1



Another young *B. adventitium* found during select point sampling at F-1

Conclusions

Select point sampling and cover objects appear to be the best techniques for determining the presence and abundance of *B. adventitium*

It is possible mustard applications and pitfall traps may be used to locate terrestrial planarians. Further research must be done in the field to confirm this.

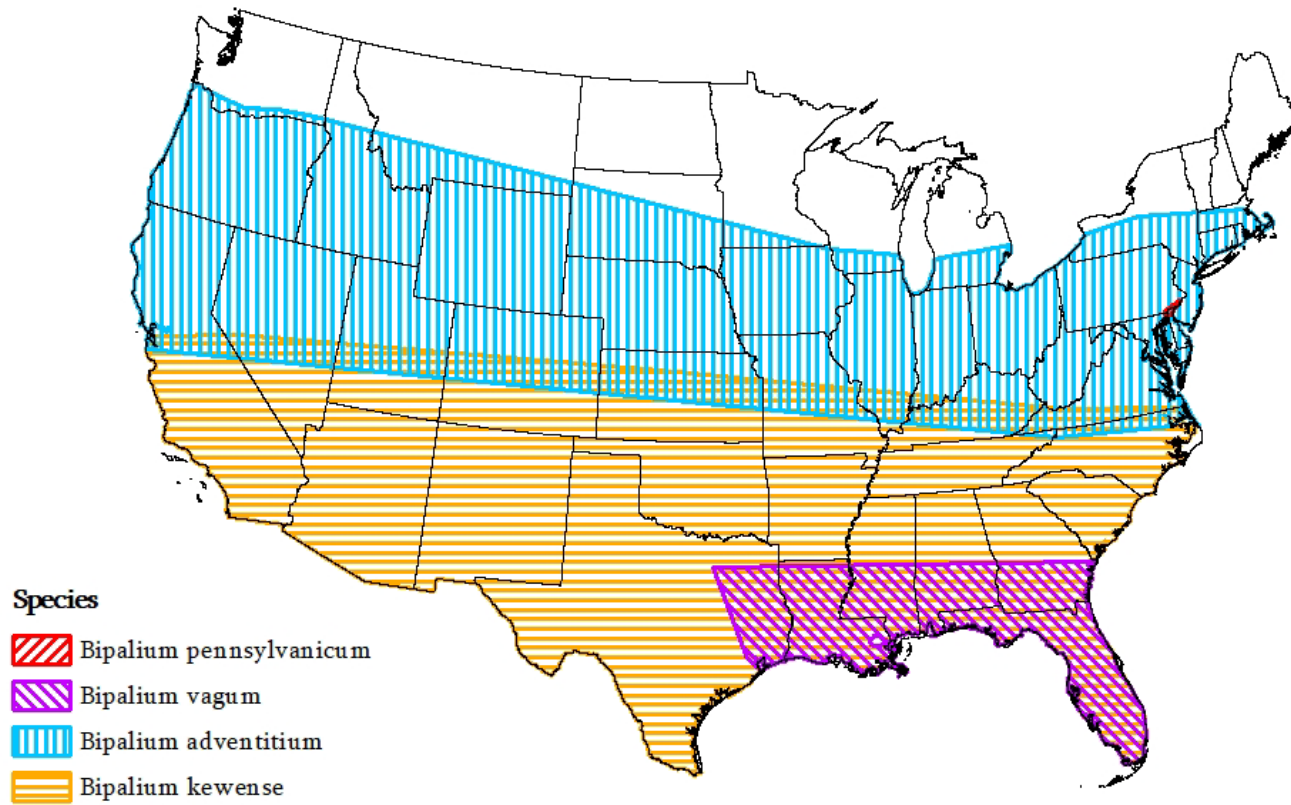
The only sites *B. adventitium* were found were those with lawn.

It appears that planarians are mostly found inside the source range and near humans.

Biogeography



Ranges of Invasive Terrestrial Planarians



Current
ranges of
invasive
planarians

Note: Range of *Bipalium adventitium* extends up the western coast towards Canada

Factors to consider

Precipitation

Maximum and
minimum
temperatures

Dominant
vegetation

Sunlight

Soil type

Elevation

Biome

Next Steps

Sampling techniques:

- How does the effectiveness of these techniques change over time? Would cover objects work better if given more time before checking?
- How well do these techniques work when used in the prime sampling season?

Biogeography:

- Analyze the factors of interest. Which are most important to the range of *Bipalium*?
- Based on the above, determine the most likely home range of *Bipalium adventitium*.
- Create maps representing these data.

Acknowledgements

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Questions

