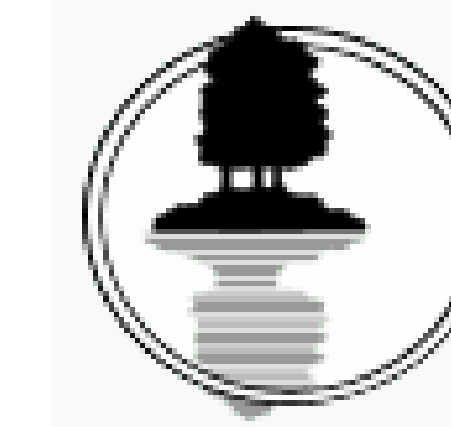


An In-Depth Look at Ant Communities in the Big Thicket National Preserve (BTNP)

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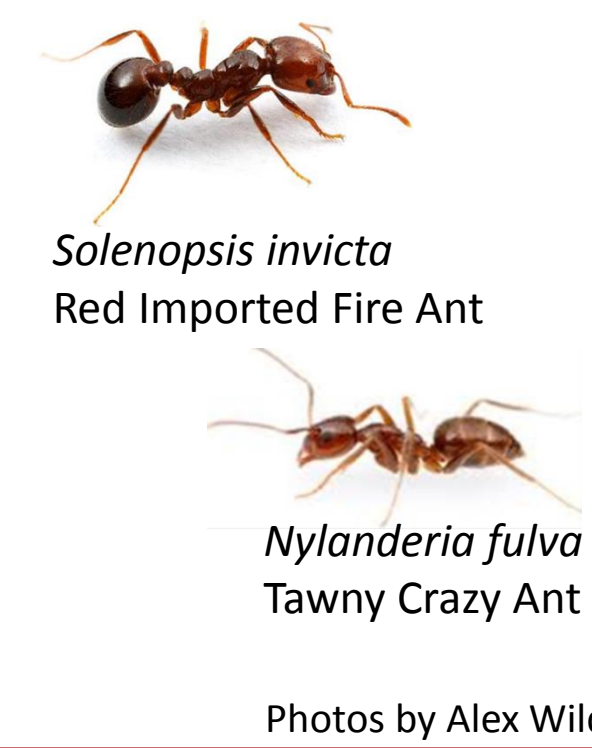


Big Thicket Association
Founded 1964



Background: Ants

- Important components of terrestrial ecosystems¹
- Constitute a significant portion of animal biomass¹
- Ecosystem engineers (soil structure and energy flow)¹
- Native ants are often displaced by non-native ants
- Two non-native species are spreading through Texas³



Photos by Alex Wild

Objective

Previous research examined the presence and spread of the noted species in grassland, not forested areas, which is the ecosystem in which the ants are spreading.³ We aim to do so.

The BTNP offers a variety of habitats which provides extraordinary diversity and profusion of organisms.

However, much remains to be learned about the ecology of the area, especially its insect communities.² Only recently has BTNP begun to receive intensive and systematic studies.²

With this in mind, we aim to address the following questions:

- What is the most effective sampling method for this region?
- How different are ant communities inside and outside the preserve?
- How different are ant communities between units?

Methods

Big Sandy Creek Unit

Samples collected between September 19 and October 11, 2015

Lance Rosier Unit

Pitfall Sampling

5 traps per a site
19 total sites
24 hour pitfalls

Hand Collection: Aspiration and Soft Forceps

Winkler Leaf Litter Extraction

Sample Processing

Identified ants to morphospecies

Results

Figure 1: Species Accumulation Curve

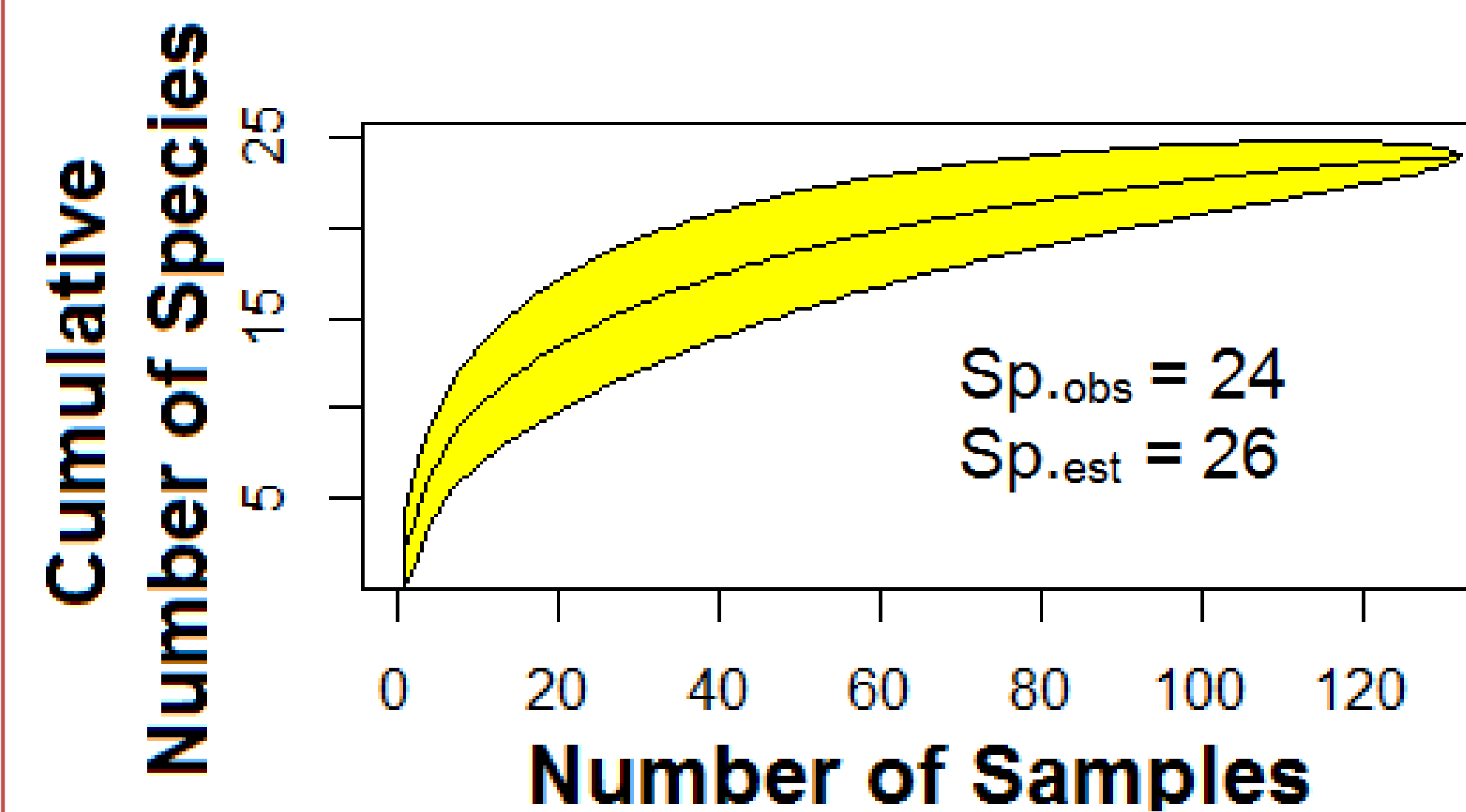


Figure 2: Pitfalls are the Most Effective Sampling Method

Collection Method	Total Individuals	Total Species	% Total Species	Shannon-Wiener Diversity Index	Simpson Diversity Index
Pitfall	666	20	83.3	2.288293992	-0.11843
Winkler Extraction	108	11	45.8	1.924932129	-0.18673
Hand	379	15	62.5	1.896099543	-0.22391

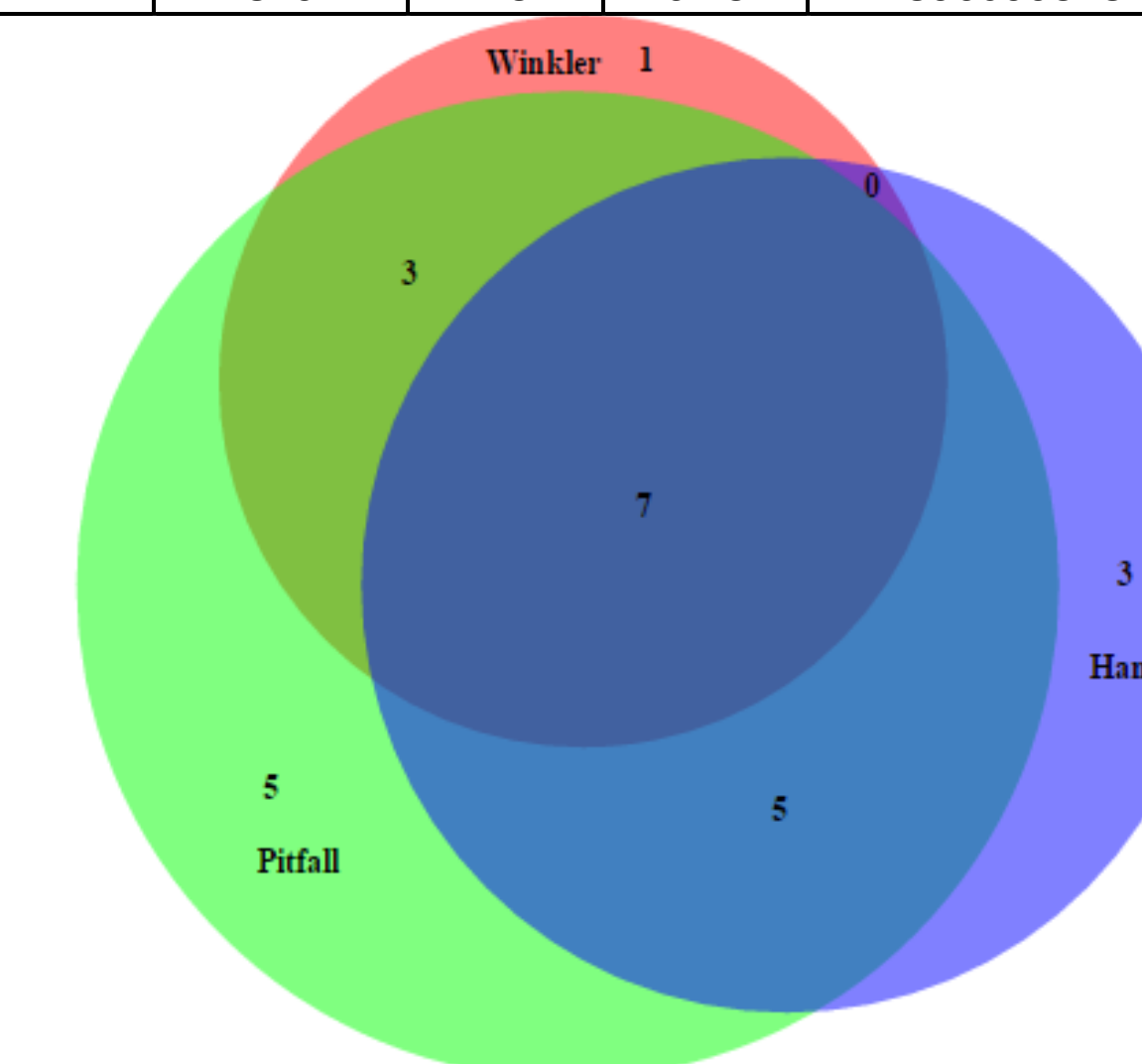
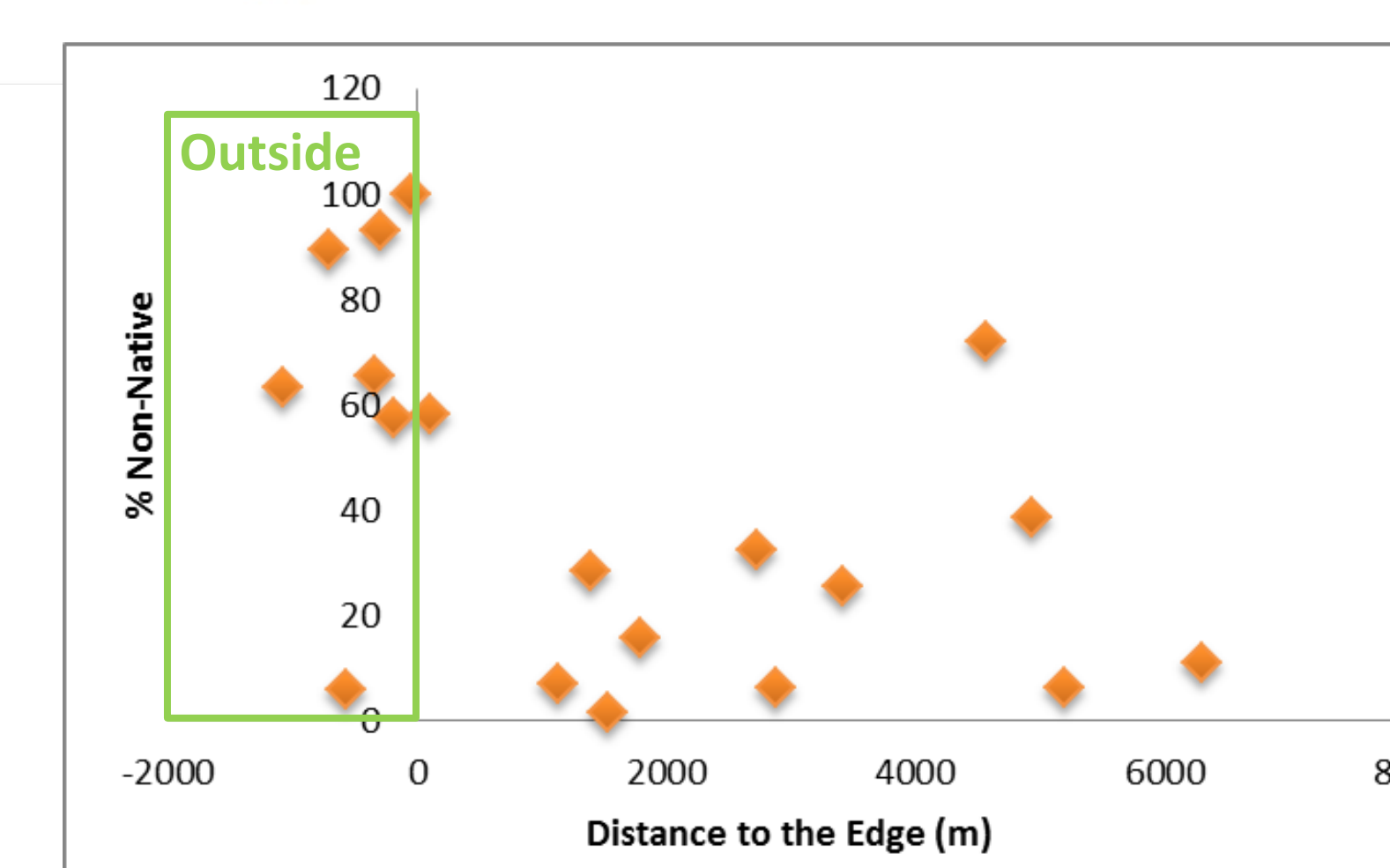
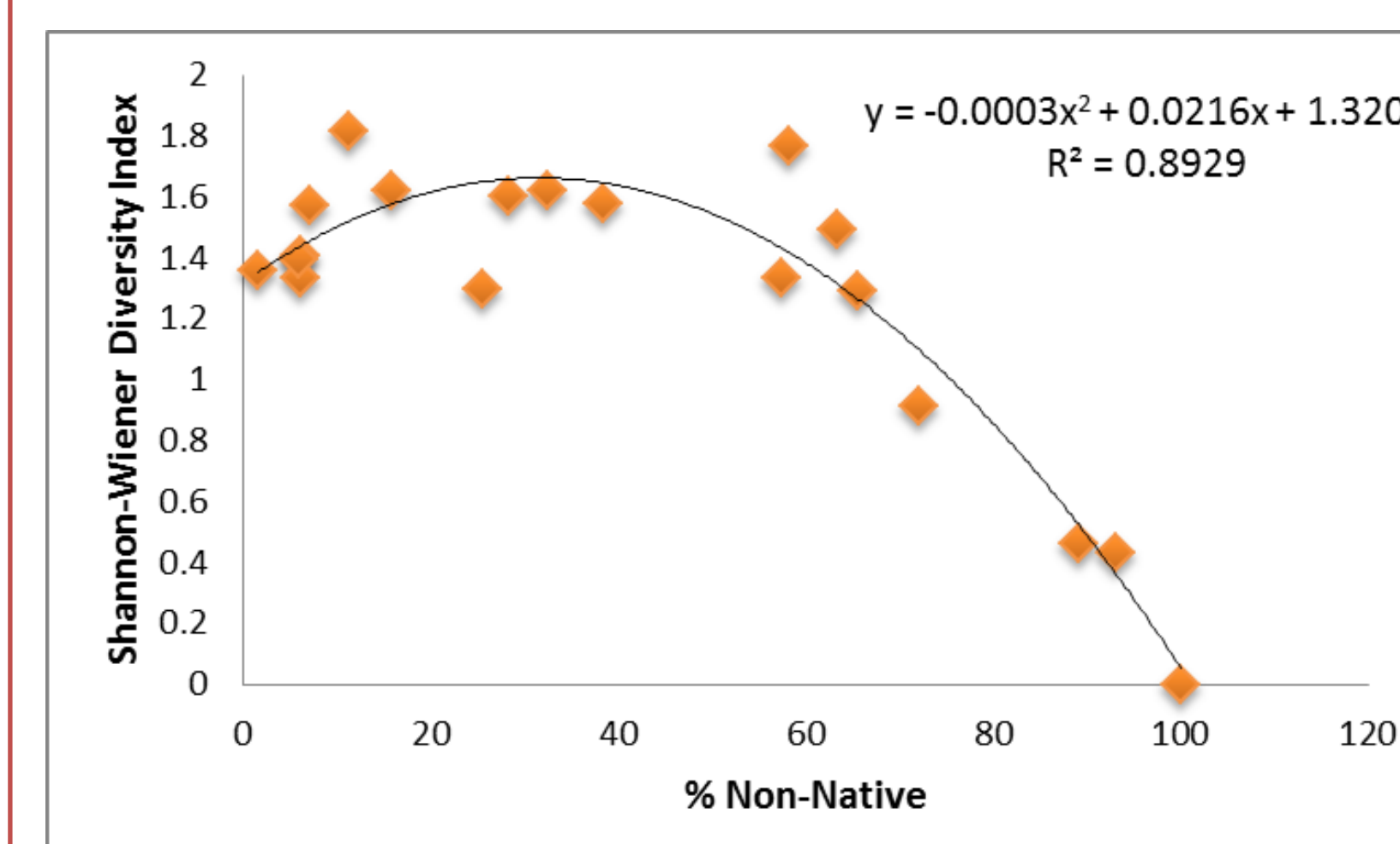
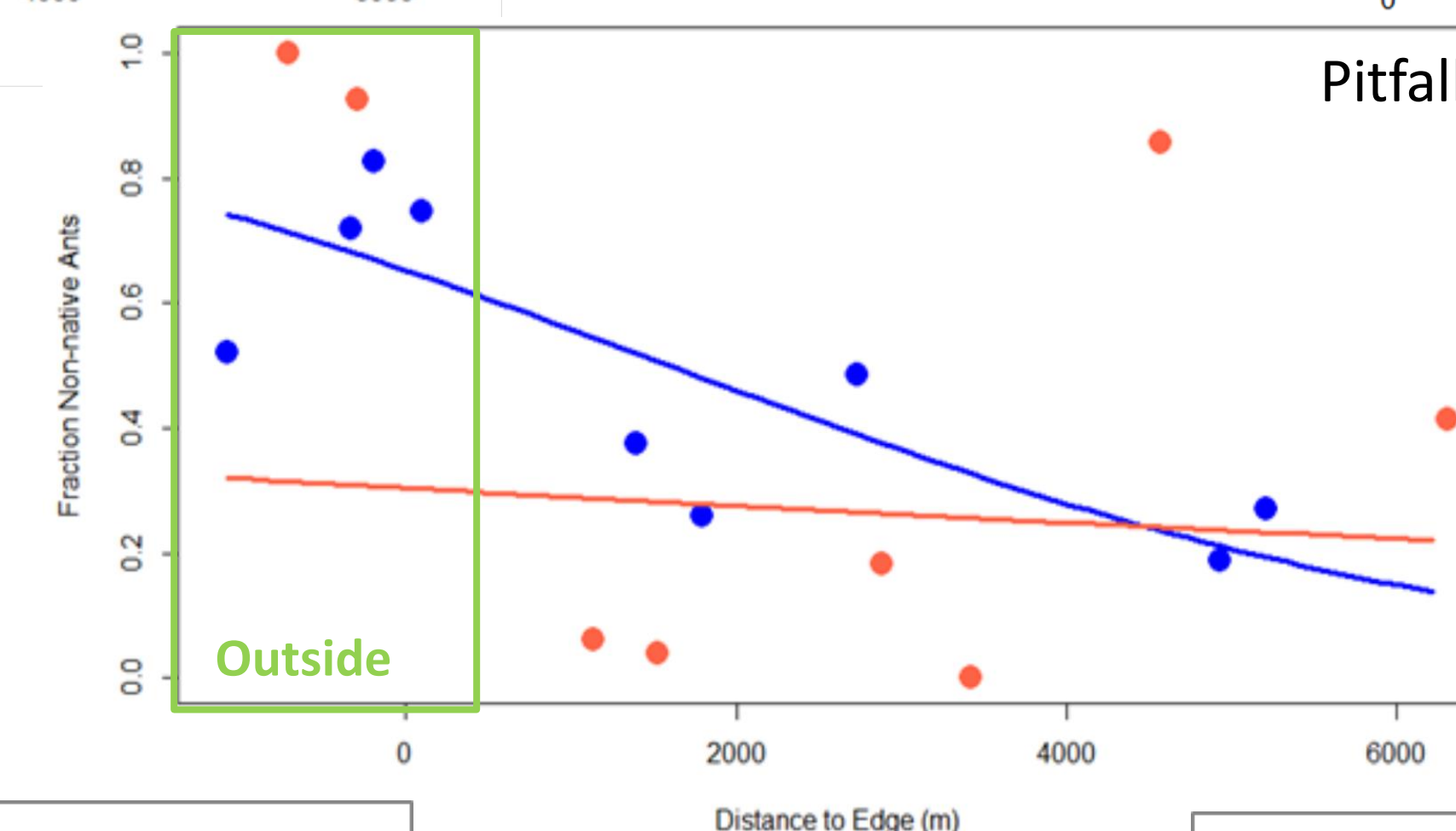
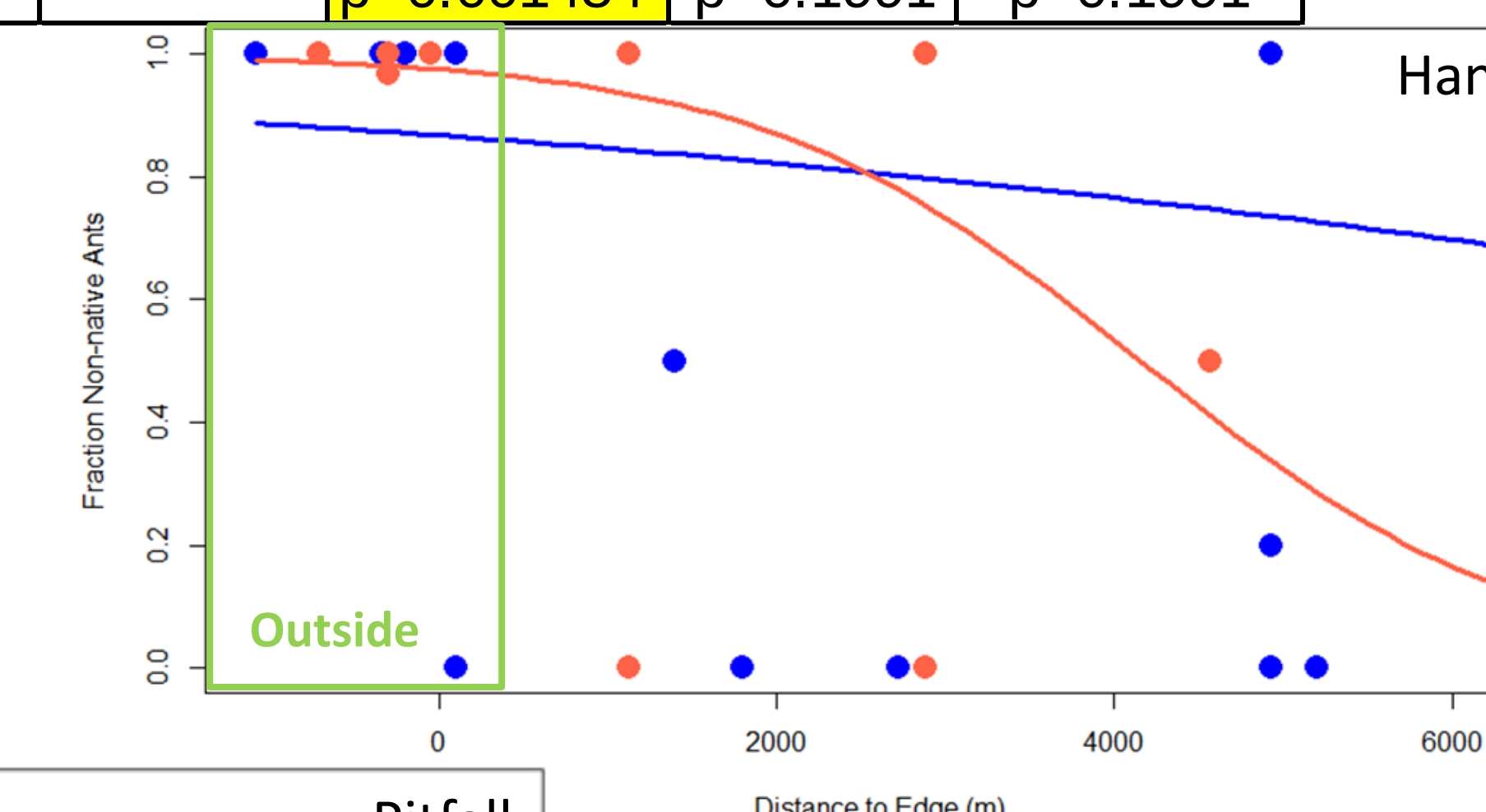
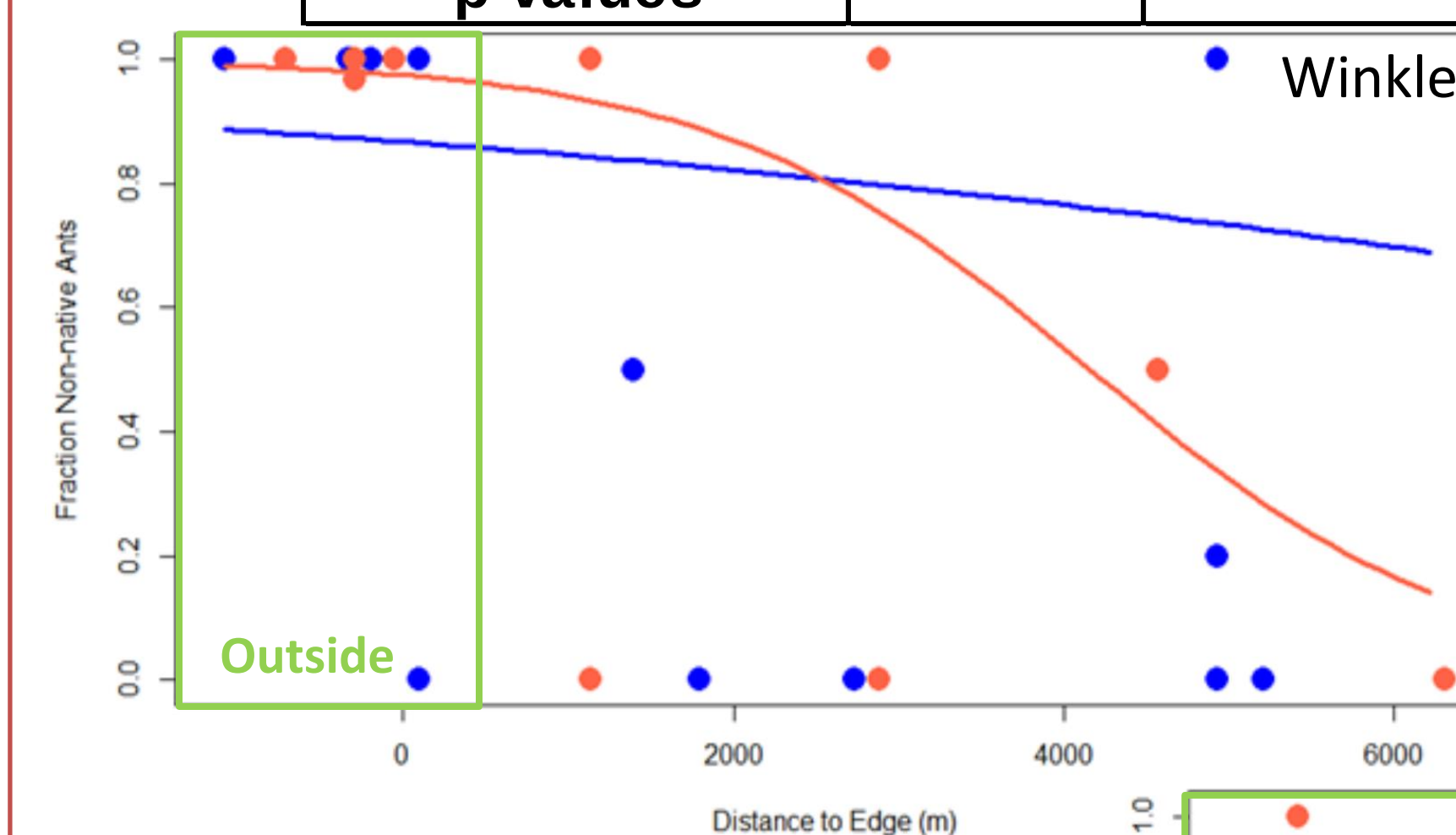


Figure 3: Distance to the Edge of the Preserve has an Affect on the Composition of Ant Communities Measured by Fraction of Non-Native Ants

Location	Total Species	Total Individuals	Total Non-Native Individuals	% Total Species	% Non-Native	Shannon Diversity	Simpson's Diversity
Inside Preserve	19	644	218	79.2	33.9	2.6688	-0.1726
Outside Preserve	19	512	421	79.2	82.2	2.0434	-0.1756
p-values					p=0.001454	p=0.1991	p=0.1991



Conclusions

Sampling Appears to be Fairly Complete

- Figure 1 illustrates the sampling performed was a fairly complete sample of ant communities
- Conclusions are applicable

Pitfalls Most Effective Sampling Method

- But all 3 methods provide most complete sample

Inside vs. Outside Preserve

- Diversity Index, a quantities measure reflecting the number of species, is the same inside and outside (p=0.1991)
- But there is a difference between the percent composition of ant communities inside vs. outside
- % Non-Native Ants (p=0.001454)

Effect of Distance to the Edge of the Preserve

- Winkler and Hand: Lance Rosier shows stronger effect
- Pitfalls: Big Sandy shows the stronger effect
- Closer to the edge is more like the outside due to increased disturbance – Edge Effect
- Ant communities become increasingly comprised of non-native species closer to the edge of the preserve

Non-Native Species

- *N. fulva* found only at one site outside preserve (Lance Rosier, Big Thicket Field Research Station in Saratoga)
- *S. invicta* found at 60% of the sites in moderate density inside (~25%) and high density outside (50+%)

Overall Conclusions

- Provide baseline data for further analyses of the dynamics of native and non-native ants
- Most comprehensive study to date of ants of the BTNP

Future Directions

- Similar research can be undertaken in order to examine the trends across seasons and years
- Distance to the edge offers valuable insight into the workings of the preserve for the National Parks Services
- In addition, it presents strong suggestions for results on further research in corridor units, long and thin units connecting larger units

Acknowledgements

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