

Effects of English Holly on Native Plant Species in St. Edward State Park

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& DR. DAVID STOKES**



A Nightmare Before Christmas (Tim Burton)

**Meeting The Challenge: Preventing, Detecting, and Controlling Invasive Plants
UW Botanical Gardens | September 17th 2014**

Outline

- Research need
- Methods
- Results
- Some discussion

Research need

- English holly
(*Ilex aquifolium*)
 - Evergreen shrub/tree
 - Shade tolerant
 - Native in British Isles
through southern Europe



King County 2014

Research need

- Holly is spreading in western Washington forests
- Reports of negative impacts
- Has potential to radically impact forests

But...

- Little information available regarding its effects on natives

Photo: David Stokes



Hypotheses

1. Native vegetation abundance and diversity are reduced under holly

Hypotheses

1. Native vegetation abundance and diversity are reduced under holly
2. Holly shade and litter fall are mechanisms contributing to suppression

Methods

- Sampled native Woody and evergreen Vegetation
- Sampling method designed to
 - Compare outside vs. under holly canopy
 - Differentiate between shade and litter effects

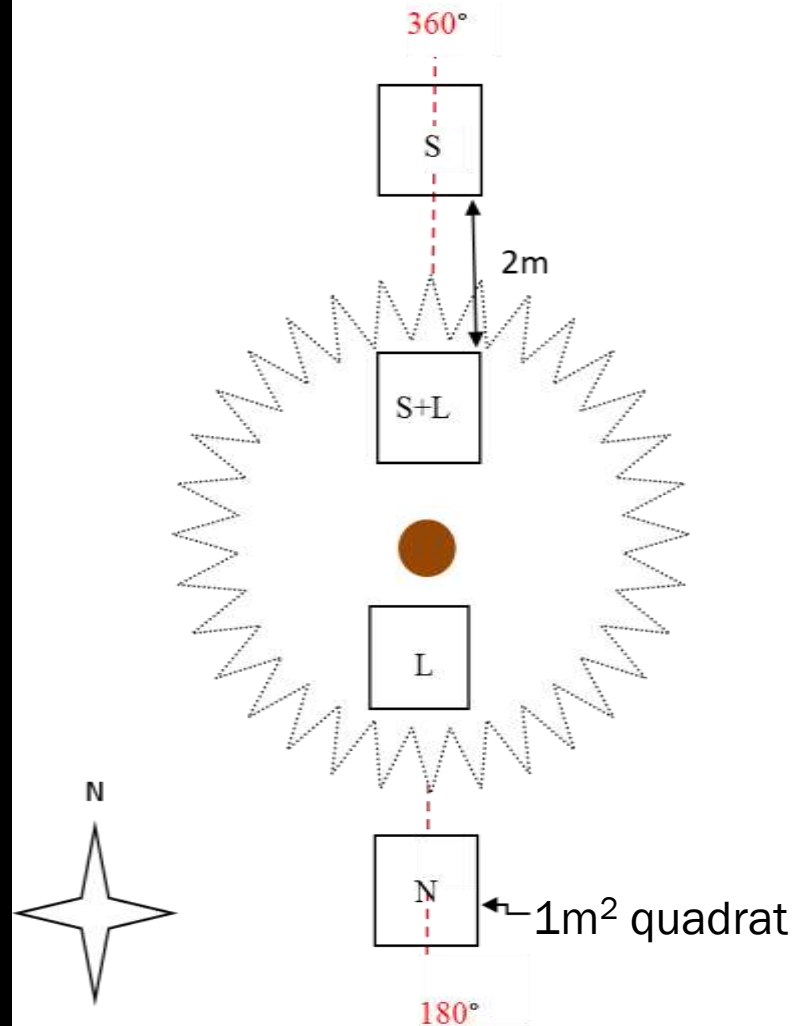


Figure 1: Sampling method.

Treatments

Shade (S)

Litter (L)

Shade + Litter (S+L)

None (N)

Methods

- Sampled native Woody and evergreen Vegetation
- Measured percent cover for each species in quadrat
- Summed to get total cover for quadrat

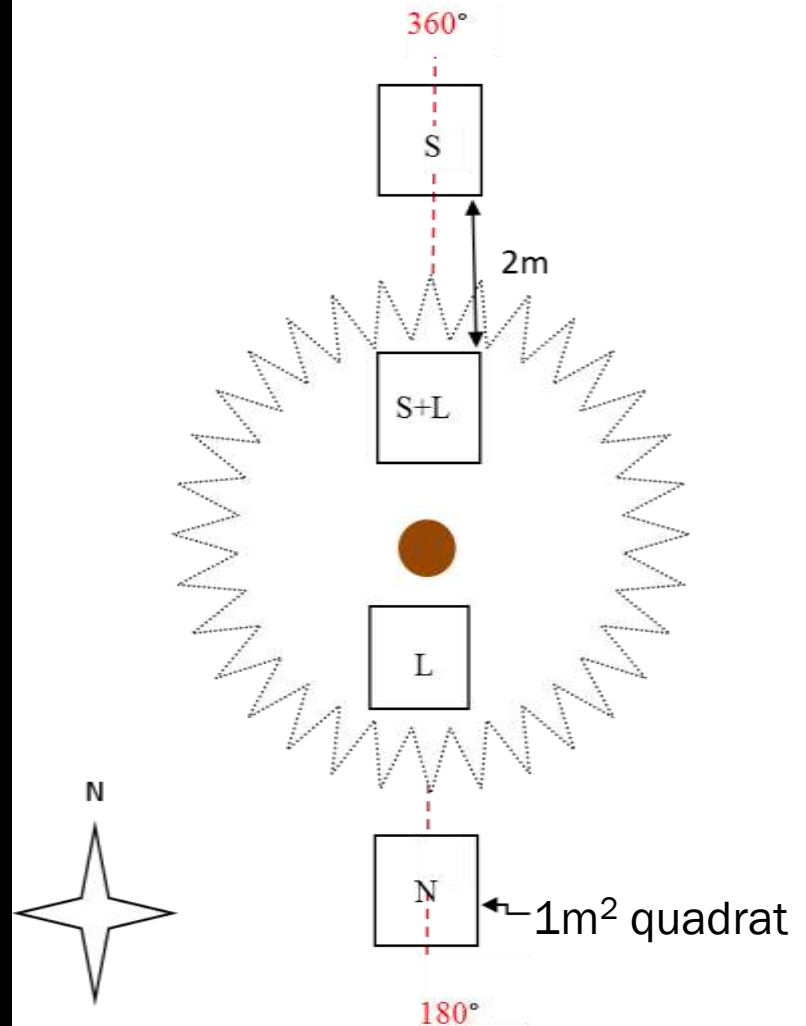


Figure 1: Sampling method.

Treatments

Shade (S)

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Shade + Litter (S+L)

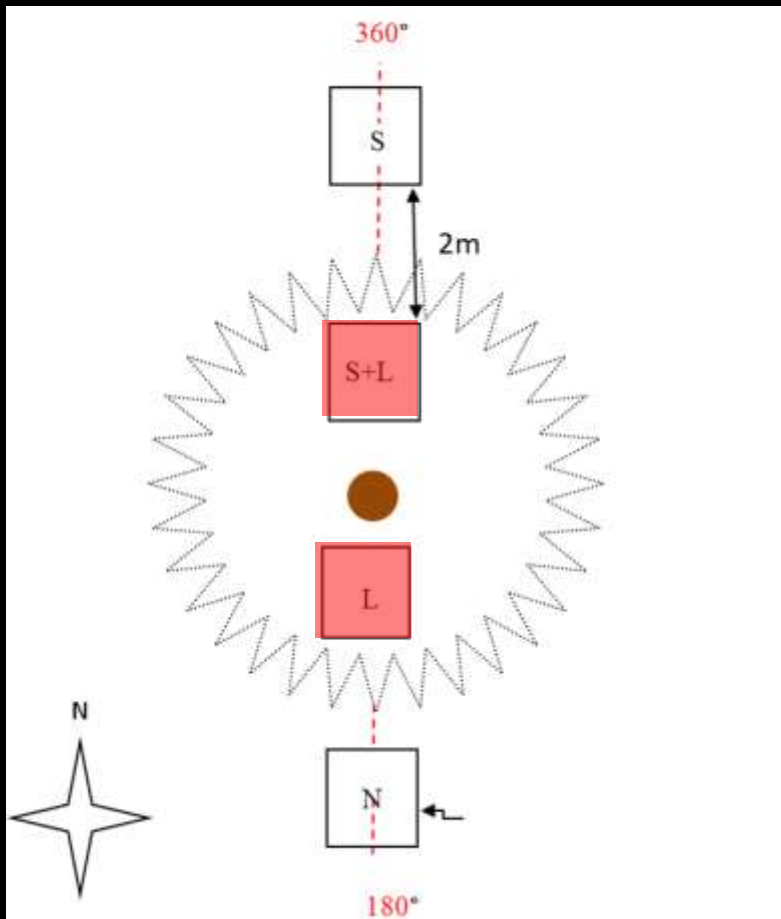
None (N)

Results

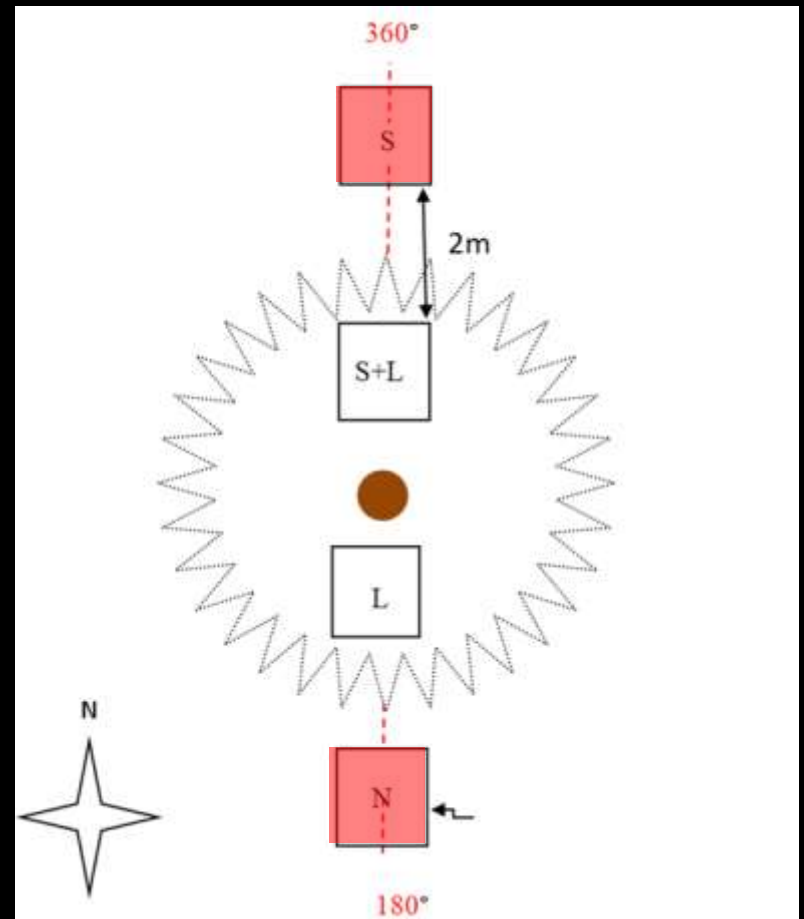
- Species
 - 19 native woody and evergreen species
 - Three most common (# plots present):
 - *Gaultheria shallon* (salal)
 - *Rubus ursinus* (trailing blackberry)
 - *Polystichum munitum* (sword fern)

Results

Looking at under vs. outside holly canopies

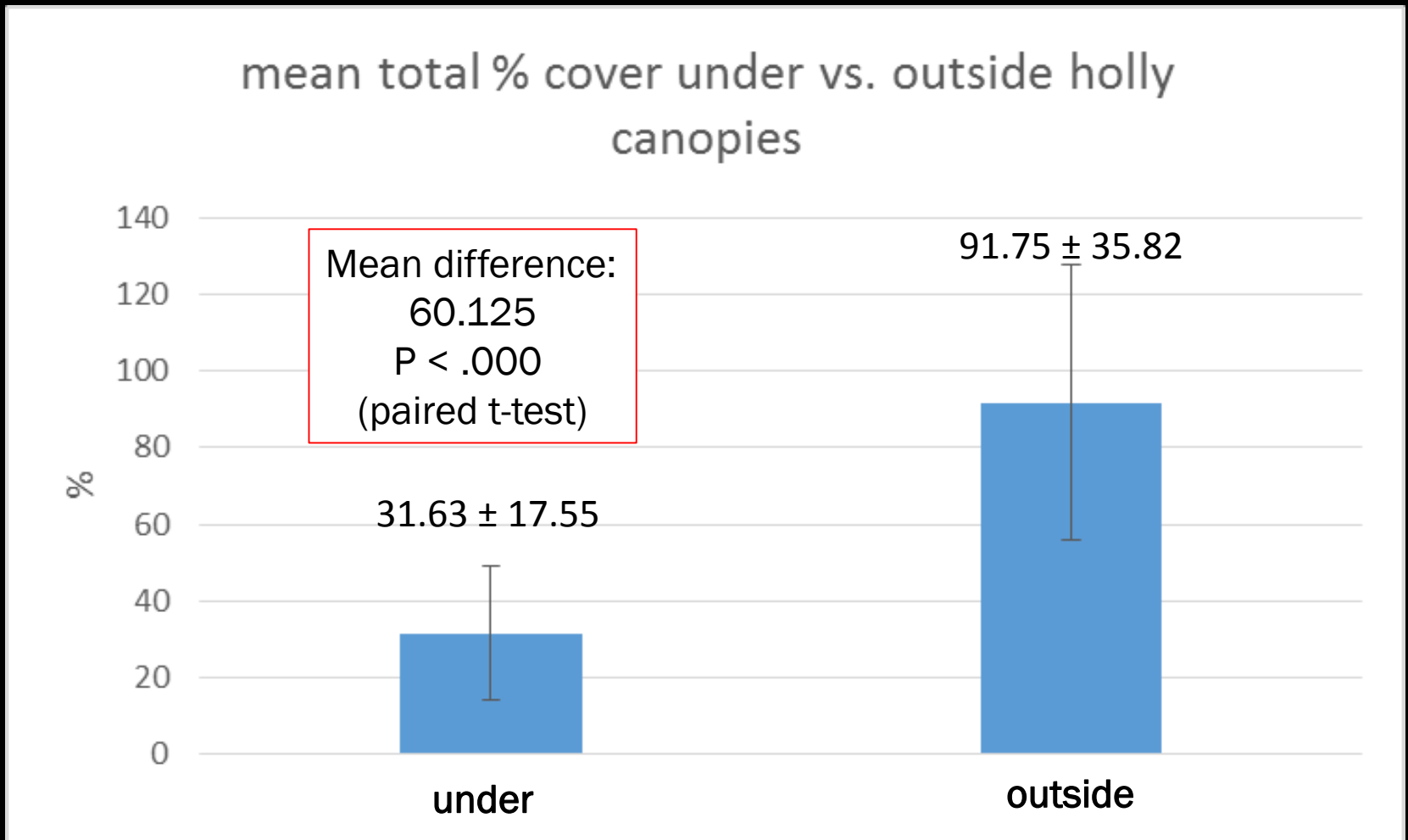


Average
of
two
quadrats



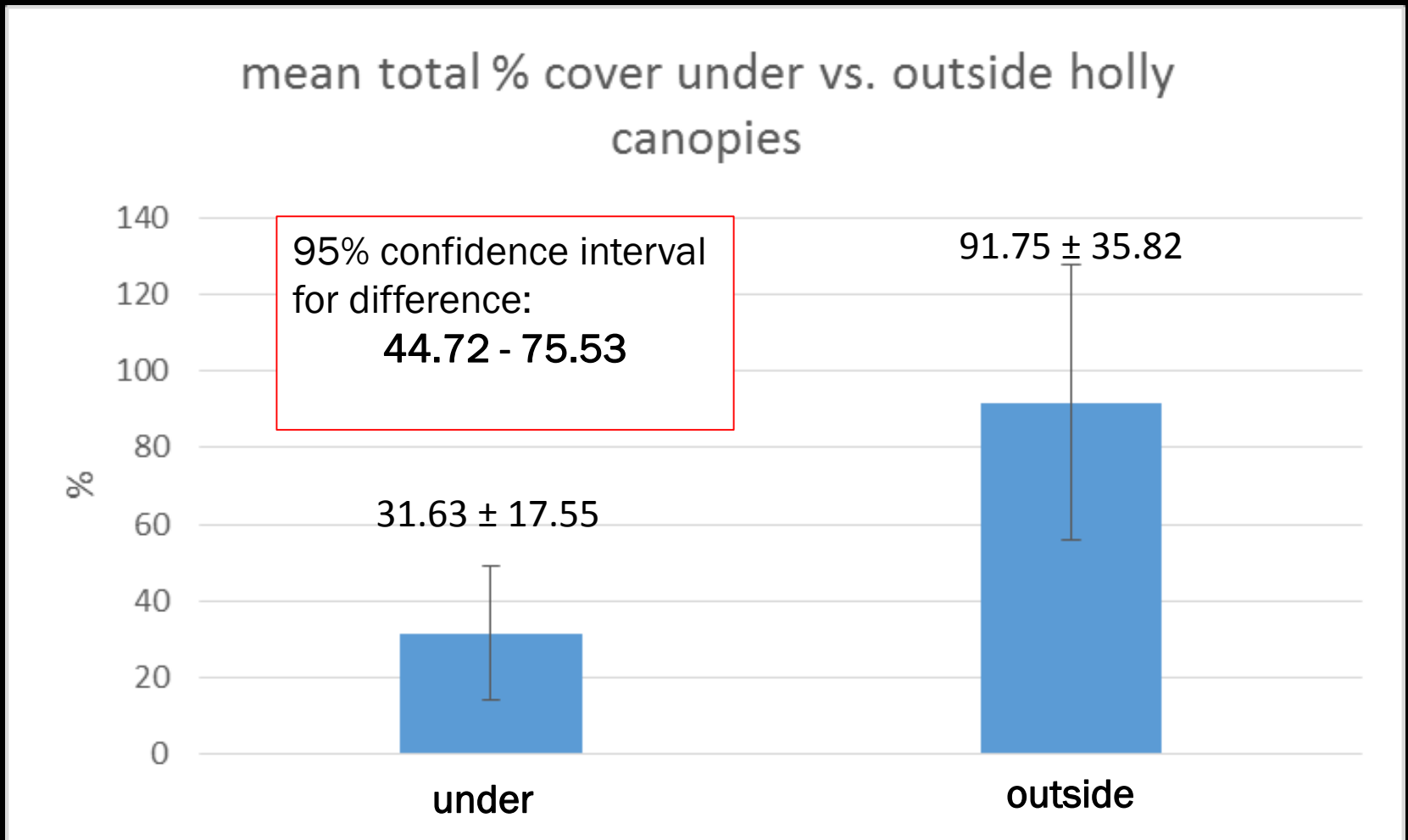
Results

Total cover - Under vs. outside holly canopies



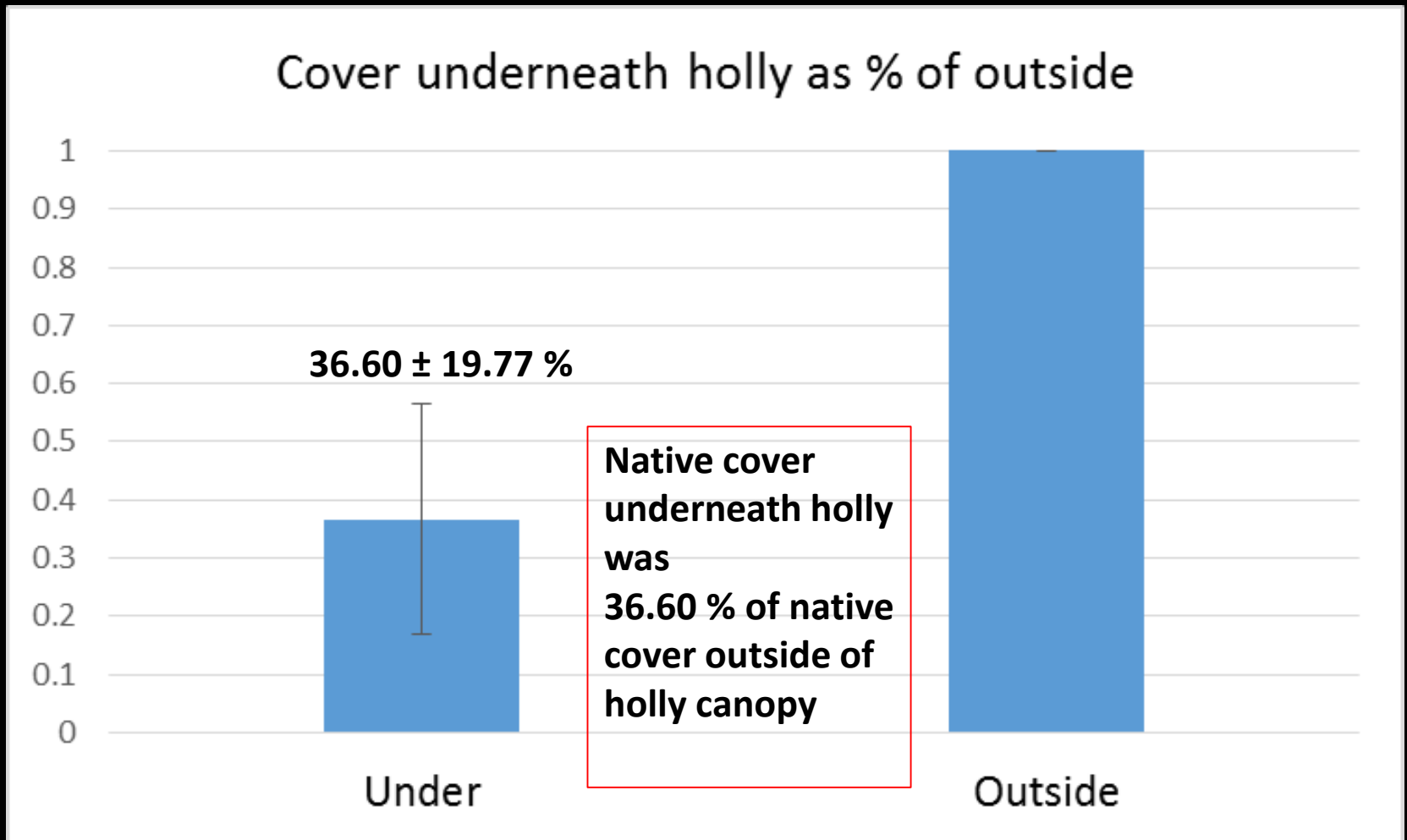
Results

Total cover - Under vs. outside holly canopies



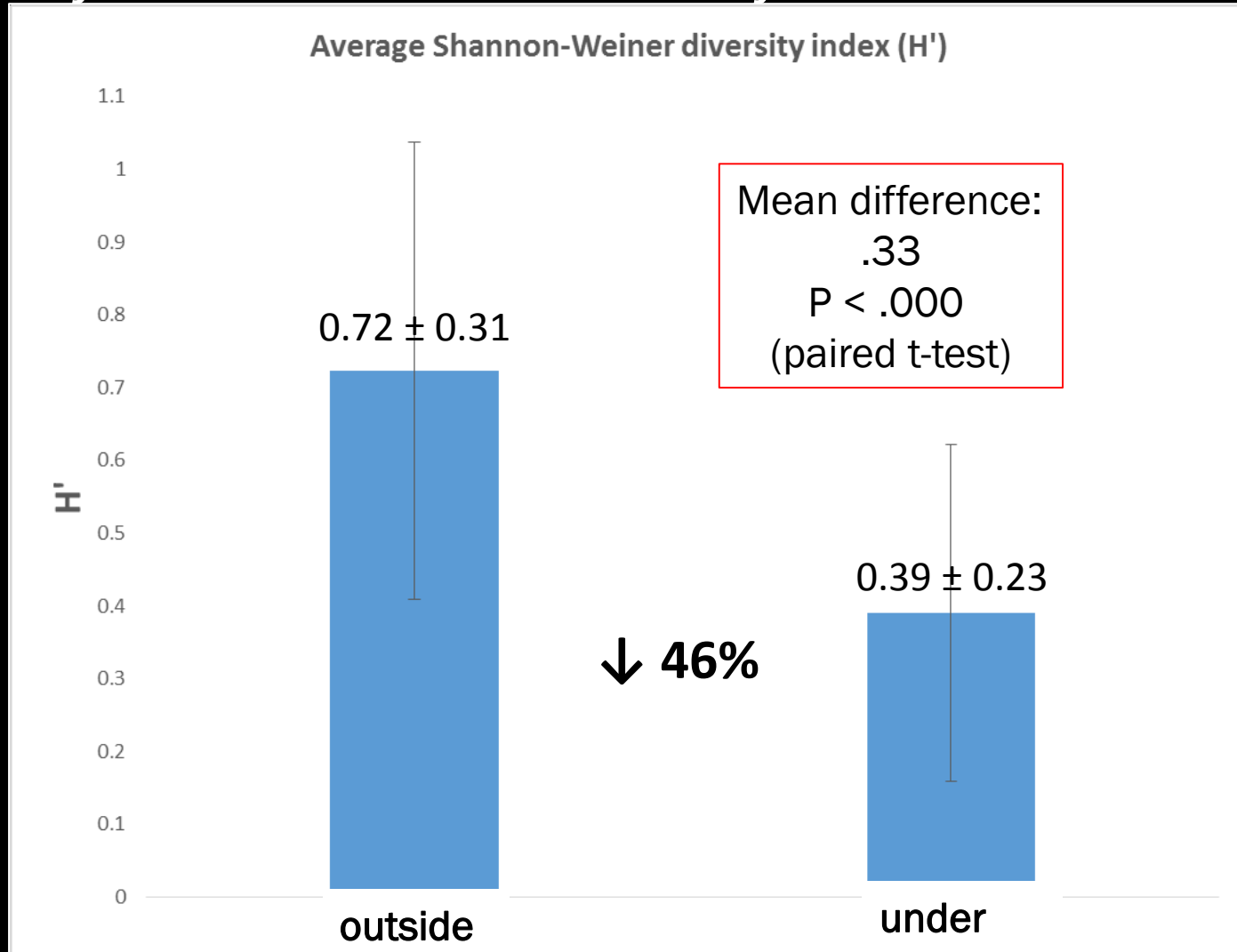
Results

Total cover - Under vs. outside holly canopies



Results

Diversity - Under vs. outside holly



Results

Cover of top 3 species under vs. outside holly



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<http://www.wnps.org/landscaping/herbarium/pages/gaultheria-shallon.html>

Salal (*Gaultheria shallon*)



© Heidi Bohan
<http://www.wnps.org/landscaping/herbarium/pages/polystichum-munitum.html>

**Sword fern
(*Polystichum munitum*)**

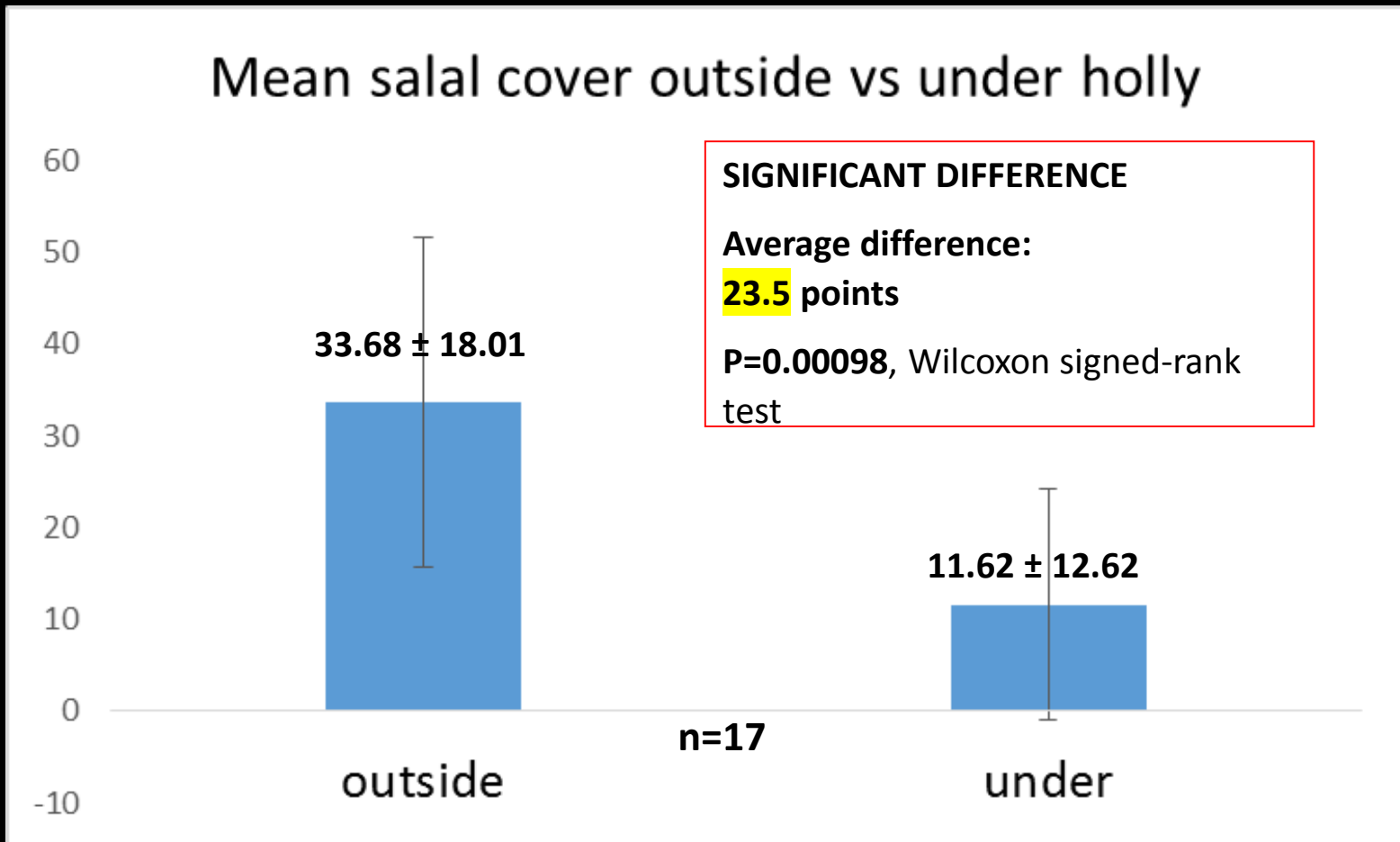


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<http://www.wnps.org/landscaping/herbarium/pages/rubus-ursinus.html>

**Trailing blackberry
(*Rubus ursinus*)**

Results

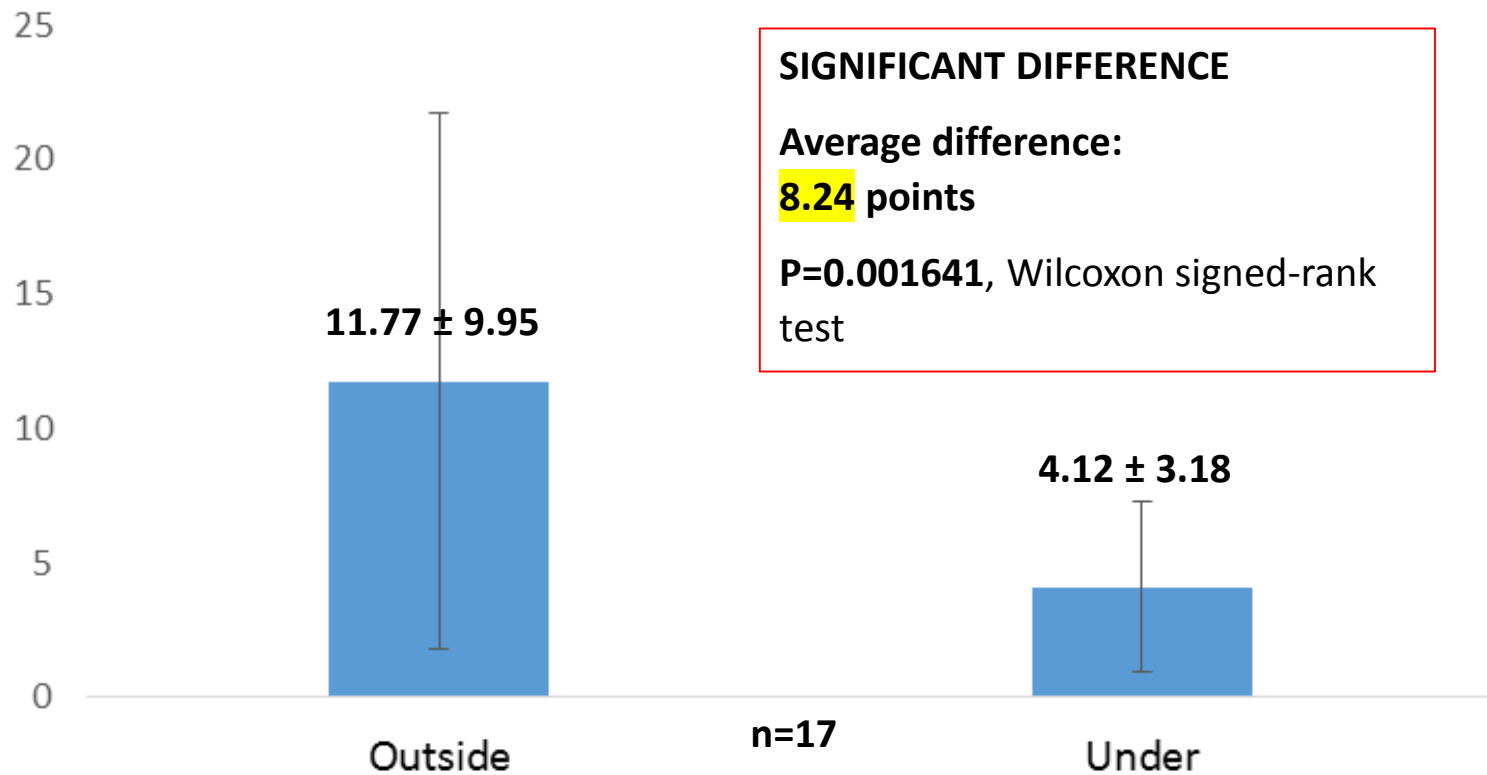
Cover of top 3 species under vs. outside holly



Results

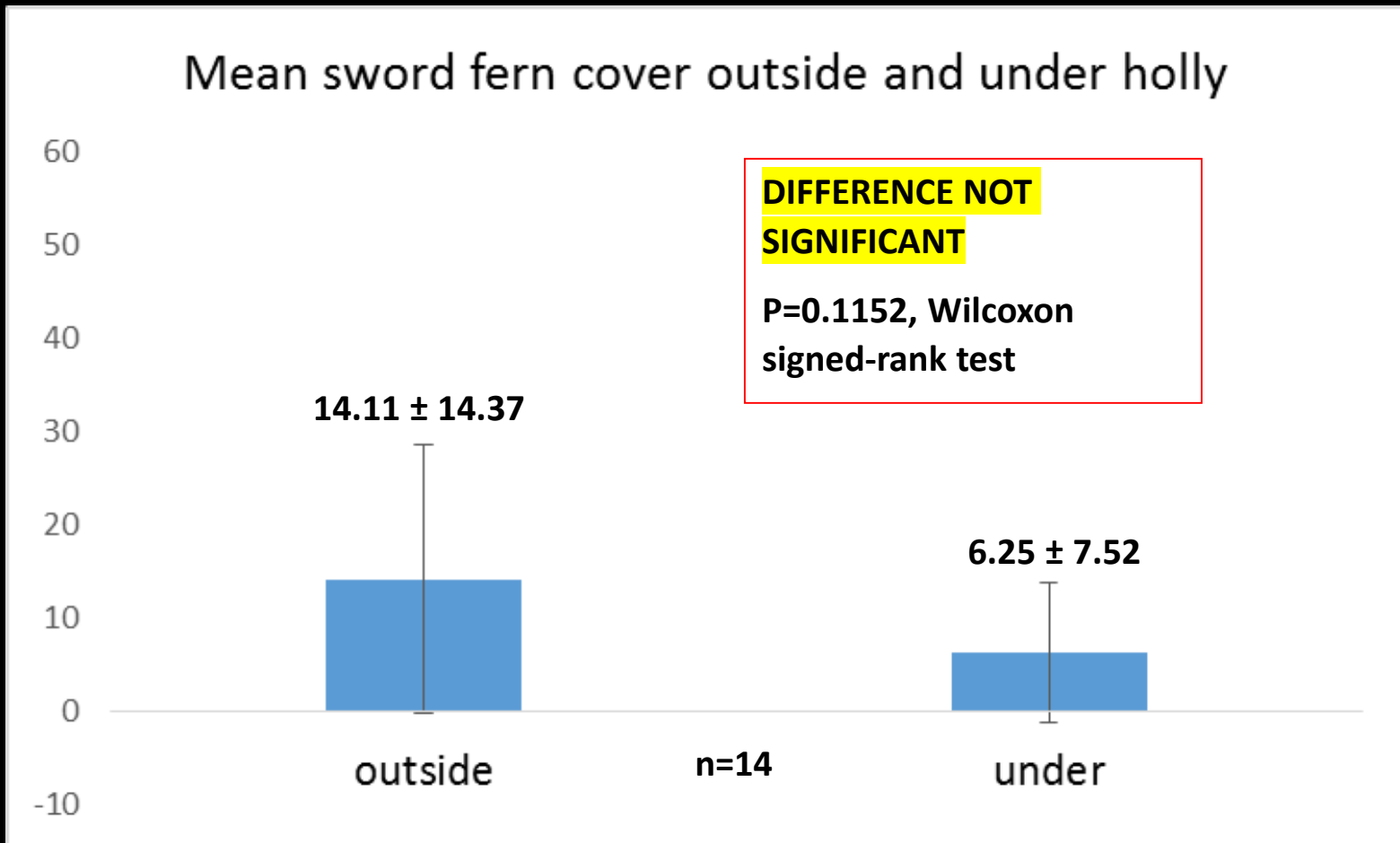
Cover of top 3 species under vs. outside holly

Mean trailing blackberry cover outside vs under holly



Results

Cover of top 3 species under vs. outside holly



Some discussion

- Clear reduction in woody and evergreen native cover under holly
- Suggests holly invasion has capacity to alter
 - biodiversity
 - succession
 - structure

Some discussion

- Difference between response of top 3 species suggests that one possible impact of holly is to alter native vegetation community

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