

Calculating control threshold values using native biodiversity

An example using
Pereskia aculeata (Cactaceae)
in South Africa

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Pereskia aculeata

- Primitive, creeping cactus
- Native in Central and South America
- Declared weed (1979) in South Africa
- Often invades pristine habitats
- Considered a threat to native biodiversity







- Control of *Pereskia aculeata* is justified and a biological control programme has been initiated.
- How will we evaluate the success of this biological control programme?



Measuring success in weed biological control

- Measurable goals determined prior to implementation of the control strategy
- Evaluation of success
 - Biological control does not eradicate the weed
 - Expectations of biological control are often too high



Parameters to measure success

- Agent establishment, agent population
- Damage to the weed
- Weed population
- Reduction in the weed's impact

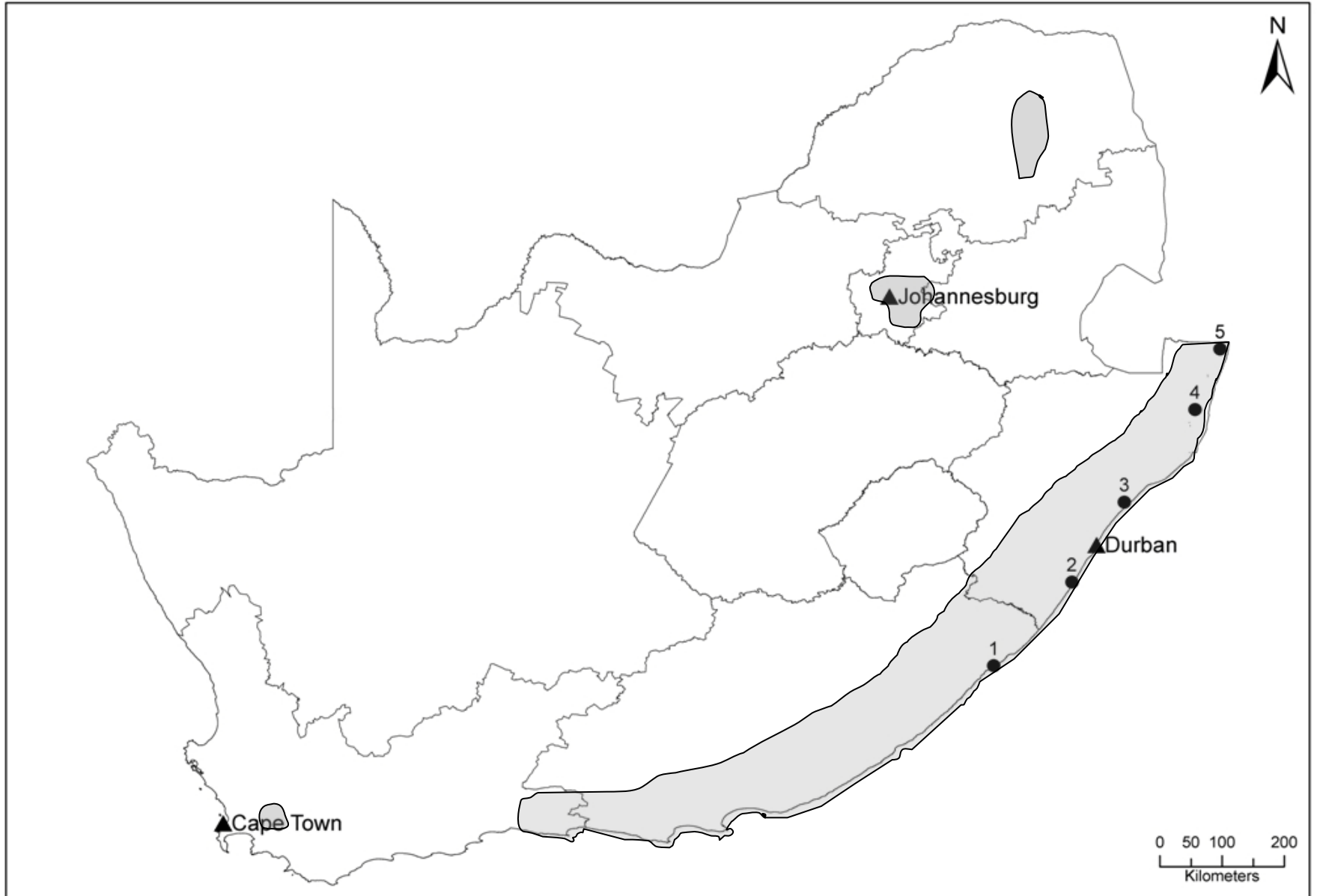


Return of native biodiversity

- *Pereskia aculeata* is considered a weed because it reduces native biodiversity
- The return in native biodiversity after control should be measured to quantify success
- But this must be done **prior** to control



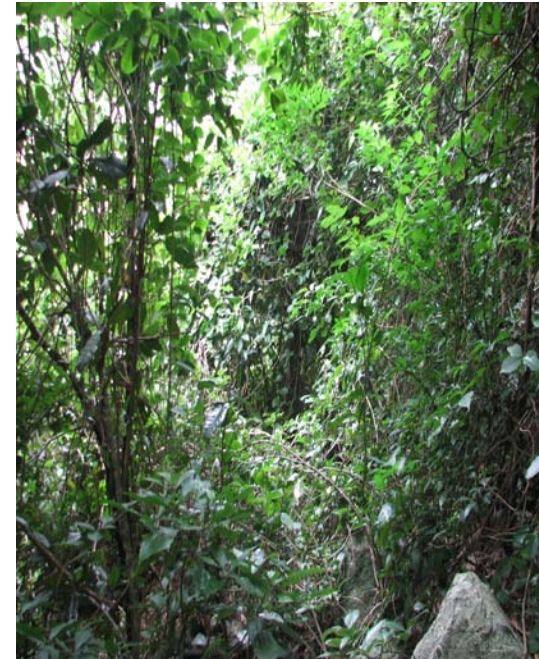
Sites

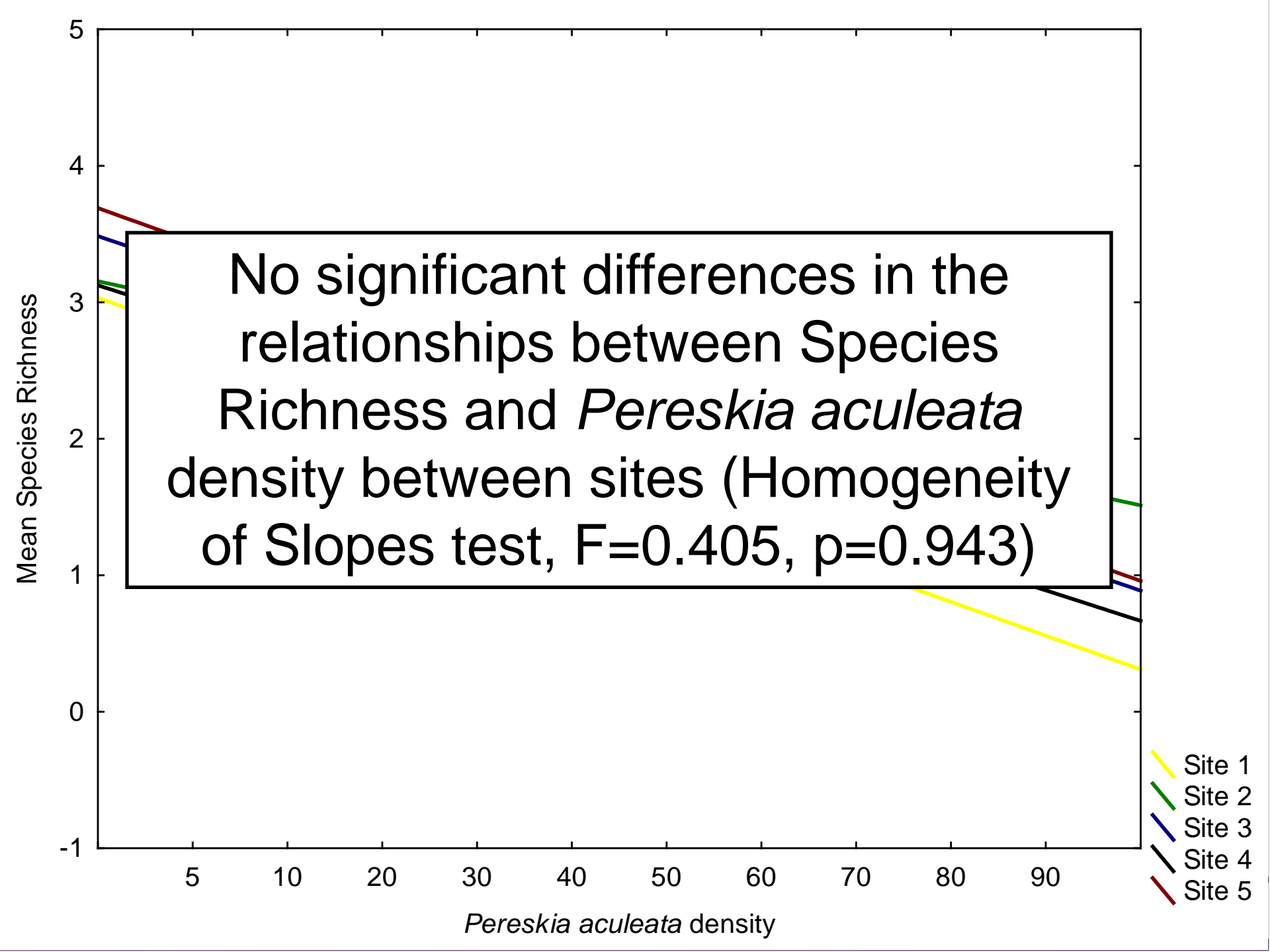


From Henderson (2001)

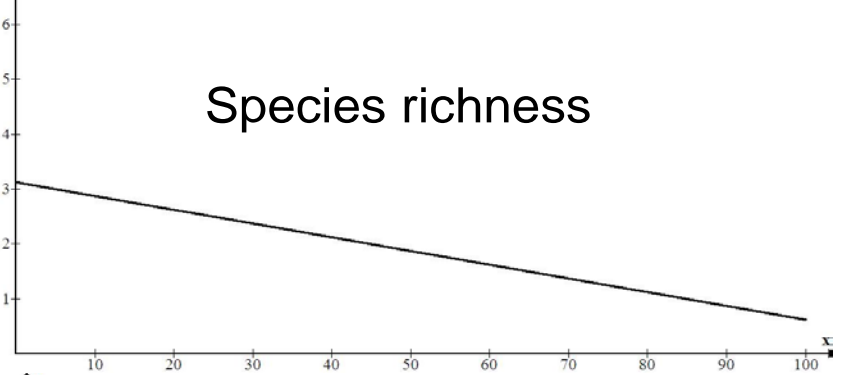
Methods

- 5 X 35m transects
- 0.5x0.5x1.0 (0.25m³) quadrats selected randomly
- Plant species and % cover recorded
- +/- 120 samples per site
- Density *P. aculeata*
- Native plant diversity
 - Species richness
 - Shannon H
 - Simpson's D

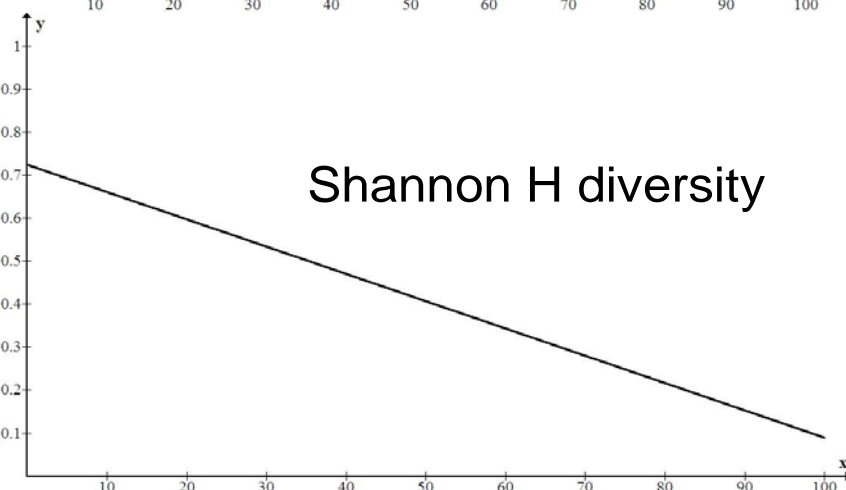




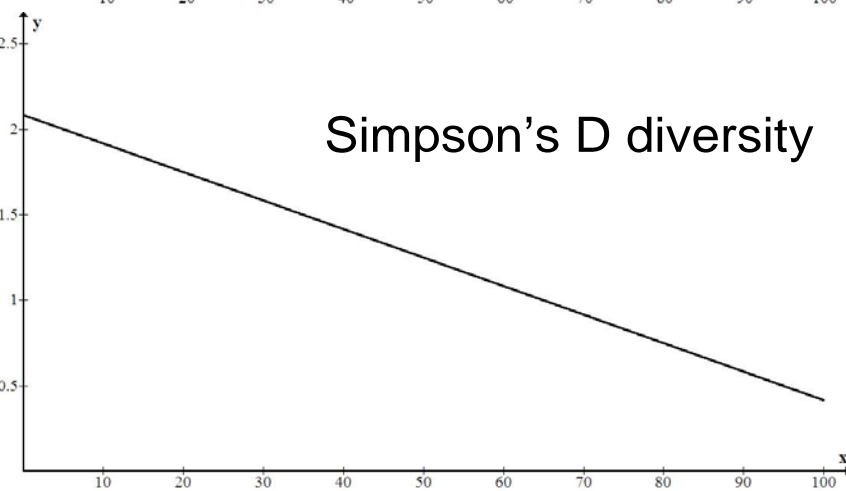
Species richness



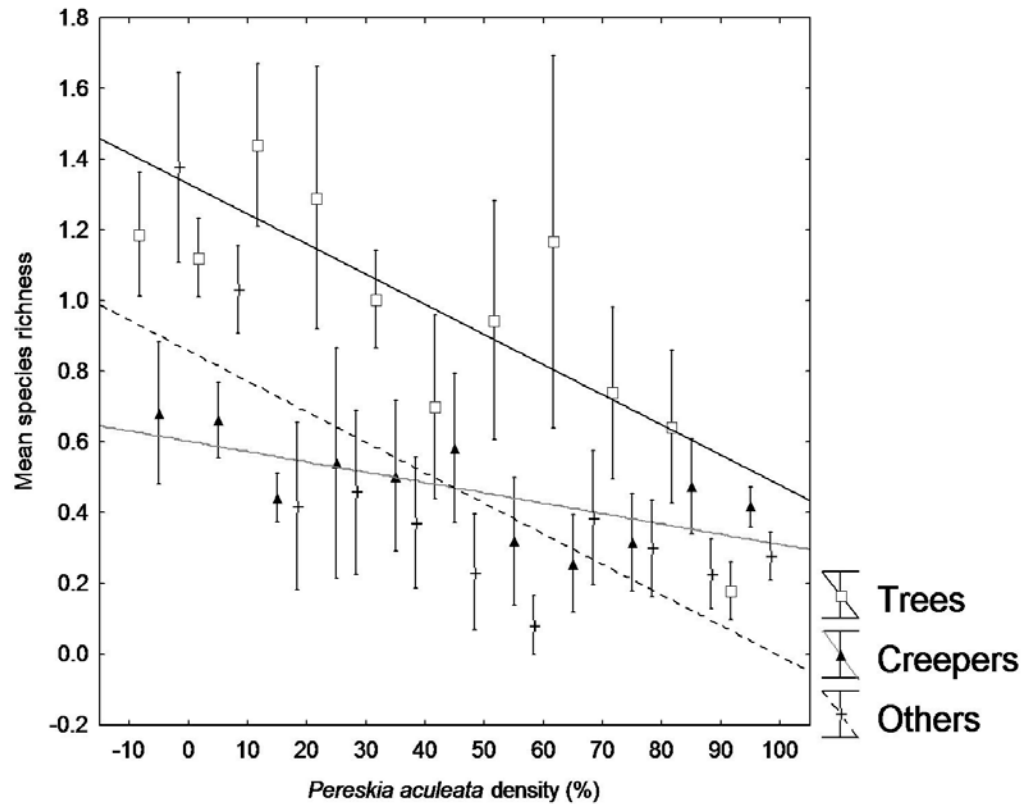
Shannon H diversity

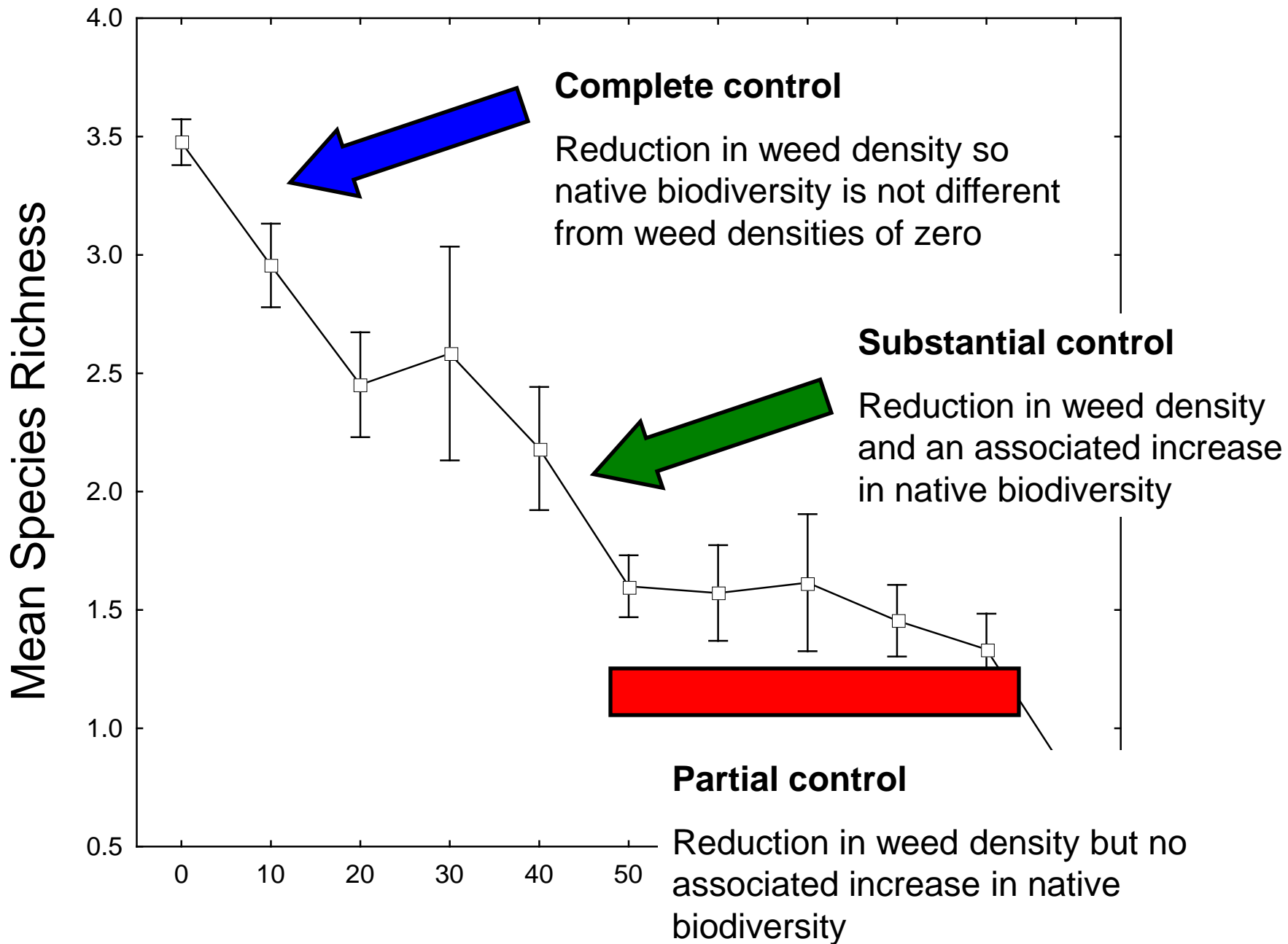


Simpson's D diversity



Pereskia aculeata density





Evidence of causality

- Thresholds are calculated based on correlative data
- To prove a causal relationship the weed must be removed



Phenrica guérini

Conclusions

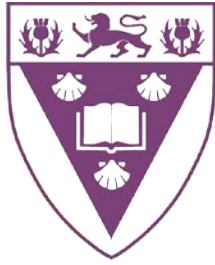
- To evaluate success in biological control measurable goals that can be determined prior to control are required
- By quantifying the relationship between weed density and native plant biodiversity threshold values can be calculated for environmentally damaging weed species



Conclusions

- Methods are simple – specialist scientists not required
- Short time scale (3 days per site)
- Threshold values can be validated or corrected after the weed is controlled in a long term post release evaluation





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