



Experimental Test of Different Treatments for Control of Terracina Spurge (*Euphorbia terracina*): Comparison of hand pulling, glyphosate, and chlorsulfuron

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Outline

➤ Introduction

- ✎ The “enemy”

- ✎ Prior NPS control efforts

➤ Research

- ✎ What are we trying to find out?

- ✎ What are we doing?

➤ Experiment

- ✎ Methods: Set-up, Data collection, Data analyses

➤ Results

➤ Discussion

➤ Implications



Terracina spurge (*Euphorbia terracina*)



- Opportunistic weed has the ability to
 - germinate quickly
 - grow rapidly
 - outcompete natives
 - create monospecific stands



- Provides an inferior habitat
 - exudes a toxic sap that decreases forage quality
 - alters species structure

- Difficult to eradicate
 - prolific seeder
 - multi-year seed bank

Control Efforts

- Combination of glyphosate (Roundup®) spraying and hand pulling
 - **In 4 years: \geq \$600,000 and \geq 2600 hours on NPS lands**
- Australian literature: long-term control using chlorsulfuron (Telar®)



Purpose

To ensure the most effective approach is being used

1. Hand pulling, necessary?
 - ✓ costly
 - ✓ survival
2. Treatment effectiveness
 - ✓ control
 - ✓ establishment
3. Herbicide impacts
 - ✓ germination/growth
 - ✓ residuals



Examining the efficacy of 6 different treatments

3 main treatments:

- 1. G**lyphosate (2% Roundup[®])
- 2. C**hlorsulfuron (Telar[®], 15g/ha)
- 3. M**echanical

Treatment was:

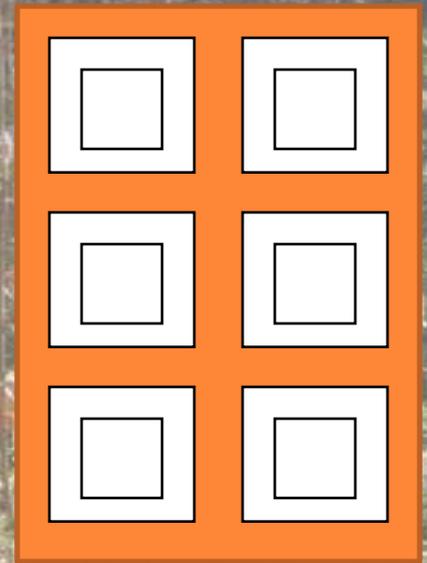
- applied alone
 - **G, C, M**
- paired with Hand **P**ulling
 - **GP, CP, MP**



Methods

Set up:

- Solstice Canyon
- 8 sites
- Each divided into 6 fixed 2 m² plots
- 1 m borders
- Permanent 1 m² area for data collection



Data collection



- Pre- and post-assessed for:
 - Percent cover of:
 - *Euphorbia*
 - native vegetation
 - non-native vegetation
 - bare ground
 - Native plant heights
 - Photographs

Assessment of *Euphorbia* performance at an adjacent site to evaluate yearly fluctuations independent of treatments

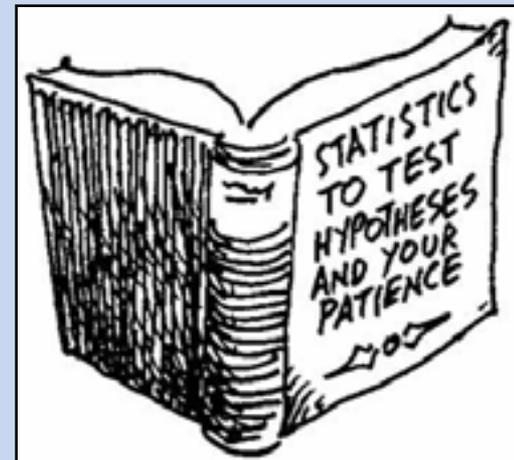
Data analyses

1. Are there differences in effectiveness of treatment?

→ ANOVA

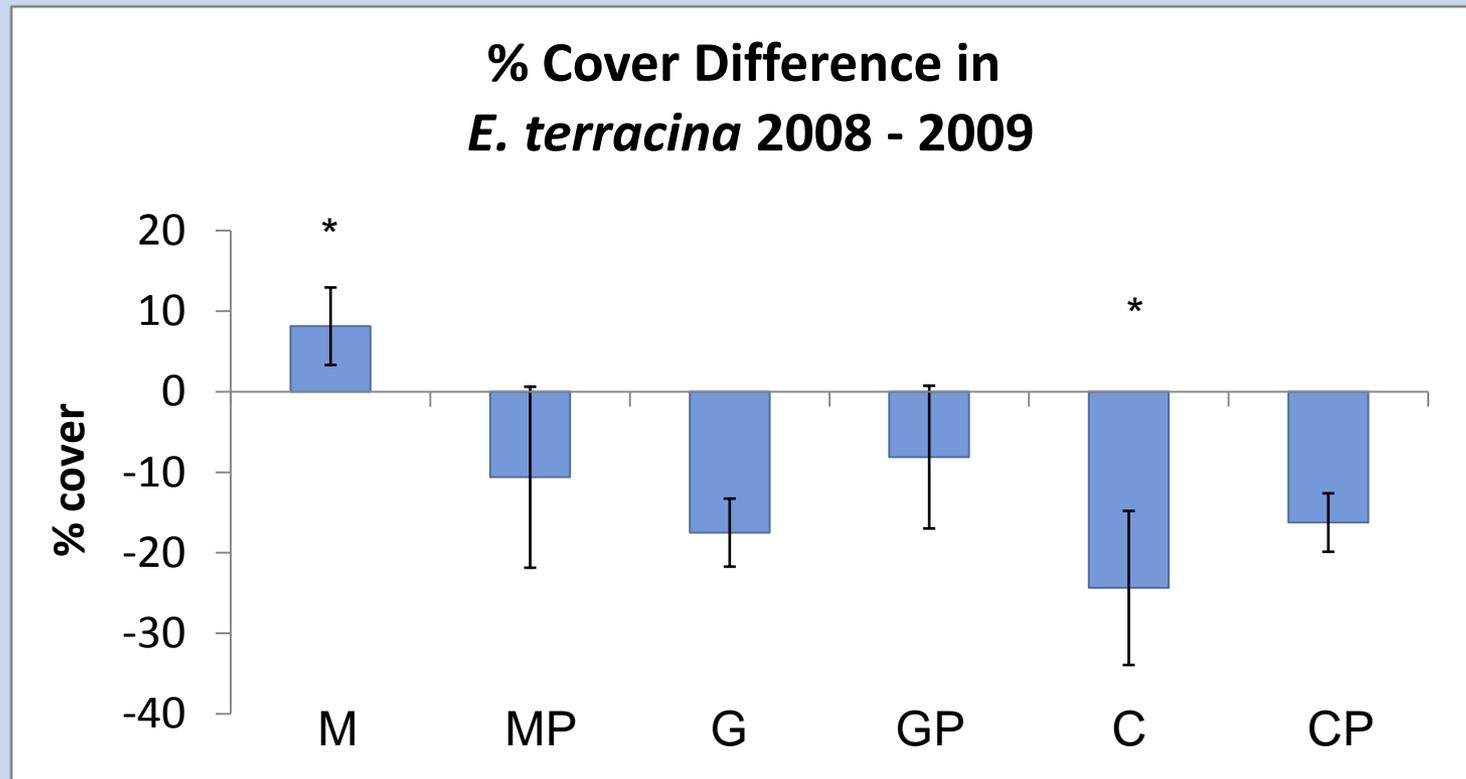
2. Is there an effect of the individual treatment?

→ Paired t-tests



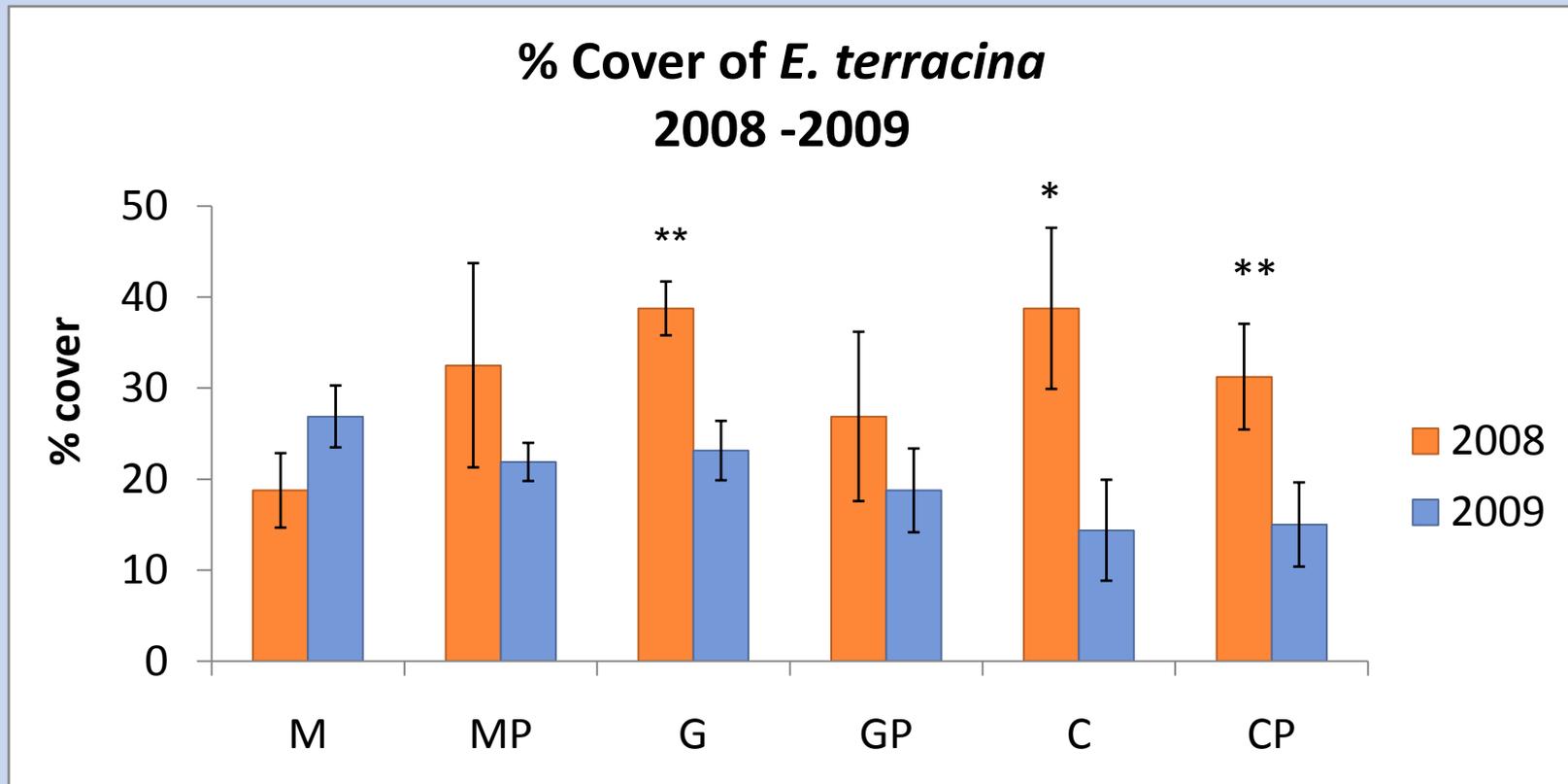
Results

Comparison of Treatments



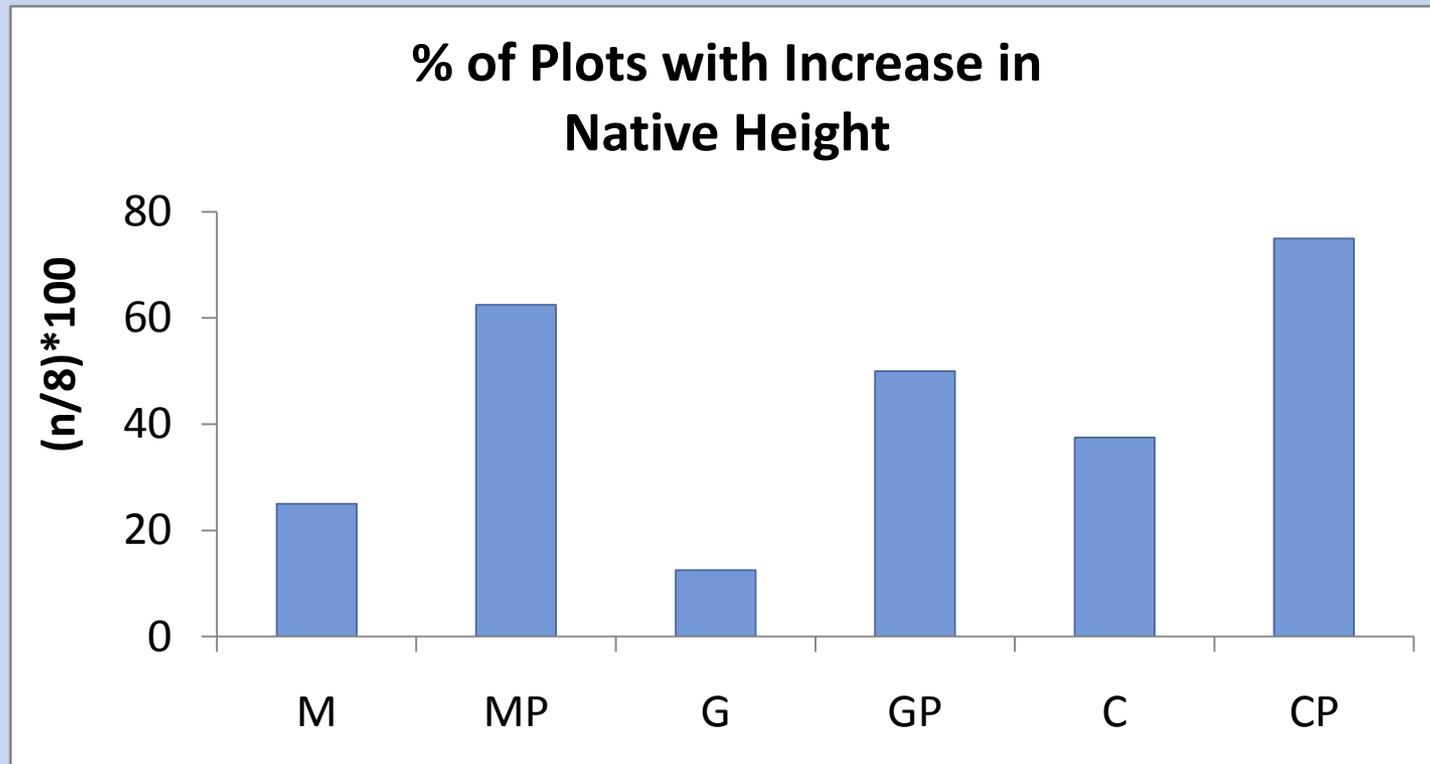
Results

Effectiveness of Each Treatment



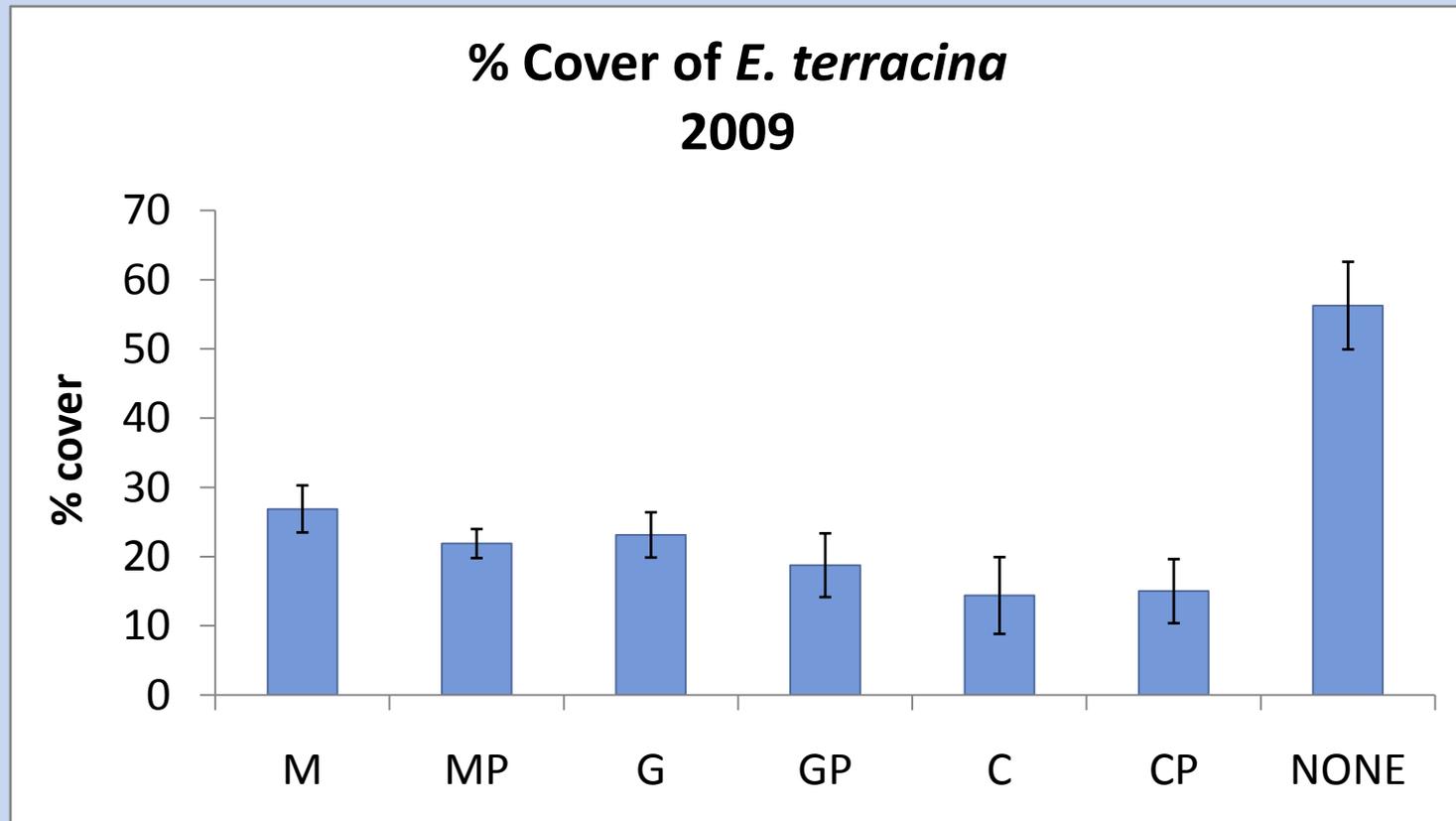
Results

Native Performance



Results

Natural Fluctuations in *E. terracina*



Discussion

1. Results reflect treatment effects, not natural fluctuations



Discussion

2. Effect of pulling

- ✓ herbicide alone more effective
- ✓ native performance data



Discussion

3. No significant difference in treatment effectiveness

- ✓ more time needed
- ✓ fire



Future Work

- **Are current control methods the most effective?**
- **Information will be used in managing wildlands parkwide**

Acknowledgements

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Questions??



Results

Native % Cover

