

Management to Improve Willamette Daisy Establishment

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Funded by NW District BLM



Willamette daisy

- Listed as endangered by USFWS
- Thought to be extirpated until populations 're'-discovered in late 1980's
- During 2018 Rangewide survey 72 sites were visited
 - only 47 had plants
- Recommendations from the survey
 - Augment
 - Improve native diversity
- At that time only 2 Recovery zones met or exceeded recovery goals
 - Common issues –
 - <50% native cover
 - <10 native species





What can be done to improve Willamette daisy establishment?

- How effective are treatments at reaching recovery goals?
 - <50% absolute cover of non-native species)
 - >50% absolute cover native species
 - Native plant diversity (>10 species total, at least 7 forbs, 1 bunchgrass)

Plot set-up and design

- 2 sites in West Eugene Wetlands (BLM)
 - Balboa
 - Vinci
- Each plot is 2m x 2m
- 30 plots at each site
- There is ERDE at each site – but NOT in the treatment plots



Timeline and Treatments

Timeline

Spring 2020

- Initial Setup
- Monitoring

Spring 2021

- Monitoring

Fall 2021

- Treatments
- Seeding

Spring 2022

- Monitoring
- Count of ERDE seedlings
- Plant community

Spring 2023 and 24

- Monitoring

Management treatments (count at each site):

SEEDED ALL PLOTS

Control (5)

Burn only (5)

Glyphosate (10)

Burn + Glyphosate (10)



Fall 2021 Burn

- Conducted by IAE and BLM staff
- Used a propane drip torch



Before and after



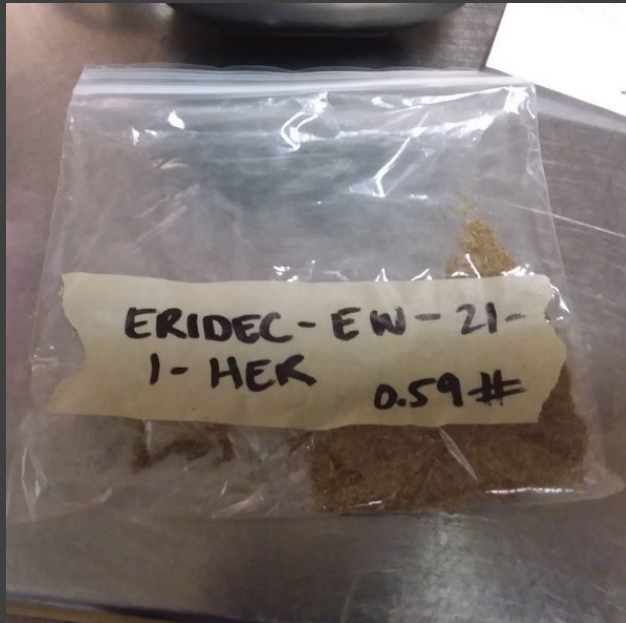
2 weeks later

- Burn Only



Fall 2021 Seeding

- Seeded at a rate of 10 lbs/acre



Seed

- Seed was sourced from an IAE production field
- A total of .59 lbs was used to seed 60 plots
- Seeding rate was equivalent to 10 lbs/acre (~9000 seeds/m²)

Control



Burn + Glyphosate



Monitoring



Burn Only (back), Glyphosate
only (front)

Seedling establishment:

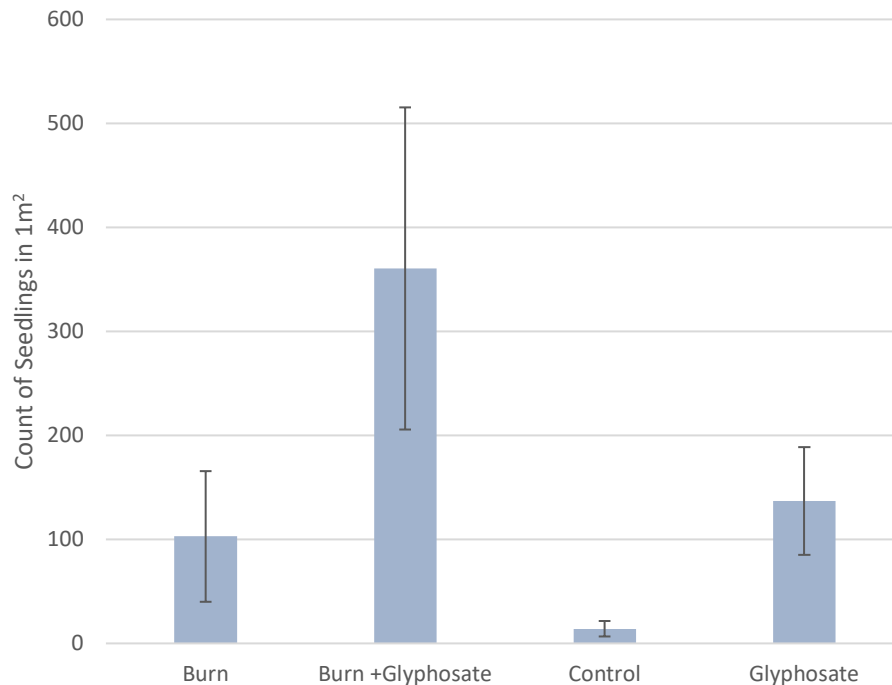
- June 2022 ('23, '24)
 - Count of seedlings in central 1m²

Plant community:

- 2020, '21 and '22, ('23,'24)
 - The center 1m² of each plot was monitored to species level

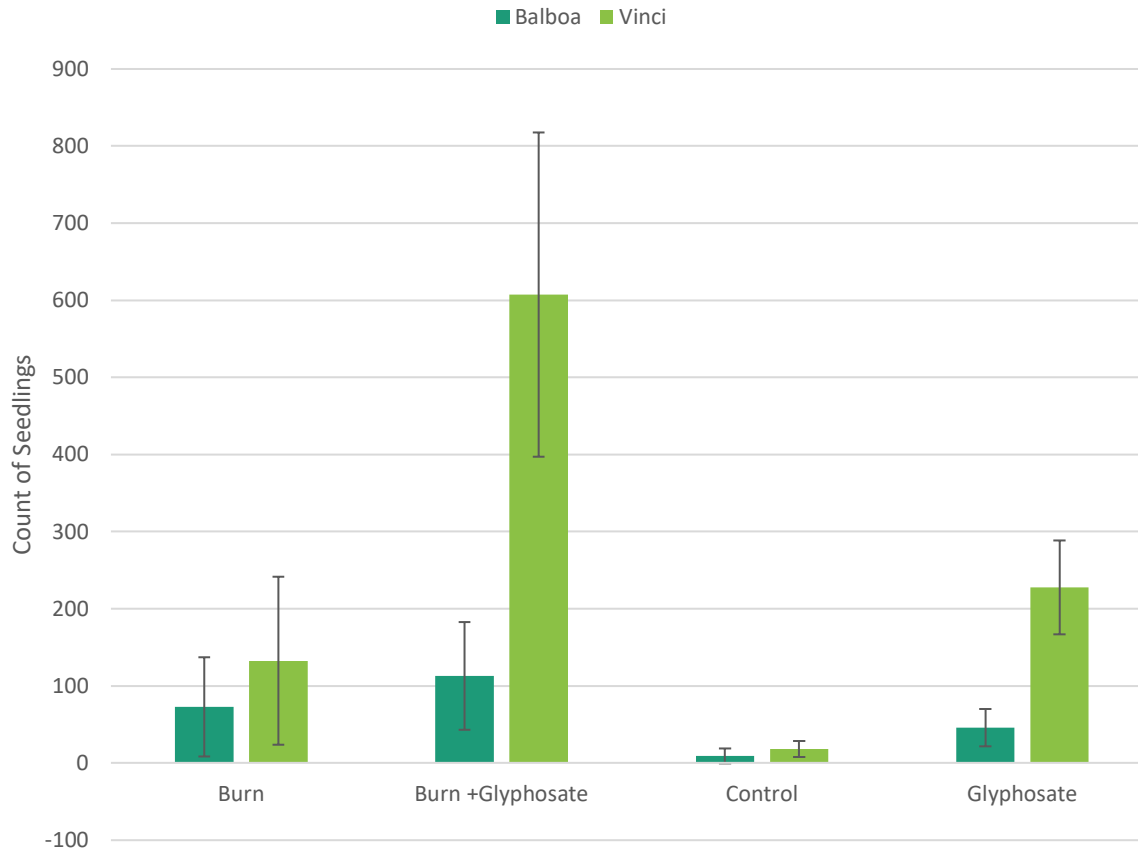
Results – Willamette daisy

- Germination of seeds observed in all treatments at both sites



- Burn + Glyphosate resulted in significantly more seedlings than any other treatment.
- Glyphosate significantly more than control
- Burn only
 - More than control
 - Less than burn+glyphosate

Results – Willamette Daisy – by site



Balboa:

- Burn + Glyphosate significantly higher than control
- Fewer seedlings/plot

Vinci:

- Burn + Glyphosate > Glyphosate, both significantly better than control
- Burn only inconclusive (high variance)

Results – Forbs- Balboa

Native Forbs:

Increase in Burn +
Glyphosate and
Glyphosate

Introduced Forbs:

No change across
treatments

Main players:

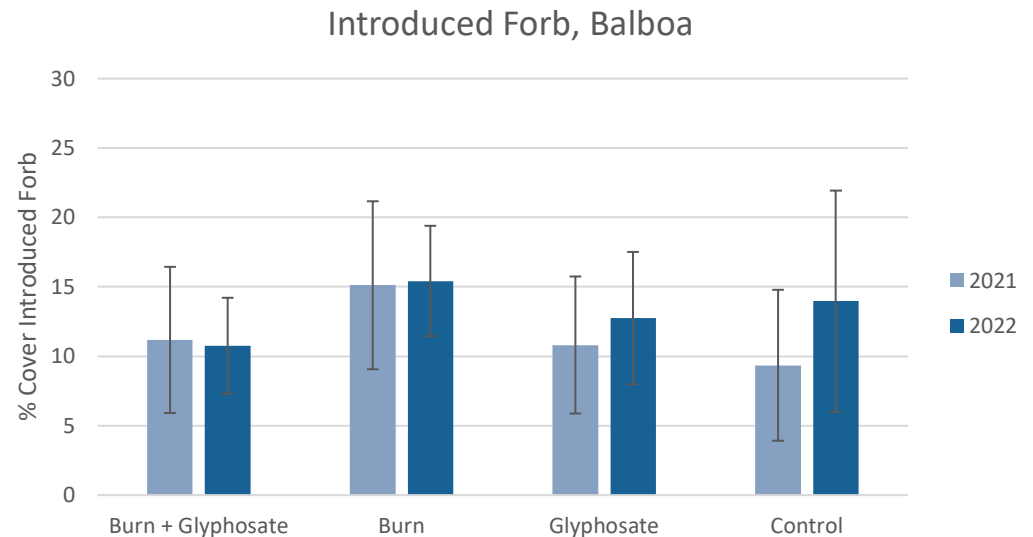
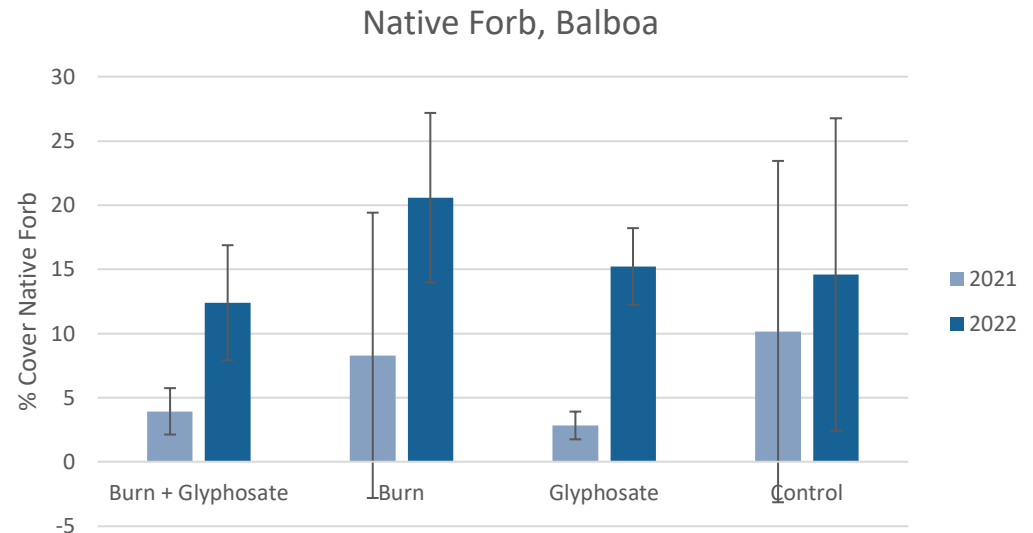
Native:

Agoseris grandiflora

Introduced:

Hypochaeris radicata

Mentha pulegium



Results – Forbs- Vinci

Native Forbs:

No significant differences across treatments

Introduced Forbs:

Decrease in Burn treatment

Main players:

Native:

Agoseris grandiflora

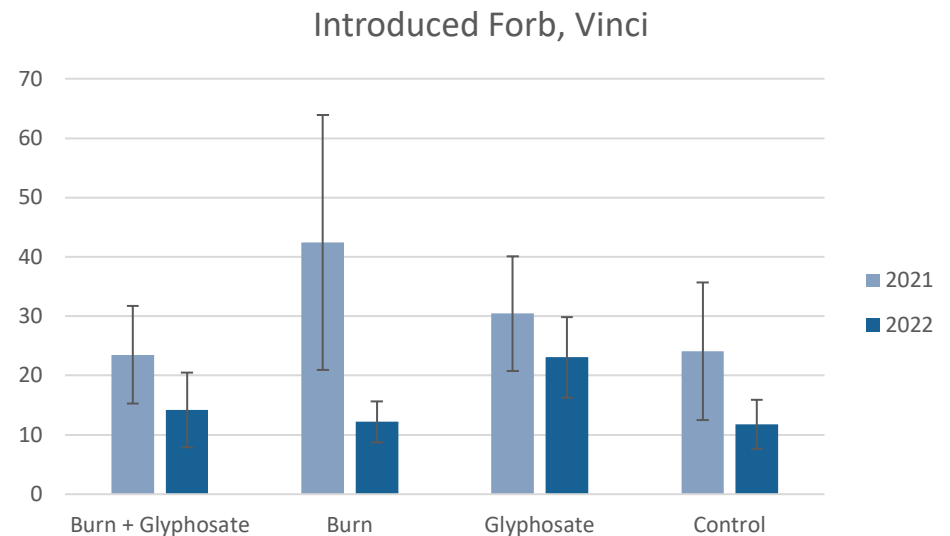
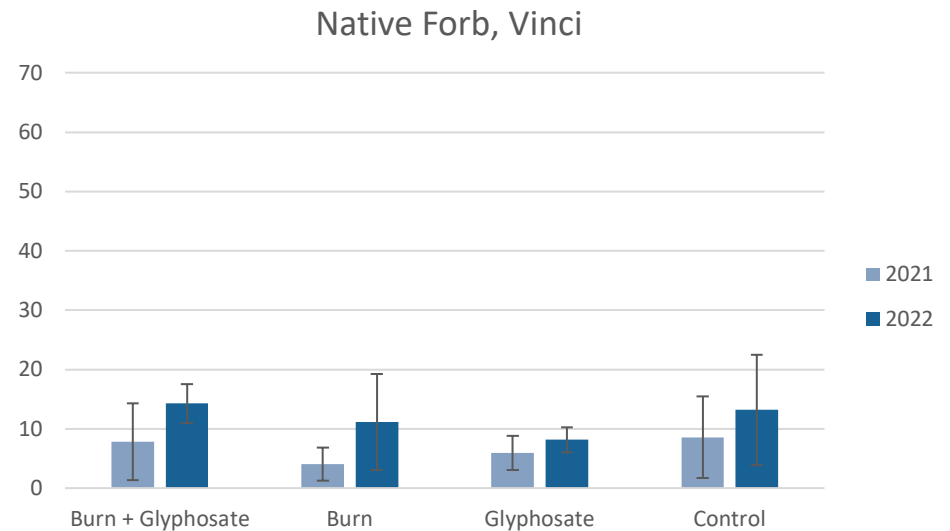
Eriophyllum lanatum

Introduced:

Hypochaeris radicata

Mentha pulegium

Leucanthemum vulgare



Results – Graminoids- Balboa

Native Graminoids:

Glyphosate only decreased native graminoid cover

Other treatments decreased (but not significantly) cover of native graminoids

Introduced Graminoids:

Glyphosate decreased introduced graminoid cover

Main players:

Native:

Deschampsia cespitosa

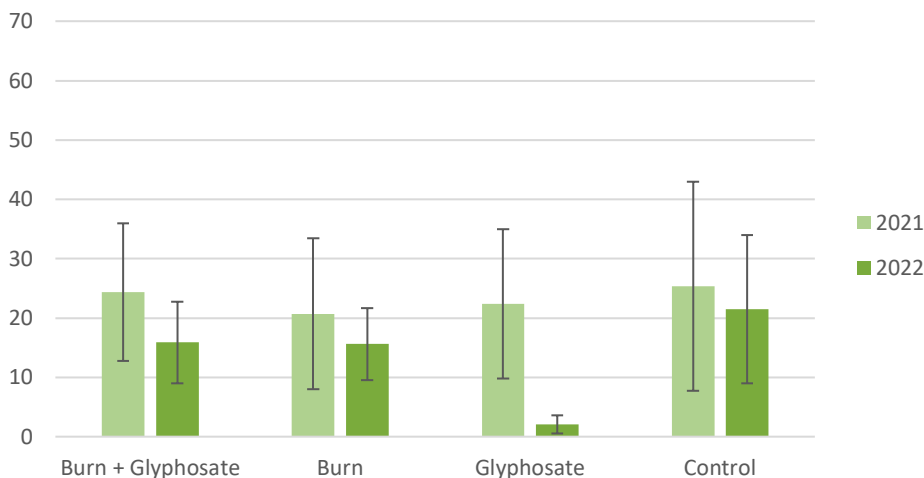
Danthonia californica

Introduced:

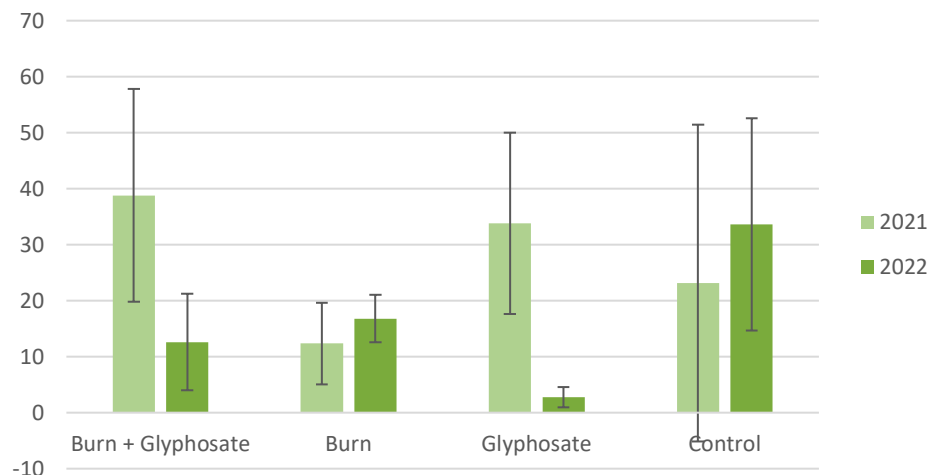
Festuca arundinacea

Agrostis sp.

Native Graminoid, Balboa



Introduced Graminoid, Balboa



Results – Graminoids- Vinci

Native Graminoids:

Glyphosate only decreased native graminoid cover

Introduced Graminoids:

Glyphosate and Burn
+Glyphosate decreased introduced graminoid cover

Main players:

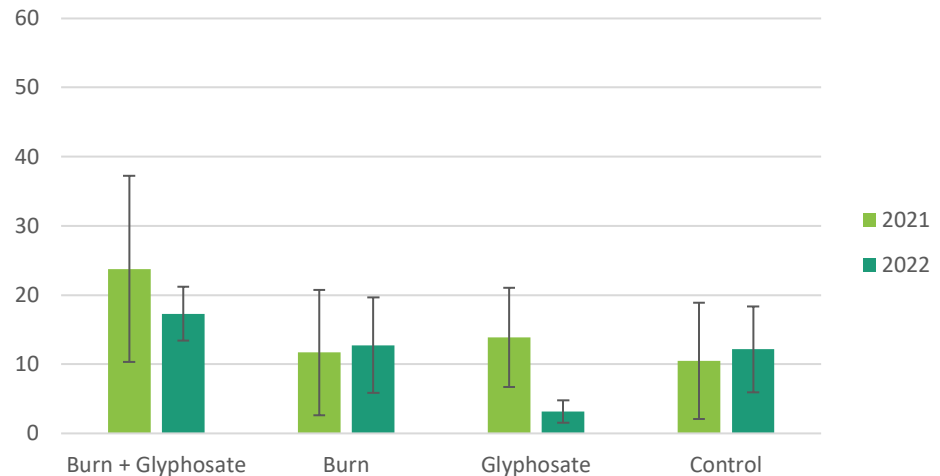
Native:

Deschampsia cespitosa

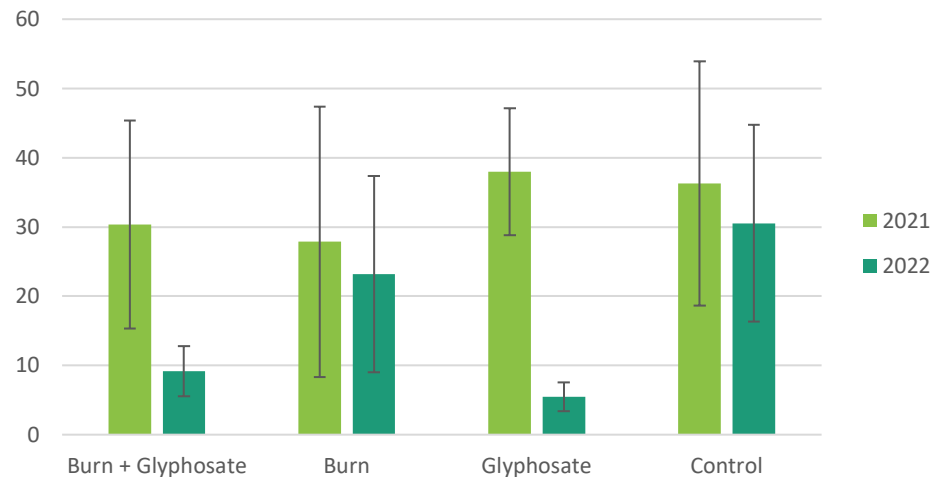
Introduced:

Agrostis sp.

Native Graminoid, Vinci



Introduced Graminoid, Vinci



Conclusions – Plant Community

- Plant Community

- Forbs

- Native forb cover increased from 2021-22 in Glyphosate and Burn + Glyphosate treatments
 - Introduced forb – signal is mixed

- Graminoids

- Native graminoid cover

- Glyphosate only lowered native graminoid cover
 - Other treatments had no significant impact on native graminoid cover

- Introduced graminoids

- Lowered by Glyphosate only and Burn +Glyphosate

Conclusions – Willamette Daisy

- Willamette daisy:
 - Burn + Glyphosate (and glyphosate only) had more seedlings than other treatments ($p = 0.00085$)
 - There were site differences in total number of germinants

WINNER = ***Burn + Glyphosate*** with more germinants/plot, lower introduced graminoid cover, and higher native forb cover.



Acknowledgements

Funders:

Eugene – NW District BLM

Field Staff:

2020 – Nadav Mouallem

Justin Ford, Cameron Johnson

2021 - Cameron Johnson

2022 – Jean Fleming, Ari Brown

Treatment Implementation:

BLM:

Christine Calhoun

Colin Sayre

IAE:

Julia Fields

Rolando Beorchia

Seeds:

IAE Plant Materials Program



A person wearing a red long-sleeved shirt, dark pants, and a dark baseball cap is crouching in a field of tall grass and purple flowers. The person is looking down at the plants. The field is filled with green grass and numerous small purple flowers. The sky is overcast with grey clouds. The text "Questions?" is overlaid in the upper right corner.

Questions?

- Why 10lbs/acre ? (1-2 lbs didn't work)
- * PLS
- Plots don't have ERDE to start
- Paired (remove?)
- Add $p/(a/b)$
- (make y's same for spp)

Why is burn only not so good?

- Theories

- Exposure made microhabitat less conducive to germination
- Seedlings were found under thatch in Controls and Glyphosate only plots
- More likely to get eaten by birds or rodents (but not observed in
- Decreased competition from weedy species.

P Values:

- Combined P =0.000448
- Balboa
 - P 0.085
 - Inconclusive between treatments
- VINCI:
 - P 0.000065
 - Between treatments
 - Burn vs Burn + Glyphosate 0.002102
 - Burn + Glyphosate vs Control 0.000167
 - Burn + Glyphosate vs Glyphosate only 0.00258

