Impacts of pulse and persistent grazing on the Fender's blue butterfly

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Outline of talk

1. Why do a grazing study
2. Investigated 2 methods of grazing
3. Methodology
4. Results
5. Future work
6. Conclusions and recommendations

Why do the grazing studies

The rare Fender's blue butterfly (FBB) and host plant require prairie/grassland habitat

- Mowing and fire are presently used
- Grazing is a another option
- Some private landowners have FBB and utilize livestock

Two methods of grazing

We investigated:

Pulse grazing (high intensity short duration grazing) using about 40 sheep for 4 days

Pulse grazing occurred during early FBB flight period

Objective 1: Reduce cover of vegetation

- Increasing apparency of lupine for FBB
- Reducing competition for the lupine

Objective 2: Provide a benefit for the sheep

- Sheep would increase in weight

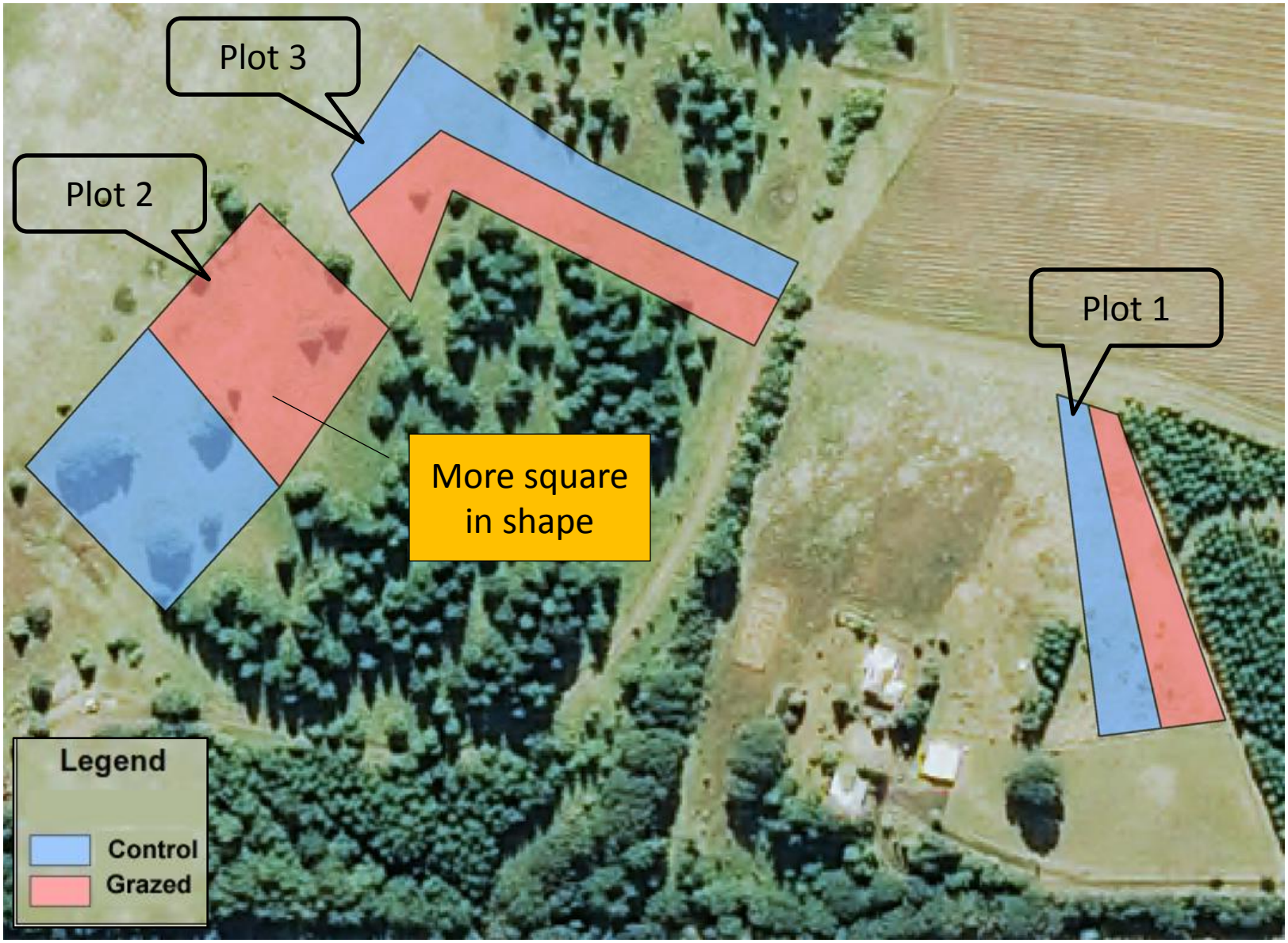
Persistent grazing at two sites:

- Year-around grazing with 2 horses
- Year-around grazing with 1 llama

Pulse grazing methodology

- Used the Before-After-Control-Impact (BACI) design with 3 replicates
- Counted FBB eggs and lupine leaf density before and after grazing
  - Sampled using 15 randomly assigned quadrats (0.36 m^2)
- Measured native and non-native vegetation cover
  - Point intercept method
  - Vegetation types: grasses and forbs
- Measured nectar abundance
  - Counted flower units

Pulse Grazing study plots

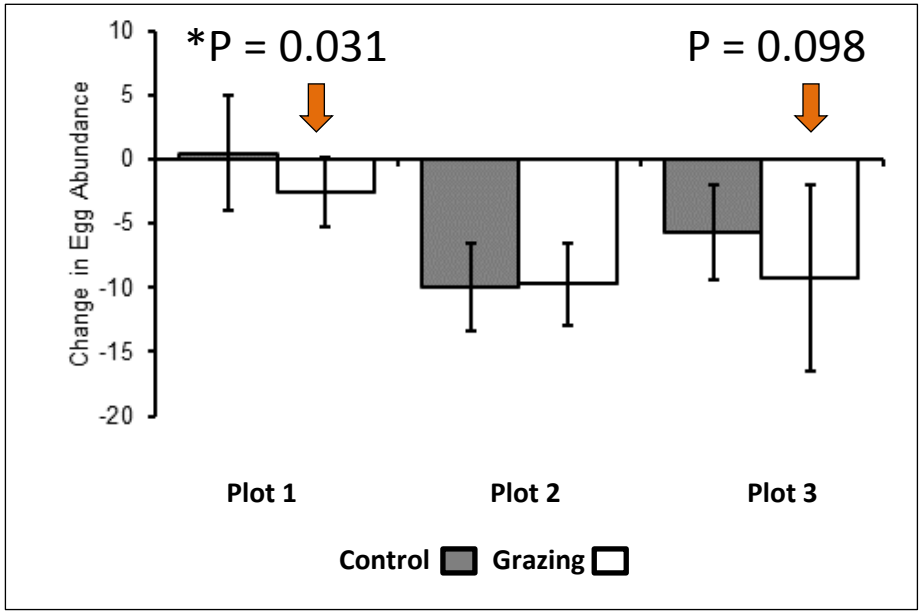


General observations

- About 1/3 of lupine plants were trampled or grazed
- Plot 2 had significantly less lupine trampling (10% compared to 44% for plot 1 and 3)

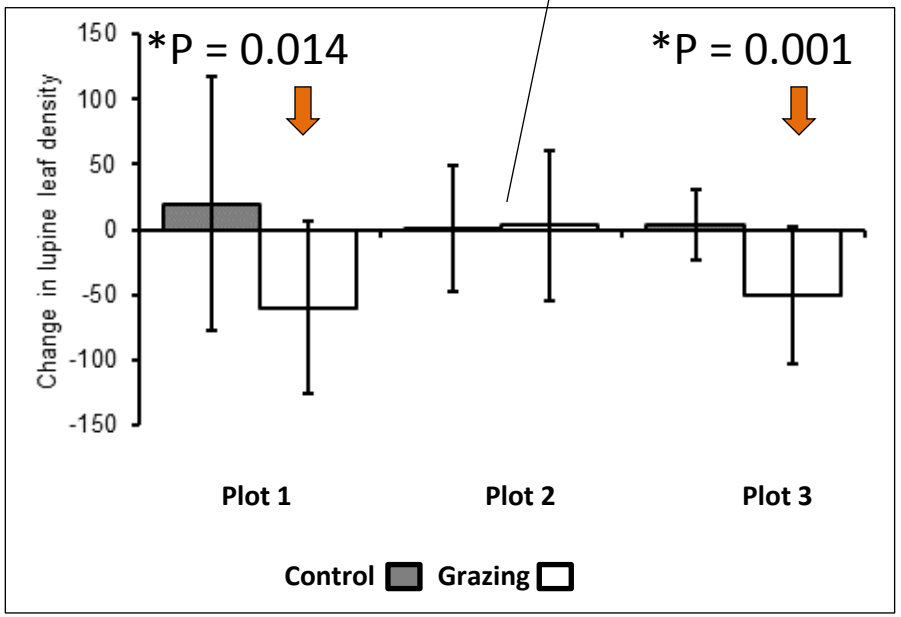
  -Long narrow pastures encourage sheep movement
- Forage quality of grasses was very poor (low fertility)
- Sheep preferred forbs over grasses (less fibrous)
- Lupine did re-sprout after being trampled and grazed
- Sheep lost weight during trial (less in Plot 2)

Pulse Grazing results



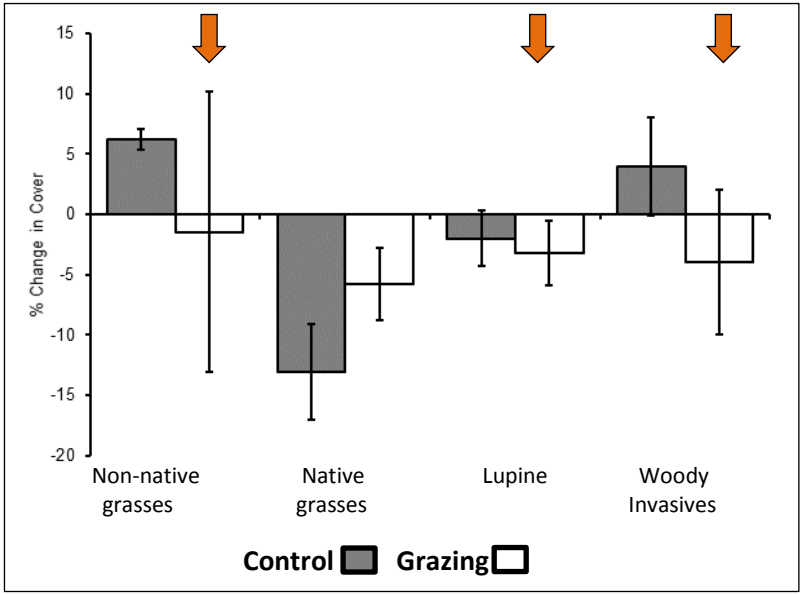
Change in FBB **egg** abundance

More square in shape

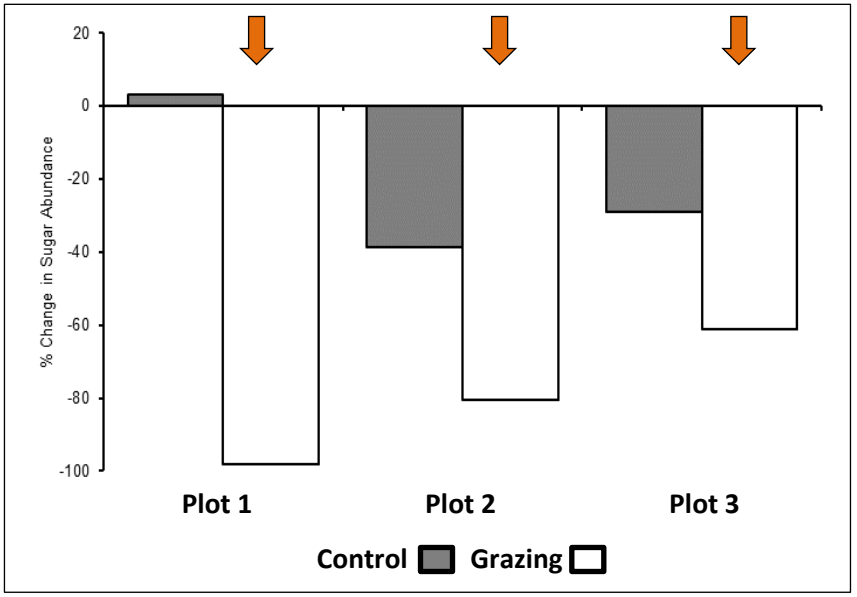


Change in **lupine leaf** abundance

Pulse Grazing results



Change in key **vegetative** cover



Change in **nectar**/sugar abundance

Conclusions / recommendations

Pulse grazing with sheep during FBB flight period is not recommended at this time.

More research is needed to evaluate pulse grazing under different conditions. Different conditions might include:

1. Sites where grasses dominate rather than forbs
2. Sites with better soil fertility so grasses are more palatable
3. Sites that are more square in shape
4. Different grazing animal

Persistent grazing

Persistent Grazing Study methodology

- Observational type study
- Two sites
  - Pasture with 2 horses
  - Pasture with 1 llama
- Counted FBB eggs and lupine leaf density
  - Sampled using 15 randomly assigned quadrats (0.36 m^2) for each grazed and control plot.

Persistent Grazing Study

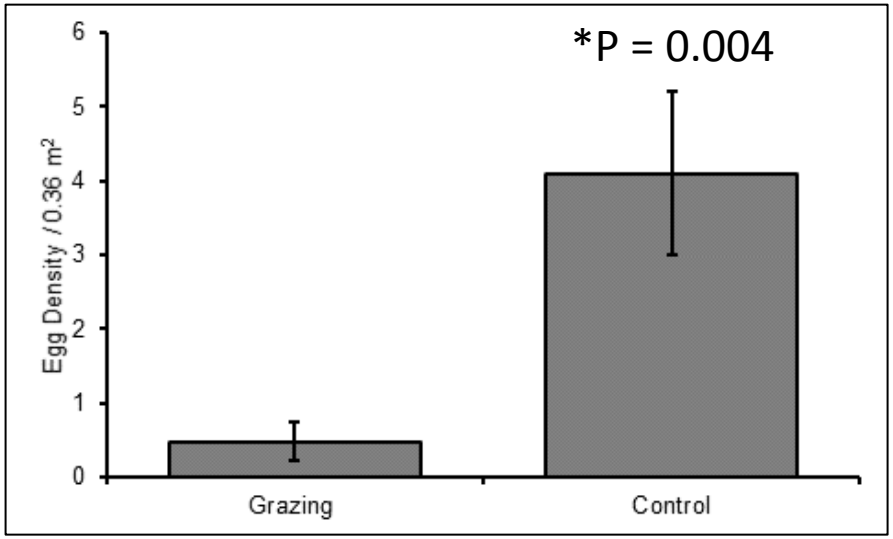
Note: red circles indicate Kincaid's lupine

Land with year around horse grazing

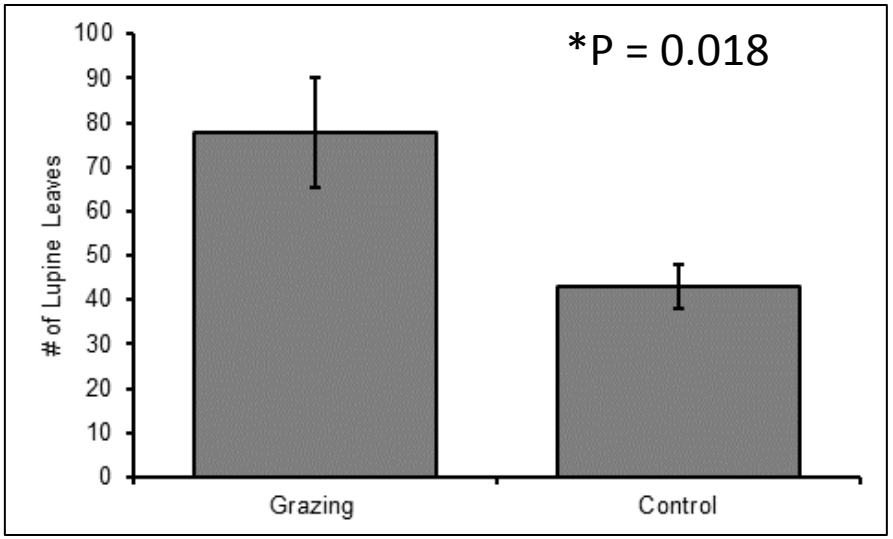
Land with no grazing

Persistent Grazing Study Results

Horse pasture results



Egg abundance



Lupine leaf abundance

Note: Llama pasture had very similar results as the horse pasture

Persistent Grazing Study Results

General observations/ hypotheses:

- Grazed areas lack moss and soil litter
  - Maybe this deficiency is perceived by FBB as low quality habitat
- Lupines tend to be more robust in grazed areas (less competition)
  - This might lead to higher alkaloid content making them less palatable

Persistent Grazing FBB time trials

Methodology

- Randomly established 15 10 meter plots
- Female FBB were captured and released into grazed and ungrazed areas
- Amount of time was recorded for various behaviors of female FBB

Results

Key finding: Female FBB spent **75% more time** ovipositing in ungrazed area

Persistent grazing: Future work

1. Monitoring abandoned llama and horse pastures to see if/when FBB to begin laying eggs at similar rates as non-grazed areas.

2. Established cattle grazing trials where K. lupine is present. Grazing occurs during growing season.

Methods:

- Fenced pasture divided into grazed and ungrazed areas
- Monitoring lupine leaf density and establishment rates of new lupine in grazed and ungrazed pastures

1st year Results:

Treatment	Lupine leaf density	Lupine plant establishment
Grazed	97% decline	19 % decline
Ungrazed	39% decline	10% decline

Conclusions / recommendations

Persistent grazing is not recommended until additional research can explain why FBB are reluctant to lay eggs in grazed areas.

- Do a more in depth literature search
- Investigate the importance of soil litter
- Compare lupine chemistry and physiology (leaf toughness) in grazed and ungrazed areas

Acknowledgements

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QUESTIONS?