A recalibration of the Percent Ungrazed Plant utilization method in semi-arid grasslands invaded by lovegrass

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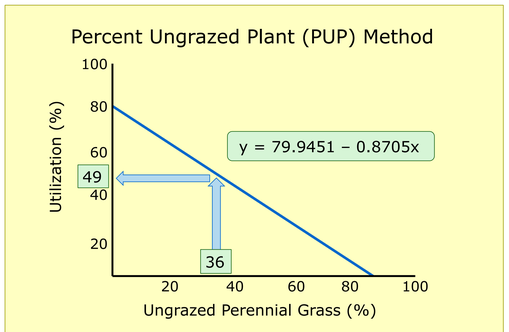
Key Finding: Introduced lovegrass has not influenced the springtime developed Percent Ungrazed Plant Method created prior to the widespread presence of introduced lovegrass.

1. Introduction

Background

- Utilization is the percentage of annual herbage produced that is removed by grazing animals.
- One method to estimate utilization is the Percent Ungrazed Plant (PUP) Method.



Roach 1950: Estimating Perennial Grass Utilization on Semidesert Cattle Ranges by Percentage of Ungrazed Plants

- PUP was developed in spring 1950 at the Santa Rita Experimental Range as a quicker, easier substitute for the height-weight method.
- PUP was tested prior to the widespread dominance of lovegrass (Lehmann lovegrass, *Eragrostis lehmanniana* and Boer lovegrass, *E. curvula*).

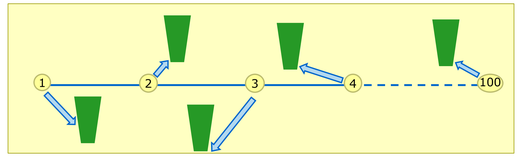
Research Questions

- Does the presence of lovegrass influence the PUP Method?
- With lovegrass, do utilization estimates vary between the season of measurement?
  - Spring = April, May, June
  - Winter = January, February, March

2. Methods

Field site

- Santa Rita Experimental Range
- Data collected in spring/winter of 2010 to 2013
- Identify the closest perennial grass along a 100 hit paced transect, separated by 3 paces

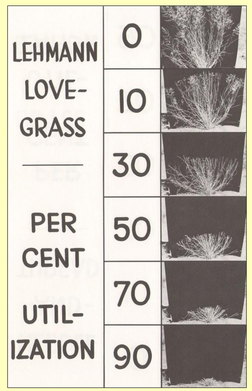


Two methods of estimating utilization

Method 1: PUP Method
- Determine grazed-ungrazed status
- Convert % ungrazed to % utilization using PUP Method equation

Method 2: Photo Guide (PG) Method
- More direct measurement than PUP
- Classes defined by photo guides used to estimate % utilization

Photo Guide (PG) Method

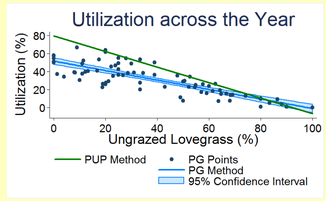


Schmutz 1978: Estimating Range Use with Grazed-Class Photo Guides

- Compare PUP and PG Methods across the year and by season

3. Results

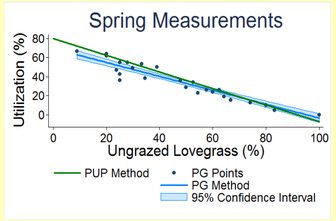
a. Comparing PUP and PG across the Year



PG Across the Year
y = -0.53x + 51.75
p = 0.004
R^2 = 0.78
n = 81

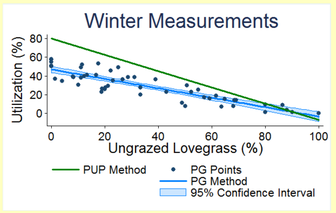
PG Method differs from PUP Method
p = 0.004

b. Comparing PUP and PG by Season



PG following spring grazing
y = -0.73x + 69.6
p <0.001
R^2 = 0.92
n = 28

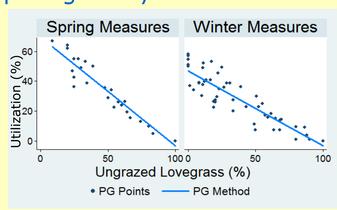
PG Method does not differ from PUP Method
p = 0.12



PG following winter grazing
y = -0.5x + 46.86
p < 0.001
R^2 = 0.80
n = 53

PG Method differs from PUP Method
p < 0.001

c. Comparing PG by Season



Spring PG Method differs from Winter PG Method
p = 0.02

4. Conclusions

PUP and PG across the year and by season

- Across the year, PUP and PG differ. The difference may be the result of cool season lovegrass growth.
- With spring measurements, PUP and PG do not differ, suggesting lovegrass has not influenced the PUP Method equation.

Seasonal measurements using PG

- Spring and winter measurements result in different estimates of utilization.
- The consistent relationship with spring measures, PUP, and PG suggests spring measurements may be more accurate and consistent.

Measuring utilization using PUP is recommended during the spring because it represents the end of the growing season making spring measures more accurate and consistent than winter measures.

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