

Interseeding Falcata Alfalfa (*Medicago sativa* ssp. *falcata*) into Native Rangelands:

Effects on forage production and quality

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Introduction:

Livestock producers desire practices that will increase carrying capacity and productivity.

Longer grazing season to reduce supplement feed needs

Higher crude protein in native forage

Introduction:

Interseeding a legume such as alfalfa can:

Provide early-winter grazing and quality forage during the growing season

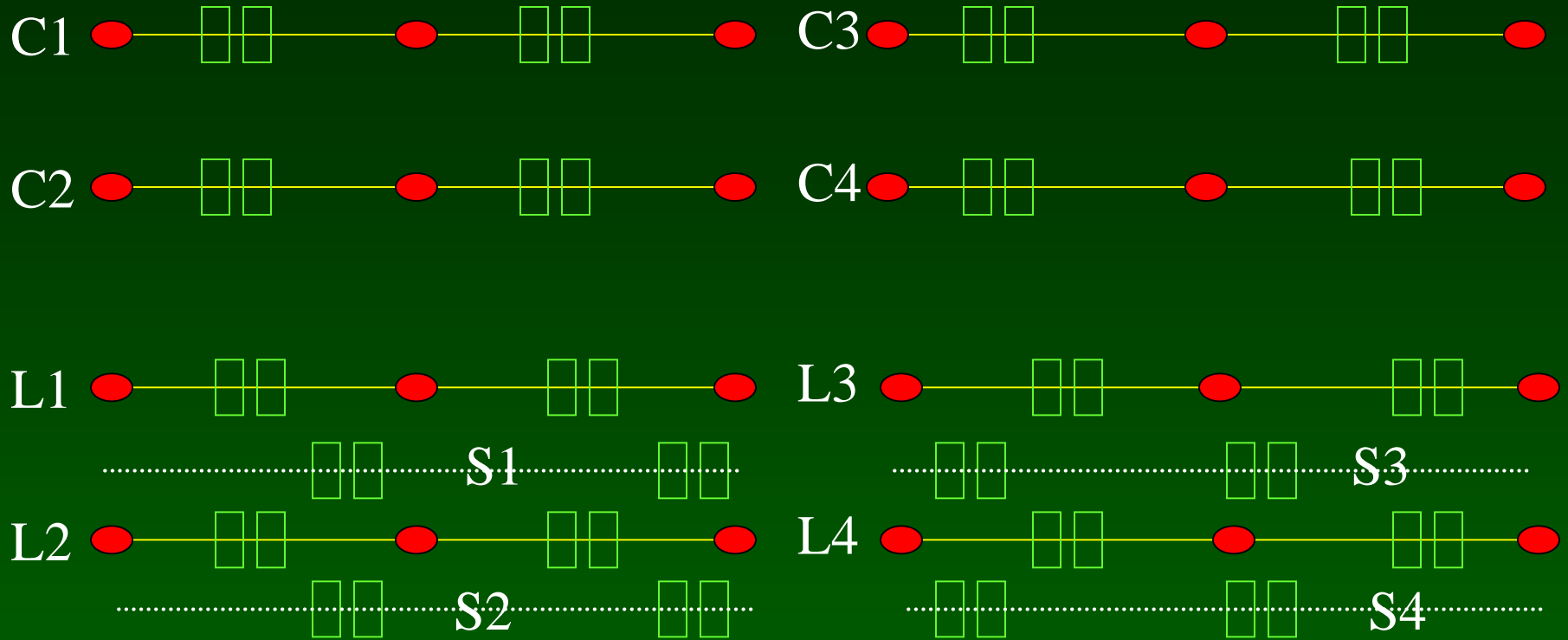
Fix atmospheric N, providing fertilization to increase productivity and protein content of the native plant community.

** Poor survival under grazing has limited implementation of interseeding alfalfa.

Methods:

The vegetative aspect of this study used transects, with the addition of plant samples collected in the S, or interspace area.

Experimental Design:



Four plant clipping locations (using 0.18m² frames) on all transects C,L,S were clipped and plants separated into growth forms

Plant Growth Forms:

Live biomass

Annual forbs

Perennial forbs

Cool season grasses

Warm season grasses

Other grasses

Weedy species

Alfalfa

Other biomass

Litter

Standing dead

All plants analyzed for total N and C



Belowground biomass

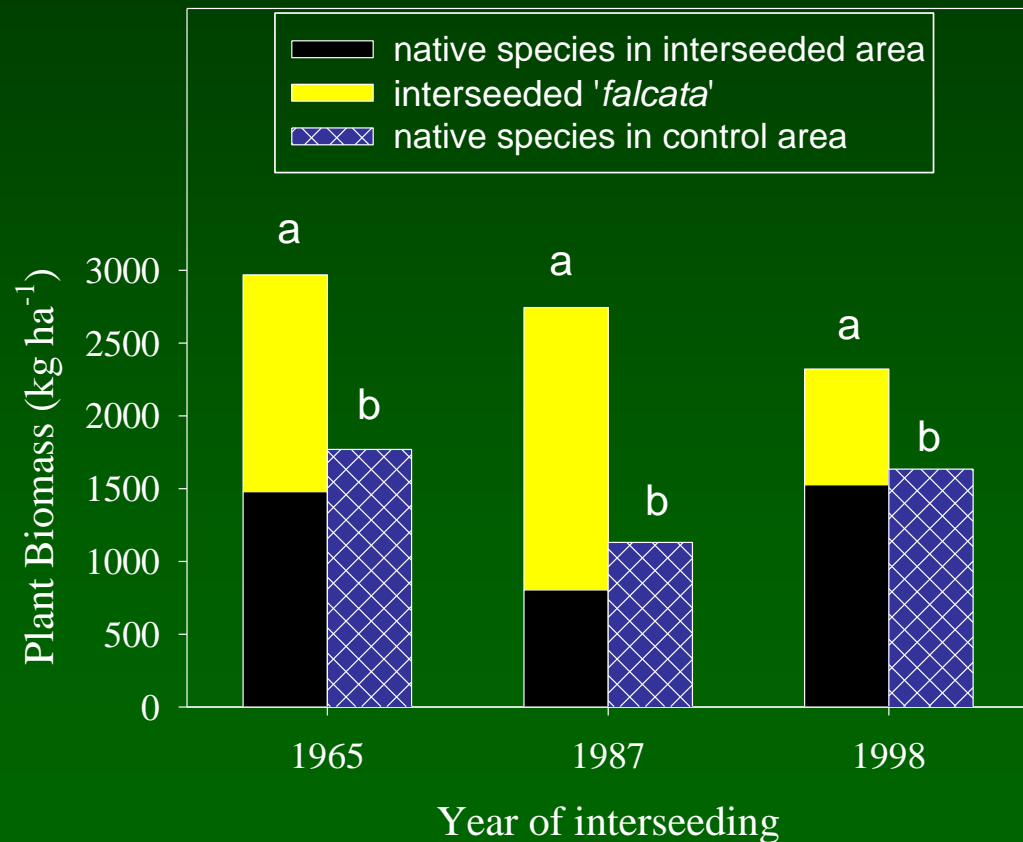
Roots were removed from soil samples and analyzed for total C and N, which were corrected for ash content.

Root biomass was estimated using a root : shoot ratio of 27:1 established for a mixed grass prairie under light grazing (Schuman et al. 1999).

Results:

Effects of interseeding '*falcata*' alfalfa on native rangeland production

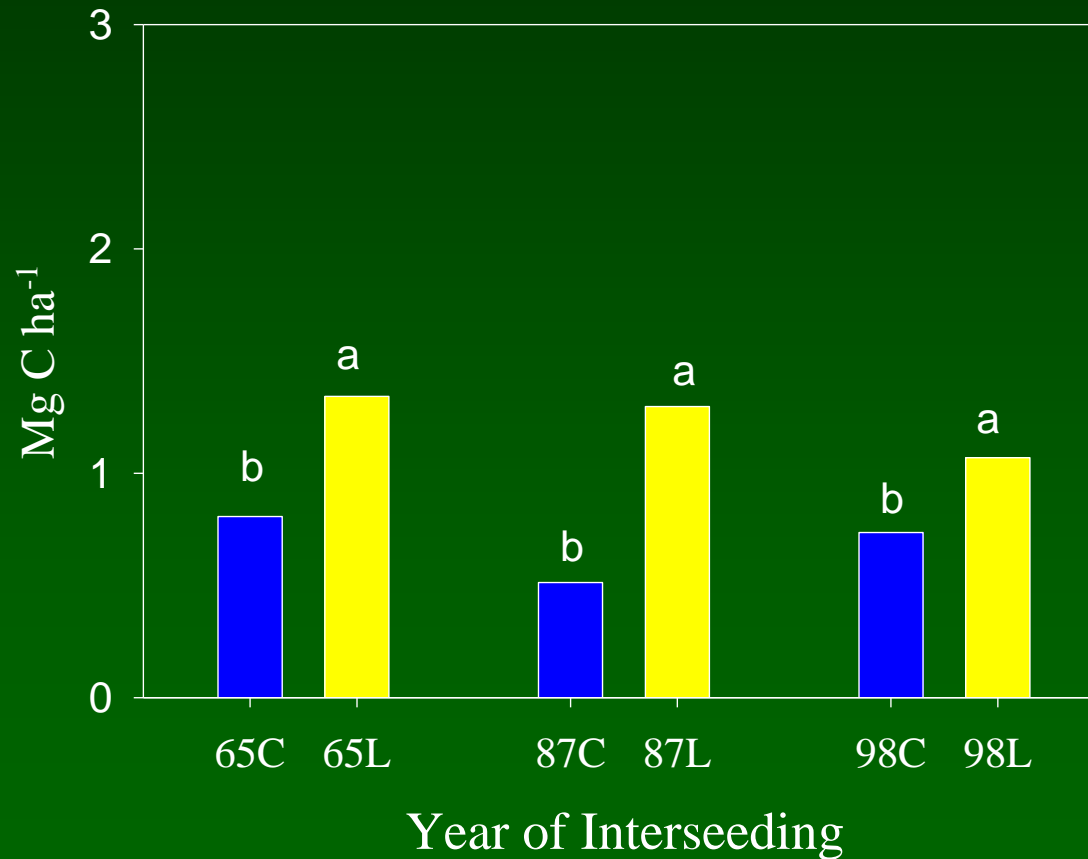
Alfalfa 60+ cm tall



Means with the same letter within a year are not significantly different ($P \leq 0.10$)

Results:

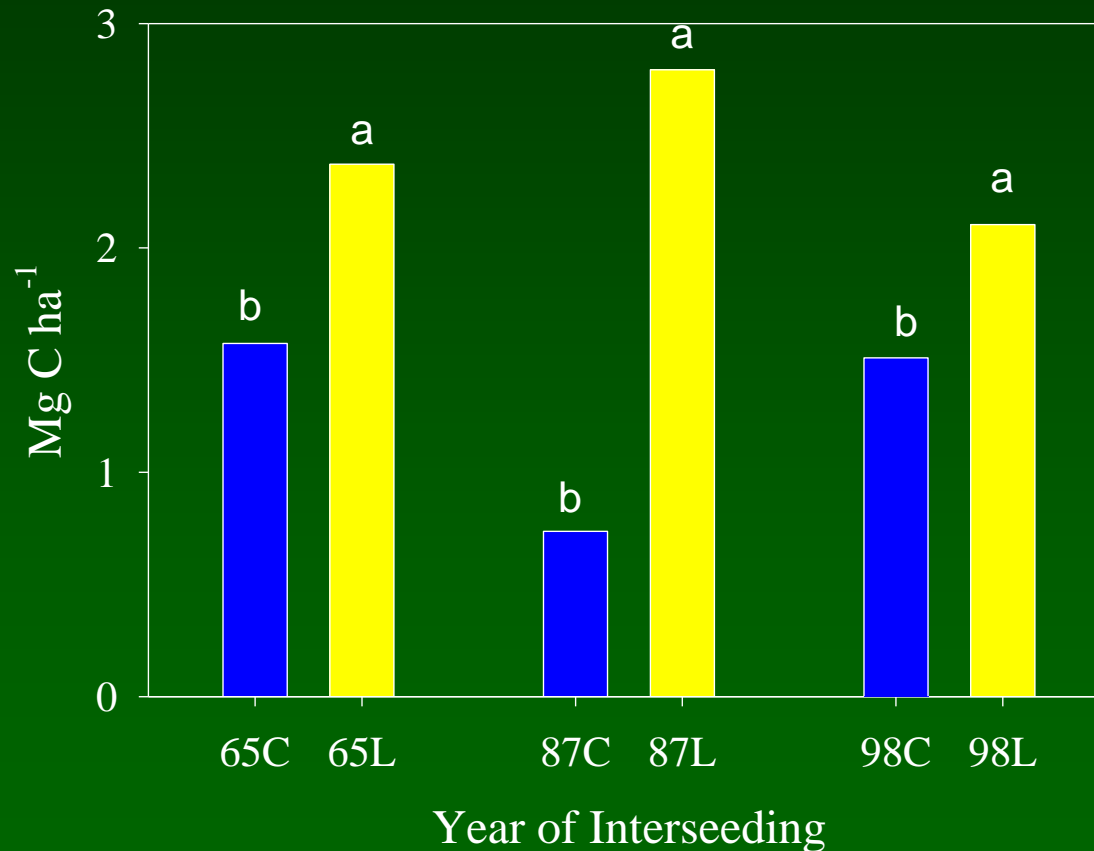
Aboveground Live Biomass C in Control vs. Interseeded Plots



Means with the same letter within a year are not significantly different ($P \leq 0.10$)

Results:

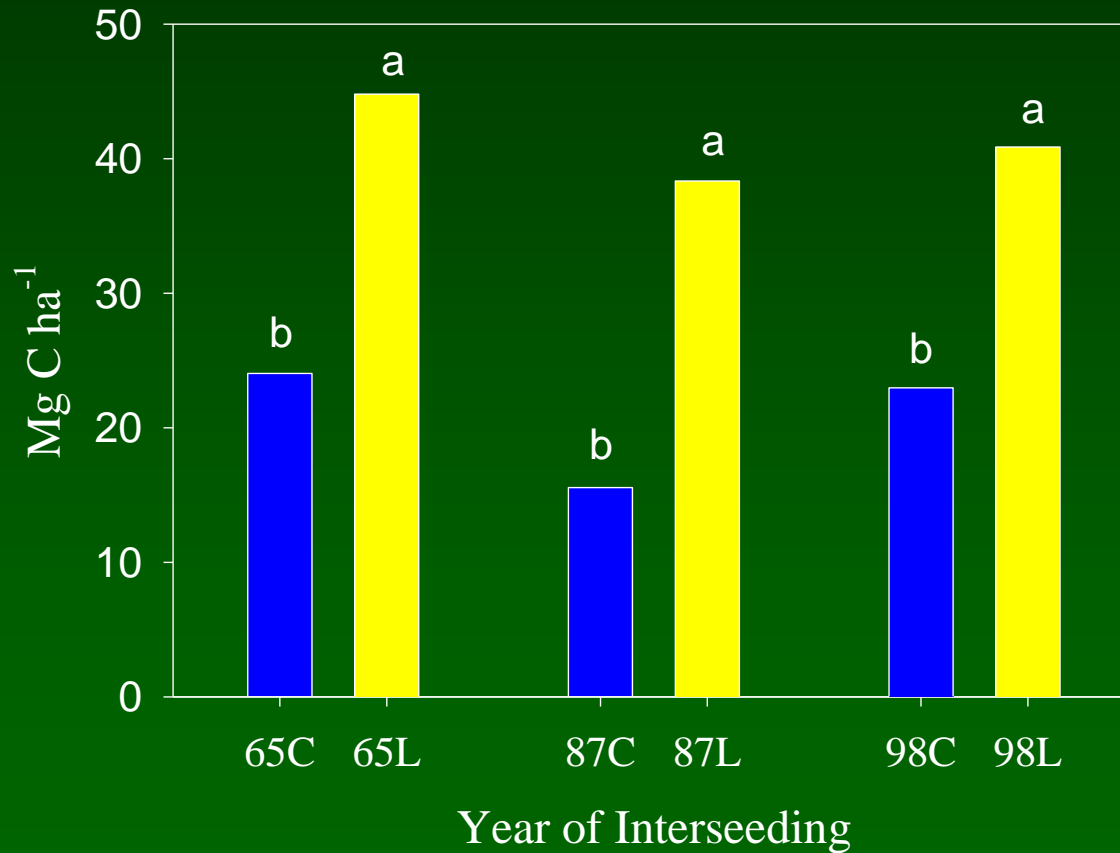
Aboveground Total Biomass C in Control vs. Interseeded Plots



Means with the same letter within a year are not significantly different ($P \leq 0.10$)

Results:

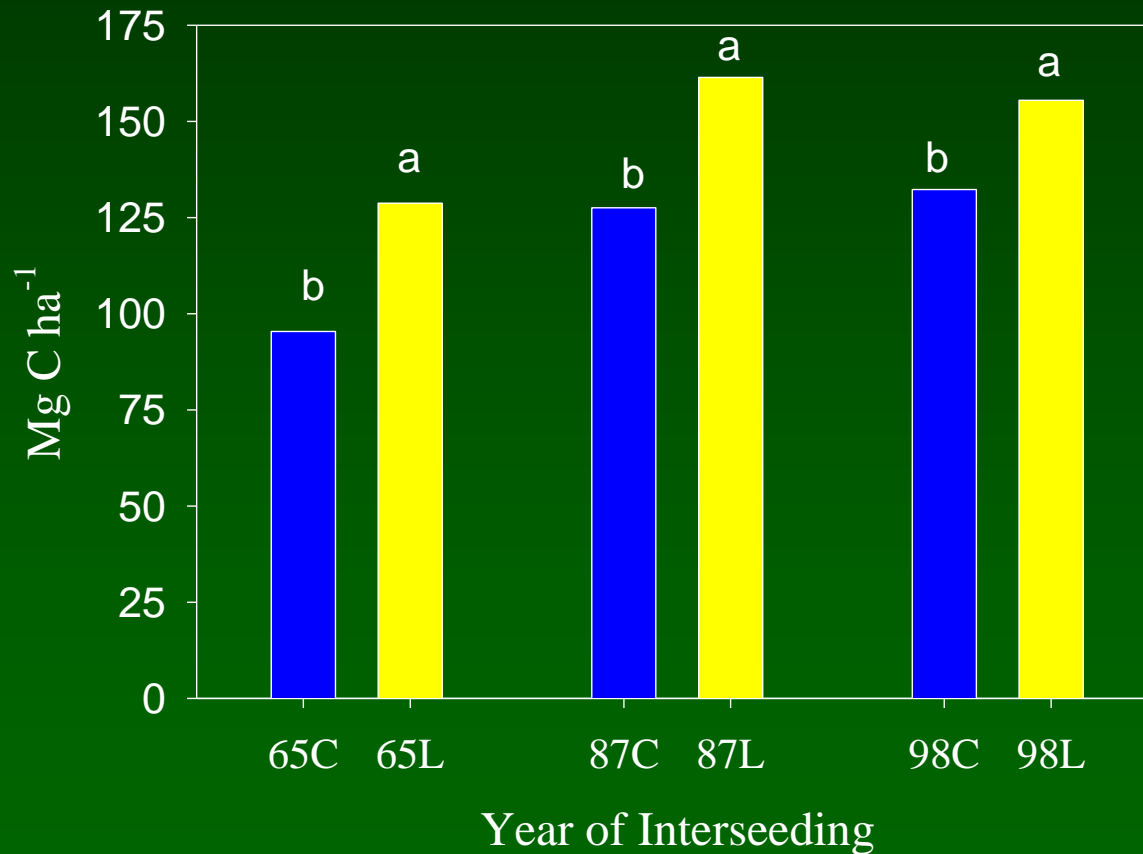
Root Biomass C in Control vs. Interseeded Plots



Means with the same letter within a year are not significantly different ($P \leq 0.10$)

Results:

Total Ecosystem C in Control vs. Interseeded Plots



Means with the same letter within a year are not significantly different ($P \leq 0.10$)

Results:

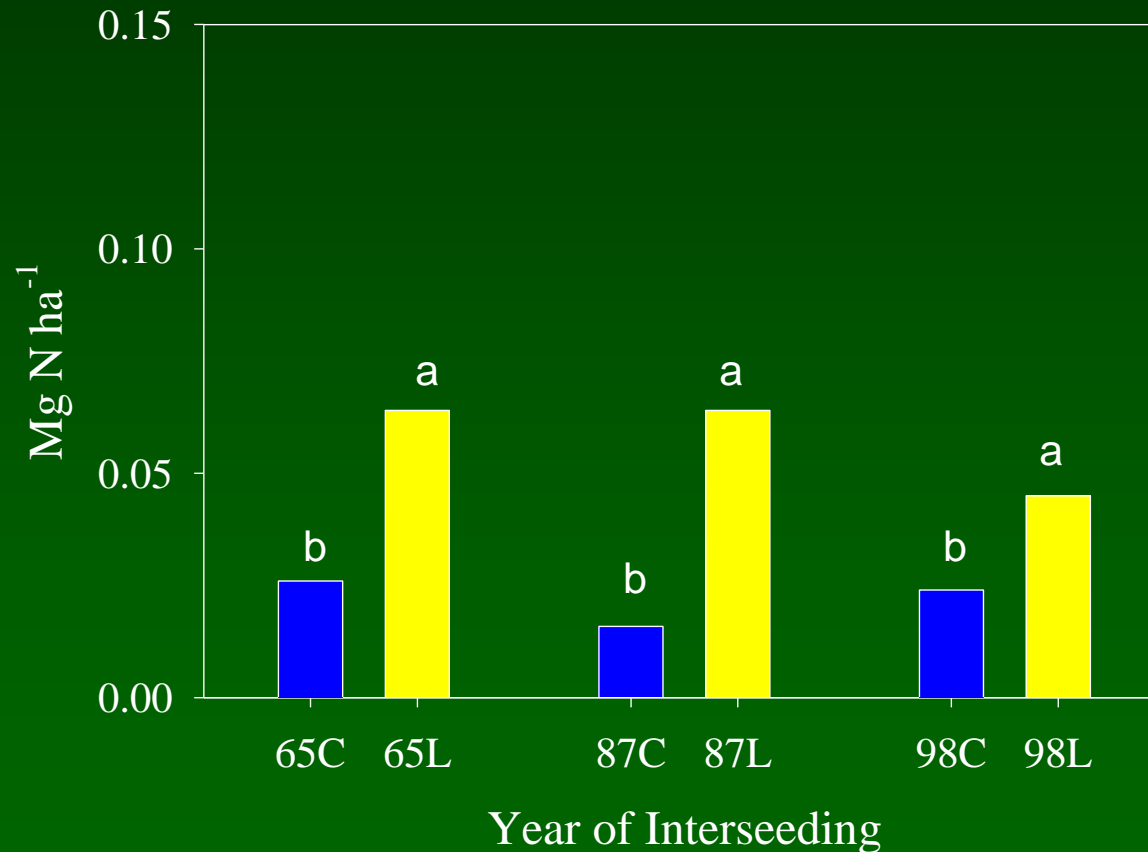
Carbon and Nitrogen content of extracted root material

| Treatment | % Carbon | % Nitrogen |
|-------------------|----------|------------|
| 1965 Control | 50.33 | 1.15 |
| 1965 Interseeding | 51.36 | 1.58 |
| 1987 Control | 50.89 | 0.93 |
| 1987 Interseeding | 52.29 | 1.14 |
| 1998 Control | 52.02 | 1.20 |
| 1998 Interseeding | 51.90 | 1.29 |

Root C and N concentrations corrected for ash content

Results:

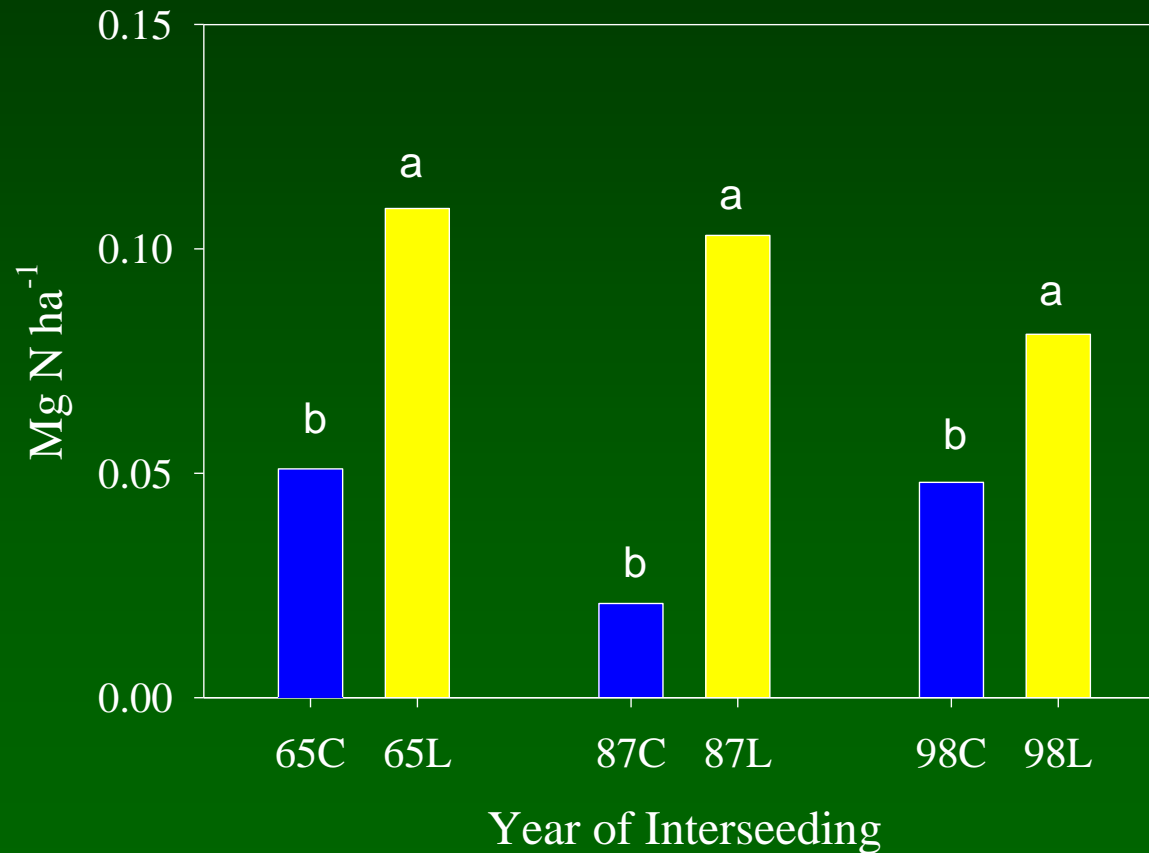
Aboveground Live Biomass N in Control vs. Interseeded Plots



Means with the same letter within a year are not significantly different ($P \leq 0.10$)

Results:

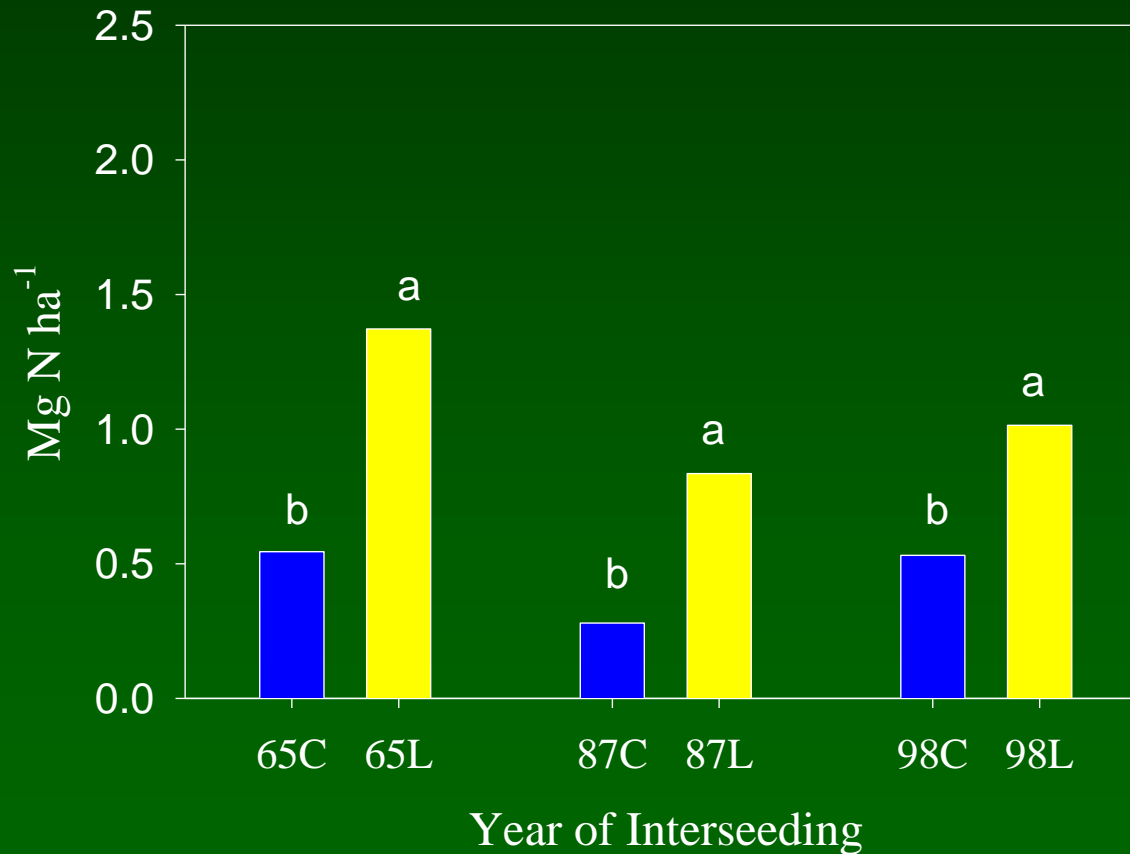
Aboveground Total Biomass N in Control vs. Interseeded Plots



Means with the same letter within a year are not significantly different ($P \leq 0.10$)

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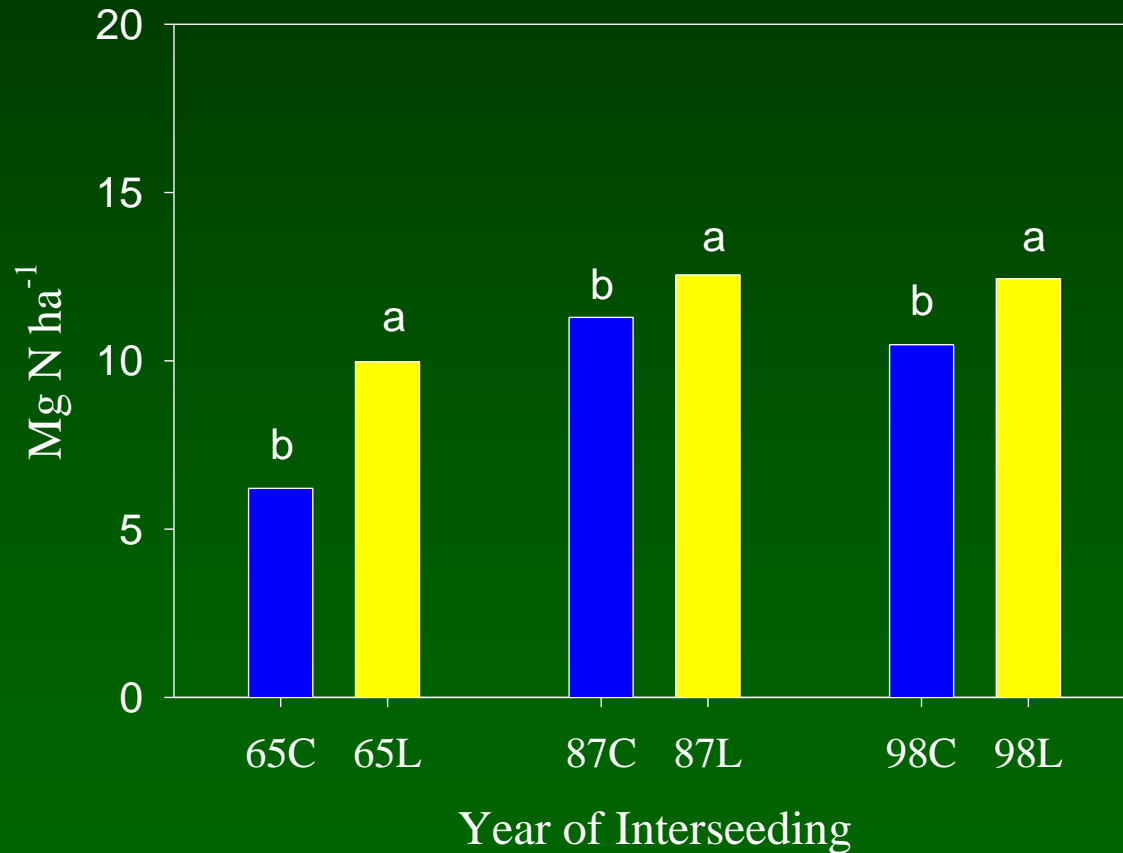
Root Biomass N in Control vs. Interseeded Plots



Means with the same letter within a year are not significantly different ($P \leq 0.10$)

Results:

Total Ecosystem N in Control vs Interseeded Plots



Means with the same letter within a year are not significantly different ($P \leq 0.10$)

Conclusions:

Increasing rangeland forage production and quality can help livestock producers by increasing carrying capacity and livestock performance.

Interseeding '*falcata*' alfalfa has been shown to,

- Increase production on native rangelands
- Provide high protein forage for livestock
- Increase protein content of the native vegetation
- Reduce need for winter supplemental feed by lengthening the grazing season

Conclusions:

Soil C and N represent the majority of the C and N in the ecosystem.

Interseeding alfalfa has been shown to increase soil N, which along with grazing will increase sequestration of C in a rangeland setting.