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

Effects on forage production and quality

G.E. Schuman, M.C. Mortenson, L.J. Ingram

USDA-ARS, High Plains Grasslands Research Station, Cheyenne, WY
Univ. of Wyoming, Dept. of Ecosystem Science and Management, Laramie, WY
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.
Four plant clipping locations (using 0.18m\(^2\) 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 ≤ 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 ≤ 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<0.10)
Results:

Root Biomass C in Control vs. Interseeded Plots

Means with the same letter within a year are not significantly different (P ≤ 0.10)
Results:

Total Ecosystem C in Control vs. Interseeded Plots

Means with the same letter within a year are not significantly different (P ≤ 0.10)
### Results:

**Carbon and Nitrogen content of extracted root material**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>% Carbon</th>
<th>% Nitrogen</th>
</tr>
</thead>
<tbody>
<tr>
<td>1965 Control</td>
<td>50.33</td>
<td>1.15</td>
</tr>
<tr>
<td>1965 Interseeding</td>
<td>51.36</td>
<td>1.58</td>
</tr>
<tr>
<td>1987 Control</td>
<td>50.89</td>
<td>0.93</td>
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<tr>
<td>1987 Interseeding</td>
<td>52.29</td>
<td>1.14</td>
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<tr>
<td>1998 Control</td>
<td>52.02</td>
<td>1.20</td>
</tr>
<tr>
<td>1998 Interseeding</td>
<td>51.90</td>
<td>1.29</td>
</tr>
</tbody>
</table>

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≤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 ≤ 0.10)
Results:

Root Biomass N in Control vs. Interseeded Plots

Means with the same letter within a year are not significantly different (P≤0.10)
Results:

Total Ecosystem N in Control vs Interseeded Plots

Means with the same letter within a year are not significantly different (P ≤ 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.