Evaluation of *Camelina sativa* as an Alternative Dryland Seed Crop in Southeast Wyoming

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Introduction

The desire for energy security and new Environmental Protection Agency regulations mandating lower sulfur content in diesel fuel have stimulated interest in vegetable oil (biodiesel) as an alternative fuel. A 1- to 2-percent blend of biodiesel can restore the lubricity that was lost in diesel as a result of the lowering of the sulfur content. *Camelina sativa* has been reported to be a drought tolerant oilseed crop with oil qualities that make it attractive as a biodiesel crop.

Objectives

The goal was to evaluate camelina as a partial fallow replacement under the dryland growing conditions of southeastern Wyoming.

Materials and Methods

Since 2008, 10 acres of dryland camelina has been grown at the James C. Hageman Sustainable Agriculture Research and Extension Center (SAREC) near Lingle to evaluate cropping systems impacts when camelina is included in a crop rotation. A winter wheat-camelina (camelina replacing fallow) rotation scheme was compared to the traditional winter wheat-fallow system in field scale replicated trials. The experimental design consisted of four replications with each treatment block (plot) encompassing approximately one-half acre. The experiment was repeated in each year of the three years. It is to be continued for a fourth year (2011). In 2011, a 12-treatment nitrogen/phosphorus (N/P) fertilizer trial has been imposed on a portion of each camelina block.

Plots were sown using conventional equipment in mid-March 2008, but they required replanting in mid-May so sowing was delayed until mid-April in 2009 and 2010. Yield sampling was accomplished by harvesting approximately 7,500 square feet of each plot using a small plot combine in late July.

Results and Discussion

There was visually and quantitatively a dramatic impact from cropping camelina in place of fallow at SAREC. Mean yields of camelina after wheat were far below economic viability in 2008 and 2009 *(Table 1)*.
Table 1. Camelina yield over three years following winter wheat in dryland crop rotation at SAREC.

<table>
<thead>
<tr>
<th>Year</th>
<th>Yield (lb/a)</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td>Camelina</td>
<td>3.2</td>
<td>24.1</td>
<td>13.7</td>
</tr>
<tr>
<td>Fallow</td>
<td>13.2</td>
<td>25.6</td>
<td>19.4</td>
</tr>
<tr>
<td>Mean</td>
<td>8.2</td>
<td>24.8</td>
<td>16.5</td>
</tr>
<tr>
<td>LSD 0.05</td>
<td>NS</td>
<td>NS</td>
<td>NS</td>
</tr>
</tbody>
</table>

Table 2. Comparison of winter wheat yield (bu/acre) over two years following camelina or fallow in dryland crop rotations at SAREC.

Although grasshoppers no doubt contributed to the low yield of 92 lb/acre in 2009, it is believed that, although there was some recovery from the long-term drought, lack of soil moisture was a primary factor. For the camelina season (roughly the first six months of the year, January 1 to July 30) precipitation was 45, 52, 70, 93, and 140 percent of the 30-year mean of 9.5 inches for 2006, 2007, 2008, 2009, and 2010, respectively. Camelina yield in 2010 improved substantially to more than 700 lbs/acre but was still below the anticipated threshold of 800 lbs/acre. This no doubt was from the increased precipitation during the first half of 2010, which exceeded the long term (30-year) average precipitation by 40 percent. As a consequence of the level of precipitation, wheat yields following camelina averaged 70 percent of those after fallow in 2009 and 2010 (Table 2). In 2010, however, yields were only marginally reduced after camelina compared to fallow (24.1 vs 25.6 bu/acre). This indicates that in some years camelina may replace fallow without harming wheat yields.

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**Contact Information**

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