Organic wheat: Profitable niche market for conventional wheat producers?

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Organic wheat: Profitable niche market for conventional wheat producers?

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Introduction

Few cropping alternatives exist for growers in the semi-arid dryland wheat producing area in the Palouse region of the Pacific Northwest. In this study we explore the potential for increasing economic and environmental sustainability in this region by incorporating organic reduced tillage cropping systems into conventional farming operations using results from six years of organic cropping system trials near Pullman, WA (Kahl, 2014).

Barriers to Organic Production

This region is characterized by high yielding dryland grain production, but less than 0.01% of the 8 million acres in dryland production in Washington and Idaho are certified organic. Challenges to organic production are both agronomic and economic. Replacing herbicides with tillage exacerbates tillage erosion, a serious problem in this region. Conservation tillage is practiced on most farms in the region (Kok et al., 2009). Lack of locally available manure hampers fertility efforts. Weed control is another serious issue for organic producers, requiring specialized tillage equipment such as the rotary harrow and hoe (see Painter et al., 2007). 

Organic Production within a Large Conventional Farm

Modeled on a large, well-established farm in this region, organic production serves as a specialty crop or niche within this conventional farm. For machinery, organic production can be done with older cast-offs or conventional machinery that has been thoroughly cleaned before moving between conventional and organic. Prices for organic grain have averaged more than double the conventional prices over the six years of the study period. While organic production is perceived as riskier, and has less tools for battling pests, for example, a good organic crop can be quite profitable. While conventional grain prices have stagnated recently, organic prices remain strong, averaging more than 300% of conventional wheat in the first few months of 2015 (USDA-NASS, USDA-AMS).

Data & Methods

Cropping systems (CS): Four organic and one conventional

CS1—Organic 5-year rotation: 3 years of perennial alfalfa-orchardgrass, followed by winter wheat and spring barley

CS2—Organic 2-year rotation for weed control: Winter triticale followed by winter pea used to address perennial bindweed infestation

CS3—Organic 2-year rotation with green manure: Winter pea green manure followed by winter wheat used to assess the ability of green manure as the sole source of nutrients for grain production

CS4—Organic 3-year intensive grain rotation with spring wheat followed by winter pea hay and winter wheat production. Poultry manure was used as a nutrient source for the wheat crops.

CS5—Conventional 3-year rotation with green manure: Winter pea green manure followed by winter wheat used to assess the ability of green manure as the sole source of nutrients for grain production

Economic Comparison of Cropping Systems

Given different lengths of these cropping systems, the net present value (NPV) of returns over total costs (RTC) for the different systems are compared using an annual equivalent annuity (AEA) formula, expressed as

\[ r(NPV)/(1 - (1 + r)^n) \]

where \( r \) represents the interest rate, NPV is the net present value, and \( n \) equals the number of years.

Crop Price Assumptions

<table>
<thead>
<tr>
<th>Crop</th>
<th>Unit</th>
<th>$/unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>Organic Soft white winter wheat, food grade</td>
<td>bu</td>
<td>$13.00</td>
</tr>
<tr>
<td>Organic Hard red spring wheat, feed grade</td>
<td>bu</td>
<td>$16.00</td>
</tr>
<tr>
<td>Organic barley, feed grade</td>
<td>ton</td>
<td>$333.00</td>
</tr>
<tr>
<td>Organic Winter triticale, feed grade</td>
<td>bu</td>
<td>$12.00</td>
</tr>
<tr>
<td>Organic alfalfa-orchardgrass</td>
<td>tons</td>
<td>$215.00</td>
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<tr>
<td>Organic Winter pea hay</td>
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<tr>
<td>Conventional soft white wheat</td>
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<td>$6.50</td>
</tr>
<tr>
<td>Conventional hard red spring wheat (DNWS)</td>
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<td>$8.00</td>
</tr>
<tr>
<td>Conventional Spring Pea</td>
<td>lb</td>
<td>$0.14</td>
</tr>
</tbody>
</table>

Sources: Organic grain prices are estimates provided by Grain Miller’s Inc., valid for the Northwest region of the U.S (Spring 2014) and verified by comparison to average prices provided by USDA-AMS Livestock and Grain Market News (http://www.ams.usda.gov).

Results & Conclusions

Under the assumption of organic premiums on 100% of production, all but one of the organic cropping systems in this analysis are more profitable than C5, the conventional comparison, with returns calculated as the AEA of RTC of $31 per acre (Fig. 1). Returns for CS3, a winter pea green manure/winter wheat rotation, were negative under all premium scenarios. However, if organic premiums are not received, or received on just half of production, returns for all of the organic systems but C2, the winter triticale/winter pea hay rotation, are negative.

Figure 1. Annual Equivalent Annuity for Net Returns over Total Costs ($/acre) by Cropping System and Level of Organic Premiums

Results for CS1 and CS4 appear promising because of high potential returns with 100% organic premiums without the large downside risk of CS2 or CS3 when organic premiums are not available (Fig. 1). Even with organic premiums on just 50% of production, CS4 would provide break-even returns. While C1 is much less profitable than C4, with potential returns of $42 per acre compared to $136 per acre for C4, its returns are 31% higher than C5, the conventional comparison. CS2 shows the strong potential of organic winter triticale, particularly if weed pressure is severe. While adoption of alternative agricultural management systems is inherently risky, these results show promise for selecting reduced tillage organic cropping systems in this region. Further experimentation at production scale is merited.

References:
