Costs of Establishing Organic Northern Highbush Blueberry: Impacts of Planting Method, Fertilization, and Mulch Type

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Additional index words: Vaccinium corymbosum, weed management, compost, blueberry, weed management costs, fertilization, mulch

Abstract. A scenario study was established to evaluate financial management practices for establishing organic production of northern highbush blueberry (Vaccinium corymbosum L.). The practices compared the herb and mulched planting bed and a non-mulched planting bed followed by cold compost. The scenarios also included non-organic applications of herbicides. Costs of establishing Northern highbush blueberries were determined at the Oregon State University fields (Willamina, OR) in 2007 by improving drainage and weed control practices from previous research (Griggs and Rollins, 1947; Hanson, 2004). Organic mulches were added to improve microbial activity, weed control, and drainage. A combination of three mulch types: sawdust, compost, and mulch organic products; has been shown to improve production in blueberry through improved weed control, soil moisture, and yield (Griggs and Rollins, 1947; Clark, 1991; Clark and Johnson, 1991; Keeser et al., 1994). Organic mulches were compared with an inorganic mulch, consisting of 300 g/m² of polyethylene film. The scenarios evaluated the costs of establishing planting beds for highbush blueberry cultivars, where different mulch types, including mixtures, compost plus microbial, and weed mat, and the use of feather meal and feather meal plus compost applied at one and six harvests to examine the impact of the mulches on yield and profit. Results of the scenarios were positive for mulch and compost in highbush blueberry, as they improved yield and increased net returns. The scenarios also highlighted the importance of early season weed control, as weeds have been shown to negatively impact yield and product quality. The scenarios provided a framework for evaluating the cost-effectiveness of mulches and compost in highbush blueberry production systems for organic production.
Feather meal was added to the compost and mulches. This was followed by the application of compost in the second year using the same amount as the previous year. The cost of compost application was $15/h.

Additionally, the establishment of the blueberry plants was done using a drip irrigation system. In this study, the establishment costs were estimated to be $150/bush. The establishment cost included the purchase price of the blueberry plants and the labor costs associated with the planting process.

Overall, the establishment cost for the blueberry plants was $3,420. This cost included the purchase price of the blueberry plants ($2,772) and the labor costs associated with the planting process ($648). The labor costs were estimated to be $15/h.

The establishment cost for the blueberry plants was then compared to the returns obtained from the blueberry production. The returns from the blueberry production were estimated to be $7,077 for the first year, $9,431 for the second year, and $6,978 for the third year. These returns were calculated using the production costs and the sale price of the blueberry fruit.

The economic analysis of the blueberry production showed that the project was economically feasible. The net returns from the blueberry production were positive for all three years. The net returns were calculated as the difference between the returns and the establishment costs.

In conclusion, the establishment of the blueberry plants was economically feasible. The project showed a positive net return of $7,077 for the first year, $9,431 for the second year, and $6,978 for the third year. The establishment cost was $3,420, which was offset by the returns obtained from the blueberry production. Therefore, the establishment of the blueberry plants was a viable option for farmers in the area.
Table 6. Fertilizer treatment costs per organically grown blueberry established on raised and flat beds, Years 1 to 3 (2007 to 2009).

<table>
<thead>
<tr>
<th>Year/Operation</th>
<th>Fertilizer Treatment</th>
<th>Compost</th>
<th>Sawdust (at $/ha)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$179</td>
<td>$249</td>
<td>$70</td>
</tr>
<tr>
<td>2008</td>
<td>$179</td>
<td>$249</td>
<td>$70</td>
</tr>
<tr>
<td>2009</td>
<td>$179</td>
<td>$249</td>
<td>$70</td>
</tr>
</tbody>
</table>

Table 7. Total weed control costs per organically grown blueberry established on flat and raised beds, Years 1 to 3 (2007 to 2009).

<table>
<thead>
<tr>
<th>Year/Operation</th>
<th>Flat Bed</th>
<th>Raised Bed</th>
<th>Total Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>$179</td>
<td>$249</td>
<td>$428</td>
</tr>
<tr>
<td>2008</td>
<td>$179</td>
<td>$249</td>
<td>$428</td>
</tr>
<tr>
<td>2009</td>
<td>$179</td>
<td>$249</td>
<td>$428</td>
</tr>
</tbody>
</table>

Fig. 1. Organic blueberry production system planting in the first growing season, 21 Aug. 2007. ‘Duke’ on raised bed, weed mat mulch, and herbicides were applied through a hand-held string trimmer and herbicide-carrying backpack sprayer, respectively. Top view of ‘Duke’ on flat ground with weed mat, hand-pulled weeds, and herbicides carried in a backpack sprayer.

Fig. 2. Organic blueberry production systems planting in the first growing season, 21 June 2008. ‘Duke’ grows with compost + sawdust mulch and herbicides carried in a backpack sprayer.

Fig. 3. System used to apply uncertified compost mulch- and water-based treatments.

Fig. 4. Comparative rates of herbicide and water-based treatments on blueberry beds, 2007 and 2008. (A) Herbicides applied as water-based treatments were comparable in cost, but the water-based treatments were less effective at controlling weeds. (B) Herbicides applied as water-based treatments were comparable in cost, but the water-based treatments were less effective at controlling weeds. (C) Herbicides applied as water-based treatments were comparable in cost, but the water-based treatments were less effective at controlling weeds.
Table 4. Economic impact of blueberry production in the Pacific Northwest.

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Cumulative Returns</th>
<th>Net Returns</th>
</tr>
</thead>
<tbody>
<tr>
<td>Raised beds, Yallop</td>
<td>$32,967</td>
<td>$15,800</td>
</tr>
<tr>
<td>Raised beds, ‘Duke’ grown on weed mat, fertilized with fish emulsion</td>
<td>$32,967</td>
<td>$15,800</td>
</tr>
<tr>
<td>Raised beds, ‘Liberty’ grown with compost, fertilized with feather meal</td>
<td>$32,967</td>
<td>$15,800</td>
</tr>
<tr>
<td>Raised beds, ‘Liberty’ grown with compost, fertilized with fish emulsion</td>
<td>$32,967</td>
<td>$15,800</td>
</tr>
</tbody>
</table>

*Note: Cumulative returns for ‘Duke’ and ‘Liberty’ are typical in blueberry production to reflect fruit sales and net returns for each treatment and SOIL cultivation options. Economic impact of blueberry production in the Pacific Northwest has significant effects on returns in organic blueberry production systems in the Pacific Northwest.

Literature Cited


