ALTERNATIVE ROW SPACING FOR CORN GRAIN: PRELIMINARY FINDINGS FOR NEW YORK

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This work benefits from the contributions of Rodman Lott, and other family members of Rodman Lott & Son Farms. Rodman and the family shared data from on farm trials, and helped develop the partial budget analyses used to estimate expected changes in profit associated with the change from 30 to 15 inch row spacing of corn grain.

INTRODUCTION

Producers and researchers have evaluated the potential of alternative row widths of corn grain for some time. Currently, efforts focus on narrow row widths, here, less than 30 inches. These include 22, 20 and 15 inch widths, and twin rows among others.

Producers and researchers cite several potential advantages associated with narrow rows. Producers expect some advantages to lead to increased yields.

- More equidistant, in row plant spacing reduces crowding of, and competition among individual plants within the row, allowing the crop to better utilize available light, water and nutrients
- Better weed control
- Less water lost to evaporation
- Decreased soil erosion

Producers and researchers cite several potential disadvantages associated with narrow row widths.

- Mechanical cultivation, post emergence herbicide applications, side dressing the crop and other tasks may be more difficult in narrow rows
- Increased ownership and operating costs associated with changes to the machinery complement
- Increased risk of compaction

Producers desire information, analyses to help with decision making. Are narrow row widths attractive for corn grain under what conditions? What are expected changes in profit associated with a change from 30 inch to narrow rows of corn grain, for example, to 15 inch or 20 inch rows? Analyses should reflect New York conditions, and incorporate the expected advantages and disadvantages associated with the change from 30 inch rows to narrow rows.
A number of studies in corn producing regions compare narrow rows to the more conventional 30 inch row spacing. Most show a positive yield response to narrower rows, while some have resulted in no response. A few have shown a negative response. The yield response to narrow rows seems to be greatest in shorter season environments, and less or even negative at longer season locations. Work in New York has been limited, and has focused on narrow row widths in corn silage production (Cox, Hanchar, Knoblauch, and Cherney). The current work focuses on corn grain in New York.

METHODS

Partial Budget Analysis

One measure that producers use to evaluate possible changes in practices is the expected change in profit. Profit equals the total value of production minus the costs of inputs used in production. Expected change in profit equals the expected change in total value of production minus the expected change in costs. Analysts construct a partial budget to estimate the expected change in profit associated with a proposed change in the farm business, for example, the change from 30 inch row spacing of corn grain to 15 inch rows.

A partial budget analysis provides answers to the following questions to estimate the effects on profitability.

- What value of production, income increases are expected?
- What cost decreases are expected?
- What value of production decreases are expected?
- What cost increases are expected?

Partial budgeting will be used to evaluate the proposed change from 30 inch corn grain rows to 15 inch rows.

Cost Concepts

Partial budget analysis will incorporate expected changes in ownership and operating costs associated with more the expensive planter and narrow row corn head. Cost considerations relevant for examining alternative row spacings for corn grain include fixed and variable costs.

Fixed costs are costs associated with owning a fixed input or resource, for example, the costs associated with owning buildings, machinery and equipment that have useful lives of more than one year. Fixed costs are also referred to as ownership costs. The corn grain enterprise incurs fixed costs even when the input is not used, but still owned. Fixed costs do not vary with the level of production. They exist at the same level regardless of how much or how little the resource is used. Depreciation, interest
as an opportunity cost, some repairs, taxes (sales and property taxes, not income taxes), insurance, and housing comprise the common list of fixed or ownership costs.

Variable costs are those which the manager has control over at a given point in time. They can be varied based upon management decisions in the short term, and change as the level of production changes. For the corn grain enterprise, items such as labor, fuels, lubricants, repairs and maintenance for machinery and equipment, fertilizer and lime, seeds and plants, spray and other crop expenses are examples of variable costs.

On Farm Research

A study farm provided yield data and other information from on farm trials. Selected information and assumptions for the analysis evaluating the change from 30 inch to 15 inch spacing include the following.

- Study farm is a corn grain, soybean operation in western, New York
- Total tillable land harvested is about 3,200 acres
- Farm uses a no-till cropping system
- About 1,600 acres of corn grain harvested annually, balance soybeans
- Yield and other data from the study farm obtained during the 2013 corn grain production year

RESULTS

Producers adopting narrow row widths for corn grain can expect greater ownership and operating costs attributed to the more expensive narrow row planter and narrow row corn grain head. Ownership and operating costs information to be incorporated into the partial budget analysis are reported in Table 1.

Table 1. Selected Machinery Ownership and Operating Costs, 30 inch and 15 inch Row Spacing Alternatives, No-Till Cropping System, Preliminary, Fall 2013.

<table>
<thead>
<tr>
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<th>30 inch Row Spacing</th>
<th>15 inch Row Spacing</th>
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<tbody>
<tr>
<td>Cost</td>
<td>16 row, 30 in.</td>
<td>8 row, 30 in.</td>
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<tr>
<td>Deprec. &amp; Int.</td>
<td>17,076</td>
<td>4,889</td>
</tr>
<tr>
<td>Other</td>
<td>1,740</td>
<td>348</td>
</tr>
<tr>
<td>Repair &amp; Maint.</td>
<td>29.04</td>
<td>12.39</td>
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</tbody>
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Notes: Ownership costs include depreciation, interest as an opportunity cost, insurance, taxes and housing. Repair and maintenance costs are considered variable costs.
Expected changes in corn grain yield will be important to the partial budget analysis. Preliminary yield results from the study farm’s 2013 on farm trial suggest a 0.6 to 6.4 percent, bushels per acre increase for 15 inch rows when compared to 30 inch rows.

Team members reported partial budget results at the January 2014 Corn Congresses, in Batavia, and Waterloo, New York. Please see the PowerPoint presentation document associated with this material.

REFERENCES