Effects of Genetically modified Corn Seed on Growers in Southwestern Nebraska

Brian Lee
AGEC-4960

http://www.landreport.com/wp-content/uploads/2008/05/corn_ethanol.jpg
Outline

- Background
  - History
- Reason for Research
- Methods
  - Benefits
  - Costs
  - Risk
- Conclusion
Background

- Incredible new technology
  - Round-up
  - Bt
  - Down the pipeline
    - Drought
    - Fungicide packages
    - Plant health

- Why are these neat and important to look at?
GMO corn seed can affect decisions that producers have to make on
- Chemicals
- Applications
- Moisture
- Tillage

http://www.thetechherald.com/media/images/200915/2675568751_f8389be5b3.jpg
- I chose to use Southwest Nebraska as my research area.
- Availability of input prices was easier.
- Topics covered are directly relevant to the area.
Technology

- VT Triple
  - Monsanto
  - Round-up Ready
  - Bt
    - Rootworm
    - Corn Borer
  - $280/bag will cover 2.6 acres at a planting population of 30,000

- Round-Up Ready
  - Herbicide Tolerance
  - No Bt
  - $220/bag

- Conventional
  - No Herbicide Tolerance
  - No Bt
  - $200/bag
VT Triple

- One of the newer options on the market
- Triple means Triple stack, or 3 traits
- No applications for Rootworm and Corn borer
- Required 20% refuge acres by EPA
- 5% average yield boost over conventional
Round Up Ready seed

- Technology has been around since 1998
- Just Round-up Ready trait
- Applications for Rootworm and Corn borer required
- 5% average yield increase over conventional
Conventional

- No genetically modified genes
- Applications to control Rootworm and Corn borer
- Cannot apply Round-up to control weeds.

http://www.ca.uky.edu/entomology/entfacts/images/wcr.jpg
Methods

- Used a partial budget to examine costs included with each option
- Included yield comparisons, and considered market price of $3.18/bu. to find a value added from production.
- Included costs of seed, fertilizer, chemical, custom operations/applications, fuel/lube, repairs, and irrigation costs.
- Did not include labor, environmental effects, or time.
Assumptions

- Land and Center Pivots are owned
- Equipment is owned
- Has chemical application equipment, until it needs to be aerially applied.
- These are not necessarily the case everywhere but helps when looking at the raw costs of other inputs
### GMO versus Conventional

- **Assumed 5% yield increase**
- **Irrigated 7 inches with center pivot at $5.44/acre inch**
- **10.02% increase in value of production**

#### Gross value of production

<table>
<thead>
<tr>
<th>Item</th>
<th>GMO</th>
<th>Conventional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-drought year / per acre</td>
<td>Dekalb VT3</td>
<td>No-GMO genes</td>
</tr>
<tr>
<td>Gross value of production</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary product: Corn</td>
<td>636.00</td>
<td>604.20</td>
</tr>
<tr>
<td>Total, gross value of production</td>
<td>636.00</td>
<td>604.20</td>
</tr>
</tbody>
</table>

#### Operating costs:

<table>
<thead>
<tr>
<th>Item</th>
<th>GMO</th>
<th>Conventional</th>
</tr>
</thead>
<tbody>
<tr>
<td>Seed</td>
<td>107.70</td>
<td>77.00</td>
</tr>
<tr>
<td>Fertilizer</td>
<td>100.00</td>
<td>100.00</td>
</tr>
<tr>
<td>Chemicals: Pesticide/Fungicide/Herbicide</td>
<td>32.40</td>
<td>36.40</td>
</tr>
<tr>
<td>Custom operations/applications</td>
<td>6.50</td>
<td>13.00</td>
</tr>
<tr>
<td>Fuel, lube</td>
<td>10.98</td>
<td>20.00</td>
</tr>
<tr>
<td>Repairs</td>
<td>10.59</td>
<td>20.00</td>
</tr>
<tr>
<td>Irrigation costs 26 in/yr</td>
<td>38.08</td>
<td>38.08</td>
</tr>
<tr>
<td>Total, operating costs</td>
<td>306.25</td>
<td>304.48</td>
</tr>
</tbody>
</table>

#### Value of production less operating costs

<table>
<thead>
<tr>
<th>Item</th>
<th>GMO</th>
<th>Conventional</th>
</tr>
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<tbody>
<tr>
<td>Value of production less operating costs</td>
<td>329.75</td>
<td>299.72</td>
</tr>
</tbody>
</table>

#### Supporting information:

- **Yield (bushels per planted acre) 5% increase**: 200, 190
- **Price (dollars per bushel at harvest)**: 3.18, 3.18
- **Enterprise size (planted acres)**: 136, 136
Profit

- Refuge acres have the same cost scheduling as the Conventional acres

<table>
<thead>
<tr>
<th>Profits for 1000 ac. Farm</th>
<th>GMO per acre value</th>
<th>Conventional per acre value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Regular acres</td>
<td>329.75x800 = $263,800</td>
<td>299.72x1000 = $299,720</td>
</tr>
<tr>
<td>Refuge acres</td>
<td>299.72x200 = $59,944</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>$323,744</strong></td>
<td><strong>299,720</strong></td>
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</table>
### GMO versus Round-up Ready

- **Assumed no yield increase**
- **Irrigated 7 inches with center pivot at $5.44/acre inch**
- **2.3% increase in value of production**

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<td>Non-drought year / per acre</td>
<td>Dekalb VT3</td>
<td>RR Seed</td>
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<td>Gross value of production</td>
<td>636.00</td>
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<td>Primary product: Corn</td>
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<td>322.35</td>
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<td>Supporting information:</td>
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<tr>
<td>Yield (bushels per planted acre)</td>
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<td>200</td>
</tr>
<tr>
<td>Price (dollars per bushel at harvest)</td>
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Profit

- Refuge acres have the same cost schedule as the RR acres
GMO versus Conventional, Risk of low rainfall year.

- Crop needs 26 inches to be fully irrigated
- Figured 11 inches put on by center pivot at $5.44/acre inch
Drought year profits

$21,760 less profit for both due to irrigation costs compared to non-drought year
Why use GMO’s?

- Ease to producer
- Technology
- Yields
- Because Herbie says so

Why some people don’t

- Some producers are stuck in their ways
- Familiarity with their current production
- Refuge acres required
Conclusions

- GMO’s are the way of the future
- If you are a producer and not using GMO’s, you are leaving profit in the field.
- The profit increase is there, which should drive most growers to use them.
- Demand by growers will continue to drive R&D


  http://www1.ncdc.noaa.gov/pub/orders/48B7B8B7-2D7F-7B5B-78A0-3BC939B511D6.PDF

  http://www1.ncdc.noaa.gov/pub/orders/6A6012A0-EE76-329C-FB71-376C50F23093.PDF

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