Planting Later than the RMA FPD in South Dakota
On-Farm Research Study

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Situation

• Approximately 95% of sunflower grown in SD is covered by some form of federal crop insurance.

• Currently, producers cannot fully insure sunflower planted after June 10\textsuperscript{th} in northern SD or after June 15\textsuperscript{th} in southern SD.

• Many producers believe they can plant later than these dates without suffering major yield or quality losses.

• RMA requires data to consider changing the current FPD’s.
Crop Insurance Final Planting Dates for Sunflower

2006 Sunflower APH/MPCI (Plan 90) Counties and Final Planting Dates

- **06/05** in green, indicating early planting dates.
- **06/10** in red, indicating late planting dates.
- **06/15** in yellow, indicating expansion counties for irrigated practice.

Map showing the distribution of planting dates and expansion counties across Montana and South Dakota. The map is color-coded to differentiate between different planting dates and expansion areas.
On-Farm Sunflower Planting Date Study

• Conducted 2007-2009.
• Funded by National Sunflower Association and South Dakota Oilseeds Council.
• Objectives
  – Determine if the current FPD’s for sunflower in SD should be changed (moved later).
  – Assist growers in making planting date/replant decisions.
• Planted and harvested by farmer-cooperators using their own equipment.
• Plots monitored by local county Extension educators.
Materials and Methods

Planned
- 3 years, 7 locations per year.
- Plot size of at least 0.5 acre.
- Three planting dates per zone.
  - June 10 zone (June 10, 15, 20 target dates)
  - June 15 zone (June 15, 20, 25 target dates)

Actual
- 2007—5 locations
  - 2008—6 locations (4 harv.)
  - 2009—2 locations
- Plot size ranged from 0.5 to 1.8 acres.
- Four planting dates per zone.
  - June 10 zone (June 10, 15, 20, 25)
  - June 15 zone (June 15, 20, 25, 30)
Materials and Methods

• Randomized complete block with 3 reps.
• All plots at a location were treated similarly regarding hybrid, fertility, planting rate, and pest control.
• Each plot harvested separately and plot weight measured by weigh wagon.
• Moisture and test weight also measured and seed sample sent to SDSU for oil analysis.
Test Sites for 2007-2009 Sunflower Planting Date Study

SOUTH DAKOTA

2003 APH SUNFLOWER COUNTIES & FINAL PLANTING DATE

- **Bison**: 06/10 '07-'08
- **Java**: 06/15 '07
- **Eureka**: 06/15 '07-'08
- **Onida**: 06/15 '07-'09
- **Miller**: 06/15 '07-'08
- **Martin**: 06/15 '07-'09
## Climate Summary

<table>
<thead>
<tr>
<th>Year</th>
<th>Temperature</th>
<th>Precipitation (Jun-Sept)</th>
<th>Killing Frost (≤24°F)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007</td>
<td>Warmer than normal(^1).</td>
<td>Bison, Martin—drier than normal(^2). Eureka, Java, Miller—wetter than normal.</td>
<td>8-18 days later than normal.</td>
</tr>
<tr>
<td>2008</td>
<td>Near normal.</td>
<td>Martin—drier than normal. Bison, Eureka, Miller—wetter than normal.</td>
<td>8-18 days later than normal.</td>
</tr>
<tr>
<td>2009</td>
<td>Cooler than normal.</td>
<td>Onida—near normal. Martin—wetter than normal.</td>
<td>5-10 days earlier than normal.</td>
</tr>
</tbody>
</table>

\(^1\)Normal = 30-year average at each site.  
\(^2\)Normal precipitation, Jun-Sept:  
Bison-7.8”, Martin-8.9”, Eureka-9.7”, Java-9.0”, Onida-9.5”, Miller-9.3”
## Production Practices

<table>
<thead>
<tr>
<th>Year-Location</th>
<th>Current FPD</th>
<th>Plot size</th>
<th>Row Spacing</th>
<th>Hybrid</th>
<th>APH or County T-Yield</th>
</tr>
</thead>
<tbody>
<tr>
<td>2007 Bison</td>
<td>10-Jun</td>
<td>1.73 acre</td>
<td>12&quot;</td>
<td>Pioneer 64H41</td>
<td>850-900</td>
</tr>
<tr>
<td>2008 Bison</td>
<td>10-Jun</td>
<td>1.35 acre</td>
<td>12&quot;</td>
<td>Mycogen 8N358</td>
<td>850-900</td>
</tr>
<tr>
<td>2007 Java</td>
<td>10-Jun</td>
<td>0.5 acre</td>
<td>30&quot;</td>
<td>Pioneer 64H41</td>
<td>1,600</td>
</tr>
<tr>
<td>2007 Eureka</td>
<td>10-Jun</td>
<td>0.5 acre</td>
<td>30&quot;</td>
<td>Pioneer 64H41</td>
<td>1,800</td>
</tr>
<tr>
<td>2008 Eureka</td>
<td>10-Jun</td>
<td>0.5 acre</td>
<td>30&quot;</td>
<td>Pioneer 64H41</td>
<td>1,381</td>
</tr>
<tr>
<td>2007 Miller</td>
<td>15-Jun</td>
<td>0.9 acre</td>
<td>38&quot;</td>
<td>Mycogen 8N272</td>
<td>1,532</td>
</tr>
<tr>
<td>2008 Miller</td>
<td>15-Jun</td>
<td>1.7 acre</td>
<td>30&quot;</td>
<td>Mycogen 8N358</td>
<td>1,532</td>
</tr>
<tr>
<td>2007 Martin</td>
<td>15-Jun</td>
<td>1.1 acre</td>
<td>30&quot;</td>
<td>Mycogen 8N272</td>
<td>1,097</td>
</tr>
<tr>
<td>2008 Martin</td>
<td>15-Jun</td>
<td>0.5 acre</td>
<td>30&quot;</td>
<td>Seeds 2000 Defender Plus</td>
<td>1,097</td>
</tr>
<tr>
<td>2009 Martin</td>
<td>15-Jun</td>
<td>0.5 acre</td>
<td>30&quot;</td>
<td>Mycogen 8N358</td>
<td>1,097</td>
</tr>
<tr>
<td>2009 Onida</td>
<td>15-Jun</td>
<td>1.8 acre</td>
<td>30&quot;</td>
<td>Syngenta DKF 38-75 NS</td>
<td>1,507</td>
</tr>
</tbody>
</table>
## Actual Planting Dates

### June 10 Zone

<table>
<thead>
<tr>
<th>Target Date</th>
<th>Bison ‘07</th>
<th>Bison ‘08</th>
<th>Java ‘07</th>
<th>Eureka ‘07</th>
<th>Eureka ‘08</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun 10</td>
<td>Jun 10</td>
<td>--</td>
<td>Jun 10</td>
<td>Jun 10</td>
<td>Jun 10</td>
</tr>
<tr>
<td>Jun 15</td>
<td>Jun 15</td>
<td>Jun 14</td>
<td>Jun 16</td>
<td>Jun 15</td>
<td>Jun 14</td>
</tr>
<tr>
<td>Jun 20</td>
<td>Jun 20</td>
<td>Jun 19</td>
<td>--</td>
<td>Jun 19</td>
<td>Jun 19</td>
</tr>
<tr>
<td>(Jun 25)</td>
<td>--</td>
<td>Jun 24</td>
<td>Jun 24</td>
<td>--</td>
<td>--</td>
</tr>
</tbody>
</table>

### June 15 Zone

<table>
<thead>
<tr>
<th>Target Date</th>
<th>Miller ‘07</th>
<th>Miller ‘08</th>
<th>Martin ‘07</th>
<th>Martin ‘08</th>
<th>Martin ‘09</th>
<th>Onida ‘09</th>
</tr>
</thead>
<tbody>
<tr>
<td>Jun 15</td>
<td>--</td>
<td>Jun 15</td>
<td>Jun 17</td>
<td>Jun 14</td>
<td>Jun 17</td>
<td>Jun 15</td>
</tr>
<tr>
<td>Jun 20</td>
<td>Jun 20</td>
<td>Jun 20</td>
<td>Jun 22</td>
<td>Jun 21</td>
<td>Jun 22</td>
<td>Jun 20</td>
</tr>
<tr>
<td>Jun 25</td>
<td>Jun 24</td>
<td>Jun 25</td>
<td>--</td>
<td>--</td>
<td>--</td>
<td>Jun 25</td>
</tr>
<tr>
<td>(Jun 30)</td>
<td>Jun 28</td>
<td>--</td>
<td>Jun 28</td>
<td>Jun 28</td>
<td>Jun 29</td>
<td>--</td>
</tr>
</tbody>
</table>
2007 Java at Flowering
2007 Java Near Maturity
Seed Yield—June 10 Zone

* Thin stand

**Legend**
- 10-Jun
- 15-Jun
- 20-Jun
- 25-Jun
- T-Yield

**Graph Key**
- a
- b
- c
- *
Seed Yield (lbs/A) – June 15 Zone

* weedy, thin stand

**Wind damage**

- Miller '07
- Martin '07
- Miller '08
- Martin '08
- Martin '09
- Onida '09
- Mean
Oil % -- June 15 Zone

- 15-Jun
- 20-Jun
- 25-Jun
- 30-Jun

Oil [%]

- Miller '07
- Martin '07
- Miller '08
- Martin '08
- Martin '09
- Mean

Legend:
- b
- a
- c

Note: Graph shows the oil percentage for different zones and dates.
Moisture at Harvest

June 10 Zone

June 15 Zone

Moisture (%)

<table>
<thead>
<tr>
<th>Date</th>
<th>10-Jun</th>
<th>15-Jun</th>
<th>20-Jun</th>
<th>25-Jun</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 10 Zone</td>
<td>c</td>
<td>bc</td>
<td>b</td>
<td>a</td>
</tr>
<tr>
<td></td>
<td>c</td>
<td>c</td>
<td>bc</td>
<td>ab</td>
</tr>
</tbody>
</table>

 SDSU
Moisture (%)—June 10 Zone

Harvest Moisture (%)

- 10-Jun
- 15-Jun
- 20-Jun
- 25-Jun

Bison '07
Java '07 2 reps
Eureka '07
Eureka '08
Bison '08 2 reps
Mean

Legend:
- a
- b
- c

Note: Data for each location and date is represented by different colors and letters indicate statistical significance.
Test Wt. (lb/bu)—June 15 Zone

[Bar chart showing test weights for different locations and dates, with letters indicating statistical significance]
Summary - June 10 Zone

- Averaged over 5 environments, yield of sunflower planted on June 15\textsuperscript{th} equaled that of sunflower planted on June 10\textsuperscript{th}.
- Sunflower planted on June 20\textsuperscript{th} averaged 371 lbs/acre lower than that planted on June 10\textsuperscript{th}, but exceeded the average T-yield across locations.
- Additional yield decrease when planting delayed until June 25\textsuperscript{th}. (based on 2 locations of data)
- Oil content remained stable at all four dates of planting.
- Test weight did not differ for sunflower planted on June 10\textsuperscript{th}, 15\textsuperscript{th}, or 20\textsuperscript{th}. 
Summary - June 15 Zone

• Averaged over 6 environments, sunflower planted on June 20\textsuperscript{th} and 25\textsuperscript{th} yielded slightly lower than sunflower planted on June 15\textsuperscript{th}, but exceeded the average T-yield across locations.

• Small decrease in oil content when planting was delayed to June 20\textsuperscript{th}, but no further decrease when delayed to June 25\textsuperscript{th} or 30\textsuperscript{th}.

• Sunflower planted on June 25 and 30 had a lower test weight than that planted on June 15\textsuperscript{th}.
Conclusions

• Seed moisture tended to increase with each delay in planting in both zones. Differences were not significant at all locations.

• Some observed differences may have been due to lower plant populations/more weeds in the later-planted plots at some locations.

• Final planting dates could be moved 5-10 days later in each zone without significantly impacting crop insurance payments to growers.
 Recommendations

• In South Dakota, planting dates from May 15 to June 20 will generally give the best yield and oil content.
• Soil temperature must be ~50°F for seed germination.
• Growers should adjust planting dates for the season.
• Select early-maturing hybrids for late planting or replanting.
Acknowledgements

• National Sunflower Association/South Dakota Oilseeds Council for funding this research.
• Farmer-cooperators
  – Duane Shea — Marlow Schaffer
  – Jim Fischer — Roger Bertsch
  – Todd Porch — Robert Speck
  – Timothy Mehlhaff — Vance Huse
• Technical staff—Lee Gilbertson
Yield (lbs/acre) -- Statewide

- 10-Jun: a
- 15-Jun: b
- 20-Jun: c
- 25-Jun: d
- 30-Jun: e
Oil %--Statewide

<table>
<thead>
<tr>
<th>Date</th>
<th>Oil %</th>
</tr>
</thead>
<tbody>
<tr>
<td>10-Jun</td>
<td>a</td>
</tr>
<tr>
<td>15-Jun</td>
<td>a</td>
</tr>
<tr>
<td>20-Jun</td>
<td>b</td>
</tr>
<tr>
<td>25-Jun</td>
<td>b</td>
</tr>
<tr>
<td>30-Jun</td>
<td>c</td>
</tr>
</tbody>
</table>
June 15 Zone – 3-yr Means

Yield (lbs/acre)

- 15-Jun: a
- 20-Jun: b
- 25-Jun: bc
- 30-Jun: c

Oil (%)

- 15-Jun: a
- 20-Jun: b
- 25-Jun: b
- 30-Jun: b

Legend:
- a
- b
- c

Note: The bars labeled with the same letters (a, b, c) indicate no significant difference among them.
June 10 Zone – 3-yr Means

Yield (lbs/acre)

<table>
<thead>
<tr>
<th>Date</th>
<th>10-Jun</th>
<th>15-Jun</th>
<th>20-Jun</th>
<th>25-Jun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>a</td>
<td>ab</td>
<td>bc</td>
<td>c</td>
</tr>
</tbody>
</table>

Oil (%)

<table>
<thead>
<tr>
<th>Date</th>
<th>10-Jun</th>
<th>15-Jun</th>
<th>20-Jun</th>
<th>25-Jun</th>
</tr>
</thead>
<tbody>
<tr>
<td>Value</td>
<td>a</td>
<td>a</td>
<td>a</td>
<td>a</td>
</tr>
</tbody>
</table>
Moisture (%)--Statewide

- 10-Jun: d
- 15-Jun: c
- 20-Jun: b
- 25-Jun: a
- 30-Jun: a
Test Weight (lbs/bu)--Statewide

- 10-Jun: a
- 15-Jun: a
- 20-Jun: b
- 25-Jun: c
- 30-Jun: c