Double-Crop Sunflower Production

Curtis R. Thompson
K-State Extension Specialist
Crops & Soils, Southwest Kansas
Double Crop Sunflowers

<table>
<thead>
<tr>
<th></th>
<th>Oil SF</th>
<th>Wheat</th>
<th>Rotation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yield/a</td>
<td>2500</td>
<td>70</td>
<td></td>
</tr>
<tr>
<td>Price/unit</td>
<td>0.112</td>
<td>3.10</td>
<td></td>
</tr>
<tr>
<td>Gov. Payment</td>
<td>16.27</td>
<td>16.27</td>
<td>32.54</td>
</tr>
<tr>
<td>Miscellaneous income</td>
<td>29.59</td>
<td>29.59</td>
<td>59.18</td>
</tr>
<tr>
<td>Returns/a</td>
<td>325.86</td>
<td>262.86</td>
<td>588.12</td>
</tr>
<tr>
<td>Total costs/a</td>
<td>282.39</td>
<td>274.71</td>
<td>557.10</td>
</tr>
<tr>
<td>Returns over costs</td>
<td>43.47</td>
<td>(11.85)</td>
<td>31.62</td>
</tr>
</tbody>
</table>

As of Friday Feb 11, T. Dumler
Double Crop Flowers

- Other than planting dates, how do the agronomics change from planting full season sunflower?
  - Choosing sunflower type to grow?
  - Fertility?
  - Populations?
  - Weed control?
  - Water?
  - Insect control?
  - Harvest?
Selecting Sunflower Type

• Oil
  – Traditional types
    • Must be market through elevator - ADMNS
  – NuSun (mid-oleic)
    • Must contain minimum of 65% oleic acid to receive premium
    • Yield potential is good on new hybrids
    • Unique quality oil
Effect of frying time on oil quality

Kathleen Warner, USDA, Peoria, IL 2000 NSA
Effect of frying time on oil type

Campbell et.al. ADM 2000 NSA
### Effects of Sunflower Oil Content

<table>
<thead>
<tr>
<th>Oil Content</th>
<th>Premium Or Discount</th>
<th>Net price per cwt</th>
<th>Gross Income</th>
<th>Net Income</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>46%</td>
<td>+12.0%</td>
<td>$11.20</td>
<td>$168.00</td>
<td>$69.79</td>
<td>$18.00</td>
</tr>
<tr>
<td>44%</td>
<td>+8.0%</td>
<td>10.80</td>
<td>162.00</td>
<td>63.79</td>
<td>12.00</td>
</tr>
<tr>
<td>42%</td>
<td>+4.0%</td>
<td>10.40</td>
<td>156.00</td>
<td>57.79</td>
<td>6.00</td>
</tr>
<tr>
<td>40%</td>
<td>0.0%</td>
<td>10.00</td>
<td>150.00</td>
<td>51.79</td>
<td>Base</td>
</tr>
<tr>
<td>38%</td>
<td>-4.0%</td>
<td>9.60</td>
<td>144.00</td>
<td>45.79</td>
<td>-6.00</td>
</tr>
<tr>
<td>36%</td>
<td>-10.0%</td>
<td>9.00</td>
<td>135.00</td>
<td>36.79</td>
<td>-15.00</td>
</tr>
<tr>
<td>34%</td>
<td>-16.0%</td>
<td>8.40</td>
<td>126.00</td>
<td>27.79</td>
<td>-24.00</td>
</tr>
</tbody>
</table>
Selecting Sunflower Type

- Oil
- Confectionary ???
  - Seed size is critical (hybrid selection critical)
  - Insect free (seed weevil damage reduces quality) - spray program must be budgeted
  - Should have contract in hand, with act of God clause
  - May not be for beginners?
  - Price commonly runs above oils
Current Confectionary Sunflower Prices

• Spot: Colby and Goodland
  – Large seed (>20/64) = $19/cwt
  – Small seed (<20/64) = $13/cwt
## Effect of Confectionary Sunflower Seed Size

<table>
<thead>
<tr>
<th>Sizing over 20/64 sieve</th>
<th>Net Price</th>
<th>Gross Income</th>
<th>Net Income</th>
<th>Difference</th>
</tr>
</thead>
<tbody>
<tr>
<td>75%</td>
<td>$17.50</td>
<td>$236.25</td>
<td>$116.25</td>
<td>$8.10</td>
</tr>
<tr>
<td>65%</td>
<td>16.90</td>
<td>228.15</td>
<td>108.15</td>
<td>Base</td>
</tr>
<tr>
<td>55%</td>
<td>16.30</td>
<td>220.05</td>
<td>100.05</td>
<td>-8.10</td>
</tr>
<tr>
<td>45%</td>
<td>15.70</td>
<td>211.95</td>
<td>91.95</td>
<td>-16.20</td>
</tr>
</tbody>
</table>

* Base Price, Goodland&Colby = $19/$13 per cwt - dual scale, 1350 lb/a
Selecting Sunflower Type

- Oil
- Confectionary
- Bird Seed
  - Know your market
  - Purchase on test weight & appearance and not oil content but often they go hand in hand
  - Contract could be handy, price often follows the oil market
Hybrid Selection

- Sunflower performance publication
  - Double crop information
- Information from seed companies
- Coffee shop discussions
Double Crop Flowers

• Other than planting dates, how do the agronomics change from planting full season sunflower
  – Choosing sunflower type to grow?
  – Fertility?
Fertility

• Sunflowers require fertility!!!!!!!!!!!!
  – From the soil (SOIL TEST)+ applied!

• Nitrogen requirement is 50 lbs/1000 lbs expected yield

• 15 to 40 lbs P$_2$O$_5$ maybe required if your soils tests are in the medium or low range.

• Sunflowers root deep. Previous crop can make a difference

• DO NOT PLACE FERTIZER WITH SEED!
Double Crop Flowers

• Other than planting dates, how do the agronomics change from planting full season sunflower
  – Choosing sunflower type to grow?
  – Fertility?
  – Populations?
Planting date effect on oil sunflower yields, CSU, Meyer, Pilcher, Peairs, Shanahan, Hain
Sunflower Planting Dates Oil Content, 3-yr summary.
CSU Meyer, Pilchner, Peairs, Shanahan, and Hain

(%)
Planting Date Effect on Sunflower Yield

- April
- May
- June
- July

Hutchinson
Hesston
Scandia

No differences were observed between sprayed and not sprayed, thus treatments were combined.
Effect of oil sunflower planting date on [oil], Hesston KS, 1997-98. Duncan, Wilde, Staggenborg, Gordon, Heer, & Clausen

2-yr avg

Comet

Cavalry

mid-Apr.  mid-May  Mid-Jun  Mid-Jly

K-State Research & Extension
Planting date effect on oleic acid concentration of NuSun sunflower oil, ND. Kirsch, Miller, and Charlet.
Planting Dates

• Range – April 1 to July 10
  – Double crop sunflowers can work well!
  – Plant as soon as possible
Double Crop Flowers

• Other than planting dates, how do the agronomics change from planting full season sunflower
  – Choosing sunflower type to grow?
  – Fertility?
  – Populations?

<table>
<thead>
<tr>
<th>Heads /a</th>
<th>Seeds /head</th>
<th>Seed Wt. (g/ seed)</th>
<th>yield Lb/a</th>
<th>Large seed (%)</th>
<th>[Oil] (%)</th>
<th>Lodge (score)</th>
</tr>
</thead>
<tbody>
<tr>
<td>15000</td>
<td>831</td>
<td>0.073</td>
<td>2000</td>
<td>52</td>
<td>42.6</td>
<td>1.5</td>
</tr>
<tr>
<td>20000</td>
<td>727</td>
<td>0.067</td>
<td>2145</td>
<td>44</td>
<td>43.2</td>
<td>1.8</td>
</tr>
<tr>
<td>25000</td>
<td>632</td>
<td>0.062</td>
<td>2157</td>
<td>33</td>
<td>43.2</td>
<td>2.1</td>
</tr>
<tr>
<td>30000</td>
<td>548</td>
<td>0.060</td>
<td>2172</td>
<td>31</td>
<td>43.4</td>
<td>2.4</td>
</tr>
<tr>
<td>35000</td>
<td>501</td>
<td>0.058</td>
<td>2240</td>
<td>26</td>
<td>43.8</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Effect of planting rate on oil sunflower yield, Tribune KS. Thompson and Schlegel

(lb/a)

- 1995
- 1997

0 500 1000 1500 2000 2500 3000 3500 4000 4500 5000 5500 6000 6500 7000 7500 8000 8500 9000 9500 10000 10500 11000 11500 12000 12500 13000 13500 14000 14500 15000 15500 16000 16500 17000 17500 18000 18500 19000 19500 20000 20500 21000 21500 22000 22500 23000 23500 24000 24500 25000 25500 26000

12000 18000 24000 30000
Effect of planting rate on oil sunflower yield, Colby KS 1992-94. Mikesell and Belshe

(lb/a)

1500 1700 1900 2100 2300 2500

92-94 Avg.

10454 13068 17424 26136

K-State Research & Extension
Effect of planting rate on irrigated oil sunflower yield, Colby KS. H. Sunderman et al.

(lb/a)
Effect of sunflower planting rate on kochia control, Tribune KS, 1995-97. Thompson and Schlegel
Effect of sunflower planting rate on grass control, Tribune KS, 1995-97. Thompson and Schlegel

(% control)

Cult.  No cult.
Effect of confectionary sunflower planting rate on seed size, Minot, ND, 1998. Zarnstorff, Johnson, and Miller

(% over 20/64)
Planting rates

• Oil
  – 20000 to 24000 plants/acre
Planting conditions

• 1.5 to 2” into firm moist seedbed
• Soil temperature 50 F or greater
• Soil temps can be too high with July double crop plantings??????
• Planting rate –
  – Oil, sufficient to attain 6-8” head
  – Conf, sufficient to attain 8 to 10” head
Double Crop Flowers

- Other than planting dates, how do the agronomics change from planting full season sunflower
  - Choosing sunflower type to grow?
  - Fertility?
  - Populations?
  - Weed control?
Sunflower Insects

• Head Moth
• Stem Weevil
• Seed Weevil
• Stem Borer
• Head clipper
Sunflower Head Moth

- grayish-tan
- small dark spots on forewing
- 3/8 inch long
- 3/4 inch wing span
- Wings held tightly along the body when at rest.
Head moth

Photo Taken By Phil Sloderbeck
Sunflower Head Moth

- Difficult to scout for.
- Active only at night.
- Threshold fairly low, less than one moth per head.
- Early planted flowers often better just to assume you are going to have a problem and work on timing the spray rather than checking for moth numbers.
- Later planted flowers generally have fewer problems. Pheromone traps may be useful in determining the need to spray.
- E. T. 4 moths per trap per day
Sunflower Head Moth

- Treatment must be applied as flowers begin to bloom.
Sunflower Head Moth

• Sprays
  – Baythroid
  – Warrior
  – Lorsban
  – Asana
  – Parathion
  – Thiodan
Sunflower Head Moth Trial
Wilde - Manhattan, Ks - 1997

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Rate ai/A</th>
<th>Worms/Hd</th>
<th>% Cntrl</th>
</tr>
</thead>
<tbody>
<tr>
<td>Baythroid</td>
<td>0.031</td>
<td>4.1</td>
<td>87</td>
</tr>
<tr>
<td>Warrior</td>
<td>0.03</td>
<td>4.1</td>
<td>87</td>
</tr>
<tr>
<td>Asana</td>
<td>0.03</td>
<td>4.5</td>
<td>86</td>
</tr>
<tr>
<td>Untreated</td>
<td>--</td>
<td>31.3</td>
<td></td>
</tr>
</tbody>
</table>

- Hand Sprayer, 20 gal/A, 100 % bloom 7 July, treated 13 July,
- counted 31 July

* slide prepared by PES 1/98, selected treatments only
Effect of planting date on head moth larvae number, Wilde 1988

(#/head)

Sprayed
Sunflower Stem Weevils

- Scout when plants are at the 8- to 14-leaf stage, late June or early July. Fields planted before mid-June more likely to have problems.
- Scout must move through the field slowly to avoid having the adult stem weevils drop to the soil and “play dead”.
- Threshold for the sunflower stem weevil is one adult per three plants.
Sunflower Stem Weevils

- If stem weevils were a serious problem in the area last year consider a planting time treatment:
  - Furadan
- If beetles are detected at threshold levels consider a foliar sprays.
  - Furadan
  - Lorsban
  - Asana
  - Warrior
  - Baythroid
Both Species feed on pollen. Lay their eggs into the premature seeds and larvae consume the sunflower meat.

Treatment for head moth will control seed weevil.

Confectionary sunflower threshold is 1/head.
Red Seed Weevil

Photo Taken By Phil Sloderbeck
Sunflower Stem Borer

• Noticed at several locations in Kansas during 1999 and after.
• Evidently been around for a long time, possibly more than one species of borer involved.
• Increased sunflower acreage may be making problem worse.
Head clipper weevil & damage

Photos Taken By Phil Sloderbeck
Sunflower diseases

• Hybrid selection (rust)
• Crop rotation***********
  – No more than 1 in 4 years
Residue Concerns!

*Sunflowers*

- Pounds of residue produce is adequate about 3 lbs/lb of seed
- Distribution is poor
- Must remain standing to provide benefit
Plant no-till into wheat stubble!? Is it feasible?
Residue!
Weed control in sunflower
Soil applied herbicides

- Dual Magnum
- Sonalan
- Treflan (trifluralin)
- Prowl (pendimethalin)
- Spartan

Post Applied herbicides

- Poast
- Select
- Beyond
Spartan

- sulfentrazone - FMC
- soil applied herbicide 4 weeks before to 3 days after planting
- control pigweeds, kochia, Russian thistle, lambsquarters & some grass
Spartan

- Rates are 2.0 oz to 5.3 oz/a
- Soil type & pH are critical
- Timing & amount of moisture received can affect sunflower tolerance
- Planting depth (best at 1.5”)

K-State Research & Extension
Spartan

• Concerns with high pH and calcareous soils. pH greater than 7.8 and Ca levels greater than 4000 ppm in the top 6 inches of soil profile. White knobs or cut areas will create excessive injury.
Spartan - rotational restrictions

- Soybeans - none
- Wheat & cereals - 4 mo*
- Field corn or sorghum - 10 mo
- Millets - 12 mo
- Sweet corn or cotton - 18 mo
- Canola - 24 mo
Spartan

• Registration received in 2004.
• Rates: 2 to 5.33 oz/A
• Time: from 30 days preplant to preemergence, 3 days after planting
• Weeds: kochia, pigweeds, lambsquarters, nightshade, and yellow nutsedge
• Can cause stunting and stand reduction, especially on coarse textured, low organic matter soils with high pH
• Herbicide likely not available for 2005 season
## Spartan Rates as affect by soil type

<table>
<thead>
<tr>
<th>OM</th>
<th>Coarse Pr/a</th>
<th>Medium Pr/a</th>
<th>Fine Pr/a</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt;1.5%</td>
<td>2.0-2.67</td>
<td>2.67-3.0</td>
<td>2.67-3.0</td>
</tr>
<tr>
<td>1.5-2.0</td>
<td>2.67-3.0</td>
<td>3.0-4.0</td>
<td>3.0-4.0</td>
</tr>
<tr>
<td>&gt;2%</td>
<td>3.0-4.0</td>
<td>4.0-5.33</td>
<td>4.0-5.33</td>
</tr>
</tbody>
</table>

*Do not use on coarse soils which have less than 1% OM*
Dual Magnum

- Dual Magnum has a federal label in sunflower
- Timing: Preemergence
- Rate: 1.0 to 1.33 pt/A coarse soils
  1.33 to 1.67 pt/A on medium & fine
- Do not graze or feed residue in treated areas
Clearfield Sunflowers

- Sunflower varieties with genetic tolerance to imidazolinone herbicides.
- “Imi” resistant gene originates from ALS resistant wild sunflowers discovered in eastern Kansas.
- Allows the use of Beyond herbicide for postemergence weed control in sunflower.
- Selected hybrids available in 2004.
Beyond

- Active Ingredient: Imazamox (same as Raptor)
- Apply only to Clearfield Sunflower
- Rate: 4 to 6 oz/A
- Timing: Small annual weeds
- Adjuvant: NIS + N fertilizer
- May not control ALS resistant biotypes of kochia, Palmer amaranth, or common waterhemp.
Beyond 4 oz on Clearfield sunflower 3 DAT
Weed control in Clearfield sunflowers in Finney County, 2003 (Thompson & Schlegel).

<table>
<thead>
<tr>
<th>Herbicide</th>
<th>Rate (Prod/a)</th>
<th>Palmer amaranth</th>
<th>Puncture vine</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prowl/Beyond</td>
<td>2pt + 4 oz</td>
<td>60</td>
<td>88</td>
</tr>
<tr>
<td>Beyond</td>
<td>4 oz</td>
<td>66</td>
<td>87</td>
</tr>
<tr>
<td>Beyond</td>
<td>6 oz</td>
<td>58</td>
<td>88</td>
</tr>
<tr>
<td>LSD(0.05)</td>
<td></td>
<td>20</td>
<td>14</td>
</tr>
</tbody>
</table>

Beyond treatments included surfactant and 28% N.
Weed response to Beyond treatments at Tribune, KS 2003 (Thompson & Schlegel).

<table>
<thead>
<tr>
<th>Treatment*</th>
<th>Rate</th>
<th>Kochia</th>
<th>Russian Redroot</th>
<th>Redroot Thistle</th>
<th>Pigweed</th>
<th>Pigweed</th>
<th>Tumble</th>
</tr>
</thead>
<tbody>
<tr>
<td>Beyond+NIS+UAN</td>
<td>4 oz</td>
<td>67</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
</tr>
<tr>
<td>Prowl (PRE)</td>
<td>3.6 pt</td>
<td>80</td>
<td>85</td>
<td>75</td>
<td>79</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prowl/Beyond</td>
<td>2.4 pt / 4 oz</td>
<td>85</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spartan+Beyond</td>
<td>2 oz + 4 oz</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spartan+Beyond</td>
<td>3 oz + 4 oz</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spartan+Prowl</td>
<td>2 oz + 2.4 pt</td>
<td>98</td>
<td>95</td>
<td>88</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Spartan+Prowl</td>
<td>3 oz + 2.4 pt</td>
<td>98</td>
<td>100</td>
<td>100</td>
<td>100</td>
<td></td>
<td></td>
</tr>
<tr>
<td>LSD (0.05)</td>
<td>10</td>
<td>5</td>
<td>9</td>
<td>4</td>
<td></td>
<td></td>
<td></td>
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</tbody>
</table>

*All treatments included recommended adjuvants.
Double Crop Flowers

• Other than planting dates, how do the agronomics change from planting full season sunflower
  – Choosing sunflower type to grow?
  – Fertility?
  – Populations?
  – Weed control?
  – Water?
**Full season sunflower yield response to irrigation timing, Tribune 1979-85.**

<table>
<thead>
<tr>
<th>Treatment</th>
<th>Water (inches)</th>
<th>Yield (lb/a)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Preplant</td>
<td>15.1</td>
<td>1900</td>
</tr>
<tr>
<td>Preplant &amp; Bud</td>
<td>19.6</td>
<td>2205</td>
</tr>
<tr>
<td>Preplant &amp; Bloom</td>
<td>18.6</td>
<td>2202</td>
</tr>
<tr>
<td>PP &amp; Bud &amp; Petal D.</td>
<td>21.1</td>
<td>2512</td>
</tr>
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</table>
# Sunflower yield response to varying irrigation levels, Colby 1986-88.

<table>
<thead>
<tr>
<th>ET Factor</th>
<th>Yield (lb/a)</th>
<th>Irrigat. Water (inches)</th>
<th>Water Use (lb/a)</th>
<th>WUE (lb/in)</th>
</tr>
</thead>
<tbody>
<tr>
<td>inches</td>
<td></td>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>1.40</td>
<td>2503</td>
<td>16.96</td>
<td>24.6</td>
<td>78</td>
</tr>
<tr>
<td>1.20</td>
<td>2276</td>
<td>13.35</td>
<td>22.3</td>
<td>86</td>
</tr>
<tr>
<td>1.00</td>
<td>2372</td>
<td>10.47</td>
<td>20.2</td>
<td>97</td>
</tr>
<tr>
<td>0.75</td>
<td>2279</td>
<td>7.01</td>
<td>17.9</td>
<td>110</td>
</tr>
<tr>
<td>0.50</td>
<td>2136</td>
<td>3.07</td>
<td>14.5</td>
<td>122</td>
</tr>
<tr>
<td>None</td>
<td>2020</td>
<td>0</td>
<td>12.5</td>
<td>145</td>
</tr>
</tbody>
</table>
Double Crop Flowers

• Other than planting dates, how do the agronomics change from planting full season sunflower
  – Choosing sunflower type to grow?
  – Fertility?
  – Populations?
  – Weed control?
  – Water?
  – Insect control?
  
  • DON’T BANK ON HAVING NO INSECTS!!!!!!!!!!!
Double Crop Flowers

• Other than planting dates, how do the agronomics change from planting full season sunflower
  – Choosing sunflower type to grow?
  – Fertility?
  – Populations?
  – Weed control?
  – Water?
  – Insect control?
  – Harvest?
Harvesting Sunflower

• With double crop sunflowers it will generally be later into the season often cooler and more humidity??
  – Fewer fires
  – Slower dry down
Harvesting Sunflower

- Cylinder speed slow – 250-450 rpm
- Concave open – ideally, heads remain in tack and seeds removed
- Air speed, sunflower are light, use only to keep trash floating on sieve, wet stem or head pieces will not float.
- Harvest at 8 to 10% moisture
Harvesting Sunflower

- Harvesting sunflower less than 8% moisture increase risk of combine fires!
- Stalks and heads when too dry simple destruct during the harvest process, fine dust collects and static electricity can ignite fires
- Harvest when humidity are high and temperatures are cool
Harvesting fires!
Drying oil seeds using Aeration

Drying oilseed sunflower in October.
(47 F and 65 percent relative humidity).

NDSU Extension Bulletin 25

<table>
<thead>
<tr>
<th>Moisture Content</th>
<th>Airflow (cfm/bu)</th>
<th>Fan Time Days</th>
</tr>
</thead>
<tbody>
<tr>
<td>17%</td>
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<td>27</td>
</tr>
<tr>
<td>15%</td>
<td>1.00</td>
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</tr>
<tr>
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</tr>
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<tr>
<td>13%</td>
<td>1.00</td>
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<tr>
<td></td>
<td>0.75</td>
<td>21</td>
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<tr>
<td></td>
<td>0.50</td>
<td>28</td>
</tr>
</tbody>
</table>
## Yields of Limited Irrigated Crops in 2004

<table>
<thead>
<tr>
<th>Crop</th>
<th>Irrigation Water Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5”</td>
</tr>
<tr>
<td>Corn</td>
<td>204</td>
</tr>
<tr>
<td>Sorghum*</td>
<td>104</td>
</tr>
<tr>
<td>Soybeans</td>
<td>49</td>
</tr>
<tr>
<td>Sunflowers</td>
<td>2532</td>
</tr>
</tbody>
</table>

* 2003 Yields
### Average Yields of Limited Irrigated Crops (2001-2004)

<table>
<thead>
<tr>
<th>Crop</th>
<th>Irrigation Water Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5”</td>
</tr>
<tr>
<td>Corn</td>
<td>108.3</td>
</tr>
<tr>
<td>Sorghum</td>
<td>86.3</td>
</tr>
<tr>
<td>Soybeans</td>
<td>31.8</td>
</tr>
<tr>
<td>Sunflowers</td>
<td>1464</td>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Crop</th>
<th>Irrigation Water Applied</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>5”</td>
</tr>
<tr>
<td>Corn</td>
<td>139.7</td>
</tr>
<tr>
<td>Sorghum</td>
<td>110.7</td>
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<tr>
<td>Soybeans</td>
<td>38.3</td>
</tr>
<tr>
<td>Sunflowers</td>
<td>1934</td>
</tr>
</tbody>
</table>
Returns to Limited Irrigated Crops in 2004

- Corn
- Sorghum
- Soybeans
- Sunflowers

Returns ($/acre):
- 5"
- 10"
- 15"

K-State Research & Extension

Returns ($/acre)

- Corn
- Sorghum
- Soybeans
- Sunflowers

- 5"
- 10"
- 15"
Wheat yields following sunflower in a WSuF rotation, SWREC Tribune.

Schlegel

Bu/a

WF
WSuF

Double Crop Flowers
Summary

– Choosing sunflower type to grow? Oil or Bird
– Fertility? Soil test, 50 lbs N/1000 yield
– Plant as early as possible
– Populations? 20000-24000
– Weed control? Notill into wheat stubble, DNA/Dual/Clearfield
– Water? Essential for double crop
– Insect control? yes
– Harvest? Good luck, don’t let seeds get too dry