Carinata Production Expansion
Review and Analysis
2017 Carinata Summit - Quincy, FL

Jeff Klingenberg, Agrisoma
Review topics…

• Global progress on production expansion
• SE US acre potential over the next 5 – 7 years
• 2016-17 SE commercial production review
• Value chain development and challenges
• Technology improvements for meeting and increasing feedstock demand
• Requirements for continuing crop adoption
Pursuing a Global Opportunity Through Targeted Markets

Northern Tier
- Large acres available, excellent infrastructure, strong carbon profile, opportunity to service both US and EU markets via established logistics
- Commercial Production Started 2012

Southeastern USA
- Low to modest cost of production, strong infrastructure/logistics, excellent carbon profile
- Commercial Production Started 2014

South America
- Low cost production in rotation, excellent carbon footprint (even to carbon negative fuels), strong partners in place, massive opportunity for expansion
- Commercial Production Started 2016

EU
- World’s biggest biofuel market, excellent infrastructure and partners, need for local Carinata production, forward thinking partners, excellent regulatory environment for biofuels
- Commercial Production Scheduled 2019

Australia
- Specific demand for biojet identified, large available acres, engaged global partner and specific customers
- Commercial Production Scheduled 2020

An aggressive, staged expansion to service an increasing industry demand curve
• Summer production US: ND, SD, MT

• Current and forecasted winter Carinata production in Southern US:
  - 3rd year in production: Alabama, Florida, Georgia
  - 1st year in demo production: Tennessee
  - 1st year for demo production: 2017-18
  - 1st year demo production: 2018-19
  - S. Carolina
  - N. Carolina
Profitable with multiple product opportunities

Potential Winter Profit
• Average production cost of $275

<table>
<thead>
<tr>
<th>Estimated Net Returns</th>
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<tbody>
<tr>
<td>Yield (bu/ac)</td>
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<td></td>
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<tr>
<td>Price ($/bu)</td>
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<tr>
<td>30</td>
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<td>35</td>
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<td>40</td>
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<td>50</td>
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<table>
<thead>
<tr>
<th>Price ($/bu)</th>
<th>Yield 30</th>
<th>Yield 35</th>
<th>Yield 40</th>
<th>Yield 50</th>
<th>Yield 60</th>
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<tbody>
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<td>8.00</td>
<td>-35</td>
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<td>45</td>
<td>125</td>
<td>205</td>
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<tr>
<td>8.50</td>
<td>-20</td>
<td>22.5</td>
<td>65</td>
<td>150</td>
<td>235</td>
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<tr>
<td>9.00</td>
<td>-5</td>
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<td>85</td>
<td>175</td>
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<tr>
<td>9.50</td>
<td>10</td>
<td>57.5</td>
<td>105</td>
<td>200</td>
<td>295</td>
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Oil seed product
• High protein ~ 43% protein
• Approved for cattle in US
• Meal offtake agreements in EU
• Oil conversion to fuel in EU
• Near approval for dairy, poultry, and fish
## SE Row crop acre rotation options

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<tbody>
<tr>
<td>Alabama</td>
<td>280</td>
<td>330</td>
<td>300</td>
<td>320</td>
<td>215</td>
<td>175</td>
<td>490</td>
<td>460</td>
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<tr>
<td>Florida</td>
<td>70</td>
<td>80</td>
<td>85</td>
<td>100</td>
<td>180</td>
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<td>Georgia</td>
<td>315</td>
<td>400</td>
<td>1100</td>
<td>1300</td>
<td>800</td>
<td>760</td>
<td>360</td>
<td>265</td>
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<tr>
<td>SC</td>
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<td>350</td>
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<td>180</td>
<td>115</td>
<td>115</td>
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<td>38</td>
<td>115</td>
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<tr>
<td>Miss</td>
<td>490</td>
<td>750</td>
<td>315</td>
<td>435</td>
<td>42</td>
<td>38</td>
<td>115</td>
<td>11</td>
<td>2270</td>
<td>2040</td>
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<tr>
<td>Combined</td>
<td>1430</td>
<td>1910</td>
<td>2040</td>
<td>2335</td>
<td>1352</td>
<td>1233</td>
<td>165</td>
<td>46</td>
<td>3575</td>
<td>3230</td>
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| Ave 2 yr Acres | 1,670,000 | 2,187,500 | 1,292,500 | 105,500 | 3,402,500 | 8,658,000
Production revenue stream in a mature market with today’s technology

<table>
<thead>
<tr>
<th>Acre Reductions+A1:C8</th>
<th>Remaining Acres</th>
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<tbody>
<tr>
<td>2 yr combined 5 summer crops</td>
<td>8,658,000</td>
</tr>
<tr>
<td>less all other winter crops and fallow</td>
<td>4,329,000</td>
</tr>
<tr>
<td>less herbicide carry over i.e., ALS Inhibitor Group 2</td>
<td>3,463,200</td>
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<tr>
<td>less freeze zone tolerance validation</td>
<td>1,731,600</td>
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<tr>
<td>Less local grain elevator capacity - Total remaining</td>
<td>865,800</td>
</tr>
<tr>
<td>SE producer derived revenue stream before payout and value chain distribution ($275/ac)</td>
<td>$238,095,000</td>
</tr>
<tr>
<td>Estimated carinata grain delivery 2024-25</td>
<td>34.6M bu</td>
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</tbody>
</table>
Agrisoma’s Commercial Program, 2016-17 season

• Demonstration production on 16 farms across AL, GA, FL, TN

• 1252 acres planted, majority on irrigated land

• Commercial variety: ‘Avanza 641’

• Testing potential of 2 new varieties for high yield and cold tolerance

• Testing crop protection products

• Demonstration of crop potential and BMP’s for 2017-18 commercial production
2016-17 SE US Commercial Demo Program

2015-16 Production sites
Established Carinata Value Chain

Develop, test and introduce Carinata to farmers

Biofuels: 18% Gross Margin
- Low carbon markets driving margins
- Significant Capex required
- Feedstock costs & Regulatory key determinants of GM

Seed
- 50%+ Stable Gross Margin
  - Significant IP controlling product
  - Effective Inventory Management
  - Low working capital
  - Low capex requirements

Farming
- 30% Highly Variable Gross Margin
  - Highest Risk portion of Value Chain
  - Net Return to Farmer impacted by weather
  - Upside is 30% GM, downside can be negative
  - Farmers look for crop options to mitigate commodity swings

Logistics
- 5-8% Gross Margin
  - Relatively stable GM, Volume Dependant
  - Established Significant infrastructure & working capital investment
  - Multiple locations and service
  - Commodity business, low technology

Crush
- 11% Gross Margin
  - GM variable, can go negative
  - Meal value key component in crush equation
  - Significant Capex investment
  - Large established capital infrastructure
  - Low differentiation

Oil
Meal

Biofuels
Customers

Meal Customers

Feedlots: 5-20% Gross Margin
- Commodity feedlots low GM%
- Speciality (e.g., Dairy) can drive to higher GM%
- Differentiation is key: Sustainable, non-GMO
Breeding Funnel – Product Pipeline

**Double Haploid (DH) pipeline - Model**

- **Year 1**: 6,000 – 8,000 DH lines per year field evaluated from approximately 20 – 35 crosses

- **Year 2**: Approximately 150 – 200 lines selected based upon Agrisoma breeding objectives – to enter preliminary yield trials at 3 – 6 sites

- **Years 3 & 4**: Approximately 15 – 25 lines per year will be selected for advanced yield testing at 8 or more sites in commercial geographies

- **Year 5**: New and improved variety selected from within every 1 – 2 years breeding cycle

**Seed Production**

- **Year 1**: Self pollinated seed made in each selected row

- **Year 2**: Small pollen control tents of selected lines

- **Year 3**: Larger tents or small isolation seed increases

- **Year 4**: Large isolation fields in the next cycle (utilize both winter and summer seed increases)

- **Year 5**: Initial commercial introduction

- **Year 6**: Full commercial sales, large acreage

**Commercial Product**

**Agrisoma commercial variety**

**Breeding Funnel – Product Pipeline**

- **Year 1**: Single row nurseries

- **Years 2 – 4**: Replicated yield trials

- **Years 5 – 6**: Commercial introduction
Carinata Crop Improvement

- Frost tolerance
- NAM population
- Early maturing
- High yielding
- Agrisoma investment >$2.8 million in SE US to date
Developing near term technology to increase acre potential

- Crop maturity and planting date fitness
- Cold tolerance at different stages of growth
- Herbicide tolerance and resistance derived from native trait introgression and obtain approvals for crop protection products

Production:
- Timely contracting in alignment with good crop rotation practices
- Continue demonstration of beneficial environmental impacts
Crop adoption requirements

• Continue to grow the involvement from extension support for crop management and education about the oil seed crop industry.
• Continue to develop network of delivery locations, and increase stakeholder involvement.
• Ensure timely application of crop insurance, and production contracting with producers.
• Improve scouting for optimum field selection in rotation with summer cropping systems.
• Identify best varieties, and BMPs across the region.
Thank you!