SOYBEAN, MUNG BEAN AND FABA BEAN – POTENTIAL FOR IRRIGATION?

IRRIGATED CROP PRODUCTION UPDATE 2012

JANUARY 31, 2012

LETHBRIDGE, ALBERTA

Mark Olson
Unit Head - Pulse Crops
Alberta Agriculture and Rural Development
Agriculture Research Division
Food and Bio-Industrial Crop Branch
Potential for Irrigation?

- Can any of these new crops be substituted into the rotation in favor of existing irrigated crops?
  - competing with potato, hybrid canola, sugar beet, dry bean, processing pea, sweet corn, etc, etc

- Number of factors to consider.
  - net return per acre.
  - adaptability → yield stability.
  - agronomy understood. i.e. water use, is this a crop that requires a larger amount of water to maximize yield
  - risk, ability to insure and insurance level.
  - marketing channels and stability.
Potential for Irrigation?

Supply and Demand for new crops is a chicken and egg debate.

- companies reluctant to competitively price (demand) without a guaranteed (supply) and farmers are reluctant to grow a new crop (supply) without a guaranteed competitive price (demand).
At LAST, POSITIVE PROOF THAT THE CHICKEN CAME WELL BEFORE THE EGG
Potential for Irrigation?

Tale of three new crops

1. has a strong, well defined markets in North America and globally, but may not have the full agronomic package for Alberta yet.

2. has strong market globally and is the market is increasing in North America, but agronomics for Alberta need further refinement before becoming a commercial crop in Alberta.

3. markets have yet to develop, but has a strong agronomic package for Alberta is in place and growers interest is high.

Which crop goes with which statement?

soybean, mung bean and faba bean
Soybean

- origins northeastern China.
- first grown in Canada in 1893 at the Ontario Agricultural College.
- until recently acreage has been limited southern and central parts of Canada and Manitoba’s Red River Valley.
- a legume crop grown primarily for oil content (18-21%, but high protein (36-40%) as well.
US soybean production in 2011 totaled 3.06 billion bushels on 74.976 million acres.

The average yield per acre was estimated at 41.5 bushels.

United States 2011 production is the sixth largest on record (source Statpub.com 2012).

Soybean prices also fell sharply from the opening of $11.99 per bushel, but rebounded to close out the day at $11.82 per bushel (source Chicago Board of Trade on January 12, 2012).
Soybean

traditionally the crop has been de-oiled and meal sold separately for feed.....and there were no facilities in Alberta to do this.

A pilot plant in Coalhurst, Alberta is now operational to process soybean for feed market.

Alberta market has seen some container shipments of whole seed sent to China.

considered a pseudo - pulse and falls outside of what is called traditional pulse crops (field pea, lentil, chickpea, dry bean, chickpea, faba bean and mung bean) however, does fall under the Alberta Pulse Growers Commission mandate for levy collection.
Soybean

112-125+ days to maturity

- requires **heat** throughout entire growth cycle (including evenings) > 2300 corn heat units... **warm season pulse**
- **sunlight** also critical, as long days (photoperiod) of mid-summer delay flowering and maturity.
- **water** needed to optimize yield.

- **daytime temperatures** above 20°C for optimum flowering and seed formation.
- **seedlings susceptible to frost**
- **soil pH** 4.0 - 8.5 (7.0 is preferred)
Varieties of short season soybean and corn heat unit requirements

<table>
<thead>
<tr>
<th>Variety</th>
<th>Corn heat units</th>
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<tr>
<td>NSC Warren RR</td>
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Source: The Western Producer, February 11, 2010
Average Accumulation of Corn Heat Units in Manitoba
From May 15 to date of occurrence of first fall frost of -2.2°C
Based on 1971 to 2000 Environment Canada Data
Staff of the Pulse and Special Crops Program - CDC South

Art Kruger
Senior Technologist

Manjula Bandara
Research Scientist

Kathie Davidson
Technologist

Stephanie Mather, Eldon Graham, Don Elmer
Technologists

Prabath Lokuruge
Graduate student
### Agronomic performance of 12 soybean genotypes at Bow Island in 2011

Bandara et al, 2011

2690 kg ha\(^{-1}\) = 40 bu/acre

<table>
<thead>
<tr>
<th>Genotype</th>
<th>Rainfed Days to maturity</th>
<th>Rainfed 1000-seed weight (g)</th>
<th>Rainfed Seed yield (kg ha(^{-1}))</th>
<th>Supplementary irrigated Days to maturity</th>
<th>Supplementary irrigated 1000-seed weight (g)</th>
<th>Supplementary irrigated Seed yield (kg ha(^{-1}))</th>
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</table>
two soybean growers mentioned extensively in the farm press are:

Pat Fabian, Fabian Seed Farms (Tilley, Alberta).

Kevin Elmy, Friendly Acres Seed Farm (Salt Coats, Saskatchewan).
Mung bean - markets

- Largest exporters of mung bean are currently China, Myanmar, Thailand and Australia.

- Companies importing into Europe and NA are concerned about stability of governments in countries and export bans such as those in India and want to develop new production areas, such as southern Alberta.

- The substitution market for imported mung bean is valued at approximately $5 million dollars in Canada and is increasing.

- A number of pulse traders have pointed out that the market in the United States would be at least eight to nine times that of Canada's market; an estimated value $40 - 45 million.
Mung bean - markets

- High value.
- Already established trade channels (same as pulse crops we sell currently).
- A large and stable export market.
- Many differentiated uses.
Whole seed
Bean sprouts
Vermicelli noodles
Vermicelli dish
Dahl
Mung bean noodles
Moon cakes
Mung bean drink
Crackers
Popsicles
Wine
Estimated Prices for Pulses ($/pound)
Delivered to Plant in Alberta October 2008
Source: Personal Interviews & Agriculture & Agri-Food Canada

Field pea 12¢/lb = $7.20/bu
Mung bean

- is a small seeded legume with a green seed coat native to the Indo-Myanmar (formerly Burma) region.
- research trials in Alberta since 2005.
- sensitivity to cold soils.....slow emergence.....is a warm season pulse
- Common Bacterial Blight(CBB) resistance.
- Photoperiod sensitivity.
- early and uniform maturity.
- acceptable seed size and color to sprouters.
Bow Island - June 16th, 2006
3 weeks after seeding

Dry bean seedling stage

*cv. Pintium*

Mung bean seedling stage
Common Bacterial Blight

Resistance

Susceptible
Bow Island, Alberta, Canada – September 1, 2011
Close up of mung bean plant
Bow Island, Alberta, Canada – September 1, 2011
Brooks, Alberta, Canada – September 1, 2011
Bow Island – September 13th, 2006
16 weeks after seeding

Mung bean
Note number of pods

Dave Coutts in background
Faba bean
Faba bean markets

- Species seed size range of 200 to 1000+ g 1000⁻¹
- Large seeded (＞800 g 1000⁻¹) types known as broadbean.
- Broadbeans are eaten fresh while still young and tender and young leaves of the plant can also be eaten either raw or cooked like spinach.
- 200 to 800 g 1000⁻¹ are called fava or fava bean.
- Crude protein of 28% - 32%.
- Large seeded tannin types are for a human edible market (falafel, canned) in Middle East (Egypt) and Asia.
- Competition France and Australia.
Faba bean markets

- Livestock feed - inclusion was limited due to high tannin content (for monogastrics) but now have low (zero) tannin varieties. Prairie Swine Research Trials 2003-2004 up 60% inclusion in the diet.

- Fractions (protein 60%) for fish feed and starch for the food market.

- Alliance Grain Traders and Parrheim Foods are active in faba bean, but pricing at a level to interest growers is yet to materialize.
Faba Beans

Past and Future
Canadian breeding programs began in the 1980s

New program at the Crop Development Center, University of Saskatchewan (Dr. Albert Vandenberg)

Goals:

- develop a small seeded, low tannin variety for animal feed or silage
- develop a large seeded variety of appropriate color and shape for Middle Eastern human consumption markets.
- Early maturing and disease resistant.
Faba bean

- the highest nitrogen fixing annual grain legume.
- requires cool and moist growing conditions. ...cool season pulse.
- early seeding highly recommended.
- excellent stand-ability.
- high yielding.
Figure 1: Percentage of N derived from fixation for pulse crops grown in Western Canada

The data was compiled from published research reports and papers. The thick dark line indicates the median value, the box represents 50% of all data, and the whiskers contain the remaining 50% of the data.
Faba bean seed yield all locations in Alberta 2011

Kg ha⁻¹
Faba bean seed yield combined - all locations in Alberta 2011

100 bu acre$^{-1}$

Kg·ha$^{-1}$

FB 18-20 | FB 9-4 | Imposa | Snowbird
Potential for Irrigation?

Conclusions

• Which crop goes with which statement?
• Tale of three new crops

1. **Soybean** has a strong, well defined markets in North America and globally, but may not have the full agronomic package for Alberta yet.

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Thank you for your attention!

QUESTIONS?