Double Cropping Soybeans in Ontario

Purpose:

With timely winter wheat harvests and excellent late season growing conditions over the last few years, there has been more interest in growing soybeans as a double crop. A small group of producers are currently planting double crop soybeans after a variety of crops including winter cereals, processing peas and hay, but the practice is not widespread. There has been limited research conducted in Ontario to determine best management practices for double crop soybeans. Dry conditions during mid-summer seeding can be a challenge for germination but the biggest challenge with the ultra-short season cropping system, like double crop soybeans, is maturing the crop. This ultra-short growing season, often <90 days combined with the risk of an early fall frost, poses a unique set of management challenges.

This project was initiated to help develop best management practices for double cropping soybeans in Ontario.

Methods:

In 2012 and 2013, five locations were established including one by the University of Guelph Ridgetown Campus. In addition to these sites, Syngenta Canada conducted three trials to evaluate variety performance. One objective was to assess the best RM (relative maturity) variety to grow for a given region. Is it better to choose a variety adapted for a given heat unit zone (full season variety) or should varieties that have a lower RM be selected? Another objective was to assess seeding rate recommendations. At the U of G trial, 3 seeding rates, nitrogen fertilizer, as well as Quilt fungicide was assessed in a double cropping system.

Results:

In 2012, three trials were planted, two in Perth County near Bornholm, and one in Middlesex County, near Lucan. One site at Bornholm was planted on July 11 after winter barley, the other two sites were planted on July 23 and 24 after winter wheat. There was a delay at the two later planted sites because of the need to remove straw. As a result, only the site planted early, on July 11, actually made it to yield. The other two sites did not make enough yield to warrant combining due to an early October frost.

Table 1. Double Crop Yield for Various Seeding Rates (2012, Bornholm)

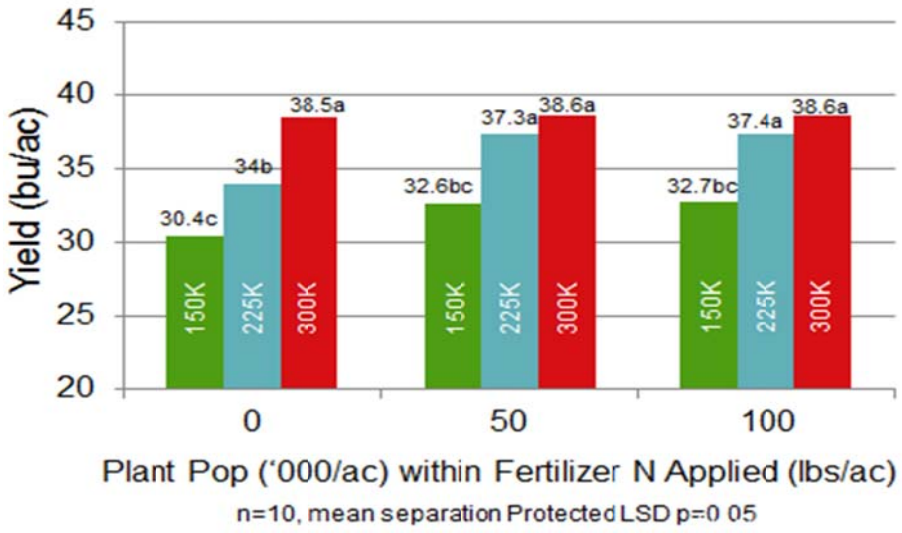
Seeding Rate	Yield (bu/ac)	Yield Advantage (bu/ac)
100 000 seeds	18.0 c	-
200 000 seeds	20.6 b	2.6
300 000 seeds	23.4 a	5.4

A seeding rate of 300 000 seeds/acre yielded significantly higher than lower seeding rates.

The site established at Bornholm in 2013 was planted on July 17th but could not be harvested due to early snowfall. The beans were also not adequately mature before a killing frost.

Figure 1. Double Crop soybeans at Bornholm ON, on November 14, 2013.

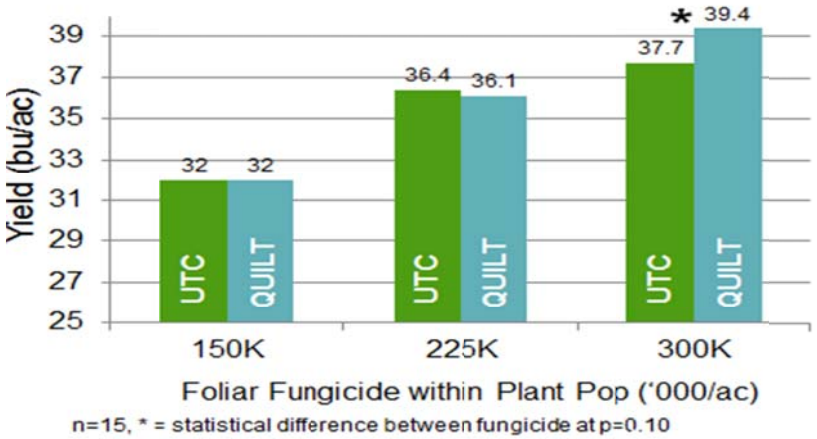
Figure 2. Double Crop Yield Response to Nitrogen and Seeding Rate at Ridgetown Campus . (planting date, July 10, 2012)



The 2012 results from Ridgetown confirm that high seeding rates yield significantly more than low seeding rates, and that 50 lbs N/acre of nitrogen fertilizer applied at planting increased yield compared to no nitrogen fertilizer when using the low seeding rate. An

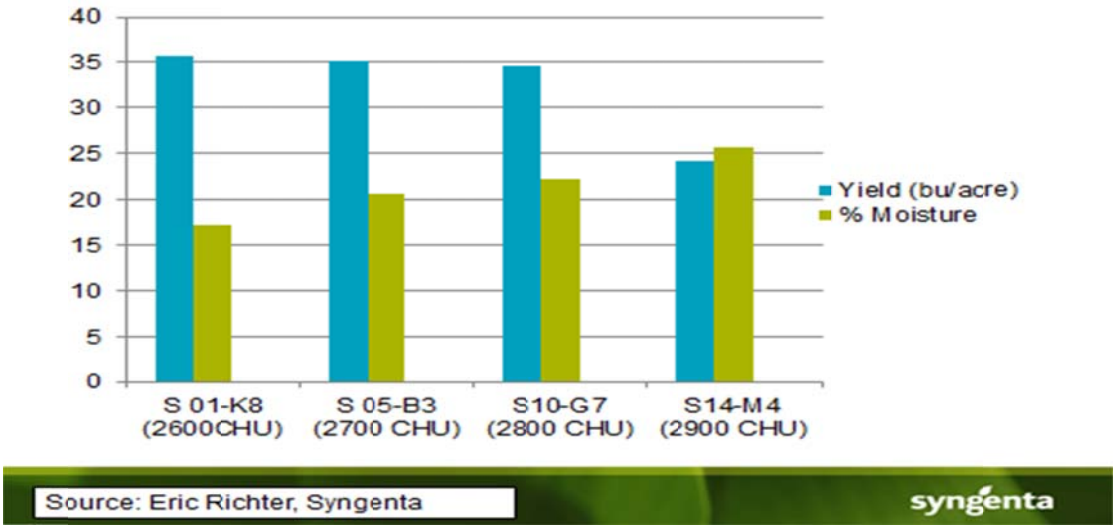
application of 100 lbs N/acre did not significantly increase yields over 50 lbs N/ac. However, the highest seeding rate with no nitrogen yielded the same as the 225 K seeding rate with 50 lbs of N.

Figure 3. Double Crop Yield Response to Quilt fungicide and Seeding Rate at Ridgetown College. (planting date, July 10, 2012)



Quilt fungicide yielded slightly more than the untreated control (UTC) but only at the highest seeding rate.

Figure 4. 2012 – 2013 Syngenta Double Crop Yield Response to Different Maturing Varieties.



Three sites were harvested by Syngenta in 2012 – 2013, each with 4 different maturing varieties. (Embro seeded on July 1st 2012, Ailsa Craig, seeded on July 13th 2012 and Embro, seeded on July 15th 2013), Seed moisture increased as variety maturity was lengthened. Yield decreased with the use of longer relative maturity (heat unit) rating varieties.

Summary:

1) Planting as early as possible is essential for success. Every day counts. In these experiments, trials seeded after July 15th were not successful.
2) The best yields were produced using seeding rates that were higher than those recommended at normal planting in May. More plants/acre closed the canopy faster. This established the maximum pods/acre possible since plant branching, canopy development, and the number of nodes per plant are limited with late seeding. A seeding rate of at least 250 000 seeds/acre is recommended.
3) Varieties with a RM shorter than recommended for a normal planting date tend to yield better and had lower seed moisture at harvest. A variety that is one full RM group shorter (200 CHU's) than used for a normal planting date should be considered if double cropping soybeans.
4) Based on only one site-year with 4 replications, N fertilizer increased yield with seeding rates of 150 K and 225 K. However, it did not provide more yield with a seeding rate of 300 K. 100 lbs/ac of actual N did not provide more yield than 50 lbs/acre of N. A seeding rate of 300 K seeds/acre with no nitrogen fertilizer yielded as much as a 225K seeding rate with N and more than a seeding rate of 150 K with N.
5) Based on only one site-year across 4 replications, the addition of a foliar fungicide provided additional yield with the highest seeding rate. (300 K) The yield increase was small (1.7 bu/ac).
6) These conclusions are based on limited data. Additional trial data across a wider geography and more growing seasons is required to establish robust best management practices across Ontario.

Acknowledgements:

We would like to thank the cooperators who lent their time and land to the project. We would also like to thank Eric Richter for coordinating the trials conducted by Syngenta. The access to tractors for these field projects from John Deere is greatly appreciated. This project was conducted in partnership with Dr. David Hooker (U of G), and Eric Richter, Syngenta.

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