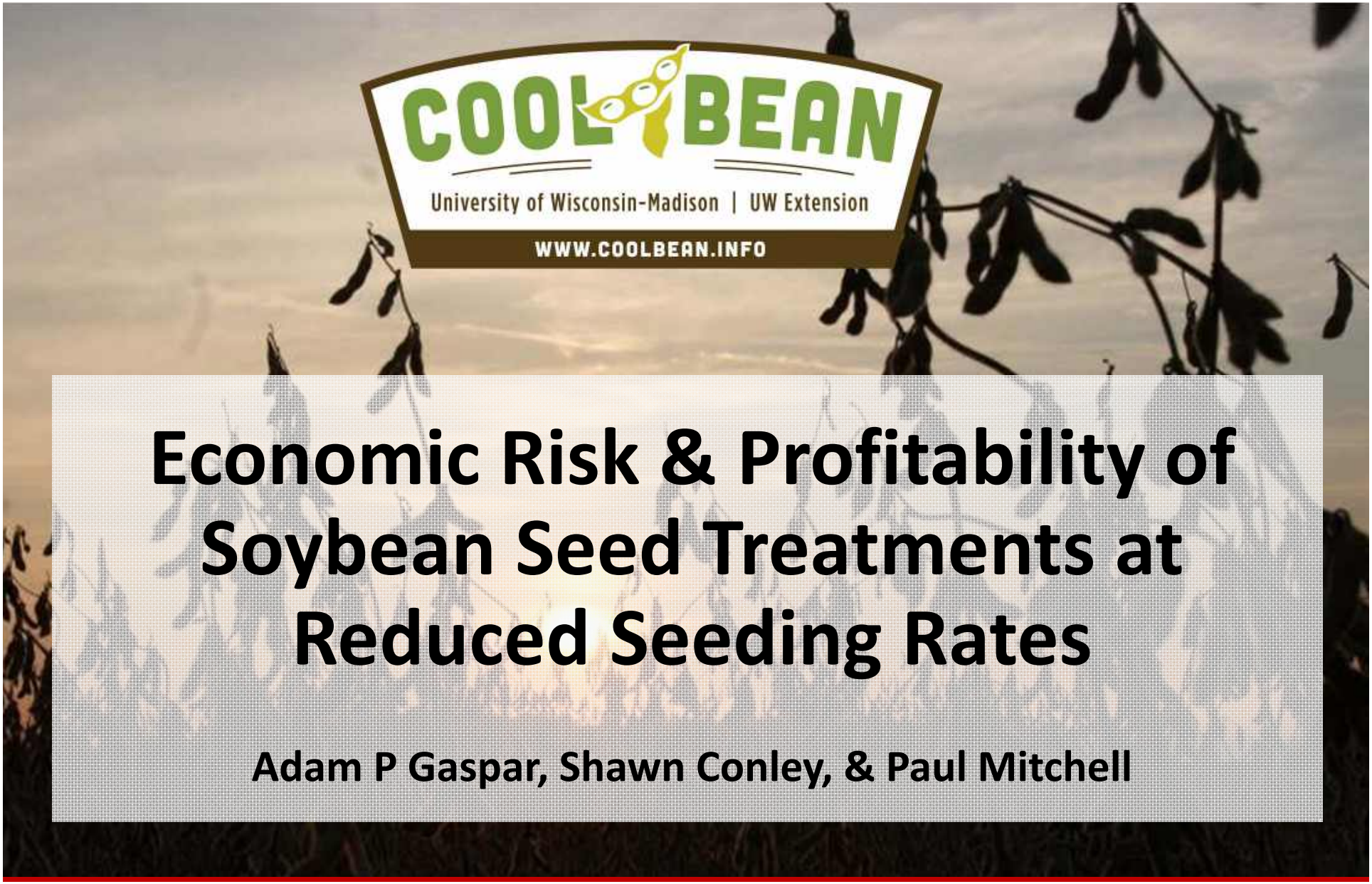

Economic Risk & Profitability of Soybean Seed Treatments at Reduced Seeding Rates

Adam P Gaspar, Shawn Conley, & Paul Mitchell

UW Extension
University of Wisconsin-Extension

WISCONSIN SOYBEAN MARKETING BOARD

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Overview

- Recent work & current practices
- Seed treatment and seeding rate effects on yield
- Economically optimal seeding rates *(EOSR)* for the three seed treatments
- Economic risk potential of lower seeding rates and seed treatments

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Recent Work

- Seed Treatment
  - Have been marketed as an insurance product
  - Recent Wisconsin studies have shown seed treatments can be economical with higher grain prices and high yields
  - North Dakota and Michigan studies reported fungicide seed treatments being cost effective less than 33% of the time
- Seeding Rate
  - *EOSR* in Iowa on high yielding sites was 75,000 seed a^{-1}
  - In Kansas dry land soybeans saw no yield increases past 80,000 plants a^{-1}
  - In Kentucky soybeans saw no yield increases past 108,000 plants a^{-1}

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Current Practices

- Growers have been reducing seeding rates gradually over time
  - Due to increased seed costs and equipment changes
- Current recommendation is roughly 140,000 seeds a^{-1}
- Seed treatment use on soybeans is around 75%
- Questions?
  - Can we maintain yield and profitability with reduced seeding rate?
  - How do recent grain price declines impact seeding rates?
  - What is the risk associated with reducing seeding rates?
  - Where do seed treatments fit into the picture?
    - Can they provide risk mitigation and increase yield?

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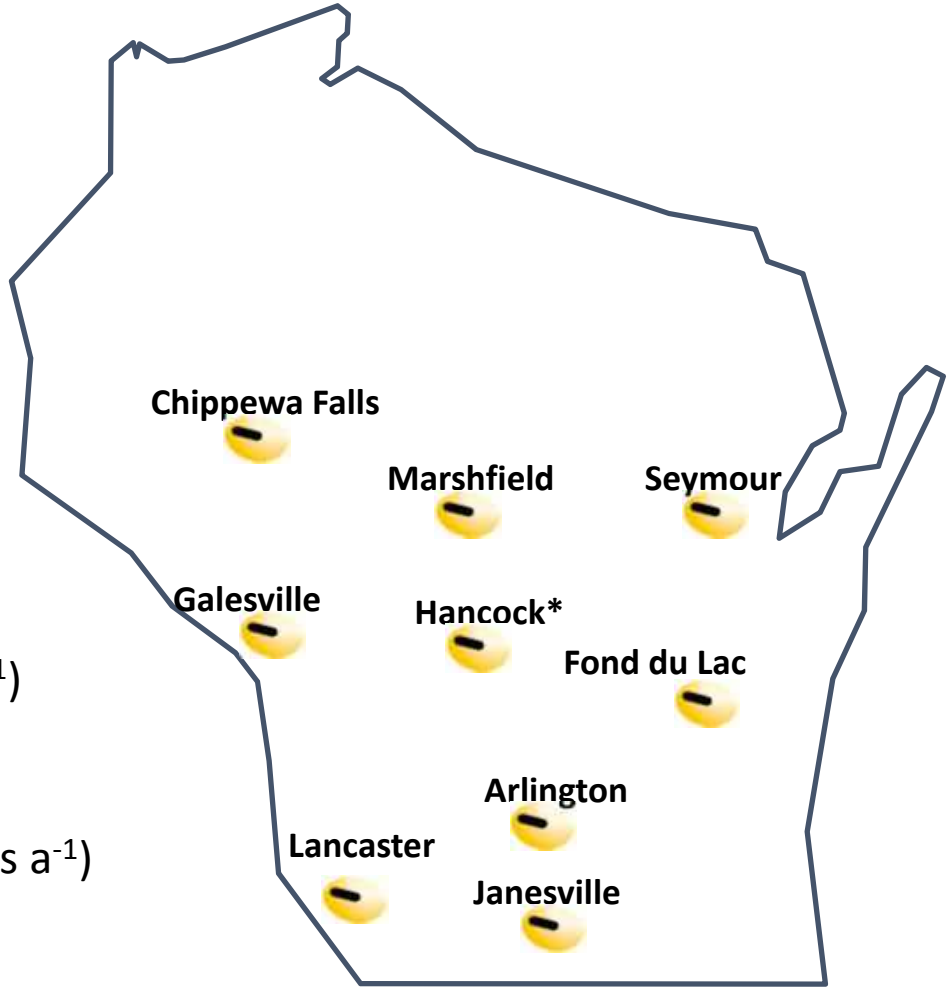
Trial Information

- Years (2012-2013) N =1296
- Regions
  - Southern
  - Central
  - N. Central
- Variety: NK Brand S20Y2
- Planting Date: First 3 weeks in May
- Row Spacing: 15 inches
- Seed treatments
  - UTC
  - ApronMaxx RFC (0.0094 mg ai seed^{-1})
  - CruiserMaxx (0.0858 mg ai seed^{-1})
- Seeding rates
  - 40, 60, 80, 100, 120, 140 (1000 seeds a^{-1})



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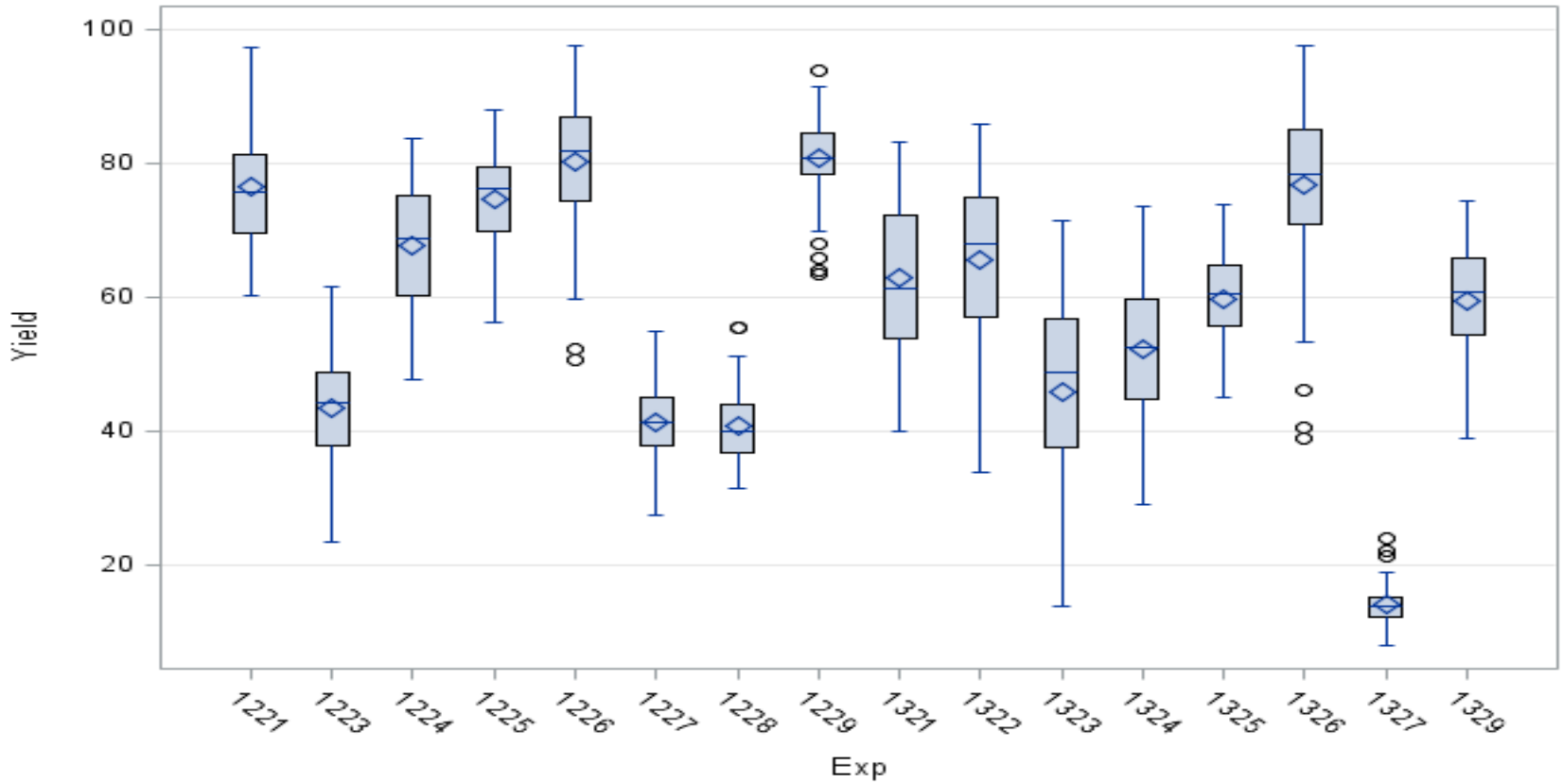
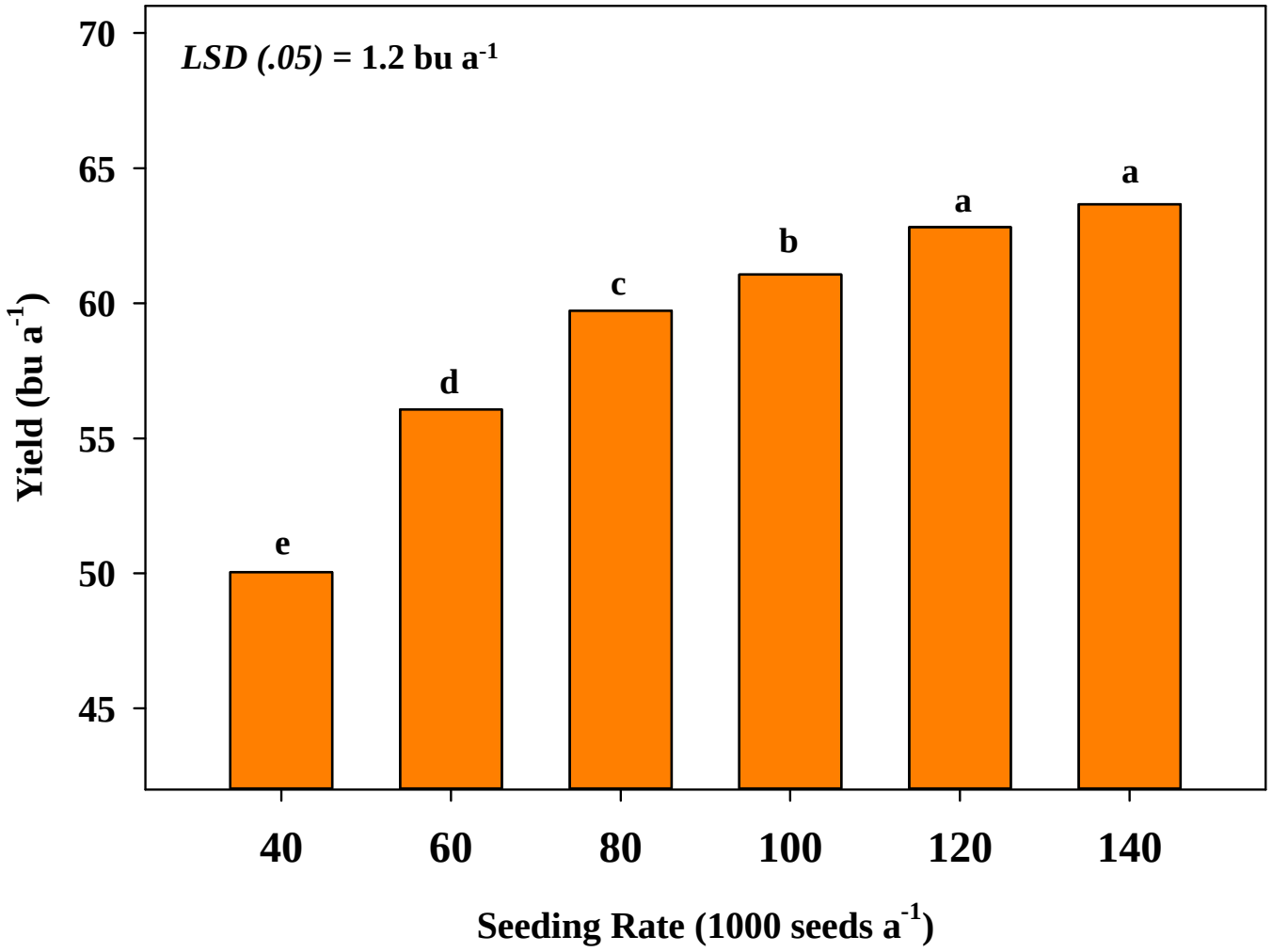
Yield Potential: Locations



- Looked at the treatments across various yield potentials and ultimately, responsive and non-responsive environments.

Main Effect: Seeding Rate



Soybean Canopy Development Time Lapse

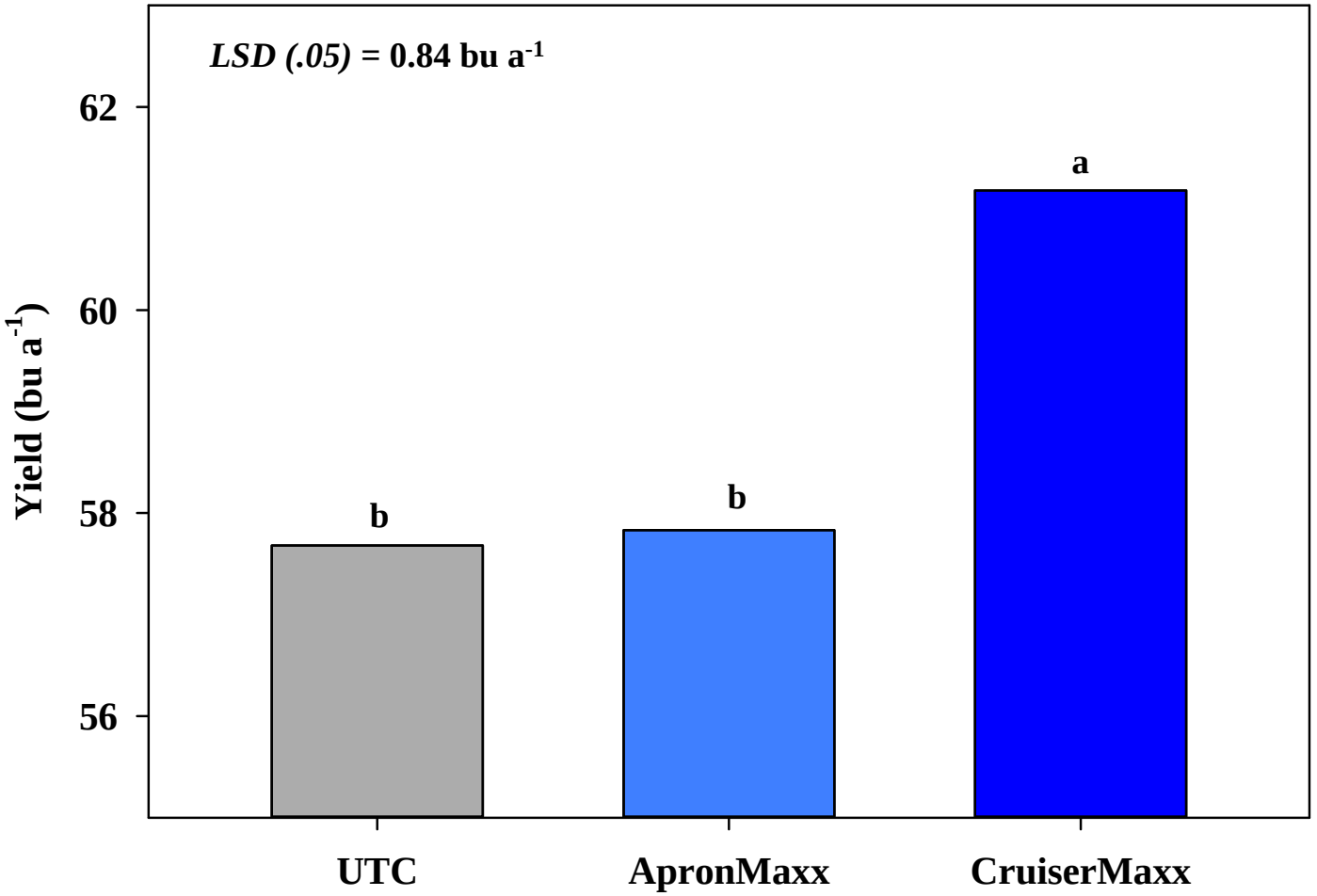
-No Seed Treatment

-May 11th Planting Date

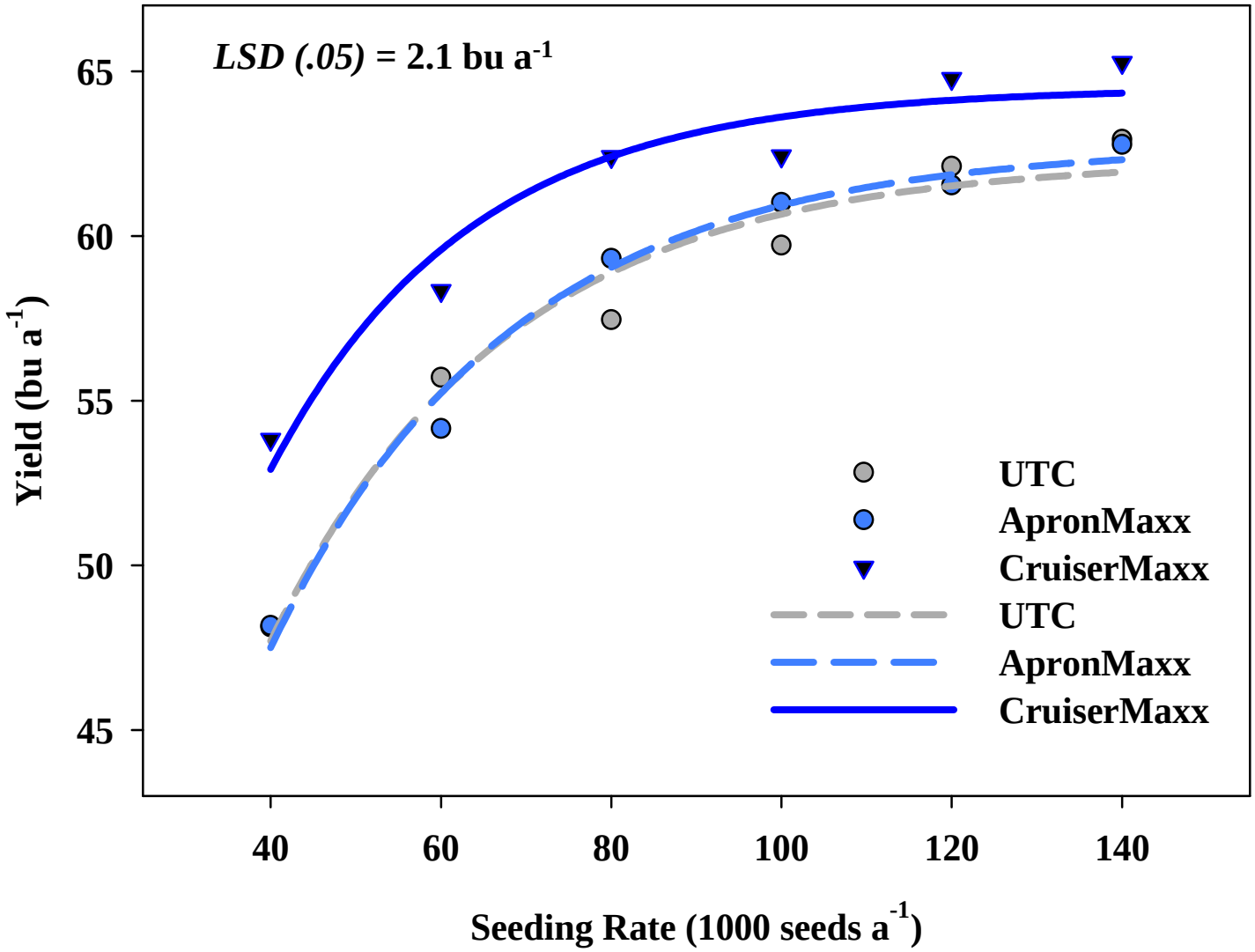
40 K **vs.** **140 K**

40 K								
% light interception	**9**	**28**	**49**	**72**	**90**	**96**	**99**	**100**
Date:	**June 6th**	**June 13th**	**June 20th**	**June 27th**	**July 4th**	**July 11th**	**July 18th**	**July 25th**
% light interception	**22**	**61**	**84**	**92**	**95**	**98**	**99**	**100**
140 K								

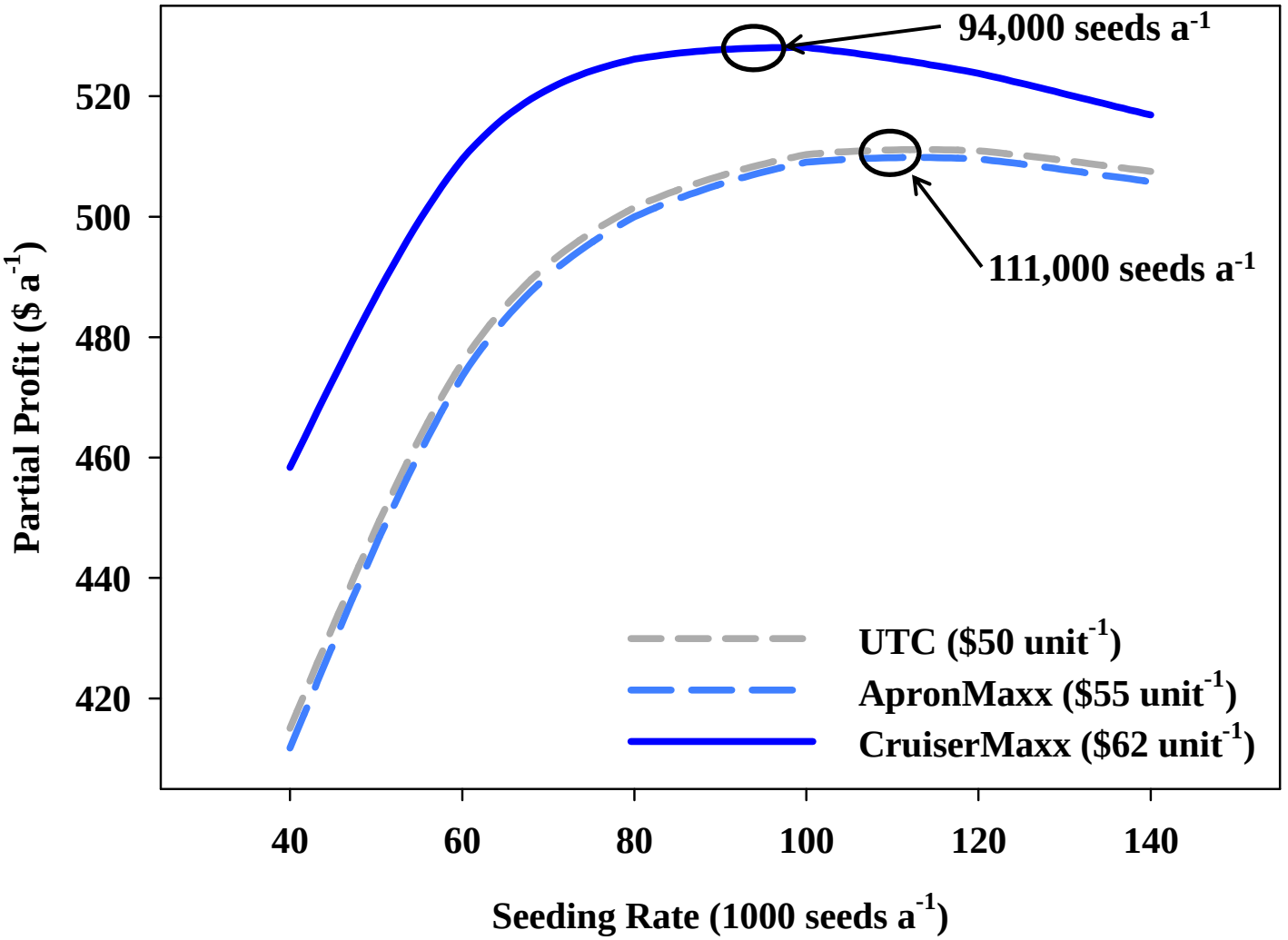
Main Effect: Seed Treatment



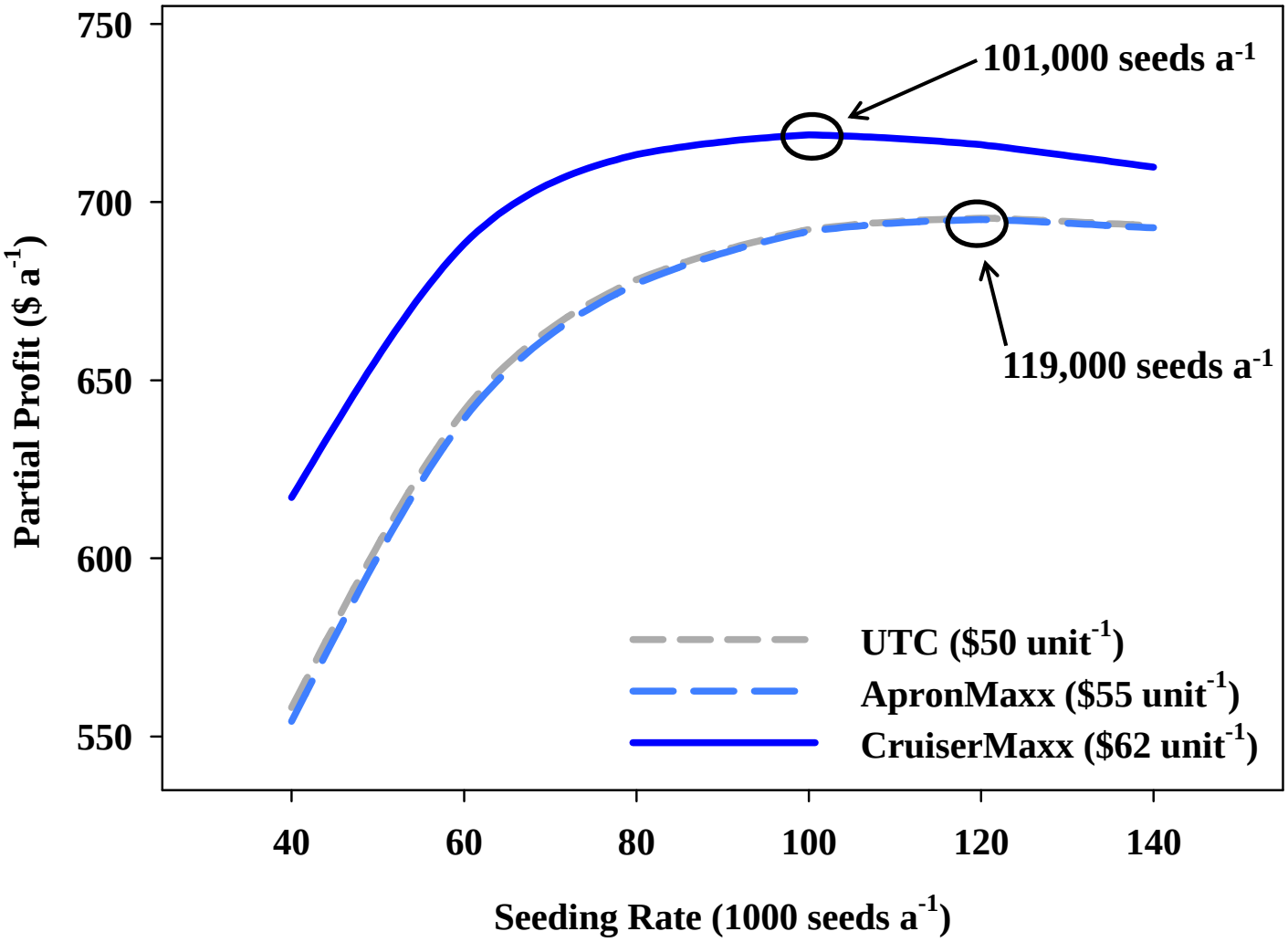
Yield at Various Seeding Rates for Different Seed Treatments



Profit per acre at $9 bu^{-1} Soybeans



Profit per acre at $12 bu^{-1} Soybeans



Economic Risk

- Uncontrollable factors during the growing season
  - Planting date (2012 vs. 2013)
  - Cool and wet condition
  - Inclement weather shortly after planting
  - In field variability
  - Lowering grain markets

- Products and practices that are valuable:
  - Show consistent yield gains
  - Provide profit stability over a wide range of situations and environments
  - Help manage long term margins and economic risk

- Assessing Economic Risk at Various Seeding Rates & How Seed Treatment Affects Risk
  - "Base case" = 140k seeds a^{-1} with no seed treatment (UTC)
  - Our trial allows us 20 comparisons to the base case.
  - The break-even probability shows us the probability that a certain seeding rate x seed trt. combination will increase profit over the base case.
    - Or essentially the risk of a certain treatment combination

Economic Risk Table for $9 bu^{-1} Soybeans

Treatment combination		Break-even probability	Avg. profit increase over the Base Case		
Seed Treatment	Seeding Rate		Positive outcomes	All outcomes	Negative outcomes
	Seeds acre^{-1}		$ acre^{-1}		
UTC	120,000	0.91	3	3	-2
	100,000	0.69	5	2	-5
	80,000	0.26	4	-8	-12
	60,000	0.01	2	-34	-34
	40,000	0.00	na	-94	-94
ApronMaxx	140,000	0.46	14	-2	-15
	120,000	0.54	15	2	-13
	100,000	0.51	14	1	-13
	80,000	0.28	10	-9	-17
	60,000	0.02	6	-36	-37
	40,000	0.00	na	-98	-98
CruiserMaxx	140,000	0.71	18	10	-11
	120,000	0.83	21	16	-9
	100,000	0.89	23	20	-8
	80,000	0.86	21	17	-8
	60,000	0.51	14	0	-15
	40,000	0.01	5	-51	-52
EOSR					
UTC	111,500	0.84	4	3	-3
ApronMaxx	111,000	0.54	14	2	-13
CruiserMaxx	94,000	0.89	23	20	-8

Economic Risk Table for $12 bu^{-1} Soybeans

Treatment combination		Break-even probability	Avg. profit increase over the Base Case		
Seed Treatment	Seeding Rate		Positive outcomes	All outcomes	Negative outcomes
	Seeds acre^{-1}		$ acre^{-1}		
UTC	120,000	0.77	3	2	-3
	100,000	0.44	4	-2	-7
	80,000	0.08	3	-17	-19
	60,000	0.00	1	-55	-55
	40,000	0.00	na	-138	-138
ApronMaxx	140,000	0.49	19	-1	-20
	120,000	0.52	19	1	-18
	100,000	0.44	17	-3	-19
	80,000	0.20	13	-18	-26
	60,000	0.01	8	-57	-57
	40,000	0.00	na	-142	-142
CruiserMaxx	140,000	0.76	27	17	-14
	120,000	0.84	29	23	-12
	100,000	0.87	30	25	-11
	80,000	0.80	26	18	-12
	60,000	0.38	16	-8	-22
	40,000	0.00	6	-79	-79
EOSR					
UTC	119,500	0.76	3	2	-3
ApronMaxx	119,000	0.52	19	1	-18
CruiserMaxx	101,000	0.87	30	25	-11

Conclusions

- Differences in yield, profitability, and economic risk due to seeding rate and seed treatment
- 2nd generation seed-applied insecticides have provided consistent yield benefits
- Multiple factors for determining seeding rates:
  - Expected grain sale price
  - Seed treatment use and components
- Fungicide/Insecticide seed treatment reduced risk across a wide range of seeding rates (80-140k)
- Lowest risk and largest average profit increase was always at the *EOSR*
- Within normal soybean planting windows producers can potentially lower seeding rates with the use of proper seed treatments

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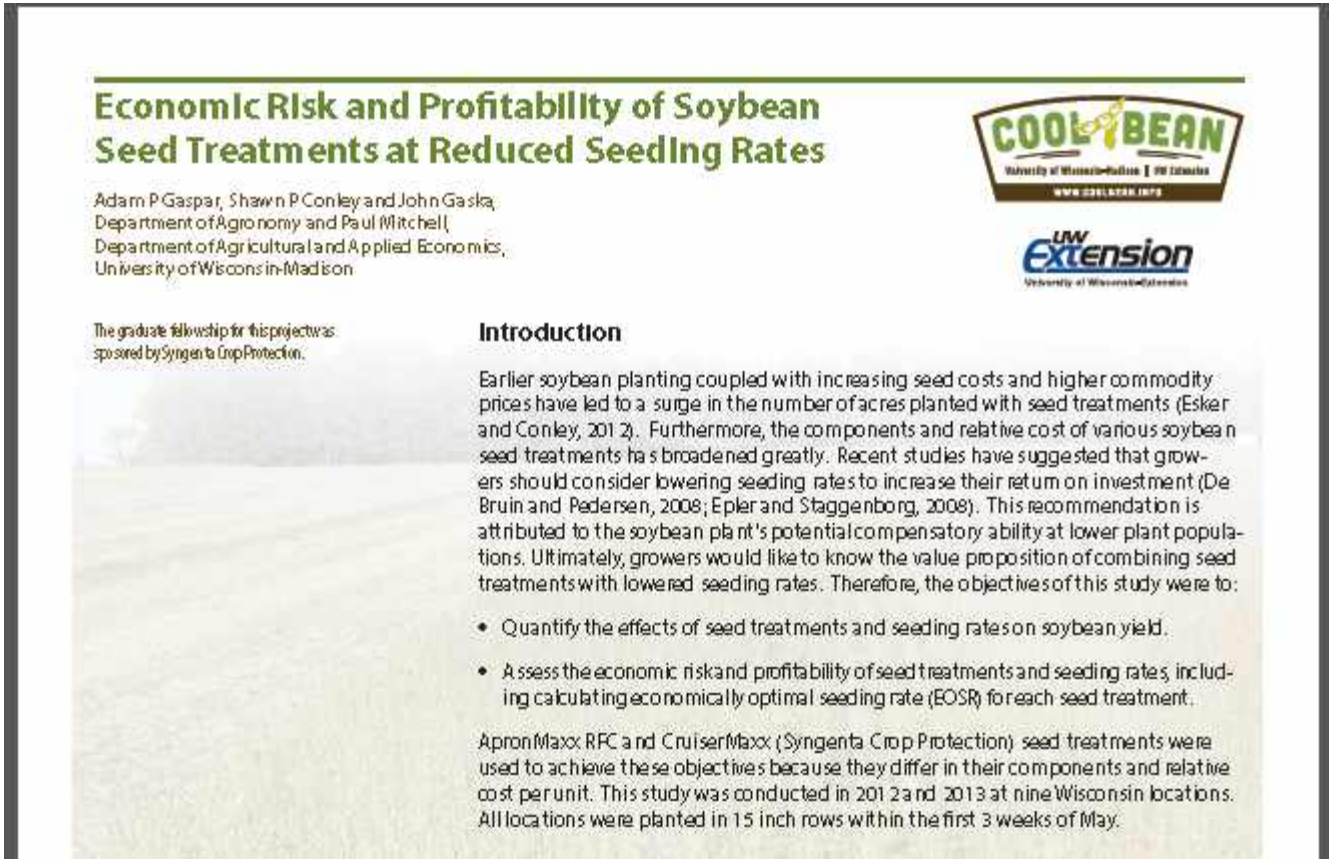

Economic Risk and Profitability of Soybean Seed Treatments at Reduced Seeding Rates

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The graduate fellowship for this project was sponsored by Syngenta Crop Protection.

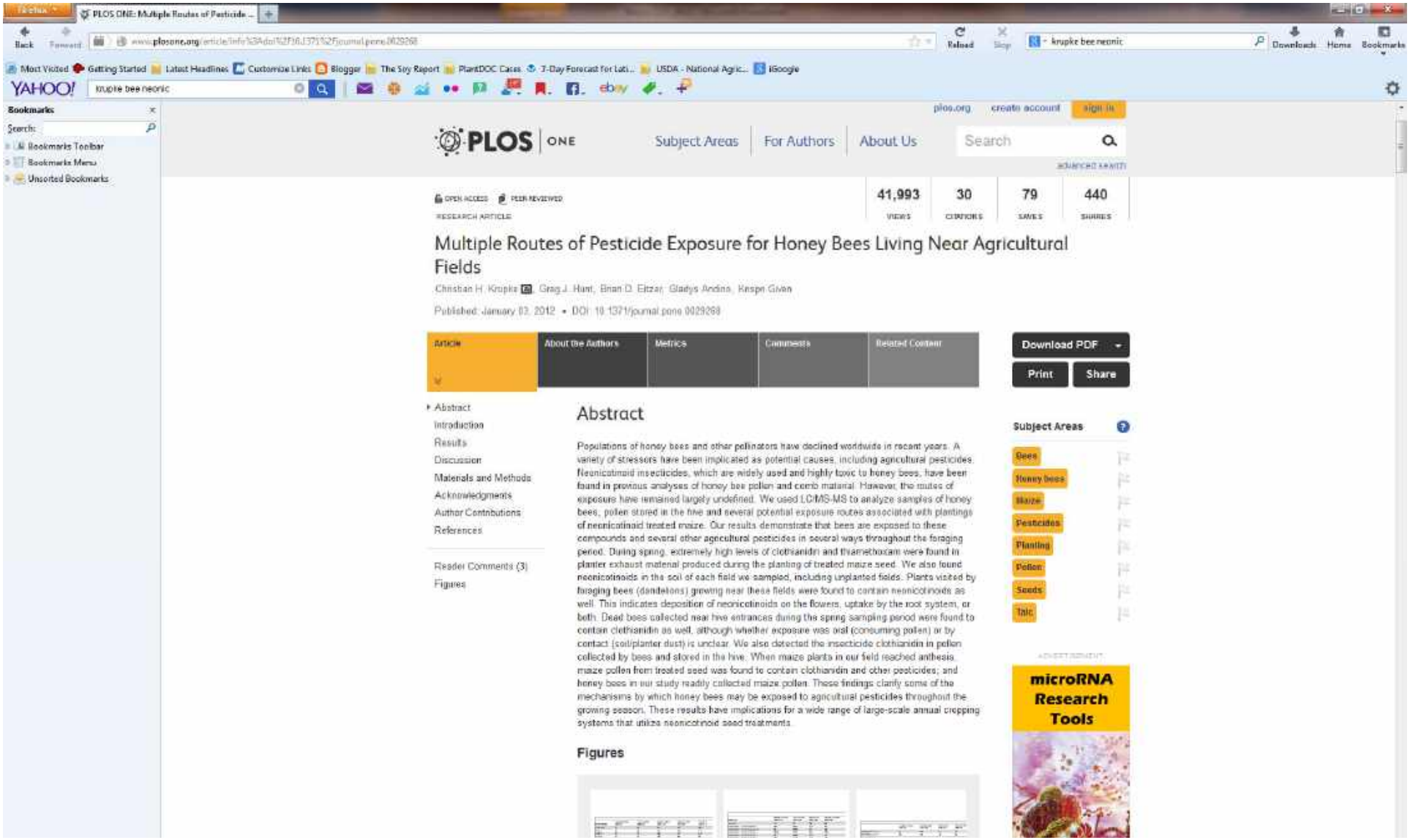
Introduction

Earlier soybean planting coupled with increasing seed costs and higher commodity prices have led to a surge in the number of acres planted with seed treatments (Esker and Conley, 2012). Furthermore, the components and relative cost of various soybean seed treatments has broadened greatly. Recent studies have suggested that growers should consider lowering seeding rates to increase their return on investment (De Bruin and Pedersen, 2008; Epler and Staggenborg, 2008). This recommendation is attributed to the soybean plant's potential compensatory ability at lower plant populations. Ultimately, growers would like to know the value proposition of combining seed treatments with lowered seeding rates. Therefore, the objectives of this study were to:

- Quantify the effects of seed treatments and seeding rates on soybean yield.
- Assess the economic risk and profitability of seed treatments and seeding rates, including calculating economically optimal seeding rate (EOSR) for each seed treatment.

ApronMaxx RFC and CruiserMaxx (Syngenta Crop Protection) seed treatments were used to achieve these objectives because they differ in their components and relative cost per unit. This study was conducted in 2012 and 2013 at nine Wisconsin locations. All locations were planted in 15 inch rows within the first 3 weeks of May.

No Free Lunch: Neonics and Honey Bees



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