

## Reducing Risks on Organic Farms

Dr. Craig Sheaffer, Associate Professor of Agronomy, University of Minnesota, described his work to develop tools to help organic farmers identify and minimize risks during the UMN's Organic Field Day, held July 11, 2007, at the Southwest Research and Outreach Center.

Dr. Sheaffer is working on a project, funded by the USDA Risk Management Agency, to develop a computer and/or printed tool to help organic farmers identify the levels of risk associated with various management options. A farmer will be able to enter data about crop plans, rotation, fertility and weed management strategies, region, target yields, and more. The tool will provide a research-based assessment of the risks associated with the plan, as entered, allowing farmers to change their plans to minimize risk.



View Dr. Sheaffer's recent presentation in the following pages.

## Managing Risk in Organic Crop Production

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## Tools for Managing Risks to Organic Crops in the Upper Midwest

To assist in evaluating the risks of alternative products, techniques or strategies for organic field crop production

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## Personnel

- Craig Sheaffer
- Don Wyse
- Pauline Nickel
- Jim Riddle
- Carmen Fernholz
- Kristine Moncada
- Deborah Allan
- Other collaborators across state



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## Risk Management Tool

- Developing tool with:
  - Learning groups
  - Educators
  - RMA personnel
- Incorporating knowledge from:
  - Previous organic research
  - Research from this grant
  - Experiences from organic producers

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## Topics covered in tool

- Corn
- Soybean
- Small grains
- Alfalfa
- Other specialized topics like flaming, composting, rotary hoeing techniques, scouting, cover crops, green manures and GMO contamination

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## Risk Management Tool Format

1. An online, interactive tool on Risk Management in Organic Production
2. A PDF text document



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## Risk Management Tool

- Users will answer questions on location, rotation, soil fertility, manure management, mechanical weed control and planting dates and rates
- Output will determine the user's risk and provide recommendations to decrease risk



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## Tool examples

- Soybean
- Alfalfa

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## Soybean example



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## Tool Input

- Your location
- Rotation
- Weed Management
- Planting



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## Location

Enter your county:	Meeker
What is your soil texture?	Silty clay loam
What is your soil drainage class?	Somewhat-poorly drained
What yield do you anticipate in bu/ac?	30

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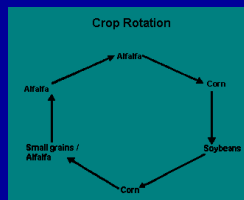
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## Tool Input

- Your location
- Rotation
- Weed Management
- Planting



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## Rotation

		Risk factor
Which best describes your crop rotation?	2 year rotation with C, SB and cover crop	13
What was the preceding crop?	Corn	1

Risk factor total = 14

Risk level = High-your county has SCN

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## Research to support the tool

Crop rotation and soybean cyst nematode



Agricultural Research Service

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## Soybean cyst nematode

1<sup>st</sup> part of experiment was the SCN survey

2<sup>nd</sup> part of SCN experiment will investigate approaches, including fungal parasites, to control soybean cyst nematode in organic production

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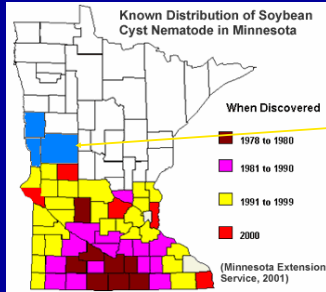
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## Distribution of Soybean Cyst Nematode in Minnesota



It has also been found in conventional soybean fields in Clay, Wilkin, and Ottertail Counties in the Red River Valley.

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## SCN in Organic Systems in MN

- 2006 survey
- 108 organic fields in the SE, SW, WC, and NW Minnesota
- Soil samples analyzed for plant parasitic nematodes by Senyu Chen at the Nematology Lab Southern Research and Outreach Center

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## SCN in Organic Systems in MN

Region	% fields	% above threshold (> 500 eggs/100cc)
NW	0	0
WC	11	0
SE	45	23
SW	88	58

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## SCN BY ROTATION

ROTATION	MEAN (eggs/100cc)	Similar groups
SB every other year	3657	A
SB every two years	1305	B
SB every three years	495	B
No SB	>0.1	B

Means with the same letter are not significantly different from each other

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## Importance of SCN and Rotation

- In regions where SCN was prevalent, the least diversified organic rotation was higher in SCN egg counts
- A diversified rotation has less risk for SCN
- A susceptible host crop should NOT be planted for 3 years

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## Tool Input

- Your location
- Rotation
- Weed Management
- Planting



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## Weeds

		Risk factor
What weeds are presently problematic?	Lambsquarters	
How much seedbed preparation do you do?	Once before planting	
How many pre-emergent operations (or blind harrowing) do you do?	Once	
How many post-emergent operations do you do?	Twice between 5-10 days after emergence	
How many times do you typically inter-row cultivate per season?	Four times or more	

Risk factor total =

Risk level =

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## Tool Input

- Your location
- Rotation
- Weed Management
- Planting/variety




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## Planting

		Risk factor
When do you plant?	Early June	
At what rate do you plant?	120,000 - 130,000/ac	
Is your cultivar food-grade or feed-grade?	Feed-grade	
What maturity is your cultivar?	Late season 140 days	
Soybean yield in bu/ac for your county:	35	

Risk factor total =

Risk level =

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## Risk Management – Establishment of Alfalfa or Red Clover



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## Establishment – risks to yield

- Harvest time
- Companion crops
- Cultivar maturity



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## Harvest schedule - risks

<u>Harvest schedule</u>	<u>Risk factor</u>
Grain harvest	5
Forage harvest	3
Solo seeding	1

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### Grain Harvest X Companion Crop

<u>Companion crop</u>	<u>Risk factor</u>
Peas	7
Wheat	5
Barley	5
Oat	3
Flax	1

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### Forage Harvest X Companion Crop

<u>Companion crop</u>	<u>Risk factor</u>
Peas	?
Wheat	?
Barley	?
Oat	?
Flax	?

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### Cultivar Effect

<u>Cultivar</u>	<u>Risk factor</u>
Late	5
Medium	3
Early	1

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## Output – Example

Management		Risk factor
Harvest schedule	Grain harvest	5
Companion crop	Barley	5
Cultivar	Late maturity	5

Overall risk		
0 – 7	=	Low
8 – 14	=	Moderate
15 – 22	=	High

Total = 15

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## Summary

- Risk management tool still in development stages. It will include corn, soybean, small grains, alfalfa and other specialized topics
- We will be incorporating our organic research results as available
- Tool will be on Organic Ecology website
- Our ultimate goal is to have producers consider different aspects of their decision-making process in order to reduce unnecessary risk

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## Questions/Comments?



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## Tool Output

Once information about location, rotation, weed management, planting is entered, recommendations on reducing risk will be given.




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## Establishment – risks to yield

- Harvest schedule
- Companion crop effects
- Cultivar effects
  - Late, medium, or early varieties




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## Planting experiment – Preliminary results - Year 1

Planting rate	Yield	Similar groups
160,000	44.6	A
220,000	43.4	A

Planting date	Yield	Similar groups
May 15	47.7	A
June 1	45.9	B
June 15	38.4	C

Means with the same letter are not significantly different from each other

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## Research - Rate and date of seeding organic soybean

- 4 locations
- 5 varieties
- 2 planting rates
- 3 planting dates
- 3 years



Soybean

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