

Production of Wheat and Spring Oats in Iowa

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Outline

- I. Introduction**
- II. Selection of Wheat Varieties**
- III. Management Practices for Wheat**
- IV. Selection of Spring Oat Varieties**
- V. Management Practices for Spring Oat**



Benefits of Small Grains

- Rotation is beneficial to the entire cropping system.
- Spreads out the workload and weather risks.
- Reduces input costs.
- Reduces soil erosion.
- Aids in weed control.
- May increase soil organic matter.
- Breaks disease cycles.
- Winter wheat serves as a cover crop.



Winter Wheat vs. Spring Wheat

- Know your market before planting.
- Hard wheat and soft wheat are different commodities and should not be mixed in the marketplace.
- Eastern U.S. – soft winter wheat is produced.
- Spring wheat is hard wheat.
- Winter wheat grown in Kansas, Nebraska and South Dakota is hard wheat.



Wheat – First Decision

- What market class of wheat will you plant?
- This determines where you will source varieties.



Comment

- I don't see any reason why wheat cannot be successfully produced in Iowa.
- Iowa is surrounded by states that produce significant amounts of wheat.



Wheat Variety Selection

1. Fusarium head blight (FHB) resistance - also called scab
2. Test weight
3. Yield
4. Winter hardiness
5. Maturity
6. Resistance to other diseases
7. Lodging resistance / height



Select varieties with scab
resistance and high test
weight!



Sources of Information on Wheat Varieties

- Illinois Variety Trial website – Northern Region performance
<http://vt.cropsci.illinois.edu/wheat.html>
- Also see handout and website with FHB resistance data
<http://vt.cropsci.illinois.edu/wheat.html>
- Spring wheat - Minnesota Variety Trial Report
[http://www.alseed.com/UserFiles/Documents/Variety Trials/2015/2015 UMN Preliminary Small Grains Report](http://www.alseed.com/UserFiles/Documents/Variety%20Trials/2015/2015%20UMN%20Preliminary%20Small%20Grains%20Report.pdf)
- Hard winter wheat – Nebraska Variety Trial website
<http://cropwatch.unl.edu/winter-wheat-variety-test-results>
- Hard Winter wheat – North Dakota
<https://www.ag.ndsu.edu/varietytrials/winter-wheat>
- Scabsmart website <http://scabsmart.org/> (go to Variety Resistance)



Illinois VT data – Northern Region

Table 2. Northern Illinois regional wheat variety trial results, 2015

<u>Company</u>	<u>Variety</u>	<u>ST¹</u>	<u>Regional Average</u>				<u>Perry</u>		<u>Urbana</u>		<u>DeKalb</u>	
			<u>Yield</u> bu/ac	<u>Yield Rank</u> 1 to 79	<u>Test wt.</u> lb/bu	<u>Height</u> in.	<u>Yield</u> bu/ac	<u>Test wt.</u> lb/bu	<u>Yield</u> bu/ac	<u>Test wt.</u> lb/bu	<u>Yield</u> bu/ac	<u>Test wt.</u> lb/bu
AgriMAXX	447	C	115.8	1	55.3	38	121.8	55.9	110.7	54.1	114.7	55.9
Lewis Hybrids	Lewis 839	C	114.7	2	55.1	38	119.3	55.8	111.7	53.8	113.0	55.8
Equity Seed	Butler	G	113.1	3	55.2	38	115.6	55.6	111.0	53.7	112.7	56.2
Green Valley Seed	GV 636	G	112.1	4	56.6	37	116.2	56.8	113.1	56.3	107.1	56.7
Sunstar Hybrids	S-1200	C	112.1	5	54.0	35	119.2	54.1	106.1	52.8	110.9	55.0
	Trial Mean		104.5		54.9	37	107.6	55.1	104.1	53.8	101.8	55.7
	LSD, 10%		7.0		1.1	2	7.7	0.7	6.8	1.3	6.7	1.4
	CV, %		8.0		2.6	6	5.3	0.9	4.8	1.8	4.9	1.9

¹ST- Seed Treatment: C= Cruiser+Fungicide, F= Fungicide, G= Gaucho+Fungicide, M= Macho+Fungicide and S = Escalate+Fungicide.

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Lewis Hybrids	Lewis 839	C	114.7	2	55.1	38	119.3	55.8	111.7	53.8	113.0	55.8
Equity Seed	Butler	G	113.1	3	55.2	38	115.6	55.6	111.0	53.7	112.7	56.2
Green Valley Seed	GV 636	G	112.1	4	56.6	37	116.2	56.8	113.1	56.3	107.1	56.7
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¹ST- Seed Treatment: C= Cruiser+Fungicide, F= Fungicide, G= Gaucho+Fungicide, M= Macho+Fungicide and S = Escalate+Fungicide.

Scab Resistance Information

Company	Entry Name	FHB Resistance Rating*					DON rating**			
		2015	2014	2013	2011	Average	2014	2013	2011	Average
Hoffman Seed House	L-Brand 400	--	3	--	--	2.6	2	--	--	2.2
Merschman	Julie 8	--	3	--	--	2.7	2	--	--	1.8
Merschman	Bintee 10	3	--	--	--	3.0	--	--	--	--
Hoffman Seed House	L-Brand 168	3	3	--	--	3.0	2	--	--	2.0
Merschman	Peyton	3	--	--	--	3.1	--	--	--	--
Pro Harvest	X2001	3	--	--	--	3.2	--	--	--	--
Baird Seed Farms	L-Brand 228 North	4	3	--	--	3.3	2	--	--	2.5
Merschman	Genie 12	--	3	--	--	3.5	2	--	--	2.1
Pro Harvest	X8001	4	--	--	--	3.5	--	--	--	--
Hoffman Seed House	LCS L163	--	--	4	--	3.5	--	2	--	2.0
Kratz Farms LLC	KF 15214	3	4	--	--	3.6	3	--	--	3.5
Virginia Crop Impr. Assoc.	Merl	--	--	--	7	6.7	--	--	10	10.0
Pro Harvest	PH 295	7	--	--	--	6.8	--	--	--	--
Pro Harvest	XP4113	--	7	--	--	6.8	5	--	--	4.7
Syngenta	W1566	--	--	--	7	7.0	--	--	8	8.2



Best Management Practices for Wheat



Planting – Winter Wheat

- Select several varieties.
- Plant treated seed (if not organic).
- Plant winter wheat at the Hessian “fly-free” date.
- Drill in 7” rows if possible.
- Plant wheat 1” – 1.5” deep – deeper crown establishment increases the chances of winter survival.
- Plant 1.3 – 1.5 million seeds / acre = ~ 30-35 seeds per square foot) (~21 seeds /ft in 7” rows).
- Apply 30-40 lbs N / A and some P preplant (18-46-0)
- For late planting or planting in a lot of residue increase the seeding rate by 10 – 20 %.
- Preferable to plant following soybeans rather than corn.
- Planting into stubble may increase winter survival.



Winter Wheat Planting Dates



Source: <http://crops.extension.iastate.edu/cropnews/2014/08/expected-fly-free-date-hessian-fly-iowa>



Winter Wheat - Topdressing

- Apply 40-60 lbs N / A
- In our environment split N application has generally not increased yield.
- Typically farmers apply N at, or before, spring green up.
 - Convenient to apply when the ground is frozen
- A better practice is to apply N later when the crop is using more N, but this may be harder to do.



Planting – Spring Wheat

- Same recommendations as for winter wheat except time of planting.
- Plant as early as possible.
- Mid-March to mid-April.
- Apply all fertilizer before planting.



Minimizing damage from
scab is essential for
profitable wheat production



Scab Damage

- Decreased yield
- Reduced test weight
- Fungus produces toxins including deoxynivalenol (DON)
- DON is detrimental to humans and livestock
- FDA guideline – 1 ppm DON in products
- 5-10 ppm DON in feed wheat depending upon species



Scab Symptoms



Scabby Grain



Control of Scab (FHB)

- Plant resistant or moderately resistant varieties.
- Reduce the risk by planting several varieties that have somewhat different maturities.
- Use scab forecasting tool to assess the risk of scab.
- Apply a fungicide at the beginning of flowering.
- Apply either Prosaro or Caramba.
- Do NOT apply strobilurins (ex. Headline) for control of scab.
- Increase air on combine if scab occurs to blow out shriveled kernels.



Scab Risk Forecasting Tool

- Available at: <http://www.wheatscab.psu.edu/>
- Sign up for Scab Alerts: See postcard or go to http://www.scabusa.org/fhb_alerts.php





FUSARIUM HEAD BLIGHT

Prediction Center

[Introduction](#)[Model Basics](#)[User Guide](#)[Fusarium](#)[Developers](#)[Login](#)

IA Commentary

There is no commentary available within seven days of 2015-05-15

1. Choose a State

State: [Help](#)

2. Choose a Model

Wheat: ?

Susceptibility:

[Link to Spring Wheat Variety Information](#)

3. Weather Forecast Mode

Forecast (hrs):

Assessment Date: ?

Advanced: Save Model and Location

Name: [Save As New](#)

Saved Locs: [Delete](#)

Legend

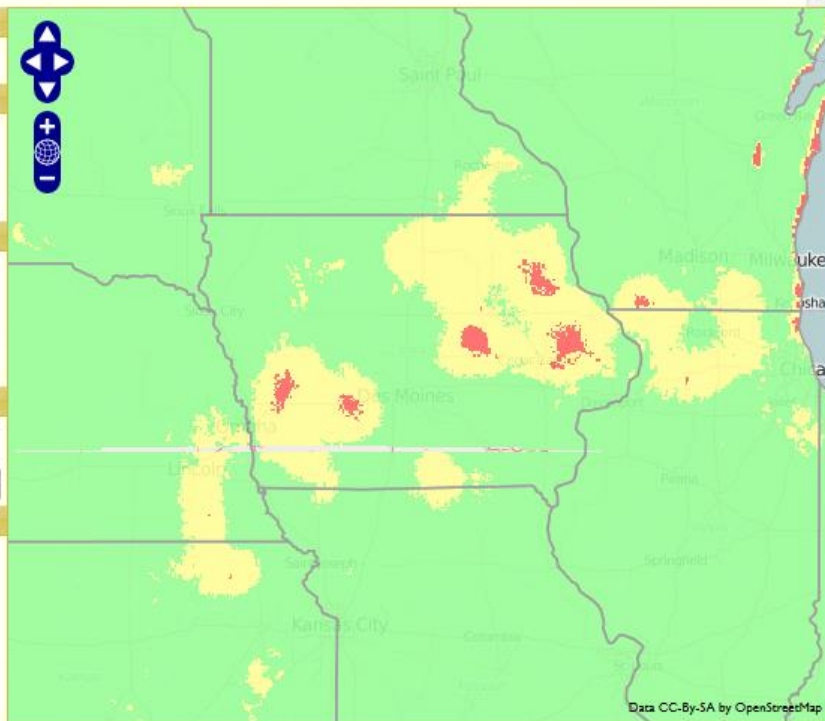
Blight Risk

☒ High
☐ Medium
☐ Low
☐ No Data

Weather Stations

☐ FAA
☐ AgNet
☐ Inactive (for model)

Risk Map Opacity: [Query](#)



PENN STATE



KSTATE
Kansas State University



Disclaimer

Fungicide Application for Scab Control

- Use only Prosaro or Caramba.
- Ground application preferable to aerial.
- Nozzles angled 45 degrees forward provide better coverage.
- Application should be at the beginning of flowering.



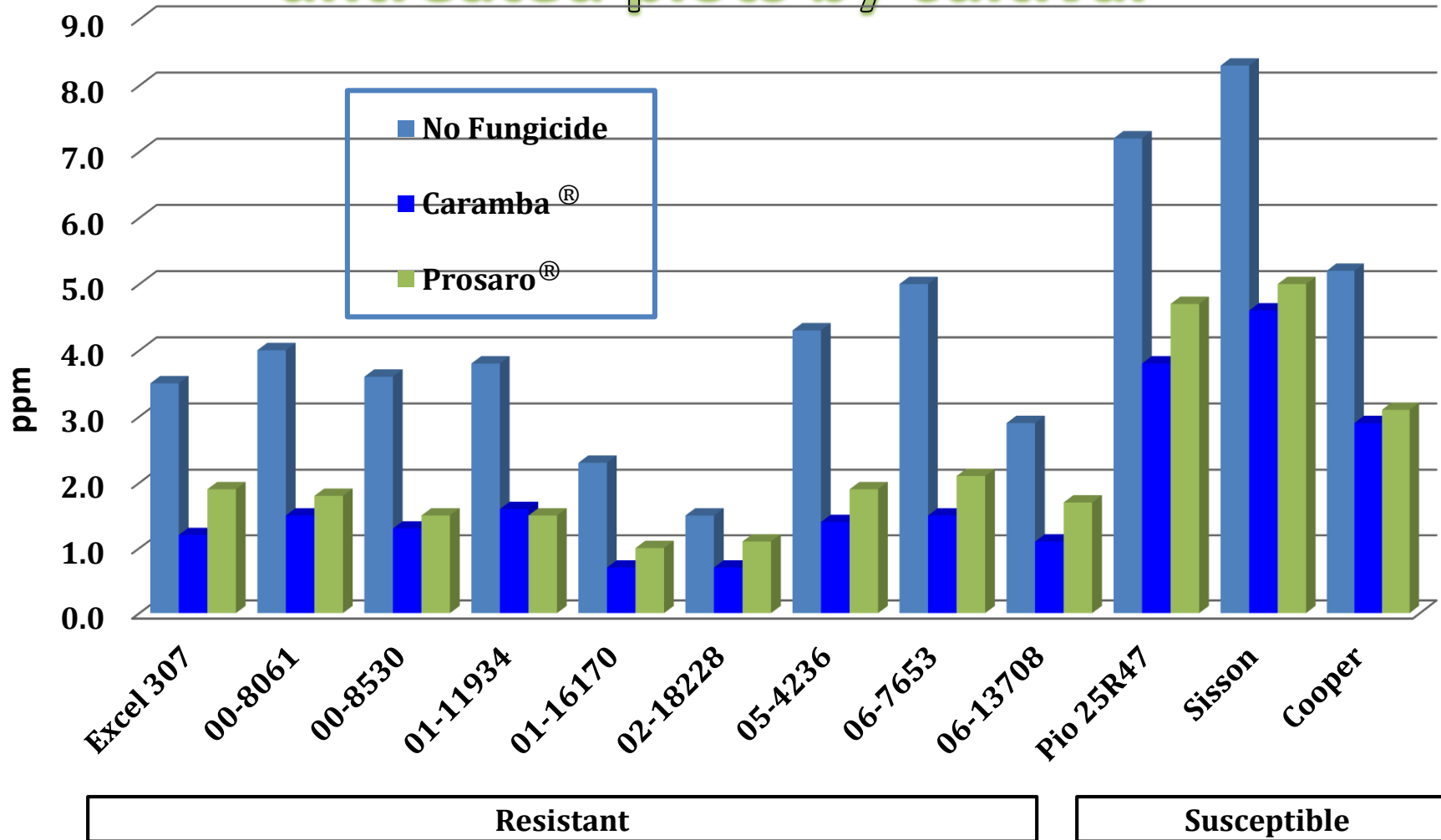
Picture source: http://ipcm.wisc.edu/blog/2013/03/using-fungicides-on-wheat/wheatflowering3june09_lancaster/

Variety Resistance + a Fungicide is the Key

- Using a scab resistant variety AND a fungicide is better than either practice individually.
- For organic producers strong host resistance to scab is crucial.



DON content (ppm) for treated and untreated plots by cultivar



Stripe rust on wheat



Leaf rust on wheat



Harvest Wheat at High Moisture

- Harvest wheat at 15-18 % moisture and dry
- Reason: Waiting for wheat to dry down in the field results in lower test weight and increases the chance of rain before harvest and reduced quality.



Comparison of two varieties

	\$/bu	Yield	TW	TW discount /bu	DON	DON discount/ bu	Discount or premium /bu	Gross Return	Differ
Variety Y	4.65	100	55	0.18	5	0.75	0.93	372	
Variety TW	4.65	80	59	0	2	0	0	372	\$0
Variety Y	4.65	100	55	0.18	5	0.75	0.93	372	
Variety TW	4.65	90	59	0	2	0	0	418.5	\$46.50
Variety Y	4.65	100	55	0.18	5	0.75	0.93	372	
Variety TW	4.65	80	59	0.05	1	0.05	0.1	380	\$8.00
Variety Y	4.65	100	55	0.18	5	0.75	0.93	372	
Variety TW	4.65	90	59	0.05	1	0.05	0.1	427.5	\$55.50



Some Soft Red Winter Wheat Varieties for Consideration

- Merschman Seed –
 - Payton, Samantha, Samantha 2, Bintee 10
- Welter Seed and Honey Co. – L 334
- MFA Inc. – 2166, 2201, 2431, 2474, 2520
- Momentum Brand – MO 104, MO 204, Mo 304



Spring Oats



Spring Oat Variety Selection

1. Yield
2. Test weight
3. Maturity
4. Resistance to diseases
 - A. Barley Yellow Dwarf Virus (BYDV)
 - B. Crown Rust
5. Lodging resistance / height
6. Kernel color - need white if selling to horse owners



Spring Oat Field Plots



BYDV susceptible

BYDV tolerant breeding line

2014-2015 University of Illinois Spring Oat Drill Plots

Urbana, DeKalb, Monmouth, IL

Name	Yield			TW		Heading Date	Height	Lodging	Crown Rust	BYDV
	(bu/A)	Rank	% mean	(lbs/bu)	Rank	(Julian)	(in.)	(0-9)	(0-9)	(0-9)
Badger	121.1	8	98	28.9	12	156.8	35.4	4.6	5.7	3.5
Baker	126.9	4	103	29.9	8	160.5	39.6	5.6	4.3	5.0
Buckskin	120.6	9	97	31.0	5	158.0	35.7	5.7	7.0	4.5
Colt	117.0	10	94	31.6	2	156.4	39.7	6.1	5.3	7.0
Esker	124.0	5	101	30.2	7	162.5	42.2	5.0	4.7	5.0
Excel	121.4	7	102	27.5	15	160.8	40.5	6.3	6.0	3.5
Horsepower	121.6	6	98	30.3	6	160.2	39.8	3.7	4.3	4.5
Kame	106.9	16	89	26.4	16	157.9	38.5	5.5	5.0	6.5
Ogle	114.7	13	93	28.2	13	160.5	41.0	5.0	5.7	6.0
Reins	132.7	1	111	31.3	3	158.9	36.4	1.7	6.3	4.0
Robust	110.8	15	86	27.5	14	163.6	42.2	4.5	5.7	4.5
Saber	129.3	3	106	29.6	11	157.7	38.9	5.0	6.3	3.5
Shelby 427	116.7	11	98	32.5	1	157.4	43.0	3.2	1.7	5.0
Spurs	129.7	2	103	29.8	9	160.0	39.7	4.3	5.0	5.0
Tack	115.6	12	91	31.3	4	158.7	38.2	4.8	6.7	4.0
Woodburn	113.8	14	95	29.6	10	157.7	41.4	5.4	5.3	5.5
EXPT. MEAN	126.5			30.6		160.4	39.0	4.4	5.1	4.6
LSD (0.05)	9.9			4.2		0.7	4.2	30.1	22.2	27.7
CV (%)	9.1			1		1.1	1.5	1.5	1.3	2.7
No. Years	2			2		2	2	1	1	1

Crown rust rating scale: 0 = resistant, 9 = susceptible

BYDV rating scale: 0 = resistant, 9 = susceptible

Lodging rating scale: 0 = standing, 9 = severely lodged

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Urbana, DeKalb, Monmouth, IL

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No. Years	2			2		2	2	1	1	1

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Colt	117.0	10	94	31.6	2	156.4	39.7	6.1	5.3	7.0
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No. Years	2			2		2	2	1	1	1

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BYDV rating scale: 0 = resistant, 9 = susceptible

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Planting – Spring Oats

- Select several varieties.
- Plant treated seed (if not organic)
- Plant as early as possible – mid-March to mid-April.
- Drill in 7" rows if possible.
- Plant oats 1" – 1.5" deep.
- Plant 1.3 – 1.5 million seeds / acre = ~ 30-35 seeds per square foot) (~21 seeds /ft in 7" rows).
- Apply 60 – 80 lbs N / A preplant



Herbicide Carryover

- **Caution: check herbicide labels for carryover information.**
- **Oats are sensitive to some herbicides.**
- **Especially a problem following a dry season.**



Disease Management in Oats

- Plant BYDV resistant and crown rust tolerant varieties.
- If non-organic - use seed treatment.
- Insecticide seed treatment to control aphids carrying BYDV is probably not necessary if planting BYDV tolerant varieties.
- Fungicide application for crown rust control generally not recommended unless oats are for seed production.



Sources of Information on Oat Varieties

- Iowa State Variety Trial Report (2008) -
http://lib.dr.iastate.edu/cgi/viewcontent.cgi?article=1566&context=farms_reports
- Illinois Variety Trial website –
<http://vt.cropsci.illinois.edu/wheat.html>
- Minnesota Variety Trial Results -
https://www.maes.umn.edu/sites/maes.umn.edu/files/oat_2015_final.pdf
- South Dakota Variety Trial website -
<http://igrow.org/up/resources/03-3020-2015.pdf>
- North Dakota Variety Trial website -
<https://www.ag.ndsu.edu/varietytrials/oat>



Illinois Agronomy Handbook

Online at:

<http://extension.cropsciences.illinois.edu/handbook/>

Chapter 4: Small Grains and Grain Sorghum

– Emerson Nafziger





**Thank you for your attention.
Questions?
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