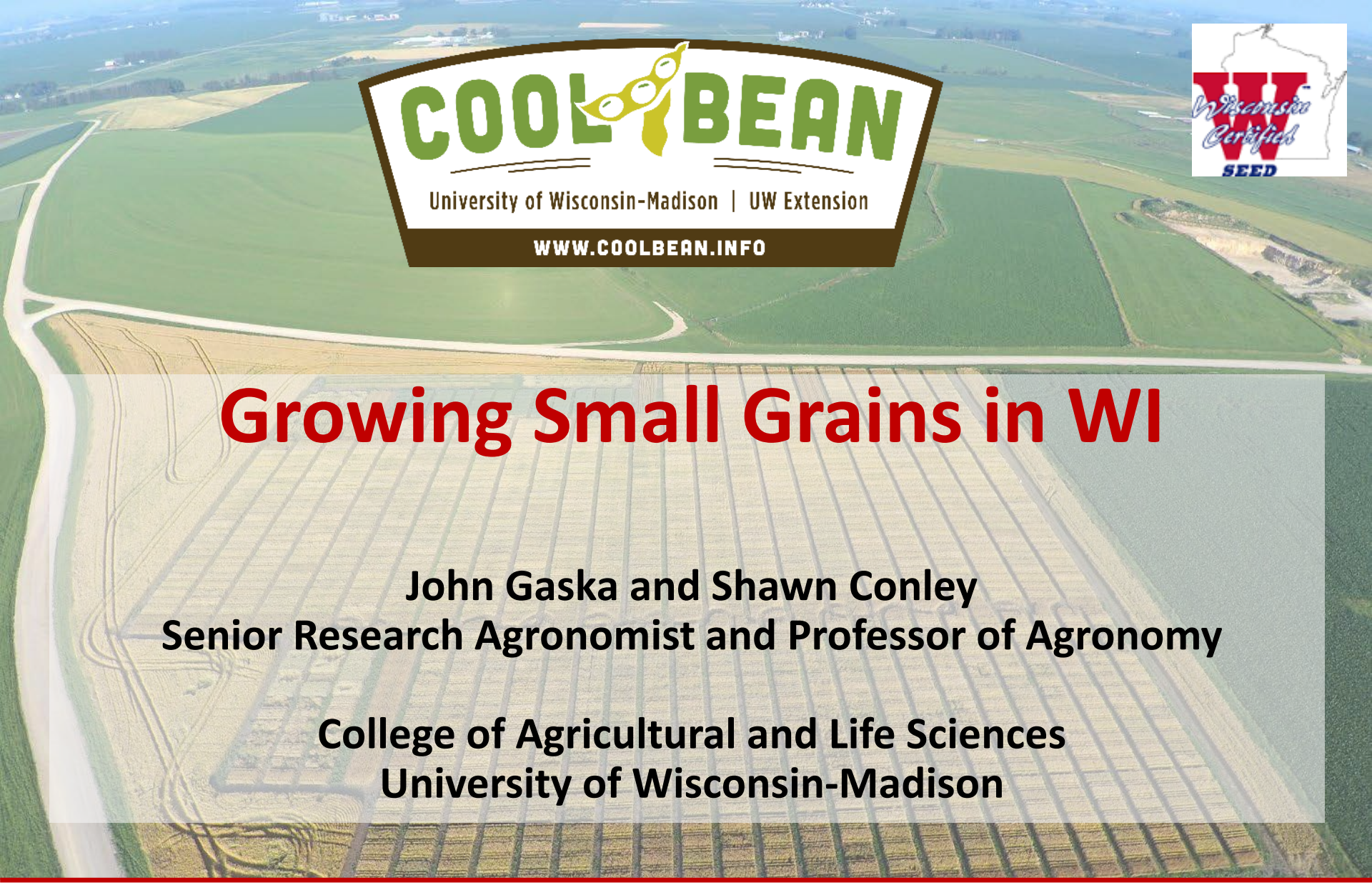

Growing Small Grains in WI

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WISCONSIN
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Small Grain Production in Wisconsin
Growing for seed vs grain

- Use good management practices for high yield
- Disease control, especially for FHB, is important for selling grain or using for seed
- Can always sell grain if you don't keep it for seed

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Cover Crop Seed Options

Specie	Plant date	Seed size seeds/lb	Seed rate million seeds/a	Bu weight lbs
Spring barley (winter barley NOT recommended)	Early spring	10,000-15,000	1.5	48
Oats	Early spring	11,000-15,000	1.5	32
Rye	Late September-early October	11,000-20,000	1.5	56
Triticale Cross of wheat (female) x rye (male)	Late September-early October	11,000-18,000	1.5	50
Winter wheat	Late September-early October	10,000-15,000	1.5	60

Small Grain Production in Wisconsin
Keys to Success

- Variety selection: please see the UW Performance Tests
- A fungicide seed treatment is recommended for winter wheat in WI, especially for seed damaged by Fusarium head blight (FHB)
- Plant 1.0”-1.5” deep
- Plant at recommended seeding rates and dates
- Plant winter grains between September 20 and October 5
- Plant spring grains as early in the spring as possible
- The optimal seeding rate for winter grains planted after October 1st should be incrementally increased as planting date is delayed to compensate for reduced fall tillering.
- Crop rotation matters

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Wheat Performance Trials

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Oat and Barley Performance Trials

2017 Wisconsin
Oats and Barley Performance Tests

Lucia Gutierrez, Pablo Gonzalez-Barrios and Shawn Conley

The Wisconsin oats and barley performance trials are conducted each year to serve Wisconsin growers. Trials include released varieties, experimental lines from Wisconsin and Midwestern states, and lines from private companies. The main objective of these trials is to obtain data on how varieties perform in different locations and years. Growers can use this data to help choose the best varieties to plant, and breeders to decide on whether or not to release a new variety and to select parents to make new crosses.

The best varieties for yield performance, disease resistance and quality are entered into the Wisconsin Certification Program. As new varieties are released to the public, older varieties with inferior qualities are removed from the recommended list and eventually dropped from the certified list as seed production declines. Additionally, good performing varieties from other states may be recommended and/or certified in Wisconsin.

Occasionally, varieties are certified without being recommended to Wisconsin growers. These varieties may include commercial varieties developed by private seed companies or varieties where there is a substantial market for Wisconsin-produced seed. Thus, in Wisconsin, recommendation and certification are different things. Recommended varieties are those with superior in state production performance records, while certification provides assurance of seed purity and seed quality.

Variety Selection

Factors to consider when selecting oat and barley varieties include grain yield, maturity, straw strength (or resistance to lodging), disease resistance and grain quality. Barley growers should also consider whether a variety is acceptable for malting. Several varieties are also evaluated for forage yield and quality.

Variety Testing

Varieties in the trials are selected based on current demand, availability, and adaptation to Wisconsin's climate. Most of these varieties are commercially available. Several commercial and public varieties are regularly tested for comparison.

Tests were conducted at seven locations during the 2017 growing season using conventional tillage practices. The goal is to have a stand of 1.3 million plants per acre. Therefore, the seeding rate was 1.47 million plants per acre. Agronomic practices at all locations are listed in Table 1. All experiments were conducted in randomized complete block designs with four replications.

Growing conditions

2017 season. Wisconsin oats production was estimated at 6.1 million bushels, the area planted with oats was 180,000 acres, and the area harvested was 95,000 acres, which was lower than in 2016. Oats yield was 64 bushels per acre and was down 2 bushels from 2016 (Table 2).

Table 1. Location and management practices of small grain variety trials in Wisconsin in 2017.

Location	Cooperators	Row spacing	Previous crop	Average N (lb/A)	Planting date	Weed control	Harvest date	# Genotypes
Arlington	P. LeMahieu, M. Bertram	6 inches	soybean	0	9-Apr	2,4D + Harmony extra	29-Jul	42
Chilton	R. Kolbe	6 inches	sweet peas	0	25-Apr	Affinity	8-Aug	34
Lancaster	D. Wiedenbeck	7.5 inches	soybean	0	18-Apr	2,4D	25-Jul	34
Madison	J. Hedtke	6 inches	soybean	0	8 Apr	2,4D + Harmony extra	25 Jul	42
Marshfield	J. Cavadini	6 inches	soybean	0	25-Apr	None	7-Aug	34
Spooner	P. Holman	7.3 inches	soybean	36	24-Apr	2,4D	16-Aug	34
Sturgeon Bay	M. Stasiak	6 inches	forage oats + peas	0	26-Apr	2,4D + Direct	1-Aug	34

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Data Tables

- Companies, varieties sorted alphabetically
- Mean and LSD shown at bottom
- Stars (*) indicate that variety is not significantly different than the highest yielding variety in the trial.
- Additional winter survival and disease data taken when available

Brand (Entrant)	Entry	2017 3-test average Yield (bu/a)	2017 3-test average Test wt. (lb/bu)	Arlington Yield (bu/a)	Arlington Test wt. (lb/bu)	Fond du Lac Yield (bu/a)	Fond du Lac Test wt. (lb/bu)	Sharon Yield (bu/a)	Sharon Test wt. (lb/bu)	2016 4-test average Yield (bu/a)
Pro Seed Genetics	PRO 260	87	55.1	97	54.6	62	55.5	103	55.1	111
Pro Seed Genetics	PRO 320A	92	56.5	106	57.8	68	56.7	101	55.0	105
Pro Seed Genetics	PRO 410	* 97	57.1	* 108	57.7	70	56.8	* 113	56.8	117
Pro Seed Genetics	PRO Ex 380	89	59.1	102	59.4	61	59.4	105	58.5	109
Pro Seed Genetics	PRO Ex 430A	92	56.7	105	58.6	62	55.9	108	55.6	--
Public	Erie	75	55.4	86	56.6	56	54.3	84	55.2	98
Public	Harpoon	* 95	54.8	* 108	56.0	68	53.9	108	54.5	--
Public	Hopewell	77	55.2	89	56.9	61	54.9	82	53.9	98
Public	Kaskaskia	78	57.6	90	58.4	60	58.0	85	56.5	93
Public	Red Devil Brand	88	56.8	100	56.9	64	57.3	99	56.1	106
Public	Red Dragon Brand	86	55.0	100	56.3	62	55.1	95	53.6	106
Public	Starburst	91	58.8	103	60.3	68	57.7	101	58.3	--
Public	Sunburst	87	58.6	101	59.1	70	58.6	91	58.1	108
Public	Whale	91	56.2	* 108	57.9	69	55.2	97	55.7	* 121
Steyer	Berwick	* 94	56.8	* 108	57.6	65	56.8	108	56.0	--
Steyer	Morrin	90	55.8	104	56.5	67	55.2	99	55.8	* 118
Steyer	STex166	92	54.2	101	54.1	65	54.6	110	53.9	--
Steyer	Wharton	92	56.9	106	57.6	62	56.7	109	56.4	--
Syngenta	SY 007	91	56.0	104	56.6	63	55.6	106	55.8	112
Syngenta	SY 100	* 94	53.8	* 109	54.4	66	54.0	109	53.1	* 120
Syngenta	SY 547	* 94	56.2	105	56.8	* 71	55.5	105	56.2	112
Van Treeck's	Bonanza	* 94	56.1	104	56.4	* 72	56.5	105	55.4	--
Van Treeck's	XL 007	* 94	56.0	106	56.6	64	55.3	111	56.1	* 118
VCIA / VA Tech	Hilliard	91	56.9	105	57.6	61	56.2	106	56.9	116
VCIA / VA Tech	VA11W-108PA	91	57.1	106	58.0	64	56.8	103	56.5	--
VCIA / VA Tech	VA12W-31	85	57.0	95	57.1	58	57.8	100	56.2	--
	Mean	**91**	**56.1**	**104**	**56.9**	**66**	**55.9**	103	**55.5**	**101**
	LSD (.10)	**7**	**1.0**	**5**	**1.0**	**7**	**0.8**	6	**0.7**	**6**

* Yield is not significantly different (0.10 level) than that of the highest yielding cultivar

Use multi-location and multi-year data for best prediction of yields

Establishment of small grains

- All small grains can be established using no-till, minimum till, or conventional till methods
- No-till recommended when proper equipment is available, soil and residue conditions are favorable, and where reduction in erosion is desired
- Most winter wheat in WI is established using no-till following soybean

Winter Wheat Seeding Rate Recommendations

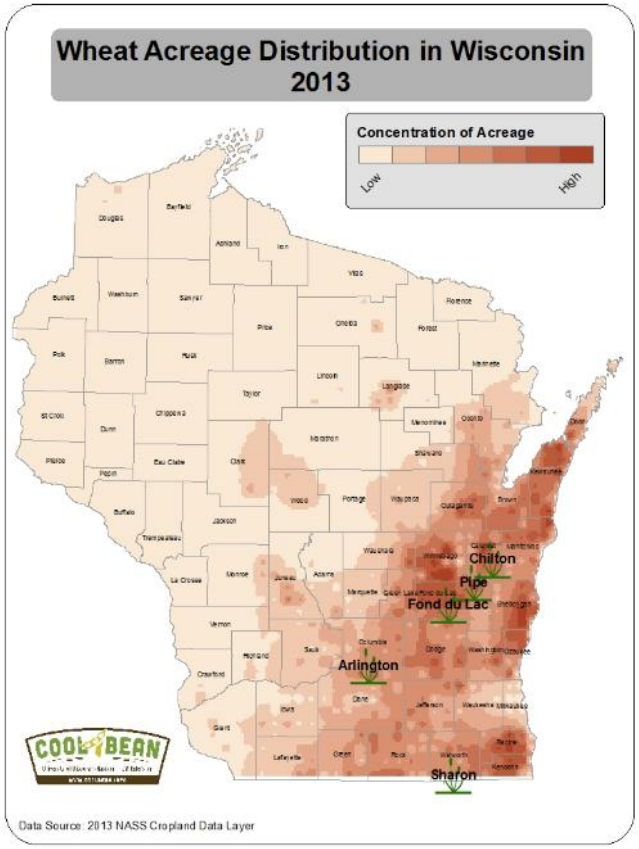
Seeds/acre Million	Seeds/sq ft	Row Width (in)			
		6	7	7.5	
		Seeds per foot row			
0.4	9.2	5	5	6	
0.5	11.5	6	7	7	
0.6	13.8	7	8	9	
0.7	16.1	8	9	10	
0.8	18.4	9	11	11	
0.9	20.7	10	12	13	Seeding Rate for Sept 1 to Sept 15
1.0	23.0	11	13	14	
1.1	25.3	13	15	16	
1.2	27.5	14	16	17	
1.3	29.8	15	17	19	
1.4	32.1	16	19	20	Seeding Rate for Sept 15 to Oct. 1
1.5	34.4	17	20	22	
1.6	36.7	18	21	23	
1.7	39.0	20	23	24	
1.8	41.3	21	24	26	
1.9	43.6	22	25	27	Seeding Rate for Oct. 1 to Oct 10
2.0	45.9	23	27	29	
2.1	48.2	24	28	30	
2.2	50.5	25	29	32	
2.3	52.8	26	31	33	
2.4	55.1	28	32	34	
2.5	57.4	29	33	36	

Seeds/lb	Seeds per acre (x 1 million)						
	1.0	1.2	1.4	1.6	1.8	2.0	2.2
	Pounds of seed/acre						
10000	100	120	140	160	180	200	220
11000	91	109	127	145	164	182	200
12000	83	100	117	133	150	167	183
13000	77	92	108	123	138	154	169
14000	71	86	100	114	129	143	157
15000	67	80	93	107	120	133	147
16000	63	75	88	100	113	125	138
17000	59	71	82	94	106	118	129

**This table is based on 100% germination. Adjust your seeding rate by the % germ printed on your bag tag.*

Winter Wheat Variety by Seeding Rate Interactions (2013-2014 growing seasons)

Seeding rate (million seeds a^{-1})	Grain yield (bu a^{-1})
1.25	88.8
1.50	88.5
1.75	90.8
2.00	90.5
2.25	91.4
2.50	90.8
LSD (0.10)	1.8



- Significant yield increase from 1.50 to 1.75 million seeds per acre
- No variety by seeding rate interaction
  - Sunburst, Pro260, P25R40

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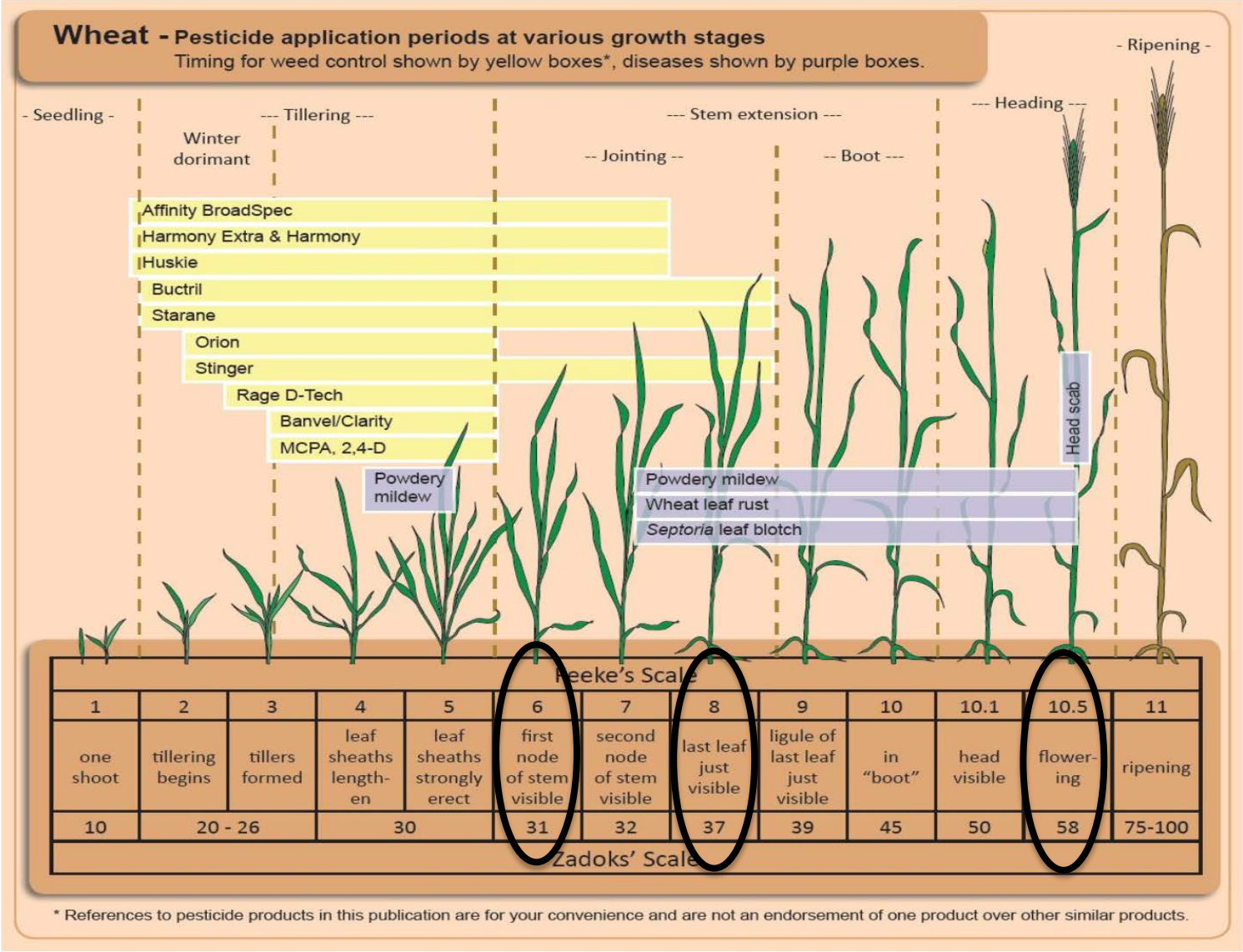
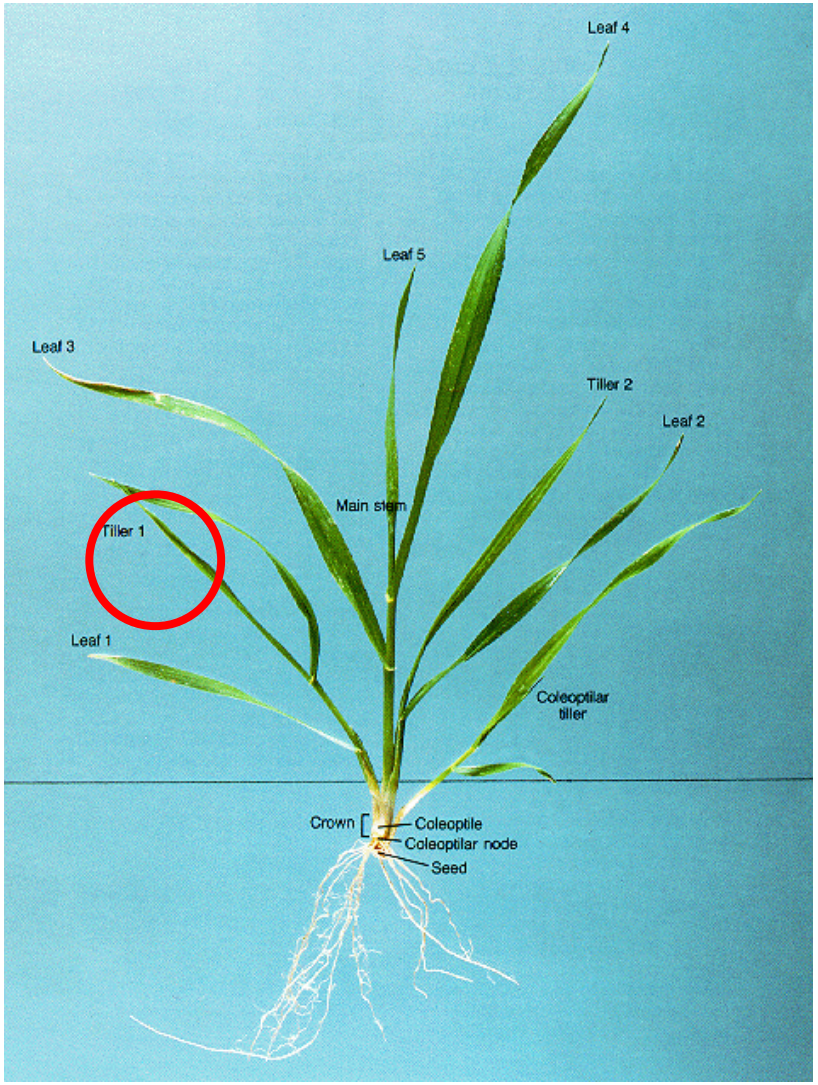
Learning Growth Staging



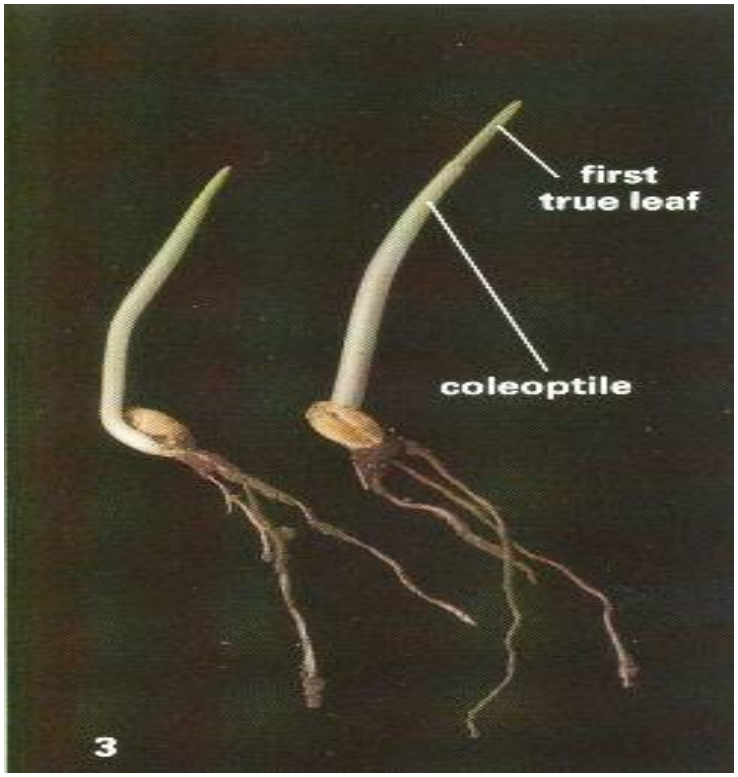
Wheat morphology and tillers

- Find the first leaf
  - Lowest leaf with blunt tip
  - May have senesced
  - Sheath encloses all other leaves
  - Opposite of coleoptillar tiller



Germination and emergence and one leaf emerged=Feekes 1

- Planting depth and soil temperature influences the length of this stage



Feekes 2
Beginning of Tillering

- Happens in fall or spring
- Dependent on planting date/temps
- Recommended plant date range = Sept. 20 to Oct. 10

Tiller ID and Contribution to Yield

- Each tiller has its own sheath – prophyll. To distinguish tillers from leaves, look for the presence of an independent sheath called a prophyll, which is located at the base of each tiller.
- Tillers are absolutely necessary for high yields. One seed planted can equal 4 to 5 heads

Tillers formed – Feekes 3

Can happen in fall with early planting or in spring.

Winterkill


Sub-crown internodes

FACTORS AFFECTING WINTER SURVIVAL

- Cyclic freezing and thawing
  - Increased injury from ice crystal growth in tissue.
- Mid-winter thaw….rain
  - Crown at base of plant is flooded.
  - Flooded crowns die at warmer temperatures.
- Ice encasement
  - Traps carbon dioxide.
- Suffocation
  - Inhibits respiration.
- Frost heaving
  - Pushed root system out of ground.
- Dessication
  - Dehydration with subzero temperatures. Leaves more sensitive than crown. Snow acts as insulator; keeps soil temperature from going below critical levels.

Assessment of plants in spring

Spring Management

- **Stand assessment**
- **Nitrogen**
- **Weed control**

Wisconsin Winter Wheat Seeding and Overwintering Recommendations

Seeds/acre Million	Seeds/sq ft	Row Width (Plants per foot row) 6	7	7.5	
0.3	6.9	3	4	4	
0.4	9.2	5	5	6	
0.5	11.5	6	7	7	
0.6	13.8	7	8	9	
0.7	16.1	8	9	10	
0.8	18.4	9	11	11	
0.9	20.7	10	12	13	Seeding Rate for Sept 1 to Sept 15
1.0	23.0	11	13	14	
1.1	25.3	13	15	16	
1.2	27.5	14	16	17	
1.3	29.8	15	17	19	
1.4	32.1	16	19	20	Seeding Rate for Sept 15 to Oct. 1
1.5	34.4	17	20	22	
1.6	36.7	18	21	23	
1.7	39.0	20	23	24	
1.8	41.3	21	24	26	
1.9	43.6	22	25	27	Seeding Rate for Oct. 1 to Oct 10
2.0	45.9	23	27	29	
2.1	48.2	24	28	30	
2.2	50.5	25	29	32	
2.3	52.8	26	31	33	
2.4	55.1	28	32	34	
2.5	57.4	29	33	36	
2.6	59.7	30	35	37	

Minimum spring plant densities

Good spring plant densities

Excellent spring plant densities

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Weed Management

A3646

Pest Management in Wisconsin Field Crops

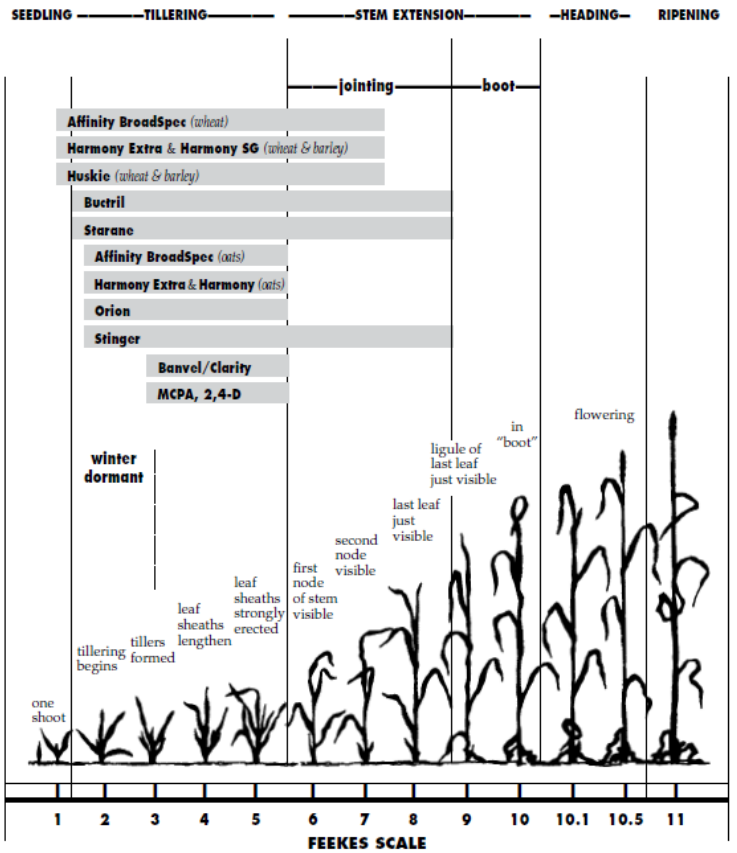
A guide to managing weeds, insects, and diseases in corn, soybean, forages, and small grains

2018

Bryan Jensen
Patrick J. Liesch
Glenn Nice
Mark Renz
Damon Smith

UW Extension
University of Wisconsin-Extension

Figure 5-1. Herbicide application periods at various growth stages of small grains (using Feekes scale)

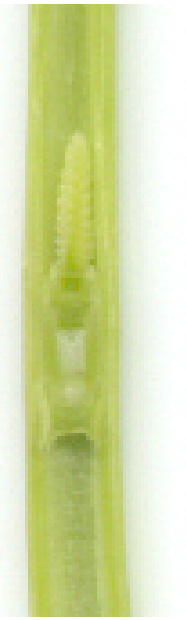


Source: Adapted and used with permission from Michigan State University Extension publication *Weed Control Guide for Field Crops* (E-434)

Image from A3646

First node visible
"Jointing"
Feekes 6

- First node is swollen and appears above soil surface
- Head is above this node
- Stem is hollow behind this node
- Do not apply 2,4-D or Banvel after this stage



The jointing stage is that point at which the internodal tissue in the wheat leaf begins to elongate, forming a stem.

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Feekes 8
The Flag Leaf

- Fungicide applications are based on the risk of disease on the flag leaf
- Flag leaf becomes visible during Feekes 8
- Most important leaf for yield, accounting for upwards of 50% or more of final yield
- Disease on this leaf at scouting may indicate it is too late for a fungicide to reduce the effects of disease - scout early!

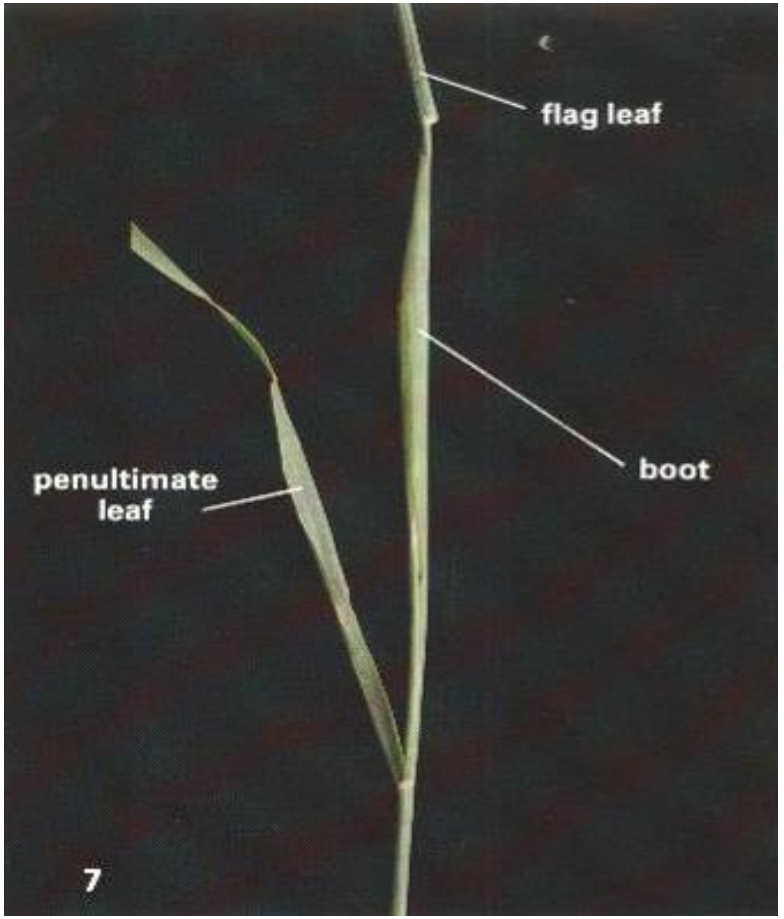
Feekes 9 and Feekes 10

Feekes 9

Ligule of flag leaf visible

Feekes 10

Head is visible in sheath



Boot stage – up to Feekes 10.0
Heading starts at Feekes 10.1

At Feekes 10.5.1 – beginning flowering- many FHB fungicides can be applied

Wheat Diseases

Assessing risk

- Disease pressure must be balanced against field resistance

- Crop protection decisions need to be taken as upper leaves emerge, well before symptoms develop on yield-forming leaves.

- To estimate the chance of disease development, the likelihood of infection – 'disease pressure' – has to be balanced against the ability of the crop to resist or avoid infection – 'field resistance'.

- Disease inoculum + weather and region = Disease pressure
- Variety + crop management = Field resistance

- Disease lesions on lower leaves are the most common source of infection of upper leaves emerging during stem extension. Crops should be inspected regularly. If even a
- small amount of disease is visible on lower leaves, the potential risk is high.

Powdery Mildew

Blumeria graminis

- **Symptoms include powdery white to gray fungal growth**
- Symptoms on leaves, stems and heads
- Pustules first on lower leaves
- **Late symptoms: small, black fruiting bodies (cleistothecia; look like black pepper) that contain spores (ascospores)**

Powdery Mildew

- Primary inoculum = spores on volunteer wheat or spores within cleistothecia
- Infections first occur in fall
- Spores dispersed by wind
- Infection favored under **cool** (50 to 71 °F), **moist weather**
- **Fluctuating relative humidity and no driving rain**
- Management: resistance; fungicide seed treatments; foliar fungicides when applied between Feekes 6 (1st detectable node) and 8 (flag leaf is visible); balanced fertility (avoid high nitrogen)

Septoria Leaf Blotch

- *Septoria tritici*
- Symptoms often part of complex with Glume blotch
- Light green to yellow spots between leaf veins on lower leaves (contact with soil)
- Symptoms elongate: irregularly shaped lesions that are tan to red-brown
- Lesions age = black speckles (pycnidia) can be seen on lesion (good diagnostic sign)

Septoria Leaf Blotch

- Two phases
  - Fall just after wheat sown
  - Spring/summer on upper leaves
- Inoculum source = pycnidia on infested residue (survive 2-3 years) or mycelia in diseased live wheat
- Infection favored by **cool conditions**: 59 to 68 ºF
- Six hours of **leaf wetness** required (maximum infection with 48 hours)
- Management: certified disease free seed with seed fungicide treatment; little resistance – breeding for rust resistance has led to a trend of increased susceptibility to Septoria; rotation of at least 2 years; foliar fungicides

Fusarium Head blight

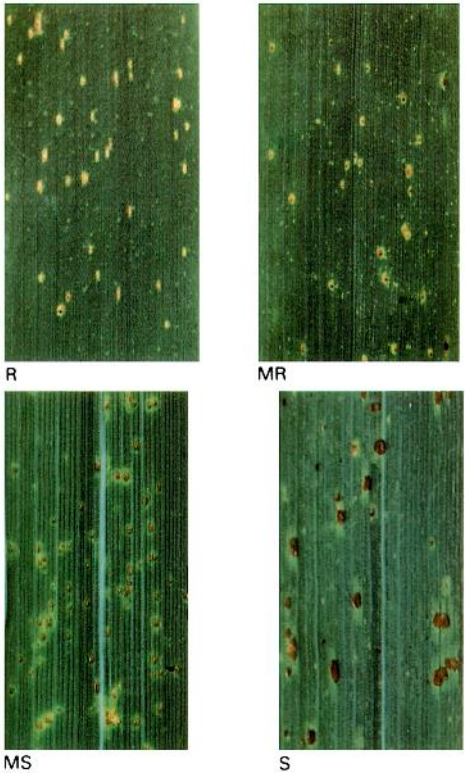
- *Fusarium graminearum*
- Any part or all of wheat head may appear bleached
- Often, part bleached, part green
- Infected spikelets and glumes = salmon-colored spore masses of fungus (prolonged periods of wet weather)
- Immediately below head, stem may be infected and have brown or purplish discoloration
- Kernels shriveled and lightweight
- Kernels with “tombstone” appearance = dull grayish or pinkish color (not consistent symptom)

Fusarium Head blight

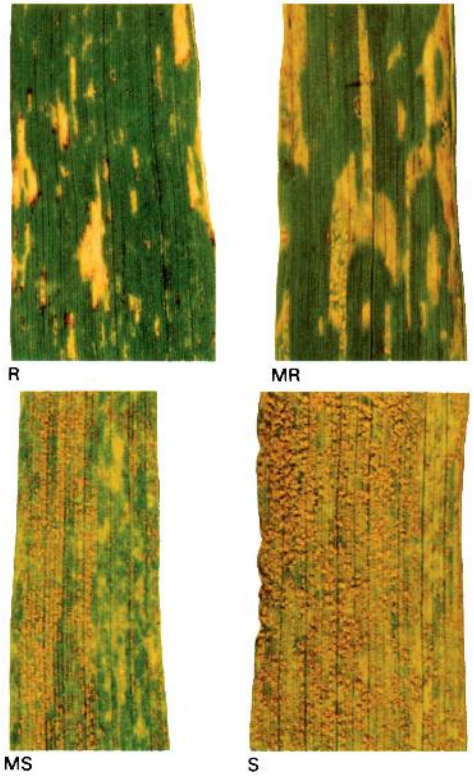
- Inoculum sources = crop residue; organism surviving soil
- Same organism that causes Gibberella stalk rot
- Spores wind or rain disseminated
- Infection occurs when spores land on heads (florets) of wheat
- Infection favored by prolonged periods of rain (or dew), high relative humidity and temperatures from 65 to 85 ºF
- Toxin concern: deoxynivalenol (DON) and zearalenone
  - Toxin can accumulate even if no apparent symptoms!!
- Management:
  - Rotation (avoid wheat after corn)
  - Fungicide sprays
  - Prediction tool: flowering date, wheat class (spring/winter), production practices
  - http://www.wheatscab.psu.edu

Rust Complex

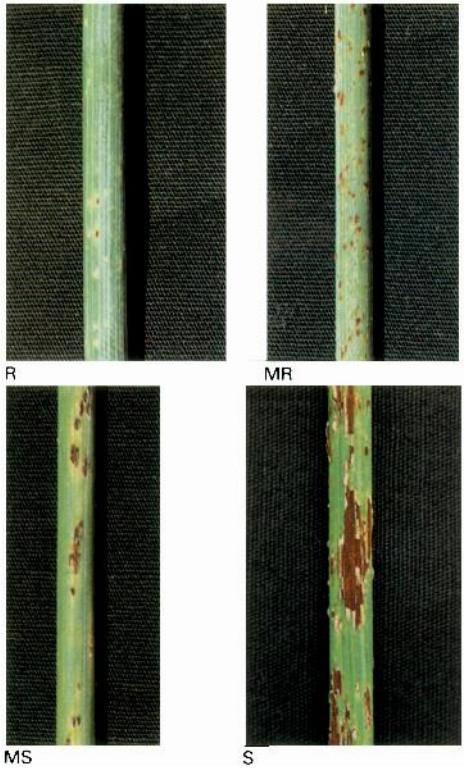
Leaf rust, stripe rust, and stem rust



Leaf rust; photo from "Compendium of Wheat Diseases, 3rd edition"



Stripe rust; photo from "Compendium of Wheat Diseases, 3rd edition"

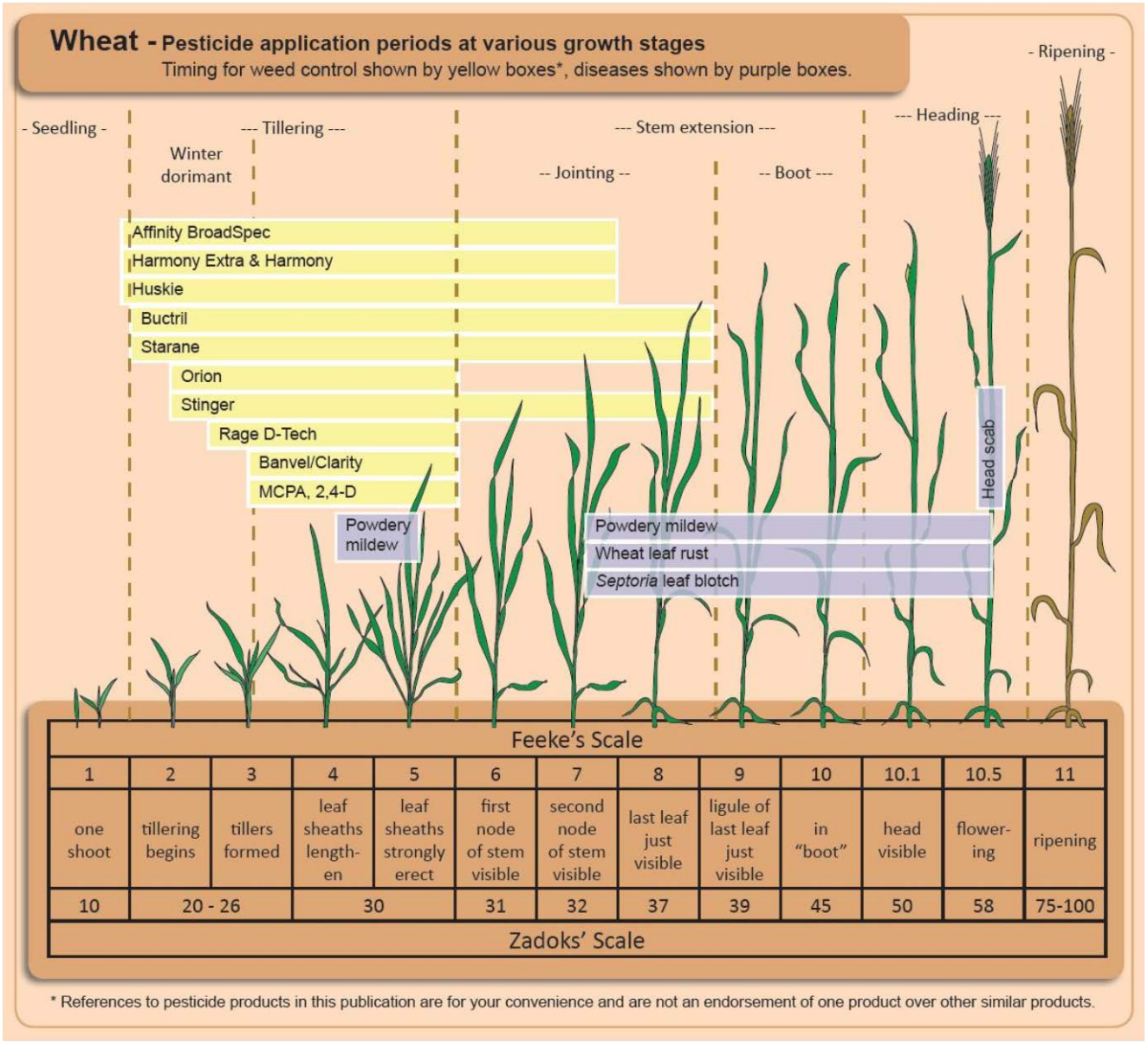


Stem rust; photo from "Compendium of Wheat Diseases, 3rd edition"

Fungicide Decisions for Wheat in Wisconsin

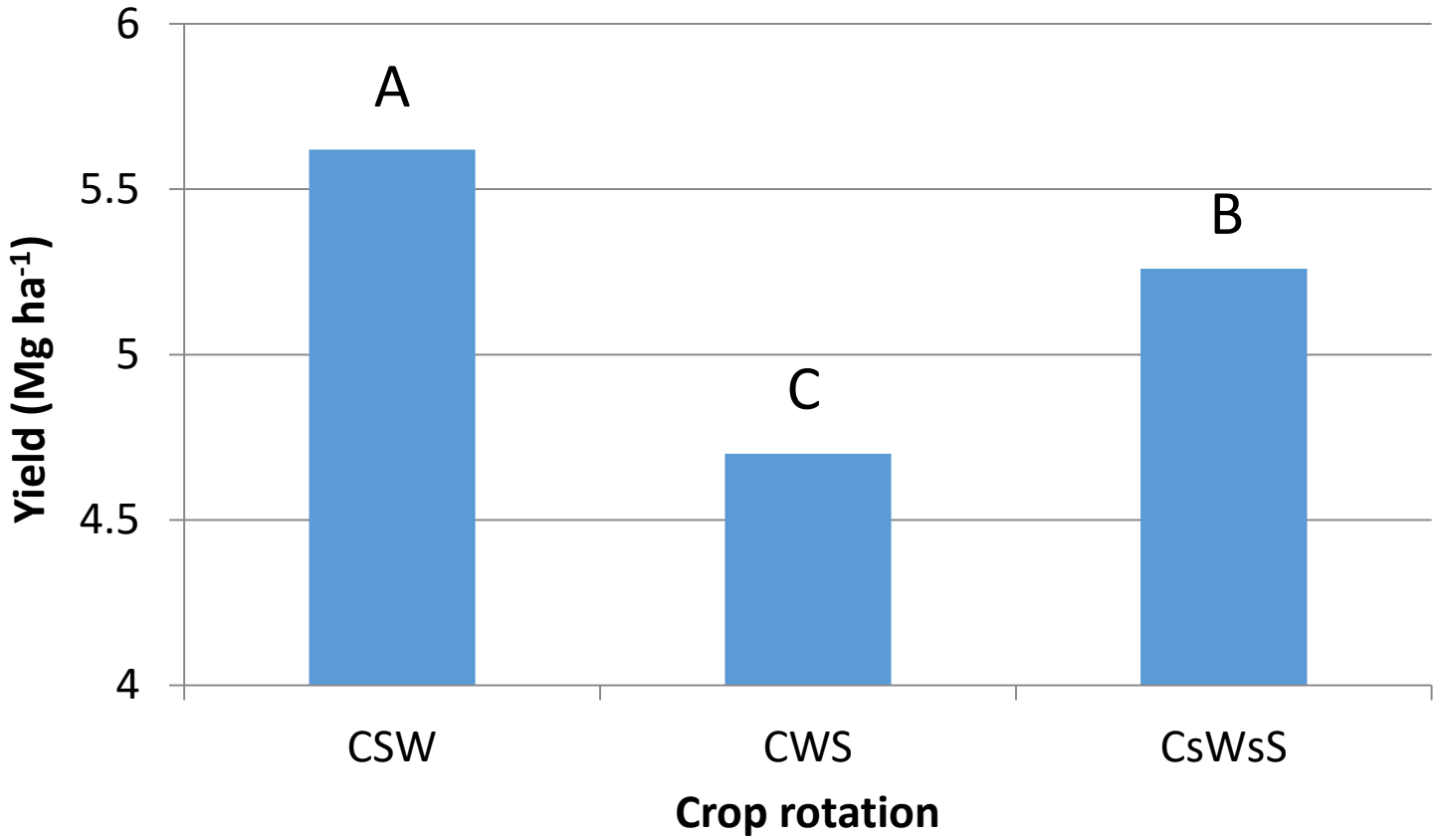
- Feekes 5 fungicide applications not needed

- Scout for leaf diseases at Feekes 8
  - Apply fungicide if leaf disease active in lower leaf canopy (e.g. Septoria leaf blotch, powdery mildew)
  - Strobilurin fungicides a good choice at this growth stage
- Monitor weather and check FHB advisory near Feekes 10.5.1 to make fungicide decision
  - Wet and/or humid weather at flowering
  - High risk field – wheat planted after silage corn
  - Avoid strobilurin fungicides – use triazoles at this growth stage


Wheat - Pesticide application periods at various growth stages
Timing for weed control shown by yellow boxes*, diseases shown by purple boxes.
- Seedling -
Winter dormant
--- Tillering ---
--- Stem extension ---
-- Jointing --
-- Boot ---
--- Heading ---
- Ripening -
Affinity BroadSpec
Harmony Extra & Harmony
Huskie
Buctril
Starane
Orion
Stinger
Rage D-Tech
Banvel/Clarity
MCPA, 2,4-D
Powdery mildew
Powdery mildew
Wheat leaf rust
Septoria leaf blotch
Head scab
Feeke's Scale
1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 10.1 | 10.5 | 11
one shoot | tillering begins | tillers formed | leaf sheaths length-en | leaf sheaths strongly erect | first node of stem visible | second node of stem visible | last leaf just visible | ligule of last leaf just visible | in "boot" | head visible | flower-ing | ripening
10 | 20 - 26 | 30 | 31 | 32 | 37 | 39 | 45 | 50 | 58 | 75-100
Zadoks' Scale
* References to pesticide products in this publication are for your convenience and are not an endorsement of one product over other similar products.

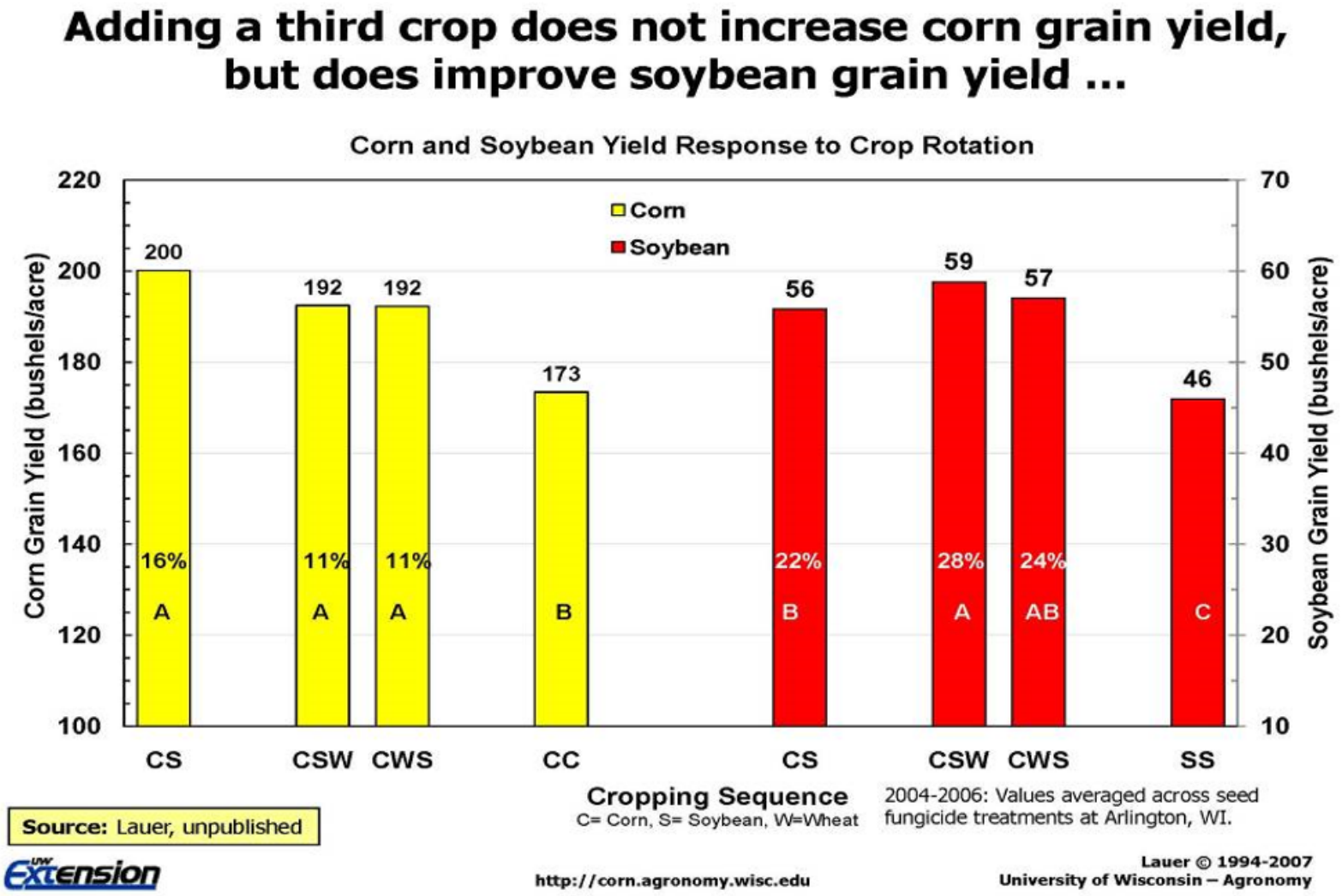
Impact of Crop Rotation on Wheat Yield

Impact of Rotation Sequence on Wheat Yield



Columns with the same letter are not statistically different at $P \leq 0.10$

Impact of Rotation on Soy and Corn Yield



Intensive Wheat Management

Objective: To evaluate the effect of management level on disease incidence, grain yield and quality of 14 wheat varieties.

Materials and Methods

- 2 years - 2016 and 2017
- Arlington location
- RCBD split plot w/4 reps
- Varieties (14) Management levels (3)

Varieties

Pro 200	**Pro 410**	**Kratz 15241**
Pro 240	**Pro 420**	**PIP 735**
Pro 320A	**Kaskaskia**	**PIP 776**
Pro 260	**Red Devil**	**Syngenta SY 547**
Pro 380	**Pioneer 25R40**	

Intensive Wheat Management

3 Management Levels

Current
Base seed treatment
Base herbicide
1.5 million seeds/acre
55 lbs N/a

Mid Level
Base seed treatment
Base herbicide
1.75 million seeds/acre
55 lbs N/a + 30 lbs N/a split app.
A21573C 13.7 fl oz/a @ F10.5.1 7-Jun-2017

High Level
Base seed treatment
Base herbicide
2.0 million seeds/acre
55 lbs N/a + 30 lbs N/a split app.

Palisade (Trinexapac) 12 fl oz/a @ F6 25-Apr-17
TakeOff Phite MZ (3-20-7+Mn+Zn) 32 fl oz/a @ F9
Trivapro 13.7 fl oz/a @ F9
EB Mix (N,S,B,Mn, Fe,Zn) 64 fl oz/a @ F9 17-May-17
TakeOff Phite 32 fl oz/a @ F10.5.1
A21573C 13.7 fl oz/a @ F10.5.1 7-Jun-2017

Intensive Wheat Management - Arlington, WI 2017

Disease assessments

Conducted by UW Plant Pathology

Stripe Rust

Rated 6/8/17

Growth Stage: Feekes 10.5.2/10.5.3

Stripe rust was evaluated by visually estimating average incidence (% plants with symptoms) and severity (% leaf with symptoms).

Fusarium head scab

Rated 6/21/17

Growth Stage: Feekes 11.1 (Milk)

Very low disease levels

Average incidence = 0.2%

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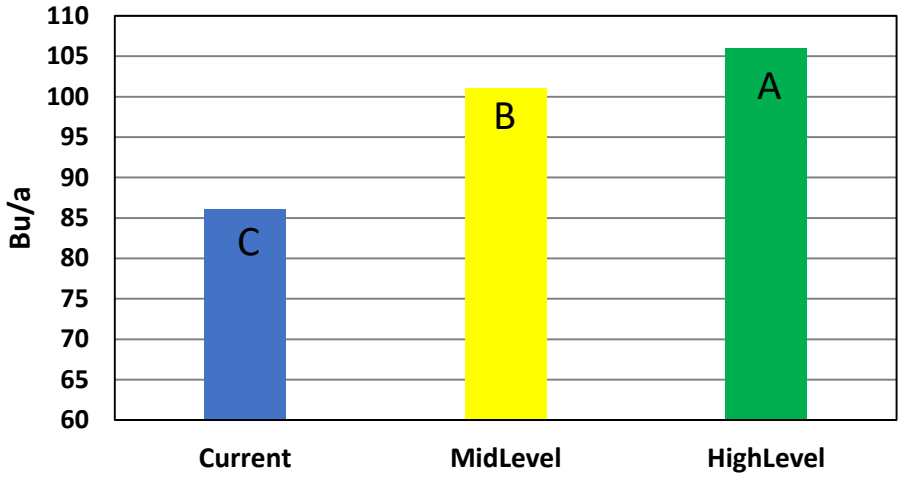
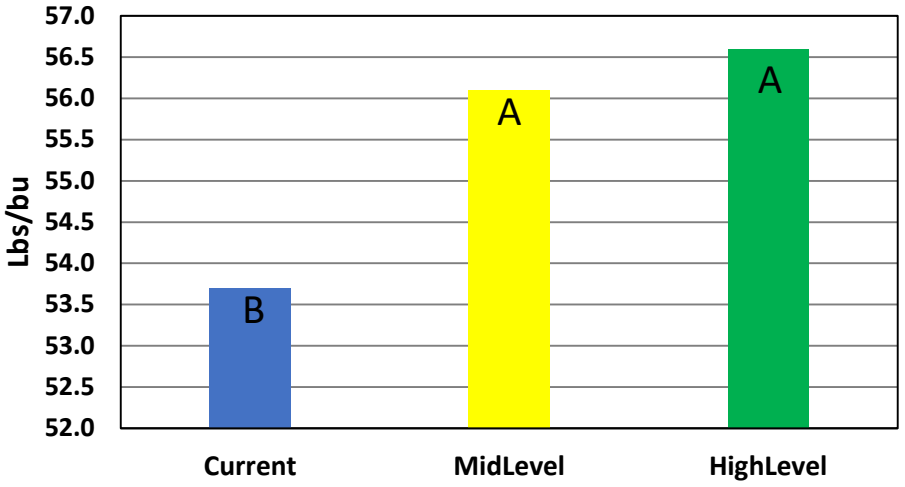
Intensive Wheat Management
Arlington, WI 2017

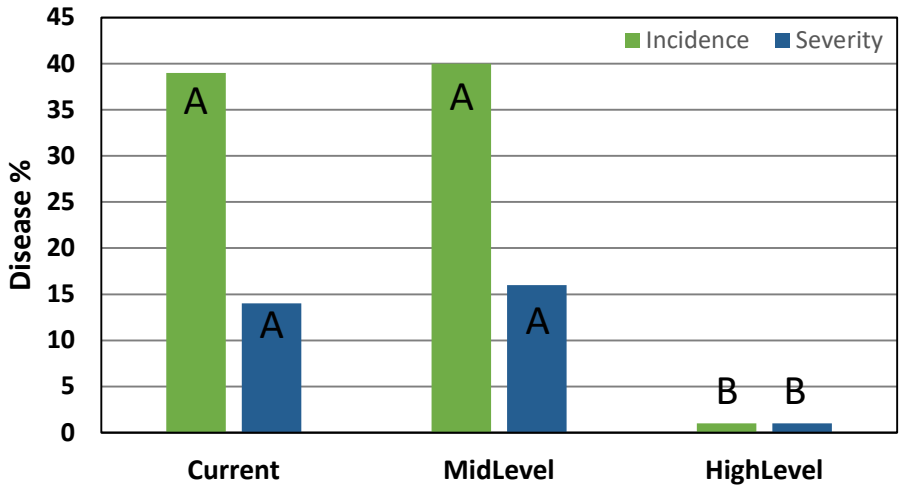
Yield



Test Weight



Strip rust incidence and severity



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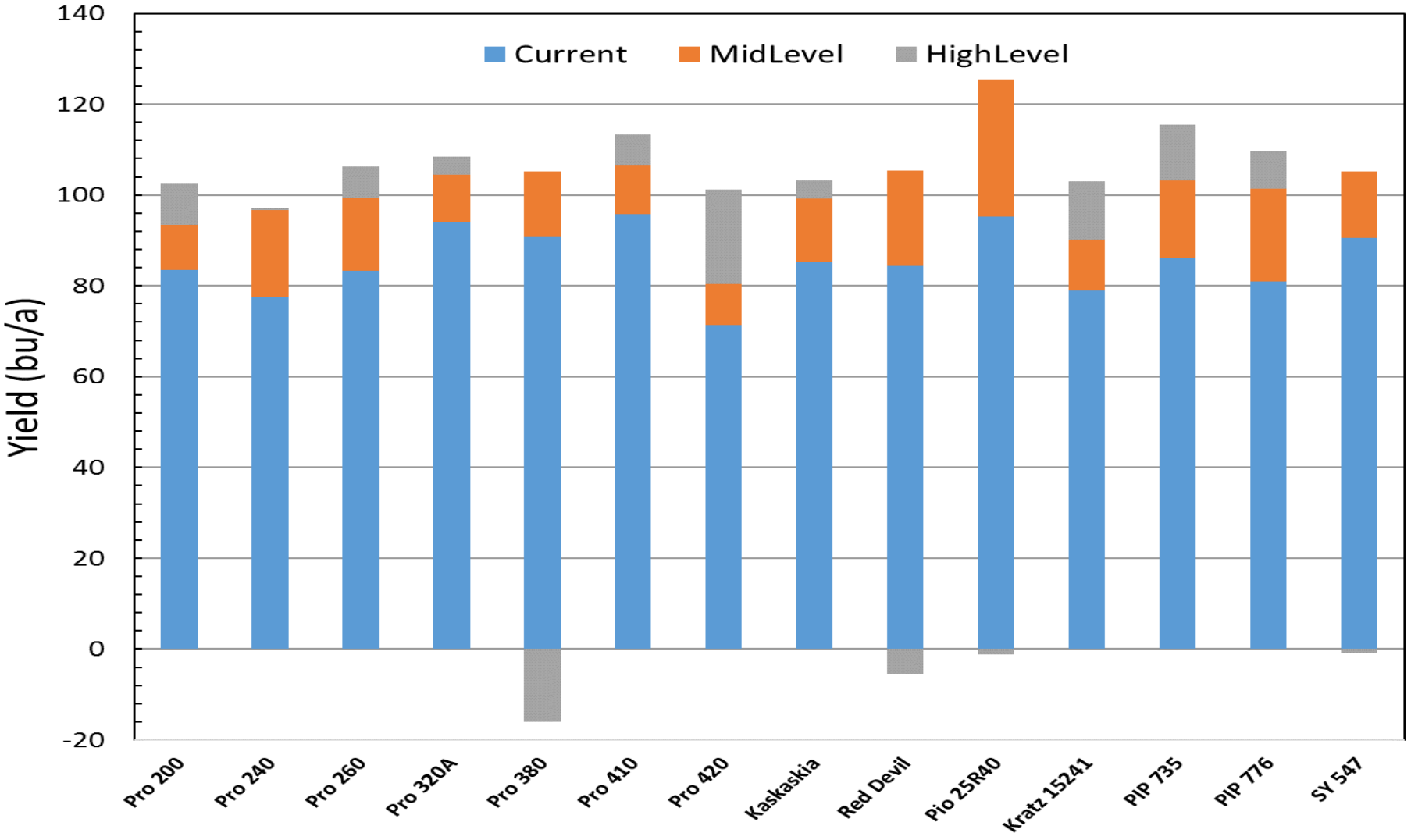
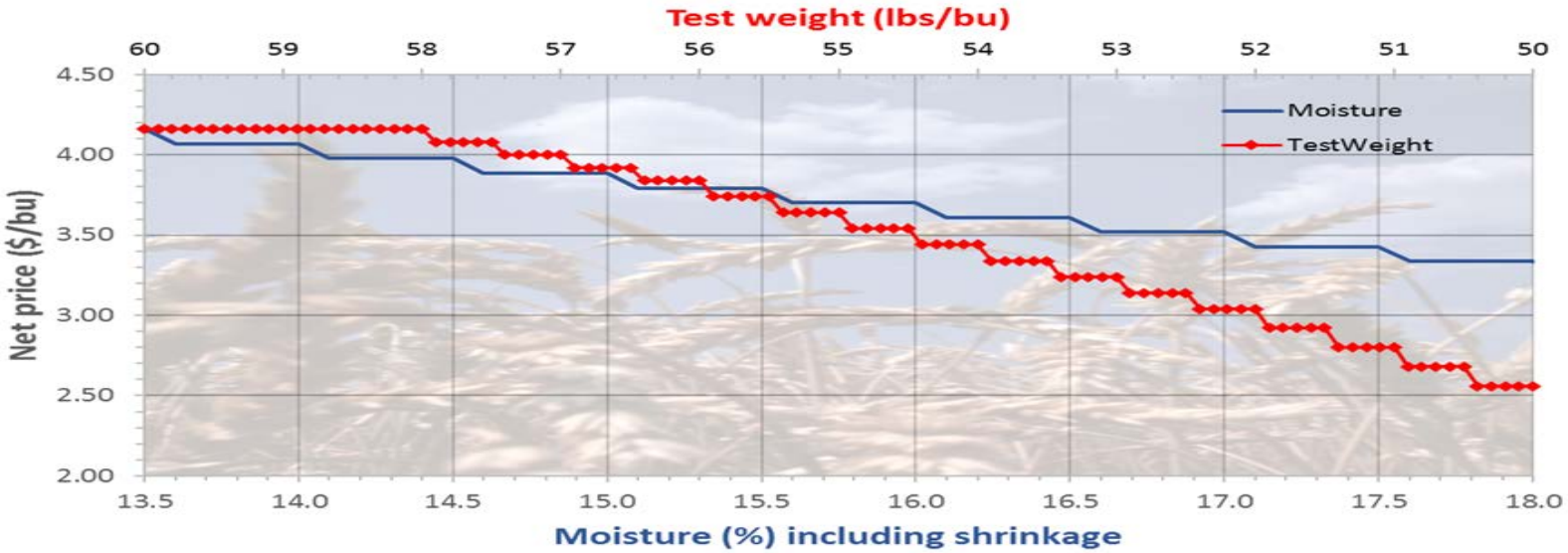
Intensive Wheat Management
Arlington, WI 2017



2017 New Research

Harvest Date Effect on Test Weight

- Objective: To compare on-time and delayed harvest on test weight and yield in wheat
- Compare the tradeoffs of drying cost and test weight reductions
- 1 location (Arlington)
- 5 harvest dates
- 5 varieties with a range of test weights



Net wheat price (market price minus discounts) based on $4.16/bu wheat market price using test weight or moisture plus shrinkage discounts as advertised by a commercial elevator in south central Wisconsin during the 2017 wheat harvest season

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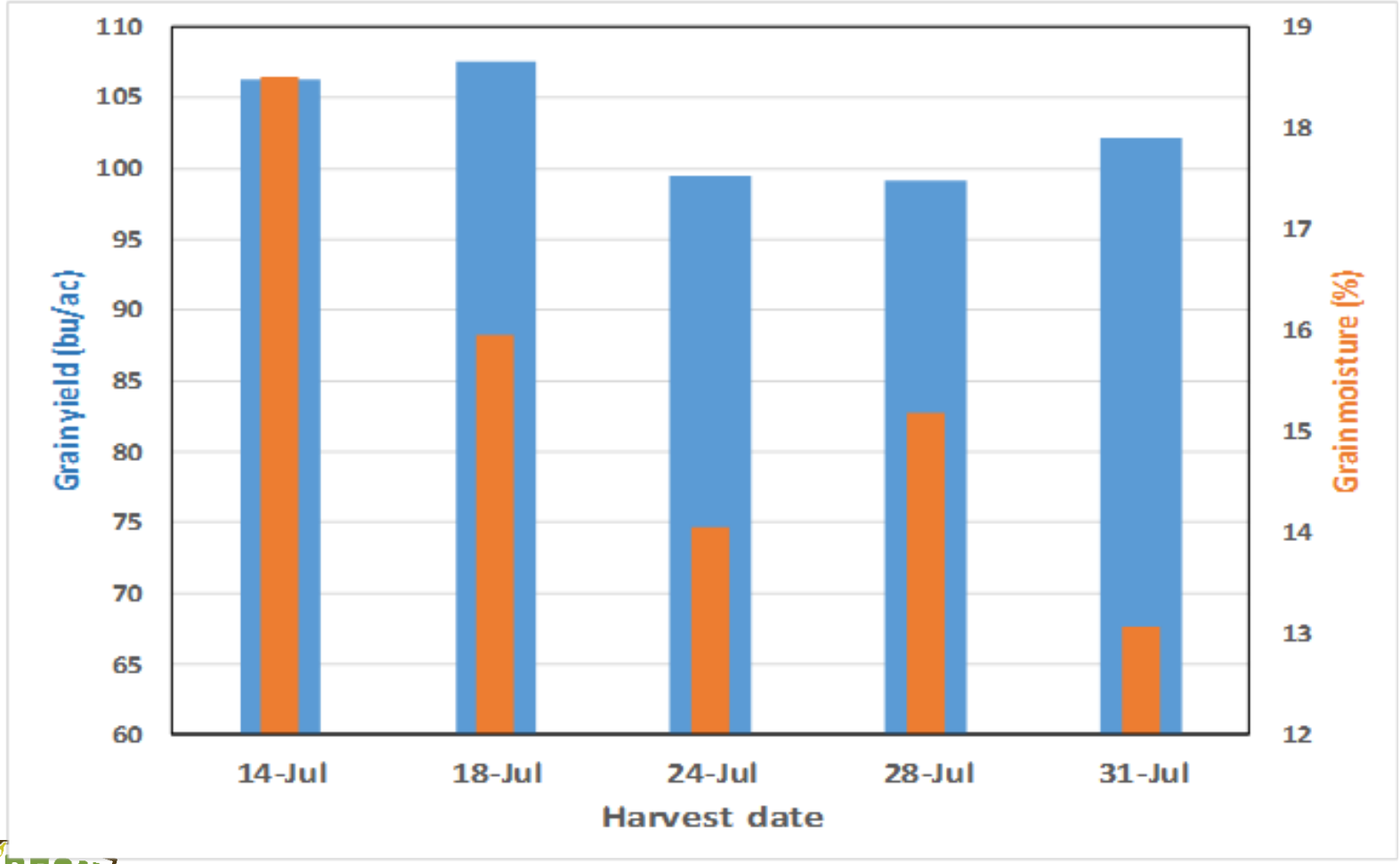
Harvest Date Effect

Grain yield and moisture at various harvest dates



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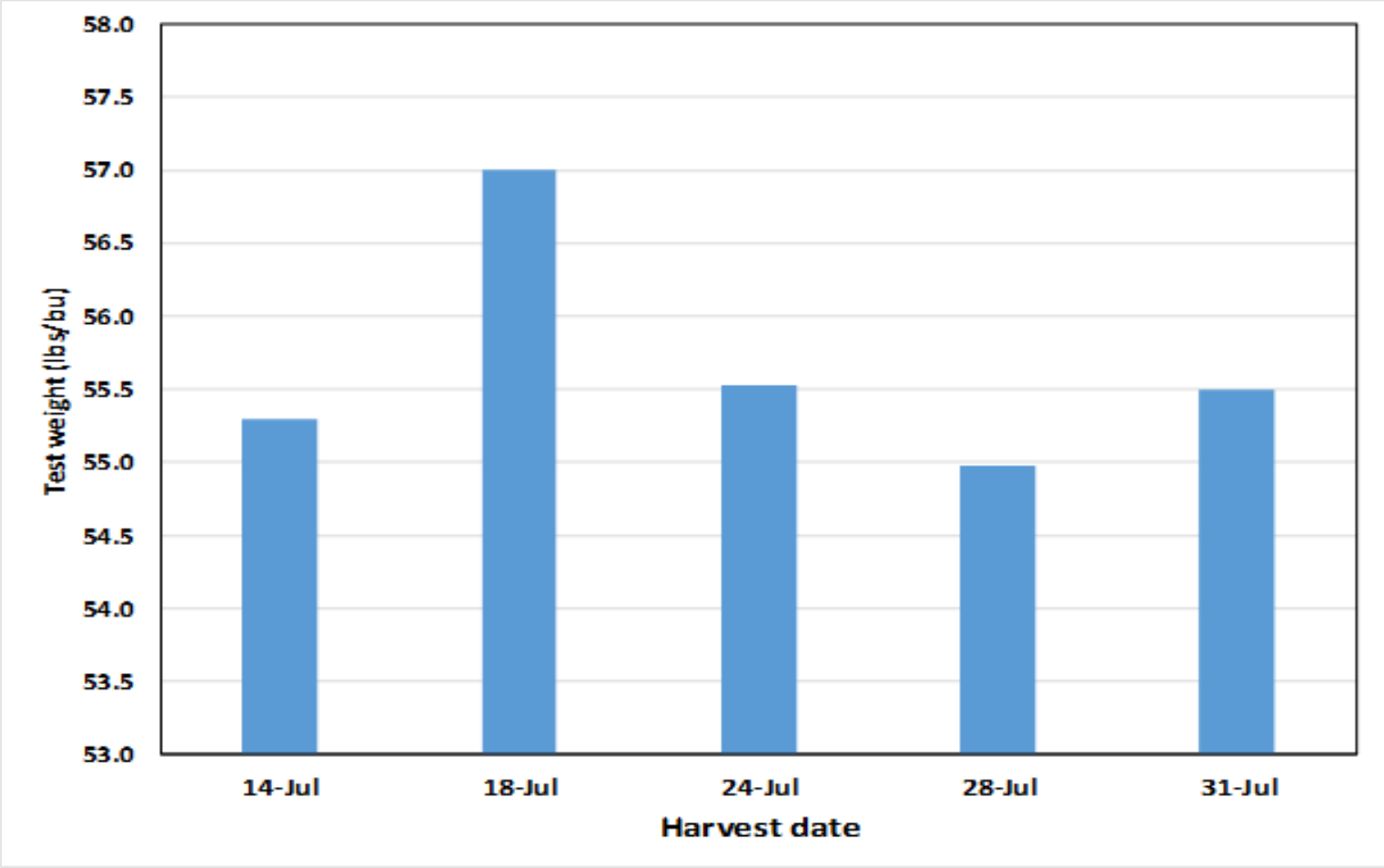
Harvest Date Effect

Test weights at various harvest dates



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Application of a Plant Growth Regulator and Fungicide in Oat 2017

Objective: Assess the impact of a plant growth regulator (Palisade) and a foliar fungicide (Trivapro) in three varieties of oats at three N rates

Varieties:

- **BetaGene: mid-late maturity, good yield potential, high beta-glucan levels, released in 2015. Good test weights, very good crown rust resistance and BYDV tolerance and medium lodging potential**
- **Ron: mid-late season variety released in 2014. Good test weight, very good crown rust resistance and BYDV tolerance and medium lodging potential**
- **Antigo: New, high yielding, early maturing oat with excellent test weight, medium lodging, and moderate resistance to crown rust**

- **Palisade PGR applied at 10 fl oz/a at the Feekes 4 stage**
- **Trivapro fungicide applied at 13.7 fl oz/a at the Feekes 9 stage**
- **Nitrogen rates of 45, 90, and 135 lbs N/a applied as urea after planting**

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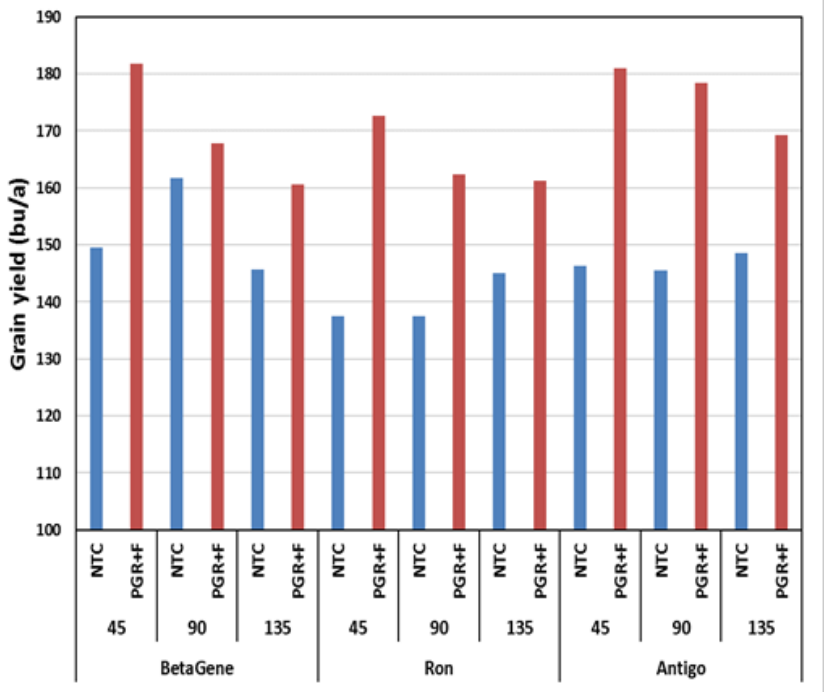
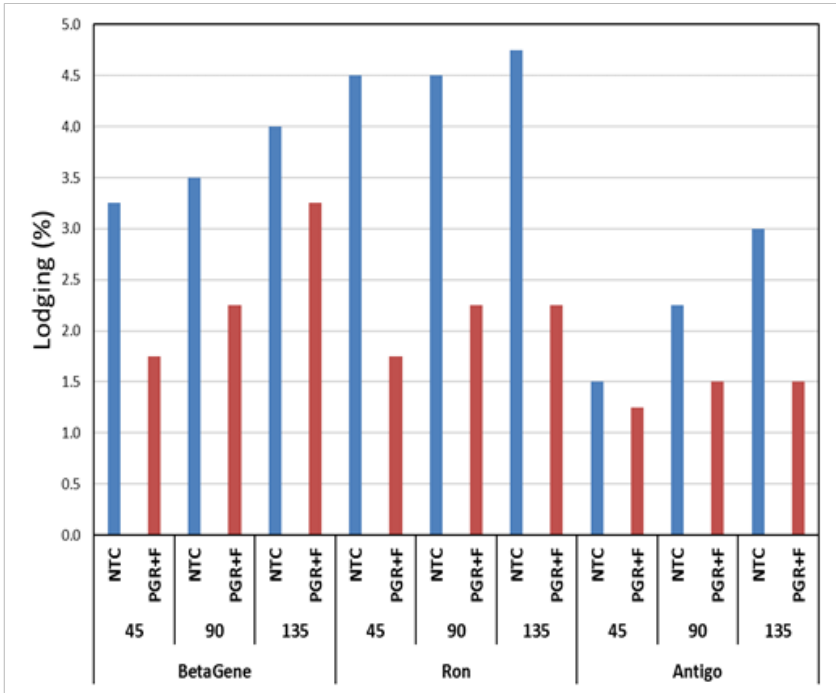
Application of a Plant Growth Regulator and Fungicide in Oat 2017

Yield and lodging of three oat varieties, at three nitrogen fertilization levels, with and without a PGR + fungicide combination





The addition of Palisade PGR and Trivapro fungicide increased oat yield and reduced lodging

Increased N rate above those recommended in A2809 did not increase oat yield

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