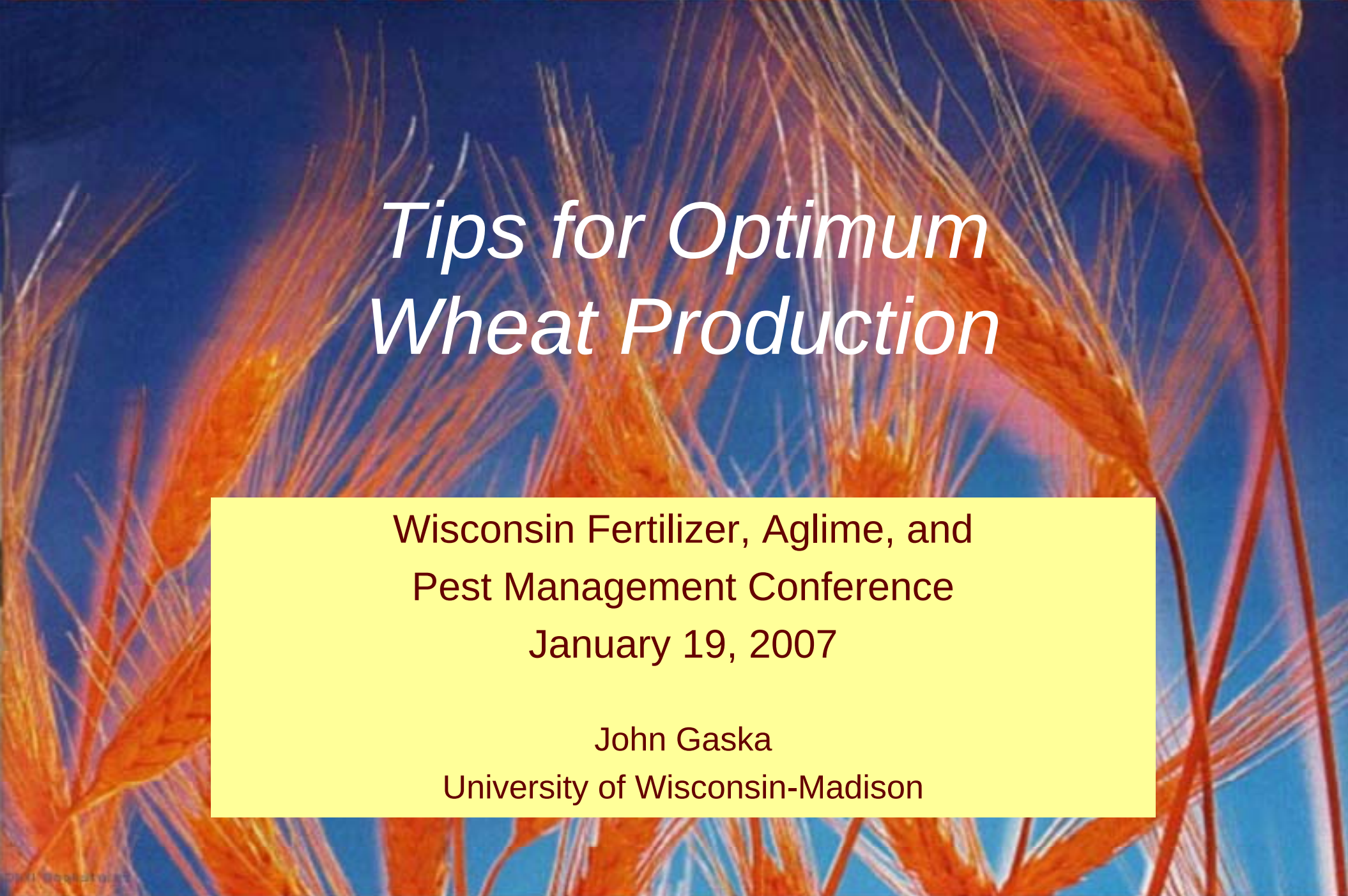
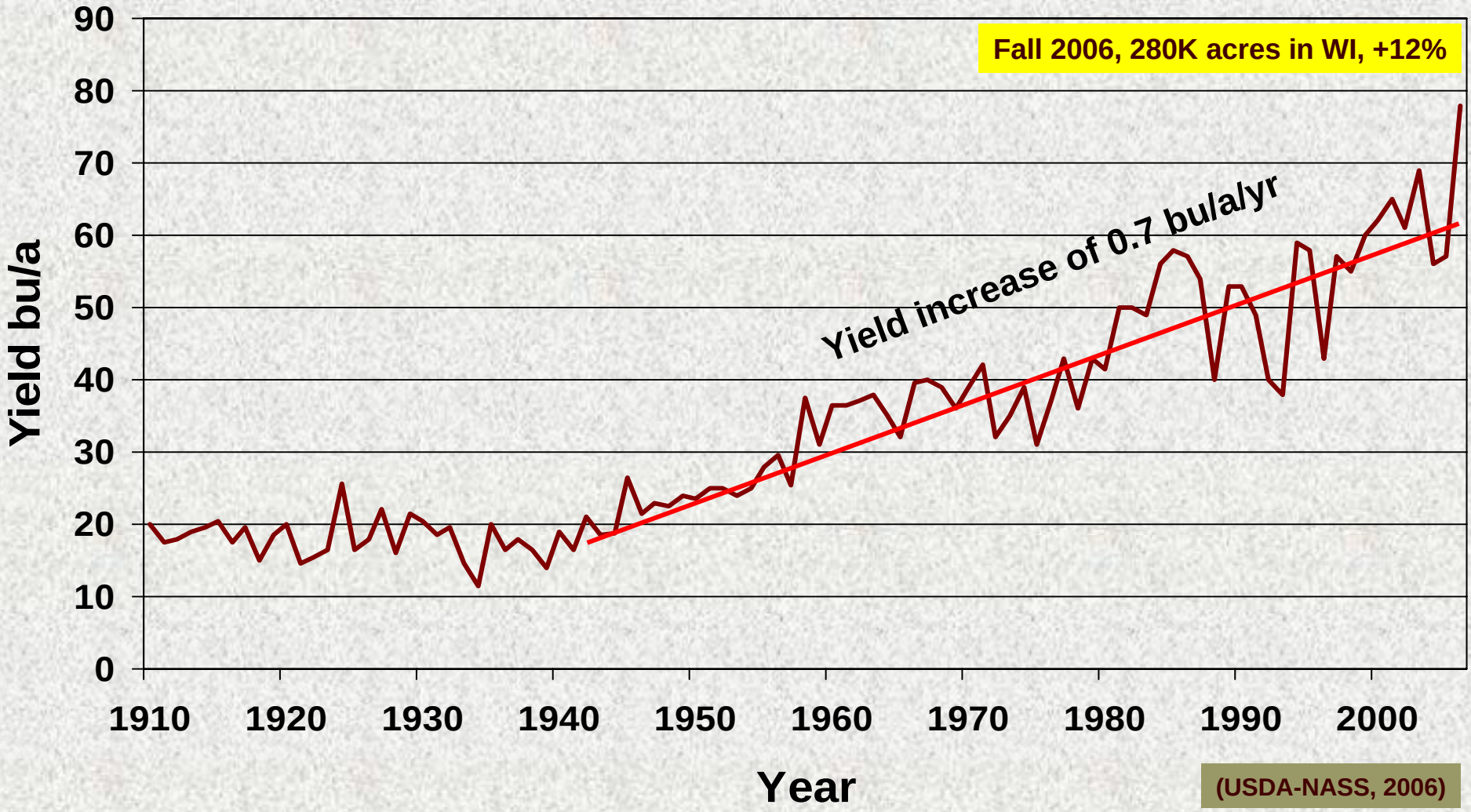


Tips for Optimum Wheat Production

Wisconsin Fertilizer, Aglime, and
Pest Management Conference
January 19, 2007

John Gaska
University of Wisconsin-Madison

Historic Winter Wheat Yields in WI



Wheat Production in Wisconsin

Keys to Success

Fertilize and lime based on a sound soil testing program

Do not till or plant when soils are too wet

Plant on dates recommended for your area

Select varieties best suited to your area

Use seed treatments as necessary

Use optimum **plant populations** for your planting date

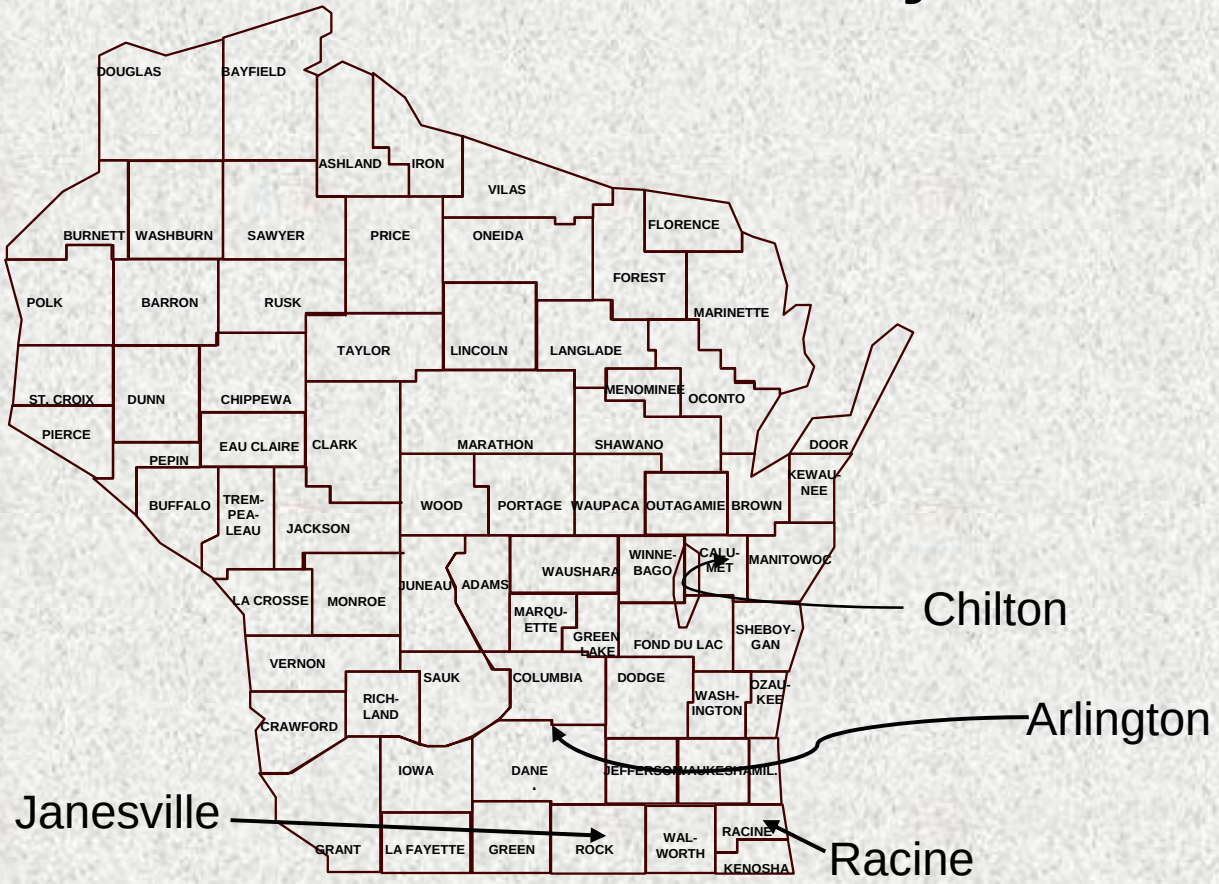
Don't plant too deep, 1" is optimum

Monitor and **control pest** populations as necessary

Harvest carefully and timely

WI Winter Wheat Variety Trials

- **Conducted at 4 locations in WI each year**
- **Average about 55-60 varieties each year**



2006 Winter Wheat Variety Trial Results.

Arlington, Janesville, Racine, and Chilton, Wisconsin.

			2006 Means				Arlington		Janesville		Racine		Chilton		2-Year
Brand	Entry	Class (1)	Yield	Test Wt.	Height	Lodging (2)	Yield	Test Wt.	Yield	Test Wt.	Yield	Test Wt.	Yield	Test Wt.	Mean Yield
			bu/a	lb/bu	in	(0-9)	bu/a	lb/bu	bu/a	lb/bu	bu/a	lb/bu	bu/a	lb/bu	bu/a
Public	Cardinal	SR	84	56.2	40	2	59	52.7	85	58.1	96	56.0	97	57.8	79
Public	Hopewell	SR	90	55.6	38	2	54	51.4	95	58.3	97	55.4	113 *	57.2	81
Public	Kaskaskia	SR	95 *	58.0	41	3	76	56.0	100 *	60.2	109 *	57.5	96	58.1	86 *
Public	Truman	SR	91	57.9	38	3	75	56.6	96	59.5	83	56.1	108	59.2	80
Diener	D 490 W	SR	99 *	56.8	38	3	91 *	55.1	94	58.3	101	56.2	110	57.4	
Diener	D 495 W	SR	92	58.1	38	3	66	55.8	96	60.6	97	57.1	108	59.0	81
Diener	D 510 W	SR	91	57.3	40	3	62	54.6	98	58.8	96	57.2	107	58.7	
Diener	XW 48	SR	90	56.9	39	3	60	53.5	90	59.6	96	56.8	113 *	57.7	83
Gristmill	Excel 211	SR	90	57.5	41	2	65	55.2	95	59.9	104	56.6	96	58.1	80
Gristmill	Excel 333	SR	95 *	56.5	39	3	74	54.2	98	58.5	100	56.5	108	57.0	82
Gristmill	Excel 352 TW	SR	88	57.1	40	3	61	54.0	85	59.5	98	57.2	108	57.8	81
Gristmill	Excel 361	SR	92	59.2	40	2	77	58.0	86	60.4	100	58.3	105	60.3	
DynaGro	DG 419	SR	90	57.2	40	2	62	54.9	99 *	59.2	99	56.9	101	58.0	79
Public - exp	IL 99-15867	SR	93	56.8	37	3	78	54.5	95	58.4	81	55.8	117 *	58.4	
Public - exp	IL 00-1665	SR	97 *	57.0	37	3	82 *	55.8	87	57.5	103	56.8	114 *	57.9	
Public - exp	OH 708	SR	90	55.5	40	2	67	52.6	84	56.5	95	55.8	112 *	57.1	
Public - exp	OH 776	SR	85	57.5	39	3	50	54.6	85	59.4	104	57.3	99	58.7	
Public - exp	P 981359C1-4-2-1-8	SR	93	59.6	42	2	67	57.6	97	61.0	97	59.0	109	60.7	79
Public - exp	P 99608C1-1-3-4	SR	97 *	56.9	38	2	82 *	55.4	96	58.6	103	56.2	108	57.5	
Public - exp	P 99840C4-8-4	SR	98 *	58.6	37	2	79	56.3	94	60.4	94	58.3	124 *	59.5	
Public - exp	VA 02W-513	SR	98 *	58.5	33	2	70	56.2	100 *	60.8	100	57.6	123 *	59.5	
Mean			93	57.2	39	3	70	54.7	94	59.1	99	56.7	108	58.3	81
LSD(.10)			8	0.9	1	1	11	1.3	7	1.1	10	0.7	13	0.7	5

(1) Class: SR = Soft Red and HR = Hard Red; (2) Belgian Lodging System rounded to whole number (0=none - 9=severe)

* Yields followed by a '*' are not significantly different (0.10 level) than the highest yielding cultivar.

(Martinka et al., 2006)

Use variety descriptions

Variety	Year Released	Lodging	Leaf Rust	Stem Rust	BYDV	Winter Hardiness	Powdery Mildew	Height	Awns	Scab	Class
A	1990	6	7	4	7	6	8	5	Awned	3	SRWW
B	2006	6	5	3	6	4	6	4	Awnless	6	SRWW
C	2003	6	5	6	5	5	5	7	Awned	8	SRWW
D	2005	8	6	7	5	4	7	5	Awned	9	SRWW
E	2000	7	4	5	7	6	6	6	Awned	5	SRWW
F	2000	9	3	3	6	5	8	5	Awned	6	SRWW
G	2002	7	8	3	6	6	6	7	Awnless	8	SRWW

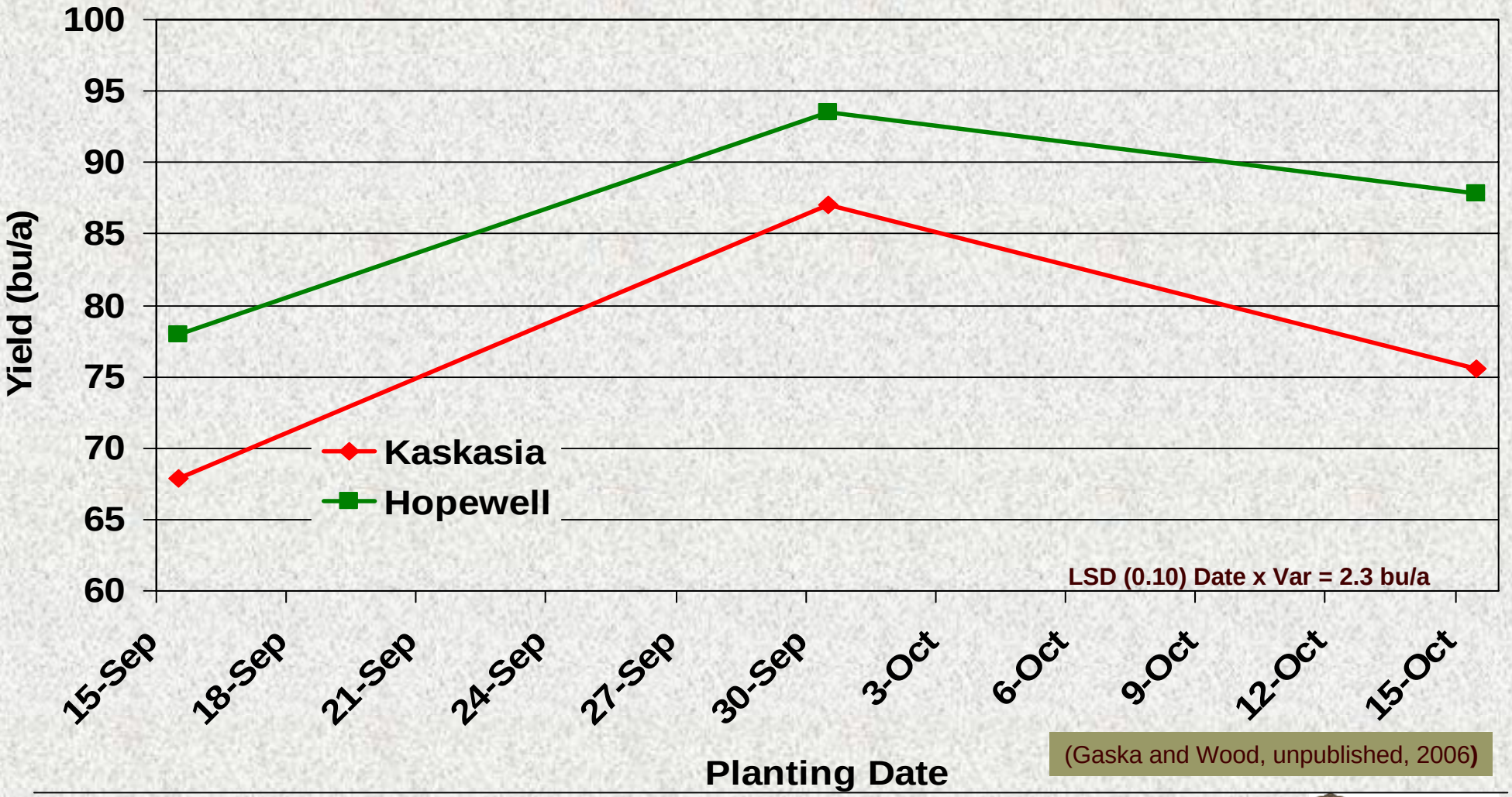
RATINGS: 9 = Excellent 1 = Poor, Height 1=short 9=tall

Planting Date Recommendations

- September 15 to October 5
- Early planting increases chance of BYDV
  - Vectored by aphids
- Late planting increases chance of winterkill
  - Not enough time to develop root system

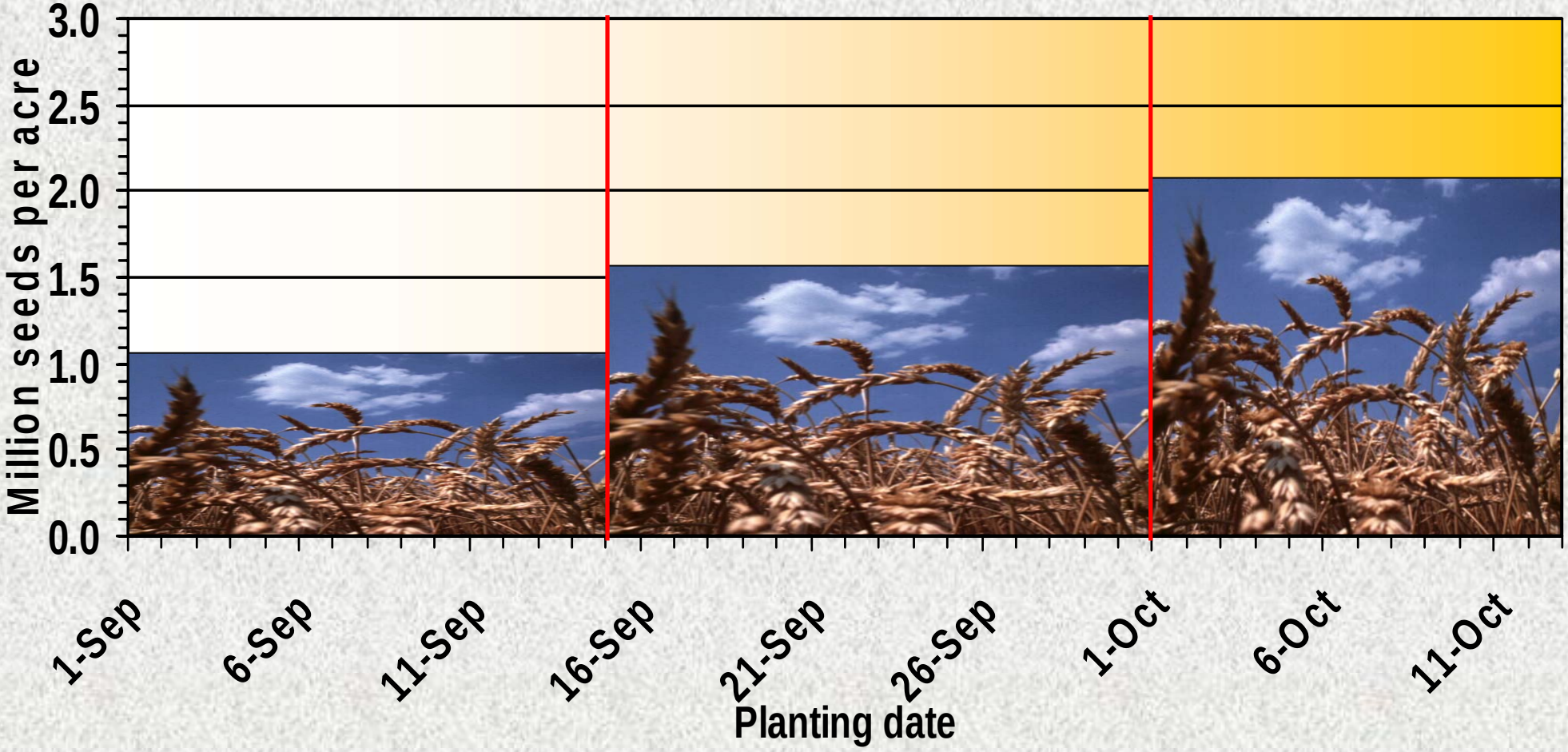
Effect of Planting Date on Winter Wheat Grain Yield

Arlington and Lancaster, WI 2006

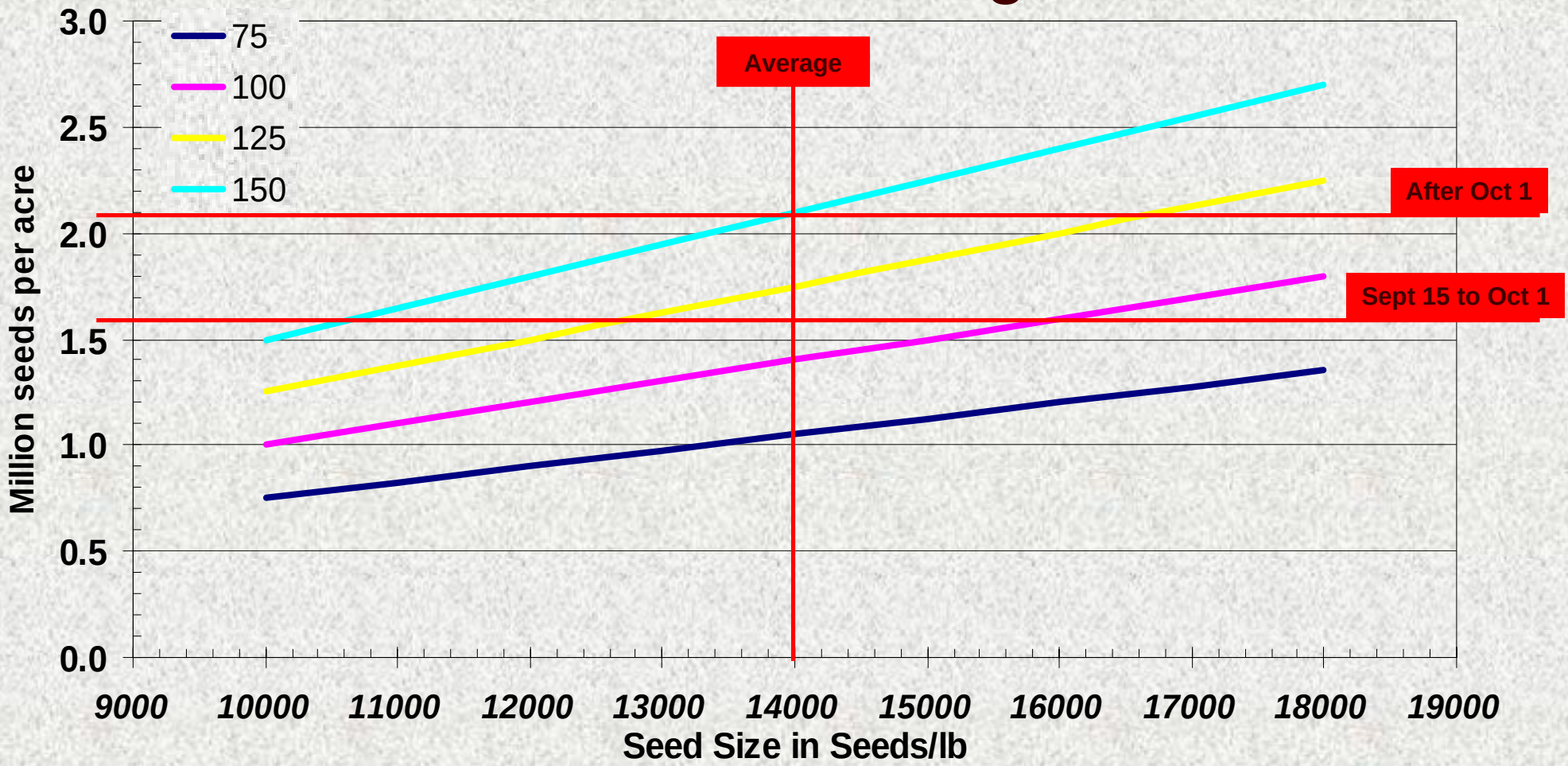


(Gaska and Wood, unpublished, 2006)

Wisconsin Winter Wheat Seeding Rate Recommendations

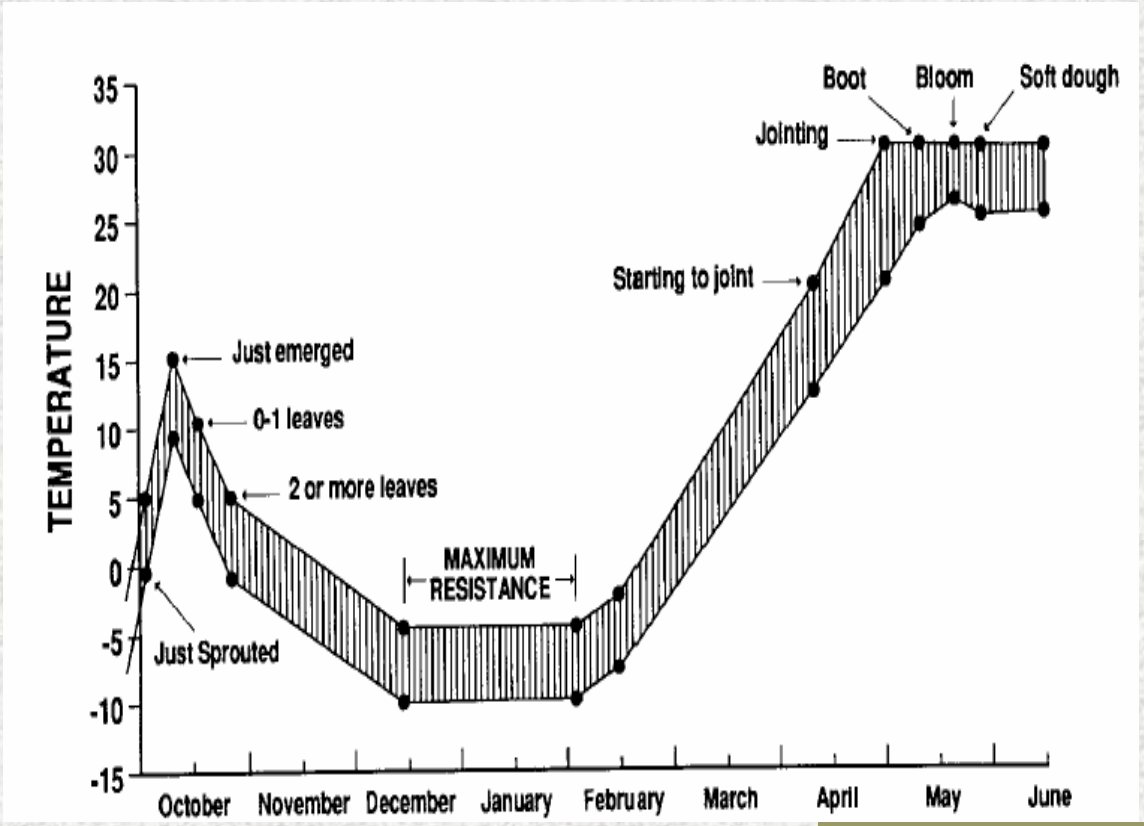


Pounds of seed/a vs. seeds/lb as basis for seeding rates



PREVENTING WINTERKILL

- **Select varieties with good winter hardiness**
- **Plant at proper time**
  - Sept 15 to Oct 5
  - Plant 1” deep
- **Provide residue cover**
  - Helps keep snow cover
  - Conserves moisture
- **Select fields with some slope**



(Paulson et al., 1982)

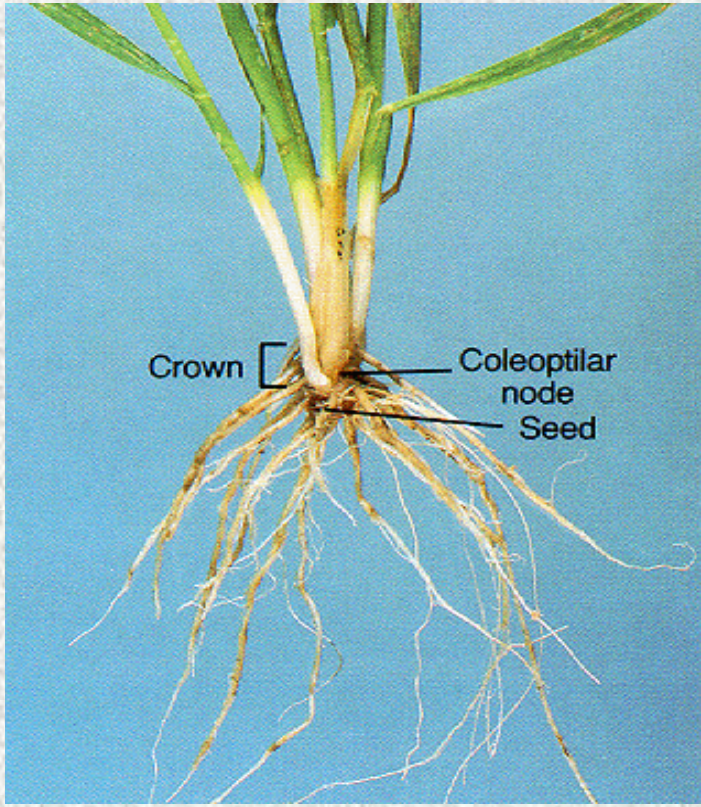

Photo: Gaska, 2006

Winter Stand Evaluation

1. **Dig up plants with roots intact**
   Free excess soil by shaking
   Plants are alive if soil adheres to live root hairs

2. **Cut into crown, white or green = alive, brownish = dead**

3. **Pot some plants indoors and water to see if they are alive**

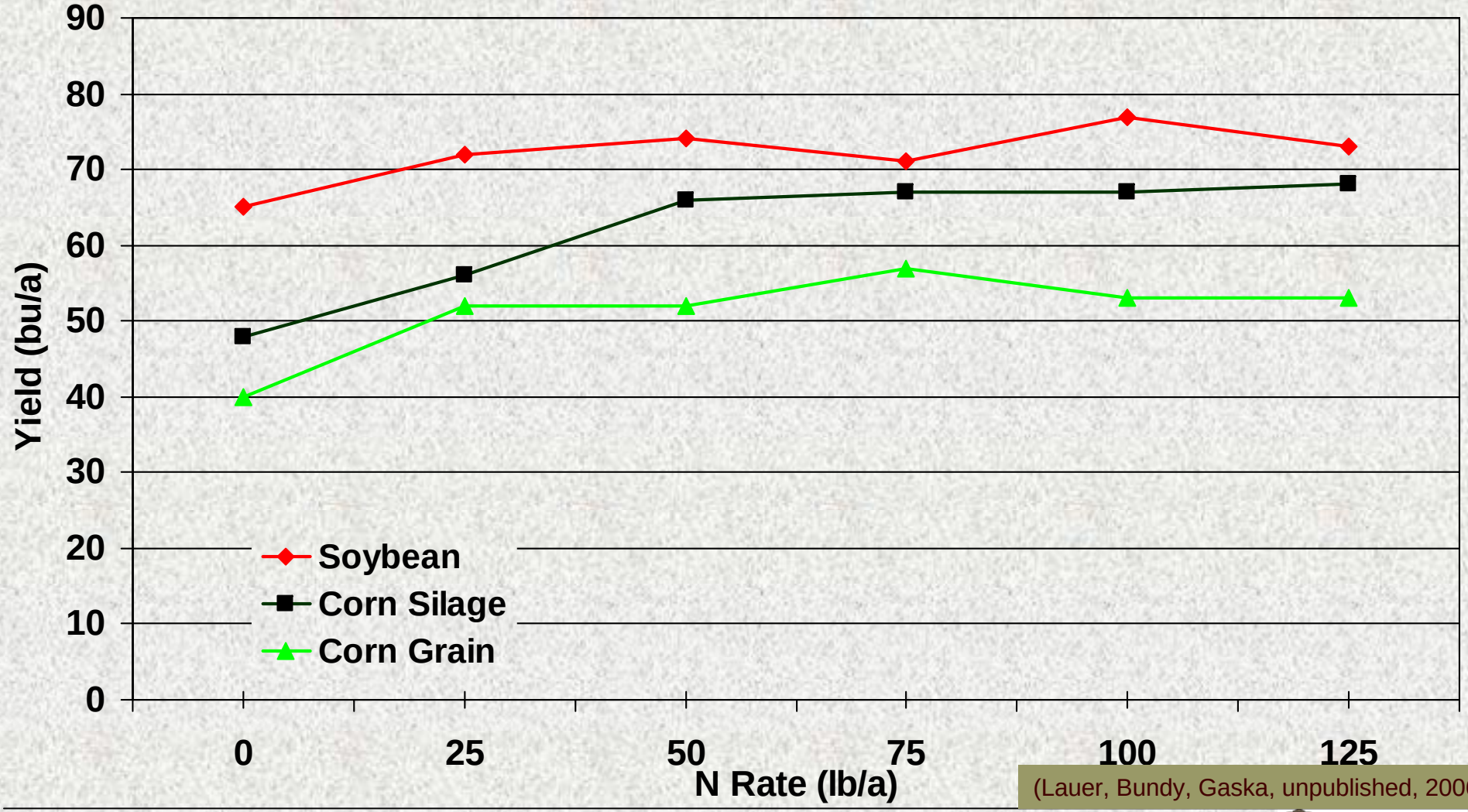


Wheat N Management

- Generally, 70 lb/a of N is adequate for soils with 2.0 to 9.9% organic matter. (Laboski et al. 2006)
- Nitrogen credit for any applied manure needs to considered
- N credit of 40 lb/a for wheat following soybean.
- Apply N on slightly frozen ground in mid March to early April in southern WI minimizes wheel traffic problems, meets the early season N needs of wheat.
- If stands are thin, tillering can be promoted with additional N applications.

Effect of previous crop and N rate on no-till wheat grain yield

Arlington, WI. 2005

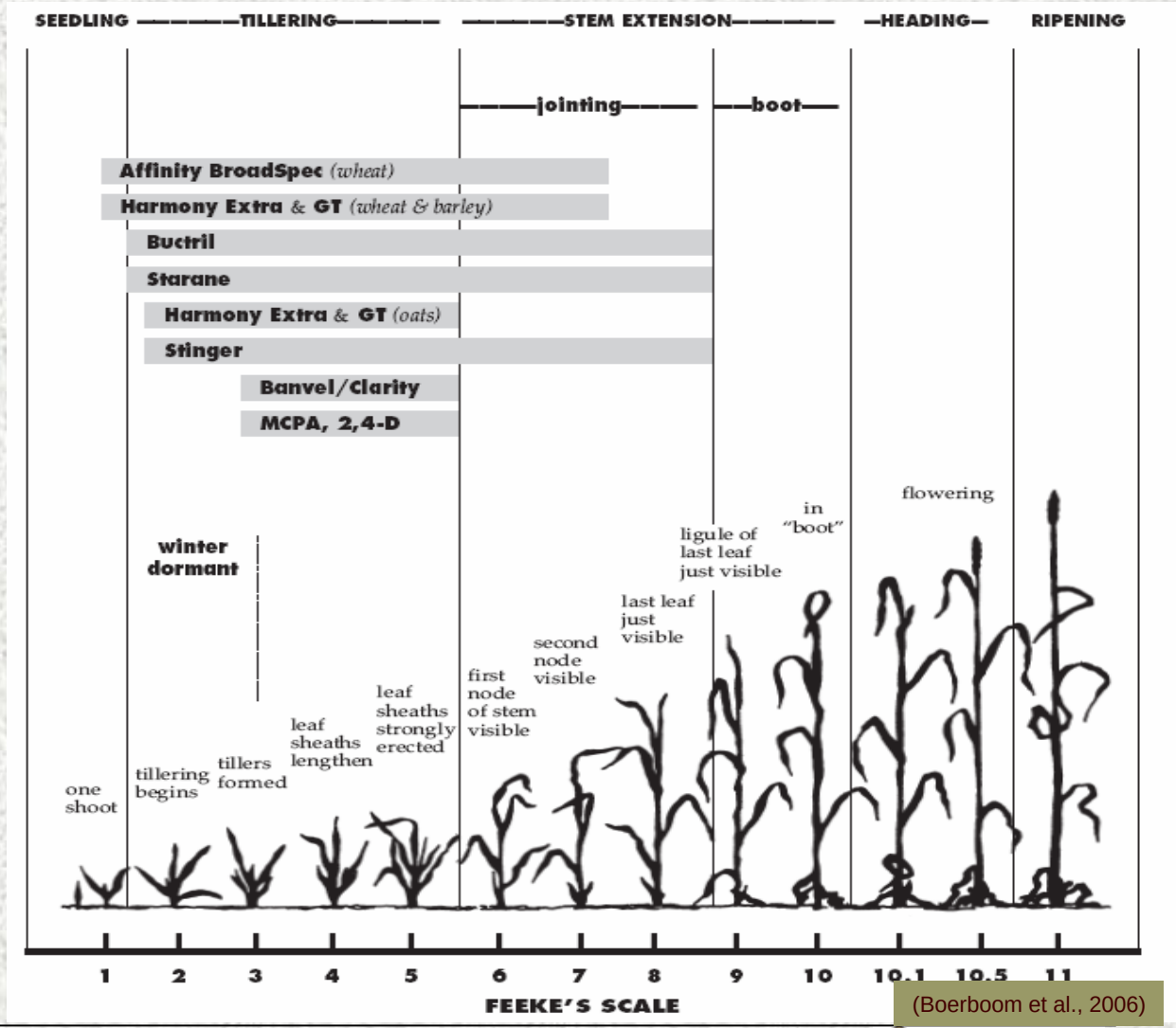


(Lauer, Bundy, Gaska, unpublished, 2006)

Weed Control

Use these options first:

- Crop rotation
- adapted varieties
- adequate fertilization
- crop competition
- clean seed



(Boerboom et al., 2006)

Do I apply a herbicide with my nitrogen?

- Timing issues
  - N applied at green up
  - Herbicide applied at jointing
  - N should be applied earlier than is optimum for weed control
- Leaf burning
  - Occurs under hot, humid conditions
  - Some herbicides require surfactants which could enhance burning effect of the N

Summary

Of all the wheat management practices:

NITROGEN FERTILIZATION

and

VARIETY SELECTION

are most important to maximize wheat yields

Thank You!