



Wheat Disease Issues 2011: Outlook for 2012

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SERVICE

Wheat Diseases 2011

Crops suffered from many weather factors → benefited disease, NOT growth and development of crop!

Diseases were favored by:

Very wet soils early

Late plantings

Frequent rains and wind

High humidity, high dew points

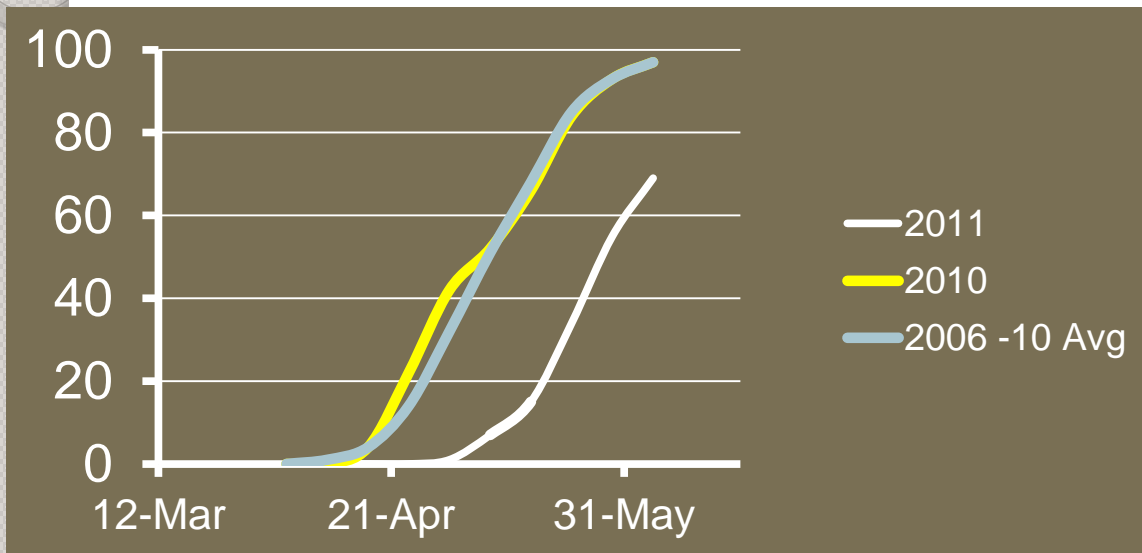
Very warm temps in July

Wet!



Rocky Butte Beach, ND, June 2, 2011
photo provided by Roger Ashley

Spring Wheat Planting Progress



Graph provided by Roger Ashley, DREC

Diseases of Note



WSMV



BYDV



Head scab



Tan spot



Bacterial
Streak &
Black chaff



Root Rot

WSMV = wheat streak mosaic



- Appeared early in 2011
- Source: often volunteer wheat not completely controlled prior to planting in fall of 2010 or
- Winter wheat crop planted without excellent control of weeds and volunteers in 2010

Concern: fall of 2011 for plantings of winter wheat on PP acres

WSMV

Management

- * Late planting date
- * 2 week window without volunteers, grassy weeds before planting. **Break Green Bridge.**



Mite Survival



"BREAK THE GREEN BRIDGE"

WHEAT STREAK MOSIAC MANAGEMENT

1



2



3

Photo from Blake Van DerVorst





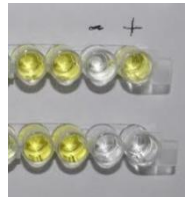
WSMV

This spring:

If unusual yellowing, streaking in young crop - Check with county agent or Area specialists at REC; diagnose symptoms, can't see mite or virus

Send sample to NDSU Diagnostic Lab; can test for virus, 2-3 day turn around

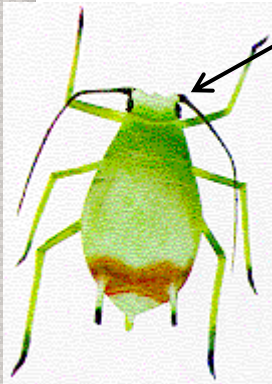
<http://www.ag.ndsu.edu/pdl>



BYDV = barley yellow dwarf virus



Virus disease, transmitted by Cereal grain aphids
Most common: bird cherry oat aphid



2011: aphids detected mid-June; Low numbers but were carrying virus;
Greatest threat to late planted cereal crops

BYDV



2011: NDSU Ext. Entomologist, Jan Knodel, released information on aphid control on June 23



Advised farmers, consultants to scout - If see aphids, treat with insecticide (no wheat variety resistance)

This year? Depends on aphid movement from south

Bacterial leaf streak and associated black chaff



Severe in many areas on all small grain crops

Bacteria moved by splashing rain, wounds created by soil moving in wind

Some varieties more susceptible; **No current management strategies**



Bacterial leaf streak & black chaff

◦ Lots of regional research, recent years

NDSU:

- Searching for resistance in 566 spring wheat accessions;
- 35 winter wheat accessions tested were resistant
- Testing chemical and bio- based products in field

(T. Adhikari, J.Hansen, S. Gurung)



Bacterial leaf streak & black chaff

SDSU:

- Spring wheat resistance source identified
- Made numerous crosses
- 532 F3 rows presently in New Zealand nursery
(C. Glover)

Bacterial leaf streak & black chaff

U of MN:

- Consistently Susceptible Wheats:
**Albany, Brogan, Pivot, RB07,
Select, Vantage, Brennan**
- Doing field screening (3 locations)
- Determining crop loss and major inoculum sources
(J. Anderson, R. Dill-Macky, C. Ishimaru)

Tan Spot leaf disease (fungus)



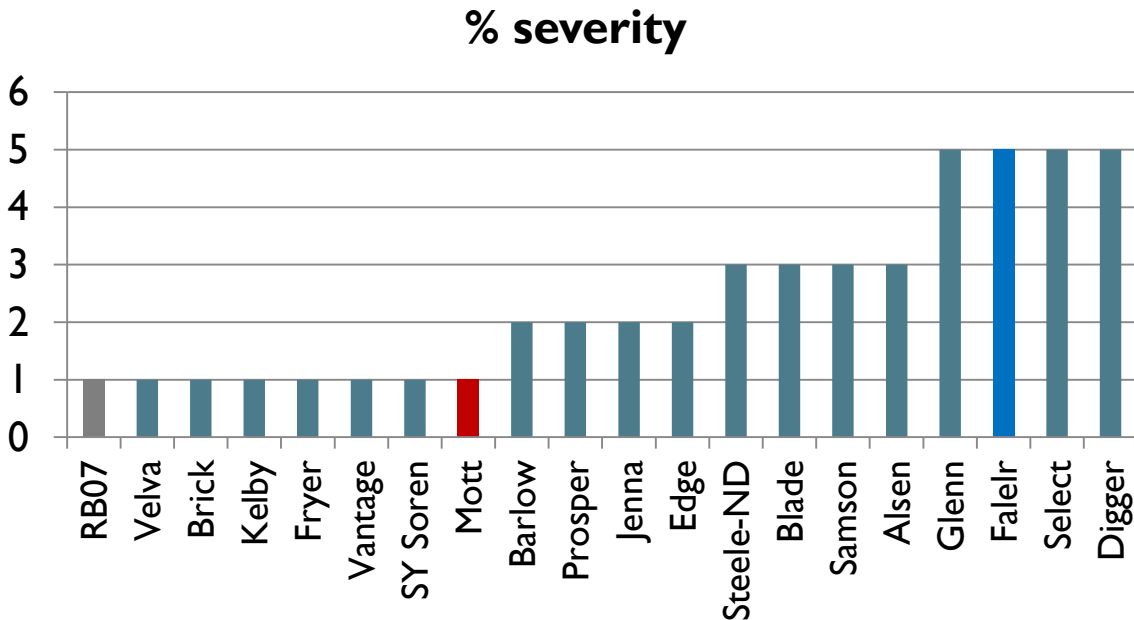
Most spring wheat and durum varieties have some susceptibility

2011: Tan spot appeared early because of wide spread wet weather; most common disease detected in ND



Management: varieties; crop rotation, fungicides

Tan spot severity, spring wheat varieties, Hettinger, 2011



Evaluations by B. Herauf, IPM Crops Scout

Fungicide Results: Headline early leaf followed by Tebuconazole (Onset) at heading (E. Eriksmoen, Hettinger REC)

Selected HRSW Varieties	Untreated yield bu/a	Treated yield bu/a
RB07	30.0	35.8
Kelby	46.4	49.9
Mott	34.6	39.3
Jenna	41.1	48.9
Edge	44.7	48.5
Steele-ND	35.9	38.6
Faller	31.9	38.0
Glenn	32.3	39.5
Average	37.1	42.3 = 5.2 bu+

Early season tan spot + scab control – RB07 HRSW 2011 (J. Pederson, NC REC)

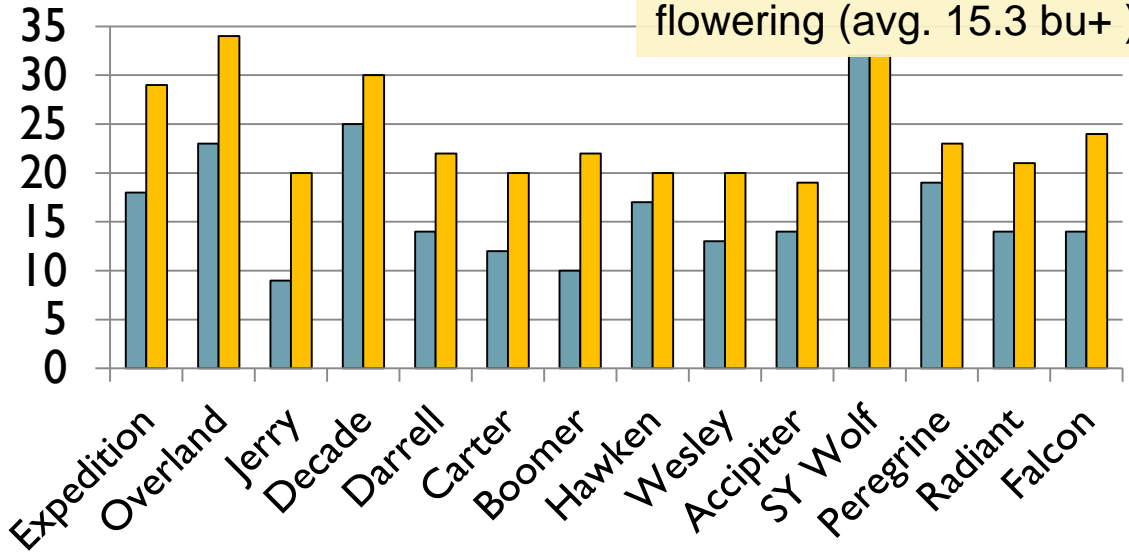
Trt and Rate/A (fl oz)	Crop Stage	Leaf Dis. 6/24	Scab FS %	Yield Bu/A
Untreated	---	26 a	22 a	29 a
Stratego YLD 2.0	4 leaf	18 b	23 a	30 a
Stratego YLD 4.0	4 leaf	15 b	20 a	32 a
Prosaro 6.5	Early flwr	26 a	9 b	41 b
Stratego YLD 2.0, Prosaro 6.5	4 leaf, Early flwr	14 b	12 b	41b
Stratego YLD 4.0, Prosaro 6.5	4 leaf, Early flwr	16 b	14 b	44 b

1-3 bu + with early season app.; 12 bu+ with late; 12-15 bu+ with 2 apps

Winter wheat varieties, Mandan, 2011; recrop-No-till

untreated = ■ treated = ■

Fungicides = Stratego early leaf followed by Prosaro at flowering (avg. 15.3 bu+)



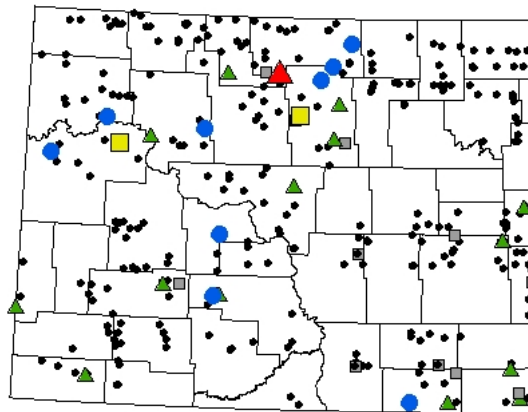
Scab = Fusarium head blight



Survey thru 8/10;
Many symptoms developed later, in late planted durum
Statewide field severity averaged less than 5%

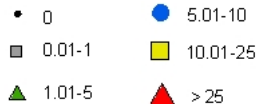
Wheat Scab

Season



Scab Field Severity Index

Severity = Incidence X Severity / 100



Uniform Scab Fungicide Study

2011 Langdon - Divide Durum (Scott Halley data)

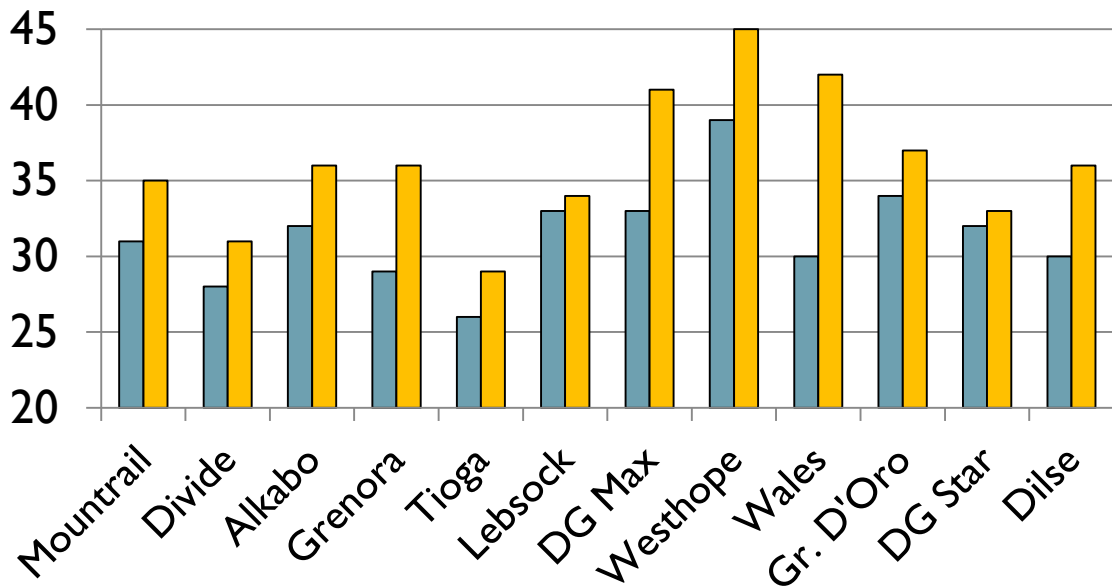
Trt and Rate/A	Crop Stage	FS scab %	FDK %	Yield Bu/A
Untreated	---	41 a	7	37 a
Caramba 13.5 fl oz	Early flwr	11 b	3	63 b
Prosaro 6.5 fl oz	Early flwr	12 b	3	58 b
Headline 6 fl oz	Early flag	51 a	8	38 a
Headline 6 fl oz, Prosaro 6.5 fl oz	Early flag, Early flwr	6 b	3	64 b
Stratego Yld 4 fl oz	Full hding	32 a	10	40 a
Quilt 10.5 fl oz	Full hding	43 a	10	43 a
Twinline 9 fl oz	Full hding	26 a	9	48 a

21 to 27 bu + with best treatments!

Durum Response to Fungicides

– Hettinger 2011

untreated = ■ treated = ■ Fungicides = Headline early leaf followed by Onset at heading (avg. 4 bu+ or 11.5%)



Bacterial leaf streak & black chaff

Was a factor in many fungicide trials in 2011,
resulting in less fungicide response than expected because of tan spot, Septoria, and sometimes scab



Wheat Bushel Response Needed

Slide from Jeremy Pederson and Marcia McMullen

“Ballpark Figures”

~Yield (bu/a)
return needed to
break even at
various market
prices *

Product cost (\$/a)	Application cost (\$/a)	Type of Application	\$5.00/ Bu	\$7.00/ Bu	\$8.00/ Bu
\$ 4	\$ 5	Custom ground	1.8	1.3	1.1
\$ 4	\$ 7	Custom aerial	2.2	1.6	1.4
\$ 14	\$ 7	Custom aerial	4.2	3.0	2.6
\$ 17	\$ 7	Custom aerial	4.8	3.4	3.0

* Market price based on good quality, no discounts for twt or vomitoxin

Other Diseases: **Root Rot**



Extended wet soils favored infection

Information lacking on response of current var.

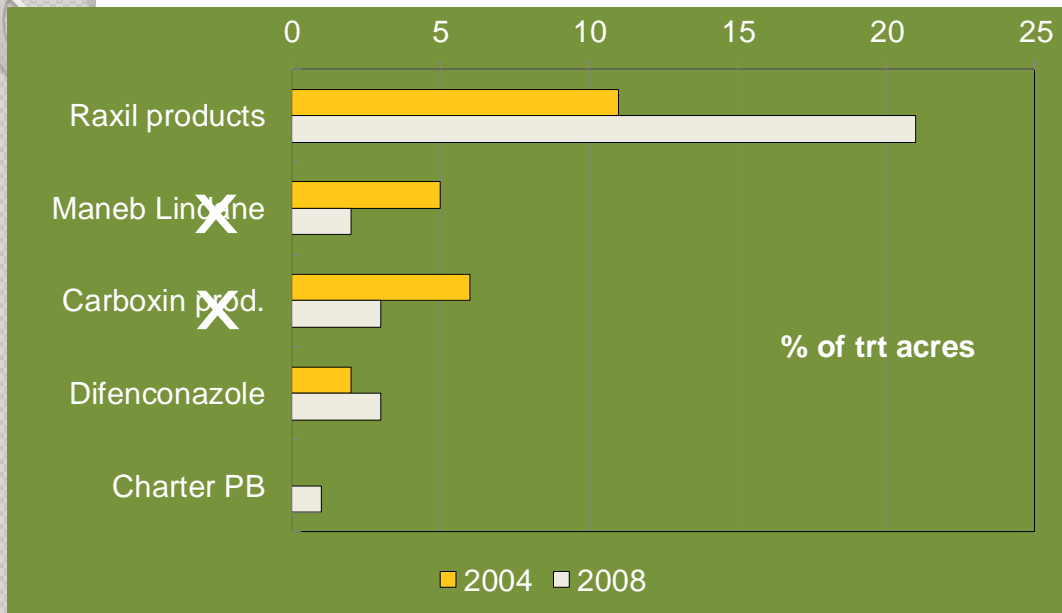
Management:

Seed treatment helps; but 2011 conditions were overwhelming

Future: evaluation of New variety responses



Wheat: Most Common Seed Trt Fungicides – 2004 and 2008



Source: 2004 and 2008 NDSU Pesticide Use Surveys



Loose Smut Activity of Some Common Seed Treatment Products

Product	Wheat	Barley
Dividend XL	+	-
Raxil XT,MD	+	+
Proceed MD	+	+
Charter	+	+
Rancona	+	+

Seed Treatment

- Recommended when loose smut seed infection > 2%
- Embryo test-barley
- Wheat – treat if saving seed, if history of smut in field

Seed Treatment Economics

Average return: 2 to 3 bu/A

Range of return: 0 to 8 bu/A

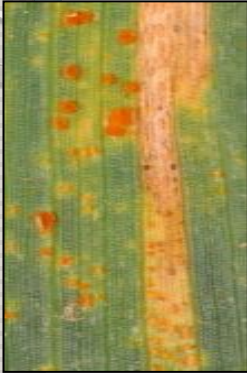
Cost of treatment:

- varies with degree of disease/insect control (increased spectrum of disease control = increased cost)

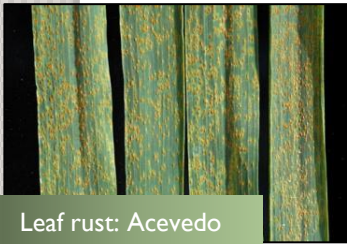
\$1 to \$3/A

**Net Return (average): \$ 14 -\$3 = \$11
at \$7.00/bu wheat**

Uncommon Diseases of 2011 In Commercial Fields: **Rusts**



Leaf/Stripe rust



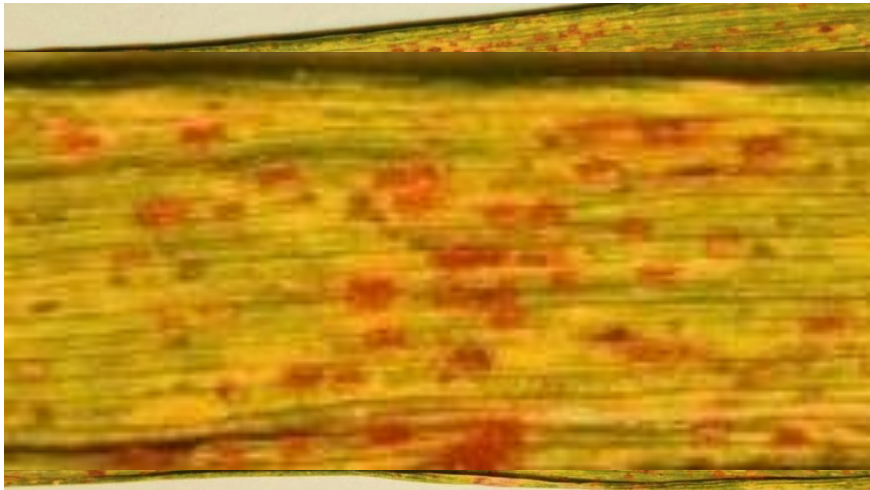
Leaf rust: Acevedo

LR21 resistance gene to wheat leaf rust now “defeated” by new **leaf rust races**, LR21 common in: Faller, Prosper, other var.

Dr. Maricelis Acevedo, NDSU Plant Cereal Rust Pathologist



Field Season 2011



Faller 7-28-11 Carrington

Leaf Rust Genes Present, as postulated by Jim Kolmer, USDA Cereal Disease Lab, St. Paul

Variety	Leaf rust resistance genes	Variety	Leaf rust resistance genes
Albany	Lr24, Lr14a, Lr26	Faller	Lr21
Alsen	Lr2a, Lr10, Lr23, Lr34	Howard	Lr21
Barlow	+ (resistance; genes not id'd)	Jenna	+
Blade	Lr16, Lr23, Lr34	RB07	Lr21
Brick	Lr16, +	Samson	Lr16, Lr23

Dr. Acevedo's Current research areas/projects

- Evaluation of germplasm for leaf, stripe and stem rust resistance.
 - HRSW
 - HRWW
 - Durum wheat
- Identification, characterization of new and/or under-utilized sources of resistance.
- Study of molecular and genetic mechanisms underlying broad resistance to wheat rusts.



Wheat Leaf Rust also Managed with Foliar Fungicides

- Products like Headline, need to be on leaf surface before infection
- Triazole products, like tebuconazoles, Prosaro, Caramba, some “kick back” activity; apply if see 1-5% infection on lvs
- **Watch for rust development in states to south; indicates risk for us**



Various fungal spots on barley



Questions?

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