2005 Agronomy Update Meetings

Janesville, Platteville, Madison, Fond du Lac, Kimberly, Wausau, Eau Claire, and Sparta

January 3-7, 2005

Joe Lauer

University of Wisconsin

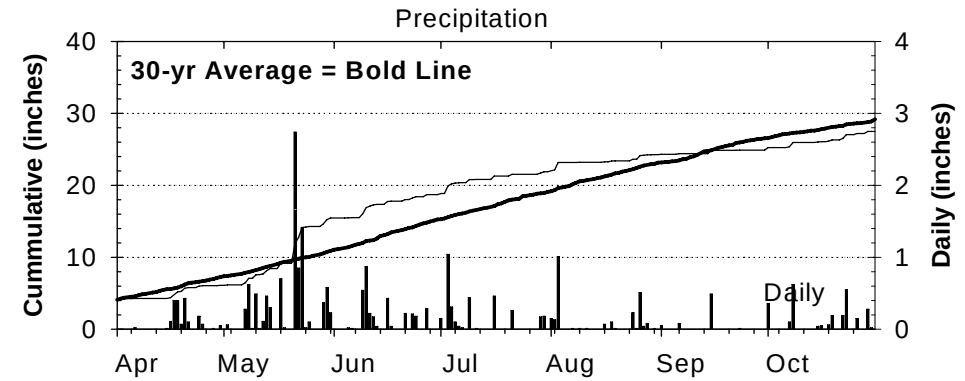
Overview

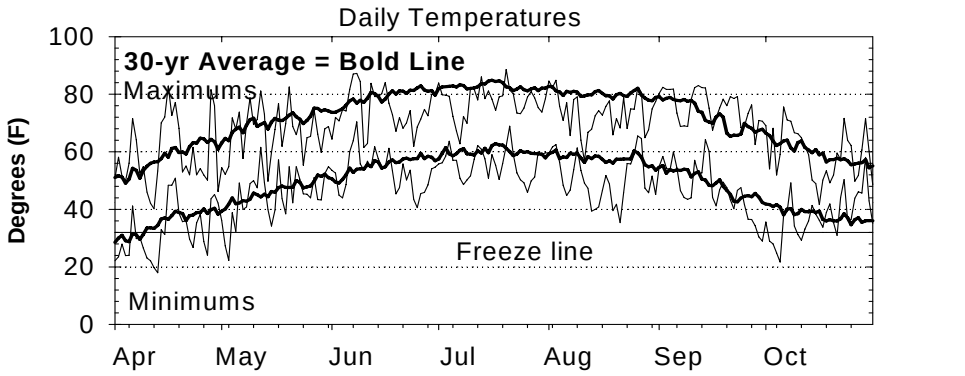
- **2004 in review**
  - ✓ What did we learn from the 2004 growing season?
  - ✓ Corn and cool weather?
  - ✓ Corn Performance in the UW Trials
- **New changes in the 2004 UW Corn Results Book**
- **What does transgenic corn mean to farmers?**
  - ✓ Selecting hybrids based on family performance
- **Performance of corn seed treatments**

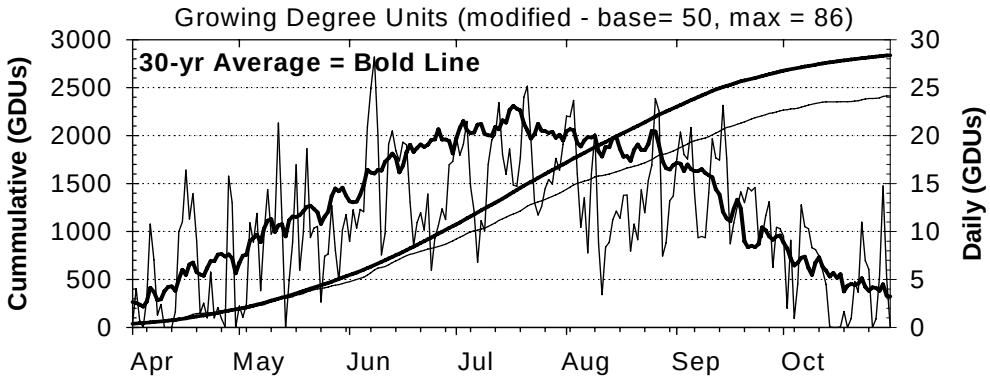
Corn Production during 2004

- **Record grain yields in southwestern Wisconsin**
- **Opportunities for early planting date in most of Wisconsin**
  - ✓ After May 5 - late (June) planting dates in eastern Wisconsin
- **Growing season**
  - ✓ Cooler than normal
  - ✓ Wetter than normal May and June
  - ✓ Corn growth and development lagged behind
  - ✓ Beautiful September
- **Hybrid Trials**
  - ✓ Variability at Fond du Lac
  - ✓ Abandoned Rhinelander (>40% grain moisture)

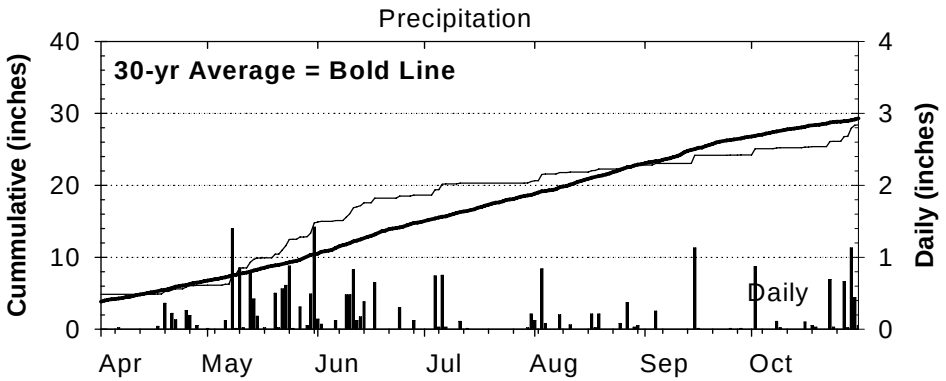
2004 Weather Summary for Arlington, WI

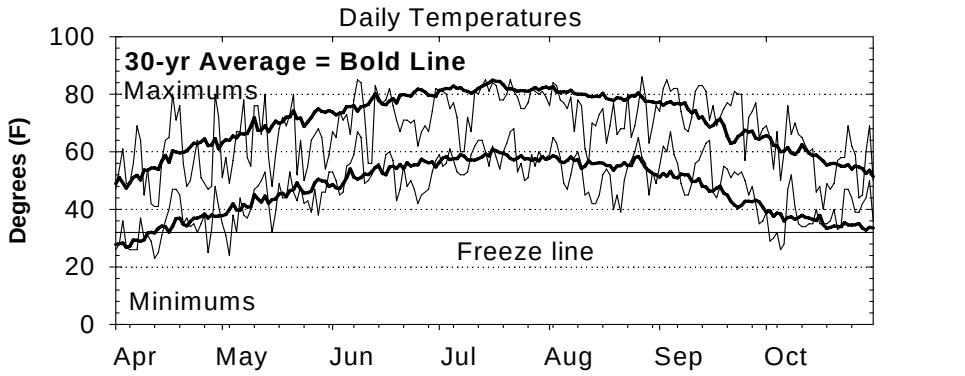


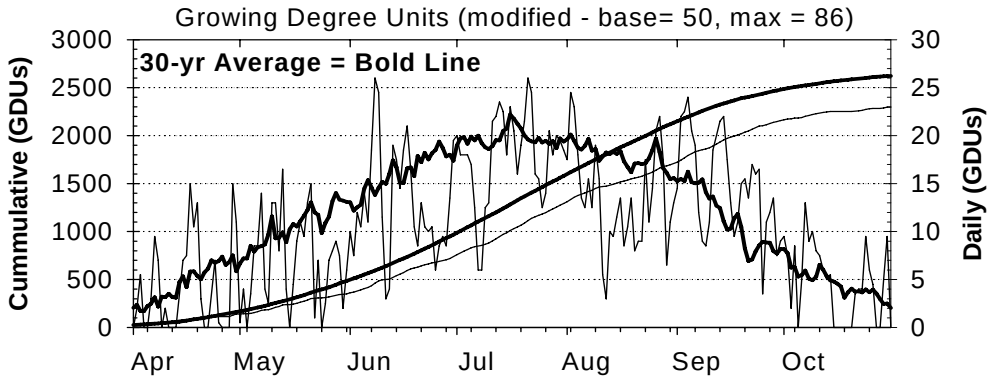




2004 Weather Summary for Marshfield, WI







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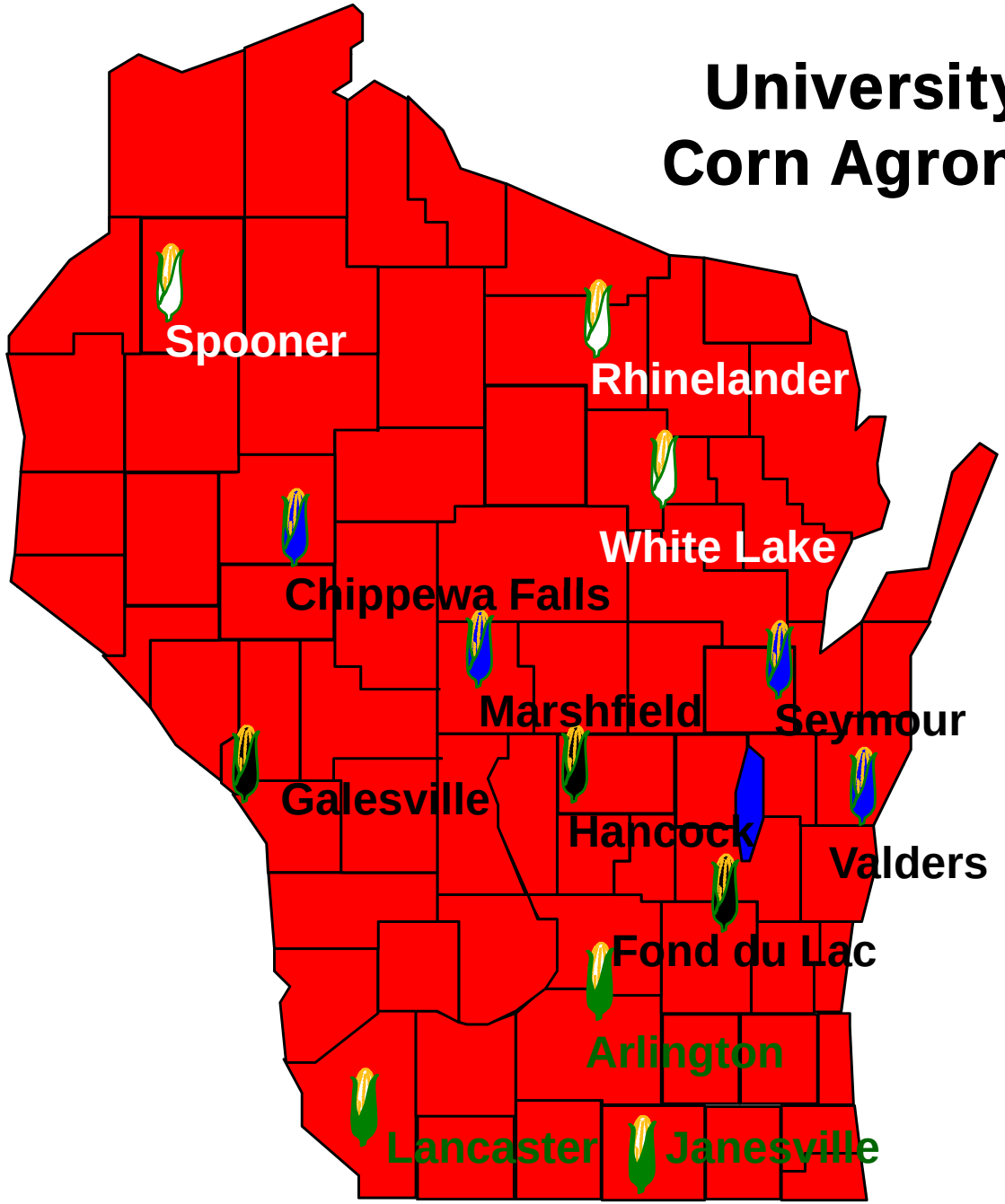


2004 Wisconsin Corn Performance Trials
Grain Summary

	1994-2003		2004		Percent
Location	N	Yield	N	Yield	change
Arlington	1841	197	174	210	7
Janesville	1840	194	174	236	22
Lancaster	1840	184	174	241	31
Fond du Lac	1623	174	171	168	-3
Galesville	1620	175	171	208	19
Hancock	1619	194	171	215	11
Chippewa Falls	1523	149	145	174	17
Marshfield	1357	156	145	150	-4
Seymour	1199	162	145	154	-5
Valders	1525	151	145	183	21
Spooner	1697	141	123	137	-3
White Lake/Rhinelander	564	109	---	---	---

2004 Wisconsin Corn Performance Trials
Silage Summary

Location	1994-2003 N	1994-2003 Yield	2004 N	2004 Yield	Percent change
Arlington	491	9.4	52	9.7	2
Lancaster	491	7.9	52	10.1	27
Fond du Lac	476	8.5	57	7.7	-10
Galesville	477	8.6	61	9.1	6
Chippewa Falls	104	7.5	51	8.1	8
Marshfield	486	6.8	52	7.1	5
Valders	491	6.6	52	8.5	28
Rhinelander	42	6.3	27	6.4	2
Spooner	84	6.6	54	7.9	19

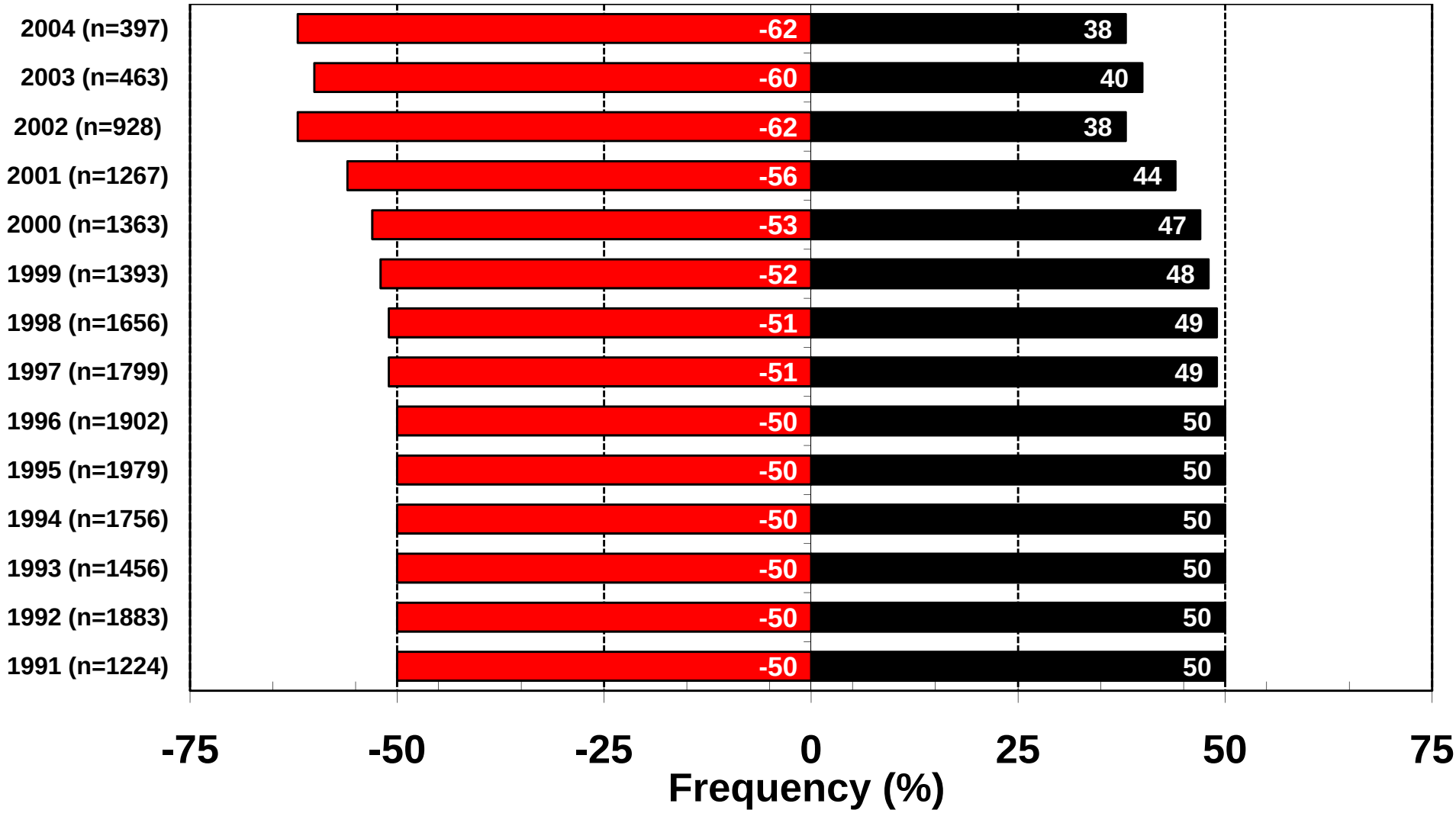
New in 2004 UW Performance Trial Books

- **Seed treatment listed in Hybrid Index (Table 1).**
- **Hybrid Star Lists**
  - ✓ Star when performance was statistically similar to highest hybrid in the trial for yield and performance index (P.I. and Milk2000)
  - ✓ Hybrid Index
  - ✓ Hybrid History
  - ✓ ~40% of hybrids starred
- **Objective: Provide a "short list"**

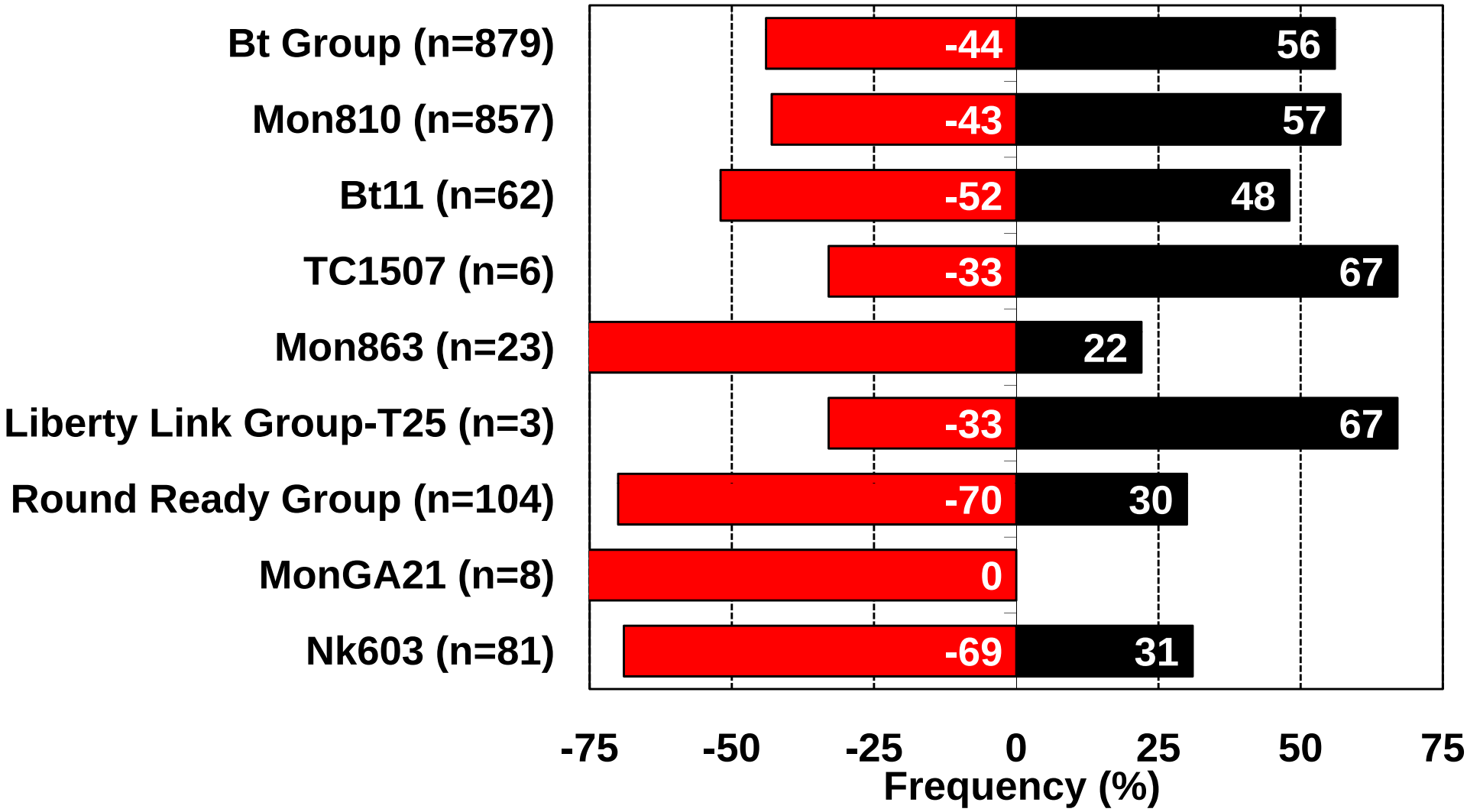
Statistics of 273 UW Corn Trials for Grain

Statistic	All trials 1994-2004	Fond du Lac 1994-2003	Fond du Lac 2004 E	Fond du Lac 2004 L
N (hybrids)	77	80	**80**	**89**
Min-Max	16 - 117	58 to 104	**---**	**---**
Mean (bu/A)	168	175	**160**	**175**
Min-Max	47 - 255	128 to 211	**---**	**---**
Range (bu/A)	79	73	**122**	**106**
Min-Max	30 - 167	49 to 119	**---**	**---**
Standard deviation	±16	±14	**± 32**	**± 29**
Min-Max	±7 to ±39	±10 to ±19	**---**	**---**

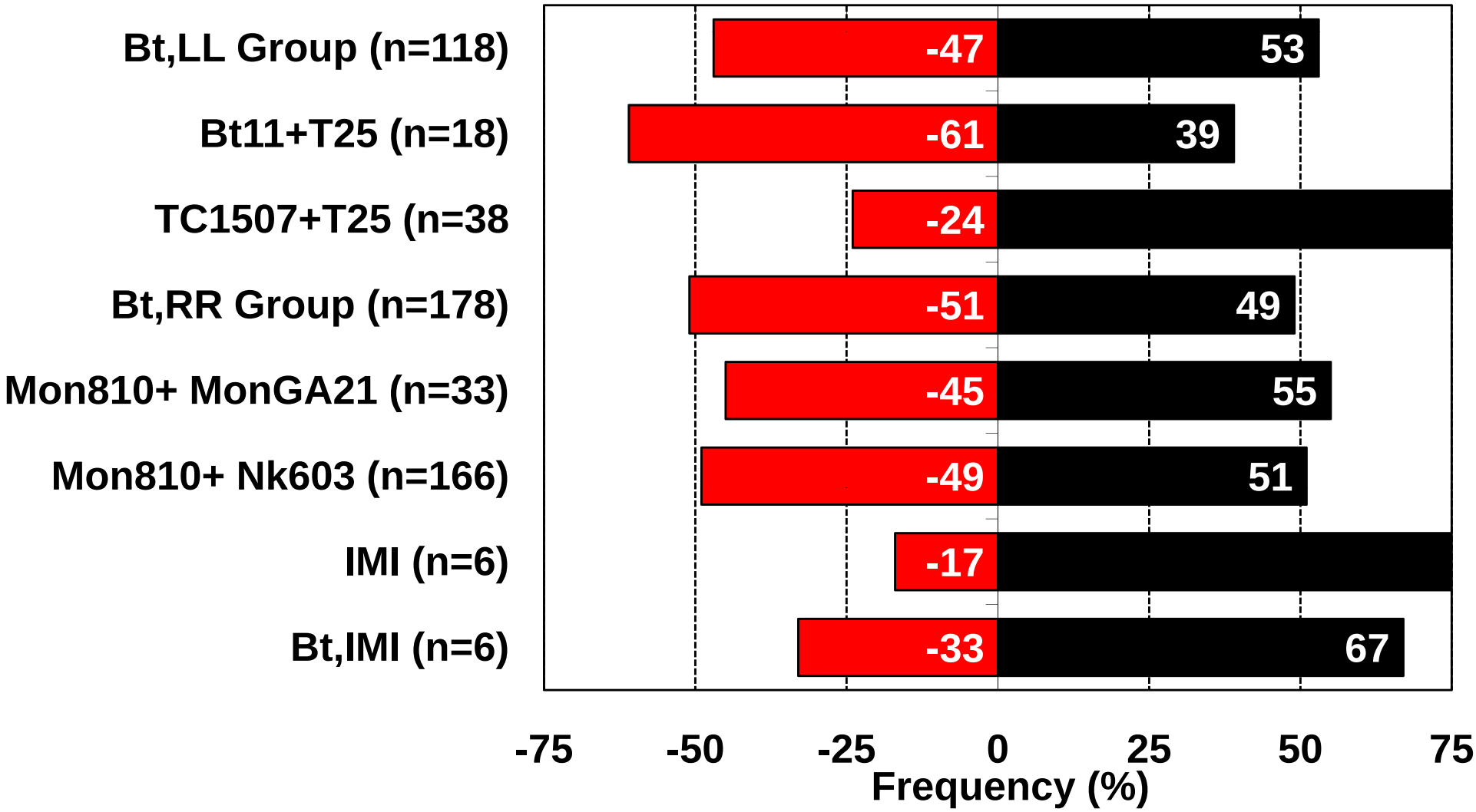
Frequency of ‘Normal’ Corn Hybrids Yielding Above the Trial Average in the UW Corn Trials



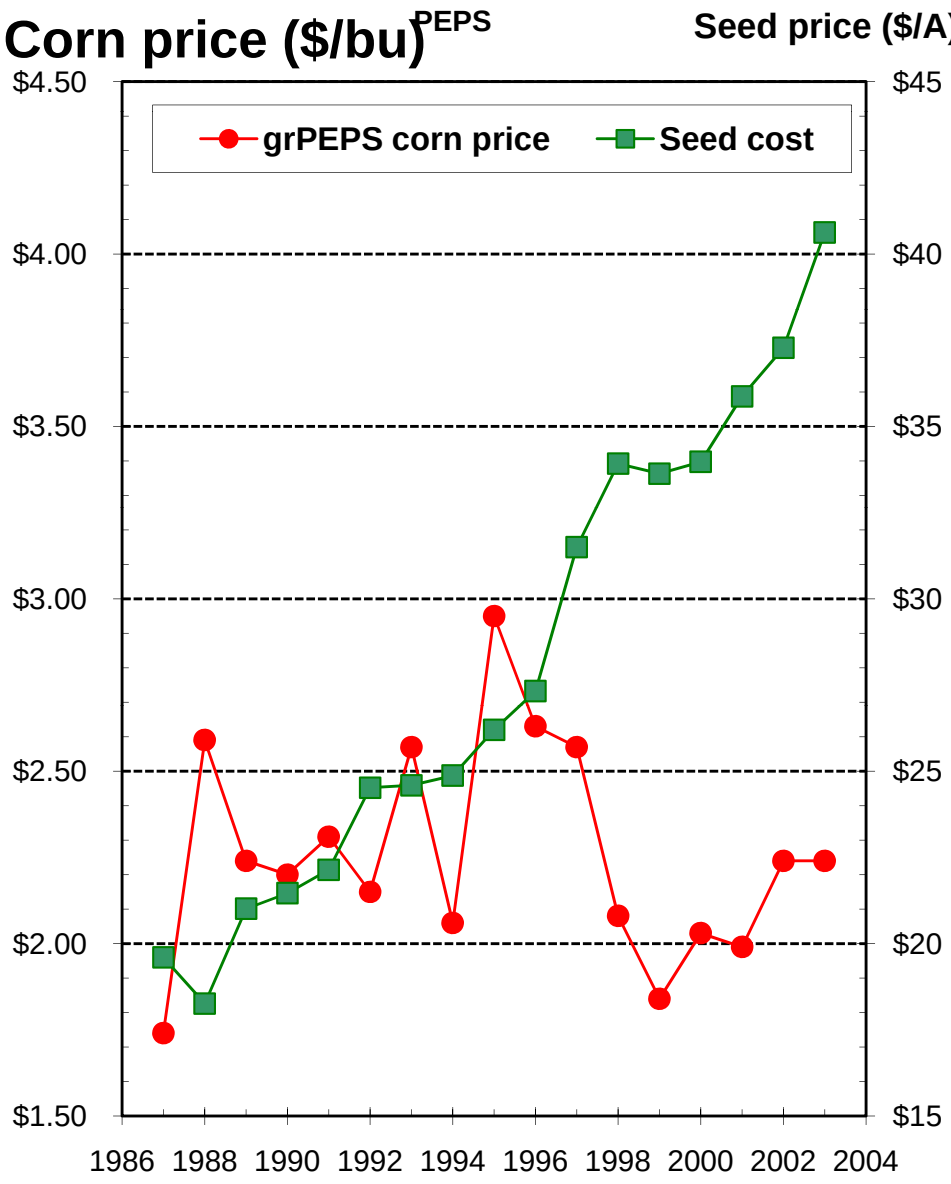
Frequency of Transgenic Hybrids Yielding Above the Trial Average in the 2004 UW Corn Trials



Frequency of “Stacked” Transgenic Hybrids Yielding Above the Trial Average in the 2004 UW Corn Trials



Calculating Grower Return



Partial Budget Analysis

- **Grower return = (Yield x Price) - Costs**
  - Handling ($0.02 per bushel)
  - Hauling ($0.04 per bushel)
  - Trucking (system rate)
  - Drying (system rate per bushel-point > 15.5%)
  - Storage (system rate per 30 day)

  ✓Marketing plan: 50% sold at harvest, 25% at 4 months, and 25% at 8 months.

- Corn Production Systems

  ✓Livestock: drying=$0.00, trucking=$0.00, storage=$0.01

  ✓**On-farm: drying=$0.02, trucking=$0.11, storage=$0.02**

  ✓Commercial: drying=$0.04, trucking=$0.11, storage=$0.03

- Corn Price per bushel

  ✓ Price matrix: $2.00, **$2.50**, $3.00 = gr250

  ✓**grPEPS**: Weighted Price per bushel =
  50% November Average Cash price
  + 25% March CBOT Futures ($0.15 basis)
  + 25% July CBOT Futures ($0.10 basis)

  ❑November Average Cash price derived from WI Ag Statistics; CBOT Futures prices derived from closing price on first business day in December.

Breakeven Matrix ($/A) for Corn Hybrid Seed Sold at Various Seed Bag Prices (Technology Fees)

Yield Increase (bu/A)	$20 Bag difference			$40 Bag difference			$60 Bag difference		
	Corn Price			Corn Price			Corn Price		
	$2.00	$2.50	$3.00	$2.00	$2.50	$3.00	$2.00	$2.50	$3.00
0	-8	**-8**	-8	-17	**-17**	-17	-25	**-25**	-25
2	-4	**-3**	-2	-13	**-12**	-11	-21	**-20**	-19
4	0	**2**	4	-9	**-7**	-5	-17	**-15**	-13
6	4	**7**	10	-5	**-2**	1	-13	**-10**	-7
8	8	**12**	16	-1	**3**	7	-9	**-5**	-1
10	12	**17**	22	3	**8**	13	-5	**0**	5
12	16	**22**	28	7	**13**	19	-1	**5**	11

Assume: 80,000 seeds/bag planted at 33,000 seeds/A for final population of 30,000 plants/A

What do Transgenic Hybrids Mean for Farmers?
(Compared to the Normal Corn Average through 2004)

Transgene	N	Grain yield	Grain moisture	Lodging	GR $2.50	GR PEPS
		Bu/A	%	%	$/A	$/A
Bt176	119	5	1	-1	9	7
Bt11	225	10	1	0	18	13
DBT418	15	-2	0	1	-1	-1
Mon810	2497	9	0	0	17	14
Mon863	34	-10	-1	0	-20	-15
MonGA21	159	2	-1	-1	6	6
Nk603	176	3	0	0	8	6
T25	65	3	0	0	3	2
IR	18	-5	-2	-1	-3	-3
IT	210	-1	0	0	-3	-3

What do "Stacked" Transgenic Hybrids Mean for Farmers?

(Compared to the Normal Corn Average through 2004)

Transgene	N	Grain yield	Grain moisture	Lodging	GR $2.50	GR PEPS
		Bu/A	%	%	$/A	$/A
TC1507+T25	60	14	0	0	27	21
Bt11+IT+T25	3	-15	-3	-1	-20	-10
Bt11+T25	119	6	0	-1	14	12
Bt176+IT	3	-2	0	7	-4	-3
Mon810+IT	9	8	0	-1	18	14
Mon810+MonGA21	114	11	0	-1	22	19
Mon810+Nk603	200	7	0	0	14	12
Mon810+T25	25	5	0	-2	9	8

Relative Performance of Specialty Hybrids Compared to Normal Sister Lines (through 2004)

Specialty Trait	N	Grain yield	Grain moisture	Lodging	GR $2.50	GR PEPS
		Bu/A	%	%	$/A	$/A
Bt11	11	14	0	-2	28	21
Bt11+T25	6	19	0	-5	39	41
DBT418	6	1	1	2	-3	-3
IR	6	-16	1	0	-35	-31
Mon810	95	8	1	0	13	10
Mon810+IT	6	-3	0	-1	-21	-18
Mon810+Nk603	3	-3	1	2	-11	-10
Mon810+T25	7	-7	2	-1	-21	-18
MonGA21	30	5	0	-1	11	9

Relative Performance among "Families" Compared to the Normal Line Grown in the same Trial (through 2004)

Family	Specialty Trait	N	Grain yield	Grain moisture	Lodging	GR $2.50	GR PEPS
			Bu/A	%	%	$/A	$/A
A12	SR	15	-10	0	0	-19	-20
A12	DBT418	3	-13	1	3	-31	-26
A12	Mon810	3	10	2	-1	13	13
A12	MonGA21	9	2	-1	-1	8	7
B99	Mon810	3	15	3	-2	13	7
B99	Mon810+T25	3	-2	1	-1	-7	-6
C284	Mon810	24	17	1	-1	34	27
C284	Mon810+IT	6	-3	0	-1	-8	-6

Summary

- **Care must be taken selecting normal hybrids.**
- **Grain yield and grower return of Bt11 and Mon810 corn hybrids is better than the trial average and normal hybrid average.**
  - ✓ Bt11 and Mon810 stacked with T25, MonGA21 or Nk603 perform well.
- **At this time the single transgenes T25, MonGA21, and Nk603 (as well as IMI and SR) do not add to yield or grower return.**
  - ✓ T25, MonGA21, Nk603, and Bt-IMI (as well as IMI and SR) corn hybrids should only be recommended for problem fields or difficult management situations.
  - ✓ Bt(CRW) ?
- **Pick hybrids based upon individual performance.**
  - ✓ Do not assume that performance is equivalent across a hybrid family or a hybrid's 'base' genetics.
- **"Variation for grain yield exists among commercial transgenic hybrids sold in Wisconsin."**

The Problem

- **Historically seedling emergence is a problem in WI**
- **Changing farmer practices**
  - ✓ Seed environment is often cool and wet
  - ✓ Earlier planting dates
  - ✓ Increased acreage where corn is planted into reduced tillage seedbeds.
    - ❑ "Slow-growth" syndrome in reduced tillage systems causes delayed emergence, poor seedling growth, and difficult stand establishment

Today there are more chances than ever for disease development from soil pathogens.

Rate of Pathogen Growth v. Rate of Corn Growth at Cool Temperatures

- **Environments which favor seedling blight have high enough temperatures to start corn germination followed by a period of low temperatures**
  - ✓ (Dickson, 1929; referring to the 1921 growing season).
- **"... that other factors being constant, the relative growth rates of the host and pathogen determine to a considerable degree the severity of preemergence and seedling infection at different temperatures."**
  - ✓ (Leach, 1947)
- **From nearly 50 years, Captan has been the "workhorse" for protecting corn seed.**

Corn Seed Treatments
Chemical Names / Common Names

Fungicides

- **Captan**
- **Fludioxonil**
  - ✓ Maxim
- **Mefenoxam (metalaxyl-M)**
  - ✓ Apron FL, Apron XL, Allegiance
- **Fludioxonil + Mefenoxam**
  - ✓ Maxim XL
- **Strobilurins**
  - ✓ Dynasty, Protégé, Quadris, Trilex

Insecticides

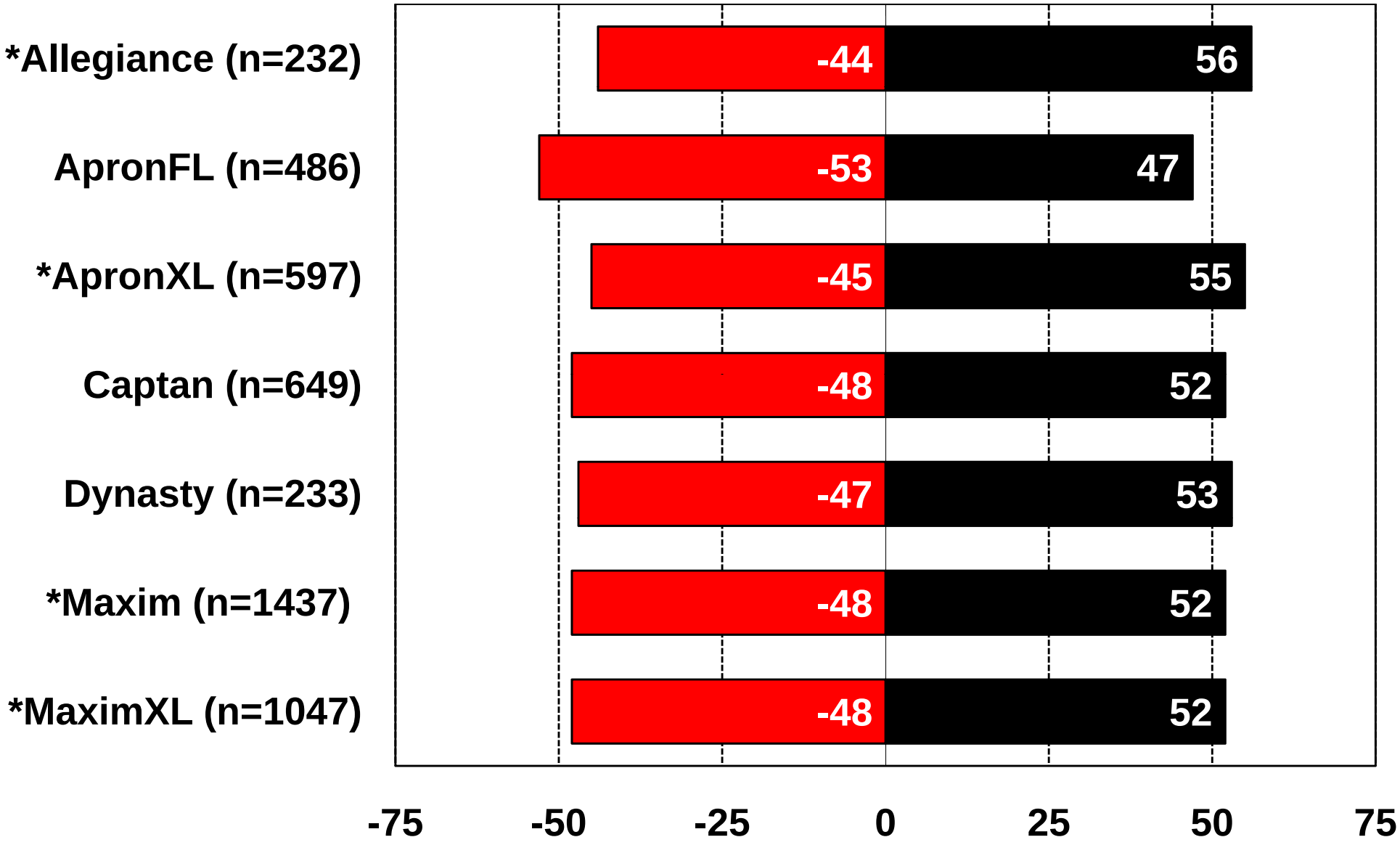
- **Chlorpyrifos**
  - ✓ Lorsban
- **Clothianidin**
  - ✓ Poncho250, Poncho1250
- **Imidacloprid**
  - ✓ Gaucho, Admire, Condifor, Premier, Premise, Provado, and Marathon
- **Permethrin**
  - ✓ Assult, Baracuda
- **Pirimiphos-methyl**
  - ✓ Actellic, Nu-Gro
- **Thiamethoxam**
  - ✓ Cruiser

Efficacy of Corn Seed Treatments

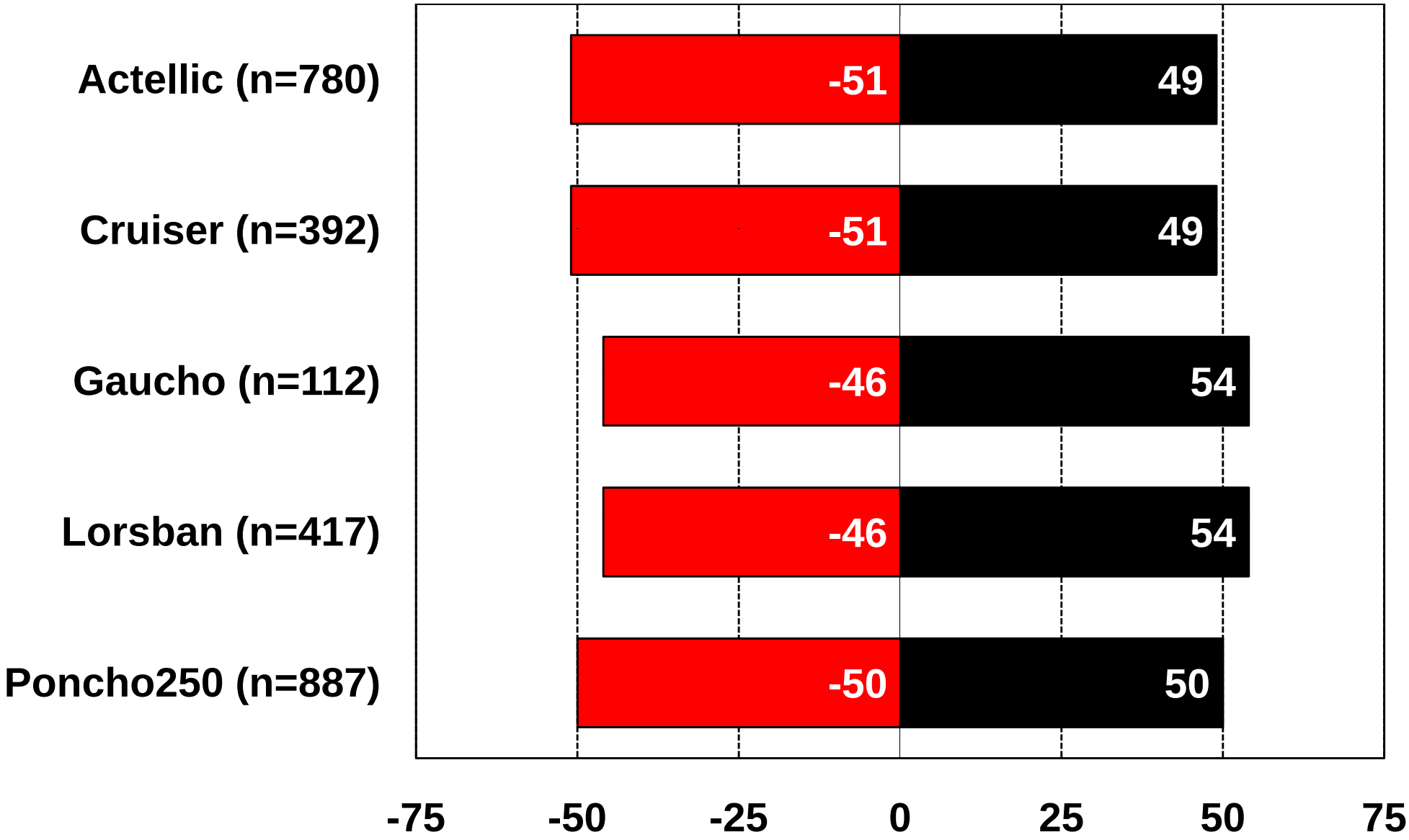
Disease	Captan	Maxim	Apron
Rhizoctonia	Good	Good	Poor
Fusarium	Good	Excellent	Poor
Pythium	Poor	Poor	Excellent
Helminthosporium	Good	Good	Poor
Penicillium	Good	Good	Poor
Aspergillus	Good	Good	Poor

derived from Pedersen, U. of Illinois

Rank Frequency of a Fungicide Seed Treatment Used Alone or in Combination Compared to the Trial Average (minimum of 100 tests in UW Hybrid Trials 2003-2004)



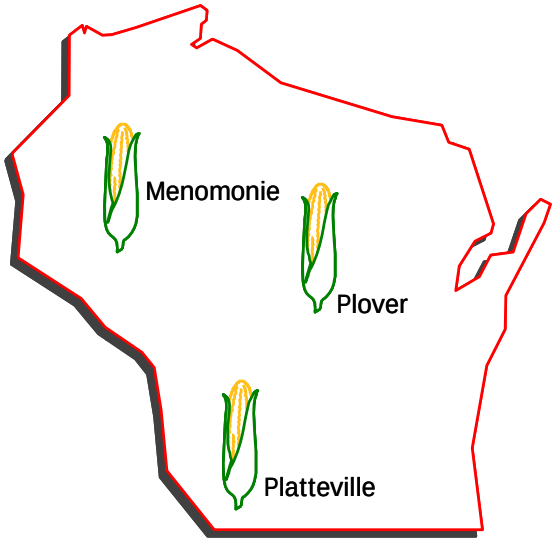
Rank Frequency of an Insecticide Seed Treatment Used Alone or in Combination Compared to the Trial Average (minimum of 100 tests in UW Hybrid Trials 2003-2004)



Summary

- **UW Corn Trials evaluate genetics rather than products**
  - ✓ Assumption: Seed treatments are applied randomly to hybrids
  - ✓ Plots are thinned to a uniform stand
- **The fungicides Maxim, Maxim XL, Apron XL, and Allegiance improved the frequency of hybrids yielding above average in the trials**
  - ✓ Strobilurins (Dynasty, Trilex, Protégé, and Quadris) do not improve the frequency of hybrids yielding above average in the trials
  - ✓ Captan is still a workhorse
- **Insecticides (Actellic, Cruiser, Gaucho, Lorsban, and Poncho250) did not improve the frequency of hybrids yielding above average in the trials**
  - ✓ Poncho1250?
- **"Stay-tuned"**

Thanks for your attention!
Questions?



Wisconsin Corn Conferences
January 10-14, 2005

WISCONSIN
Corn/Soy
EXPO

January 27-28, 2005
Kalahari Resort, Wisconsin Dells, WI