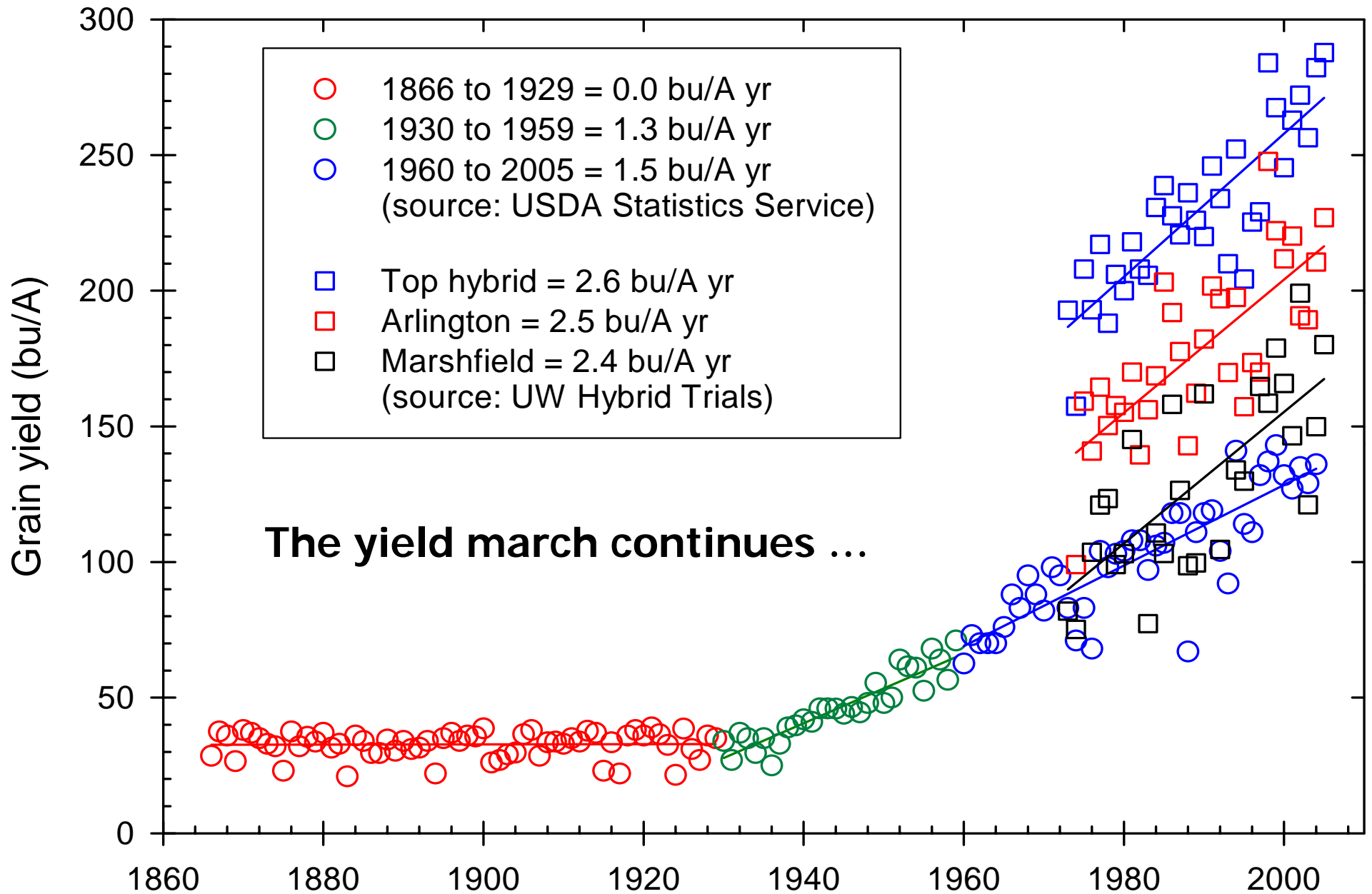


Reducing the Risk of Corn Silage Hybrid Selection

Joe Lauer
University of Wisconsin

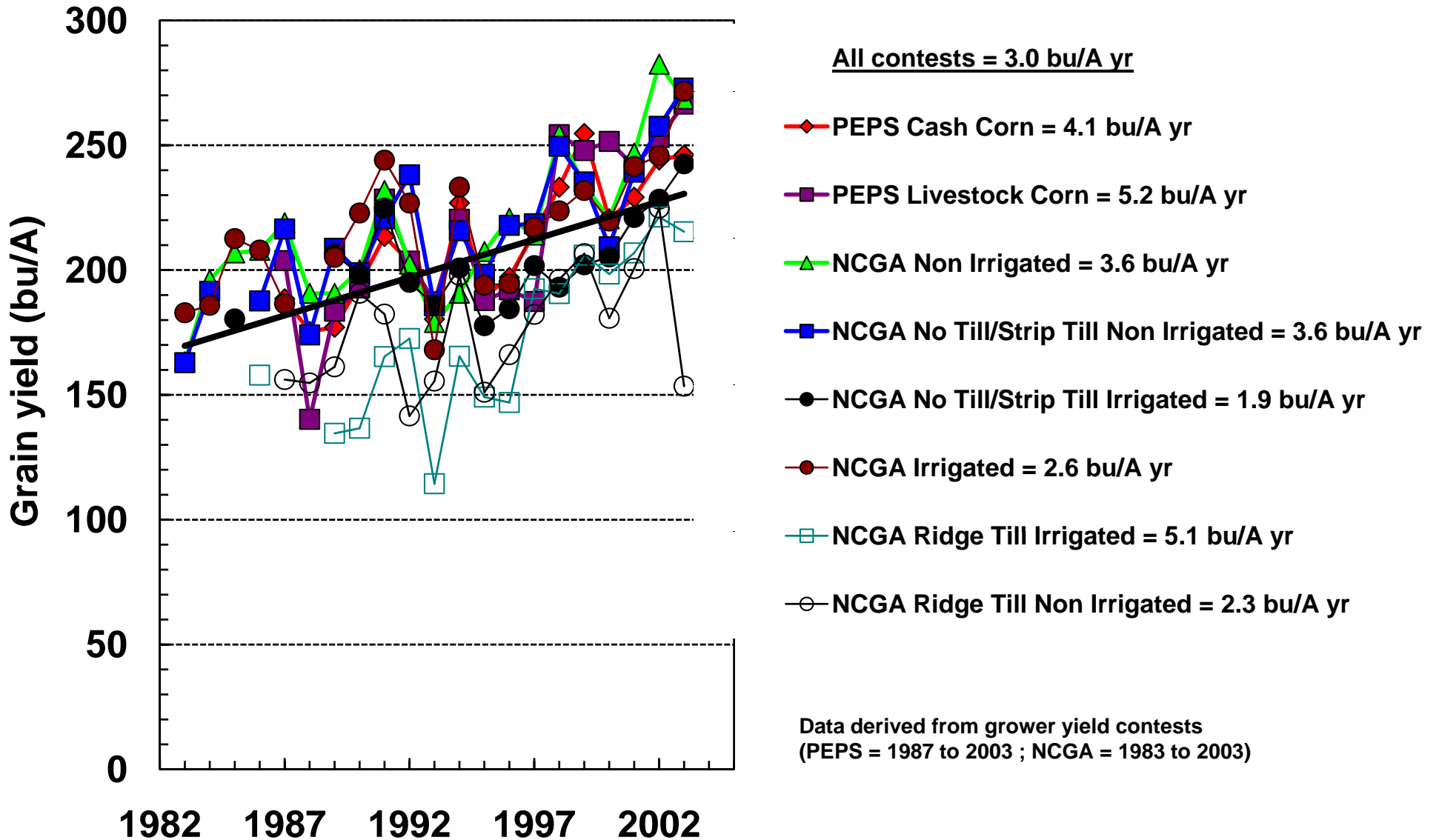
2006 Midwest Forage Association Meeting
Stoney Creek Inn, Mosinee, WI
February 1, 2006

Corn yield in Wisconsin since 1866



The yield march continues ...

Corn yield progress in Wisconsin

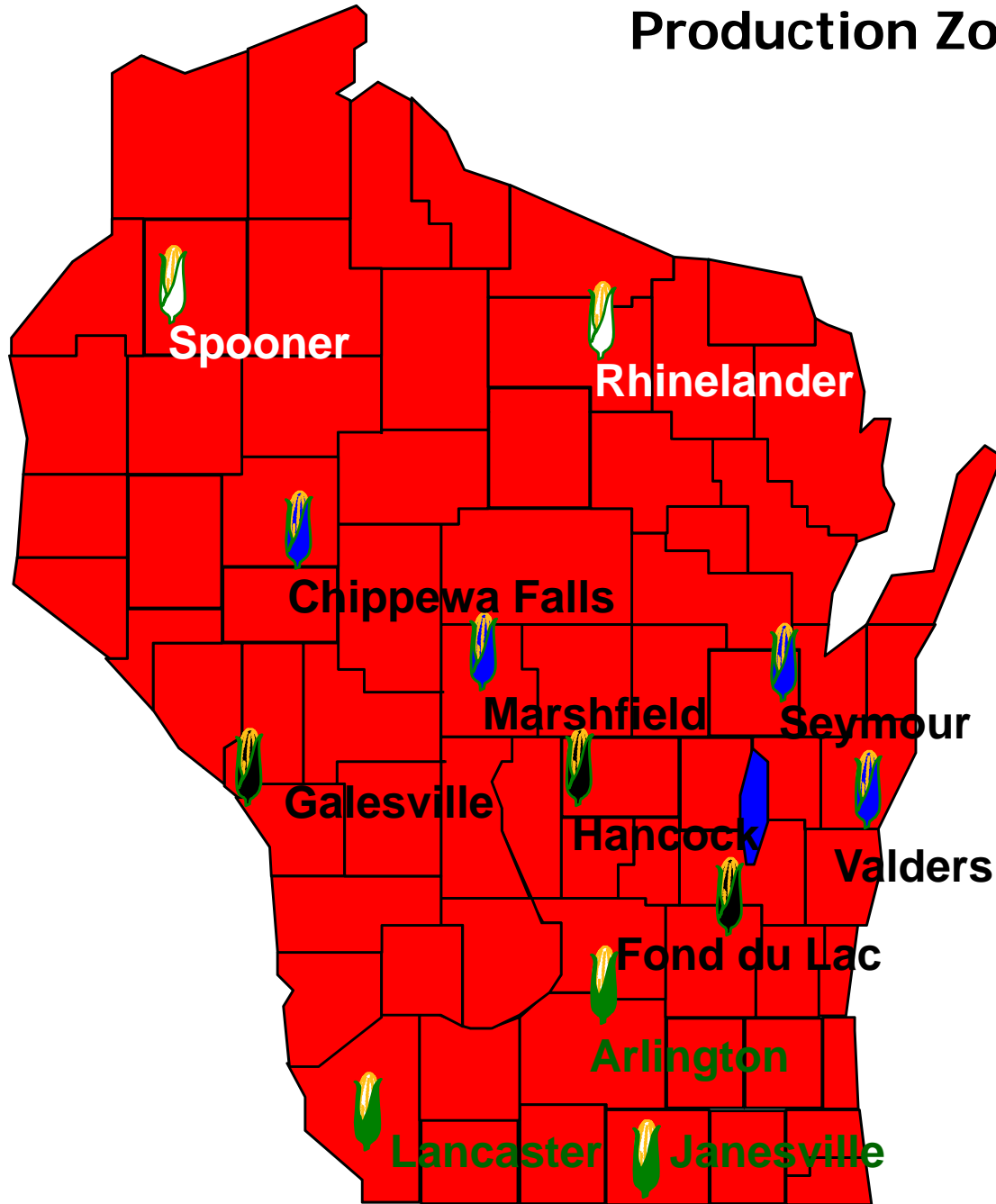


Overview

- Selecting hybrids from the UW corn silage trial program.
- How do hybrids selected this year perform the following year?
- “It is probably not worth your time to conduct your own on-farm trials.”

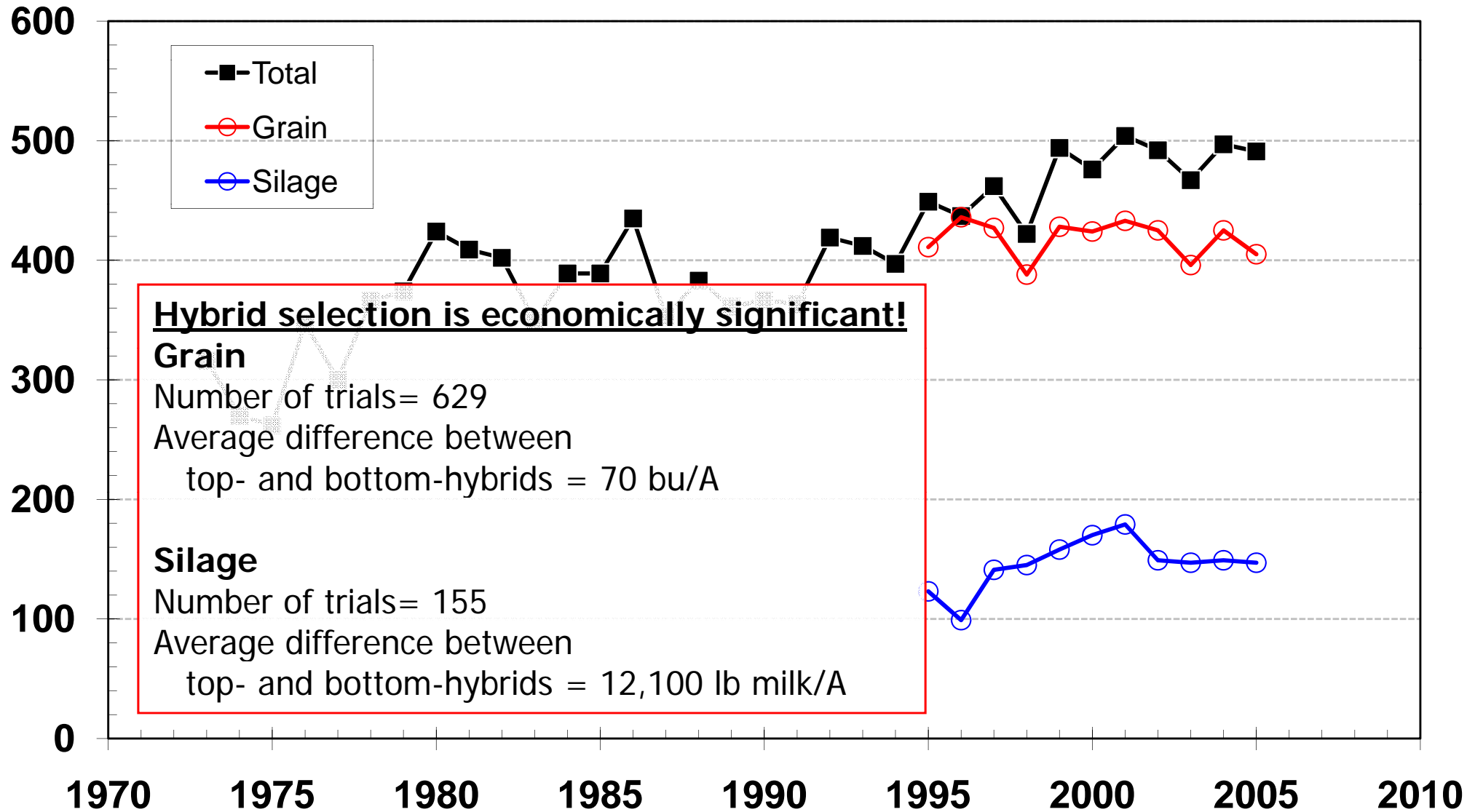


University of Wisconsin - Corn Agronomy Program Production Zones = S, SC, NC, and N



Number of hybrids tested in the UW Corn Trials

Number of hybrids



2005 Wisconsin Corn Performance Trials Silage Summary

Location	<u>1995-2004</u>		<u>2005</u>		Percent change
	N	Yield	N	Yield	
Arlington	543	9.5	56	8.9	-5
Lancaster	543	8.1	56	9.7	19
Fond du Lac	533	8.4	60	8.7	3
Galesville	538	8.6	60	10.1	17
Chippewa Falls	155	7.7	50	6.5	-15
Marshfield	543	6.8	50	7.7	13
Valders	543	6.8	50	7.4	9
Rhineland	69	6.3	22	8.7	38
Spooner	138	7.9	44	6.2	-22

Top 10 Corn Silage Hybrids in the Southern Production Zones during 2005

Hybrid	Yield	Hybrid	Yield
<u>Southern zone</u>	T/A	<u>South central zone</u>	T/A
Croplan Genetics 691BtLL	10.6	NK Brand N48-V8	10.8
OBrien OB1113Bt	10.3	Croplan Genetics 693HXLLCL	10.6
Lemke 7068Bt	10.1	Carharts Blue Top CR1960RB	10.3
Kaltenberg K8112LF	10.1	Pioneer 34M93	10.3
Renk RK684	10.1	Kaltenberg K8110LF	10.3
Renk RK684YGCB	10.1	Garst 8689IT	10.3
Dekalb DKC61-45(RR2YGCB)	10.0	Croplan Genetics DS107HXLL	10.0
Renk RK854	10.0	Crows 4908	10.0
Dekalb DKC63-62(RR2)	9.9	Golden Harvest H9006Bt	10.0
Kaltenberg K8110LF	9.7	Univ Wisconsin EX09	10.0

Bold = Normal hybrid

Top 10 Corn Silage Hybrids in the Northern Production Zones during 2005

Hybrid	Yield	Hybrid	Yield
<u>North central zone</u>	T/A	<u>Northern zone</u>	T/A
Gold Country GCS9606SLS	8.3	Pioneer 37A92	7.7
Pioneer 35D28	8.2	Garst 8921YG1RR	7.7
Pioneer 34M93	8.1	Renk RK488YGCB	7.6
Pioneer 34A86	8.1	Renk RK452LLYGCB	7.6
Golden Harvest H7990Bt	8.0	Kaltenberg K8099LFRR	7.5
NK Brand N49-E3	7.9	Pioneer 38W22	7.5
Pioneer 35Y67	7.9	Pioneer 37R70	7.5
Golden Harvest H8069Bt	7.9	Carharts Blue Top CX585Bt	7.1
Garst 8921YG1RR	7.8	Carharts Blue Top CX1857Bt	7.1
Legacy Seeds L2927Bt	7.8	NK Brand N33-H6	7.1

Bold = Normal hybrid

Picture of Silage Performance Index (Milk2000)

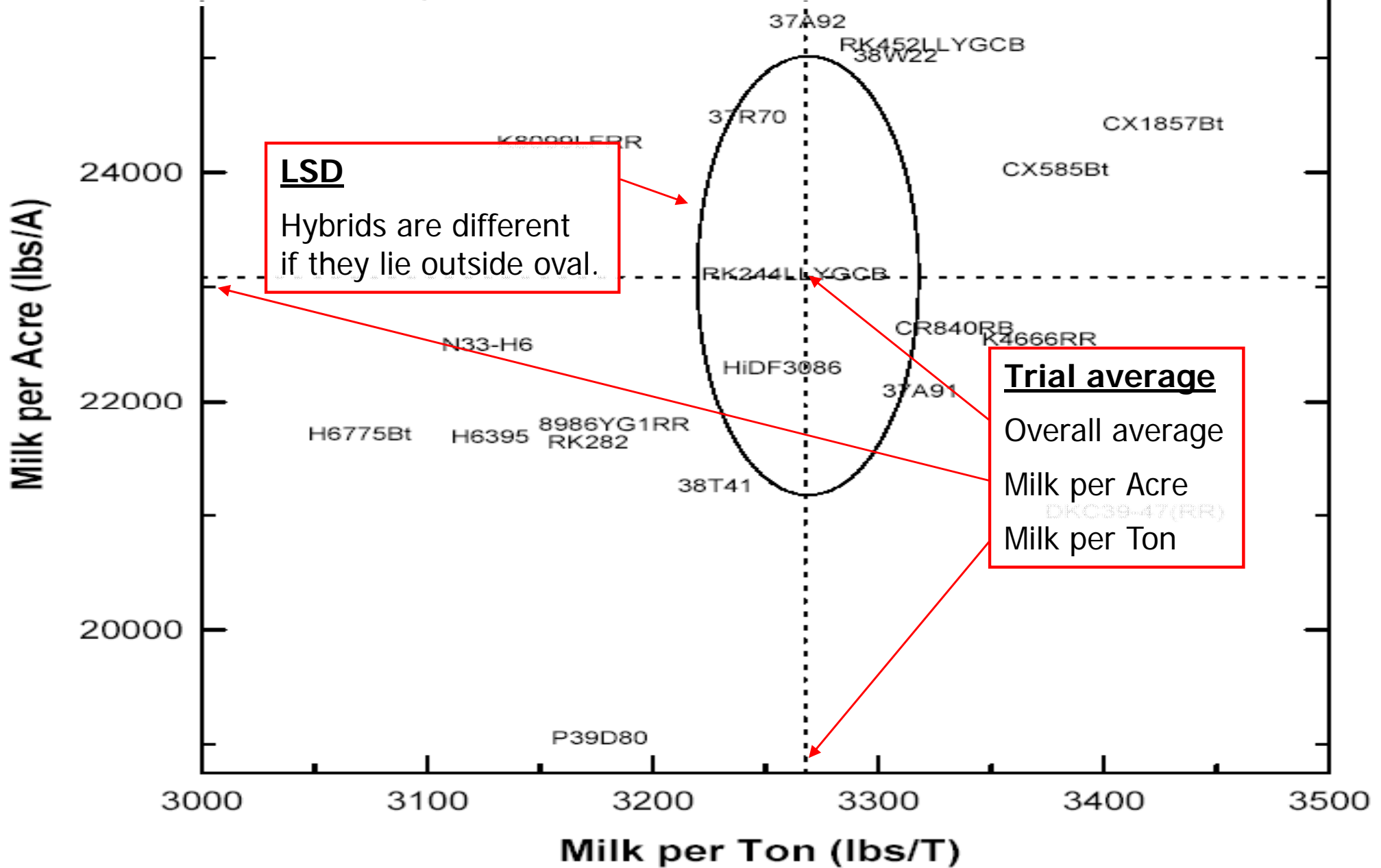


Table 1b. Companies and hybrids included in the 2005 trials. A star (*) indicates that the hybrid performed statistically similar to the highest hybrid for yield or performance index (P.I. or MILK2000) in one or more zones.

Brand Hybrid	Genes	Relative Maturity				Seed Tables	Seed Trt	Brand Hybrid	Genes	Relative Maturity				Seed Tables	Seed Trt
		Co.	MN	GRM	SRM					Co.	MN	GRM	SRM		
AgriGold A6205Bt	Bt-G	96	96	96		6	55	Cornelius C592RRYG	Bt,RR-GJ	110	109	109	5,12	46	
* AgriGold A6225BtRR	Bt,RR-GJ												5*	46	
AgriGold A6235										111	110		5	51	
AgriGold A6305Bt	Bt-G														
AgriGold A6333Bt	Bt-G												8	37	
* AgriGold A6395													8	37	
* AgriGold A6395Bt	Bt-G												8,15*	37	
AgriGold A6398													9	37	
AgriGold A6474													6,9	37	
AgriGold XA5020BtRR	Bt,RR-GJ												6,9	37	
* AgriGold XA5509Bt	Bt-G	102		106									4,6,9	37	
* Asgrow RX668RR2YGCB	Bt,RR-GJ	107		110	106								7*	37	
* Asgrow RX715RR2	RR-J	111		111									6	37	
* Brown 3000YGCB	Bt-G	90	90	90									5*	37	
* Brown 5636RR2YGCB	Bt,RR-GJ	101	101	104									5*,12*	37	
Brown 7044		112	112		111								14*	37	
Brown EX804LL	LL-D	83		84									12	37	
Brunner EXP102RR	RR-X	100											12	37	
* Brunner EXP108Bt	Bt-G	108											14	37	
Brunner Exp93		93											16	37	
Brunner S1137Bt	Bt-G	110											14	37	
Brunner S2053RR	RR-X	82											11*	37	
Brunner S2055RR	RR-J	82											5*	37	
* Brunner S3403RRBt	Bt,RR-GJ	84											14*	37	
* Bru													6*	37	
* Bru													14	37	
Bru													7	37	
Bru													5	37	
Bru															
Car													8	55	
* Carharts Blue Top CR1800RB	Bt,RR-GJ	100											9*	55	
* Carharts Blue Top CR840RB	Bt,RR-GJ	85	85	87	91	8,10,15,17*	34						7	55	
* Carharts Blue Top CX1111Bt	Bt-G	111		108	109	5,7*,12,14	34						6	54	
* Carharts Blue Top CX1857Bt	Bt-G	90		88	92	8*,10*,15*,17*	7						9	55	
* Carharts Blue Top CX1956Bt	Bt-G	95	95	95	97	6,9*,13,16	34	* Dahlco 4101Bt	Bt-G	110	104		7*	54	
* Carharts Blue Top CX585Bt	Bt-G	85		86	87	8,10*,15*,17*	34	Dahlco 4121RRBt	Bt,RR-GJ	112	111		5	55	
* Cornelius C327YG	Bt-G	101		103			4*	51	Dahlman D4215CB	Bt-G	85	85	85	8	54
* Cornelius C358RRYG	Bt,RR-GJ	102		104			4	51	* Dahlman D4515	Bt-G	90	92	89	8*	54
* Cornelius C382YG	Bt-G	104		103	101		4,11*	51	Dahlman D4801		96	96	94	9	54
* Cornelius C417YG	Bt-G	104		103			4	51	Dahlman D4815	Bt-G	95	95	94	9	54
* Cornelius C584		111		111	111		5,12	51	Dahlman R4215	RR-J	85	85	85	8	54
* Cornelius C590YG	Bt-G	110		109	111		5,12	46	Dahlman R4515	RR-J	90	90	88	8	54

Specialty Traits and Genes

- Traits
- Genes (code at bottom of page)
- WI Grain and Silage RM
 - Purpose is to verify maturity so that comparisons can be made between companies.

Stars (*): indicate hybrid was not different from the top performing hybrid in zone for yield or P.I.

- ~ 40-50% of hybrids listed in table are starred
- Use to evaluate consistency

Use multi-location
Use "The Index"

† Trait-Gene=Code: bmr-bm3=B; IMI:IT=C; LL-T25=D; Bt-ECB-Bt176=F, Mon810=G, Bt11=K, TC1507=L; RR-MonGA21=H, Nk603=J; Leafy-lfy=M; Bt-CRW-Mon863=N; Unknown-X.

List of hybrids tested in the Wisconsin Corn Performance Trials between 2003 and 2005. A star (*) indicates that the hybrid performed statistically similar to the highest hybrid for yield or performance index (P.I. or MILK2000) in one or more zones.

Brand Hybrid	Year tested	Brand Hybrid	Year tested	Brand Hybrid	Year tested	Brand Hybrid	Year tested
Access A1506RR	04	Brown 5020	03	*Cornelius C327YG	05*	*Crows 3520B	03,02,01*
Access A1597RR	04	Brown 5130YGCB	03	*Cornelius C358RRYG	05,04*	*Crows 438B	03,02,01*
Access A5405YGCB	04	Brown 5345YGCB	03	*Cornelius C382YG	05*,04*	*Crows 4903B	05*,04*
Access A5410YGCB	04	Brown 5636	03	Cornelius C406	04	*Crows 4908	05*,02*,01
Access A5503YGCB	04	*Brown 5636RR2YGCB	05*,04*	*Cornelius C417YG	05,04*,03	*Crows 4911B	04,03*
Access A8407HX	04	Brown 6079	03,02,01*	Cornelius C430YG	03*	*Crows 4S502	05*
Ag+ Seeds 5492Bt	03	Brown 6220	04,03,02	Cornelius C443YG	03	Crows SR472B	05
Ag+ Seeds 6290Bt	03	*Brown 6895YGCB	03,02,01*	Cornelius C572	03	Crows X51021RB	05
Ag+ Seeds 6387RR	04,03	*Brown 7044	05,04,03*,02,01*	Cornelius C584	05	Crows X51081B	05
AgriGold A6205Bt	05,04,03	Brown EX804LL	05	*Cornelius C590YG	05,04*,03*,02*,01*	Dahlico 2141RRBt	04
AgriGold A6225BtRR	05	Brown X48RR2	04	Cornelius C592RRYG	05	Dahlico 2147Bt	05
AgriGold A6235	05	Brown X7171YGCB	03	Cornelius C599	03	Dahlico 2288RRBt	04,02
AgriGold A6235Bt	04,03	*Brunner B2495	03,02,01*	Cornelius C605YG	03	*Dahlico 2482Bt	05*,04
AgriGold A6263	04	Brunner EX1000Bt	03	Dahlico 2055Bt	03	Dahlico 2055Bt	05,04
AgriGold A6305Bt	05,04,03	Brunner EX1000Bt	03	Dahlico 3089Bt	05	Dahlico 3089Bt	05
AgriGold A6333	04,02,01	Brunner EX1000Bt	03	Dahlico 3320Bt	05	Dahlico 3320Bt	05
AgriGold A6333Bt	05,04,03*,02*,01	Brunner EX1000Bt	03	Dahlico 4061Bt	05,04	Dahlico 4061Bt	05,04
AgriGold A6375	03	Brunner EX1000Bt	03	Dahlico 4101Bt	05*	Dahlico 4101Bt	05*
AgriGold A6395	05,03*,02*	*Brunner EX1000Bt	03	Dahlico 4241	04	Dahlico 4241	04
AgriGold A6395Bt	05,04*	*Brunner EX1000Bt	03	Dahlico 43750Bt	04	Dahlico 43750Bt	04
AgriGold A6398	05,04	Brunner S1100Bt	03	Dahlico 4413	04*	Dahlico 4413	04*
AgriGold A6454	04	Brunner S2000Bt	03	Dahlico 4413	04*	Dahlico 4413	04*
AgriGold A6474	05	*Brunner S2000Bt	03	Dahlico 4413	04	Dahlico 4413	04
AgriGold XA5020BtRR	05	Brunner S2800Bt	03	Dahman D4210CB	05	Dahman D4210CB	05
AgriGold XA5234	03	Brunner S3403RRBt	05*,04*	Dahman D4301	03,02,01	Dahman D4301	03,02,01
AgriGold XA5311Bt	04	*Brunner S3630RR	04*,03	Dahman D4411Bt.LL	04	Dahman D4411Bt.LL	04
AgriGold XA5416Bt	04	Brunner S3686Bt	04	Dahman D4501Bt	03,02	Dahman D4501Bt	03,02
AgriGold XA5509Bt	05	*Brunner S3704Bt	05*,04*	*Dahman D4515	05*,04*,03*,02*	*Dahman D4515	05*,04*,03*,02*
AgriGold XA6302	03	*Brunner S3792RRBt	05*,04*	Dahman D4547	04	Dahman D4547	04
Asgrow RX499YG	03	Brunner S3903RRBt	03	*Dahman D4747Bt	04,03*	*Dahman D4747Bt	04,03*
Asgrow RX668RR2YGCB	05	Brunner S4498	04*	Dahman D4801	05,04*,03*,02*	Dahman D4801	05,04*,03*,02*
Asgrow RX702YG	03	Brunner S4605RR	05	*Dahman D4815	05,04*,03	*Dahman D4815	05,04*,03
Asgrow RX715RR2	05	Brunner S4903Bt	04	*Dahman D5102Bt	03*,02*,01*	*Dahman D5102Bt	03*,02*,01*
Badgerland BL466	04	Brunner S4954	05	*Dahman R4215	05,04,03*	*Dahman R4215	05,04,03*
Badgerland BL484	04	*Brunner S4993	03*	Dahman R4515	05,04	Dahman R4515	05,04
Badgerland BL509Y	03	Brunner S5202	03,02	Dahman R45S15	05,03	Dahman R45S15	05,03
Baldrige Hybrids BH515	03	*Brunner S6408Bt	03,02*	Dahman R4815	05,04,03*	Dahman R4815	05,04,03*
Baldrige Hybrids BH611A	03	Brunner S8104	04	Dairyland DST10427	03	Dairyland DST10427	03
Bio Gene BG0940	04,03*	Brunner S8204	05,04	*Dairyland DST10562	04*	*Dairyland DST10562	04*
Bio Gene BG0991	04	*Carharts Blue Top CR1080RB	04*	*Dairyland DST10563	05*	*Dairyland DST10563	05*
Bio Gene BG1075	04,02	Carharts Blue Top CR1505RB	05	*Dairyland DST10832	04*	*Dairyland DST10832	04*
Bio Gene BG1111	03	*Carharts Blue Top CR1857RB	04*,03*	Dairyland HiDF3007	05	Dairyland HiDF3007	05
Bio Gene BG1119	04	*Carharts Blue Top CR1960RB	05*,04*	*Dairyland HiDF3086	05*,04	*Dairyland HiDF3086	05*,04
Bio Gene BG991	03	*Carharts Blue Top CR840RB	05*,04*,03*,02	*Dairyland HiDF3300	04,03*,02*,01	*Dairyland HiDF3300	04,03*,02*,01
Bio Gene BT1071	03,02	*Carharts Blue Top CR8500RB	03*,02*	Dairyland HiDF3600	03,02	Dairyland HiDF3600	03,02
Brown 1811YGCB	03	Carharts Blue Top CR85RR	03	*Dairyland HiDF4200	05*,04,03*,02*,01*	*Dairyland HiDF4200	05*,04,03*,02*,01*
Brown 3000YGCB	05,04,03*	Carharts Blue Top CX1057Bt	04,03	Dairyland Stealth 1089Bt	03,02,01	Dairyland Stealth 1089Bt	03,02,01
Brown 3020YGCB	04,03	Carharts Blue Top CX1080Bt	03	*Dairyland Stealth 1280	04,03,02,01*	*Dairyland Stealth 1280	04,03,02,01*
Brown 4250YGCB	04,03*	*Carharts Blue Top CX1111Bt	05*	Dairyland Stealth 1287RR	03	Dairyland Stealth 1287RR	03
Brown 4688WX	04	*Carharts Blue Top CX1505Bt	04*	*Dairyland Stealth 1297	03*,02,01*	*Dairyland Stealth 1297	03*,02,01*
Brown 4910RRYGCB	04	Carharts Blue Top CX1857Bt	05*	Dairyland Stealth 1416	03	Dairyland Stealth 1416	03
		Carharts Blue Top CX1956Bt	05,04*,03*	Dairyland Stealth 1476	04	Dairyland Stealth 1476	04
		Carharts Blue Top CX585Bt	05,04*	Dairyland Stealth 1488	05	Dairyland Stealth 1488	05
		Carharts Blue Top CX8500A	04,03,02,01*	Dairyland Stealth 1496	03,02*,01*	Dairyland Stealth 1496	03,02*,01*
				Crows 1703B	04,03		
				Crows 2192B	05,04*,03*		

Review "The History"

- Lists all hybrids tested during the previous 3 years.
- Stars (*) indicate hybrid was similar to top hybrid for performance index (P.I. or Milk2000) in one or more zones.

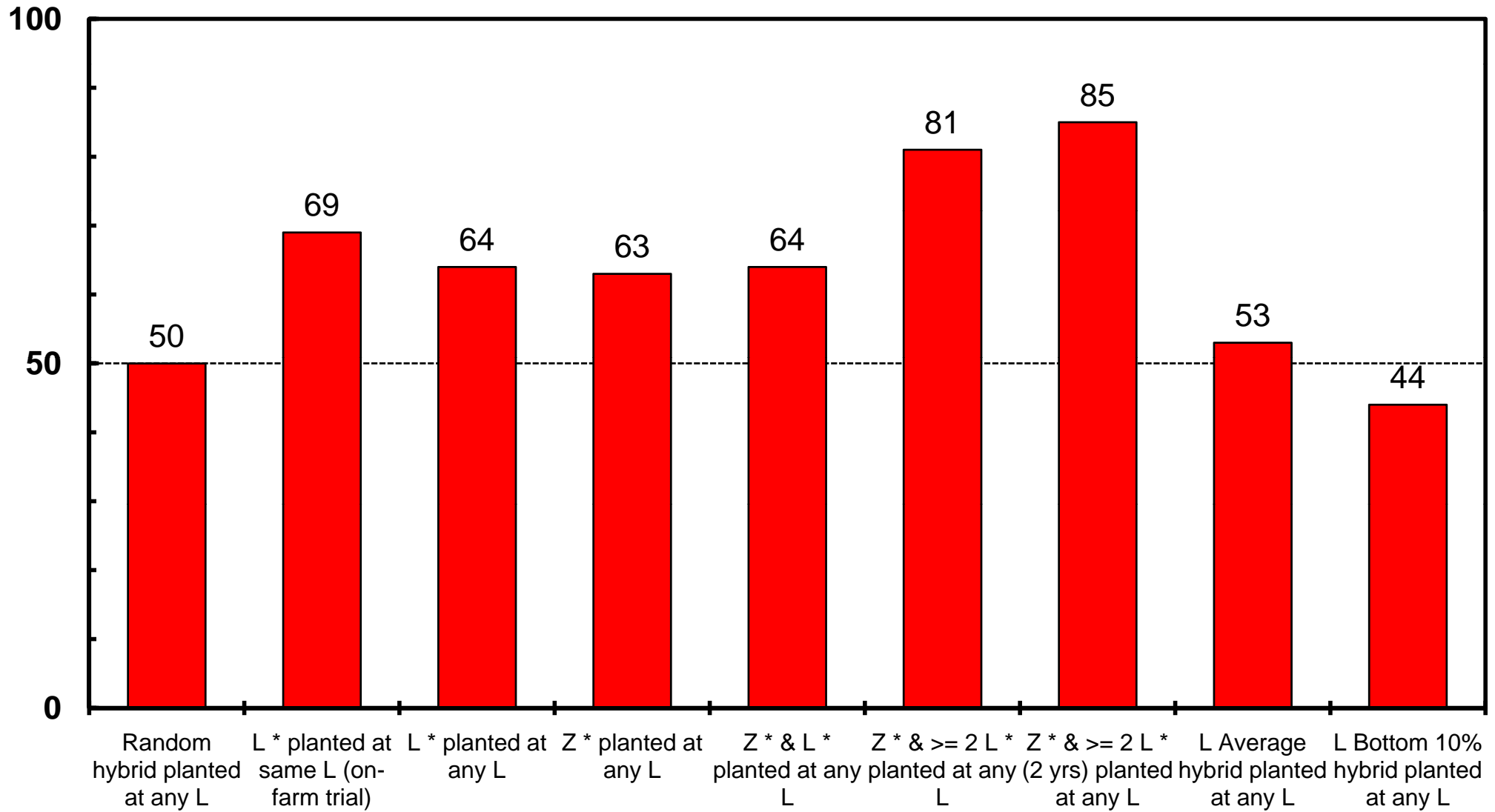
How well do the UW Silage Trials Predict next Year's Performance? Materials and Methods

- 1995 to 2005: Hybrids tested at multiple locations in zone.
- Picked hybrids based on criteria:
 - ✓ Location(s) star (*)
 - ✓ Zone star (*)
- Simulated success of selection strategies (n=64) the following year:
 - ✓ Top hybrid
 - ✓ Top three hybrids
 - ✓ Top hybrid in 3 maturity groups
 - ✓ Top 10% of hybrids
 - ✓ Average
 - ✓ Bottom 10% of hybrids



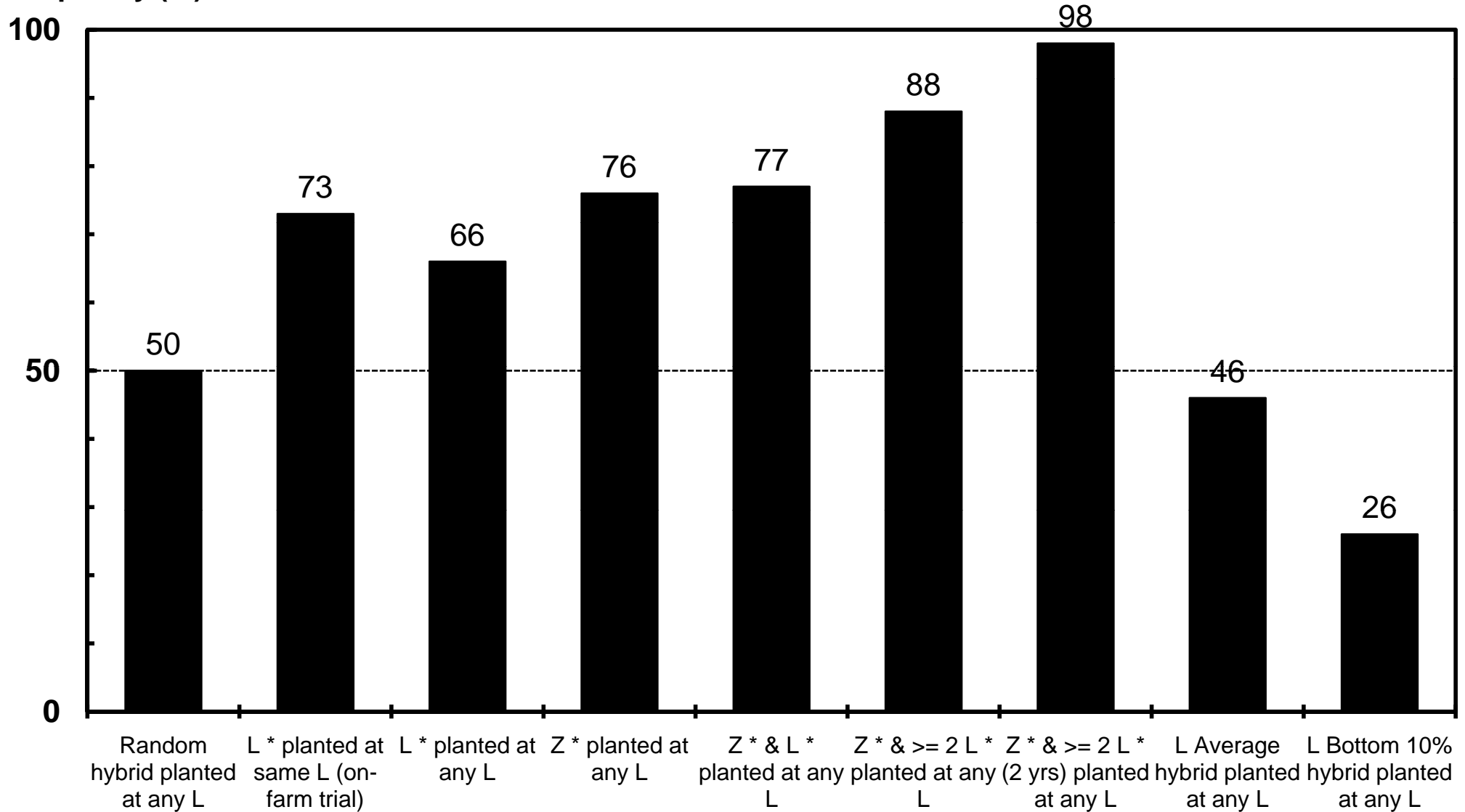
Next year's forage yield performance of a hybrid using various selection strategies. Simulated using UW Hybrid Silage Trial Results 1989-2005 (L=Location, Z=Zone)

Frequency (%)



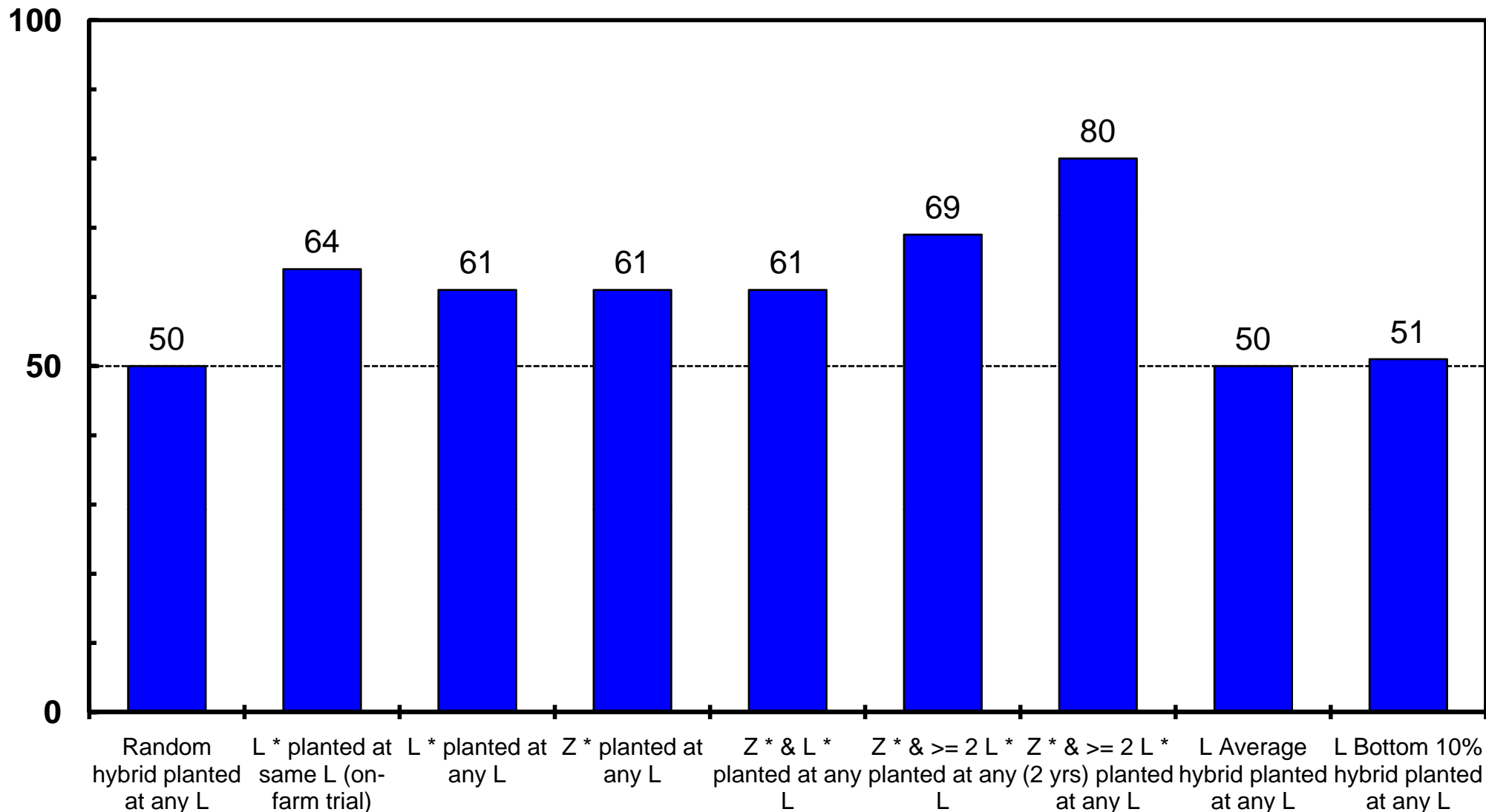
Next year's Milk per Ton performance of a hybrid using various selection strategies. Simulated using UW Hybrid Silage Trial Results 1989-2005 (L=Location, Z=Zone)

Frequency (%)



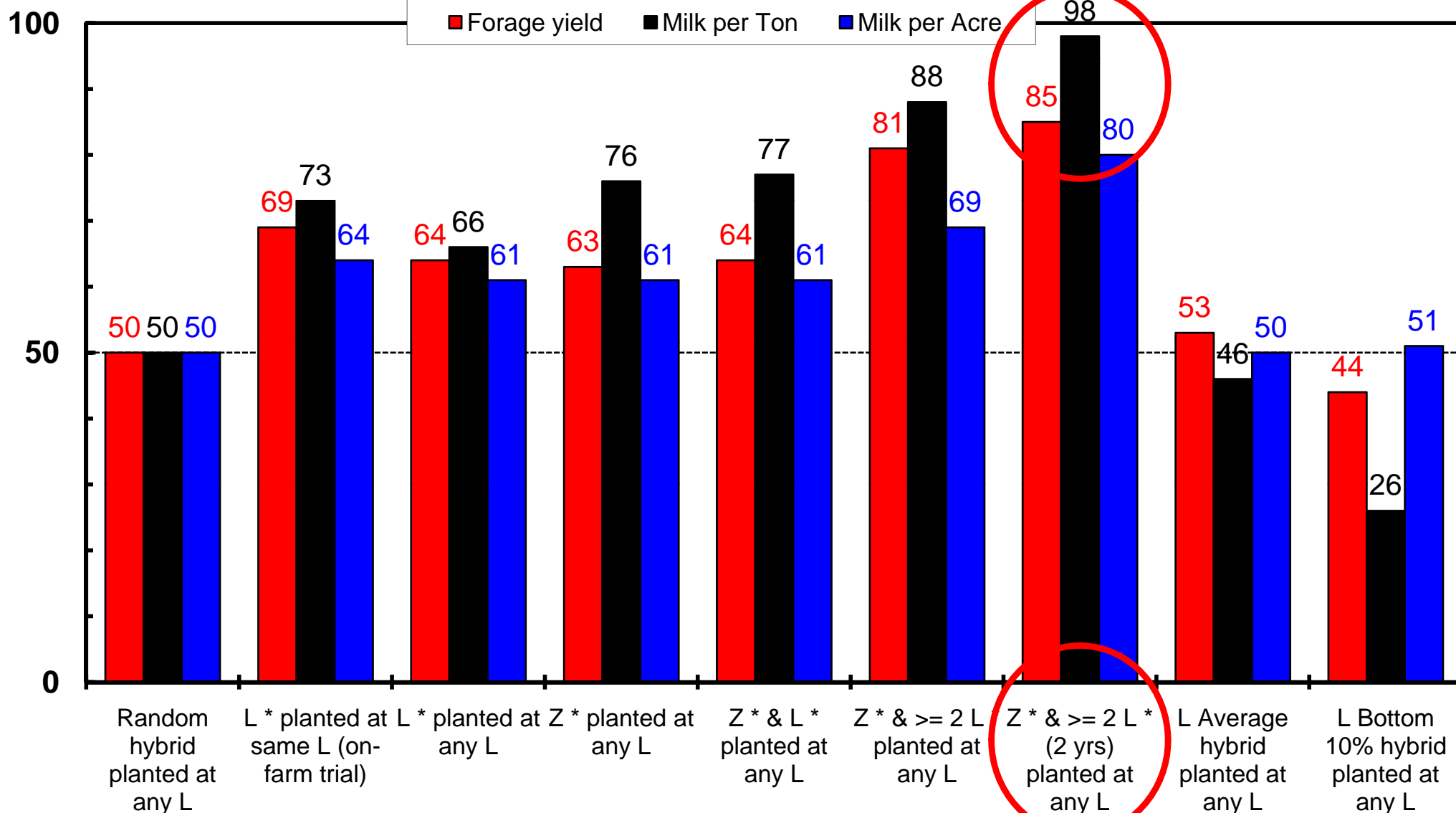
Next year's Milk per Acre performance of a hybrid using various selection strategies. Simulated using UW Hybrid Silage Trial Results 1989-2005 (L=Location, Z=Zone)

Frequency (%)

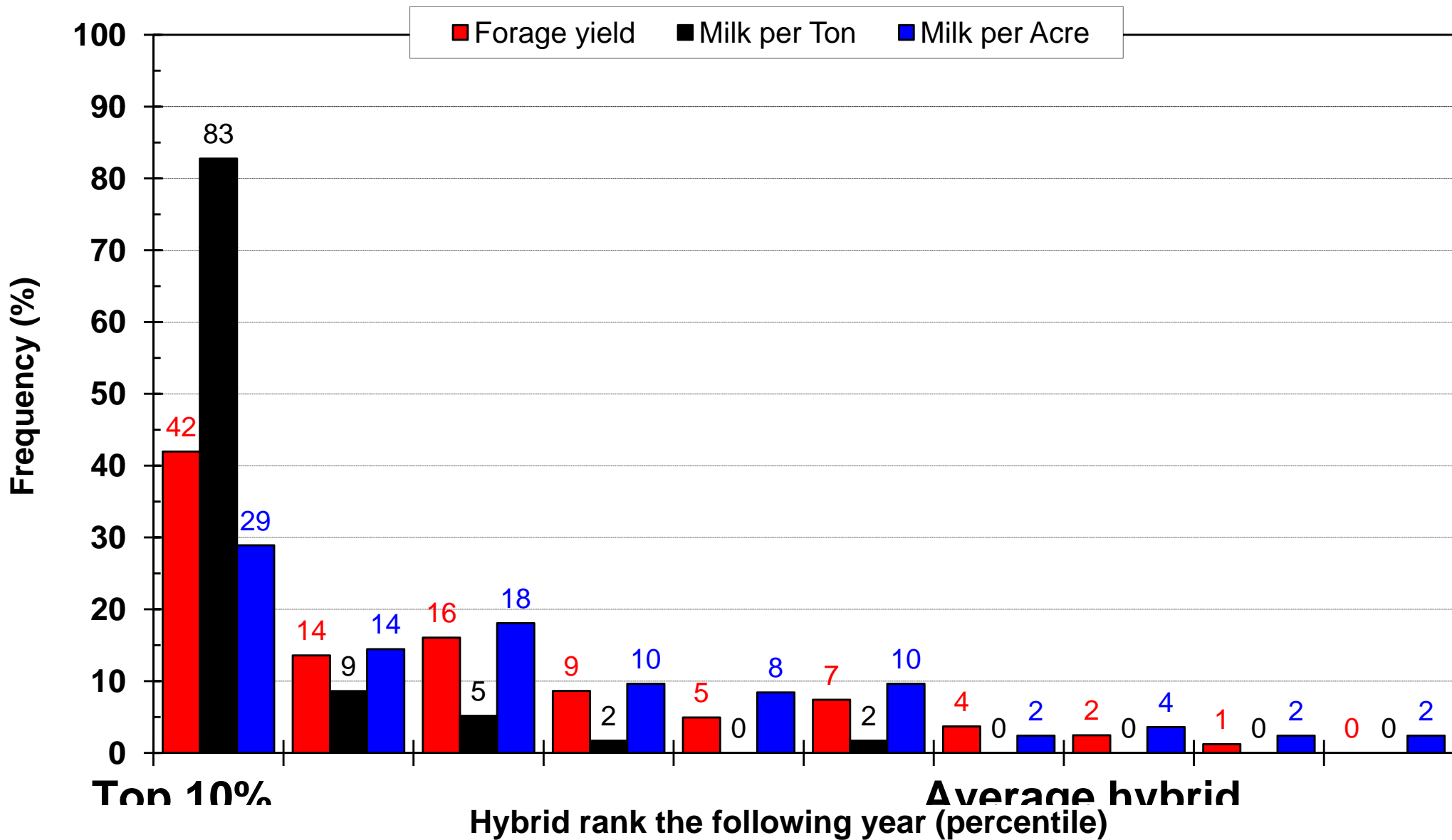


Next year's Milk per Acre performance of a hybrid using various selection strategies. Simulated using UW Hybrid Silage Trial Results 1989-2005 (L=Location, Z=Zone)

Frequency (%)



Next year's performance of a hybrid selected using a Zone * and ≥ 2 Location * for 2 years and planted at any Location.



Economic consequences of selection strategies

(Data source: UW Trials 1995 to 2005)

Selection scheme	Relative forage yield	Milk per Ton difference	Milk per Acre difference
	percent	Lb/T	Lb/A
1 L* (on-farm)	5	100	1140
Z* & \geq 2L*	8	200	1810
Z* & \geq 2L* (2 yrs)	11	280	2570
1 L average	1	-10	170
1 L bottom 10%	-3	-60	-170

Economic consequences of selection strategies over time (Data source: UW Trials 1995 to 2005)

Selection scheme	Previous years		Selected year	Future years			
	-2	-1	0	1	2	3	4
	Relative forage yield (%) difference						
1 L* (on-farm)	10	8	16	5	6	6	2
Z* & \geq 2L*	11	9	15	8	8	7	8
Z* & \geq 2L* (2 yrs)	12	12	17	11	11	10	10
1 L average	4	3	0	1	1	-1	-3
1 L bottom 10%	0	-1	-18	-3	-1	-9	-15

Summary

- Use multi-location average data.
- Preference for two or more years of data.
- Use single location data to evaluate consistency.

- Final thoughts ...
 - ✓ You are taking a tremendous gamble if basing your hybrid selection decisions on 1 or 2 local test plots
 - ✓ "Variation for yield exists among commercial hybrids in Wisconsin."
 - ❑ 70 bu/A in grain trials
 - ❑ 12,100 lb milk/A in silage trials

