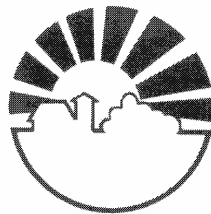


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Bulletin  
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**PERFORMANCE  
OF FORAGES IN  
INDIANA, 2000-2004**



**Department of Agronomy  
Agricultural Research Programs  
Purdue University  
West Lafayette, Indiana**

**PURDUE**  
UNIVERSITY





## Performance of Forages in Indiana, 2000-2004

Arianna McKeown, Jeremy W. Sweeten and Keith D. Johnson\*  
Department of Agronomy

### Introduction

This bulletin summarizes the results of the 2000 - 2004 yield performance tests for forage variety entries in

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\*Research agronomist, statistical consultant and Professor of Agronomy, respectively, Department of Agronomy, Purdue University, West Lafayette, IN 47907-2054

### Acknowledgments

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Questions can be directed to:

Dr. Keith D. Johnson  
Dept. of Agronomy  
Purdue University  
Lilly Hall of Life Sciences  
915 West State Street  
West Lafayette, IN 47907-2054  
E-mail: johnsonk@purdue.edu

Phone: (765) 494-4800  
FAX: (765) 496-2926

### Experimental Methods

Participating seed companies selected entries to be tested. Seed was sent to Purdue University for planting and evaluation. Commercial alfalfa entries were obtained through a seed procurement program initiated by the recommendation of the North American Alfalfa Improvement Conference. Experimental entries (i.e. experimental generations) were sent from companies to Purdue; the data from these entries are clearly marked as non-commercial entries.

Between 2000 and 2004 eight alfalfa performance trials were successfully established at the Purdue University Agronomy Center for Research and Education Center (West Lafayette). At the Feldun-Purdue Agricultural Center (Bedford) two orchardgrass and tall fescue trials were sown in August of 2002 and 2003. Smooth Bromegrass and Timothy were established in August of 2003. The test plots were seeded into conventionally prepared seedbeds. Benefin (Balan) herbicide was incorporated into the soil prior to alfalfa seeding. Alfalfa seed was inoculated with *Rhizobium* bacteria and treated with metalaxyl (Apron) fungicide. Plots were seeded with a five-row press-wheel seeder with 6-inch row spacing.

Best management practices were used in all studies. Optimum pH and fertility were provided and maintained. Alfalfa weevil and potato leafhopper were controlled, if needed, with the systemic insecticide cyfluthrin (Bathyroid 2). When necessary, control of broadleaf or grass weeds in alfalfa was accomplished with application of 4-(2,4-Dichlorophenoxy) butyric acid (Butyrac), sethoxydim (Poast) and/or imazethapyr (Pursuit) herbicides. A flail-type forage harvester was used to harvest alfalfa plots, generally in late-bud to early-flower stage, and cool-season grasses in foil-head at first harvest and 6 week intervals thereafter during the growing season. Sub-samples were obtained for dry matter determination.

### Location of Tests

**Figure 1** shows the two locations of the reported trials. The following is information about each location.

The Purdue Agronomy Research Center is located near West Lafayette in Tippecanoe

County (James J. Beaty III, superintendent). The 2000, 2003, and 2004 seeded trials are on a Rockfield silt loam soil with a 0-2 % slope (**Tables 1, 3, 4, 5, 7, 8 and 9**). The 2002 seeded trials are on a Chalmers silty clay loam on a 0-2 % slope (**Tables 2 and 6**).

At the Feldun-Purdue Agricultural Center in Lawrence County (Richard M. Huntrods, superintendent), the soil type is a Bedford silt loam with a 2 % slope (**Tables 10-15**).

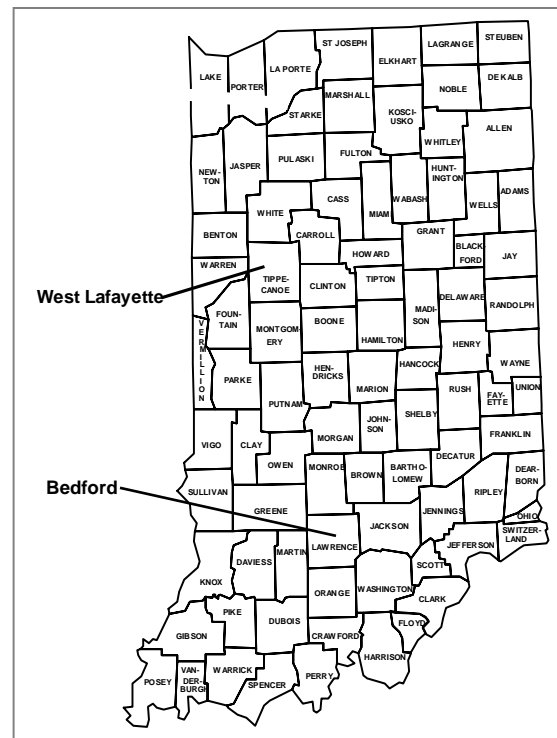
### 2000-2004 Growing Seasons

(Refer to Appendix Figure 1 and Appendix Table 2.)

#### *West Lafayette*

The 2000 seeding was damaged by a very heavy rainfall in the spring, and replanted in August. Fall rains provided good moisture levels to enter the winter season.

During the 2001 growing season there was a range of growing conditions. The spring



**Figure 1.** Locations of forage performance trials in Indiana

started out dry, but by May the rainfall average was back to normal. Below-average rainfall occurred throughout the growing season. The only seeding done this year was a replant of a potato leafhopper resistant alfalfa trial.

The 2002 growing season had extremes of rain and drought. During the spring, much of the state received an abundant amount of rainfall. The rain delayed planting and May forage harvests, but it did provide excellent yields. Precipitation in June was near normal level. As the growing season progressed, rainfall declined. This reduced forage yields of later harvests dramatically. It continued to be dry through the end of the forage production season.

In 2003, the first harvests were delayed due to the lack of rainfall in the beginning of the year. Despite this lack of precipitation, the over all yields for the year were not adversely affected as the rainfall resumed its normal pattern through the later part of the growing season. This set the trend on through to August, and resulted in satisfactory yields.

During the 2004 season, West Lafayette experienced a lack of rain in April resulting in delayed growth. However, rainfall for the rest of the season was near or above average and resulted in excellent yields for this year. September had minimum precipitation, but there was plenty of late-year rainfall going into the winter season.

### ***Bedford***

In 2003 the growing season began with an adequate amount of precipitation, though a little below normal. Above average rainfall in May was not detrimental to the grasses and yields were good. As the fall season progressed there was a good amount of

rainfall that provided adequate growth prior to winter.

In the spring of 2004, rainfall was well below normal. This caused a bit of delay in growth. Ample rainfall occurred May through July and the grasses grew at a desirable rate. August was drier than normal; however, there was adequate rainfall in the subsequent months giving an optimistic outlook for the 2005 season.

### **Presentation and Interpretation of Results**

Yields are reported as dry matter yield in tons per acre (T/A). Tables 1-8 summarize results of 2000-2004 alfalfa variety yield trials conducted, table 9 shows the results of the 2002 red clover trial, and tables 10-15 provide the results of the 2003-2004 cool-season grass yield trials.

In each table, varieties are listed in order of total yield to date. Within a column, varieties differing from each other by less than the respective LSD (least significant difference) were not significantly different from one another with a 95% certainty. Yields followed by an asterisk (\*) are not significantly different from the highest value in the column.

The CV (coefficient of variability) is the ratio of the standard deviation to the grand mean. It is a measure of the precision of the experiment. Lower CV's indicate lower error and higher precision in the trial.

Number of harvests within a year is listed at the bottom of each yield column.

Yield as percent of check is listed in the rightmost columns of the tables. The check varieties used for the alfalfa trials were 'Vernal' and '5454'. 'Arlington' was considered the red clover check. For the

cool-season grasses varieties used were: 'Climax' timothy, 'Badger' smooth brome grass, 'Kentucky 31-I' tall fescue, and 'Potomac' orchardgrass. Additionally, when appropriate, tables show percent of check in the first two years and in the cumulated years of production. This can be used as an indirect measure of persistence. Percentages that increase with time or are relatively high in the final years may be an indication of better persistence.

In 1994, the North American Alfalfa Improvement Conference recommended new guidelines to separate entries allocated from commercial and experimental seed sources. Names of entries are preceded by "X" if tested using experimental seed provided by the entrant; remaining entries were obtained from commercial seed lots. Research has shown yield tends to decrease in some breeding lines as seed progresses from a more heterozygous state in experimental generations to the commercially available generation.

Appendix Tables 3 and 5 contain listings of commercially available entries. In Appendix Table 3, reference number of the alfalfa variety's appropriate marketer(s) (in correspondence with Appendix Table 4), tables where data are found, and characterization information including fall dormancy rating and resistance ratings to bacterial wilt, verticillium wilt, fusarium wilt, anthracnose, phytophthora root rot, aphanomyces stem nematode, southern root-knot nematode and northern root-knot nematode are listed. Appendix table 5 contains a list of cool-season varieties as well as the marketer, address, phone number, and contact person as provided by the entrant company.

## How to Use Forage Performance Information

Information presented in the bulletin should be useful in selecting seed for forage production in Indiana. Here are some suggestions for using this information.

1. Select the test location (Figure 1) that best represents your production area.
2. Within a location, yield tables with the greatest number of years are probably the best predictors of performance.
3. Utilize the percent of check columns in Tables 1 through 15 to evaluate persistence.
4. For alfalfa varieties, if a particular disease problem is known in your area, check Appendix Table 3 for resistance ratings. Fall dormancy ratings of 3-5 are generally appropriate for Indiana.
5. Once your list is narrowed down, contact seed dealers listed in Appendix Tables 4 and 5 for seed availability and price.

Evaluate each part of your management system to ensure that selected varieties can express their full yield potential. The highest-yielding varieties, when mismanaged, may not produce the yield and quality of lower-yielding varieties properly managed. Seek to improve your management skills through information from available resources. The information found in this publication, as well as other helpful publications dealing with forage production can be obtained from your local Purdue Cooperative Extension Service office, from the Media Distribution Center, or at the Purdue Forage Information web site (<http://www.agry.purdue.edu/ext/forages>)

**Table 1.** 2000 Seeded West Lafayette Alfalfa Yields at the Agronomy Center for Research and Education

Entry	Dry Matter Yield (T/A)				% of Check	
	2001 total	2002 total	2003 total	01-03 total	01-02	01-03
Lightning II	7.24 *	9.73 *	9.88 *	26.85 *	126	128
DK 134	7.21 *	9.29 *	9.77 *	26.27 *	123	125
Geneva	7.22 *	9.57 *	9.39 *	26.17 *	125	125
X ZG 9840 A	7.06 *	9.50 *	9.77 *	26.34 *	123	124
4200	6.96 *	9.43 *	9.47 *	25.86 *	122	123
X CW 64026	6.76 *	9.48 *	9.57 *	25.79 *	121	123
X CW 64049	6.93 *	9.38 *	9.46 *	25.76 *	121	123
5454	6.90 *	9.66 *	8.74 *	25.33 *	123	123
X CW 94008	6.67 *	9.52 *	9.38 *	25.56 *	120	122
Laser	6.59 *	9.59 *	9.30 *	25.47 *	120	122
X CW 54033	7.04 *	9.22 *	9.16 *	25.42 *	121	121
Magnum V	6.78 *	9.58 *	8.91	25.27 *	122	121
Radiant	6.78 *	9.42 *	9.07 *	25.23 *	120	121
Winter Gold	6.95 *	8.92	9.01 *	24.90 *	118	121
X EX 99C01	6.39 *	9.45 *	9.11 *	24.95 *	118	119
X CW 74040	6.72 *	8.79	9.33 *	24.84 *	115	119
X ZC 9950 A	6.98 *	9.07	8.44	24.49	119	119
X A 30-06	6.76 *	9.17 *	8.70	24.63	118	118
X CW 64004	6.40 *	9.01	8.66	24.07	115	115
X ZC 9854 A	6.47 *	9.11	8.80	24.38	116	115
X ZC 9941 A	6.37 *	8.92	8.65	23.94	114	115
Vernal	5.60	7.85	7.42	20.77	100	100
Grand mean	6.76	9.26	9.13	25.10		
LSD (5%)	1.04	0.63	0.84	2.01		
C.V. (%)	10.78	4.84	6.57	5.63		
No. of harvests	4	4	4	12		
	6.76	9.26	9.09	25.10		

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Vernal' used to calculate % of check

Location: West Lafayette, IN

Soil Type: Rockfield silt loam

Design: Randomized block, 4 replications, 22 entries

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Seeded: August 14, 2000 with 15 lb. live seed / acre

Fertilizer: 60 lb. P<sub>2</sub>O<sub>5</sub> and 250 lb. K<sub>2</sub>O / acre applied after first and final harvest through 2003; in 2004, 69 lb. P<sub>2</sub>O<sub>5</sub> and 219 lb. K<sub>2</sub>O / acre, applied after first harvest.

Insects: Alfalfa weevil and potato leafhopper controlled by spraying

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**Table 2.** 2002 Seeded West Lafayette Alfalfa Yields at the Agronomy Center for Research and Education

<b>Entry</b>	<b>Dry Matter Yield (T/A)</b>			
	<b>2003</b>	<b>2004</b>	<b>03-04</b>	<b>% of Check</b>
	<b>total</b>	<b>total</b>	<b>total</b>	<b>03-04</b>
WL 342	8.64 *	9.53 *	18.17 *	132
GH 744	8.59 *	9.21	17.80 *	129
54V54	8.42 *	9.31 *	17.73 *	129
Enduro Ultra	8.34 *	9.30 *	17.64 *	128
WL 338 SR	8.56 *	9.05	17.61 *	128
Winter Gold	8.18 *	9.35 *	17.53 *	127
WL 319 HQ	8.24 *	9.26 *	17.50 *	127
Gold Rush	8.05 *	9.30 *	17.35	126
Reward II	8.29 *	8.96	17.25	125
Perfect	8.18 *	8.91	17.09	124
54H91	8.19 *	8.86	17.05	124
Leaf Guard	7.73	8.28	16.01	116
Vernal	6.13	7.66	13.79	100
Grand mean	8.12	9.00	17.12	
LSD (5%)	0.60	0.28	0.70	
C.V. (%)	5.13	2.17	2.85	
No. of harvests	4	4	8	

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Vernal' used to calculate % of check

Location: West Lafayette, IN

Soil Type: Chalmers silty clay loam

Design: Randomized block, 4 replications, 13 entries

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Seeded: August 20, 2002 with 15 lb. live seed / acre

Fertilizer: 60 lb. P<sub>2</sub>O<sub>5</sub> and 250 lb. K<sub>2</sub>O / acre applied after first and final harvest through 2003; in 2004, 69 lb. P<sub>2</sub>O<sub>5</sub> and 219 lb. K<sub>2</sub>O / acre, applied after first harvest.

Insects: Alfalfa weevil and potato leafhopper controlled by spraying

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**Table 3.** 2003 Seeded West Lafayette Alfalfa Yields at the Agronomy Center for Research and Education

Entry	Dry Matter Yield (T/A)			% of Check 03-04
	2003 total	2004 total	03-04 total	
54V46	3.63 *	7.62 *	11.25 *	123
WL 357HQ	3.57 *	7.61 *	11.18 *	123
HybriForce-420/Wet	3.58 *	7.54 *	11.12 *	122
DKA33-16	3.41	7.46 *	10.87 *	119
Reward II	3.59 *	7.22 *	10.81 *	119
54Q25	3.64 *	6.72	10.36	114
54H91	3.46 *	6.72	10.18	112
Regal	3.59 *	6.31	9.90	109
Vernal	2.82	6.30	9.12	100
Grand mean	3.48	7.12	10.60	
LSD (5%)	0.21	0.43	0.56	
C.V. (%)	4.04	4.15	3.63	
No. of harvests	2	4	6	

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Vernal' used to calculate % of check

Location: West Lafayette, IN

Soil Type: Rockford silt loam

Design: Randomized block, 4 replications, 9 entries

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Seeded: April 3, 2003 with 15 lb. live seed / acre

Weed Control: Post emergence application of Poast and Buctril

Fertilizer: 60 lb. P<sub>2</sub>O<sub>5</sub> and 250 lb. K<sub>2</sub>O / acre applied after first and final harvest through 2003; in 2004, 69 lb. P<sub>2</sub>O and 219 lb. K<sub>2</sub>O / acre, applied after first harvest.

Insects: Alfalfa weevil and potato leafhopper controlled by spraying

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**Table 4.** 2004 Seeded West Lafayette Alfalfa Yields at the Agronomy Center for Research and Education

Entry	Dry Matter Yield (T/A)				% of Check
	1st	2nd	3rd	2004 total	2004
HayGrazer	1.26 *	1.20 *	1.59 *	4.06 *	111
Hayblazer 444Hyb	1.15 *	1.17 *	1.52 *	3.84 *	105
Vernal	1.10 *	1.12 *	1.46 *	3.67 *	100
NOVA	1.07 *	1.13 *	1.44 *	3.63 *	99
WL 357HQ	1.10 *	1.17 *	1.37 *	3.63 *	99
Grand mean	1.14	1.16	1.48	3.77	
LSD (5%)	0.28	0.25	0.27	0.69	
C.V. (%)	15.90	13.85	11.77	11.83	
No. of harvests				3	

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Vernal' used to calculate % of check

Location: West Lafayette, IN

Soil Type: Rockford Silt Loam

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Design: Randomized block, 4 replications, 5 entries

Seeded: April 23, 2004 with 15 lb. live seed / acre

Weed Control: Post emergence application of Poast and hand weeding of small number of broadleaf weeds

Fertilizer: None required

Insects: Potato leafhopper controlled by spraying

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**Table 5.** 2001 Seeded "Potato Leafhopper No-spray" Alfalfa yields at the West Lafayette Agronomy Center for Research and Education

Entry	Dry Matter Yield T/A				% of Check	
	2002	2003	2004	02-04	02-03	02-04
	total	total	total	total		
X ZN9936	5.49 *	8.77 *	7.96 *	22.22 *	101	102
5454	5.33 *	8.79 *	7.69 *	21.81 *	100	100
X Cimarron SR	5.57 *	8.75 *	7.24	21.56 *	101	99
54H91	5.56 *	8.43 *	7.08	21.07	99	97
Grand mean	5.49	8.69	7.49	21.67		
LSD (5%)	0.67	0.48	0.53	1.06		
C.V. (%)	7.64	3.48	4.43	3.06		
No. of harvests	4	4	4	12		

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of '5454' used to calculate % of check

Location: West Lafayette, IN

Soil Type: Rockford Silt Loam

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Design: Randomized block, 4 replications, 4 entries

Seeded: August 15, 2001 with 15 lb. live seed / acre; 1.3 lb. a.i. Balan / acre, incorporated

Fertilizer: 60 lb. P2O5 and 250 lb. K2O / acre applied after first and final harvest through 2003; in 2004, 69 lb. P2O5 and 219 lb. K2O / acre, applied after first harvest.

Insects: Alfalfa weevil controlled by spraying; potato leafhopper~~not~~ controlled by spraying

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**Table 6.** 2002 Seeded "Potato Leafhopper No-spray" Alfalfa yields at the West Lafayette Agronomy Center for Research and Education

Entry	Dry Matter Yield (T/A)				2004 total	% of Check 2004
	1st	2nd	3rd	4th		
X FG 41H160	3.01	2.07 *	2.57 *	1.67 *	9.32 *	140
DKA37-20	3.24	1.94 *	2.39	1.68 *	9.24 *	139
4375LH	3.15	2.01 *	2.40	1.54	9.10 *	137
X FG 41H152	2.83	1.99 *	2.45 *	1.64 *	8.91 *	134
54H91	2.98	1.75	2.17	1.56	8.45	127
LeafGuard	3.57 *	1.45	1.57	1.50	8.08	122
Vernal	2.85	1.40	1.22	1.18	6.65	100
Grand mean	3.09	1.80	2.11	1.54	8.54	
LSD (5%)	0.31	0.21	0.16	0.09	0.60	
C.V. (%)	6.65	7.79	5.26	3.85	4.76	
No. of harvests					4	

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Vernal' used to calculate % of check

Location: West Lafayette, IN

Soil Type: Chalmers silty clay loam

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Design: Randomized block, 4 replications, 7 entries

Seeded: August 20, 2002 with 15 lb. live seed / acre; 1.3 lb. a.i. Balan / acre, incorporated

Fertilizer: 60 lb. P<sub>2</sub>O<sub>5</sub> and 250 lb. K<sub>2</sub>O / acre applied after first and final harvest through 2003; in 2004, 69 lb. P<sub>2</sub>O<sub>5</sub> and 219 lb. K<sub>2</sub>O / acre, applied after first harvest.

Insects: Alfalfa weevil controlled by spraying; potato leafhopper **not** controlled by spraying

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**Table 7.** 2003 Seeded "Potato Leafhopper No-spray" Alfalfa yields at the West Lafayette Agronomy Center for Research and Education

Entry	Dry Matter Yield T/A			% of Check 03-04
	2003 total	2004 total	03-04 total	
X CimarronVL400	2.90 *	6.91 *	9.81 *	124
WL 346LH	2.93 *	6.87 *	9.80 *	124
5454	2.70	6.89 *	9.59 *	122
54H91	2.90 *	6.53	9.43 *	120
Vernal	1.99	5.90	7.89	100
Grand mean	2.68	6.62	9.31	
LSD (5%)	0.18	0.36	0.45	
C.V. (%)	4.28	3.50	3.15	
No. of harvests	2	4	6	

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Vernal' used to calculate % of check

Location: West Lafayette, IN

Soil Type: Rockford silt loam

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Design: Randomized block, 4 replications, 5 entries

Seeded: April 3, 2003 with 15 lb. live seed / acre

Fertilizer: 60 lb. P<sub>2</sub>O<sub>5</sub> and 250 lb. K<sub>2</sub>O / acre applied after first and final harvest through 2003; in 2004, 69 lb. P<sub>2</sub>O<sub>5</sub> and 219 lb. K<sub>2</sub>O / acre, applied after first harvest.

Insects: Alfalfa weevil controlled by spraying; potato leafhopper **not** controlled by spraying

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**Table 8.** 2004 Seeded "Potato Leafhopper No-spray" Alfalfa yields at the West Lafayette Agronomy Center for Research Research and Education.

Entry	Dry Matter Yield (T/A)				% of Check 2004
	1st	2nd	3rd	2004 total	
TrailBlazer 5.0	1.40 *	1.16	1.29 *	3.86 *	139
X 42H161	1.33 *	1.21 *	1.24 *	3.78 *	136
X 42H153	1.19	1.25 *	1.23 *	3.67 *	132
Vernal	0.95	0.90	0.92	2.77	100
Grand mean	1.22	1.13	1.17	3.52	
LSD (5%)	0.17	0.09	0.18	0.28	
C.V. (%)	8.65	5.18	9.74	4.89	
No. of harvests				3	

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Vernal' used to calculate % of check

Location: West Lafayette, IN

Soil Type: Rockford silt loam

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Design: Randomized block, 4 replications, 4 entries

Seeded: April 23, 2004 with 15 lb. live seed / acre; 1.3 lb. a.i. Balan / acre, incorporated

Weed Control: Post emergence application of Poast and hand weeding of small number of broadleaf weeds

Fertilizer: None required.

Insects: Potato leafhopper not controlled by spraying

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**Table 9.** 2003 Seeded Red Clover Yields at the West Lafayette Agronomy Center for Research and Education

Entry	Dry Matter Yield T/A						% of Check 03-04
	1st	2nd	3rd	2004 total	2003 total	03-04 total	
Kenland	3.05	2.01 *	1.15 *	6.21 *	2.03 *	8.24 *	132
Cyclone	3.29 *	1.80	0.99 *	6.08 *	1.95 *	8.03 *	129
X CW3001	3.07 *	1.69	0.82	5.58	1.88 *	7.47	120
Duration	3.02	1.50	1.03 *	5.55	1.92 *	7.48	120
Arlington	2.86	1.06	0.58	4.51	1.74 *	6.24	100
Grand mean	3.06	1.61	0.91	5.59	1.90	7.48	
LSD (5%)	0.23	0.18	0.20	0.39	0.33	0.63	
C.V. (%)	4.80	7.20	14.46	4.49	11.60	5.50	
No. of harvests				3	1	4	

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Arlington' used to calculate % of check

Location: West Lafayette, IN

Soil Type: Rockford silt loam

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Design: Randomized block, 4 replications, 5 entries

Seeded: April 3, 2003 with 10 lb. live seed / acre

Weed Control: Post emergence application of Poast and Buctril

Soil Type: Rockfield silt loam

Fertilizer: 60 lb. P<sub>2</sub>O<sub>5</sub> and 250 lb. K<sub>2</sub>O / acre applied after final harvest through 2003; in 2004, 69 lb. P<sub>2</sub>O<sub>5</sub> and 219 lb. K<sub>2</sub>O / acre, applied after first harvest.

Insects: Insect control was not needed

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**Table 10.** 2002 Seeded Orchardgrass Yields at the Feldun-Purdue Agricultural Center

Entry	Dry Matter Yield (T/A)									Maturity stage at first harvest	
	1st	2nd	3rd	2004	2003	03-04	% of Check			5/19/03	5/21/04
				total	total	total	03-04				
Warrior	4.54 *	0.97 *	2.40 *	7.91 *	6.27 *	14.18 *	110			R2.8	R4.1
X OG9705G	4.08 *	1.11 *	2.30 *	7.48 *	6.56 *	14.04 *	109			R3.8	R4.5
Icon	4.24 *	1.08 *	2.39 *	7.71 *	6.18 *	13.89 *	108			R2.5	R4.8
Tekapo	4.08 *	1.03 *	2.40 *	7.51 *	5.80	13.31	103			R3.5	R4.1
Potomac	3.65	1.06 *	2.08 *	6.79	6.07	12.86	100			R3.3	R4.4
Grand mean	4.12	1.05	2.31	7.48	6.18	13.66					
LSD (5%)	0.49	0.17	0.37	0.61	0.45	0.86					
C.V. (%)	7.48	10.55	10.24	5.20	4.58	4.01					
No. of harvests				3	3	6					

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Potomac' used to calculate % of check

Location: Bedford, IN

Soil Type: Bedford silt loam

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Design: Randomized block, 4 replications, 5 entries

Seeded: August 2002

Fertilizer: 100, 50 and 50 lb, of N/acre applied in March and after the 1st and 2nd harvest, respectively

Insects: Insect control was not needed

Terms used in reporting primary growth stages of perennial grasses

Elongation

E3 Third node palpable / visible

E4 Fourth node palpable / visible

Reproductive

R0 Boot Stage

R1 Inflorescence (seed head) emergence / first spikelet visible

R2 Spikelets fully emerged / peduncle (portion of stem directly below seed head) not emerged

R3 Inflorescence emerged / peduncle fully emerged

R4 Anther emergence / anthesis (pollen shedding)

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**Table 11.** 2003 Seeded Orchardgrass Yields at the Feldun-Purdue Agricultural Center

Entry	Dry Matter Yield (T/A)				% of Check 2004	Maturity stage at	Foliar Disease:
	1st	2nd	3rd	2004 total		5/21/04	5/21/04 (1=Clean, 9=All diseased)
X Mammoth	3.97 *	1.80 *	2.53 *	8.30 *	107	R5	4.25
X Shilo II	3.87 *	1.74 *	2.52 *	8.13 *	105	R5	4.75
X Command	3.88 *	1.66 *	2.32 *	7.86 *	102	R2	4.25
Potomac	3.55 *	1.74 *	2.45 *	7.74 *	100	R5	5.25
X Niva	3.55 *	1.77 *	2.38 *	7.70 *	99	R2	4.00
X CIS-OG 4	3.69 *	1.70 *	2.28	7.66	99	R4	4.00
Grand mean	3.75	1.74	2.41	7.90			
LSD (5%)	0.45	0.26	0.22	0.61			
C.V. (%)	7.88	9.83	5.99	5.10			
No. of harvests				3			

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Potomac' used to calculate % of check

Location: Bedford, IN

Soil Type: Bedford silt loam

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Design: Randomized block, 4 replications, 6 entries

Seeded: August 2003

Fertilizer: 100, 50 and 50 lb, of N/acre applied in March and after the 1st and 2nd harvest, respectively

Insects: Insect control was not needed

Terms used in reporting primary growth stages of perennial grasses

Elongation

E3 Third node palpable / visible

E4 Fourth node palpable / visible

Reproductive

R0 Boot Stage

R1 Inflorescence (seed head) emergence / first spikelet visible

R2 Spikelets fully emerged / peduncle (portion of stem directly below seed head) not emerged

R3 Inflorescence emerged / peduncle fully emerged

R4 Anther emergence / anthesis (pollen shedding)

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**Table 12.** 2002 Seeded Tall Fescue Yields at the Feldun-Purdue Agricultural Center

Entry	Dry Matter Yield (T/A)						% of Check 03-04	Maturity stage at first harvest	
	1st	2nd	3rd	2004	2003	03-04		5/19/03	5/21/04
				total	total	total			
Kentucky 31-I	4.21 *	1.15	2.24 *	7.61 *	8.21	15.81 *	100	R2	R3.8
Tuscany II	3.97 *	1.31 *	2.27 *	7.55 *	8.02	15.57 *	98	R2	R4
Kentucky 31 - NI	4.19 *	1.11	2.17 *	7.47 *	7.83	15.30 *	97	R2	R4
X KYFA9304	3.58	1.19	2.14 *	6.90	8.37	15.27 *	97	R2	R4
KYFA9301	3.87 *	1.09	2.13 *	7.10 *	8.01	15.10 *	96	R2	R4
Duo	3.36	0.60	1.32	5.28	9.41 *	14.68	93	R4	R3
Quantum	3.42	1.31 *	2.15 *	6.89	7.32	14.21	90	R3.5	S0
X K5666V	3.01	1.03	2.14 *	6.18	7.17	13.36	85	R2.5	R3
X Q4508	3.29	1.32 *	2.05	6.66	6.95	13.60	86	R3.5	R5
X AGRFA 111	3.25	1.00	2.10 *	6.35	6.81	13.16	83	R2	R4
Grand mean	3.62	1.11	2.07	6.8	7.81	14.61			
LSD (5%)	0.35	0.11	0.25	0.51	0.69	1.01			
C.V. (%)	6.62	6.94	8.43	5.13	6.07	4.77			
No. of harvests				3	3	6			

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Kentucky 31-I' used to calculate % of check

Location: Bedford, IN

Soil Type: Bedford silt loam

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Design: Randomized block, 4 replications, 10 entries

Seeded: August 2002

Fertilizer: 100, 50 and 50 lb, of N/acre applied in March and after the 1st and 2nd harvest, respectively through

Insects: Insect control was not needed

Terms used in reporting primary growth stages of perennial grasses

Elongation

E3 Third node palpable / visible

E4 Fourth node palpable / visible

Reproductive

R0 Boot Stage

R1 Inflorescence (seed head) emergence / first spikelet visible

R2 Spikelets fully emerged / peduncle (portion of stem directly below seed head) not emerged

R3 Inflorescence emerged / peduncle fully emerged

R4 Anther emergence / anthesis (pollen shedding)

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**Table 13.** 2003 Seeded Tall Fescue Yields at the Feldun-Purdue Agricultural Center

Entry	Dry Matter Yield (T/A)					% of Check 2004	Maturity stage at first harvest 5/21/04
	1st	2nd	3rd	2004 total			
X Stockman	4.13	* 1.68	2.76	* 8.57	* 103	R5	
Kentucky 31-NI	4.21	* 1.53	2.66	* 8.40	* 101	R4	
X CIS-FFT 25	3.76	* 1.83	* 2.85	* 8.43	* 101	R4.5	
X CIS-FFT 24	3.63	1.91	* 2.76	* 8.30	* 100	R5	
Kentucky 31-I	4.24	* 1.47	2.60	* 8.31	* 100	R4	
X Kora	4.03	* 1.72	* 2.57	* 8.33	* 100	R4.5	
Jesup MaxQ	4.15	* 1.15	2.70	* 8.00	* 96	R4	
X Hoedown	3.53	1.62	2.64	7.78	94	R4	
Grand mean	3.96	1.61	8.69	8.27			
LSD (5%)	0.43	0.20	0.18	0.61			
C.V. (%)	7.39	8.34	4.63	4.98			
No. of harvests				3			

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Kentucky 31-I' used to calculate % of check

Location: Bedford, IN

Soil Type: Bedford silt loam

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Design: Randomized block, 4 replications, 8 entries

Seeded: August 2003

Fertilizer: 100, 50 and 50 lb, of N/acre applied in March and after the 1st and 2nd harvest, respectively

Insects: Insect control was not needed

Terms used in reporting primary growth stages of perennial grasses

Elongation

E3 Third node palpable / visible

E4 Fourth node palpable / visible

Reproductive

R0 Boot Stage

R1 Inflorescence (seed head) emergence / first spikelet visible

R2 Spikelets fully emerged / peduncle (portion of stem directly below seed head) not emerged

R3 Inflorescence emerged / peduncle fully emerged

R4 Anther emergence / anthesis (pollen shedding)

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**Table 14.** 2003 Seeded Bromegrass Yields at the Feldun-Purdue Agricultural Center

Entry	Dry Matter Yield (T/A)				2004 total	% of Check 2004	Maturity stage at first harvest 5/21/04
	1st	2nd	3rd				
York	3.92 *	1.87 *	2.05 *	7.84 *	142	R4	
Manchar	3.67 *	1.91 *	2.00 *	7.59 *	138	R4	
X Bigfoot	3.73 *	1.33	2.05 *	7.11 *	129	R3	
X AC Knowles	3.50 *	1.34	2.03 *	6.87	125	R4	
Badger	2.57	1.10	1.83 *	5.51	100	R4	
Grand mean	3.48	1.51	1.99	6.98			
LSD (5%)	0.66	0.20	0.29	0.81			
C.V. (%)	12.25	8.58	9.58	7.56			
No. of harvests				3			

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Badger' used to calculate % of check

Location: Bedford, IN

Soil Type: Bedford silt loam

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Design: Randomized block, 4 replications, 5 entries

Seeded: August 2003

Fertilizer: 100, 50 and 50 lb, of N/acre applied in March and after the 1st and 2nd harvest, respectively

Insects: Insect control was not needed

Terms used in reporting primary growth stages of perennial grasses

Elongation

E3 Third node palpable / visible

E4 Fourth node palpable / visible

Reproductive

R0 Boot Stage

R1 Inflorescence (seed head) emergence / first spikelet visible

R2 Spikelets fully emerged / peduncle (portion of stem directly below seed head) not emerged

R3 Inflorescence emerged / peduncle fully emerged

R4 Anther emergence / anthesis (pollen shedding)

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**Table 15.** 2003 Seeded Timothy Yields at the Feldun-Purdue Agricultural Center

Entry	Dry Matter Yield (T/A)				2004 total	% of Check 2004	Maturity stage at first harvest 5/21/04
	1st	2nd	3rd				
Clair	3.87	1.75 *	3.34 *		8.95 *	151	R3
Aurora	4.38 *	1.51	2.40		8.29	140	R0
X Dolina	4.17 *	1.34 *	2.19		7.70	130	E5
Tuukka	3.76	0.96	2.03		6.75	114	E4
Climax	2.76	1.06	2.09		5.91	100	R1
Grand mean	3.79	1.32	2.41		7.52		
LSD (5%)	0.44	0.17	0.36		0.47		
C.V. (%)	7.49	8.26	9.64		4.05		
No. of harvests					3		

Entries with names preceded by "X" were tested using experimental seed that may not give performance identical to commercially available seed.

Yields followed by an asterisk (\*) are not significantly different from the highest yield in the column.

Yield of 'Climax' used to calculate % of check

Location: Bedford, IN

Soil Type: Bedford silt loam

Plots: Five rows, 2.5' x 20', (harvested 2.5' x 15')

Design: Randomized block, 4 replications, 5 entries

Seeded: August 2003

Fertilizer: 100, 50 and 50 lb, of N/acre applied in March and after the 1st and 2nd harvest, respectively

Insects: Insect control was not needed

Terms used in reporting primary growth stages of perennial grasses

Elongation

E3 Third node palpable / visible

E4 Fourth node palpable / visible

Reproductive

R0 Boot Stage

R1 Inflorescence (seed head) emergence / first spikelet visible

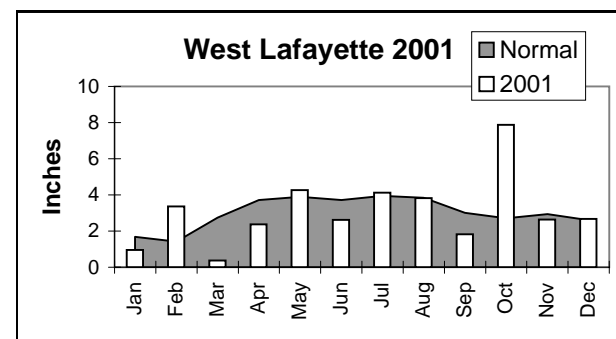
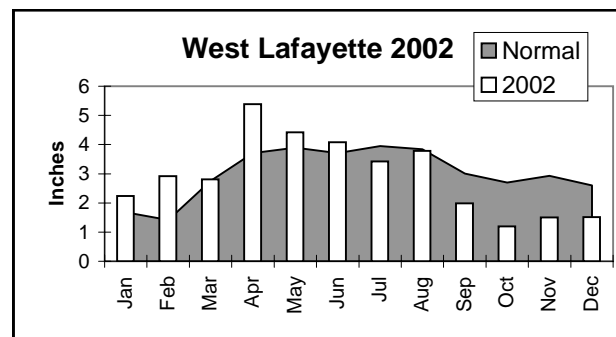
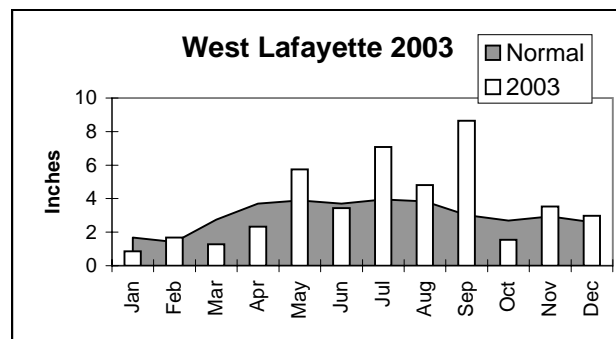
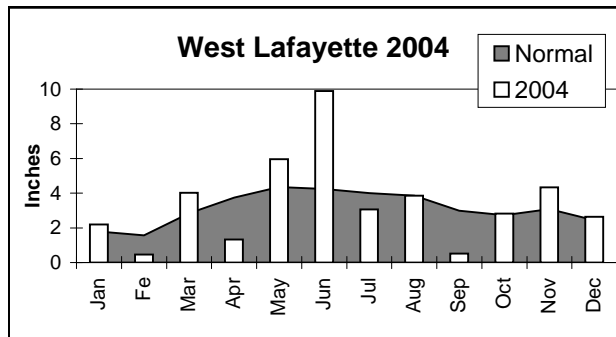
R2 Spikelets fully emerged / peduncle (portion of stem directly below seed head) not emerged

R3 Inflorescence emerged / peduncle fully emerged

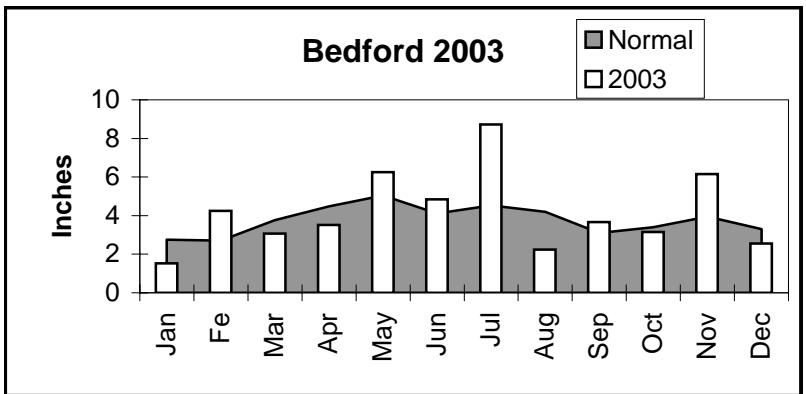
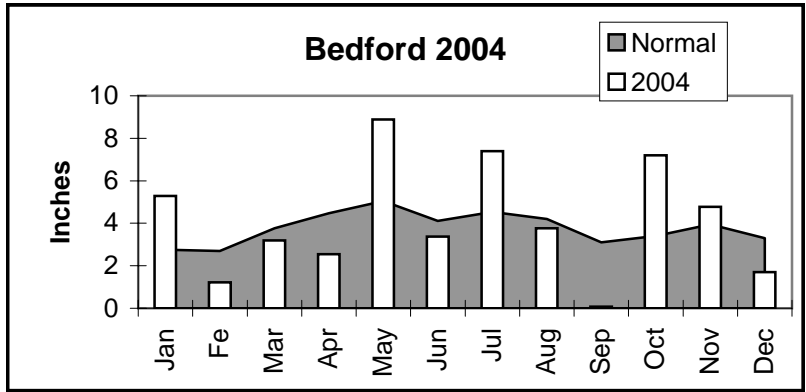
R4 Anther emergence / anthesis (pollen shedding)

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**Appendix Figure 1.** 2001-2004 Total Monthly Precipitation (inches) for the West Lafayette Agronomy Center for Research and Education. Normal denotes 30 year average from 1971-2000.



**Appendix Figure 2.** 2003-2004 Total Monthly Precipitation (inches) for the Feldun-Purdue Agricultural Center.



Normal Denotes 30 year average from 1971-2000

**Appendix Table 1.** Hay Statistics for Indiana and the United States, 2001-2004

	<b>Acres for Harvest, thousands</b>				<b>Yield, tons/acre<sup>†</sup></b>			
	2001	2002	2003	2004	2001	2002	2003	2004
<b>Indiana</b>								
All Hay	610	600	650	640	3.36	2.66	6.40	7.10
Alfalfa Hay	330	280	350	350	4.00	3.30	3.80	4.10
Other Hay	280	320	300	290	2.60	2.10	2.60	3.00
<b>United States</b>								
All Hay	63,511	64,497	63,342	63,342	2.47	2.34	5.27	5.73
Alfalfa Hay	23,812	23,135	23,578	23,578	3.37	3.19	3.24	3.48
Other Hay	39,699	41,362	39,764	39,764	1.93	1.87	2.03	2.25

<sup>†</sup> Does not include yield harvested by grazing or removed as silage.

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**Appendix Table 2.** Monthly normal average of daily temperatures and deviations from normal for West Lafayette, Indiana, 2001 - 2004

	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
<b>West Lafayette</b>												
<u>Normal</u>	<u>23.0</u>	<u>26.7</u>	<u>37.1</u>	<u>50.1</u>	<u>60.7</u>	<u>70.0</u>	<u>73.6</u>	<u>71.4</u>	<u>65.2</u>	<u>53.5</u>	<u>40.5</u>	<u>29.0</u>
2001	-0.9	-4.3	1.1	-6.3	-4.4	0.4	-0.3	-2.3	2.2	-0.8	10.4	6.0
2002	9.7	6.7	-1.1	2.2	-1.5	6.6	3.0	2.6	5.0	-1.3	-1.8	1.1
2003	-4.6	-3.3	3.9	2.9	-0.3	-2.0	0.9	2.1	-1.7	-0.7	4.2	3.8
2004	0.1	1.3	6.6	2.8	4.4	-1.4	-2.7	-4.4	0.7	0.0	44.5	27.6

<sup>†</sup> Data not available at time of data collection.

**Appendix Table 3.** Monthly normal average of daily temperatures and deviations from normal for Bedford, Indiana, 2003 - 2004

	<b>Jan</b>	<b>Feb</b>	<b>Mar</b>	<b>Apr</b>	<b>May</b>	<b>Jun</b>	<b>Jul</b>	<b>Aug</b>	<b>Sep</b>	<b>Oct</b>	<b>Nov</b>	<b>Dec</b>
<b>Bedford</b>												
<u>Normal</u>	<u>27.7</u>	<u>32.0</u>	<u>41.9</u>	<u>52.1</u>	<u>62.1</u>	<u>70.9</u>	<u>74.9</u>	<u>73.3</u>	<u>66.0</u>	<u>54.0</u>	<u>43.5</u>	<u>32.6</u>
2003	3.6	5.4	-1.8	-3.1	0	3.7	0.8	-1.8	1.5	-0.2	-3.7	-3.0
2004	0.8	0.5	-3.9	-2.1	-5.6	-0.1	2.2	3.3	-2.5	2.7	5.3	-1.2

<sup>†</sup> Data not available at time of data collection.

**Appendix Table 3. Commercially Available Entries<sup>1</sup>**

Entry	Marketer(s) <sup>2</sup>	Data Tables	FD <sup>3</sup>	BW	VW	FW	AN	PRR	APH	SN	SRKN	NRKN
4200	10	1	-	-	-	-	-	-	-	-	-	-
4375 LH	10	6	4	HR	HR	HR	HR	HR	HR	R	-	-
5454	13	1,5,7	4	R	MR	HR	HR	HR	LR	MR	-	-
54Q25	13	3	4	HR	HR	HR	HR	HR	R	HR	-	HR
54V46	13	3	4	R	HR	HR	HR	HR	R	MR	-	HR
54V54	13	2	4	HR	HR	HR	HR	HR	MR	LR	-	-
54H91	13	2,3,5,6,7	4	HR	HR	R	HR	HR	R	MR	-	MR
A 30-06	1	1	3	HR	HR	HR	HR	HR	HR	-	-	-
Cimarron SR	15,16	5	4	HR	HR	HR	HR	HR	MR	R	R	-
Cimarron VL 400	15,16	7	4	HR	R	HR	HR	HR	MR	R	MR	-
DKA33-16	9	3	3	HR	HR	HR	HR	HR	HR	-	-	R
DKA 37-20	9	6	4	HR	HR	HR	HR	HR	R	MR	-	-
DK134	9	1	3	HR	HR	HR	HR	HR	HR	LR	-	R
Enduro Ultra	4	2	3.8	HR	R	HR	HR	HR	HR	R	-	-
Geneva	9,11	1	4	HR	HR	HR	HR	HR	HR	R	-	-
GH 744	14	2	4	HR	HR	HR	HR	HR	HR	MR	-	-
Gold Rush	3	2	4	HR	R	HR	R	R	R	-	-	-
Hayblazer 444Hyb	8	4	4	HR	R	HR	HR	HR	R	R	-	-
HayGrazer	15,16	4	4	HR	R	HR	R	R	MR	R	R	MR
HybriForce-420/Wet	6	3	4	HR	R	HR	R	HR	R	HR	-	HR
Laser	6	1	4	HR	R	HR	R	HR	MR	-	MR	-
Leaf Guard	3	2,6	3	HR	HR	R	R	HR	R	-	-	-
Lightning II	9	1	4	HR	R	HR	HR	HR	HR	MR	-	-
Magnum V	6	1	4	HR	R	HR	R	HR	MR	R	-	MR
Nova	15,16	4	4	HR	R	HR	R	HR	R	R	-	-
Perfect	7	2	4	HR	HR	HR	HR	HR	HR	R	-	-
Radiant	2,4	1	4	HR	HR	HR	HR	HR	HR	R	-	-
Regal	15,16	3	5	HR	R	HR	R	HR	MR	HR	MR	-
Reward II	12	2,3	4	HR	R	HR	R	HR	R	R	-	HR
TrailBlazer 5.0	5	8	4	-	-	-	-	-	-	-	-	-
Vernal	Public	1,2,3,4,6,7,8	2	R	-	MR	-	-	-	-	-	MR
WL 319 HQ	4,17	2	3	HR	HR	HR	HR	HR	HR	MR	-	-
WL 338SR	4,17	2	4	HR	R	HR	HR	HR	HR	-	-	-
WL 342	4,17	2	4	HR	HR	HR	HR	HR	HR	R	-	-
WL 346LH	4,17	7	4	HR	HR	HR	HR	HR	R	MR	-	-
WL 357 HQ	4,17	3,4	5	HR	HR	HR	HR	HR	HR	-	-	-
Winter Gold	3	1,2	4	HR	HR	HR	HR	HR	HR	R	-	-

<sup>1</sup> Entries not in this list are experimental or do not have a designated marketer

<sup>2</sup> Marketer numbers correspond with the marketer list (Appendix Table 4).

<sup>3</sup> Information obtained from entrant companies or from the National Alfalfa Alliance's 2004/2005 edition of Winter Survival, Fall Dormancy & Pest Resistance Ratings for Alfalfa Varieties . This information has not been verified by Purdue University. A dash (-) indicates that variety is susceptible, has not been adequately tested or no information was provided.

FD=Fall Dormancy (higher numbers = less dormant)

BW=Bacterial Wilt

VW=Verticillium Wilt

FW=Fusarium Wilt

AN=Anthracnose

PRR=Phytophthora Root Rot

APH=Aphanomyces Root Rot

SN=Stem Nematode

SRKN=Southern Root Knot Nematode

NRKN=Northern Root Knot Nematode

Pest resistance ratings	
% Resistant plants	Resistance class
0-5	S Susceptible
6-14	LR Low Resistance
15-30	MR Medium Resistance
31-50	R Resistant
>50	HR High Resistance

**Appendix Table 4.** Alfalfa Marketer Contact Information

1. ABI Alfalfa  
1870 Backbone Rd. West  
P.O. Box 404  
Princeton, IL 61356  
800-873-2532  
Gene Lind
2. AMPAC Seed Company  
403 Wooster Road  
Winona Lake, IN 46590  
574-268-9549  
Dave Robinson  
dave@ampacseed.com
3. Beck's Superior Hybrids  
6767 E. 276th St.  
Atlanta, IN 46031  
800-937-2325  
Lee Rulon  
www.beckshybrids.com
4. CISCO  
602 North Shortridge Rd  
Indianapolis, IN 46219  
1-800-888-2986  
Steve Houghton  
www.ciscoseeds.com
5. Croplan Genetics  
P.O. Box 64406, MS 7455  
St. Paul, MN 55164-0406  
800-851-8810  
Dennis Gehler  
www.croplangenetics.com
6. Dairyland Seed Company  
P.O. Box 958  
West Bend, WI 53095  
800-236-0163  
Michael Velde  
www.dairylandseed.com
7. Grassland Central  
16690 Greystone Lane  
Jordan, MN 55352  
952-492-2990  
Dallas Grekoff
8. Hoffman Seed House  
200 East 4th St.  
Hoffman, IL 62250  
Mike Hanenberger  
618-495-2617
9. Monsanto  
3100 Sycamore Rd.  
DeKalb, IL 60115  
815-758-9323  
Diane Freeman  
www.farmsource.com
10. Mycogen Plant Sciences  
9330 Zionsville Road  
308 3E352  
Indianapolis, IN 46268  
317-337-4007  
Ed Nintz  
www.mycogen.com
11. Novartis Seeds, Inc.  
7500 Olson Memorial HWY  
Goldent Valley, MN 55427  
612-593-7395  
Jim Beck
12. PGI Alfalfa, Inc.  
2700 Camino del Sol  
Oxnard, CA 93030  
866-744-5710  
Brenda Severson  
[brenda.severson@seminis.com](mailto:brenda.severson@seminis.com)
13. Pioneer Hi-Bred Intl.  
14171 Carole Drive  
Bloomington, IL 61704  
800 950-3489  
Greene, Danny  
danny.greene@pioneer.com
14. Sommer Bros.  
P.O. Box 248  
Pekin, IL 61555-0248  
309-346-2127  
www.goldenharvestseeds.com
15. Spink Seed Company, LLC  
10430 Mapledale Road  
Horton, MI 49246  
517-563-8548  
Harold Spink
16. Jeremy Sweeten  
4816 N 400 E  
Peru, IN 46970  
(765) 985-3746  
jmsweeten@myvine.com
17. W-L Research, Inc.  
P.O. Box 8112  
Madison, WI 53708-8112  
1-800-406-7662  
Mike Peterson

**Appendix Table 5.** List of Marketers for the Cool-season Grasses and Red Clover Varieties Evaluated.

Species / Variety	Marketer
Bromegrass	
Badger	Public
Bigfoot	Grassland Oregon, and Grassland West
Manchar	Public
York	Ampac Seed
Orchardgrass	
Command	Seed Research of Oregon
Icon	Seed Research of Oregon
Potomac	Public
Shilo II	ProSeeds Marketing
Tekapo	The CISCO Companies
Warrior	The CISCO Companies
Red Clover	
Arlington	Public
Cyclone	Byron Seed Supply
Duration	The CISCO Companies
Kenland	Public
Timothy	
Aurora	The CISCO Companies
Clair	The CISCO Companies
Climax	Ampac Seed
Tuukka	The CISCO Companies
Tall Fescue	
Duo	The CISCO Companies
Kentucky 31-I	Public
Kentucky 31 - NI	Public
Jesup MaxQ	Annington Seed, Inc
Tuscany II	Seed Research of Oregon
Quantum	The CISCO Companies

Annington Seed, Inc.  
PO Box 290  
Madison, GA 30650  
800-286-6100  
Chris Agee

Byron Seed Supply  
9820 N 740 E  
Marshall IN 47859  
765-435-7243

Seed Research of Oregon  
27630 Llewellyn Road  
Corvallis, OR 97333  
Ken May  
800-253-5766

AMPAC Seed Company  
403 Wooster Road  
Winona Lake, IN 46590  
574-268-9549  
Dave Robinson  
[dave@ampacseed.com](mailto:dave@ampacseed.com)

The CISCO Companies  
602 North Shortridge Rd  
Indianapolis, IN 46219  
800-888-2986  
Steve Houghton  
[www.ciscoseeds.com](http://www.ciscoseeds.com)

ProSeeds Marketing  
13963 Westside Lane S.  
Jefferson, OR 97352  
(541)928-9999  
Craig Edminster

Grassland Oregon  
P.O. Box 21630  
Keizer, OR 97307  
503-566-9900  
Don Baune

Grassland West  
908 Port Drive  
Clarkston, WA 99403-1845  
509-758-9100  
Brad Styner