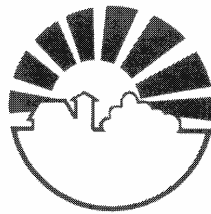


**November 2002  
Bulletin  
B-817**

**PERFORMANCE  
OF ALFALFA IN  
INDIANA, 1999-2002**



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

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## Performance of Alfalfa in Indiana, 1999-2002

Jeremy W. Sweeten and Keith D. Johnson\*

Department of Agronomy

### Introduction

This bulletin summarizes the results of the 1999 - 2002 yield performance tests for alfalfa variety entries in In-

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

### Acknowledgments

We appreciate the help of the personnel of the Pinney Purdue Agricultural Center, the Agronomy Research Center and Brad Shelton, and others that have assisted in these studies. We would like to thank the Indiana Agricultural Statistics Service for the data used in Appendix Table 1. Also, we would like to thank the Applied Meteorology Group in the Purdue Agronomy Department for the information included in Appendix Figures 1, 2, and 3 and Appendix Table 2 of this bulletin.

Questions can be directed to:

Jeremy Sweeten  
Dept. of Agronomy  
Purdue University  
Lilly Hall of Life Sciences  
915 West State Street  
West Lafayette, IN 47907-2054  
E-mail: [sweetenj@purdue.edu](mailto:sweetenj@purdue.edu)

Phone: (765) 494-5825  
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 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 1999 and 2002 Purdue University successfully established five alfalfa performance trials at three locations across Indiana; however, the data from the trial at Butlerville will not be presented because the stand experienced heaving and died during late winter of 2002. The test plots were seeded into conventionally prepared seedbeds. Benefin (Balan) herbicide was incorporated into the soil prior to seeding. 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 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 plots, generally in late-bud to early-flower stage. 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.

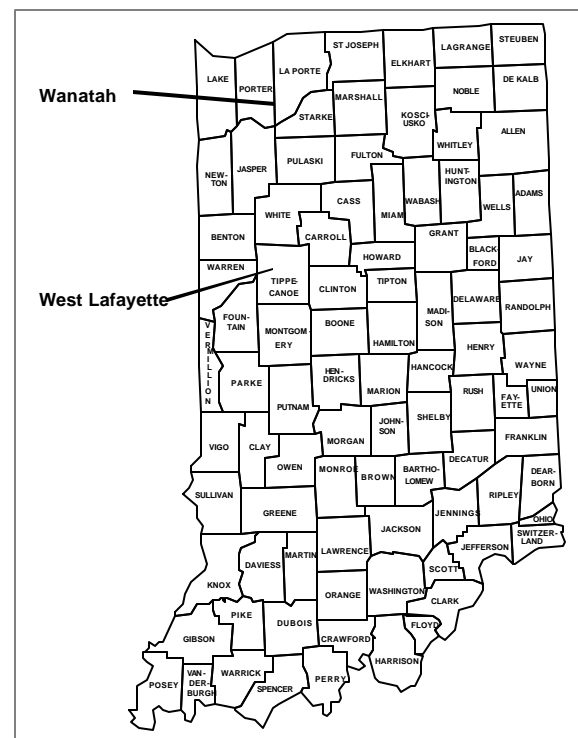
The Pinney Purdue Agricultural Center is located near Wanatah in Porter and LaPorte Counties (Jon D. Leuck, superintendent). The study seeded in 1999 (**Table 1 and 4**) is on a Sebawa loam soil on a 0-2% slope, formed in loamy glacial outwash.

The Purdue Agronomy Research Center is located near West Lafayette in Tippecanoe County (James J. Beaty III, superintendent). The 1999 and 2000 seeded trials are on a Rockfield silt loam soil with a 0-2 % slope (**Tables 2, 3, and 5**).

### 1999-2002 Growing Seasons

(Refer to Appendix Figures 1 and Appendix Table 2 for more information.)

The 1999 season started out excellently at most sites, with seeding of new plots completed in a timely fashion. Excessive rainfall damaged the emerging stand at the West Lafayette site enough that it was destroyed and was re-seeded in the spring of 2000. After the first harvest, rainfall diminished and later developed into extreme drought at all sites. The water-holding capacity of the Rockford and Sebawa soil series became a factor in the regrowth of the



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

alfalfa plants. Due to the differences in soil type and the lack of adequate rainfall, both sites had low harvest numbers. The shortage of soil moisture continued through the fall season, leaving the plots very dry going into the winter months.

The spring of 2000 started with very favorable planting conditions at all sites. With the greatly reduced entry numbers, only the Lafayette location was seeded. The 1999 Lafayette trial replant was successful, but the 2000 seeding was damaged by a very heavy rainfall, and replanted in August. With the variability of weather patterns across the state; the Wanatah site was only harvested three times, and the West Lafayette site was harvested four times. 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 started out dry, but by May the rainfall average was back to normal. The West Lafayette locations received below average rainfall throughout the growing season, while the Wanatah location received average rainfall. The only seeding done this year was a replant of "PLH No-spray" at West Lafayette.

The 2002 growing season has 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 levels. As the growing season progressed, rainfall levels declined and much of the state experienced drought. This reduced forage yields of later harvests dramatically. It continued to be dry up through the end of the forage production season.

## **Presentation and Interpretation of Results**

Yields are reported as dry matter yield in tons per acre (T/A). Tables (1-5) summarize results of 1999-2002 alfalfa variety yield trials conducted in Indiana.

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 variety used was Vernal. Additionally, 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 Table 3 contains a listing of commercially available entries, reference number of their 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, and root-knot nematode.

Appendix Table 4 lists marketer, address, phone number, and contact person as provided by the entrant company and referenced in Appendix Table 3.

### **How to Use Alfalfa Performance Information**

Information presented in the bulletin should be useful in selecting alfalfa 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 3 to evaluate persistence.
4. If a particular disease problem is known in your area, check Appendix Table 3 for resistance ratings. Fall dormancy ratings of 2-4 are generally appropriate for Indiana.
5. Once your list is narrowed down, contact seed dealers listed in Appendix Table 4 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. Helpful publications dealing with forage production can be obtained from your local Purdue Cooperative Extension Service office, from the Media Distribution Center, or found at <http://www.agry.purdue.edu/ext/forages>

For more information on other forages such as red clover, orchardgrass, tall fescue, smooth brome grass, and timothy, please visit the following Web site, <http://www.agry.purdue.edu/ext/forages>

**Table 1.** 1999 Seeded Wanatah Alfalfa Yields at the Pinney-Purdue Agricultural Center

| Entry            | Dry Matter Yield (T/A) |        |         |        |         | % of Check |       |
|------------------|------------------------|--------|---------|--------|---------|------------|-------|
|                  | 1999                   | 2000   | 2001    | 2002   | 99-02   | 99-00      | 99-02 |
|                  | total                  | total  | total   | total  | total   |            |       |
| ABT 350          | 1.32 *                 | 7.85 * | 10.40 * | 8.69 * | 28.26 * | 132        | 126   |
| WL327            | 1.36 *                 | 7.63 * | 10.68 * | 8.17 * | 27.84 * | 130        | 124   |
| 53Q60            | 1.37 *                 | 7.93 * | 9.78    | 8.10 * | 27.18 * | 134        | 121   |
| Awesome          | 1.36 *                 | 7.85 * | 10.30 * | 7.36   | 26.87 * | 133        | 119   |
| Rocket           | 1.09 *                 | 7.41 * | 10.43 * | 7.94   | 26.87 * | 123        | 119   |
| FQ 315           | 1.22 *                 | 7.70 * | 10.01 * | 7.87   | 26.80 * | 129        | 119   |
| DK141            | 1.37 *                 | 7.55 * | 10.16 * | 7.63   | 26.71 * | 129        | 119   |
| Samurai          | 1.37 *                 | 7.42 * | 9.90    | 7.88   | 26.57 * | 127        | 118   |
| Amerigraze 401+Z | 1.34 *                 | 7.26 * | 10.17 * | 7.72   | 26.49 * | 124        | 118   |
| 6420             | 1.05                   | 7.36 * | 10.02 * | 7.87   | 26.30   | 121        | 117   |
| Cimarron SR      | 1.25 *                 | 7.56 * | 9.45    | 7.82   | 26.08   | 127        | 116   |
| Affinity +Z      | 1.26 *                 | 7.22 * | 9.73    | 7.71   | 25.92   | 122        | 115   |
| DK 140           | 1.17 *                 | 7.03   | 9.64    | 7.99   | 25.83   | 118        | 115   |
| Winter Gold      | 0.92                   | 7.17 * | 9.70    | 7.56   | 25.35   | 117        | 113   |
| Emperor          | 1.38 *                 | 7.19 * | 9.17    | 7.43   | 25.17   | 124        | 112   |
| DK 134           | 1.01                   | 7.06 * | 9.40    | 7.26   | 24.73   | 116        | 110   |
| Vernal           | 1.00                   | 5.93   | 8.81    | 6.75   | 22.49   | 100        | 100   |
| Grand mean       | 1.22                   | 7.33   | 9.83    | 7.76   | 26.13   |            |       |
| LSD (5%)         | 0.31                   | 0.90   | 0.77    | 0.61   | 1.85    |            |       |
| C.V. (%)         | 18.05                  | 8.60   | 5.50    | 5.56   | 4.97    |            |       |
| No. of harvests  | 1                      | 3      | 4       | 4      | 12      |            |       |

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: Wanatah, IN

Design: Randomized block, 4 replications, 17 entries

Soil Type: Sebawa loam

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

Seeded: May 10, 1999, 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

Insects: Alfalfa weevil and potato leafhopper controlled by spraying

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**Table 2.** 1999<sup>†</sup> Seeded West Lafayette Alfalfa Yields at the Agronomy Center for Research and Education

| Entry           | Dry Matter Yield (T/A) |        |        |         | % of Check |       |
|-----------------|------------------------|--------|--------|---------|------------|-------|
|                 | 2000                   | 2001   | 2002   | 00-02   | 00-01      | 00-02 |
|                 | total                  | total  | total  | total   |            |       |
| WL327           | 1.35 *                 | 9.92 * | 9.94 * | 21.21 * | 131        | 134   |
| X CW84025       | 1.30 *                 | 9.69 * | 9.88 * | 20.87 * | 128        | 132   |
| X CW84024       | 1.23 *                 | 9.53 * | 9.80 * | 20.56 * | 125        | 130   |
| X CW74043       | 1.25 *                 | 9.69 * | 9.59 * | 20.53 * | 127        | 130   |
| 6420            | 1.50 *                 | 9.58 * | 9.35 * | 20.43 * | 129        | 129   |
| Winter Gold     | 1.30 *                 | 9.57 * | 9.45 * | 20.32 * | 126        | 129   |
| DK140           | 1.18                   | 9.57 * | 9.26 * | 20.01 * | 125        | 127   |
| WL232HQ         | 1.43 *                 | 9.16 * | 9.34 * | 19.93 * | 123        | 126   |
| 53Q60           | 1.24 *                 | 9.21 * | 9.37 * | 19.82 * | 121        | 125   |
| X CW64030       | 1.23 *                 | 9.14 * | 9.36 * | 19.73 * | 120        | 125   |
| X CW63002       | 1.26 *                 | 9.12 * | 9.20 * | 19.58 * | 121        | 124   |
| Cimarron SR     | 1.42 *                 | 8.81 * | 9.35 * | 19.58 * | 119        | 124   |
| X CW73009       | 1.24 *                 | 9.12 * | 9.13 * | 19.49 * | 120        | 123   |
| Passport        | 1.16                   | 8.98 * | 9.24 * | 19.38 * | 118        | 123   |
| X CW64025       | 1.28 *                 | 9.22 * | 8.84   | 19.34 * | 122        | 122   |
| X CW83017       | 1.20                   | 8.88 * | 9.16 * | 19.24 * | 117        | 122   |
| X ZN9746        | 1.24 *                 | 8.89 * | 9.06   | 19.19 * | 118        | 121   |
| Rocket          | 1.15                   | 8.52 * | 9.51 * | 19.18 * | 112        | 121   |
| X CW83016       | 1.13                   | 8.89 * | 9.09 * | 19.11 * | 116        | 121   |
| X ZC984DA       | 1.25 *                 | 8.78 * | 8.98   | 19.01 * | 116        | 120   |
| WL325HQ         | 1.25 *                 | 8.57 * | 9.17 * | 18.99 * | 114        | 120   |
| X CW73038       | 1.29 *                 | 8.66 * | 9.02 * | 18.97 * | 116        | 120   |
| DK134           | 1.35 *                 | 8.71 * | 8.88   | 18.94 * | 117        | 120   |
| X ZC9841A       | 1.31 *                 | 8.86 * | 8.61   | 18.78 * | 118        | 119   |
| X CW64018       | 1.18                   | 8.61 * | 8.49   | 18.28 * | 114        | 116   |
| X CW82032       | 1.24 *                 | 8.19 * | 8.84   | 18.27 * | 110        | 116   |
| ABT-400 SCL     | 1.23                   | 8.47 * | 8.53   | 18.23 * | 113        | 115   |
| X CW74033       | 1.06                   | 8.40 * | 8.64   | 18.10 * | 110        | 115   |
| X CW63009       | 1.03                   | 8.51 * | 8.44   | 17.98 * | 111        | 114   |
| DK141           | 1.36 *                 | 8.43 * | 8.08   | 17.87   | 114        | 113   |
| X CW82093       | 1.19                   | 7.82 * | 8.56   | 17.57   | 105        | 111   |
| X ZC9842A       | 1.20                   | 7.92 * | 8.03   | 17.15   | 106        | 109   |
| X CW82031       | 1.22                   | 7.72   | 8.13   | 17.07   | 104        | 108   |
| X CW83040       | 1.24 *                 | 7.70   | 8.02   | 16.96   | 104        | 107   |
| X CW83095       | 1.25 *                 | 7.54   | 8.01   | 16.80   | 102        | 106   |
| X CW82033       | 1.18                   | 7.48   | 8.00   | 16.66   | 101        | 105   |
| X CW83094       | 1.28 *                 | 7.36   | 8.00   | 16.64   | 100        | 105   |
| X CW83037       | 1.16                   | 7.63   | 7.84   | 16.63   | 102        | 105   |
| Vernal          | 0.95                   | 7.66   | 7.19   | 15.80   | 100        | 100   |
| Grand mean      | 1.24                   | 8.78   | 8.85   | 18.87   |            |       |
| LSD (5%)        | 0.27                   | 2.02   | 0.94   | 2.48    |            |       |
| C.V. (%)        | 15.16                  | 16.30  | 7.51   | 9.34    |            |       |
| No. of harvests | 1                      | 4      | 4      | 9       |            |       |



**Table 2. (Cont)** 1999 Seeded West Lafayette Alfalfa Yields at the Agronomy Center for Research and Education

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

Design: Randomized block, 4 replications, 39 entries

Soil Type: Rockfield silt loam

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

†Reseeded: May 5, 2000, 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

Insects: Alfalfa weevil and potato leafhopper controlled by spraying

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**Table 3.** 2000 Seeded West Lafayette Alfalfa Yields at the Agronomy Center for Research and Education

| Entry           | Dry Matter Yield (T/A) |        |         | % of Check |       |
|-----------------|------------------------|--------|---------|------------|-------|
|                 | 2001                   | 2002   | 01-02   | 2002       | 01-02 |
|                 | total                  | total  | total   |            |       |
| Lightning II    | 7.24 *                 | 9.73 * | 16.97 * | 123        | 125   |
| Geneva          | 7.22 *                 | 9.57 * | 16.79 * | 121        | 124   |
| 5454            | 6.90 *                 | 9.66 * | 16.56 * | 122        | 122   |
| DK 134          | 7.21 *                 | 9.29 * | 16.50 * | 118        | 122   |
| X ZC 9950 A     | 6.98 *                 | 9.50 * | 16.48 * | 120        | 122   |
| 4200            | 6.96 *                 | 9.43 * | 16.39 * | 119        | 121   |
| Magnum V        | 6.78 *                 | 9.58 * | 16.36 * | 121        | 121   |
| X CW 64049      | 6.93 *                 | 9.38 * | 16.31 * | 119        | 121   |
| X CW 54033      | 7.04 *                 | 9.22 * | 16.26 * | 117        | 120   |
| X CW 64026      | 6.76 *                 | 9.48 * | 16.24 * | 120        | 120   |
| Radiant         | 6.78 *                 | 9.42 * | 16.20 * | 119        | 120   |
| X CW 94008      | 6.67 *                 | 9.52 * | 16.19 * | 121        | 120   |
| Laser           | 6.59 *                 | 9.59 * | 16.18 * | 121        | 120   |
| X ZC 9840 A     | 7.06 *                 | 9.11 * | 16.17 * | 115        | 120   |
| X A 30-06       | 6.76 *                 | 9.17 * | 15.93 * | 116        | 118   |
| Winter Gold     | 6.95 *                 | 8.92   | 15.87 * | 113        | 117   |
| X EX 99C01      | 6.39 *                 | 9.45 * | 15.84 * | 120        | 117   |
| X CW 74040      | 6.72 *                 | 8.79   | 15.51 * | 111        | 115   |
| X ZC 9941 A     | 6.37 *                 | 9.07   | 15.44   | 115        | 114   |
| X CW 64004      | 6.40 *                 | 9.01   | 15.41   | 114        | 114   |
| X ZC 9854 A     | 6.47 *                 | 8.92   | 15.39   | 113        | 114   |
| Vernal          | 5.63                   | 7.90   | 13.53   | 100        | 100   |
| Grand mean      | 6.76                   | 9.26   | 16.02   |            |       |
| LSD (5%)        | 1.04                   | 0.63   | 1.52    |            |       |
| C.V. (%)        | 10.78                  | 4.84   | 6.67    |            |       |
| 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: 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

Insects: Alfalfa weevil and potato leafhopper controlled by spraying

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**Table 4.** 1999 "Potato Leafhopper No-spray" Wanatah Alfalfa Yields at the Pinney-Purdue Agricultural Center

| Entry           | Dry Matter Yield T/A |        |        |        |         | % of Check |       |
|-----------------|----------------------|--------|--------|--------|---------|------------|-------|
|                 | 1999                 | 2000   | 2001   | 2002   | 99-02   | 99-00      | 99-02 |
|                 | total                | total  | total  | total  | total   |            |       |
| 54H69           | 0.95 *               | 5.52 * | 9.22 * | 7.13 * | 22.82 * | 141        | 137   |
| DK131HG         | 0.80 *               | 5.23 * | 8.30   | 6.79 * | 21.12   | 132        | 127   |
| Cimarron SR     | 0.28                 | 5.49 * | 8.24   | 6.52 * | 20.53   | 126        | 123   |
| Vernal          | 0.14                 | 4.44   | 6.86   | 5.20   | 16.64   | 100        | 100   |
| Grand mean      | 0.49                 | 5.26   | 8.16   | 6.48   | 20.25   |            |       |
| LSD (5%)        | 0.23                 | 0.72   | 0.59   | 0.83   | 1.27    |            |       |
| C.V. (%)        | 31.07                | 8.83   | 4.46   | 8.30   | 3.93    |            |       |
| No. of harvests | 1                    | 3      | 4      | 4      | 12      |            |       |

Yield of "Vernal" used to calculate % of check

Location: Wanatah, IN

Soil Type: Sebawa loam

Design: Randomized block, 4 replications, 4 entries

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

Seeded: May 10, 1999, 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

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

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**Table 5.** 2000 "Potato Leafhopper No-spray" Alfalfa yields at the West Lafayette Agronomy Center for Research and Education

| Entry           | Dry Matter Yield T/A |            |
|-----------------|----------------------|------------|
|                 | 2002                 | % of Check |
|                 | total                | 2002       |
| Cimarron SR     | 5.56 *               | 105        |
| 54H91           | 5.55 *               | 104        |
| XZN9936         | 5.47 *               | 103        |
| 5454            | 5.32 *               | 100        |
| Grand mean      | 5.47                 |            |
| LSD (5%)        | 0.67                 |            |
| C.V. (%)        | 7.68                 |            |
| 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 "5454" used to calculate % of check

Location: West Lafayette, IN

Soil Type: Rockford silt loam

Design: Randomized block, 4 replications, 4 entries

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

Seeded: May 10, 1999 with 15 lb. live seed / acre; 1.3 lb. a.i. Balan / acre, incorporated

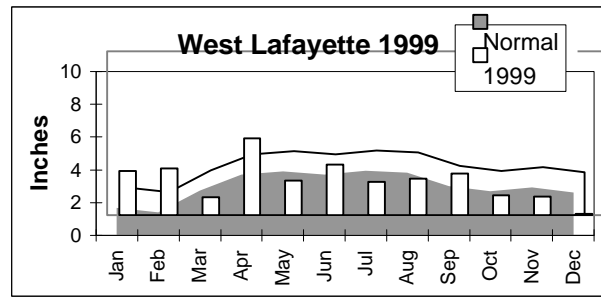
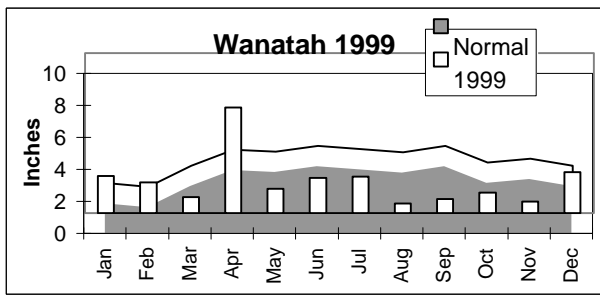
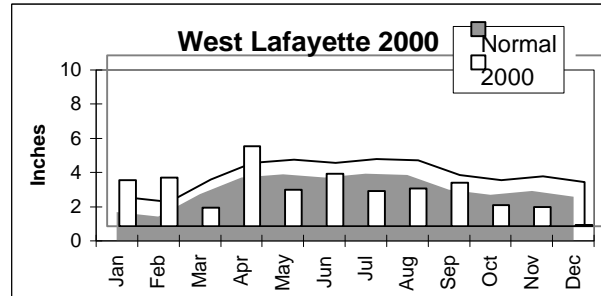
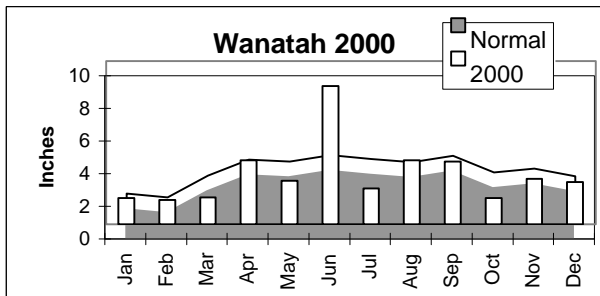
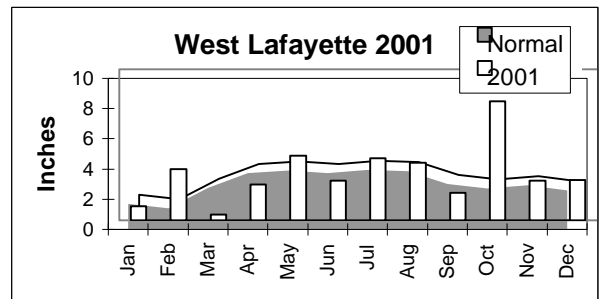
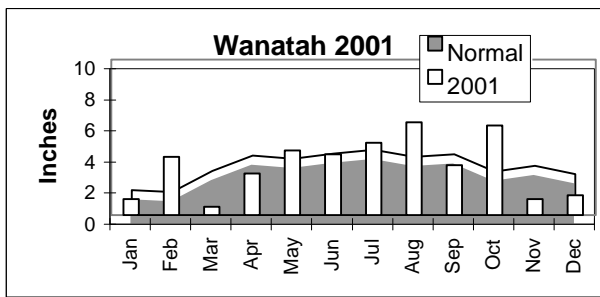
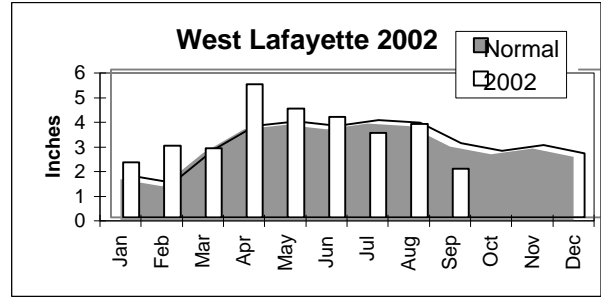
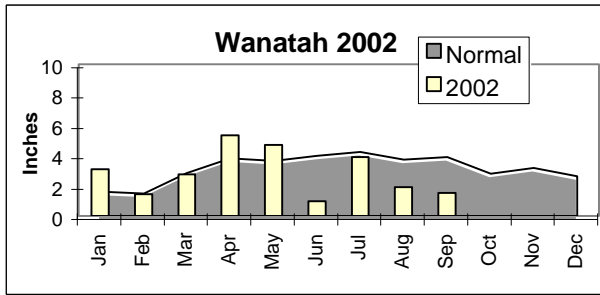
Soil Type: Rockfield silt loam

Fertilizer: 60 lb. P<sub>2</sub>O<sub>5</sub> and 250 lb. K<sub>2</sub>O / acre, applied after first and final harvest

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

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**Appendix Figure 1.** 1999-2002 Total Monthly Precipitation (inches)



**Appendix Table 1.** Hay Statistics for Indiana and the United States, 1998-2001

|                      | Acres for Harvest, thousands |        |        |                   | Yield, tons/acre <sup>†</sup> |      |      |                   |
|----------------------|------------------------------|--------|--------|-------------------|-------------------------------|------|------|-------------------|
|                      | 1999                         | 2000   | 2001   | 2002 <sup>‡</sup> | 1999                          | 2000 | 2001 | 2002 <sup>‡</sup> |
| <b>Indiana</b>       |                              |        |        |                   |                               |      |      |                   |
| All Hay              | 700                          | 750    | 610    | 580               | 3.19                          | 3.50 | 3.36 | *                 |
| Alfalfa Hay          | 400                          | 430    | 330    | 300               | 3.71                          | 4.10 | 4.00 | 3.00              |
| Other Hay            | 300                          | 320    | 280    | 280               | 2.50                          | 2.70 | 2.60 | 2.80              |
| <b>United States</b> |                              |        |        |                   |                               |      |      |                   |
| All Hay              | 63,220                       | 59,854 | 63,511 | 64,709            | 2.53                          | 2.54 | 2.47 | *                 |
| Alfalfa Hay          | 23,968                       | 23,077 | 23,812 | 24,134            | 3.57                          | 3.48 | 3.37 | 3.09              |
| Other Hay            | 39,165                       | 36,777 | 39,699 | 40,575            | 1.92                          | 1.95 | 1.93 | 1.87              |

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

<sup>‡</sup> Estimates as of October 1, 2002

\* Not available at time of publishing

**Appendix Table 2.** Monthly normal average of daily temperatures and deviations from normal for Wanatah and West Lafayette, Indiana, 1999 - Sept. 2002

|                       | Jan         | Feb         | Mar         | Apr         | May         | Jun         | Jul         | Aug         | Sep         | Oct         | Nov         | Dec         |
|-----------------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|
| <b>Wanatah</b>        |             |             |             |             |             |             |             |             |             |             |             |             |
| Normal                | <u>22.6</u> | <u>26.7</u> | <u>36.6</u> | <u>49.2</u> | <u>59.7</u> | <u>68.8</u> | <u>72.5</u> | <u>70.8</u> | <u>64.4</u> | <u>53.9</u> | <u>40.4</u> | <u>28.7</u> |
| 1999                  | -0.7        | 7.1         | -2.7        | 1.5         | 4.0         | 1.9         | 3.5         | 3.3         | -1.8        | -2.0        | 2.7         | 1.6         |
| 2000                  | 1.1         | 6.5         | 7.3         | -1.9        | 2.9         | -0.5        | -2.8        | -0.5        | -1.5        | 1.0         | -2.9        | -12.7       |
| 2001                  | -2.4        | -1.1        | 1.6         | -5.2        | -1.9        | 1.8         | 0.3         | -3.1        | 1.6         | -0.2        | -8.7        | 5.0         |
| 2002                  | 8.5         | 5.2         | -3.5        | -0.1        | -4.3        | 3.3         | 3.4         | 1.5         | 4.85        | †           | †           | †           |
| <b>West Lafayette</b> |             |             |             |             |             |             |             |             |             |             |             |             |
| Normal                | <u>23.0</u> | <u>26.7</u> | <u>37.1</u> | <u>50.1</u> | <u>60.7</u> | <u>70</u>   | <u>73.6</u> | <u>71.4</u> | <u>65.2</u> | <u>53.5</u> | <u>40.5</u> | <u>29</u>   |
| 1999                  | 1.7         | 9.1         | -1.4        | 3.1         | 3.4         | 1.4         | 4.2         | -2.4        | -0.6        | 0.6         | 4.0         | 3.1         |
| 2000                  | 2.5         | 9.3         | 7.8         | 0.4         | 3.3         | -0.6        | -3.2        | 0.2         | -1.0        | 2.9         | -2.2        | -11.4       |
| 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         | †           | †           | †           |

† Data not available at time of printing

**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 | RKN |
|--------------------|--------------------------|-------------|-----------------|----|----|----|----|-----|-----|----|-----|
| 6420               | 12                       | 1,2         | 4               | HR | R  | HR | -  | HR  | R   | R  | HR  |
| 53Q60              | 18                       | 1,2         | 3               | HR | R  | R  | HR | HR  | R   | R  | MR  |
| 5454               | 18                       | 3,5         | 4               | R  | MR | HR | HR | HR  | LR  | MR | -   |
| 54H69              | 18                       | 4           | 4               | HR | HR | HR | HR | HR  | MR  | LR | -   |
| 54H91              | 18                       | 5           | 4               | HR | HR | R  | HR | HR  | R   | MR | MR  |
| A 30-06            | 17                       | 3           | 3               | HR | HR | HR | HR | HR  | HR  | R  | -   |
| ABT 350            | 2,11                     | 1           | 3               | HR | HR | HR | HR | HR  | HR  | -  | -   |
| ABT 400 SCL        | 2                        | 2           | 4               | HR | HR | HR | HR | HR  | HR  | -  | -   |
| Affinity +Z        | 3,7,11,13,22             | 1           | 4               | HR | HR | HR | HR | HR  | R   | R  | -   |
| Amerigraze 401 + Z | 3,7,11,13,22             | 1           | 4               | HR | R  | HR | HR | HR  | R   | R  | -   |
| Cimarron SR        | 6,20                     | 1,2,4,5     | 4               | HR | HR | HR | HR | HR  | MR  | R  | R   |
| DK 134             | 15                       | 1,2,3       | 3               | HR | HR | HR | HR | HR  | -   | MR | -   |
| DK 140             | 15                       | 2,3         | 4               | HR | R  | HR | HR | HR  | -   | MR | -   |
| DK131HG            | 15                       | 4           | 3               | HR | HR | HR | HR | HR  | R   | MR | MR  |
| DK 141             | 15                       | 2           | 4               | HR | HR | HR | HR | HR  | -   | MR | -   |
| Emperor            | 1,22                     | 1           | 4               | HR | HR | HR | HR | HR  | HR  | -  | -   |
| FQ 315             | 16                       | 1           | 3               | HR | R  | HR | HR | HR  | HR  | R  |     |
| Geneva             | 21                       | 3           | 4               | HR | HR | HR | HR | HR  | HR  | MR | -   |
| GH 700†            | 19                       | 2           | 4               | HR | HR | HR | HR | HR  | HR  | R  | -   |
| Laser              | 4                        | 3           | 4               | HR | R  | HR | R  | HR  | MR  | -  | MR  |
| Lightning II       | 14                       | 3           | 4               | HR | HR | HR | HR | HR  | HR  | R  | -   |
| Magnum V           | 10                       | 3           | 4               | HR | R  | HR | R  | HR  | R   | MR | MR  |
| Radiant            | 7                        | 3           | 4               | HR | HR | HR | HR | HR  | R   | H  | -   |
| Rocket             | 8                        | 1,2         | 4               | HR | R  | HR | HR | HR  | HR  | MR | MR  |
| Samurai            | 1,22                     | 1           | 3               | HR | R  | HR | HR | HR  | R   | -  | -   |
| Synergy            | 9                        | 1,2,3       | 3               | HR | R  | HR | HR | HR  | R   | MR | -   |
| Vernal             | Public                   | All         | 2               | R  | -  | MR | -  | -   | -   | -  | MR  |
| WL 232 HQ          | 7,23                     | 2           | 2               | HR | HR | HR | HR | HR  | HR  | MR | -   |
| WL 325 HQ          | 7,23                     | 2           | 3               | HR | R  | HR | HR | HR  | R   | R  | -   |
| WL 327             | 7,23                     | 1,2         | 4               | HR | R  | HR | HR | HR  | HR  | R  | -   |
| Winter Gold        | 5                        | 1,2,3       | 4               | HR | HR | HR | HR | HR  | HR  | -  | -   |

† Formerly CW64025

<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. 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

RKN=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. Marketer Addresses and Phone Numbers**

|                                                                                                                                       |                                                                                                                                          |                                                                                                                                          |
|---------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------|
| 1. ABI Alfalfa<br>1870 Backbone Rd. West<br>P.O. Box 404<br>Princeton, IL 61356<br>800-873-2532<br>Gene Lind                          | 9. Crow's Hybrid Corn Co.<br>Box 157<br>Kentland, IN 47951<br>800-331-7201<br>www.crowshybrid.com                                        | 17. PGI Alfalfa, Inc.<br>225 W. 1st Street<br>Story City, IA 50248<br>800-247-3967<br>Brenda Severson<br>bseverson@mbsgenetics.com       |
| 2. Allied Seed<br>P.O. Box 592<br>Tangent, OR 97389<br>541-812-2556<br>Ron Schmidt                                                    | 10. Dairyland Seeds<br>P.O. Box 958<br>West Bend, WI 53095<br>800-236-0163<br>Michael Velde<br>www.dairylandseed.com                     | 18. Pioneer Hi-Bred Intl.<br>1000 W. Jefferson St.<br>Tipton, IN 46072<br>800-258-3579<br>www.pioneer.com                                |
| 3. America's Alfalfa<br>P.O. Box 404<br>Princeton, IL 61356<br>800-873-2532<br>Gene Lind<br>www.americasalfalfa.com                   | 11. Donley Seed Company<br>709 E. 4th Street<br>New Albany, IN 47150<br>812-941-9822<br>Charles Leppert                                  | 19. Sommer Bros.<br>P.O. Box 248<br>Pekin, IL 61555-0248<br>309-346-2127<br>www.goldenharvestseeds.com                                   |
| 4. AMPAC Seed Company<br>403 Wooster Road<br>Winona Lake, IN 46590<br>574-268-9549<br>Dave Robinson<br>dave@ampacseed.com             | 12. Garst Seed Company<br>8610 Pomona Dr.<br>Amarillo, TX 79110<br>806-358-4807<br>Rick Henley<br>www.garstseed.com                      | 20. Spink Seed Company, LLC<br>10430 Mapledale Road<br>Horton, MI 49246<br>517-563-8548<br>Harold Spink                                  |
| 5. Beck's Hybrids<br>6767 E. 276th St.<br>Atlanta, IN 46031<br>800-937-2325<br>Lee Rulon<br>www.beckshybrids.com                      | 13. Golden Harvest<br>27525 135th Ave. N.<br>Cordova, IL 61242<br>800-421-1169<br>Ken Martin<br>www.goldenharvestseeds.com               | 21. Syngenta Seeds<br>1525 Airport Road<br>Ames, IA 50010<br>800-258-0498<br>Jennifer Pruin<br>www.nk.com                                |
| 6. Caudill Seeds<br>502 Market Street<br>Portland, TN 37148<br>888-565-7333<br>Jim Rush                                               | 14. Jung Seed Genetics<br>341 S. High St.<br>Randolph, WI 53956<br>800-242-1855<br>www.jungseedgenetics.com                              | 22. TenBarge Seed, Inc.<br>P.O. Box 187<br>Haub & Main<br>Haubstadt, IN 47639<br>800-467-0158<br>Kent Schuerger<br>www.tenbargeseeds.com |
| 7. CISCO<br>3610 Shelby St.<br>Indianapolis, IN 46227-3359<br>800-888-2986<br>Dave Pearl<br>www.ciscoseeds.com                        | 15. Monsanto<br>3100 Sycamore Rd.<br>DeKalb, IL 60115<br>815-758-9323<br>Diane Freeman<br>www.farmsource.com                             | 23. W-L Research, Inc.<br>P.O. Box 8112<br>Madison, WI 53708-8112<br>608-240-0630<br>Mike Peterson                                       |
| 8. Croplan Genetics<br>P.O. Box 64406, MS 7455<br>St. Paul, MN 55164-0406<br>800-851-8810<br>Dennis Gehler<br>www.croplangenetics.com | 16. Mycogen Plant Sciences<br>9330 Zionsville Road<br>308 3E352<br>Indianapolis, IN 46268<br>317-337-4007<br>Ed Nintz<br>www.mycogen.com |                                                                                                                                          |