

# 2006 Alfalfa Report

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## Introduction

Alfalfa (*Medicago sativa*) has historically been the highest yielding, highest quality forage legume grown in Kentucky. It forms the basis of Kentucky's cash hay enterprise and is an important component in dairy, horse, beef, and sheep diets. Choosing a good alfalfa variety is a key step in establishing a stand of alfalfa. The choice of variety can impact yield, thickness of stand, and persistence of alfalfa stands.

This report provides current yield data on alfalfa varieties included in yield trials in Kentucky, as well as guidelines for selecting alfalfa varieties. New for 2006, Table 9 shows a summary of all alfalfa varieties tested in Kentucky during the last 10 years. Go to the UK Forage Extension Web site at <[www.uky.edu/Ag/Forage](http://www.uky.edu/Ag/Forage)> to obtain electronic versions of all forage variety testing reports from Kentucky, from surrounding states, and a large number of other forage publications.

## Considerations in Selecting an Alfalfa Variety

**Local Adaptation and Persistence.** High yields in variety tests over a range of years and locations are the best indication that a variety is locally adapted and persistent. Several varieties are adapted for use in Kentucky as determined from results in this report.

**Winter-Hardiness.** Each variety has a fall dormancy (FD) rating that ranges from 1 (very dormant) to 9 (nondormant). In general, varieties with lower dormancy ratings are more winter-hardy but take more warm weather in the spring to initiate growth, and they stop growing sooner in the fall. This growth habit can, but does not necessarily, reduce annual yields compared to less dormant varieties. Generally, alfalfa varieties with FD ratings of 2 to 5 will show good winter survival in Kentucky. Varieties with ratings of 6 and above are not winter-hardy under Kentucky conditions. Many Kentucky producers have found that FD 4 varieties provide the best combination of yield and winter survival.

**Disease and Pest Resistance.** In Kentucky, producers should use varieties that have at least a moderate resistance (MR) rating to phytophthora root rot (PRR), anthracnose (An), bacterial wilt (Bw), and fusarium wilt (Fw), as well as a resistance (R) rating to aphanomyces root rot (APH). Kentucky research indicates that aphanomyces root rot is a widespread problem in the state during stand establishment and that resistance is beneficial, particularly in soils also infested with phytophthora root rot.

Phytophthora root rot is a fungal disease associated with poorly drained soils or excessive rainfall. This disease causes yellowish- to reddish-brown areas on roots and crowns that eventually become black and rotten. The top growth of infected plants appears stunted and yellow.

Anthracnose, also caused by a fungus, attacks the stems of alfalfa, preventing water flow to the rest of the shoot and causing sudden wilting. These wilted shoots have a characteristic "shepherd's crook" appearance. Anthracnose can also cause a bluish-black crown rot. Bacterial wilt and fusarium wilt are infections of the water-conducting tissues of alfalfa roots and do not cause any noticeable root rot. These diseases prevent water flow to leaves, resulting in wilting of shoots and the eventual death of infected plants. Roots infected with bacterial wilt often have a yellowish-brown discoloration of the inner woody cylinder of the taproot. Fusarium infection can be recognized by brown-to-red streaks in the inner woody cylinder of the taproot.

Aphanomyces root rot is another fungal disease associated with poorly drained soils or excessive rainfall. Affected seedlings will be stunted but remain upright, unlike those with symptoms of damping off. In established plants, root symptoms are not as well defined as those for phytophthora root rot, but brown lesions on the taproot indicate where lateral roots were destroyed. This disease can be associated with phytophthora root rot, and together they may form a root disease complex. Aphanomyces root rot is known to affect new seedlings in Kentucky, but it is still unclear how it affects established alfalfa. In years with overly cool and wet spring weather, alfalfa stands have suffered great damage due to aphanomyces when planted with varieties that are susceptible to this disease.

Although certain alfalfa varieties are reported to have some resistance to sclerotinia crown and stem rot, research at the University of Kentucky has shown that these varieties have only marginal protection when conditions are ideal for disease development. Varieties currently in development show promise for sclerotinia resistance.

**Seed Quality.** Buy premium-quality seed that is high in germination and purity and free from weed seed. Buy certified seed or proprietary seed of an improved variety. An improved variety is one that has performed well in independent trials, such as those that are reported in this publication or others like it. Other information on the label will include the test date, which must be within the previous nine months, the level of germination, and other crop and weed seed. Order seed well in advance of planting time to assure that it will be available when needed.

## Description of the Tests

Alfalfa variety tests were established at Lexington (2002 and 2004), Princeton (2005), and Eden Shale (2003) as part of the forage variety testing program. Trials were planted in Lexington and Bowling Green in the spring of 2006 but failed due to poor establishment conditions. These were replanted in August of 2006. The soils at most locations are well suited to alfalfa because they are generally well-drained silt loam soils (Maury, Crider, and Nicholson at Lexington, Princeton, and Eden Shale, respectively).

Plots were 5 by 15 feet in a randomized complete block design with four replications. In each test, 20 pounds of seed per acre were planted into a prepared seedbed using a disk drill. Plots were harvested with a sickle-type forage plot harvester. First cuttings in the seeding year were delayed to allow the alfalfa to completely reach maturity, indicated by full bloom. Otherwise, harvests were taken when the alfalfa was in the bud-to-early flower stage. Fresh weight samples were taken at each harvest to calculate percent dry matter production. Management of all tests for establishment, fertility, pest control, and harvest management was according to Kentucky Cooperative Extension recommendations. Pests (weeds and insects) were controlled so that they would not limit yield or persistence.

## Results and Discussion

Weather data for Eden Shale, Lexington, and Princeton are presented in Tables 1 through 3.

Yield data (on a dry matter basis) for all tests are reported in Tables 4 through 7. Stated yields are adjusted for percent weeds, therefore the value listed is for the crop only. Varieties are listed in order from highest to lowest total production (for the life of the test). Experimental varieties are listed separately at the bottom of the tables and are not available commercially. Yields are given by cutting for 2006 and by year for each prior year of production.

Statistical analyses were performed on all alfalfa yield data (including experimentals) to determine if the apparent differences are truly due to variety. Varieties not significantly different from the highest numerical value in a column are marked with an asterisk (\*). To determine if two varieties are truly different, compare the difference between the two varieties to the Least Significant Difference (LSD) at the bottom of the column. If the difference is equal to or greater than the LSD, the varieties are truly different when grown under the conditions at a given location. The Coefficient of Variation (CV), which is a measure of the variability of the data, is included for each column of means. Low variability is desirable, and increased variability within a study results in higher CVs and larger LSDs.

Table 8 summarizes information about fall dormancy, disease resistance, and yield performance across years and locations for all the varieties currently included in the tests discussed in this report. Varieties are listed in alphabetical order with the experi-

mental varieties at the bottom. Remember that experimental varieties are not available for farm use, while commercial varieties can be purchased through dealerships. In Table 8, open blocks indicate that the variety was not in that particular test (labeled at the top of the column), while an X means that the variety was in the test, but yielded significantly less than the top-yielding variety. A single asterisk (\*) means that the variety was not significantly different from the top-yielding variety based on the 5% LSD. It is best to choose a variety that has performed well over several years and locations as indicated by the asterisks.

Table 9 is a summary of yield data from 1995 to 2006 of commercial varieties that have been entered in the Kentucky trials. The data is listed as a percentage of the mean of the commercial varieties entered in each specific trial. In other words, the mean for each trial is 100%—varieties with percentages over 100 yielded better than average and varieties with percentages less than 100 yielded lower than average. Direct, statistical comparisons of varieties cannot be made using the summary Table 9, but these comparisons do help to identify varieties for further consideration. Varieties that have performed better than average over many years and at several locations have very stable performance, while others may have performed very well in wet years or on particular soil types. These details may influence variety choice, and the information can be found in the yearly reports. See footnote in Table 9 to determine which yearly report to refer to.

## Summary

Consistent production of high yields of alfalfa is the result of good variety selection along with the implementation of good management techniques. For further information about alfalfa management, refer to these College of Agriculture publications, available at the local county Extension office:

AGR-76 *Alfalfa: The Queen of the Forage Crops*

AGR-64 *Establishing Forage Crops*

AGR-90 *Inoculation of Forage Legumes*

AGR-18 *Grain and Forage Crop Guide for Kentucky*

AGR-1 *Lime and Fertilizer Recommendations*

AGR-148 *Weed Control Strategies for Alfalfa and Other Forage Legume Crops*

ENT-17 *Insect Management Recommendations for Field Crops and Livestock*

PPA-10D *Kentucky Plant Disease Management Guide for Forage Legumes*

AGR-137 *Alfalfa Hay: Quality Makes the Difference*

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**Table 1. Temperature and rainfall at Lexington, Kentucky, in 2002, 2003, 2004, 2005, and 2006.**

|       | 2002  |     |          |       | 2003  |     |          |       | 2004  |     |          |       | 2005  |     |          |        | 2006  |     |          |       |
|-------|-------|-----|----------|-------|-------|-----|----------|-------|-------|-----|----------|-------|-------|-----|----------|--------|-------|-----|----------|-------|
|       | Temp. |     | Rainfall |       | Temp. |     | Rainfall |       | Temp. |     | Rainfall |       | Temp. |     | Rainfall |        | Temp. |     | Rainfall |       |
|       | °F    | DEP | IN       | DEP   | °F    | DEP | IN       | DEP   | °F    | DEP | IN       | DEP   | °F    | DEP | IN       | DEP    | °F    | DEP | IN       | DEP   |
| JAN   | 38    | +7  | 2.12     | -0.74 | 26    | -5  | 0.96     | -1.90 | 30    | -1  | 3.14     | +0.28 | 37    | +6  | 4.35     | +1.49  | 42    | +11 | 4.77     | +1.91 |
| FEB   | 38    | +3  | 1.28     | -1.93 | 32    | -3  | 3.59     | +0.38 | 36    | +1  | 1.32     | -1.89 | 39    | +4  | 1.68     | -1.53  | 36    | +1  | 2.13     | -1.08 |
| MAR   | 45    | +1  | 7.93     | +3.53 | 47    | +3  | 2.09     | -2.31 | 47    | +3  | 3.43     | -0.97 | 41    | -3  | 2.79     | -1.61  | 44    | 0   | 3.05     | -1.35 |
| APR   | 58    | +3  | 4.19     | 0.31  | 57    | +2  | 3.14     | -0.74 | 55    | 0   | 3.06     | -0.82 | 56    | +1  | 3.30     | -0.58  | 59    | +4  | 3.52     | -0.36 |
| MAY   | 61    | -3  | 4.36     | -0.11 | 63    | -1  | 6.68     | +2.21 | 68    | +4  | 9.79     | +5.32 | 61    | -3  | 1.78     | -2.69  | 62    | -2  | 2.99     | -1.48 |
| JUN   | 74    | +2  | 2.45     | -1.21 | 69    | -3  | 4.85     | +1.19 | 72    | 0   | 3.13     | -0.53 | 75    | +3  | 1.33     | -2.33  | 70    | -2  | 1.82     | -1.84 |
| JUL   | 78    | +2  | 1.10     | -3.90 | 74    | -2  | 2.68     | -2.32 | 73    | -3  | 7.65     | +2.65 | 77    | +1  | 3.30     | -1.70  | 76    | 0   | 5.13     | +0.13 |
| AUG   | 77    | +2  | 0.95     | -2.98 | 75    | 0   | 5.26     | +1.33 | 71    | -4  | 2.91     | -1.02 | 78    | +3  | 3.34     | -0.59  | 76    | +1  | 3.23     | -0.70 |
| SEP   | 72    | +4  | 4.90     | 1.70  | 65    | -3  | 4.22     | +1.02 | 68    | 0   | 2.61     | -0.59 | 72    | +4  | 0.59     | -2.21  | 64    | -4  | 9.27     | +6.07 |
| OCT   | 55    | -2  | 5.61     | 3.04  | 56    | -1  | 1.61     | -0.96 | 58    | +1  | 5.65     | +3.08 | 58    | +1  | 0.92     | -1.65  | 54    | -3  | 4.88     | +2.31 |
| NOV   | 43    | -2  | 3.76     | 0.37  | 50    | +5  | 4.63     | +1.24 | 49    | +4  | 6.29     | +2.90 | 47    | +2  | 1.54     | -1.85  | 47    | +2  | 1.78     | -1.61 |
| DEC   | 36    | 0   | 4.11     | -1.13 | 36    | 0   | 3.26     | -0.72 | 36    | 0   | 3.20     | -0.78 | 32    | -4  | 2.19     | -1.79  |       |     |          |       |
| Total |       |     | 42.73    | -1.79 |       |     | 42.97    | -1.58 |       |     | 52.18    | +7.63 |       |     | 27.51    | -17.04 |       |     | 42.57    | +2.00 |

DEP is departure from the long-term average.

**Table 2. Temperature and rainfall at Princeton, Kentucky, in 2005 and 2006.**

|       | 2005  |     |          |       | 2006  |     |          |       |
|-------|-------|-----|----------|-------|-------|-----|----------|-------|
|       | Temp. |     | Rainfall |       | Temp. |     | Rainfall |       |
|       | °F    | DEP | IN       | DEP   | °F    | DEP | IN       | DEP   |
| JAN   | 41    | +7  | 5.30     | +1.50 | 46    | +12 | 5.38     | +1.58 |
| FEB   | 43    | +5  | 2.30     | -2.13 | 38    | 0   | 2.66     | -1.77 |
| MAR   | 47    | 0   | 4.11     | -0.83 | 51    | +4  | 4.22     | -0.72 |
| APR   | 60    | +1  | 4.61     | -0.19 | 63    | +4  | 4.02     | -0.78 |
| MAY   | 65    | -2  | 1.54     | -3.42 | 66    | -1  | 5.42     | +0.46 |
| JUN   | 76    | +1  | 3.09     | -0.76 | 75    | 0   | 3.39     | -0.46 |
| JUL   | 79    | +1  | 2.39     | -1.90 | 79    | +1  | 3.79     | -0.50 |
| AUG   | 80    | +3  | 11.54    | +7.53 | 80    | +3  | 2.58     | -1.43 |
| SEP   | 74    | +2  | 2.17     | -1.16 | 67    | -4  | 9.80     | +6.47 |
| OCT   | 60    | +1  | 0.19     | -2.86 | 57    | -2  | 4.5      | +1.45 |
| NOV   | 50    | +3  | 2.48     | -2.15 | 49    | +2  | 4.31     | -0.32 |
| DEC   | 35    | -4  | 1.92     | -3.12 |       |     |          |       |
| Total |       |     | 42.55    | -8.58 |       |     | 50.07    | +3.98 |

DEP is departure from the long-term average.

**Table 3. Temperature and rainfall at Eden Shale, Kentucky, in 2004, 2005, and 2006.**

|       | 2004  |     |          |       | 2005  |     |          |       | 2006  |     |          |        |
|-------|-------|-----|----------|-------|-------|-----|----------|-------|-------|-----|----------|--------|
|       | Temp. |     | Rainfall |       | Temp. |     | Rainfall |       | Temp. |     | Rainfall |        |
|       | °F    | DEP | IN       | DEP   | °F    | DEP | IN       | DEP   | °F    | DEP | IN       | DEP    |
| JAN   | 30    | 0   | 4.3      | +1.76 | 35    | +5  | 5.67     | +3.13 | 42    | +12 | 5.56     | +3.02  |
| FEB   | 36    | +3  | 1.35     | -1.4  | 39    | +6  | 1.98     | -0.77 | 35    | +2  | 2.05     | -0.70  |
| MAR   | 48    | +5  | 2.92     | -1.8  | 40    | -3  | 3.78     | -0.94 | 44    | +1  | 6.18     | +1.46  |
| APR   | 56    | +2  | 4.32     | +0.17 | 56    | +2  | 3.65     | -0.50 | 59    | +5  | 5.23     | +1.08  |
| MAY   | 69    | +6  | 7.8      | +3.39 | 61    | -2  | 2.09     | -2.32 | 62    | -1  | 3.57     | -0.84  |
| JUN   | 72    | +1  | 1.66     | -2.11 | 75    | +4  | 1.52     | -1.85 | 69    | -2  | 5.07     | +1.30  |
| JUL   | 73    | -2  | 3.37     | -1.16 | 78    | +3  | 3.22     | -1.21 | 77    | +2  | 4.4      | -0.13  |
| AUG   | 71    | -3  | 3.86     | +0.13 | 78    | +4  | 8.59     | +4.89 | 77    | +3  | 3.81     | +0.08  |
| SEP   | 69    | +1  | 2.14     | -1.05 | 71    | +3  | 1.56     | -1.63 | 65    | -3  | 8.64     | +5.45  |
| OCT   | 58    | +1  | 6.51     | +3.52 | 58    | +1  | 1.74     | -1.25 | 54    | -3  | 5.96     | +2.97  |
| NOV   | 49    | +4  | 5.02     | +1.47 | 47    | +2  | 3.61     | +0.06 | 47    | +2  | 1.75     | -1.80  |
| DEC   | 34    | -1  | 3.38     | -0.05 | 31    | -4  | 2.8      | -0.63 |       |     |          |        |
| Total |       |     | 46.63    | +2.87 |       |     | 40.61    | -3.15 |       |     | 52.22    | +11.89 |

DEP is departure from the long-term average.

**Table 4. Dry matter yields and stand persistence of alfalfa varieties sown April 12, 2002, at Lexington, Kentucky.**

| Variety  | Percent Stand |        |       |        | Yield (tons/acre) |               |               |               |        |        |        |        |       |       |               |
|--|---------------|--------|-------|--------|-------------------|---------------|---------------|---------------|--------|--------|--------|--------|-------|-------|---------------|
|  | 2005          |        | 2006  |        | 2002<br>Total     | 2003<br>Total | 2004<br>Total | 2005<br>Total | 2006   |        |        |        |       |       | 5-yr<br>Total |
|  | Apr 8         | Oct 28 | Apr 7 | Oct 17 |                   |               |               |               | May 16 | Jun 15 | Jul 18 | Aug 16 | Oct 5 | Total |               |
| <b>Commercial Varieties—Available for Farm Use</b> |               |        |       |        |                   |               |               |               |        |        |        |        |       |       |               |
| 4m76   | 75            | 79     | 83    | 81     | 1.25              | 4.75          | 4.67          | 3.45          | 1.24   | 1.00   | 0.39   | 0.72   | 0.51  | 3.86  | 17.97*        |
| WL319HQ  | 70            | 78     | 83    | 83     | 1.19              | 4.33          | 4.02          | 3.62          | 1.13   | 0.98   | 0.43   | 0.60   | 0.40  | 3.55  | 16.71*        |
| 6420   | 53            | 74     | 80    | 74     | 1.32              | 4.34          | 3.52          | 3.41          | 1.11   | 1.09   | 0.44   | 0.64   | 0.45  | 3.74  | 16.33*        |
| WL327  | 48            | 68     | 73    | 58     | 1.37              | 4.25          | 4.03          | 3.16          | 1.06   | 0.92   | 0.42   | 0.55   | 0.44  | 3.39  | 16.20*        |
| GH744  | 48            | 65     | 73    | 66     | 1.33              | 4.62          | 3.76          | 3.26          | 0.91   | 0.93   | 0.33   | 0.51   | 0.48  | 3.16  | 16.13*        |
| Geneva   | 50            | 65     | 68    | 58     | 1.06              | 4.47          | 3.68          | 3.15          | 1.11   | 0.87   | 0.44   | 0.59   | 0.51  | 3.52  | 15.88         |
| WL338SR  | 55            | 64     | 65    | 65     | 1.41              | 4.25          | 3.85          | 2.95          | 0.98   | 0.73   | 0.39   | 0.49   | 0.55  | 3.14  | 15.59         |
| Arc (certified)                                    | 43            | 68     | 68    | 58     | 1.08              | 4.00          | 3.84          | 3.09          | 0.95   | 0.67   | 0.34   | 0.45   | 0.44  | 2.85  | 14.86         |
| DK140  | 48            | 60     | 60    | 48     | 1.14              | 4.08          | 3.87          | 2.65          | 0.99   | 0.78   | 0.34   | 0.48   | 0.41  | 3.00  | 14.74         |
| 54V54  | 43            | 63     | 63    | 61     | 1.23              | 4.06          | 3.53          | 2.69          | 0.89   | 0.88   | 0.35   | 0.55   | 0.34  | 3.01  | 14.50         |
| Vernal   | 53            | 65     | 68    | 61     | 1.16              | 4.08          | 3.33          | 3.01          | 0.85   | 0.69   | 0.33   | 0.50   | 0.39  | 2.76  | 14.35         |
| Buffalo  | 33            | 48     | 58    | 48     | 1.21              | 4.09          | 3.22          | 2.44          | 0.99   | 0.69   | 0.41   | 0.49   | 0.37  | 2.94  | 13.90         |
| Saranac AR (certified)                             | 43            | 58     | 55    | 43     | 1.25              | 3.83          | 3.18          | 2.74          | 0.80   | 0.57   | 0.30   | 0.44   | 0.36  | 2.48  | 13.49         |
| <b>Experimental Varieties</b>                      |               |        |       |        |                   |               |               |               |        |        |        |        |       |       |               |
| DU 202   | 35            | 65     | 60    | 55     | 1.35              | 4.02          | 3.63          | 3.41          | 1.00   | 0.83   | 0.40   | 0.67   | 0.56  | 3.46  | 15.88         |
| Mean   | 49.5          | 65.5   | 68.0  | 61.2   | 1.24              | 4.22          | 3.72          | 3.07          | 1.00   | 0.83   | 0.38   | 0.55   | 0.44  | 3.20  | 15.47         |
| CV,%   | 24.5          | 16.6   | 15.2  | 21.6   | 14.56             | 8.93          | 11.4          | 17.32         | 16.64  | 20.96  | 26.13  | 23.48  | 22.15 | 17.77 | 9.09          |
| LSD,0.05   | 17.3          | 15.5   | 14.8  | 18.9   | 0.26              | 0.54          | 0.61          | 0.76          | 0.24   | 0.25   | 0.14   | 0.18   | 0.14  | 0.81  | 2.01          |

\*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

**Table 5. Dry matter yields and stand persistence of alfalfa varieties sown April 7, 2004, at Lexington, Kentucky.**

| Variety  | Percent Stand |        |       |        | Yield (tons/acre) |               |        |        |        |        |       |       |               |
|--|---------------|--------|-------|--------|-------------------|---------------|--------|--------|--------|--------|-------|-------|---------------|
|  | 2005          |        | 2006  |        | 2004<br>Total     | 2005<br>Total | 2006   |        |        |        |       |       | 3-yr<br>Total |
|  | Apr 8         | Oct 28 | Apr 7 | Oct 17 |                   |               | May 16 | Jun 15 | Jul 18 | Aug 16 | Oct 5 | Total |               |
| <b>Commercial Varieties—Available for Farm Use</b> |               |        |       |        |                   |               |        |        |        |        |       |       |               |
| WL357HQ  | 88            | 96     | 98    | 94     | 1.78              | 3.37          | 1.15   | 1.43   | 0.61   | 0.80   | 0.56  | 4.55  | 9.69*         |
| Genoa  | 88            | 95     | 95    | 95     | 1.79              | 2.91          | 1.07   | 1.22   | 0.52   | 0.78   | 0.61  | 4.21  | 8.91*         |
| Expedition   | 88            | 88     | 94    | 93     | 1.70              | 2.83          | 1.19   | 1.30   | 0.57   | 0.72   | 0.43  | 4.20  | 8.73*         |
| Summer Gold  | 85            | 94     | 93    | 94     | 1.47              | 3.08          | 1.03   | 1.12   | 0.48   | 0.78   | 0.60  | 4.02  | 8.57          |
| Mountaineer 2.0                                    | 88            | 96     | 96    | 96     | 1.66              | 2.70          | 1.15   | 1.21   | 0.54   | 0.77   | 0.54  | 4.20  | 8.57          |
| 6400HT   | 88            | 93     | 98    | 95     | 1.70              | 2.76          | 1.12   | 1.19   | 0.53   | 0.68   | 0.49  | 4.01  | 8.46          |
| Feast+EV   | 85            | 96     | 96    | 93     | 1.75              | 2.94          | 0.99   | 0.95   | 0.48   | 0.62   | 0.47  | 3.51  | 8.19          |
| FSG408DP   | 83            | 91     | 91    | 90     | 1.69              | 2.53          | 0.98   | 0.99   | 0.41   | 0.69   | 0.53  | 3.60  | 7.83          |
| AC Longview  | 75            | 89     | 94    | 91     | 1.24              | 2.25          | 1.10   | 0.82   | 0.35   | 0.54   | 0.44  | 3.24  | 6.74          |
| Arc (certified)                                    | 50            | 75     | 85    | 80     | 1.08              | 2.08          | 1.15   | 0.82   | 0.47   | 0.64   | 0.44  | 3.53  | 6.69          |
| Saranac AR (certified)                             | 63            | 85     | 89    | 84     | 1.34              | 2.09          | 0.99   | 0.81   | 0.39   | 0.52   | 0.47  | 3.18  | 6.61          |
| Buffalo  | 60            | 78     | 85    | 84     | 1.04              | 1.91          | 1.11   | 0.98   | 0.44   | 0.60   | 0.44  | 3.56  | 6.51          |
| <b>Experimental Varieties</b>                      |               |        |       |        |                   |               |        |        |        |        |       |       |               |
| 50T176   | 88            | 95     | 95    | 95     | 1.79              | 3.02          | 1.20   | 1.30   | 0.55   | 0.76   | 0.51  | 4.32  | 9.13*         |
| VL02   | 83            | 95     | 96    | 91     | 1.88              | 2.45          | 1.37   | 1.06   | 0.44   | 0.59   | 0.54  | 4.00  | 8.33          |
| 41H158   | 63            | 83     | 95    | 93     | 1.19              | 2.57          | 0.92   | 1.15   | 0.78   | 0.66   | 0.45  | 3.97  | 7.72          |
| Mean   | 78.0          | 89.8   | 93.0  | 91.1   | 1.54              | 3.02          | 1.10   | 1.09   | 0.50   | 0.68   | 0.50  | 3.87  | 8.05          |
| CV,%   | 9.6           | 9.8    | 5.0   | 5.0    | 19.27             | 2.45          | 15.68  | 16.44  | 23.18  | 17.55  | 20.31 | 13.93 | 9.20          |
| LSD,0.05   | 10.7          | 12.6   | 6.7   | 6.6    | 0.42              | 2.57          | 0.25   | 0.26   | 0.17   | 0.17   | 0.15  | 0.77  | 1.06          |

\*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

**Table 6. Dry matter yields and stand persistence of alfalfa varieties sown Aug. 25, 2003, at the Eden Shale Farm near Owenton, Kentucky.**

| Variety  | Percent Stand |        |       |        | Yield (tons/acre) |            |        |        |        |       |       | 3-yr Total |
|--|---------------|--------|-------|--------|-------------------|------------|--------|--------|--------|-------|-------|------------|
|  | 2005          |        | 2006  |        | 2004 Total        | 2005 Total | 2006   |        |        |       |       |            |
|  | Apr 12        | Oct 12 | Apr 7 | Oct 24 |                   |            | May 31 | Jun 29 | Jul 31 | Oct 4 | Total |            |
| <b>Commercial Varieties—Available for Farm Use</b> |               |        |       |        |                   |            |        |        |        |       |       |            |
| FSG505   | 89            | 94     | 94    | 94     | 2.40              | 3.99       | 0.91   | 1.29   | 0.98   | 0.47  | 3.65  | 10.04*     |
| WL357HQ  | 93            | 98     | 98    | 98     | 2.72              | 3.81       | 0.70   | 1.29   | 0.89   | 0.38  | 3.25  | 9.77*      |
| Evermore   | 90            | 96     | 96    | 95     | 2.49              | 3.83       | 0.77   | 1.24   | 0.87   | 0.47  | 3.35  | 9.68*      |
| Reward II  | 94            | 90     | 100   | 98     | 2.48              | 3.79       | 0.86   | 1.27   | 0.78   | 0.34  | 3.26  | 9.53*      |
| 54V46  | 94            | 95     | 94    | 91     | 2.32              | 3.56       | 0.83   | 1.25   | 0.93   | 0.36  | 3.37  | 9.24*      |
| 5-star   | 89            | 89     | 98    | 98     | 2.18              | 3.60       | 0.80   | 1.29   | 0.99   | 0.31  | 3.39  | 9.16*      |
| Feast+EV   | 88            | 91     | 91    | 90     | 2.43              | 3.49       | 0.86   | 1.16   | 0.76   | 0.35  | 3.13  | 9.05*      |
| Regal  | 74            | 93     | 93    | 89     | 2.29              | 3.42       | 0.85   | 1.13   | 0.81   | 0.49  | 3.29  | 8.99*      |
| Buffalo  | 78            | 89     | 91    | 86     | 2.32              | 3.36       | 0.99   | 1.17   | 0.75   | 0.34  | 3.26  | 8.94*      |
| Saranac AR (certified)                             | 79            | 89     | 89    | 85     | 2.45              | 3.23       | 0.80   | 1.12   | 0.78   | 0.46  | 3.17  | 8.85*      |
| Mean   | 86.5          | 92.3   | 94.1  | 92.1   | 2.41              | 3.61       | 0.84   | 1.22   | 0.85   | 0.39  | 3.31  | 9.33       |
| CV,%   | 6.6           | 7.7    | 5.8   | 7.2    | 7.63              | 11.28      | 27.80  | 16.60  | 18.23  | 27.96 | 16.42 | 9.37       |
| LSD,0.05   | 8.3           | 10.3   | 8.2   | 10.0   | 0.27              | 0.59       | 0.34   | 0.29   | 0.23   | 0.16  | 0.79  | 1.27       |

\*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

**Table 7. Dry matter yields, seedling vigor and stand persistence of alfalfa varieties sown April 15, 2005, at Princeton, Kentucky.**

| Variety  | Seedling Vigor <sup>1</sup><br>Jun 13, 2005 | Percent Stand |       |        | Yield (tons/acre) |        |        |        |        |        |       | 2-yr Total |
|--|---|---------------|-------|--------|-------------------|--------|--------|--------|--------|--------|-------|------------|
|  |   | 2005<br>Oct 6 | 2006  |        | 2005<br>Total     | 2006   |        |        |        |        |       |            |
|  |   |               | Apr 5 | Oct 30 |                   | May 23 | Jun 26 | Jul 24 | Aug 22 | Oct 10 | Total |            |
| <b>Commercial Varieties—Available for Farm Use</b> |   |               |       |        |                   |        |        |        |        |        |       |            |
| Baralfa 53HR                                       | 5.0   | 100           | 99    | 97     | 2.62              | 2.20   | 1.79   | 1.26   | 0.71   | 0.53   | 6.50  | 9.12*      |
| Phirst   | 4.8   | 100           | 99    | 97     | 2.58              | 2.22   | 1.79   | 1.26   | 0.71   | 0.51   | 6.49  | 9.07*      |
| WL357HQ  | 5.0   | 100           | 100   | 99     | 2.69              | 1.92   | 1.71   | 1.28   | 0.69   | 0.54   | 6.14  | 8.83*      |
| Dynagro Everlast                                   | 5.0   | 99            | 100   | 98     | 2.47              | 2.02   | 1.53   | 1.28   | 0.75   | 0.58   | 6.16  | 8.64*      |
| 6415   | 5.0   | 100           | 100   | 99     | 2.56              | 1.80   | 1.48   | 1.44   | 0.74   | 0.55   | 6.01  | 8.57*      |
| Reward II  | 4.5   | 100           | 100   | 99     | 2.56              | 2.06   | 1.45   | 1.18   | 0.69   | 0.57   | 5.95  | 8.50*      |
| Vernal   | 4.8   | 98            | 100   | 96     | 2.30              | 2.07   | 1.52   | 1.23   | 0.67   | 0.62   | 6.12  | 8.42*      |
| Arc (certified)                                    | 4.8   | 98            | 100   | 97     | 2.31              | 2.14   | 1.62   | 1.07   | 0.69   | 0.56   | 6.08  | 8.38*      |
| Buffalo  | 5.0   | 99            | 100   | 99     | 2.47              | 1.91   | 1.60   | 1.27   | 0.64   | 0.48   | 5.89  | 8.37*      |
| LegenDairy 5.0                                     | 5.0   | 100           | 100   | 99     | 2.62              | 1.72   | 1.50   | 1.29   | 0.68   | 0.48   | 5.67  | 8.29*      |
| TripleTrust 450                                    | 4.8   | 100           | 100   | 100    | 2.52              | 1.76   | 1.45   | 1.33   | 0.70   | 0.52   | 5.76  | 8.28*      |
| Saranac AR (certified)                             | 5.0   | 98            | 100   | 99     | 2.31              | 2.16   | 1.52   | 1.10   | 0.59   | 0.50   | 5.88  | 8.19       |
| Genoa  | 4.8   | 100           | 98    | 98     | 2.56              | 1.91   | 1.17   | 1.18   | 0.65   | 0.52   | 5.43  | 7.99       |
| Expedition   | 4.8   | 100           | 98    | 96     | 2.44              | 1.66   | 1.47   | 1.10   | 0.63   | 0.48   | 5.34  | 7.79       |
| <b>Experimental Varieties</b>                      |   |               |       |        |                   |        |        |        |        |        |       |            |
| A-4440   | 4.5   | 100           | 100   | 98     | 2.50              | 2.06   | 1.64   | 1.21   | 0.66   | 0.51   | 6.08  | 8.59*      |
| AA108E   | 5   | 99            | 100   | 99     | 2.50              | 1.76   | 1.51   | 1.33   | 0.74   | 0.52   | 5.86  | 8.36*      |
| Mean   | 4.8   | 99.3          | 99.5  | 97.9   | 2.50              | 1.96   | 1.55   | 1.24   | 0.68   | 0.53   | 5.96  | 8.46       |
| CV,%   | 8.0   | 2.0           | 2.0   | 1.7    | 8.12              | 13.35  | 17.60  | 11.08  | 16.65  | 18.03  | 9.47  | 7.06       |
| LSD,0.05   | 0.6   | 2.9           | 2.9   | 2.4    | 0.29              | 0.37   | 0.39   | 0.20   | 0.16   | 0.14   | 0.80  | 0.85       |

\*Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

<sup>1</sup> Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.

**Table 8. Characterization and performance of alfalfa varieties across years and locations.**

| Variety  | Variety Characteristics <sup>1</sup> | Lexington |                                 |    |    |     |     |                   |    |    |    | Princeton |      | Eden Shale |    |      |    |      |    |    |
|--|--------------------------------------|-----------|---------------------------------|----|----|-----|-----|-------------------|----|----|----|-----------|------|------------|----|------|----|------|----|----|
|  |                                      | FD4       | Disease Resistance <sup>2</sup> |    |    |     |     | 2002 <sup>3</sup> |    |    |    |           | 2004 |            |    | 2005 |    | 2003 |    |    |
|  |                                      |           | Bw                              | Fw | An | PRR | APH | 02                | 03 | 04 | 05 | 06        | 04   | 05         | 06 | 05   | 06 | 04   | 05 | 06 |
| <b>Commercial Varieties—Available for Farm Use</b> |                                      |           |                                 |    |    |     |     |                   |    |    |    |           |      |            |    |      |    |      |    |    |
| 4m76   | FFR/Southern States                  | 4.7       | HR                              | HR | R  | HR  | R   | *                 | *  | *  | *  | *         |      |            |    |      |    |      |    |    |
| 54V46  | Pioneer Hi-Bred                      | 4         | R                               | HR | HR | HR  | R   |                   |    |    |    |           |      |            |    |      |    | X    | *  | *  |
| 54V54  | Pioneer Hi-Bred                      | 4         | HR                              | HR | HR | HR  | HR  | *                 | X  | X  | X  | X         |      |            |    |      |    |      |    |    |
| 5-Star   | Croplan Genetics                     | 5         | R                               | HR | R  | R   | R   |                   |    |    |    |           |      |            |    |      |    | X    | *  | *  |
| 6400HT   | Garst Seed Co.                       |           |                                 |    |    |     |     |                   |    |    |    |           |      | *          | X  | *    |    |      |    |    |
| AC Longview  | Newfield Seeds Co. Ltd               |           | HR                              |    |    |     |     |                   |    |    |    |           |      | X          | X  | X    |    |      |    |    |
| Arc (certified)                                    | Public                               | 4         | LR                              | MR | HR | -   | -   | X                 | X  | X  | *  | X         | X    | X          | X  | X    | *  | *    |    |    |
| Baralfa 53HR                                       | Barenbrug USA                        | -         |                                 |    |    |     |     |                   |    |    |    |           |      |            |    |      | *  | *    |    |    |
| Buffalo  | Public                               | -         | -                               | -  | -  | -   | -   | *                 | X  | X  | X  | X         | X    | X          | X  | X    | *  | *    | X  | X  |
| DK140  | Monsanto                             | 4         | HR                              | HR | HR | HR  | HR  | X                 | X  | X  | X  | X         |      |            |    |      |    |      |    |    |
| Dynagro Everlast                                   | United Agri. Products                | 3.8       | HR                              | HR | HR | HR  | R   |                   |    |    |    |           |      |            |    |      | *  | *    |    |    |
| Evermore   | FFR/Southern States                  | 5         | HR                              | HR | HR | HR  | HR  |                   |    |    |    |           |      |            |    |      |    | *    | *  | *  |
| Expedition   | NK Brand/Syngenta Seeds              | 5         | HR                              | HR | R  | RR  | R   |                   |    |    |    |           |      | *          | X  | *    | *  | X    |    |    |
| Feast+EV   | Garst Seed Co.                       |           |                                 |    |    |     |     |                   |    |    |    |           |      | *          | *  | X    |    |      | X  | *  |
| FSG 408DP  | Allied Seed, L.L.C.                  | 4         | HR                              | HR | HR | HR  | R   |                   |    |    |    |           |      | *          | X  | X    |    |      |    |    |
| FSG 505  | Allied Seed, L.L.C.                  | 5         | HR                              | HR | HR | HR  | R   |                   |    |    |    |           |      |            |    |      |    |      | X  | *  |
| Garst 6415   | Garst Seed Co.                       | 4         | HR                              | HR | R  | HR  | R   |                   |    |    |    |           |      |            |    |      | *  | *    |    |    |
| Garst 6420   | Garst Seed Co.                       | 4         | HR                              | HR |    | HR  | R   | *                 | *  | X  | *  | *         |      |            |    |      |    |      |    |    |
| Geneva   | Novartis                             | 4         | HR                              | HR | HR | HR  | HR  | X                 | *  | X  | *  | *         |      |            |    |      |    |      |    |    |
| Genoa  | NK Brand/Syngenta Seeds              | 4         | HR                              | HR | HR | RR  | HR  |                   |    |    |    |           | *    | X          | *  | *    | *  | X    |    |    |
| GH 744   | Golden Harvest                       | 3.6       | HR                              | HR | HR | HR  | MR  | *                 | *  | X  | *  | *         |      |            |    |      |    |      |    |    |
| LegenDairy 5.0                                     | Croplan Genetics                     | 3         | HR                              | HR | HR | HR  | HR  |                   |    |    |    |           |      |            |    |      | *  | *    |    |    |
| Mountaineer 2.0                                    | Croplan Genetics                     | 5         | HR                              | HR | HR | RR  | HR  |                   |    |    |    |           | *    | X          | *  |      |    |      |    |    |
| Phirst   | UniSouth Genetics, Inc.              | 4         | HR                              | HR | HR | HR  | R   |                   |    |    |    |           |      |            |    |      | *  | *    |    |    |
| Regal  | Great Plains Research                | 5         | HR                              | HR | R  | HR  | MR  |                   |    |    |    |           |      |            |    |      |    |      | X  | *  |
| Reward II  | PGI Alfalfa, Inc.                    | 4         | HR                              | HR | R  | HR  | R   |                   |    |    |    |           |      |            |    |      | *  | *    | *  | *  |
| Saranac AR (cert.)                                 | Public                               | 4         | MR                              | R  | HR | LR  | -   | *                 | X  | X  | X  | X         | X    | X          | X  | X    | *  | *    | *  | *  |
| SummerGold   | Beck's Hybrids                       | 4         | HR                              | HR | HR | HR  | HR  |                   |    |    |    |           |      | *          | *  | *    |    |      |    |    |
| TripleTrust 450                                    | ABI Alfalfa, Inc                     | 5         | HR                              | HR | HR | HR  | HR  |                   |    |    |    |           |      |            |    |      | *  | *    |    |    |
| Vernal   | Public                               | 2         | R                               | MR | -  | -   | -   | *                 | X  | X  | *  | X         |      |            |    |      | X  | *    |    |    |
| WL319HQ  | W-L Research                         | 3         | HR                              | HR | HR | HR  | HR  | *                 | *  | X  | *  | *         |      |            |    |      |    |      |    |    |
| WL327  | W-L Research                         | 4         | HR                              | HR | HR | HR  | HR  | *                 | *  | X  | *  | *         |      |            |    |      |    |      |    |    |
| WL338SR  | W-L Research                         | 4         | HR                              | HR | HR | HR  | HR  | *                 | *  | X  | *  | *         |      |            |    |      |    |      |    |    |
| WL357HQ  | W-L Research                         | 5         | HR                              | HR | HR | HR  | HR  |                   |    |    |    |           | *    | *          | *  | *    | *  | *    | *  | *  |
| <b>Experimental Varieties</b>                      |                                      |           |                                 |    |    |     |     |                   |    |    |    |           |      |            |    |      |    |      |    |    |
| 41H158   | FFR/Southern States                  | 4         | HR                              | HR | HR | HR  | HR  |                   |    |    |    |           |      | X          | X  | *    |    |      |    |    |
| 50T176   | FFR/Southern States                  | 5         | HR                              | HR | HR | HR  | R   |                   |    |    |    |           |      | *          | *  | *    |    |      |    |    |
| A-4440   | PGI Alfalfa, Inc.                    |           |                                 |    |    |     |     |                   |    |    |    |           |      |            |    |      | *  | *    |    |    |
| AA108E   | ABI Alfalfa, Inc                     |           |                                 |    |    |     |     |                   |    |    |    |           |      |            |    |      | *  | *    |    |    |
| DU 202   | Great Plains Research                | 4         | HR                              | HR | HR | HR  | R   | *                 | *  | X  | *  | *         |      |            |    |      |    |      |    |    |
| VL02   | Great Plains Research                | 4         | HR                              | HR | HR | HR  | MR  |                   |    |    |    |           | *    | X          | *  |      |    |      |    |    |

<sup>1</sup> Variety characteristics: FD=fall dormancy, Bw=bacterial wilt, Fw=fusarium wilt, An=anthracnose, PRR=phytophthora root rot, APH-aphanomyces root rot. Information provided by seed companies.

<sup>2</sup> Disease resistance: S=susceptible, LR=low resistance, MR=moderate resistance, R=resistance, HR=high resistance.

<sup>3</sup> Establishment year.

<sup>4</sup> Fall dormancy: 1=Spredor 3, 2=Vernal, 3=Ranger, 4=Saranac, 5=DuPuits.

Open boxes indicate the variety was not in the test.

x in the box indicates the variety was in the test but yielded significantly less than the top-ranked variety in the test.

\* Not significantly different from the top-ranked variety in the test.

**Table 9. Summary of Kentucky Alfalfa Yield Trials 1995-2006 (yield shown as a percentage of the mean of the commercial varieties in the test).**

| Variety/ Proprietor   |                   | Variety Characteristics <sup>1</sup> |                                 |    |    |     |     | Lexington         |     |     |     |     |     | Princeton |     |     | Bowling Green <sup>2</sup> |     |     | Eden Shale |     | Mean <sup>6</sup><br>(# trials) |        |
|-----------------------|-------------------|--------------------------------------|---------------------------------|----|----|-----|-----|-------------------|-----|-----|-----|-----|-----|-----------|-----|-----|----------------------------|-----|-----|------------|-----|---------------------------------|--------|
|                       |                   | FD                                   | Disease Resistance <sup>3</sup> |    |    |     |     | 95 <sup>4,5</sup> | 97  | 97  | 99  | 00  | 02  | 04        | 97  | 99  | 01                         | 96  | 98  | 03         | 98  |                                 | 03     |
|                       |                   |                                      | Bw                              | Fw | An | PRR | APH | 6yr <sup>7</sup>  | 5yr | 6yr | 4yr | 5yr | 3yr | 5yr       | 4yr | 4yr | 7yr                        | 7yr | 3yr | 5yr        | 3yr |                                 |        |
| Abilene +Z            | America's Alf.    | 5                                    | HR                              | HR | HR | HR  | R   |                   |     |     |     |     |     |           |     |     |                            |     |     |            |     |                                 | 102(2) |
| ABT 205               | W-L Research      | 2                                    | HR                              | HR | HR | HR  | R   |                   |     | 100 |     |     |     | 97        |     |     |                            |     |     |            |     |                                 | 99(2)  |
| ABT 350               | W-L Research      | 3                                    | HR                              | HR | HR | HR  | HR  |                   |     |     |     |     |     | 98        |     |     |                            | 105 |     | 101        |     |                                 | 101(3) |
| ABT 400SCL            | W-L Research      | 4                                    | HR                              | HR | HR | HR  | HR  |                   |     |     |     |     |     | 102       |     |     |                            | 102 |     |            |     |                                 | 102(2) |
| ABT 405               | W-L Research      | 4                                    | HR                              | HR | HR | HR  | R   |                   | 101 | 101 |     |     |     |           |     | 108 |                            | 101 |     |            |     |                                 | 103(4) |
| AC Longview           | Newfield Seeds    |                                      | HR                              |    |    |     |     |                   |     |     |     |     | 85  |           |     |     |                            |     |     |            |     |                                 | -      |
| Affinity+Z            | ABI Alfalfa       | 4                                    | HR                              | HR | HR | HR  | R   |                   |     | 99  |     |     |     |           | 101 |     | 104                        |     |     |            |     |                                 | 101(3) |
| Alfagraze             | America's Alf.    | 2                                    | MR                              | R  | MR | R   | -   |                   | 99  |     |     |     |     |           |     |     |                            |     |     | 97         |     |                                 | 98(2)  |
| AmeriGraze 401+Z      | America's Alf.    | 4                                    | HR                              | HR | HR | HR  | R   |                   | 102 |     |     | 99  |     |           | 102 | 99  |                            |     |     | 102        |     |                                 | 101(5) |
| AmeriStand 403T       | America's Alf.    | 3                                    | HR                              | HR | HR | HR  | HR  |                   |     |     |     |     |     |           |     | 97  |                            |     |     |            |     |                                 | -      |
| Ameriguard 302+Z      | America's Alf.    | 3                                    | HR                              | HR | HR | HR  | HR  |                   |     |     |     | 103 |     |           |     |     |                            |     |     |            |     |                                 | -      |
| Apollo                | America's Alf.    | 4                                    | R                               | R  | R  | R   | -   |                   | 80  | 108 |     |     |     |           |     |     | 96                         |     |     |            |     |                                 | 95(3)  |
| Arc(certified)        | Public            | 4                                    | LR                              | MR | HR | -   | -   |                   | 98  | 101 | 87  | 99  | 91  | 96        | 84  | 96  | 100                        | 99  | 91  | 90         | 98  | 94                              | 95(14) |
| Baralfa 54            | Barenbrug         | -                                    | R                               | HR | HR | HR  | HR  |                   |     |     |     |     |     |           |     |     |                            |     | 96  |            | 99  |                                 | 98(2)  |
| Buffalo               | Public            | -                                    | -                               | -  | -  | -   | -   |                   |     |     |     |     | 90  | 82        |     |     |                            | 93  |     |            | 96  |                                 | 90(4)  |
| Choice                | FFR/Sou. St.      | 4                                    | HR                              | R  | R  | HR  | R   | 110               |     |     | 104 |     |     |           | 106 |     |                            | 103 | 97  |            | 103 |                                 | 104(6) |
| Cimarron3i            | Great Plains      | 4                                    | HR                              | HR | HR | HR  | HR  |                   |     |     | 100 |     |     |           |     |     |                            |     | 99  |            | 96  |                                 | 98(3)  |
| Cimarron SR           | Great Plains      | 4                                    | HR                              | HR | HR | HR  | MR  |                   |     |     |     | 103 |     |           |     | 101 |                            |     |     |            |     |                                 | 102(2) |
| Cimarron VR           | Great Plains      | 5                                    | HR                              | HR | R  | R   | MR  |                   |     |     | 99  |     |     |           |     |     |                            |     |     |            |     |                                 | -      |
| Demand                | ABI Alfalfa       | 3                                    | HR                              | HR | HR | HR  | R   |                   |     |     |     |     |     |           |     |     | 99                         |     |     |            |     |                                 | -      |
| Depend+EV             | ABI Alfalfa       | -                                    | -                               | -  | -  | -   | -   |                   |     |     |     |     |     |           |     |     |                            | 104 |     |            |     |                                 | -      |
| DK 127                | Monsanto          | 3                                    | HR                              | HR | HR | HR  | -   | 111               |     |     |     |     |     |           |     |     |                            | 102 |     |            |     |                                 | 107(2) |
| DK 133                | Monsanto          | 4                                    | HR                              | HR | HR | HR  | R   | 106               |     |     |     |     |     |           |     |     |                            | 104 |     |            |     |                                 | 105(2) |
| DK 131HQ              | Monsanto          | 3                                    | HR                              | HR | HR | HR  | R   |                   |     |     |     | 105 |     |           |     |     |                            |     |     |            |     |                                 | -      |
| DK 140                | Monsanto          | 4                                    | HR                              | HR | HR | HR  | H   |                   |     |     | 104 |     | 95  |           |     | 102 | 100                        |     | 103 |            | 103 |                                 | 101(6) |
| DK 141                | Monsanto          | 4                                    | HR                              | HR | HR | HR  | H   |                   |     |     | 99  |     |     |           |     | 98  |                            |     | 103 |            |     |                                 | 100(3) |
| Dominator             | America's Alf.    | 4                                    | HR                              | HR | HR | HR  | HR  | 102               |     |     |     |     |     |           |     |     |                            |     |     |            |     |                                 | -      |
| Dynagro Everlast      | United Agr. Prod. | 3.8                                  | HR                              | HR | HR | HR  | R   |                   |     |     |     |     |     |           |     |     |                            |     |     |            |     |                                 | -      |
| Emperor               | ABI Alfalfa       | 4                                    | HR                              | HR | HR | HR  | HR  |                   |     |     |     |     |     |           |     |     |                            |     | 102 |            | 93  |                                 | 98(2)  |
| Evermore              | FFR/Sou. St.      | 5                                    | HR                              | HR | HR | HR  | HR  |                   |     |     |     |     |     |           |     |     |                            |     |     | 105        |     | 104                             | 105(2) |
| Excalibur II          | Allied Seeds      | 4                                    | HR                              | HR | HR | HR  | R   | 107               |     |     |     |     |     |           |     |     |                            |     |     |            |     |                                 | -      |
| Expedition            | Syngenta          | 5                                    | HR                              | HR | R  | RR  | R   |                   |     |     |     | 110 |     |           |     |     |                            |     |     |            |     |                                 | -      |
| Feast                 | Garst Seeds       | 3                                    | HR                              | HR | HR | HR  | R   |                   | 101 |     |     |     |     |           | 101 |     |                            |     |     |            |     |                                 | 101(2) |
| Feast +EV             | Garst Seeds       | 3                                    | HR                              | HR | HR | R   | HR  |                   |     |     |     |     |     |           |     |     |                            |     |     | 101        |     | 97                              | 100(3) |
| FK 421                | Donely Seed       | 4                                    | HR                              | H  | H  | H   | H   |                   |     |     |     |     |     |           |     | 101 |                            |     |     |            |     |                                 | -      |
| Fortress              | Syngenta          | 3                                    | R                               | R  | R  | HR  | -   |                   | 99  | 96  |     |     |     |           | 97  |     |                            | 98  |     |            | 99  |                                 | 98(5)  |
| FSG 406               | Allied Seeds      | 4                                    | HR                              | HR | HR | HR  | HR  |                   |     |     |     |     |     |           |     |     |                            |     |     | 110        |     |                                 | -      |
| FSG 408DP             | Allied Seeds      | 4                                    | HR                              | HR | HR | HR  | R   |                   |     |     |     |     |     | 98        |     |     |                            |     |     |            |     |                                 | -      |
| FSG 505               | Allied Seeds      | 5                                    | HR                              | HR | HR | HR  | R   |                   |     |     |     |     |     |           |     |     |                            |     |     |            | 106 | 108                             | 107(2) |
| Gem                   | FFR/Sou. St.      | 4                                    | HR                              | HR | HR | HR  | S   |                   |     | 100 |     |     |     |           | 98  |     |                            | 101 |     |            | 105 |                                 | 101(4) |
| Geneva                | Syngenta          | 4                                    | HR                              | HR | HR | HR  | HR  |                   |     |     |     | 106 | 103 |           |     | 99  | 104                        |     | 101 |            | 102 |                                 | 103(6) |
| Genoa                 | Syngenta          | 4                                    | HR                              | HR | HR | RR  | HR  |                   |     |     |     |     |     | 112       |     |     |                            |     |     |            |     |                                 | -      |
| GH 744                | Golden Harvest    | 3.6                                  | HR                              | HR | HR | HR  | MR  |                   |     |     |     |     | 104 |           |     |     |                            |     |     |            |     |                                 | -      |
| Goldplus              | PGI Alfalfa       | 4                                    | HR                              | HR | HR | HR  | R   |                   |     |     |     |     |     |           |     |     |                            |     | 90  |            |     |                                 | -      |
| Grazeking             | FFR/Sou. St.      | 5                                    | MR                              | HR | HR | R   | S   |                   | 100 |     |     |     |     |           |     |     |                            |     |     |            |     | 102                             | 101(2) |
| Haygrazer             | Great Plains      | 4                                    | HR                              | HR | R  | R   | MR  |                   | 102 |     |     |     |     |           |     |     |                            |     |     |            | 100 |                                 | 101(2) |
| HybridForce 400       | Dairyland         | 4                                    | HR                              | HR | R  | HR  | MR  |                   |     |     |     |     |     |           |     | 106 |                            |     |     |            |     |                                 | -      |
| Imperial              | America's Alf.    | 3                                    | HR                              | HR | HR | HR  | R   |                   |     |     |     |     |     |           |     |     | 104                        |     |     |            |     |                                 | -      |
| Innovator+Z           | America's Alf.    | 3                                    | HR                              | HR | HR | HR  | R   |                   |     |     |     |     |     |           |     |     | 101                        |     |     |            |     |                                 | -      |
| Legacy                | Green Seed        | 4                                    | R                               | R  | R  | R   | R   | 88                |     |     |     |     |     |           |     |     | 96                         |     |     |            |     |                                 | 92(2)  |
| LH4                   | Pioneer           | 3                                    | HR                              | HR | HR | R   | R   |                   |     |     |     | 99  |     |           |     |     |                            |     |     |            |     |                                 | -      |
| Magnum V              | Dairyland         | 4                                    | HR                              | HR | R  | HR  | HR  |                   |     |     |     |     | 104 |           |     |     |                            |     |     |            |     |                                 | -      |
| Magnum V-wet          | Dairyland         | 3                                    | HR                              | HR | R  | HR  | MR  |                   |     |     |     |     | 105 |           |     |     |                            |     |     |            |     |                                 | -      |
| Mountaineer 2.0       | Croplan Gen.      | 5                                    | Hr                              | HR | HR | RR  | HR  |                   |     |     |     |     |     | 108       |     |     |                            |     |     |            |     |                                 | -      |
| Multiqueen            | Cal/West          | 4                                    | HR                              | HR | HR | HR  | R   | 103               |     |     |     |     |     |           |     |     |                            |     |     |            |     |                                 | -      |
| Pasture Plus          | MBS               | 3                                    | HR                              | HR | R  | HR  | MR  |                   |     |     |     |     |     |           |     |     |                            |     | 108 |            |     |                                 | -      |
| Pegasus               | FFR/Sou. St.      | 4                                    | HR                              | HR | HR | HR  | R   |                   |     |     |     |     |     |           |     | 95  |                            |     |     |            |     |                                 | -      |
| ProGro                | MBS               | 4                                    | HR                              | HR | R  | HR  | MR  |                   |     |     |     |     |     |           |     |     |                            |     |     | 95         |     |                                 | -      |
| Regal                 | Great Plains      | 5                                    | HR                              | HR | R  | HR  | MR  |                   |     |     |     |     |     |           |     |     |                            |     |     |            | 103 | 96                              | 100(2) |
| Reward                | PGI Alfalfa       | 4                                    | HR                              | HR | R  | HR  | MR  |                   |     |     |     |     |     |           | 98  |     |                            |     |     |            |     |                                 | -      |
| Reward II             | PGI Alfalfa       | 4                                    | HR                              | HR | R  | HR  | R   |                   |     |     |     |     |     |           |     | 99  |                            |     |     | 94         |     | 102                             | 98(3)  |
| Rushmore              | Syngenta          | 4                                    | HR                              | HR | HR | HR  | HR  | 108               |     |     |     | 95  |     |           | 103 |     |                            | 99  |     |            |     |                                 | 101(4) |
| Saranac AR(certified) | Public            | 4                                    | MR                              | R  | HR | LR  | -   | 103               | 99  | 95  | 96  | 93  | 87  | 83        | 93  |     | 92                         | 101 | 90  | 99         | 101 | 95                              | 95(14) |
| Spredor 3             | Syngenta          | 1                                    | HR                              | HR | R  | MR  | S   |                   | 95  |     |     |     |     |           |     |     |                            |     |     |            | 101 |                                 | 98(2)  |
| Stampede              | Allied Seeds      | 3                                    | HR                              | R  | R  | HR  | R   |                   | 95  |     |     |     |     |           |     |     |                            |     |     |            | 106 |                                 | 101(2) |
| Stellar               | W-L Research      | 4                                    | HR                              | HR | HR | HR  | LR  |                   |     |     |     |     |     |           |     |     |                            |     | 94  |            |     |                                 | -      |
| Summer Gold           | Beck's Hybrids    | 4                                    | HR                              | HR | HR | HR  | HR  |                   |     |     |     |     |     | 108       |     |     |                            |     |     |            |     |                                 | -      |
| Supercuts             | ABI Alfalfa       | 4                                    | HR                              | HR | HR | HR  | S   | 104               |     |     |     |     |     |           |     |     |                            | 103 |     |            |     |                                 | 104(2) |
| TMF Generation        | Mycogen Seeds     | 4                                    | HR                              | HR | HR | HR  | R   |                   |     |     |     |     |     |           |     |     |                            | 103 |     |            |     |                                 | -      |

