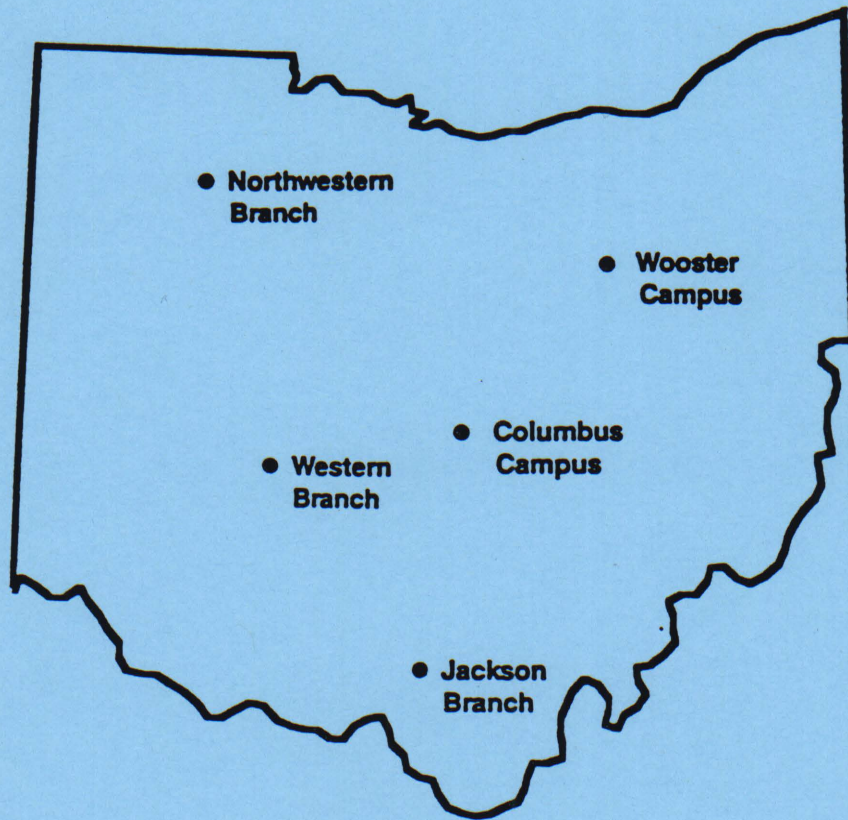


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1994 Ohio Forage Legume Performance Trials



The Ohio State University
Ohio Agricultural Research and Development Center
Ohio State University Extension
Horticulture and Crop Science
Department of Plant Pathology



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1994 OHIO FORAGE LEGUME PERFORMANCE TRIALS

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SUMMARY

This report is a summary of performance data collected from ongoing forage legume variety trials in Ohio. The 1994 report includes performance data of commercial alfalfa varieties in tests planted in 1990, 1991, 1992, and 1993 across five sites (Tables 3-9); commercial red clover varieties planted in 1993 at three sites (Tables 10-13), and commercial birdsfoot trefoil varieties planted in 1991 at two sites (Tables 14-16).

Interpreting Yield Data

Yield data are reported in Tables 3 through 9 and 11 through 16. Details of establishment and management of each test are listed in footnotes below the tables. Alfalfa and red clover varieties are ranked according to their performance in 1994. In addition, yield totals for previous harvest years are reported where stands were in at least the second production year.

Least significant differences (LSD) are listed at the bottom of each table. Differences between varieties are significant only if they are equal to or greater than the LSD value. If a given variety outyields another variety by as much or more than the LSD value, then we are 95% sure that the yield difference is real, with only a 5% probability that the difference is due to chance alone. For example, if variety X is 0.50 ton/acre higher in yield than variety Y, then this difference is statistically significant if the LSD is 0.50 or less. If the LSD is 0.51 or greater, then we cannot be confident that variety X really yields higher than variety Y under the conditions of the test.

The CV value, or coefficient of variation, listed at the bottom of each table is used as a measure of the precision of the experiment. Lower CV values will generally relate to lower experimental error in the trial. Uncontrollable or unmeasurable variations in soil fertility, soil drainage, and other environmental factors contribute to greater experimental error and higher CV values.

Results reported here should be representative of what might occur throughout the state but would be most applicable under environmental and management conditions similar to those of the tests. The relative yields of all forage legume varieties are affected by crop management and by environmental factors including soil type, winter conditions, soil moisture conditions, diseases, and insects. These factors vary with the year and location.

ALFALFA

Alfalfa has the highest combined yield and quality potential of any adapted perennial forage grown in Ohio. It is the state's largest single hay crop, being grown on about one-half of the total hay acres. Alfalfa requires well-drained soils with near-neutral pH (6.5-7.0) for greatest production and persistence. The following data summarize the results of the Ohio State University alfalfa performance trials. Alfalfa trials are initiated each year and data is collected for at least four years unless the stand becomes so depleted that further testing is no longer worthwhile.

Guidelines for Selecting Alfalfa Varieties

To capitalize on alfalfa's potential, select high-yielding varieties with resistance to problem diseases. Consider these factors when selecting alfalfa varieties for Ohio:

1. **Yield.** Yield is the major factor in determining profitability of an alfalfa stand. Select varieties with high yields over several locations and years. Varieties that perform equally well across several locations and years are probably adapted to a wider range of environmental conditions. Stable yield performance across several environments is important because soils may vary on your farm and weather conditions vary from year to year. Conditions on most farms are such that

several varieties may perform equally well. There is usually no need to rely on a single variety.

2. **Persistence.** Another important consideration beyond yield is how long the stand will last. Study variety performance by age of stand to get an estimate of longevity of stand productivity. Some varieties may decline with age more rapidly than others. This may influence your choice of variety depending on how long you intend to keep the stand in production. For long-term rotations, choose varieties with good performance in the fourth or fifth year of production. If you plan to harvest alfalfa for three years or less, then high performance during early years of the stand should be given major consideration.
3. **Fall dormancy (FD)** Alfalfa varieties with fall dormancy ratings of 1 through 5 are considered adequately winter hardy for Ohio conditions while those of 6 or higher are not considered adapted. Varieties with higher fall dormancy ratings tend to grow at a lower temperature. Thus they begin to grow earlier in the spring and later into the fall, extending the growing season. Until recently it was generally felt that fall dormancy rating was very closely correlated with winter hardiness. This relationship with modern varieties seems less dependable. Now, for example, a variety with a "2" dormancy rating may not always have greater cold tolerance compared to one with "3" fall dormancy rating. Fall dormancy ratings are given in Table 1.
4. **Disease and pest resistance.** Variety selection based on yield performance alone is less satisfactory than selections that also consider disease resistance characteristics. Resistance to specific disease-causing pathogens may be the most important attribute in an alfalfa variety. Pathogens can dramatically reduce yield and persistence of susceptible varieties. For example, *Phytophthora* root rot resistance is often very important on soils that are less than well-drained. The disease resistance characteristics of alfalfa varieties included in this report and their local seed marketers are listed in Table 1. Below is an explanation of the information found in Table 1.
 - a. **Bacterial Wilt (Bw) and Fusarium Wilt (Fw)** Nearly all alfalfa varieties currently grown in Ohio have resistance to Bacterial Wilt and Fusarium Wilt. The widespread use of these varieties has greatly diminished the significance of these diseases. However, severe losses can still be incurred in stands of susceptible varieties.
 - b. **Verticillium Wilt (Vw)** First detected in Ohio in 1984, this disease still has limited distribution within the state, having been confirmed on 17 farms in 9 Ohio counties. It has been found in Ashland, Columbiana, Franklin, Holmes, Knox, Logan, Medina, Stark, and Wayne Counties as of January, 1994. Verticillium Wilt is usually introduced into a field on invested seed and generally does not become a problem until the third production year. Scattered plants become yellow and stunted and gradually die, leaving a thin, unproductive stand.
 - c. **Anthracnose (An)** Anthracnose occurs during hot, rainy weather. The fungus attacks individual stems and grows into the crown, causing a crown rot and eventual death of the plant. However, severe losses can still be incurred in stands of susceptible varieties.
 - d. **Phytophthora Root Rot (PRR)** This disease typically occurs in heavy or poorly drained soils. However, when any soil becomes water saturated, the fungus may invade the taproot and destroy the plant. Even resistant varieties are fairly susceptible to Phytophthora in the seedling stage.
 - e. **Root Knot Nematode (RRN)** Damage from Root Knot Nematode is most likely to occur on sandy or organic (muck) soils. Small galls or 'knots' form on roots. These may be confused with nitrogen-fixing Rhizobium nodules.
 - f. **Aphanomyces root rot** may contribute to poor alfalfa establishment and growth in wet soils. Seedlings may die (damping off) if infection occurs at an early stage of development. Older seedlings are yellowed and stunted. When aphanomyces and phytophthora occur together, they form a destructive disease complex.
5. **Compare to check variety.** For comparisons of varieties across several trials, always compare varieties to the same check planted within the trial. The variety Vernal is used as a check in all Ohio trials.
6. **Use good management.** No variety can produce well under poor management. Good management considers all aspects of alfalfa production: seedbed preparation, liming and fertilization, seeding, pest control, harvest, storage, and postharvest treatment. Many newer varieties are better adapted to intensive management.

Table 1: Characteristics of Alfalfa Varieties Listed in This Report.

The abbreviations for the column headings are: **(FD)** Fall Dormancy; **(Bw)** Bacterial Wilt; **(Vw)** Verticillium Wilt; **(Fw)** Fusarium Wilt; **(An)** Anthracnose; **(PRR)** Phytophthora Root Rot; **(RKN)** Root Knot Nematode

Resistance Key: 0-5% = susceptible (S); 6-14% = low resistance (LR); 15-30% = moderate resistance (MR); 31-50% = resistance (R); >50% = high resistance (HR). If the resistance rating for a variety is not listed, then the variety is susceptible or has not been adequately tested.

| Variety | Marketer | FD | BW | VW | FW | AN | PRR | RKN | APH |
|----------------|-----------------------|----|----|----|----|----|-----|-----|-----|
| 2833 | Ciba-Geigy Seeds | 3 | HR | R | HR | HR | HR | -- | -- |
| 2980 | L.L. Olds | 3 | HR | R | R | R | HR | -- | R |
| 3324 | L. Herried Seed | 3 | HR | R | R | HR | HR | -- | R |
| 5246 | Pioneer | 3 | HR | R | HR | HR | HR | -- | MR |
| 5373 | Pioneer | 4 | HR | R | HR | HR | MR | -- | LR |
| 5454 | Pioneer | 4 | R | MR | HR | HR | HR | -- | LR |
| 9323 | Research Seeds/Shiss. | 3 | HR | R | HR | R | HR | -- | R |
| Achieva | Agway/Allied | 3 | R | R | HR | HR | HR | R | -- |
| Agate | Public | 2 | HR | -- | HR | MR | R | -- | -- |
| Aggressor | America's Alfalfa | 4 | HR | R | HR | HR | HR | -- | MR |
| Apollo Supreme | America's Alfalfa | 4 | HR | R | HR | HR | R | -- | -- |
| Arrow | America's Alfalfa | 3 | HR | R | HR | MR | HR | -- | -- |
| Asset | Allied Seed | 4 | HR | R | R | R | HR | -- | MR |
| B-54 | Allied Seed | | | | | | | | |
| Belmont | Great Plains | 5 | HR | R | HR | HR | R | -- | -- |
| Blazer XL | Cenex/Land O'lakes | 3 | R | R | HR | HR | HR | -- | R |
| Cimarron | Great Plains | 4 | HR | LR | HR | HR | MR | -- | -- |
| Cimarron VR | Great Plains | 4 | HR | R | HR | HR | R | MR | MR |
| Class | Union Seeds | 3 | HR | R | R | HR | HR | -- | R |
| Crockett | Northrup King | | | | | | | | |
| Crown II | Cargill | 3 | HR | R | HR | HR | HR | -- | -- |
| Crystal | PGI/MBS | 4 | HR | R | HR | R | HR | -- | LR |
| Dart | AgriPro | 3 | HR | R | HR | R | HR | -- | -- |
| Dawn | AgriPro | 3 | HR | R | HR | R | HR | -- | -- |
| DK 122 | Dekalb | 2 | HR | R | R | HR | HR | -- | -- |
| DK 125 | Dekalb | 3 | HR | R | R | HR | R | -- | -- |
| DK 133 | Dekalb | 4 | HR | R | HR | HR | HR | -- | R |
| Dominator | AgriPro | 4 | HR | R | HR | HR | HR | -- | R |
| Encore | Res.Seeds/Spangler | 3 | HR | R | HR | HR | HR | -- | R |
| Envy | Peterson Seed | 3 | HR | R | HR | HR | R | -- | MR |
| Fortress | Northrup King | 4 | R | R | R | R | HR | -- | -- |
| GH 777 | Golden Harvest | 3 | HR | R | HR | R | HR | -- | R |
| Garst 645 | ICI Seeds | 3 | HR | R | R | HR | HR | -- | MR |
| Homestead | Research Seeds | 3 | HR | R | HR | HR | HR | -- | -- |
| ICI 630 | ICI Seeds | 4 | HR | MR | R | MR | R | -- | -- |
| Impact | Peterson Seed | 3 | HR | R | HR | MR | R | -- | -- |
| Legacy | Genesis | 4 | HR | R | HR | R | HR | -- | -- |
| Legend | Cenex/Land O'lakes | 4 | HR | R | HR | HR | HR | -- | -- |
| Magnum III | Dairyland | 4 | R | MR | R | MR | R | -- | LR |
| MultiKing I | Northrup King | 3 | HR | R | HR | R | R | -- | -- |
| Multi-Plier | Jacques | 3 | HR | R | HR | HR | HR | -- | -- |
| Multistar | FFR | 3 | HR | R | HR | HR | HR | -- | -- |
| Pacesetter | Research Seeds/Brown | 2 | HR | R | R | HR | HR | -- | -- |
| PGI 4212 | Mike Brayton Seeds | | | | | | | | |
| Precedent | Doebblers/Wyffels | 4 | HR | R | R | R | HR | -- | R |
| Premier | Wyffels/Wetsel | 4 | HR | R | HR | HR | HR | MR | -- |
| Prism | Beachley-Hardy | 4 | HR | R | R | HR | HR | -- | MR |
| Pro-Cut 2 | L. Herried | 4 | HR | R | R | R | HR | -- | MR |

Table 1: Characteristics of Alfalfa Varieties Listed in This Report (continued).

| Variety | Marketer | FD | BW | VW | FW | AN | PRR | RKN | APH |
|-------------|------------------|----|----|----|----|----|-----|-----|-----|
| Resistar | FFR | 4 | R | HR | HR | R | HR | -- | -- |
| Sabre | Agway/Allied | 4 | HR | HR | HR | HR | R | -- | -- |
| Shenandoah | Great Plains | | | | | | | | |
| Spur | Madison Seed Co. | | | | | | | | |
| Stine 9227 | Stine | 4 | HR | R | HR | HR | HR | -- | MR |
| Venture | Merrit Seeds | 4 | HR | R | R | HR | R | -- | R |
| Vernal | Public | 2 | R | -- | MR | -- | -- | MR | -- |
| Wampr | FFR | 4 | R | R | R | R | R | -- | -- |
| Webfoot MPR | Great Lakes | 4 | HR | HR | HR | HR | HR | -- | R |
| WL 225 | W-L Research | 2 | HR | R | HR | MR | HR | MR | -- |
| WL 317 | W-L Research | 3 | HR | R | HR | R | HR | MR | -- |
| WL 320 | W-L Research | 4 | R | MR | HR | MR | R | MR | -- |
| WL 322 HQ | W-L Research | 4 | HR | R | HR | MR | R | -- | -- |
| Zenith | ICI Seeds | 3 | HR | R | R | HR | R | -- | -- |

1994 Growing Season

The 1994 Ohio growing season started with above average rainfall and temperature (April) then turned cooler and drier than average (Table 2). Total rainfall for May ranged from 30 to 50% of the long term average throughout the state. Low incident rainfall had the greatest impact on alfalfa production at the Western and Jackson locations. Rainfall at the Western Branch (S. Charleston) was below the long term average throughout the growing season (April through August) and reduced the first cutting yield by about 50% (Table 7).

The reduction of total alfalfa production at the Jackson location was greater for the August 1993 seeding (Table 3) than for the older test (Table 6), partially due to the fact that only three harvests were taken from the August 1993 seeding. No major disease problems were observed during the 1994 season. Insect problems (weevil and leafhopper) were more prevalent at the Columbus and Wooster locations.

Table 2: Weather data summary for the 1994 growing season.

| Month | Columbus | | Wooster | | Western | | Northwestern | | Jackson | |
|--|-------------|-------------|-------------|-------------|-------------|--------------|--------------|--------------|-------------|--------------|
| | Total | DFA* | Total | DFA | Total | DFA | Total | DFA | Total | DFA |
| -----Precipitation (inches of rainfall)----- | | | | | | | | | | |
| Apr | 4.62 | 0.89 | 4.55 | 1.20 | 3.04 | -0.93 | 4.38 | 1.10 | 3.73 | -0.15 |
| May | 2.34 | -1.83 | 1.84 | -4.12 | 1.66 | -2.81 | 0.97 | -2.36 | 1.84 | -2.22 |
| June | 4.62 | 0.31 | 4.28 | 0.33 | 2.38 | -1.71 | 3.59 | 0.02 | 4.02 | 0.31 |
| July | 6.10 | 1.56 | 2.08 | -2.08 | 3.80 | -0.32 | 1.48 | -2.42 | 3.72 | -0.76 |
| Aug | <u>4.89</u> | <u>1.14</u> | <u>5.00</u> | <u>1.35</u> | <u>3.22</u> | <u>-0.35</u> | <u>2.69</u> | <u>-0.41</u> | <u>3.35</u> | <u>-0.34</u> |
| Total | 22.57 | 2.07 | 17.75 | -3.32 | 14.10 | -5.42 | 13.11 | -4.07 | 16.66 | -3.16 |
| -----Average Daily Temperature (°F)----- | | | | | | | | | | |
| Apr | 53.4 | 2.2 | 50.5 | 2.3 | 52.8 | 1.6 | 50.2 | 1.1 | 55.2 | 2.8 |
| May | 58.6 | -2.9 | 55.2 | -3.4 | 58.8 | -2.6 | 57.7 | -2.3 | 57.9 | -3.9 |
| June | 70.7 | 0.4 | 69.5 | 2.0 | 72.9 | 2.7 | 71.5 | 2.1 | 72.5 | 2.7 |
| July | 73.9 | -0.3 | 72.5 | 1.0 | 73.3 | -0.5 | 73.2 | 0.4 | 73.6 | 0.1 |
| Aug | 70.2 | -2.4 | 68.0 | -1.9 | 69.4 | -2.5 | 68.4 | -2.1 | 70.0 | -2.1 |

*DFA = departure from longterm average

Table 3: Alfalfa Cultivar Trials - Jackson 1994

| Cultivar | 1994 Yield | | | Total | 1994 Relative Yield (% Vernal) |
|-------------|-----------------------------------|-------|-------|-------|---|
| | 5/25 | 6/28 | 7/26 | | |
| | ------(Tons Dry Matter/Acre)----- | | | | |
| 5454 | 1.79 | 0.47 | 0.98 | 3.25 | 107 |
| Crystal | 1.75 | 0.50 | 0.97 | 3.22 | 106 |
| Aggressor | 1.67 | 0.50 | 0.94 | 3.11 | 102 |
| Magnum IV | 1.70 | 0.44 | 0.93 | 3.07 | 101 |
| Vernal | 1.54 | 0.47 | 1.03 | 3.03 | 100 |
| Webfoot MPR | 1.64 | 0.46 | 0.92 | 3.02 | 100 |
| 2833 | 1.55 | 0.45 | 0.98 | 2.98 | 98 |
| 8920 MF | 1.53 | 0.48 | 0.97 | 2.98 | 98 |
| Key | 1.50 | 0.49 | 0.97 | 2.96 | 97 |
| WL 323 | 1.37 | 0.49 | 1.05 | 2.91 | 96 |
| Rushmore* | 1.44 | 0.46 | 0.96 | 2.85 | 94 |
| Cimarron VR | 1.43 | 0.45 | 0.96 | 2.84 | 94 |
| DK 133 | 1.44 | 0.46 | 0.90 | 2.80 | 92 |
| Agate | 1.39 | 0.46 | 0.92 | 2.77 | 91 |
| Avg. | 1.55 | 0.46 | 0.96 | 2.98 | |
| LSD 0.05 | 0.224 | 0.039 | 0.096 | 0.261 | |
| CV % | 10.2 | 5.9 | 7.1 | 6.2 | |

*Variety tested using experimental seed that may not give performance identical to commercially available seed.

Location: Jackson, Ohio
Date seeded: 27 August 1993
Establishment: Seeded with Carter cone seeder at 15 lb/a of inoculated seed. A uniform application of Ronilan (2 lb/a) on 26 Oct. 1993 for sclerotinia control.
Soil type and status: Gilpin loamy clay; pH = 5.3, P = 84 lb/a, K = 231 lb/a (4/93), 2 ton/a of lime applied and incorporated in June 1993, 600 lb/a of 0-0-60 + 200 lb/a of 0-46-0 applied and incorporated prior to seeding, 100 lb/a of 0-46-0 and 1 ton/a of lime surface applied at seeding
Pest control: Herbicide applied on 15 June for grassy weed control plus a uniform application of an insecticide for leafhopper control.

Table 4: Alfalfa Cultivar Trials - Wooster 1994

| Cultivar | 1994 Yield | | | | | 1993 Total | 2-Year Total | 1994 Relative Yield (% Vernal) |
|----------------|-----------------------------------|-------|-------|-------|-------|---------------|-----------------|---|
| | 5/27 | 6/30 | 8/1 | 9/8 | Total | | | |
| | ------(Tons Dry Matter/Acre)----- | | | | | | | |
| Precedent | 3.02 | 1.99 | 2.08 | 1.79 | 8.87 | 6.04 | 14.91 | 109 |
| DK 122 | 3.00 | 2.05 | 2.02 | 1.81 | 8.87 | 5.83 | 14.70 | 109 |
| 5454 | 2.93 | 2.15 | 1.92 | 1.79 | 8.80 | 6.15 | 14.95 | 108 |
| 2833 | 3.09 | 1.84 | 1.98 | 1.73 | 8.64 | 6.08 | 14.72 | 106 |
| DK 133 | 2.91 | 1.99 | 2.04 | 1.70 | 8.63 | 6.23 | 14.86 | 106 |
| PGI 4212 | 2.90 | 1.87 | 2.11 | 1.74 | 8.62 | 5.84 | 14.46 | 106 |
| Encore | 2.93 | 2.00 | 1.93 | 1.76 | 8.62 | 5.84 | 14.46 | 106 |
| Multi-plier | 3.00 | 1.97 | 1.94 | 1.69 | 8.59 | 6.11 | 14.70 | 106 |
| Legend | 2.88 | 2.02 | 1.91 | 1.77 | 8.58 | 5.89 | 14.47 | 106 |
| Crown II | 2.99 | 1.80 | 2.08 | 1.71 | 8.58 | 6.22 | 14.80 | 106 |
| Cimarron-VR | 2.79 | 2.02 | 2.06 | 1.71 | 8.57 | 5.86 | 14.43 | 106 |
| Dividend* | 2.89 | 1.89 | 2.06 | 1.68 | 8.51 | 5.93 | 14.44 | 105 |
| Homestead | 2.78 | 2.00 | 1.96 | 1.77 | 8.51 | 6.10 | 14.61 | 105 |
| ICI 630 | 2.91 | 1.97 | 1.83 | 1.76 | 8.47 | 6.08 | 14.55 | 104 |
| Aggressor | 2.84 | 1.94 | 1.95 | 1.72 | 8.46 | 5.90 | 14.36 | 104 |
| Garst 645 | 2.69 | 2.02 | 1.94 | 1.76 | 8.41 | 5.82 | 14.23 | 103 |
| Stine 9227 | 2.86 | 1.83 | 1.91 | 1.75 | 8.35 | 5.93 | 14.28 | 103 |
| Dart | 2.74 | 1.90 | 1.94 | 1.74 | 8.33 | 5.66 | 13.99 | 103 |
| Prism | 2.89 | 1.84 | 1.84 | 1.74 | 8.31 | 6.05 | 14.36 | 102 |
| Arrow | 2.72 | 1.85 | 1.97 | 1.75 | 8.30 | 5.54 | 13.84 | 102 |
| Dominator | 2.69 | 1.96 | 1.92 | 1.67 | 8.26 | 5.89 | 14.15 | 102 |
| Magnum III | 2.88 | 1.88 | 1.82 | 1.66 | 8.25 | 6.18 | 14.43 | 102 |
| 5246 | 2.71 | 1.92 | 1.89 | 1.73 | 8.24 | 5.94 | 14.18 | 101 |
| WL 322 HQ | 2.73 | 1.99 | 1.84 | 1.67 | 8.23 | 5.78 | 14.01 | 101 |
| 3324* | 2.64 | 1.98 | 1.93 | 1.66 | 8.20 | 6.11 | 14.31 | 101 |
| Apollo Supreme | 2.64 | 1.96 | 1.86 | 1.71 | 8.18 | 5.67 | 13.85 | 101 |
| Asset | 2.74 | 1.84 | 1.86 | 1.70 | 8.13 | 5.83 | 13.96 | 100 |
| Vernal | 2.80 | 1.91 | 1.85 | 1.57 | 8.12 | 5.74 | 13.86 | 100 |
| Crystal | 2.78 | 1.68 | 1.97 | 1.68 | 8.10 | 6.06 | 14.16 | 100 |
| Spur | 2.82 | 1.75 | 1.80 | 1.72 | 8.08 | 6.08 | 14.16 | 100 |
| Achieva | 2.65 | 1.68 | 1.98 | 1.74 | 8.05 | 5.58 | 13.63 | 99 |
| Dawn | 2.65 | 1.83 | 1.82 | 1.68 | 7.98 | 5.87 | 13.85 | 98 |
| Venture | 2.77 | 1.72 | 1.79 | 1.66 | 7.93 | 5.86 | 13.79 | 98 |
| Webfoot MPR | 2.59 | 1.83 | 1.76 | 1.67 | 7.85 | 5.81 | 13.66 | 97 |
| WL 317 | 2.56 | 1.68 | 1.85 | 1.66 | 7.76 | 5.81 | 13.57 | 96 |
| Agate | 2.86 | 1.54 | 1.73 | 1.55 | 7.68 | 5.64 | 13.32 | 95 |
| Avg. | 2.81 | 1.87 | 1.92 | 1.71 | 8.33 | 5.92 | 14.25 | -- |
| LSD 0.05 | 0.243 | 0.427 | 0.183 | 0.131 | 0.707 | 0.417 | -- | |
| CV % | 6.2 | 16.1 | 6.8 | 5.5 | 6.1 | 5.0 | | |

*Variety tested using experimental seed that may not give performance identical to commercially available seed.

Location: Schaffter Farm, Wooster, Ohio
Date seeded: 24 August 1992
Establishment: Bandseeded at 15 lb/a with presswheels and 100 lb/a of 0-46-0. Uniform application of Ronilin (2 lb/a) applied 21 Oct. 1992 for *sclerotinia* control
Soil type & status: Riddles silt loam, pH = 7.2, P = 106 lb/a, K = 246 lb/a (4/94)
Fertilization: Annual fall application of 300 lb/a of 0-46-0 and 500 lb/a of 0-0-60, plus 300 lb/a of 0-0-60 after first harvest each spring
Pest control: Insecticide was applied for leafhopper control 14 June and 15 July 1994.

Table 5: Alfalfa Cultivar Trials - Columbus 1994

| Cultivar | 1994 Yield | | | | | 1993 Total | 2-Year Total | 1994 Relative Yield (% Vernal) |
|----------------|-----------------------------------|-------|-------|-------|-------|---------------|-----------------|---|
| | 5/23 | 6/22 | 7/26 | 9/8 | Total | | | |
| | ------(Tons Dry Matter/Acre)----- | | | | | | | |
| ICI 630 | 2.96 | 1.63 | 1.71 | 1.63 | 7.94 | 7.28 | 15.22 | 112 |
| Dawn | 2.89 | 1.65 | 1.71 | 1.66 | 7.90 | 7.21 | 15.11 | 112 |
| DK 133 | 2.84 | 1.65 | 1.82 | 1.58 | 7.89 | 7.64 | 15.53 | 112 |
| WL 322 HQ | 2.88 | 1.69 | 1.74 | 1.58 | 7.89 | 7.36 | 15.25 | 112 |
| DK 125 | 3.01 | 1.59 | 1.78 | 1.49 | 7.86 | 7.47 | 15.33 | 111 |
| Webfoot MPR | 2.93 | 1.63 | 1.69 | 1.61 | 7.86 | 7.82 | 15.68 | 111 |
| Dominator | 2.80 | 1.68 | 1.76 | 1.54 | 7.77 | 6.89 | 14.66 | 110 |
| Magnum III | 2.76 | 1.69 | 1.82 | 1.46 | 7.73 | 7.80 | 15.53 | 109 |
| Garst 645 | 2.85 | 1.52 | 1.79 | 1.41 | 7.58 | 6.79 | 14.37 | 107 |
| Belmont | 2.96 | 1.54 | 1.69 | 1.34 | 7.54 | 7.36 | 14.90 | 107 |
| 5373 | 2.84 | 1.58 | 1.71 | 1.38 | 7.51 | 7.27 | 14.78 | 106 |
| Aggressor | 2.74 | 1.46 | 1.65 | 1.44 | 7.30 | 6.79 | 14.09 | 103 |
| 5454 | 2.77 | 1.43 | 1.76 | 1.30 | 7.27 | 6.36 | 13.63 | 103 |
| Dart | 2.76 | 1.44 | 1.65 | 1.34 | 7.21 | 6.80 | 14.01 | 102 |
| Arrow | 2.83 | 1.38 | 1.55 | 1.32 | 7.08 | 7.09 | 14.17 | 100 |
| Vernal | 2.67 | 1.45 | 1.67 | 1.27 | 7.07 | 6.61 | 13.68 | 100 |
| Apollo Supreme | 2.78 | 1.40 | 1.42 | 1.34 | 6.94 | 6.80 | 13.74 | 98 |
| Agate | 2.48 | 1.18 | 1.54 | 1.11 | 6.31 | 6.38 | 12.69 | 89 |
| Avg. | 2.83 | 1.55 | 1.70 | 1.46 | 7.54 | 7.15 | | |
| LSD 0.05 | 0.218 | 0.249 | 0.246 | 0.245 | 0.718 | 0.969 | | |
| CV % | 4.6 | 9.8 | 8.8 | 10.2 | 5.8 | 8.2 | | |

*Variety tested using experimental seed that may not give performance identical to commercially available seed.

Location: Columbus, Ohio
Date seeded: 27 August 1992
Establishment: Bandseeded with presswheels at 15 lb/a and 100 lb/a of 0-46-0.
Soil type and status: Crosby clay loam, pH = 6.5, P = 158 lb/a, K = 295 lb/a (4/93)
Fertilization: Annual fall application of 300 lb/a of 0-46-0 and 500 lb/a of 0-0-60, plus 300 lb/a of 0-0-60 applied after first harvest each spring
Pest control: Insecticide was applied on 13 May for weevil control. For the control of leafhopper damage an additional insecticide was applied on 14 June, 11 July, and 15 August 1994.

Table 6: Alfalfa Cultivar Trials - Jackson 1994

| Cultivar | 1994 Yield | | | | | 1992 Total | 1993 Total | 3-Year Total | 1994 Relative Yield (% Vernal) |
|------------|-----------------------------------|------|-------|-------|-------|---------------|---------------|-----------------|---|
| | 5/18 | 6/26 | 8/8 | 9/14 | Total | | | | |
| | ------(Tons Dry Matter/Acre)----- | | | | | | | | |
| Legend | 1.72 | 1.20 | 1.62 | 0.81 | 5.36 | 5.22 | 5.66 | 16.24 | 122 |
| 9323* | 1.81 | 1.26 | 1.53 | 0.72 | 5.32 | 5.29 | 5.92 | 16.53 | 121 |
| Crown II | 1.72 | 1.22 | 1.49 | 0.74 | 5.17 | 4.81 | 5.52 | 15.50 | 118 |
| Encore | 1.48 | 1.23 | 1.71 | 0.75 | 5.16 | 4.80 | 6.13 | 16.09 | 118 |
| Achieva* | 1.54 | 1.23 | 1.56 | 0.69 | 5.02 | 4.99 | 5.37 | 15.38 | 115 |
| Class* | 1.53 | 1.16 | 1.53 | 0.76 | 4.98 | 4.69 | 5.33 | 15.00 | 114 |
| Resistar | 1.64 | 1.14 | 1.38 | 0.77 | 4.94 | 5.20 | 5.47 | 15.61 | 113 |
| 2833 | 1.55 | 1.20 | 1.47 | 0.72 | 4.94 | 4.84 | 5.54 | 15.32 | 113 |
| Belmont | 1.47 | 1.15 | 1.56 | 0.72 | 4.89 | 4.65 | 5.70 | 15.24 | 112 |
| WAMPR | 1.50 | 1.15 | 1.44 | 0.71 | 4.81 | 4.51 | 5.87 | 15.19 | 110 |
| WL 317 | 1.48 | 1.11 | 1.44 | 0.73 | 4.76 | 4.10 | 5.66 | 14.52 | 109 |
| Crystal | 1.42 | 1.13 | 1.48 | 0.70 | 4.73 | 4.14 | 5.79 | 14.66 | 108 |
| Shenandoah | 1.32 | 1.18 | 1.50 | 0.70 | 4.70 | 3.74 | 5.23 | 13.67 | 107 |
| Zenith | 1.54 | 1.13 | 1.33 | 0.68 | 4.68 | 4.60 | 5.20 | 14.48 | 107 |
| Homestead | 1.57 | 1.01 | 1.38 | 0.67 | 4.63 | 5.02 | 5.03 | 14.68 | 106 |
| Prism | 1.43 | 1.07 | 1.52 | 0.61 | 4.63 | 5.09 | 5.17 | 14.89 | 106 |
| Fortress | 1.36 | 1.14 | 1.34 | 0.70 | 4.54 | 4.13 | 5.37 | 14.04 | 104 |
| W1 322 HQ | 1.58 | 1.04 | 1.24 | 0.67 | 4.52 | 4.43 | 4.82 | 13.77 | 103 |
| Crockett | 1.36 | 1.07 | 1.47 | 0.51 | 4.41 | 3.55 | 4.72 | 12.68 | 101 |
| Vernal | 1.23 | 1.08 | 1.49 | 0.59 | 4.38 | 3.65 | 3.39 | 11.42 | 100 |
| Avg. | 1.52 | 1.14 | 1.47 | 0.70 | 4.82 | 4.57 | 5.37 | 14.76 | 110 |
| LSD 0.05 | NS | NS | 0.227 | 0.138 | 0.557 | 0.79 | 0.853 | -- | -- |
| CV% | 12.8 | 14.2 | 9.3 | 11.5 | 7.0 | 10.5 | 9.6 | -- | 7.0 |

*Variety tested using experimental seed that may not give performance identical to commercially available seed.

Location: Jackson, Ohio
Date seeded: 27 August 1991
Establishment: Bandseeded with presswheels at 12 lb/a and 100 lb/a of 0-46-0. All seed inoculated.
A uniform application of Ronilan was applied on 15 Oct for *sclerotinia* control.
Soil type: Monogahela silt loam; pH = 6.8, P = 162 lb/a, K = 367 lb/a (28 September 1992).
Fertilization: Annual fall application of 200 lb/a of 0-46-0 and 400 lb/a of 0-0-60, plus 300 lb/a of 0-0-60 after first harvest.
Pest control: No pesticides applied in 1994.

Table 7: Alfalfa Cultivar Trials - Western Branch 1994

| Cultivar | 1994 Yield | | | | | 1992 Total | 1993 Total | 3-Year Total | 1994 Relative Yield (% Vernal) |
|----------------|-----------------------------------|-------|-------|-------|-------|---------------|---------------|-----------------|---|
| | 5/20 | 6/28 | 8/1 | 9/7 | Total | | | | |
| | ------(Tons Dry Matter/Acre)----- | | | | | | | | |
| Webfoot MPR* | 0.89 | 2.16 | 1.46 | 0.89 | 5.39 | 1.80 | 4.56 | 11.75 | 137 |
| Multistar | 1.21 | 1.30 | 1.75 | 1.01 | 5.27 | 1.90 | 4.87 | 12.04 | 134 |
| Resistar | 1.29 | 1.20 | 1.60 | 0.97 | 5.07 | 1.92 | 4.89 | 11.88 | 129 |
| Dart | 1.23 | 1.16 | 1.69 | 0.98 | 5.06 | 1.80 | 4.82 | 11.68 | 128 |
| Dawn | 1.19 | 1.35 | 1.62 | 0.88 | 5.03 | 1.76 | 4.32 | 11.11 | 128 |
| Sabre | 1.08 | 1.08 | 1.99 | 0.82 | 4.97 | 1.93 | 4.34 | 11.24 | 126 |
| Mulit-plier | 1.01 | 1.30 | 1.65 | 0.94 | 4.90 | 1.95 | 4.80 | 11.65 | 124 |
| Prism | 1.15 | 1.27 | 1.57 | 0.91 | 4.90 | 1.96 | 4.73 | 11.59 | 124 |
| Apollo Supreme | 1.17 | 1.22 | 1.58 | 0.92 | 4.89 | 1.85 | 4.38 | 11.12 | 124 |
| Crystal | 1.02 | 1.05 | 1.88 | 0.93 | 4.89 | 1.70 | 4.33 | 10.92 | 124 |
| DK 133* | 1.20 | 1.24 | 1.35 | 0.98 | 4.76 | 2.15 | 4.61 | 11.52 | 121 |
| Cimarron-VR | 1.13 | 1.16 | 1.55 | 0.91 | 4.74 | 1.81 | 4.32 | 10.87 | 120 |
| Encore | 0.97 | 1.25 | 1.57 | 0.92 | 4.72 | 2.01 | 5.05 | 11.78 | 120 |
| Crown II | 1.06 | 1.26 | 1.47 | 0.92 | 4.70 | 1.94 | 4.65 | 11.29 | 119 |
| Zenith | 1.01 | 1.18 | 1.59 | 0.90 | 4.68 | 1.88 | 4.68 | 11.24 | 119 |
| 9323* | 0.99 | 1.14 | 1.61 | 0.93 | 4.67 | 2.01 | 4.76 | 11.44 | 119 |
| Class* | 1.05 | 1.24 | 1.44 | 0.91 | 4.65 | 1.77 | 4.50 | 10.92 | 118 |
| Arrow | 1.14 | 1.17 | 1.46 | 0.86 | 4.63 | 2.05 | 4.49 | 11.17 | 118 |
| WL 317 | 1.02 | 1.19 | 1.54 | 0.87 | 4.63 | 1.65 | 3.96 | 10.24 | 118 |
| Fortress | 1.09 | 1.08 | 1.53 | 0.92 | 4.62 | 1.86 | 4.51 | 10.99 | 117 |
| 2833 | 1.05 | 1.24 | 1.47 | 0.84 | 4.59 | 2.26 | 4.74 | 11.59 | 117 |
| Homestead | 1.05 | 1.15 | 1.47 | 0.90 | 4.57 | 1.98 | 4.65 | 11.20 | 116 |
| Legend | 1.01 | 1.12 | 1.53 | 0.89 | 4.55 | 2.07 | 4.53 | 11.15 | 115 |
| Asset | 1.06 | 1.10 | 1.50 | 0.87 | 4.53 | 1.93 | 4.27 | 10.73 | 115 |
| Impact | 1.00 | 1.12 | 1.37 | 1.02 | 4.51 | 1.90 | 4.35 | 10.76 | 115 |
| WAMPR | 1.03 | 1.09 | 1.48 | 0.90 | 4.50 | 1.76 | 4.91 | 11.17 | 114 |
| DK 122 | 0.99 | 1.22 | 1.39 | 0.90 | 4.49 | 1.84 | 4.27 | 10.60 | 114 |
| WL 322 HQ | 1.13 | 1.17 | 1.35 | 0.84 | 4.49 | 2.12 | 4.61 | 11.22 | 114 |
| Belmont | 1.17 | 1.10 | 1.34 | 0.88 | 4.49 | 1.84 | 4.47 | 10.80 | 114 |
| Envy | 1.10 | 1.17 | 1.39 | 0.83 | 4.48 | 1.99 | 4.14 | 10.61 | 114 |
| Shenandoah | 1.00 | 1.05 | 1.46 | 0.96 | 4.47 | 1.67 | 4.58 | 10.72 | 114 |
| Achieva* | 0.98 | 1.00 | 1.46 | 0.87 | 4.31 | 1.91 | 4.47 | 10.69 | 109 |
| MultiKing I | 0.82 | 0.97 | 1.58 | 0.88 | 4.25 | 1.90 | 4.42 | 10.57 | 108 |
| Flagship ML | 0.96 | 0.94 | 1.42 | 0.64 | 3.95 | 1.89 | 4.37 | 10.21 | 100 |
| Vernal | 0.99 | 0.97 | 1.22 | 0.76 | 3.94 | 1.83 | 3.47 | 9.24 | 100 |
| Avg. | 1.08 | 1.19 | 1.52 | 0.90 | 4.68 | 1.91 | 4.53 | 11.12 | -- |
| LSD 0.05 | 0.159 | 0.153 | 0.167 | 0.114 | 0.367 | 0.381 | 0.543 | -- | -- |
| CS % | 9.1 | 7.9 | 6.8 | 7.8 | 4.8 | 12.2 | 7.4 | -- | -- |

*Variety tested using experimental seed that may not give performance identical to commercially available seed.

Location: South Charleston, Ohio

Date seeded: 28 August 1991

Establishment: Bandseeded with presswheels at 12 lb/a and 100 lb/a of 0-46-0. All seed inoculated.

Soil type: Crosby silt loam; pH = 6.7, P = 124 lb/a, K = 344 lb/a.

Fertilization: Annual fall application of 400 lb/a of 0-46-0 and 0-0-60, plus 400 lb/a of 0-0-60 and 200 lb/a of 0-46-0 after first harvest in 1994.

Pest control: Insecticide was applied for leafhopper control on 13 July, 1994.

Table 8: Multileaf Alfalfa Cultivar Trials - Columbus 1994

| Cultivar | 1994 Yield | | | | 1991 Total | 1992 Total | 1993 Total | 4 Year Total | 1994 Relative Yield (% Vernal) | |
|-------------------|--|-------|-------|-------|---------------|---------------|---------------|-----------------|---|-------|
| | 5/25 | 6/24 | 7/26 | 9/8 | | | | | | Total |
| | ----- (Tons Dry Matter/Acre) ----- | | | | | | | | | |
| Pacesetter | 2.52 | 1.13 | 1.90 | 1.42 | 6.97 | 3.97 | 7.44 | 6.89 | 25.27 | 115 |
| Multi-plier | 2.47 | 1.11 | 1.72 | 1.36 | 6.66 | 4.34 | 7.16 | 6.69 | 24.85 | 109 |
| 2833 | 2.39 | 1.06 | 1.77 | 1.42 | 6.65 | 4.22 | 7.24 | 6.74 | 24.85 | 109 |
| Impact | 2.32 | 1.13 | 1.73 | 1.32 | 6.50 | 4.32 | 6.91 | 6.47 | 24.20 | 107 |
| Crown II | 2.24 | 1.06 | 1.80 | 1.39 | 6.49 | 4.25 | 7.32 | 6.82 | 24.88 | 107 |
| DK 122 | 2.36 | 1.03 | 1.76 | 1.32 | 6.47 | 4.33 | 7.50 | 6.69 | 24.99 | 106 |
| GH 777 | 2.16 | 1.08 | 1.69 | 1.39 | 6.32 | 4.08 | 7.29 | 6.56 | 24.25 | 104 |
| Vernal | 2.13 | 1.02 | 1.72 | 1.21 | 6.09 | 3.85 | 6.33 | 6.23 | 22.50 | 100 |
| MultiKing I | 2.14 | 1.09 | 1.60 | 1.14 | 5.97 | 4.01 | 6.88 | 6.66 | 23.52 | 98 |
| Cimarron | 2.09 | 1.04 | 1.59 | 1.20 | 5.91 | 3.76 | 6.66 | 6.44 | 22.77 | 97 |
| Legend | 2.31 | 0.99 | 1.45 | 1.12 | 5.86 | 4.72 | 6.46 | 6.28 | 23.32 | 96 |
| Avg. | 2.28 | 1.07 | 1.70 | 1.30 | 6.35 | 4.19 | 6.98 | 6.55 | 24.06 | |
| LSD ₀₅ | 0.222 | 0.140 | 0.282 | 0.146 | 0.480 | 0.38 | 0.491 | 0.421 | -- | |
| CV% | 5.7 | 7.7 | 9.7 | 6.6 | 4.4 | 5.3 | 4.2 | 3.8 | -- | |

Location: Columbus, Ohio
Date seeded: 31 August 1990
Establishment: Bandseeded with presswheels at 12 lb/a and 100 lb/a of 0-46-0.
Soil type: Crosby silt loam; pH = 6.5, P = 158 lb/a, K = 350 lb/a (4/94).
Fertilization: Annual fall application of 400 lb/a of 0-46-0 and 0-0-60, plus 400 lb/a of 0-0-60 after first harvest.
Pest control: Uniform application of insecticide for leafhopper control on 14 June, 11 July and 15 August, 1994.
 Additional insecticide was applied on 13 May for weevil control.

NOTE: Vernal and Cimarron are not multileaf types, but included as check or standard types.

Table 9: Alfalfa Cultivar Trials - Northwestern Branch 1994

| Cultivar | -----1994 Yield----- | | | | | 1990* | 1991 | 1992* | 1993 | 5 year | 1994 |
|-------------|----------------------|-------|-------|-------|-------|------------------------|------|-------|-------|--------|------------|
| | 5/24 | 6/23 | 7/19 | 8/29 | Total | | | | | | |
| | | | | | | (Tons Dry Matter/Acre) | | | | | (% Vernal) |
| Multi-plier | 2.74 | 1.35 | 2.05 | 1.25 | 7.39 | 2.59 | 5.90 | 6.10 | 4.90 | 26.88 | 112 |
| Resistar | 2.58 | 1.40 | 1.98 | 1.24 | 7.20 | 2.83 | 6.16 | 6.55 | 4.45 | 27.19 | 109 |
| DK 122 | 2.66 | 1.39 | 1.87 | 1.27 | 7.19 | 1.98 | 6.06 | 6.66 | 5.15 | 27.04 | 109 |
| Zenith | 2.65 | 1.36 | 1.92 | 1.19 | 7.12 | 3.27 | 5.90 | 6.19 | 5.06 | 27.54 | 108 |
| WL 225 | 3.02 | 1.21 | 1.75 | 1.12 | 7.10 | 3.00 | 5.36 | 6.21 | 5.00 | 26.67 | 108 |
| WL 317 | 2.73 | 1.25 | 1.83 | 1.21 | 7.03 | 2.75 | 5.55 | 7.22 | 4.93 | 27.48 | 107 |
| Crown II | 2.75 | 1.43 | 1.57 | 1.21 | 6.97 | 2.42 | 6.04 | 6.55 | 4.78 | 26.76 | 106 |
| Sabre | 2.84 | 1.26 | 1.59 | 1.27 | 6.96 | 2.28 | 5.86 | 6.64 | 4.85 | 26.59 | 106 |
| WAMPR | 2.55 | 1.34 | 1.83 | 1.20 | 6.92 | 2.44 | 5.82 | 6.44 | 4.87 | 26.49 | 105 |
| Pro-cut 2 | 2.59 | 1.48 | 1.58 | 1.23 | 6.88 | 2.86 | 6.19 | 6.25 | 4.66 | 26.84 | 104 |
| 2833 | 2.73 | 1.27 | 1.64 | 1.20 | 6.83 | 2.64 | 6.10 | 6.36 | 4.30 | 26.23 | 102 |
| Legacy | 2.68 | 1.28 | 1.60 | 1.17 | 6.73 | 2.75 | 6.02 | 6.15 | 4.40 | 26.05 | 104 |
| Cimmaron | 2.51 | 1.26 | 1.73 | 1.19 | 6.69 | 2.71 | 6.11 | 6.07 | 4.65 | 26.23 | 102 |
| Premier | 2.44 | 1.34 | 1.66 | 1.21 | 6.64 | 2.68 | 5.71 | 6.56 | 4.37 | 25.96 | 101 |
| Asset | 2.49 | 1.27 | 1.72 | 1.15 | 6.63 | 2.77 | 5.91 | 6.48 | 4.52 | 26.31 | 101 |
| Eliminator | 2.37 | 1.28 | 1.77 | 1.17 | 6.60 | 2.66 | 5.44 | 5.92 | 4.60 | 25.22 | 100 |
| Vernal | 2.48 | 1.13 | 1.87 | 1.11 | 6.59 | 1.91 | 5.07 | 5.22 | 4.78 | 23.57 | 100 |
| B-54 | 2.55 | 1.33 | 1.52 | 1.16 | 6.56 | 2.46 | 5.95 | 6.54 | 4.53 | 26.04 | 100 |
| WL 320 | 2.42 | 1.37 | 1.51 | 1.23 | 6.52 | 2.76 | 5.86 | 6.79 | 4.44 | 26.37 | 99 |
| Blazer XL | 2.46 | 1.25 | 1.52 | 1.16 | 6.39 | 3.21 | 5.98 | 6.70 | 4.28 | 26.56 | 97 |
| Precedent | 2.44 | 1.36 | 1.47 | 1.10 | 6.37 | 2.65 | 5.72 | 6.27 | 4.24 | 25.25 | 97 |
| 2980 | 2.29 | 1.10 | 1.76 | 1.05 | 6.20 | 2.39 | 5.85 | 6.13 | 4.52 | 25.09 | 94 |
| Avg. | 2.59 | 1.30 | 1.72 | 1.19 | 6.80 | 2.64 | 5.84 | 6.36 | 4.65 | 26.29 | -- |
| LSD 0.05 | 0.238 | 0.145 | 0.337 | 0.128 | 0.598 | 0.60 | 0.49 | 0.46 | 0.449 | -- | -- |
| CV % | 5.6 | 6.7 | 11.9 | 6.6 | 5.3 | 15.9 | 5.9 | 5.1 | 5.9 | -- | -- |

*Two harvests in 1990 (seeding year)

**Three harvests in 1992 and 1993

Location: Northwestern Branch, North Baltimore, Ohio

Date seeded: 30 April 1990

Soil type: Hoytville silty clay, pH = 6.7, P = 80, K = 458

Establishment: Bandseeded with presswheels at 12 lb/a with 100 lb 0-46-0. Uniform application of 3 lb EPTC incorporated prior to seeding with a uniform application of Ridomil applied after seeding.

Pest control: Insecticide was applied on 6 July 1994 for leafhopper control.

Fertilization: Annual fall application of 400 lb/a of 0-46-0 and 0-0-60 plus 400 lb/a of 0-0-60 after first harvest.

RED CLOVER

The following data summarize the results of the Ohio State University red clover performance trials seeded in 1993 at three sites. Red clover is an excellent short-lived perennial legume that is better adapted than alfalfa to soils that are somewhat poorly drained and slightly acidic; however, greatest production occurs on well-drained soils with high water-holding capacity and pH above 6.0. This crop has the ability to produce profitable levels of highly palatable, nutritious forage. It is a vigorous establisher and is one of the easiest legumes to establish using no-till interseeding or frost-seeding techniques; therefore, it is an excellent choice when renovating pastures with legumes. Red clover is well suited for use as a forage legume in short rotations with corn. It can withstand more shading than most other forage legumes, making it very compatible with grass sods in pastures and as a green-legume crop interseeded into winter wheat. The longevity of red clover may be enhanced by the following management practices:

1. When direct seeding red clover, cut before it blooms in the seeding year. If allowed to reach full-bloom stage, red clover often has reduced stands and yields the following year.
2. Harvest red clover in early bloom stage. This means a three-cut system for most of Ohio.
3. Choose varieties that have high yields and persistence. This report summarizes results from the first production year only, so additional years are needed to thoroughly evaluate persistence of these varieties in Ohio.

1994 Growing Season

The 1994 Ohio growing season initially had above average rainfall and temperatures (April), then turned cooler and drier than average (Table 2). Total rainfall for the month of May was only about 50% that of the long term average, with daily average temperatures from 3 to 4 degrees below average for the three red clover test locations. Rainfall was near average for June at each location. Due to the rather unusual weather conditions at Jackson, red clover dry matter yields were only about 40% of the yield at the other locations. In addition, only two harvests were taken at Jackson compared to three harvests at Columbus and Wooster, which further reduced the total annual yield at Jackson. Nevertheless, good to excellent red clover stands were established at all three locations.

Table 10: Red Clover Cultivars in 1994 Ohio Tests

| <u>Cultivar</u> | <u>Seed Developer/Marketer</u> |
|-----------------|--|
| Acclaim | Allied Seed |
| Arlington | Public (Wisconsin) |
| Cherokee | Public (Florida) |
| Cinnamon | FFR - Countrymark Co-op |
| Concorde | ABI |
| FUS | International Seeds, Inc./Central Indiana Supply Co. & Hill of Indiana |
| Kenland | Public (Kentucky) |
| Kenstar | Public (Kentucky) |
| Marathon | Public (Wisconsin) |
| Ram | Pickseed Canada, Inc. |
| Reddy | FFR - Countrymark Co-op |
| Renegade | International Seeds, Inc./Ohio Seed Company |
| Ruby | Dairyland Seed |
| Scarlett | Dairyland Seed |
| Walter | Pickseed Canada, Inc. |
| Common Red | Public |

Table 11: Red Clover Cultivar Performance - Columbus, 1994

| Cultivar | Relative Maturity* | 1994 Yield | | | Total |
|-------------------|--------------------|------------------------------------|--------|-------|-------|
| | | 6 Jun | 18 Jul | 2 Sep | |
| | (6 Jun) | ----- (tons dry matter/acre) ----- | | | |
| Scarlett | 4 | 2.24 | 1.93 | 1.31 | 5.47 |
| Acclaim | 4 | 2.36 | 1.87 | 1.22 | 5.45 |
| Walter | 4 | 2.23 | 1.81 | 1.15 | 5.19 |
| C-369 | 3 | 2.02 | 1.86 | 1.27 | 5.16 |
| Ruby | 5 | 2.15 | 1.77 | 1.24 | 5.15 |
| Cinnamon | 4 | 2.25 | 1.86 | 1.03 | 5.14 |
| HC-60 | 4 | 2.04 | 1.76 | 1.29 | 5.08 |
| Reddy | 4 | 2.27 | 1.71 | 1.10 | 5.08 |
| Concorde | 3 | 2.24 | 1.82 | 1.00 | 5.06 |
| Arlington | 3 | 2.19 | 1.70 | 1.09 | 4.97 |
| C-328 | 4 | 1.94 | 1.78 | 1.21 | 4.93 |
| Common Red | 5 | 2.23 | 1.57 | 1.07 | 4.87 |
| C-182 | 3 | 2.06 | 1.77 | 1.01 | 4.84 |
| Kenstar | 4 | 1.88 | 1.82 | 1.11 | 4.81 |
| Cherokee | 5 | 2.26 | 1.48 | 1.02 | 4.76 |
| Ram | 5 | 2.22 | 1.59 | 0.92 | 4.73 |
| FUS | 4 | 1.78 | 1.76 | 1.18 | 4.72 |
| Marathon | 4 | 1.79 | 1.79 | 1.14 | 4.71 |
| Renegade | 4 | 2.09 | 1.55 | 1.04 | 4.68 |
| Kenland | 5 | 1.95 | 1.53 | 1.14 | 4.62 |
| Avg. | | 2.11 | 1.74 | 1.12 | 4.97 |
| LSD ₀₅ | | 0.51 | 0.26 | 0.37 | 0.78 |
| % CV | | 14.6 | 9.0 | 19.8 | 9.4 |

*Maturity: 5 = full flower; 3 = midflower; 1 = late bud

Seeding Date: 25 August 1993
Establishment: Seeded at 12 lb/a of inoculated seed with Carter cone seeder. Uniform application of Ronilin (2 lb/a) in Oct 1993 for sclerotinia control.
Soil Type & Status: Crosby clay loam; pH = 7.1; P = 144 lb/a, K = 304 lb/a (4/94)
Fertilization: Annual October application of 250 lb K₂O/a. Lime and P applied as needed based on soil test.
Pest Control: Insecticide applied on 20 June for leafhopper control.

Table 12: Red Clover Cultivar Performance - Wooster, 1994

| Cultivar | Relative Maturity* | 1994 Yield | | | |
|--------------------|--------------------|-----------------------------------|--------|--------|-------|
| | | 6 Jun | 13 Jul | 30 Aug | Total |
| | (6 Jun) | ------(tons dry matter/acre)----- | | | |
| Cinnamon | 4 | 2.41 | 1.49 | 1.86 | 5.76 |
| Arlington | 2 | 2.69 | 1.42 | 1.55 | 5.66 |
| Concorde | 2 | 2.46 | 1.35 | 1.84 | 5.65 |
| Acclaim | 2 | 2.48 | 1.36 | 1.60 | 5.43 |
| C-182 | 2 | 2.11 | 1.46 | 1.77 | 5.34 |
| Ruby | 2 | 2.52 | 1.28 | 1.46 | 5.26 |
| C-328 | 1 | 2.12 | 1.40 | 1.68 | 5.21 |
| Scarlett | 2 | 2.20 | 1.36 | 1.57 | 5.13 |
| C-369 | 1 | 1.84 | 1.41 | 1.81 | 5.06 |
| Ram | 3 | 2.33 | 1.28 | 1.42 | 5.03 |
| Reddy | 2 | 2.16 | 1.33 | 1.51 | 5.00 |
| Cherokee | 5 | 2.16 | 1.22 | 1.51 | 4.89 |
| Marathon | 2 | 1.81 | 1.34 | 1.60 | 4.75 |
| Renegade | 2 | 1.98 | 1.29 | 1.45 | 4.72 |
| HC-60 | 1 | 1.73 | 1.23 | 1.64 | 4.61 |
| Walter | 2 | 2.07 | 1.18 | 1.34 | 4.59 |
| FUS | 4 | 1.60 | 1.20 | 1.63 | 4.44 |
| Kenstar | 3 | 1.46 | 1.27 | 1.64 | 4.38 |
| Common Red | 2 | 1.99 | 1.20 | 1.10 | 4.29 |
| Kenland | 3 | 2.05 | 1.06 | 1.09 | 4.20 |
| Avg. | | 2.11 | 1.31 | 1.55 | 4.97 |
| LSD _{.05} | | 0.65 | 0.25 | 0.35 | 0.86 |
| % CV | | 22 | 14 | 16 | 12 |

*Maturity: 5 = full flower; 3 = midflower; 1 = late bud

Seeding Date: 23 August 1993
Establishment: Bandseeded at 12 lb of inoculated seed/a with 100 lb/a of 0-46-0. Uniform application of 2 lb/a of Ronilan for sclerotinia control on 25 October 1993.
Soil Type & Status: Riddles silt loam; pH = 6.8; P = 110 lb/a; K = 252 lb/a
Fertilization: Annual fall application of 300 lb K₂O/a
Pest Control: None in 1994

Table 13: Red Clover Cultivar Performance - Jackson, 1994

| Cultivar | 1994 Yield | | | Stand Rating* (14 Dec 1993) |
|--------------------|-----------------------------------|--------|-------|--------------------------------|
| | 27 May | 26 Aug | Total | |
| | ------(tons dry matter/acre)----- | | | |
| Cinnamon | 1.57 | 1.54 | 3.11 | 7.3 |
| C-182 | 1.56 | 1.45 | 3.01 | 7.0 |
| Renegade | 1.51 | 1.44 | 2.96 | 8.3 |
| Walter | 1.44 | 1.47 | 2.91 | 6.3 |
| HC-60 | 1.58 | 1.31 | 2.89 | 6.7 |
| Reddy | 1.39 | 1.47 | 2.87 | 6.7 |
| Arlington | 1.32 | 1.52 | 2.83 | 7.0 |
| Concorde | 1.43 | 1.39 | 2.82 | 7.3 |
| Common Red | 1.62 | 1.10 | 2.73 | 8.0 |
| C-369 | 1.12 | 1.54 | 2.66 | 5.3 |
| C-328 | 1.45 | 1.18 | 2.63 | 7.0 |
| Acclaim | 1.21 | 1.41 | 2.61 | 7.0 |
| FUS | 1.29 | 1.31 | 2.60 | 6.0 |
| Marathon | 1.18 | 1.36 | 2.54 | 5.7 |
| Ram | 1.12 | 1.42 | 2.54 | 6.0 |
| Kenstar | 1.26 | 1.21 | 2.48 | 7.0 |
| Cherokee | 1.23 | 1.19 | 2.41 | 8.3 |
| Kenland | 1.08 | 1.29 | 2.37 | 7.3 |
| Avg. | 1.32 | 1.35 | 2.67 | 6.6 |
| LSD _{.05} | 0.38 | NS** | 0.58 | 1.9 |
| % CV | 17 | 20 | 13 | 17 |

*Rating Scale: 9 = excellent; 6 = adequate; 1 = very poor

**NS = No significant yield differences.

Seeding Date: 27 August 1993
Establishment: Seeded with Carter cone seeder at 12 lb/a of inoculated seed. Uniform application of 2 lb/a Ronilan on 26 Oct 1993 for sclerotinia control.
Soil Type & Status: Gilpin loamy clay; pH = 5.3; P = 46 lb/a, K = 190 lb/a (4/93). Two ton/a of lime, 600 lb/a of 0-0-60, and 200 lb/a of 0-46-0 applied and incorporated in July 1993 prior to seeding. One ton/a of lime and 100 lb/a of 0-46-0 surface applied at seeding.
Fertilization: Annual fall application of 250 lb/a of K₂O, P and lime applied as needed based on soil test.
Pest Control Herbicide applied on 15 June 1994 for grassy weed control plus a uniform application of insecticide for leafhopper control.

BIRDSFOOT TREFOIL

The following data summarize the results of the Ohio State University birdsfoot trefoil performance trials seeded in 1992 at two sites. Birdsfoot trefoil is more tolerant than other forage legumes of soils which have low pH (tolerates as low as pH 5.0), moderate to somewhat poor soil drainage, marginal fertility, and fragipans. It is not as productive as alfalfa on well-drained, fertile soils with high pH, but it will outyield alfalfa on marginal soils. It can withstand several weeks of flooding. It also tolerates periods of moderate drought and heat. It is resistant to insects and produces forage of excellent quality. Birdsfoot trefoil normally outlives red clover by several years. Stands can last for many years if managed to allow natural reseeding. Natural reseeding is especially important in southern Ohio where birdsfoot trefoil stands are generally short-lived. Birdsfoot trefoil is an ideal pasture legume. It has excellent grazing tolerance, high forage quality, good palatability, and does not cause bloat in grazing animals.

Variety Selection

Birdsfoot trefoil varieties have traditionally been classified by growth habit. Empire-type varieties have prostrate growth and fine stems, and are thought to be better adapted to grazing. The variety Empire is a prostrate-type variety. European-type varieties are more erect, establish faster, and regrow faster after harvest. Thus, they are well suited to hay production, but are also very suitable for rotational grazing. Viking is an erect European-type variety. Most of the newer varieties are intermediate with semi-erect to erect growth habit. Birdsfoot trefoil traditionally has not performed well in southern Ohio; however, varieties recently developed in the southern USA are being evaluated for persistence in southern Ohio environments (data not available this year). Table 16 shows the relative maturing ratings for birdsfoot trefoil varieties tested in Ohio.

Varieties

AU Dewey A semierect variety with low to moderate winter hardiness. AU Dewey is also useful in permanent pastures but more adapted to the southern states because of the winter hardiness. AU Dewey was developed by Auburn University.

Carroll A semierect variety with high winter hardiness. Carroll has excellent seedling vigor and good yields. Carroll was developed by Iowa State University.

Dawn A semierect variety, with moderate to high winter hardiness. Dawn has good yields and grazing tolerance. Dawn was developed by USDA\ARS and the University of Missouri.

Empire A semierect leafy variety with high winter hardiness. Empire has good grazing tolerance and is more adapted to wetter soils than most varieties. Empire was developed by Cornell University.

Fergus A semierect variety with moderate winter hardiness. Fergus has good grazing tolerance. Fergus was developed by the University of Kentucky.

Georgia 1 A semierect variety with moderate winter hardiness. Georgia 1 was developed by University of Georgia.

Norcen A semierect variety with high winter hardiness. Norcen has good yields and ranks high in crude protein. Norcen was developed by North Central States.

Viking An erect variety with moderate winter hardiness. Viking has excellent seedling vigor and good yields and regrowth. Viking was developed by Cornell University.

Table 14: Birdsfoot Trefoil Cultivar Forage Yield at Columbus, Ohio, 1992-94.

| Cultivar | 1992 | | | | 1993 | | | 1994 | | | 3-yr. mean | Stand Density Jul 1994 |
|--------------------|---|-------|--------|-------|--------|--------|-------|-------|-------|-------|------------|------------------------|
| | 2 Jun | 8 Jul | 24 Aug | Total | 17 Jun | 16 Jul | Total | 3 Jun | 7 Jul | Total | | |
| | ------(ton dry matter/acre, weed free)----- | | | | | | | | | | | |
| AU Dewey | 1.89 | 1.86 | 1.53 | 5.28 | 2.47 | 1.09 | 3.56 | 2.04 | 1.11 | 3.15 | 4.00 | 87 |
| Georgia 1 | 1.91 | 1.87 | 1.93 | 5.71 | 2.49 | 1.06 | 3.55 | 2.49 | 1.05 | 3.54 | 4.27 | 87 |
| Norcen | 1.75 | 1.94 | 1.78 | 5.47 | 2.56 | 1.10 | 3.66 | 2.00 | 1.07 | 3.07 | 4.07 | 77 |
| Viking | 1.76 | 1.74 | 1.84 | 5.34 | 2.54 | 1.19 | 3.73 | 2.20 | 0.90 | 3.10 | 4.06 | 70 |
| Empire | 1.36 | 1.84 | 1.80 | 4.99 | 2.31 | 1.17 | 3.48 | 2.11 | 1.24 | 3.35 | 3.94 | 88 |
| Avg. | 1.73 | 1.85 | 1.76 | 5.36 | 2.47 | 1.12 | 3.59 | 2.17 | 1.07 | 3.24 | 4.06 | 82 |
| LSD _{.05} | NS* | NS | 0.30 | NS | NS | NS | NS | NS | NS | NS | -- | 15 |
| % CV | 17 | 12 | 9 | 10 | 6 | 14 | 8 | 20 | 21 | 19 | -- | 10 |

*NS = No significant yield differences

Seeding date: 8 May 1991

Establishment: Bandseeded at 6 lb/acre with 100 lb/a of 0-46-0.

Fertilization: Annual October application of 200 lb/a of K₂O, P applied as required based on soil test.

Pest control: No herbicides applied; leafhopper control as needed.

Table 15: Birdsfoot Trefoil Cultivar Forage Yield at Northwestern Branch, Custer, Ohio, 1992-94.

| | 1992 | | | 1993 | | | 1994 | | | | 3-yr. mean |
|--------------------|---|--------|-------|--------|--------|-------|-------|--------|--------|-------|------------|
| | 15 Jun | 11 Aug | Total | 16 Jun | 14 Jul | Total | 8 Jun | 13 Jul | 30 Aug | Total | |
| | ------(ton dry matter/acre, weed free)----- | | | | | | | | | | |
| AU Dewey | 1.74 | 1.39 | 3.13 | 2.73 | 1.24 | 3.97 | 2.64 | 1.64 | 0.777 | 5.05 | 4.05 |
| Carroll | 1.78 | 1.60 | 3.38 | 2.61 | 1.24 | 3.84 | 2.53 | 1.85 | 0.66 | 5.04 | 4.09 |
| Dawn | 1.83 | 1.63 | 3.46 | 3.24 | 1.05 | 4.29 | 3.02 | 2.01 | 0.91 | 5.94 | 4.56 |
| Empire | 1.37 | 1.45 | 2.83 | 2.81 | 1.13 | 3.94 | 2.37 | 1.59 | 0.71 | 4.67 | 3.81 |
| Fergus | 1.83 | 1.57 | 3.40 | 3.14 | 1.07 | 4.20 | 2.83 | 1.69 | 0.84 | 5.36 | 4.32 |
| Georgia 1 | 0.85 | 1.20 | 2.05 | 2.23 | 1.03 | 3.26 | 2.15 | 1.54 | 0.71 | 4.40 | 3.24 |
| Norcen | 2.00 | 1.69 | 3.69 | 3.19 | 1.11 | 4.30 | 2.72 | 2.09 | 0.82 | 5.62 | 4.54 |
| Viking | 1.61 | 1.62 | 3.23 | 2.79 | 1.13 | 3.91 | 3.00 | 1.88 | 0.90 | 5.78 | 4.31 |
| Avg. | 1.62 | 1.52 | 3.15 | 2.84 | 1.12 | 3.96 | 2.66 | 1.79 | 0.79 | 5.23 | 4.11 |
| LSD _{.05} | 0.62 | 0.41 | 0.94 | 0.43 | 0.20 | 0.52 | 0.46 | 0.33 | 0.18 | 0.88 | -- |
| % CV | 26 | 18 | 20 | 10 | 12 | 9 | 12 | 13 | 16 | 11 | -- |

Seeding date: 16 May 1991

Establishment: Uniform application of 3 lb/a of EPTC incorporated prior to bandseeding of cultivars at 5 lb of inoculated seed/acre with 100 lb/a of 0-46-0

Fertilization: Annual October application of 150 lb/a of K₂O and 50 lb/a of P₂O₅

Table 16: Birdsfoot Trefoil Cultivar Maturity at First Harvest, 1992-94.

| Cultivar | Northwestern Branch | | | Relative Rank* | Columbus | | | Relative Rank* |
|-----------|-------------------------|------|------|-------------------------|----------|------|------|----------------|
| | 1992 | 1993 | 1994 | | 1992 | 1993 | 1994 | |
| | -----(% flowering)----- | | | -----(% flowering)----- | | | | |
| AU Dewey | 65 | 40 | 68 | 1 | 30 | 50 | 75 | 1 |
| Carroll | <10 | <10 | 20 | 8 | -- | -- | -- | -- |
| Dawn | 15 | 10 | 30 | 6 | -- | -- | -- | -- |
| Empire | 30 | 15 | 50 | 5 | 15 | <10 | 25 | 4 |
| Fergus | 50 | 25 | 82 | 2 | -- | -- | -- | -- |
| Georgia 1 | 60 | 40 | 58 | 3 | 25 | 35 | 60 | 2 |
| Norcen | <10 | 15 | 20 | 7 | <10 | <10 | 12 | 5 |
| Viking | 20 | 20 | 70 | 4 | 15 | 15 | 30 | 3 |

*Relative rank: 1 = earliest

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Allied Seed Co-op
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Nampa, ID 83687
800-236-0163

America's Alfalfa
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