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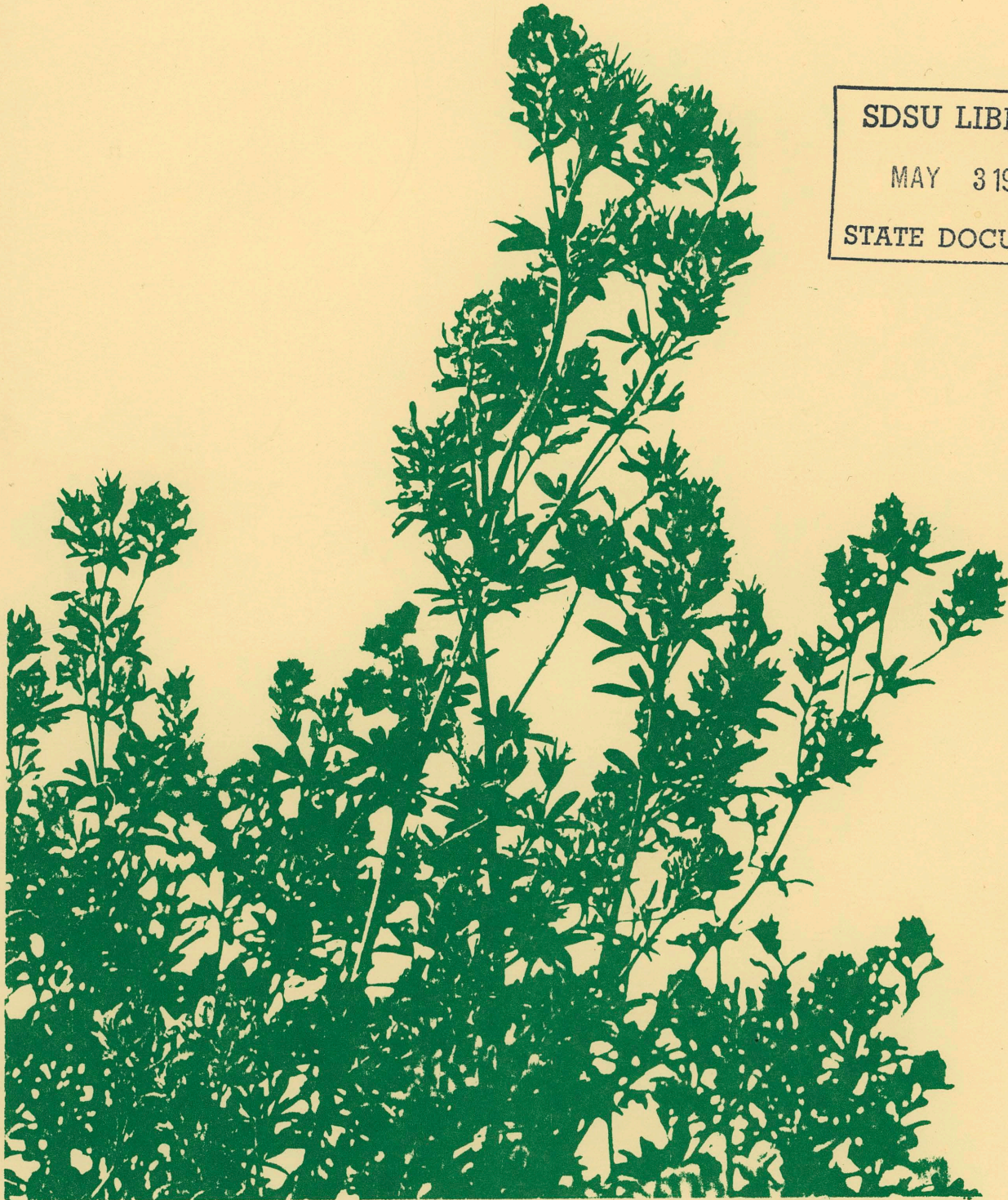
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Cultivar tests in South Dakota, 1987 report:

Alfalfa yields

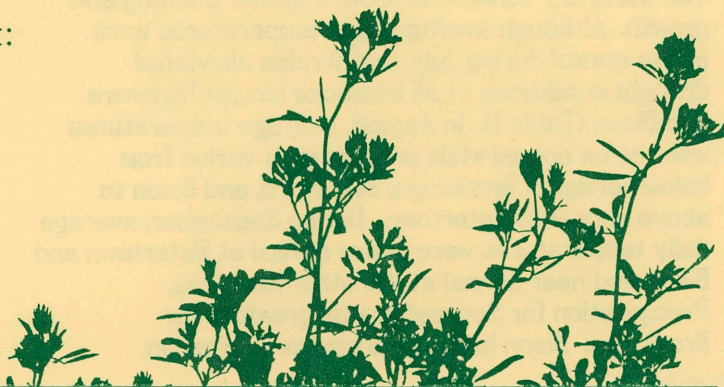


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Alfalfa yields

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Public and commercial breeding of alfalfa cultivars has been intense during the last 15 years, and approximately 15 new cultivars are released annually. Yield results of 119 cultivars and experimental lines from 27 companies and 11 public institutions are presented in this report, which summarizes experiments for the period 1985-1987. The results show the relative forage production characteristics for these lines at several locations in South Dakota.

Materials and Methods

Experimental plots of hay-type alfalfa cultivars were established in 1985, 1986, and 1987 at the Southeast Research Farm (Beresford) and the Central Crops and Soils Research Station (Highmore) and in 1985 and 1987 at the Northeast Research Station (Watertown). Tests were established on cooperators' land near Bison in 1985 and near Summit in 1986. Additionally, plots were established at the SDSU Research Station (Brookings) in 1987. Plots for evaluation of pasture-type alfalfa cultivars were established in 1985 at Highmore and Bison.

Alfalfa was planted between mid-April and late May into a firm seedbed using a 5-row planter with 6-inch row spacings. Seeding rates were 12 and 10 lb PLS/A for hay- and pasture-type alfalfa, respectively. A pre-plant herbicide (Eptam¹ at 3 lb ai/A) and a fungicide (Ridomil at 1 lb ai/A) were used to aid seedling establishment. The experimental design was a randomized complete block with four replicates. An experimental unit consisted of a 75 sq-ft (3 X 25 ft) plot. Plots were fertilized immediately after planting with 50 lb P₂O₅/A and according to SDSU soil

test results for growth periods after the seeding year. Insect pests did not reach problem levels, so chemical pest control was not used.

Harvesting was done with one of two flail-type forage plot harvesters with a harvest area of either 44 or 66 sq ft. Fresh herbage weights were obtained for each plot immediately following herbage removal. Moisture samples from half of the entries in each replicate were randomly taken, dried at 100 F in a forced-air oven, and weighed to determine dry-matter concentration. Mean dry-matter concentrations for each replicate were multiplied by fresh herbage weights for each experimental unit and then divided by harvest area to obtain forage dry-matter (DM) production per area of harvest. These data were converted into tons DM per acre (tons DM/A). Data were analyzed by analysis of variance, and differences among cultivars were tested by the least significant difference (LSD) procedure. Relative performance among cultivars was calculated by dividing average total yield by the mean forage yield of a given location.

Experiments were harvested up to four times each year, although growing conditions at some locations often limited harvest frequencies. Seeding year harvests were not obtained in 1985 at Highmore and Bison and in 1987 at Highmore because of limited plant growth.

Environmental Conditions

Among the six locations, average precipitation for the 6-month period from April to September ranged from 19 inches at Beresford to 13 inches at Bison. The 1985 and 1986 growing seasons had above normal precipitation.

Above normal temperatures and below normal precipitation occurred during the early 1987 growing season (April to June) for all locations (Table 1).

¹Mention of a tradename or commercial product does not constitute endorsement by SDSU.

The warm, dry conditions allowed earlier planting and growth. Although average daily temperatures were above normal during July, timely rains alleviated drought conditions at all locations except Highmore and Bison (Table 1). In August, average temperatures were below normal while precipitation varied from below normal at Brookings, Beresford, and Bison to above normal at Watertown. During September, average daily temperatures were above normal at Watertown and Bison and near normal at the other locations. Precipitation for September was greatest for Brookings. Bison had sub-normal precipitation.

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Results

Dry-matter yield data for cultivars tested at the six locations are in Tables 2 through 13. Average yields were satisfactory for eastern South Dakota locations. Limited available soil moisture caused reduced yields at central and western locations.

The greatest apparent moisture stress occurred at Highmore where precipitation for the 6-month period between April and September was 3.5 inches below normal. Only two harvests could be obtained at Highmore in 1987 for the experiments planted in 1985, while no data were collected from the new test planted in 1987. Soil moisture during the early growing season was limited at Watertown, resulting in first-cutting yields being lower than second-cutting yields.

Seeding year yields were generally lower in 1987 compared to previous years. Dry soil surface conditions caused by reduced precipitation in the early growing season resulted in slower establishment and a reduced harvest frequency in the seeding year.

Cultivar Selection

A large number of alfalfa cultivars are available from public and commercial sources. Consequently, South Dakota producers are faced with difficult decisions regarding selection of an alfalfa cultivar. Important characteristics to evaluate are yield, fall dormancy, disease resistance, and cost per unit of pure live seed (PLS).

Yield:

Yield information represents seeding year, 2-, and 3-year averages. Generally, yield data from several years of production are the most meaningful for use in cultivar selections. Use yields from the test

location which most nearly resembles your farm in terms of growing conditions.

A statistical measure known as the least significant difference (LSD) is used to determine the significance of yield differences between cultivars. If the difference in yield between any two cultivars equals or exceeds the LSD value, the higher yielding cultivar is significantly higher in yield. If the yield difference is less than the LSD value, the two cultivars do not significantly differ in yield. In some cases a LSD value is not presented, and the designation NS (non-significant) indicates significant yield differences among the cultivars were not detected.

Fall Dormancy:

Fall dormancy ratings (Table 14) range from values of 1 (very dormant) to 8 (least dormant). Fall dormancy is closely related to winterhardiness of an alfalfa cultivar.

Severe winters in South Dakota require that winterhardiness be a major consideration in cultivar selection. Generally, cultivars with a fall dormancy rating of 1 or 2 are very winterhardy and may persist longer under South Dakota conditions. Forage yield under optimum conditions may be lower for these cultivars than for less dormant types. Consequently, very winterhardy cultivars should be used if stand longevity is of primary concern.

Cultivars with a rating of 3 to 4 are winterhardy to moderately winterhardy, and at least 3 to 4 years of excellent production can be expected. Cultivars with ratings of 5 to 8 are generally not winterhardy enough to survive severe South Dakota winters. These cultivars may be used as annual forages.

Disease Resistance:

Disease resistance ratings are important indicators of a cultivar's potential to perform in situations where specific diseases are present and may limit production. Several diseases may affect the productivity of alfalfa in South Dakota; however, major diseases of concern include bacterial wilt, Phytophthora root rot, and Verticillium wilt.

Bacterial wilt infection occurs in spring or early summer, entering the plant through cracks and wounds in the roots and crowns. Eventually, the water-conducting tissues of the roots become plugged, causing the topgrowth to wilt, especially during periods of pronounced moisture stress. Symptoms include yellow leaves, stunted growth, and a yellow to brown discoloration of the root tissue beneath the

outermost layer. Disease symptoms do not usually appear before the second or third crop year. There are several bacterial resistant cultivars available.

Phytophthora root rot is a fungal disease which occurs in wet, poorly drained soils during extended periods of precipitation or excessive irrigation. Symptoms include deteriorated root or crown tissue in areas where stands are thinning. Wilting, yellowing, and lack of vigorous growth are also frequently observed. This disease is sometimes involved in damping-off of alfalfa seedlings.

Verticillium wilt is a fungal disease. Initial symptoms are temporary wilting of upper leaves on warm days at pre-bud to floral stages of maturity. After a period of yellowness on the leaf tips, the leaves die and drop off. Eventually, the stems die as well. Yellow to brown discoloration is usually present in the woody cylinder of the tap root. Verticillium wilt has not yet been documented in South Dakota; however, it has been observed in several surrounding states and its appearance in South Dakota is expected.

Other diseases, such as anthracnose, leaf spots, Fusarium wilt, and other root and crown rots may be problems at a particular site. The only practical way to minimize economic loss from disease is to use resistant cultivars. Disease resistance ratings for the tested cultivars are given in Table 14.

Pasture-Type Cultivars:

Yield values for pasture-type cultivars are given in Tables 9 and 12. These cultivars are less erect, slower to recover after cutting, and more winterhardy than most hay-type alfalfas. They are also generally less productive than hay-types under optimum growth conditions; however, they often withstand moisture and temperature stresses better than hay-type alfalfas because of their high degree of fall dormancy. Pasture-type cultivars frequently have broad, deep-set crowns and spreading root systems which make them more tolerant of grazing than hay-type cultivars.

Conclusions

When considering a single factor, such as yield, no single cultivar or small group of cultivars is superior. Although yield serves as a good measure of economic production, stand longevity and stress tolerance are also important.

Important criteria for proper cultivar selection include yield performance, fall dormancy, and disease resistance.

Yield response data collected over several years and locations may be useful indicators of stress tolerance, longevity, and economic production. Fall dormancy has a significant influence upon winterhardiness, stress tolerance, and yield potential, and is related to stand longevity in stressful environments. Multiple disease resistance also benefits stand longevity and yield. Finally, seed cost per unit PLS should also be considered when selecting alfalfa cultivars.

Acknowledgments

The authors express their gratitude to Leroy Spoering at Bison and Omar Halvorson at Summit for their cooperation in permitting these experiments to be conducted on their properties. Appreciation is also extended to research station managers Dale Sorensen, Jim Smolik, and Paul Weeldreyer for their assistance in conducting this research.

Table 1. Average daily temperatures, total monthly precipitation, and departures from normal for six locations in South Dakota during the 1987 growing season.

| Month | Brookings | Beresford | Watertown | Highmore | Bison ^a | Summit ^b |
|-----------------------------|-----------|-----------|-----------|----------|--------------------|---------------------|
| <u>April</u> | | | | | | |
| Temp. ^c (°F) | 49.90 | 52.80 | 51.30 | 52.40 | 51.90 | 50.60 |
| Dep. ^d | +6.20 | +4.20 | +5.70 | +6.60 | +9.90 | +8.30 |
| Prec. ^e (inches) | 0.28 | 0.50 | 0.80 | 0.77 | 0.25 | 0.58 |
| Dep. | -1.73 | -1.86 | -1.61 | -1.31 | -1.60 | -1.73 |
| <u>May</u> | | | | | | |
| Temp. (°F) | 60.80 | 65.20 | 63.40 | 63.80 | 60.30 | 60.20 |
| Dep. | +4.70 | +4.90 | +8.00 | +6.30 | +6.20 | +5.20 |
| Prec. (inches) | 1.65 | 3.15 | 1.28 | 1.94 | 4.95 | 2.41 |
| Dep. | -1.41 | -0.08 | -1.86 | -0.75 | +2.39 | +0.40 |
| <u>June</u> | | | | | | |
| Temp. (°F) | 69.10 | 72.10 | 71.20 | 70.80 | 68.90 | 68.10 |
| Dep. | +3.30 | +1.90 | +5.60 | +3.50 | +5.40 | +4.00 |
| Prec. (inches) | 2.54 | 3.98 | 0.69 | 1.60 | 1.70 | 0.93 |
| Dep. | -1.87 | -0.41 | -3.27 | -1.68 | -1.58 | -3.07 |
| <u>July</u> | | | | | | |
| Temp. (°F) | 71.20 | 74.90 | 75.30 | 76.50 | 73.20 | 72.70 |
| Dep. | +2.50 | 0.00 | +4.10 | +2.60 | +2.90 | +2.90 |
| Prec. (inches) | 5.26 | 4.75 | 4.00 | 2.97 | 1.39 | 3.75 |
| Dep. | +2.44 | +1.53 | +1.13 | +0.40 | -0.81 | +1.10 |
| <u>August</u> | | | | | | |
| Temp. (°F) | 65.80 | 68.40 | 67.00 | 68.50 | 67.00 | 66.10 |
| Dep. | -2.80 | -4.40 | -2.30 | -4.20 | -1.80 | -2.20 |
| Prec. (inches) | 1.88 | 1.42 | 4.71 | 0.95 | 1.36 | 1.81 |
| Dep. | -1.27 | -1.72 | +1.94 | -0.31 | -0.49 | -0.84 |
| <u>September</u> | | | | | | |
| Temp. (°F) | 58.60 | 62.30 | 60.50 | 61.90 | 61.20 | 59.80 |
| Dep. | +0.30 | -0.60 | +2.10 | -0.10 | +3.80 | +1.40 |
| Prec. (inches) | 4.55 | 2.67 | 1.82 | 1.51 | 0.68 | 1.87 |
| Dep. | +2.60 | +0.09 | +0.22 | +0.19 | -0.53 | +0.23 |

- a Environmental data measured at Lemmon, SD.
b Environmental data measured at Milbank, SD.
c Average daily temperature.
d Departure from normal.
e Total monthly precipitation.

Table 2. Yield performance of 60 alfalfa cultivars planted on 5-6-85 and grown at the Southeast Research Station, Beresford, SD.

| Cultivar | 1985 | 1986 | 1987 Forage Yield (tons DM/A) | | | | 3 | % |
|------------|----------------|----------------|-------------------------------|---------------|---------------|----------------|-----------------|--------------------------------------|
| | 3-Cut Total | 4-Cut Total | Cut 1 6/1 | Cut 2 6/23 | Cut 3 7/30 | 3-Cut Total | Year Average | Relative Performance ^a |
| Arrow | 3.96 | 6.82 | 3.06 | 1.51 | 2.64 | 7.21 | 6.00 | 111 |
| Surpass | 3.92 | 6.57 | 3.08 | 1.54 | 2.78 | 7.40 | 5.96 | 110 |
| Magnum III | 4.86 | 6.16 | 2.70 | 1.34 | 2.52 | 6.56 | 5.86 | 108 |
| DS 512 | 4.30 | 6.36 | 2.78 | 1.39 | 2.67 | 6.84 | 5.83 | 108 |
| Crown | 4.16 | 6.28 | 2.78 | 1.38 | 2.54 | 6.70 | 5.71 | 105 |
| Oneida | 4.23 | 6.43 | 2.72 | 1.41 | 2.34 | 6.47 | 5.71 | 105 |
| 5432 | 4.00 | 6.20 | 2.88 | 1.56 | 2.46 | 6.90 | 5.70 | 105 |
| Elevation | 4.18 | 6.17 | 2.84 | 1.28 | 2.61 | 6.73 | 5.69 | 105 |
| WL 320 | 4.28 | 5.84 | 2.72 | 1.53 | 2.70 | 6.95 | 5.69 | 105 |
| 82503 | 3.95 | 6.57 | 2.64 | 1.28 | 2.58 | 6.50 | 5.67 | 105 |
| DS 537 | 4.21 | 5.78 | 2.80 | 1.54 | 2.70 | 7.04 | 5.67 | 105 |
| Sparta | 4.40 | 5.96 | 2.76 | 1.34 | 2.50 | 6.60 | 5.66 | 104 |
| NY 8412 | 4.34 | 5.94 | 2.68 | 1.43 | 2.55 | 6.66 | 5.65 | 104 |
| Big 10 | 4.39 | 5.76 | 2.74 | 1.31 | 2.72 | 6.77 | 5.64 | 104 |
| Futura | 4.25 | 5.98 | 2.88 | 1.34 | 2.43 | 6.65 | 5.63 | 104 |
| Endure | 4.20 | 5.59 | 3.02 | 1.46 | 2.60 | 7.08 | 5.62 | 104 |
| DK 125 | 4.23 | 5.51 | 3.02 | 1.36 | 2.63 | 7.01 | 5.58 | 103 |
| Magnum | 4.24 | 5.87 | 2.80 | 1.28 | 2.55 | 6.63 | 5.58 | 103 |
| Vernema | 4.34 | 5.98 | 2.68 | 1.48 | 2.26 | 6.42 | 5.58 | 103 |
| 120 | 4.53 | 5.92 | 2.75 | 1.20 | 2.32 | 6.27 | 5.57 | 103 |
| MN 6209 | 4.30 | 5.98 | 2.70 | 1.38 | 2.22 | 6.30 | 5.53 | 102 |
| Shield | 4.36 | 5.75 | 2.76 | 1.28 | 2.43 | 6.47 | 5.53 | 102 |
| 532 | 3.96 | 5.99 | 2.73 | 1.39 | 2.46 | 6.58 | 5.51 | 102 |
| MN 6216 | 3.80 | 6.46 | 2.72 | 1.32 | 2.17 | 6.21 | 5.50 | 101 |
| 526 | 4.01 | 6.01 | 2.69 | 1.44 | 2.32 | 6.45 | 5.49 | 101 |
| Iroquois | 4.55 | 6.32 | 2.48 | 1.19 | 1.89 | 5.56 | 5.48 | 101 |
| Magnum + | 3.40 | 6.17 | 2.83 | 1.46 | 2.60 | 6.89 | 5.48 | 101 |
| Peak | 3.82 | 6.20 | 2.80 | 1.28 | 2.34 | 6.42 | 5.48 | 101 |
| Mohawk | 4.11 | 5.53 | 2.89 | 1.36 | 2.53 | 6.78 | 5.48 | 101 |
| NY 8413 | 3.71 | 5.88 | 2.79 | 1.48 | 2.55 | 6.82 | 5.46 | 101 |
| Saranac AR | 3.95 | 5.76 | 2.72 | 1.28 | 2.57 | 6.57 | 5.42 | 100 |
| H-155 | 4.54 | 5.46 | 2.60 | 1.19 | 2.47 | 6.26 | 5.42 | 100 |
| DK 135 | 4.69 | 5.32 | 2.54 | 1.20 | 2.50 | 6.24 | 5.42 | 100 |
| Agate | 4.17 | 5.82 | 2.57 | 1.37 | 2.30 | 6.24 | 5.41 | 100 |
| Blazer | 3.75 | 5.97 | 2.87 | 1.23 | 2.36 | 6.46 | 5.39 | 99 |
| Cimarron | 4.08 | 5.69 | 2.60 | 1.28 | 2.46 | 6.34 | 5.37 | 99 |
| Verta + | 3.87 | 5.73 | 2.66 | 1.25 | 2.60 | 6.51 | 5.37 | 99 |
| Oneida VR | 3.80 | 5.85 | 2.70 | 1.29 | 2.44 | 6.43 | 5.36 | 99 |
| Summit | 3.86 | 5.56 | 2.81 | 1.32 | 2.50 | 6.63 | 5.34 | 98 |

Table 2. Continued

| Cultivar | 1985 3-Cut Total | 1986 4-Cut Total | 1987 Forage Yield (tons DM/A) | | | | 3 Year Average | % Relative Performance ^a |
|------------|------------------------|------------------------|-------------------------------|---------------|---------------|----------------|----------------------|---|
| | | | Cut 1 6/1 | Cut 2 6/23 | Cut 3 7/30 | 3-Cut Total | | |
| 8016 PCa3 | 4.00 | 6.18 | 2.59 | 1.27 | 1.97 | 5.83 | 5.34 | 98 |
| XAF31 | 4.11 | 5.53 | 2.69 | 1.34 | 2.32 | 6.35 | 5.33 | 98 |
| Maxim | 3.79 | 5.78 | 2.54 | 1.43 | 2.38 | 6.35 | 5.31 | 98 |
| MN 5617 | 3.72 | 6.21 | 2.45 | 1.41 | 2.08 | 5.94 | 5.29 | 98 |
| Max 85 | 3.51 | 5.88 | 3.01 | 1.29 | 2.18 | 6.48 | 5.28 | 97 |
| WL 316 | 3.86 | 5.16 | 2.68 | 1.39 | 2.61 | 6.68 | 5.24 | 97 |
| Kingstar | 4.27 | 5.18 | 2.56 | 1.26 | 2.41 | 6.23 | 5.22 | 96 |
| Armor | 3.58 | 5.55 | 2.73 | 1.34 | 2.48 | 6.55 | 5.22 | 96 |
| Top Gun | 3.90 | 5.43 | 2.63 | 1.20 | 2.49 | 6.32 | 5.22 | 96 |
| Baker | 3.64 | 5.52 | 2.68 | 1.20 | 2.60 | 6.48 | 5.20 | 96 |
| Dawson | 3.89 | 6.15 | 2.31 | 1.17 | 1.99 | 5.47 | 5.18 | 96 |
| Spectrum | 4.41 | 5.14 | 2.54 | 1.14 | 2.26 | 5.94 | 5.16 | 95 |
| Saranac | 3.87 | 5.75 | 2.48 | 1.21 | 2.11 | 5.80 | 5.14 | 95 |
| H-154 | 4.13 | 4.76 | 2.64 | 1.25 | 2.54 | 6.43 | 5.11 | 94 |
| Sure | 3.86 | 5.15 | 2.59 | 1.21 | 2.52 | 6.32 | 5.10 | 94 |
| Horizon | 3.87 | 5.13 | 2.75 | 1.34 | 2.22 | 6.31 | 5.10 | 94 |
| H-156 | 3.82 | 4.79 | 2.43 | 1.28 | 2.60 | 6.31 | 4.98 | 92 |
| Epic | 3.96 | 4.89 | 2.42 | 1.27 | 2.27 | 5.96 | 4.94 | 91 |
| Vernal | 3.42 | 5.36 | 2.57 | 1.26 | 2.10 | 5.93 | 4.90 | 90 |
| F-146 | 4.31 | 4.39 | 2.29 | 1.14 | 2.45 | 5.88 | 4.86 | 90 |
| Megaton | 3.71 | 5.19 | 2.15 | 0.97 | 2.07 | 5.19 | 4.70 | 87 |
| Average | 4.06 | 5.77 | 2.69 | 1.32 | 2.42 | 6.44 | 5.42 | |
| LSD (0.05) | 0.69 | 0.99 | 0.18 | 0.21 | 0.25 | 0.59 | 1.11 | |

^a % Relative Performance based on 3-year average.

Table 3. Yield performance of 42 alfalfa cultivars planted on 5-5-86 and grown at the Southeast Research Station, Beresford, SD.

| Cultivar | 1986 | 1987 Forage Yield (tons DM/A) | | | | 2 Year Avg | % Relative Performance ^a |
|------------|----------------|-------------------------------|---------------|---------------|----------------|------------------|---|
| | 2-Cut Total | Cut 1 5/20 | Cut 2 6/24 | Cut 3 7/30 | 3-Cut Total | | |
| Sparta | 2.75 | 2.91 | 1.49 | 2.26 | 6.66 | 4.70 | 111 |
| Crown | 3.28 | 2.40 | 1.33 | 2.37 | 6.10 | 4.70 | 111 |
| Dart | 2.77 | 2.67 | 1.57 | 2.34 | 6.58 | 4.68 | 111 |
| Salute | 2.81 | 2.61 | 1.53 | 2.31 | 6.45 | 4.63 | 110 |
| DK 135 | 2.81 | 2.80 | 1.50 | 2.10 | 6.40 | 4.60 | 109 |
| Sure | 2.45 | 2.91 | 1.48 | 2.34 | 6.73 | 4.58 | 108 |
| SX 424 | 2.92 | 2.44 | 1.52 | 2.18 | 6.14 | 4.53 | 107 |
| 120 | 3.11 | 2.54 | 1.37 | 2.02 | 5.93 | 4.52 | 107 |
| Summit | 2.25 | 2.77 | 1.59 | 2.33 | 6.69 | 4.47 | 106 |
| Cimarron | 2.40 | 2.65 | 1.62 | 2.20 | 6.47 | 4.44 | 105 |
| G-2841 | 2.20 | 2.72 | 1.52 | 2.39 | 6.63 | 4.42 | 105 |
| F 144 VWR | 2.17 | 2.39 | 1.89 | 2.37 | 6.65 | 4.41 | 104 |
| SX 217 | 2.55 | 2.60 | 1.48 | 2.17 | 6.25 | 4.40 | 104 |
| AP 45 | 2.77 | 2.47 | 1.25 | 2.28 | 6.00 | 4.38 | 104 |
| 5432 | 2.92 | 2.25 | 1.42 | 2.14 | 5.81 | 4.36 | 103 |
| Magnum + | 2.69 | 2.32 | 1.35 | 2.38 | 6.05 | 4.36 | 103 |
| WL 225 | 2.67 | 2.62 | 1.27 | 2.07 | 5.96 | 4.31 | 102 |
| Drummor | 2.74 | 2.26 | 1.42 | 2.20 | 5.88 | 4.31 | 102 |
| Arrow | 2.29 | 2.63 | 1.41 | 2.28 | 6.32 | 4.31 | 102 |
| Surpass | 2.51 | 2.50 | 1.28 | 2.23 | 6.01 | 4.27 | 101 |
| 526 | 2.63 | 2.42 | 1.32 | 2.16 | 5.90 | 4.26 | 101 |
| MTO N82 | 1.92 | 2.08 | 1.17 | 1.71 | 4.96 | 4.24 | 100 |
| GH-747 | 2.47 | 2.53 | 1.25 | 2.25 | 6.03 | 4.24 | 100 |
| RS 7890 | 2.39 | 2.39 | 1.38 | 2.28 | 6.05 | 4.22 | 100 |
| H 150R | 2.41 | 2.32 | 1.62 | 2.08 | 6.02 | 4.21 | 100 |
| LL 3387 | 2.58 | 2.32 | 1.42 | 2.08 | 5.82 | 4.20 | 100 |
| Edge | 2.46 | 2.22 | 1.30 | 2.38 | 5.90 | 4.18 | 99 |
| WL 320 | 2.28 | 2.45 | 1.40 | 2.20 | 6.05 | 4.16 | 98 |
| 532 | 2.04 | 2.57 | 1.36 | 2.24 | 6.17 | 4.11 | 97 |
| Eagle | 2.50 | 2.26 | 1.36 | 2.11 | 5.73 | 4.11 | 97 |
| Champ | 2.17 | 2.64 | 1.29 | 2.10 | 6.03 | 4.10 | 97 |
| H-168 | 2.37 | 2.34 | 1.46 | 1.97 | 5.77 | 4.06 | 96 |
| Dynasty | 2.22 | 2.31 | 1.50 | 2.09 | 5.90 | 4.06 | 96 |
| Olds "98" | 2.18 | 2.36 | 1.34 | 2.22 | 5.92 | 4.05 | 96 |
| MTO S82 | 2.76 | 2.12 | 1.12 | 1.83 | 5.07 | 3.92 | 93 |
| Heinrich's | 2.33 | 2.18 | 1.40 | 1.85 | 5.43 | 3.88 | 92 |

Table 3. Continued

| Cultivar | 1986 2-Cut Total | 1987 Forage Yield (tons DM/A) | | | | 2 Year Avg | % Relative Performance ^a |
|-------------|------------------------|-------------------------------|---------------|---------------|----------------|------------------|---|
| | | Cut 1 5/20 | Cut 2 6/24 | Cut 3 7/30 | 3-Cut Total | | |
| Epic | 2.17 | 2.21 | 1.42 | 1.94 | 5.57 | 3.88 | 92 |
| Rambler | 2.96 | 2.09 | 0.95 | 1.64 | 4.68 | 3.82 | 91 |
| Vernal | 2.10 | 2.35 | 1.26 | 1.90 | 5.51 | 3.81 | 90 |
| Rangelander | 2.52 | 1.99 | 1.20 | 1.69 | 4.88 | 3.69 | 87 |
| Roamer | 1.98 | 2.11 | 1.00 | 1.79 | 4.90 | 3.44 | 82 |
| Drylander | 1.80 | 2.04 | 0.91 | 1.74 | 4.69 | 3.25 | 77 |
| Average | 2.48 | 2.42 | 1.37 | 2.12 | 5.92 | 4.22 | |
| LSD (0.05) | 0.55 | 0.46 | 0.33 | 0.25 | 0.77 | 0.76 | |

^a % Relative Performance based on 2-year average.

Table 4. Yield performance of 35 alfalfa cultivars planted on 4-21-87 and grown at the Southeast Research Station, Beresford, SD.

| Cultivar | Forage Yield (tons DM/A) | |
|-------------|--------------------------|------|
| | Cut 1 10/22/87 | |
| FSRC IH-171 | | 1.03 |
| DK 135 | | 1.02 |
| Fortress | | 0.97 |
| Dynasty | | 0.95 |
| Big 10 | | 0.94 |
| Magnum III | | 0.94 |
| SX 217 | | 0.93 |
| W-L 225 | | 0.88 |
| GH 737 | | 0.87 |
| FSRC H-172 | | 0.84 |
| Saranac | | 0.80 |
| FSRC H-170 | | 0.79 |
| Blazer | | 0.79 |
| Cimarron | | 0.78 |
| MTO S82 | | 0.77 |
| FSRC H-174 | | 0.77 |
| Commandor | | 0.77 |
| 120 | | 0.76 |
| Dart | | 0.72 |
| XPH 2001 | | 0.72 |
| 636 | | 0.71 |
| NAPB 31 | | 0.71 |
| Vernal | | 0.69 |
| Arrow | | 0.68 |
| SX 424 | | 0.67 |
| NAPB 32 | | 0.67 |
| Mohawk | | 0.65 |
| Saranac AR | | 0.65 |
| 5432 | | 0.64 |
| Salute | | 0.64 |
| Endure | | 0.62 |
| 532 | | 0.62 |
| Iroquois | | 0.62 |
| 526 | | 0.59 |
| MTO N82 | | 0.52 |
| Average | | 0.76 |
| LSD (0.05) | | NS |

Table 5. Yield performance of 34 alfalfa cultivars planted on 4-25-87 and grown at the SDSU Research Station, Brookings, SD.

| Cultivar | Forage Yield (tons DM/A) | |
|------------|--------------------------|------|
| | Cut 1 7/22/87 | |
| Ultra | | 1.58 |
| MTO N82 | | 1.56 |
| Emerald | | 1.51 |
| MTO S82 | | 1.50 |
| Mohawk | | 1.50 |
| Commandor | | 1.49 |
| DK 135 | | 1.49 |
| Blazer | | 1.48 |
| Sure | | 1.45 |
| RS 7890 | | 1.44 |
| DS 701 | | 1.44 |
| DS 702 | | 1.44 |
| Dart | | 1.42 |
| Summit | | 1.42 |
| WL 225 | | 1.42 |
| Endure | | 1.41 |
| Vernal | | 1.40 |
| Arrow | | 1.39 |
| NAPB 32 | | 1.39 |
| SX 424 | | 1.39 |
| Saranac | | 1.39 |
| 120 | | 1.38 |
| Fortress | | 1.37 |
| Saranac AR | | 1.36 |
| SX 217 | | 1.36 |
| GH-747 | | 1.34 |
| Cimarron | | 1.33 |
| Big 10 | | 1.32 |
| Iroquois | | 1.31 |
| 636 | | 1.30 |
| NAPB 31 | | 1.28 |
| 532 | | 1.27 |
| 8016 PCa3 | | 1.20 |
| 526 | | 1.19 |
| Average | | 1.40 |
| LSD (.05) | | NS |

Table 6. Yield performance of 45 alfalfa cultivars planted on 5-20-85 and grown at the Northeast Research Station, Watertown, SD.

| Cultivar | 1985 | 1986 | 1987 Forage Yield (tons DM/A) | | | | | 3 | % |
|------------|-------------|-------------|-------------------------------|------------|------------|-------------|-------------|-----------|-----------------------------------|
| | 2 Cut Total | 4 Cut Total | Cut 1 5/29 | Cut 2 7/22 | Cut 3 8/20 | Cut 4 10/21 | 4-Cut Total | Year Avg. | Relative Performance ^a |
| Surpass | 2.66 | 7.62 | 1.86 | 3.39 | 1.21 | 1.24 | 7.70 | 5.66 | 108 |
| 5432 | 2.50 | 7.93 | 1.75 | 2.30 | 1.28 | 1.15 | 6.48 | 5.64 | 108 |
| MN 5617 | 2.31 | 7.59 | 1.72 | 2.53 | 1.43 | 1.25 | 6.93 | 5.61 | 107 |
| Maxim | 2.41 | 7.92 | 1.59 | 2.44 | 1.19 | 1.19 | 6.41 | 5.58 | 107 |
| Magnum + | 2.45 | 7.58 | 1.55 | 2.42 | 1.38 | 1.29 | 6.64 | 5.56 | 106 |
| Spectrum | 2.51 | 7.90 | 1.33 | 2.37 | 1.20 | 1.28 | 6.18 | 5.53 | 106 |
| Horizon | 2.50 | 7.65 | 1.52 | 2.48 | 1.20 | 1.17 | 6.37 | 5.51 | 106 |
| DK 135 | 2.91 | 7.49 | 1.28 | 2.32 | 1.22 | 1.13 | 5.95 | 5.45 | 104 |
| Sparta | 2.63 | 7.60 | 1.41 | 2.32 | 1.23 | 1.15 | 6.11 | 5.44 | 104 |
| Vernema | 2.48 | 7.31 | 1.54 | 2.50 | 1.36 | 1.14 | 6.54 | 5.44 | 104 |
| Futura | 2.91 | 7.54 | 1.44 | 2.34 | 1.12 | 0.97 | 5.87 | 5.44 | 104 |
| 532 | 2.22 | 7.23 | 1.66 | 2.38 | 1.43 | 1.34 | 6.81 | 5.43 | 104 |
| Iroquois | 2.44 | 7.36 | 1.61 | 2.47 | 1.26 | 1.12 | 6.46 | 5.42 | 104 |
| 526 | 2.37 | 7.49 | 1.57 | 2.24 | 1.24 | 1.24 | 6.29 | 5.38 | 103 |
| MN 6216 | 2.06 | 7.65 | 1.54 | 2.48 | 1.34 | 1.07 | 6.43 | 5.38 | 103 |
| Cimarron | 2.54 | 7.85 | 1.17 | 2.28 | 1.17 | 1.10 | 5.72 | 5.37 | 103 |
| Arrow | 2.31 | 7.50 | 1.66 | 2.38 | 1.18 | 1.02 | 6.24 | 5.35 | 102 |
| Peak | 2.33 | 7.42 | 1.45 | 2.44 | 1.21 | 1.20 | 6.30 | 5.35 | 102 |
| Magnum | 2.64 | 7.20 | 1.40 | 2.33 | 1.23 | 1.16 | 6.12 | 5.32 | 102 |
| Max 85 | 2.31 | 7.12 | 1.48 | 2.58 | 1.26 | 1.18 | 6.50 | 5.31 | 102 |
| Elevation | 2.46 | 7.24 | 1.41 | 2.35 | 1.22 | 1.24 | 6.22 | 5.30 | 102 |
| Kingstar | 2.02 | 7.50 | 1.46 | 2.47 | 1.21 | 1.24 | 6.38 | 5.30 | 102 |
| 120 | 2.58 | 7.37 | 1.26 | 2.26 | 1.23 | 1.16 | 5.91 | 5.28 | 101 |
| Oneida VR | 2.13 | 7.07 | 1.46 | 2.52 | 1.27 | 1.36 | 6.61 | 5.27 | 101 |
| Thunder | 2.47 | 7.28 | 1.60 | 2.24 | 1.16 | 0.96 | 5.96 | 5.24 | 100 |
| Oneida | 2.21 | 7.00 | 1.57 | 2.41 | 1.28 | 1.14 | 6.40 | 5.20 | 100 |
| Dawson | 2.36 | 7.24 | 1.38 | 2.34 | 1.15 | 1.09 | 5.96 | 5.19 | 99 |
| Mohawk | 1.98 | 7.14 | 1.46 | 2.51 | 1.34 | 1.14 | 6.45 | 5.19 | 99 |
| NY 8412 | 2.05 | 7.09 | 1.52 | 2.40 | 1.19 | 1.29 | 6.40 | 5.18 | 99 |
| Saranac AR | 2.33 | 7.36 | 1.39 | 2.12 | 1.13 | 1.07 | 5.71 | 5.14 | 98 |
| XAF31 | 2.23 | 7.22 | 1.43 | 2.28 | 1.14 | 1.07 | 5.92 | 5.13 | 98 |
| H-156 | 2.34 | 7.20 | 1.37 | 2.21 | 1.20 | 1.06 | 5.84 | 5.13 | 98 |
| Vernal | 2.35 | 6.34 | 1.34 | 2.44 | 1.14 | 1.05 | 5.97 | 5.09 | 98 |
| Endure | 2.54 | 6.70 | 1.54 | 2.22 | 1.18 | 1.15 | 6.09 | 5.08 | 97 |
| H-154 | 2.74 | 7.38 | 0.91 | 2.08 | 1.10 | 0.93 | 5.02 | 5.05 | 97 |
| Epic | 2.02 | 6.95 | 1.34 | 2.50 | 1.20 | 1.13 | 6.17 | 5.05 | 97 |
| Agate | 2.25 | 6.86 | 1.40 | 2.34 | 1.19 | 0.96 | 5.89 | 5.00 | 96 |
| NY 8413 | 1.99 | 6.67 | 1.43 | 2.36 | 1.21 | 1.29 | 6.29 | 4.98 | 95 |
| MN 6209 | 2.17 | 6.62 | 1.53 | 2.21 | 1.16 | 1.13 | 6.03 | 4.94 | 95 |

Table 6. Continued

| Cultivar | 1985 | 1986 | 1987 Forage Yield (tons DM/A) | | | | | 3 Year Avg. | % Relative Performance ^a |
|------------|-------------|-------------|-------------------------------|------------|------------|-------------|-------------|-------------|-------------------------------------|
| | 2-Cut Total | 4-Cut Total | Cut 1 5/29 | Cut 2 7/22 | Cut 3 8/20 | Cut 4 10/21 | 4-Cut Total | | |
| Blazer | 2.17 | 6.76 | 1.48 | 2.10 | 1.16 | 0.95 | 5.69 | 4.88 | 93 |
| 8016 PCa3 | 2.17 | 6.73 | 1.46 | 2.10 | 1.15 | 0.94 | 5.65 | 4.85 | 93 |
| Megaton | 2.31 | 6.54 | 1.54 | 2.26 | 1.16 | 0.72 | 5.68 | 4.84 | 93 |
| Baker | 2.18 | 6.08 | 1.46 | 2.19 | 1.09 | 1.09 | 5.83 | 4.70 | 90 |
| Saranac | 1.96 | 6.46 | 1.41 | 2.14 | 1.11 | 0.96 | 5.62 | 4.68 | 90 |
| Big 10 | 2.21 | 6.10 | 1.15 | 2.16 | 1.06 | 1.00 | 5.37 | 4.56 | 87 |
| Average | 2.35 | 7.21 | 1.46 | 2.34 | 1.21 | 1.12 | 6.14 | 5.23 | |
| LSD (0.05) | 0.47 | 0.81 | 0.22 | 0.27 | 0.16 | 0.23 | 0.59 | 0.78 | |

^a % Relative Performance based on 3-year average.

Table 7. Yield performance of 31 alfalfa cultivars planted on 4-25-87 and grown at the Northeast Research Station, Watertown, SD.

| Cultivar | Forage Yield (tons DM/A) | |
|------------|--------------------------|------|
| | Cut 1 7/22/87 | |
| WL 225 | | 2.11 |
| SX 217 | | 2.05 |
| NAPB 31 | | 2.03 |
| 120 | | 2.00 |
| Cimarron | | 1.95 |
| Dart | | 1.93 |
| MTO S82 | | 1.90 |
| Fortress | | 1.87 |
| Magnum III | | 1.86 |
| Iroquois | | 1.84 |
| Vernal | | 1.83 |
| Blazer | | 1.82 |
| Dynasty | | 1.82 |
| Endure | | 1.81 |
| DK 135 | | 1.81 |
| NAPB 32 | | 1.80 |
| Commandor | | 1.80 |
| Cim 2000G | | 1.78 |
| MTO N82 | | 1.78 |
| Saranac AR | | 1.78 |
| 532 | | 1.77 |
| Big 10 | | 1.74 |
| 636 | | 1.72 |
| 5432 | | 1.72 |
| Eagle | | 1.72 |
| XPH 2001 | | 1.68 |
| Mohawk | | 1.68 |
| 526 | | 1.66 |
| SX 424 | | 1.65 |
| Arrow | | 1.65 |
| Saranac | | 1.60 |
| Average | | 1.81 |
| LSD (0.05) | | NS |

Table 8. Yield performance of 36 hay-type alfalfa cultivars planted on 4-17-85 and grown at the Central Crops and Soils Research Station, Highmore, SD^a.

| Cultivar | 1986 | 1987 (tons DM/A) | | | 2-yr Avg | % Relative Performance ^b |
|------------|-------------|------------------|-----------|-------------|----------|-------------------------------------|
| | 4-Cut Total | Cut-1 5/14 | Cut-2 7/1 | 2-Cut Total | | |
| DK 135 | 6.39 | 1.54 | 0.84 | 2.38 | 4.38 | 110 |
| Futura | 6.48 | 1.59 | 0.70 | 2.29 | 4.38 | 110 |
| Dawson | 6.16 | 1.53 | 0.93 | 2.46 | 4.31 | 108 |
| Cimarron | 6.11 | 1.57 | 0.82 | 2.39 | 4.24 | 107 |
| MN 6216 | 5.98 | 1.50 | 0.91 | 2.41 | 4.19 | 106 |
| 5432 | 6.00 | 1.54 | 0.77 | 2.31 | 4.15 | 104 |
| XAF31 | 5.98 | 1.56 | 0.76 | 2.32 | 4.15 | 104 |
| Magnum + | 6.39 | 1.62 | 0.87 | 2.49 | 4.14 | 104 |
| Magnum | 5.92 | 1.58 | 0.77 | 2.35 | 4.14 | 104 |
| MN 5617 | 5.65 | 1.74 | 0.88 | 2.62 | 4.14 | 104 |
| NY 8412 | 5.85 | 1.53 | 0.85 | 2.38 | 4.12 | 104 |
| Kingstar | 5.86 | 1.51 | 0.82 | 2.33 | 4.09 | 103 |
| Horizon | 5.80 | 1.61 | 0.74 | 2.35 | 4.08 | 103 |
| Sparta | 5.81 | 1.50 | 0.84 | 2.34 | 4.08 | 103 |
| Eagle | 6.13 | 1.38 | 0.61 | 1.99 | 4.06 | 102 |
| Big 10 | 5.82 | 1.43 | 0.86 | 2.29 | 4.05 | 102 |
| Vernema | 5.75 | 1.58 | 0.76 | 2.34 | 4.04 | 102 |
| SX 217 | 5.73 | 1.48 | 0.82 | 2.30 | 4.02 | 101 |
| Mohawk | 5.68 | 1.55 | 0.81 | 2.36 | 4.02 | 101 |
| NY 8413 | 5.51 | 1.50 | 0.88 | 2.38 | 3.94 | 99 |
| Saranac | 5.64 | 1.50 | 0.74 | 2.24 | 3.94 | 99 |
| 8016 PCa3 | 5.52 | 1.57 | 0.75 | 2.32 | 3.92 | 99 |
| Oneida Vr | 5.45 | 1.48 | 0.90 | 2.38 | 3.91 | 98 |
| 120 | 5.66 | 1.48 | 0.66 | 2.14 | 3.90 | 98 |
| Saranac AR | 5.55 | 1.44 | 0.75 | 2.19 | 3.87 | 97 |
| Baker | 5.45 | 1.53 | 0.70 | 2.23 | 3.84 | 97 |
| Elevation | 5.54 | 1.42 | 0.66 | 2.08 | 3.81 | 96 |
| 532 | 5.11 | 1.57 | 0.86 | 2.43 | 3.77 | 95 |
| Iroquois | 5.46 | 1.37 | 0.67 | 2.04 | 3.76 | 95 |
| MN 6209 | 5.34 | 1.39 | 0.72 | 2.11 | 3.77 | 95 |
| Max 85 | 5.24 | 1.52 | 0.65 | 2.17 | 3.70 | 93 |
| 526 | 5.42 | 1.36 | 0.60 | 1.96 | 3.70 | 93 |
| Blazer | 5.41 | 1.27 | 0.64 | 1.91 | 3.66 | 92 |
| Vernal | 5.07 | 1.48 | 0.60 | 2.08 | 3.57 | 90 |
| Megaton | 5.02 | 1.38 | 0.68 | 2.07 | 3.54 | 89 |
| Agate | 4.88 | 1.36 | 0.69 | 2.05 | 3.47 | 87 |
| Average | 5.67 | 1.50 | 0.76 | 2.26 | 3.97 | |
| LSD (0.05) | 0.67 | 0.19 | NS | 0.36 | 0.63 | |

^a Insufficient growth in seeding year, no data were collected in 1985.
^b % Relative Performance based on 2-year average.

Table 9. Yield performance of 19 pasture-type alfalfa cultivars planted on 4-17-85 at the Central Crops and Soils Research Station, Highmore, SD^a.

| Cultivar | 1986 | 1987 Yield (tons DM/A) | | | 2-Year Avg. | % Relative Performance ^b |
|---------------|-------------|------------------------|------------|-------------|-------------|-------------------------------------|
| | 4-Cut Total | Cut 1 5/14 | Cut 2 6/29 | 2-Cut Total | | |
| Cossack | 5.10 | 1.37 | 0.73 | 2.10 | 3.87 | 132 |
| Ladak 65 | 5.08 | 1.52 | 0.78 | 2.30 | 3.70 | 127 |
| Maverick | 4.77 | 1.47 | 0.84 | 2.31 | 3.54 | 121 |
| Beaver | 4.68 | 1.34 | 0.75 | 2.09 | 3.39 | 116 |
| Narragansett | 4.52 | 1.43 | 0.71 | 2.14 | 3.33 | 114 |
| Heinrich's | 4.16 | 1.32 | 0.73 | 2.05 | 3.11 | 106 |
| Teton | 4.19 | 1.32 | 0.69 | 2.01 | 3.10 | 106 |
| MT-0 | 4.18 | 1.37 | 0.66 | 2.03 | 3.10 | 106 |
| Spredor II | 4.64 | 1.36 | 0.63 | 1.99 | 3.09 | 106 |
| Kane | 4.25 | 1.22 | 0.63 | 1.85 | 3.05 | 104 |
| Travois | 4.23 | 1.17 | 0.58 | 1.75 | 2.98 | 102 |
| Roamer | 3.94 | 1.18 | 0.60 | 1.78 | 2.86 | 98 |
| MT-1 | 3.69 | 1.20 | 0.58 | 1.78 | 2.74 | 94 |
| Rangelander | 3.48 | 1.09 | 0.50 | 1.59 | 2.53 | 87 |
| Drylander | 3.54 | 1.05 | 0.46 | 1.51 | 2.52 | 86 |
| Rambler | 3.40 | 1.02 | 0.57 | 1.59 | 2.49 | 85 |
| Semipalitinsk | 3.33 | 1.04 | 0.48 | 1.52 | 2.42 | 83 |
| Smith's | 3.27 | 0.95 | 0.44 | 1.39 | 2.33 | 80 |
| Anik | 1.72 | 0.86 | 0.16 | 1.02 | 1.37 | 47 |
| Average | 4.01 | 1.23 | 0.61 | 1.83 | 2.92 | |
| LSD (0.05) | 0.61 | 0.23 | 0.17 | 0.32 | 0.54 | |

^a Insufficient growth in seeding year, no data were collected in 1985.

^b % Relative Performance based on 2-year average.

Table 10. Yield performance of 24 alfalfa cultivars planted on 4-10-86 and grown at the Central Crops and Soils Research Station, Highmore, SD.

| Cultivar | 1986 | 1987 Yield (tons DM/A) | | | | 3-Cut Total | 2-Year Avg. | % Relative Performance ^a |
|-------------|-------------|------------------------|--------------|---------------|-------------|-------------|-------------|-------------------------------------|
| | 3-Cut Total | Cut 1 5/14 | Cut 2 7/1 | Cut 3 8/11 | 3-Cut Total | | | |
| 5432 | 2.67 | 1.59 | 1.10 | 0.64 | 3.33 | 3.00 | 117 | |
| Edge | 2.36 | 1.54 | 1.13 | 0.67 | 3.34 | 2.85 | 111 | |
| 526 | 2.50 | 1.70 | 1.03 | 0.46 | 3.19 | 2.85 | 111 | |
| Drummor | 2.37 | 1.58 | 1.12 | 0.58 | 3.28 | 2.82 | 110 | |
| Cimarron | 2.83 | 1.54 | 0.91 | 0.31 | 2.76 | 2.80 | 109 | |
| Crown | 2.60 | 1.53 | 1.02 | 0.44 | 2.99 | 2.79 | 108 | |
| AP 45 | 2.37 | 1.64 | 1.00 | 0.56 | 3.20 | 2.78 | 108 | |
| Dart | 2.44 | 1.58 | 1.01 | 0.49 | 3.08 | 2.76 | 107 | |
| 532 | 2.50 | 1.50 | 0.94 | 0.54 | 2.98 | 2.74 | 107 | |
| Surpass | 2.24 | 1.59 | 0.98 | 0.62 | 3.19 | 2.71 | 105 | |
| 120 | 2.35 | 1.65 | 0.98 | 0.34 | 2.97 | 2.66 | 104 | |
| Epic | 2.45 | 1.46 | 0.95 | 0.43 | 2.84 | 2.65 | 103 | |
| SX 424 | 2.29 | 1.51 | 0.95 | 0.44 | 2.90 | 2.60 | 101 | |
| MTO S82 | 2.14 | 1.56 | 0.94 | 0.41 | 2.91 | 2.52 | 98 | |
| Vernal | 2.25 | 1.58 | 0.88 | 0.29 | 2.75 | 2.50 | 97 | |
| SX 217 | 2.50 | 1.36 | 0.78 | 0.38 | 2.52 | 2.50 | 97 | |
| WL 225 | 2.21 | 1.48 | 0.84 | 0.33 | 2.65 | 2.43 | 94 | |
| Arrow | 2.11 | 1.57 | 0.85 | 0.32 | 2.74 | 2.43 | 94 | |
| Heinrich's | 1.89 | 1.33 | 0.95 | 0.56 | 2.84 | 2.37 | 92 | |
| MTO N82 | 1.96 | 1.45 | 0.89 | 0.30 | 2.64 | 2.30 | 89 | |
| Rangelander | 1.83 | 1.48 | 0.64 | 0.56 | 2.68 | 2.26 | 88 | |
| Roamer | 1.77 | 1.39 | 0.73 | 0.58 | 2.70 | 2.23 | 87 | |
| Rambler | 1.89 | 1.23 | 0.65 | 0.56 | 2.44 | 2.16 | 84 | |
| Drylander | 1.63 | 1.14 | 0.63 | 0.34 | 2.11 | 1.87 | 73 | |
| Average | 2.26 | 1.50 | 0.91 | 0.46 | 2.88 | 2.57 | | |
| LSD (0.05) | 0.06 | 0.20 | 0.26 | NS | 0.64 | 0.55 | | |

^a % Relative Performance based on 2-year average.

Table 11. Yield performance of 34 hay-type alfalfa cultivars planted on 4-18-85 and grown at Bison, SD^a.

| Cultivar | 1986 | 1987 Yield (tons DM/A) | | | 2-Year Avg. | % Relative Performance ^b |
|------------|-------------|------------------------|-----------|-------------|-------------|-------------------------------------|
| | 4-Cut Total | Cut 1 6/11 | Cut 2 8/3 | 2-Cut Total | | |
| Megaton | 2.07 | 2.44 | 1.02 | 3.46 | 2.76 | 115 |
| Sparta | 2.19 | 2.34 | 0.88 | 3.22 | 2.71 | 113 |
| Blazer | 2.16 | 2.32 | 0.86 | 3.18 | 2.67 | 112 |
| Dawson | 2.20 | 2.18 | 0.85 | 3.03 | 2.62 | 110 |
| Magnum + | 1.97 | 2.16 | 1.02 | 3.18 | 2.58 | 108 |
| XAF31 | 2.08 | 2.28 | 0.80 | 3.08 | 2.58 | 108 |
| Max 85 | 2.18 | 2.22 | 0.74 | 2.96 | 2.57 | 108 |
| Futura | 2.03 | 2.16 | 0.94 | 3.10 | 2.56 | 107 |
| DK 135 | 2.11 | 2.13 | 0.88 | 3.01 | 2.56 | 107 |
| NY 8413 | 1.98 | 2.21 | 0.91 | 3.12 | 2.55 | 107 |
| 5432 | 1.95 | 2.16 | 0.94 | 3.10 | 2.52 | 105 |
| Kingstar | 2.26 | 1.92 | 0.84 | 2.76 | 2.51 | 105 |
| Elevation | 1.95 | 2.13 | 0.90 | 3.03 | 2.49 | 104 |
| Big 10 | 2.12 | 2.15 | 0.69 | 2.84 | 2.48 | 104 |
| Magnum | 1.77 | 2.12 | 1.02 | 3.14 | 2.46 | 103 |
| 526 | 2.06 | 2.02 | 0.82 | 2.84 | 2.45 | 102 |
| 532 | 1.93 | 2.07 | 0.89 | 2.96 | 2.44 | 102 |
| Horizon | 1.61 | 2.26 | 0.92 | 3.18 | 2.40 | 100 |
| MN 6216 | 1.93 | 2.14 | 0.71 | 2.85 | 2.39 | 100 |
| Vernal | 1.99 | 2.02 | 0.72 | 2.74 | 2.36 | 99 |
| Cimarron | 1.83 | 2.02 | 0.83 | 2.85 | 2.34 | 98 |
| 120 | 1.79 | 1.96 | 0.82 | 2.78 | 2.28 | 95 |
| MN 5617 | 1.82 | 2.02 | 0.70 | 2.72 | 2.27 | 95 |
| MN 6209 | 1.81 | 1.98 | 0.74 | 2.72 | 2.26 | 94 |
| Saranac AR | 1.84 | 2.10 | 0.58 | 2.68 | 2.26 | 94 |
| Mohawk | 1.91 | 1.91 | 0.63 | 2.54 | 2.22 | 93 |
| 8016 PCA3 | 1.63 | 2.06 | 0.70 | 2.76 | 2.19 | 92 |
| Iroquois | 1.57 | 2.13 | 0.63 | 2.76 | 2.16 | 90 |
| NY 8412 | 1.65 | 2.02 | 0.64 | 2.66 | 2.16 | 90 |
| Agate | 1.65 | 1.99 | 0.67 | 2.66 | 2.16 | 90 |
| Saranac | 1.63 | 2.04 | 0.61 | 2.65 | 2.14 | 90 |
| Vernema | 1.59 | 1.96 | 0.69 | 2.65 | 2.12 | 89 |
| Baker | 1.54 | 1.99 | 0.70 | 2.69 | 2.12 | 89 |
| Onieda VR | 1.53 | 1.96 | 0.60 | 2.56 | 2.04 | 85 |
| Average | 1.89 | 2.10 | 0.79 | 2.90 | 2.39 | |
| LSD (0.05) | 0.47 | NS | NS | NS | NS | |

^a Insufficient growth in seeding year, no data were collected in 1985.
^b % Relative Performance based on 2-year average.

Table 12. Yield performance of 19 pasture-type alfalfa cultivars planted on 4-18-85 and grown at Bison, SD^a.

| Cultivar | 1986 | 1987 Yield (tons DM/A) | | | 2-Year Avg. | % Relative Performance ^b |
|---------------|-------------|------------------------|-----------|-------------|-------------|-------------------------------------|
| | 2-Cut Total | Cut 1 6/11 | Cut 2 8/3 | 2-Cut Total | | |
| Heinrich's | 1.70 | 2.72 | 0.82 | 3.54 | 2.62 | 121 |
| Maverick | 1.81 | 2.54 | 0.78 | 3.32 | 2.57 | 118 |
| Ladak 65 | 2.08 | 2.09 | 0.79 | 2.88 | 2.48 | 114 |
| Spredor II | 1.85 | 2.45 | 0.64 | 3.09 | 2.48 | 114 |
| Beaver | 1.92 | 2.24 | 0.76 | 3.00 | 2.46 | 113 |
| Travois | 1.50 | 2.81 | 0.57 | 3.38 | 2.44 | 112 |
| Narragansett | 1.44 | 2.46 | 0.90 | 3.36 | 2.40 | 111 |
| MT-0 | 1.88 | 2.06 | 0.68 | 2.74 | 2.31 | 106 |
| Kane | 1.47 | 2.39 | 0.70 | 3.09 | 2.28 | 105 |
| Rambler | 1.55 | 2.44 | 0.45 | 2.89 | 2.22 | 102 |
| MT-1 | 1.51 | 2.13 | 0.59 | 2.72 | 2.12 | 98 |
| Cossack | 1.30 | 2.17 | 0.72 | 2.89 | 2.09 | 96 |
| Rangelander | 1.31 | 2.40 | 0.47 | 2.87 | 2.09 | 96 |
| Roamer | 1.31 | 2.25 | 0.49 | 2.74 | 2.03 | 94 |
| Drylander | 1.42 | 2.13 | 0.39 | 2.52 | 1.97 | 91 |
| Smith's | 0.89 | 2.59 | 0.39 | 2.98 | 1.94 | 89 |
| Teton | 1.62 | 1.54 | 0.62 | 2.16 | 1.89 | 87 |
| Semipalitinsk | 1.27 | 1.91 | 0.45 | 2.36 | 1.82 | 84 |
| Anik | 0.32 | 1.54 | 0.16 | 1.70 | 1.01 | 46 |
| Average | 1.48 | 2.26 | 0.60 | 2.86 | 2.17 | |
| LSD (0.05) | 0.36 | 0.73 | 0.27 | 0.80 | 0.68 | |

^a Insufficient growth in seeding year, no data were collected in 1985.

^b % Relative Performance based on 2-year average.

Table 13. Yield performance of 27 hay and pasture-type alfalfa cultivars planted on 5-22-86 and grown at Summit, SD.

| Cultivar | 1986 | 1987 Yield (tons DM/A) | | | | 2-Year Avg. | % Relative Performance ^a |
|-------------|-------------|------------------------|------------|------------|-------------|-------------|-------------------------------------|
| | 2-Cut Total | Cut 1 5/29 | Cut 2 7/22 | Cut 3 8/20 | 3-Cut Total | | |
| Cimarron | 2.41 | 1.38 | 1.58 | 0.80 | 3.76 | 3.08 | 112 |
| 120 | 2.38 | 1.57 | 1.52 | 0.68 | 3.77 | 3.08 | 112 |
| Magnum + | 2.35 | 1.45 | 1.50 | 0.72 | 3.67 | 3.01 | 110 |
| Dart | 2.44 | 1.54 | 1.39 | 0.62 | 3.55 | 3.00 | 109 |
| Dynasty | 2.35 | 1.37 | 1.49 | 0.73 | 3.59 | 2.97 | 108 |
| DS 647 | 2.43 | 1.39 | 1.46 | 0.64 | 3.49 | 2.96 | 108 |
| DS 646 | 2.18 | 1.58 | 1.39 | 0.75 | 3.72 | 2.95 | 108 |
| AP 45 | 2.13 | 1.61 | 1.45 | 0.59 | 3.65 | 2.89 | 105 |
| 5432 | 1.84 | 1.59 | 1.57 | 0.75 | 3.91 | 2.88 | 105 |
| Crown | 2.21 | 1.42 | 1.42 | 0.62 | 3.46 | 2.84 | 104 |
| Surpass | 2.24 | 1.48 | 1.40 | 0.51 | 3.39 | 2.82 | 103 |
| Drummor | 2.10 | 1.30 | 1.50 | 0.70 | 3.50 | 2.80 | 102 |
| Arrow | 2.16 | 1.41 | 1.44 | 0.52 | 3.37 | 2.76 | 101 |
| SX 217 | 2.08 | 1.32 | 1.48 | 0.62 | 3.42 | 2.75 | 100 |
| MTO S82 | 2.08 | 1.46 | 1.47 | 0.47 | 3.40 | 2.74 | 100 |
| Vernal | 1.95 | 1.43 | 1.50 | 0.56 | 3.49 | 2.72 | 99 |
| 526 | 2.09 | 1.45 | 1.34 | 0.53 | 3.32 | 2.71 | 99 |
| 532 | 2.05 | 1.46 | 1.24 | 0.55 | 3.25 | 2.65 | 97 |
| Edge | 2.18 | 1.25 | 1.27 | 0.58 | 3.10 | 2.64 | 96 |
| Epic | 2.06 | 1.40 | 1.28 | 0.52 | 3.20 | 2.63 | 96 |
| MTO N82 | 2.20 | 1.38 | 1.33 | 0.33 | 3.04 | 2.62 | 96 |
| SX 424 | 2.07 | 1.33 | 1.34 | 0.49 | 3.16 | 2.62 | 96 |
| Rangelander | 1.85 | 1.40 | 1.47 | 0.48 | 3.35 | 2.60 | 95 |
| Heinrich's | 1.82 | 1.42 | 1.35 | 0.48 | 3.25 | 2.54 | 93 |
| Roamer | 2.00 | 1.38 | 1.31 | 0.19 | 2.88 | 2.44 | 89 |
| Drylander | 1.58 | 1.32 | 1.36 | 0.35 | 3.03 | 2.31 | 84 |
| Rambler | 1.56 | 1.25 | 1.25 | 0.19 | 2.69 | 2.12 | 77 |
| Average | 2.10 | 1.42 | 1.41 | 0.55 | 3.39 | 2.74 | |
| LSD (0.05) | NS | 0.21 | 0.20 | 0.17 | 0.45 | 0.56 | |

^a % Relative Performance based on 2-year average.

Table 14. Listing of alfalfa cultivars, developers, suppliers, and agronomic characteristics^{ab}.

| Developer/Supplier | Cultivar | FD ^c | BW ^d | VW ^d | FW ^d | An ^d | PRR ^d | SAA ^d | PA ^d | BAA ^d | SN ^d | RKN ^d |
|--|---------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|-----------------|------------------|-----------------|------------------|
| Agriculture Canada Research Station | Anik | | | | | | | | | | | |
| | Beaver | | | | | | | | | | | |
| | Drylander | | | | | | | | | | | |
| | Heinrich's | | | | | | | | | | | |
| | Kane | | | | | | | | | | | |
| | Rambler | 1 | MR | -- | MR | S | S | -- | -- | -- | -- | -- |
| AgriPro | Rangelander | | | | | | | | | | | |
| | Roamer | | | | | | | | | | | |
| | AP 45 | | | | | | | | | | | |
| | Armor | 4 | R | -- | R | MR | R | -- | -- | -- | -- | -- |
| | Arrow | 3 | HR | R | HR | MR | HR | -- | -- | -- | -- | -- |
| | Dart | 3 | HR | R | HR | R | HR | -- | -- | -- | -- | -- |
| | Maverick | 1 | R | -- | R | -- | MR | -- | -- | -- | -- | -- |
| | NAPB 31 | | | | | | | | | | | |
| | NAPB 32 | | | | | | | | | | | |
| Thunder | 3 | R | -- | HR | MR | R | LR | -- | -- | -- | -- | |
| Arrowhead, Inc. | Horizon | | | | | | | | | | | |
| | Megaton | | | | | | | | | | | |
| Arrow Seed Company, Inc. | Emerald | 4 | R | MR | R | MR | R | LR | R | -- | -- | -- |
| Asgrow Seed Company | Eagle XPH 2001 | 4 | HR | MR | R | R | MR | R | R | LR | R | -- |
| Cargill, Inc. | Endure | 3 | R | R | R | MR | R | LR | -- | -- | -- | -- |
| Cenex/Land O'Lakes | Maxim | 4 | R | R | R | MR | MR | R | R | MR | R | -- |
| | Spectrum | | | | | | | | | | | |
| | Surpass | 3 | HR | R | HR | MR | R | -- | -- | -- | -- | -- |
| | Sure | 3 | HR | R | HR | HR | R | MR | HR | -- | -- | -- |
| | Sparta | 3 | R | R | MR | -- | MR | -- | R | -- | HR | -- |
| | LL3387 ^e | | | | | | | | | | | |
| Dairyland Research Int'l. | Blazer | 3 | HR | LR | R | LR | MR | -- | HR | -- | HR | -- |
| | Magnum III | 4 | R | MR | R | R | R | -- | -- | -- | -- | -- |
| | DS 512 ^e | | | | | | | | | | | |
| | DS 537 ^e | | | | | | | | | | | |
| | DS 646 ^e | | | | | | | | | | | |
| | DS 647 ^e | | | | | | | | | | | |
| | DS 701 | | | | | | | | | | | |
| | DS 702 | | | | | | | | | | | |
| | Dynasty | 4 | HR | R | R | MR | R | R | -- | -- | -- | -- |
| | Futura | | | | | | | | | | | |
| Magnum | 4 | R | -- | R | MR | LR | R | R | -- | MR | -- | |
| Magnum + | 4 | R | LR | R | MR | R | LR | -- | -- | -- | -- | |
| Dekalb-Pfizer Genetics | DK 135 | 4 | R | MR | R | MR | MR | MR | R | LR | R | -- |
| | 120 | 3 | HR | -- | R | LR | R | -- | R | -- | R | -- |
| | DK 125 | 3 | HR | R | R | HR | R | MR | R | -- | -- | -- |

Table 14. Continued

| Developer/Supplier | Cultivar | FD ^c | BW ^d | VW ^d | FW ^d | An ^d | PRR ^d | SAA ^d | PA ^d | BAA ^d | SN ^d | RKN ^d |
|---------------------------------|--|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|-----------------|------------------|-----------------|------------------|
| Farm Seed Research Corp. | F-144 VWR ^e | | | | | | | | | | | |
| | F-146 ^e | | | | | | | | | | | |
| | FSRC H-170 ^e | | | | | | | | | | | |
| | FSRC IH-171 ^e | | | | | | | | | | | |
| | FSRC H-172 ^e | | | | | | | | | | | |
| | FSRC H-174 ^e | | | | | | | | | | | |
| | H-150R ^e | | | | | | | | | | | |
| | H-154 ^e | | | | | | | | | | | |
| | H-155 ^e | | | | | | | | | | | |
| H-156 ^e | | | | | | | | | | | | |
| H-168 ^e | | | | | | | | | | | | |
| Funk Seeds International | G-2841 | 3 | HR | R | R | R | R | HR | R | -- | -- | -- |
| Garst Seed Company | 636 | 2 | HR | R | R | MR | R | -- | -- | -- | -- | -- |
| Golden Harvest | GH-747 | | | | | | | | | | | |
| Great Lakes Hybrids | Big 10 | 3 | HR | -- | HR | R | R | LR | R | -- | -- | -- |
| | Shield | 3 | HR | R | R | HR | R | MR | R | -- | R | -- |
| Great Plains Research Co., Inc. | Cimarron Cim 2000G ^e | 4 | HR | LR | HR | R | MR | HR | R | -- | -- | -- |
| Jacques Seed Company | Elevation | 3 | R | MR | R | -- | MR | -- | R | -- | HR | -- |
| J.C. Robinson Seed Company | GH 737 | 4 | R | R | R | MR | HR | R | R | -- | MR | -- |
| L. L. Olds Seed Co. | Old's "98" | 3 | HR | R | R | HR | R | R | R | -- | -- | -- |
| Michigan Agric. Exp. Stn. | 8016 PCa3 | | | | | | | | | | | |
| Montana Agric. Exp. Stn. | Ladak 65 | | | | | | | | | | | |
| NC+ Hybrids, Inc. | Verta + | 4 | HR | R | R | HR | R | LR | R | -- | -- | -- |
| Nebraska Agric. Exp. Stn. | Baker | 2 | HR | -- | R | LR | -- | HR | HR | -- | -- | -- |
| | Dawson | 2 | MR | -- | R | S | S | -- | -- | -- | -- | -- |
| New York Agric. Exp. Stn. | Iroquois | 2 | R | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Saranac | 4 | R | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Saranac Ar | 4 | MR | -- | -- | -- | -- | -- | -- | -- | -- | -- |
| | Mohawk | 2 | HR | -- | MR | HR | -- | -- | -- | -- | -- | -- |
| | Oneida | 2 | HR | -- | R | -- | HR | -- | -- | -- | -- | -- |
| | Oneida VR | 3 | R | HR | HR | MR | MR | -- | -- | -- | -- | -- |
| | NY 8412 ^e NY 8413 ^e | | | | | | | | | | | |
| The New Northrup King | Commandor | 4 | R | MR | R | HR | R | LR | -- | -- | MR | -- |
| | Drummor | 4 | R | -- | MR | MR | R | HR | -- | -- | MR | -- |
| | Spredor II | 1 | HR | -- | MR | -- | -- | -- | -- | -- | -- | -- |
| | 82503 | | | | | | | | | | | |
| | Summit | 4 | R | R | R | HR | R | MR | R | -- | -- | -- |
| Fortress | 2 | R | R | R | R | HR | HR | R | -- | HR | -- | |

Table 14. Continued

| Developer/Supplier | Cultivar | FD ^c | BW ^d | VW ^d | FW ^d | An ^d | PRR ^d | SAA ^d | PA ^d | BAA ^d | SN ^d | RKN ^d |
|---------------------------------|----------------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|-----------------|------------------|-----------------|------------------|
| Payco Seeds, Inc. | Edge | 4 | R | R | R | HR | R | R | R | -- | -- | -- |
| Paymaster | Crown | 3 | R | R | R | HR | R | MR | R | -- | R | -- |
| Pioneer Hi-Bred Int'l., Inc. | XAF31 | | | | | | | | | | | |
| | 526 | 2 | HR | -- | MR | -- | LR | HR | R | -- | -- | -- |
| | 532 | 3 | HR | -- | R | LR | LR | HR | R | -- | -- | -- |
| | 5432 | 4 | HR | R | HR | -- | MR | HR | R | -- | -- | -- |
| Research Seeds, Inc. | Epic | 4 | R | -- | MR | -- | R | -- | HR | -- | HR | -- |
| | Peak | 4 | R | LR | R | -- | MR | -- | HR | -- | HR | -- |
| | RS 7890 ^e | | | | | | | | | | | |
| | Champ | 3 | HR | MR | R | S | MR | S | HR | -- | HR | -- |
| Rhode Island Agric. Exp. Stn. | Narragansett | | | | | | | | | | | |
| SD Collect | Smith's | | | | | | | | | | | |
| SDSU Agric. Exp. Stn. | MT-1 ^e | | | | | | | | | | | |
| | MT-0 ^e | | | | | | | | | | | |
| | MTO N82 ^e | | | | | | | | | | | |
| | MTO S82 ^e | | | | | | | | | | | |
| | Semipalitinsk | | | | | | | | | | | |
| | Teton | 1 | MR | -- | MR | S | LR | -- | -- | -- | -- | -- |
| Travois | 1 | R | -- | MR | S | S | -- | -- | -- | -- | -- | |
| SeedTec | Max 85 | | | | | | | | | | | |
| | Ultra | 3 | HR | R | HR | HR | R | LR | R | -- | -- | -- |
| Sexauer Company | SX 217 | 4 | R | -- | HR | MR | MR | HR | -- | -- | R | MR |
| | SX 424 | 3 | MR | -- | R | R | R | HR | -- | -- | -- | -- |
| SuperCrost | Top Gun | 4 | HR | R | HR | HR | R | MR | R | -- | R | -- |
| United AgriSeeds, Inc. | Salute | 4 | HR | MR | R | MR | R | LR | -- | -- | -- | -- |
| Minnesota Agric. Exp. Stn. | Agate | 2 | HR | -- | HR | MR | R | -- | -- | -- | -- | -- |
| | MN 5617 | | | | | | | | | | | |
| | MN 6209 | | | | | | | | | | | |
| | MN 6216 | | | | | | | | | | | |
| USDA/ARS | Cossack | | | | | | | | | | | |
| WA Aric. Exp. Stn./USDA | Vernema | 4 | MR | MR | -- | LR | LR | MR | -- | -- | HR | -- |
| Wisconsin Agric. Exp. Stn./USDA | Vernal | 2 | R | -- | MR | -- | -- | -- | -- | -- | -- | MR |

Table 14. Continued

| Developer/Supplier | Cultivar | FD ^c | BW ^d | VW ^d | FW ^d | An ^d | PRR ^d | SAA ^d | PA ^d | BAA ^d | SN ^d | RKN ^d |
|--------------------|----------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|------------------|-----------------|------------------|-----------------|------------------|
| W-L Research, Inc. | Kingstar | 3 | R | R | HR | MR | R | R | MR | -- | R | MR |
| | WL 225 | 2 | HR | R | HR | MR | MR | HR | R | R | -- | MR |
| | WL 316 | 4 | MR | R | R | HR | MR | R | R | LR | MR | -- |
| | WL 320 | 5 | R | MR | HR | MR | R | R | MR | MR | MR | -- |

^e Experimental Varieties that are currently unavailable

^c FD = Fall Dormancy, see scale below

^d Refer to pest resistance rating below:

BW = Bacterial Wilt
VW = Verticillium wilt
FW = Fusarium wilt
An = Anthracnose
PRR = Phytophthora Root Rot
SAA = Spotted Alfalfa Aphid
PA = Pea Aphid
BAA = Blue Alfalfa Aphid
SN = Stem Nematode
RKN = Root Knot Nematode

Fall Dormancy Ratings

| Check Variety | Dormancy Rating |
|---------------|-----------------|
| Norseman | 1 |
| Vernal | 2 |
| Ranger | 3 |
| Saranac | 4 |
| DuPuits | 5 |
| Mesilla | 6 |
| Moapa 69 | 7 |
| CUF 101 | 8 |

Pest Resistance Ratings

| % Resistant plants | Resistance class |
|--------------------|--------------------------|
| 0-5 % | Susceptible (S) |
| 6-14% | Low Resistance (LR) |
| 15-30% | Moderate Resistance (MR) |
| 31-50% | Resistance (R) |
| > 50% | High Resistance (HR) |

^a Blank spaces indicate variety is susceptible or has not been adequately tested.

^b Ratings have been obtained from: 1987 Alfalfa Varieties. Certified Alfalfa Seed Council, Inc., Davis, CA; 1987 Varietal Trials of Farm Crops. University of Minn. Rpt. no. 24. pgs 5-7; and Alfalfa Varieties for '88. 1987. pgs 8-10. Hay and Forage Grower. vol 2, no. 6. Webb Publishing Co St. Paul, MN.

