# 1991 Kentucky Alfalfa Yield Results[1]

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Alfalfa (*Medicago sativa*) is the highest yielding, highest quality legume forage crop raised in Kentucky. This crop forms the basis of Kentucky's cash hay enterprise and is an important component in dairy, horse, beef and sheep diets. In 1990, 320,000 acres of alfalfa were produced in Kentucky, averaging 3.4 tons of dry matter yield per acre. At $75 per ton, the value of this alfalfa to Kentucky farmers would be $81.6 million.

This report provides current yield data on alfalfa varieties currently in the Kentucky Alfalfa Variety Trials. Also, guidelines on selecting alfalfa varieties are discussed.

## Description of the tests

Tests were established at Lexington, Bowling Green, and Princeton in 1990 and at Lexington in 1991. The soils at all locations are well suited to alfalfa in that they are well-drained silt loams (Maury, Pembroke, and Crider at Lexington, Bowling Green and Princeton, respectively). In each test, 20 pounds of seed per acre was planted into a prepared seedbed in a randomized complete block design with four replications. Top management practices were employed at all sites. Optimum pH and soil fertility were provided and maintained. The 1990 seedings were fertilized according to nutrient removal in the fall of 1990 with the equivalent of 69 pounds $P_2O_5$/acre, 360 pounds $K_2O$/acre and 1.5 pounds of actual boron/acre. Insects were controlled using Furadan[2] and Ambush insecticides. Herbicides such as Kerb, Gramoxone Extra, and Poast were used as needed to control weeds. A sickle-type harvester was used to remove forage from the plots where varieties were in the bud to early-flower stage. Fresh weights were measured in the field and occasional subsamples were taken and weighed and dried at 65$^{o}$ C and reweighed to determine percent dry matter.

## Results and Evaluation of Alfalfa Yield Data

The evaluation of the ability of alfalfa varieties to produce usable yield is the central purpose of this report. Yield data are presented on a oven dry matter (DM) basis and are found in Tables 1 to 4. These tables list the varieties in alphabetical order. Yields are given by cutting and by year for each year of production. In 1991, no harvests were taken

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[1]The Kentucky alfalfa variety testing program is a cooperative effort between the University of Kentucky Agricultural Experiment Station in Lexington and Princeton and Western Kentucky University in Bowling Green.

[2]The use of tradenames of agricultural chemicals and products is done for clarity and is not intended as an endorsement by the University of Kentucky.

at Princeton after August 14 due to a moisture deficit of 7.10 inches between June 1 and October 31 that caused growth of the alfalfa to cease.

All data were analyzed statistically to determine if the apparent differences in yield are truly due to superior genetics or just due to chance. In the yield tables, the highest yielding variety in each column is marked by two asterisks (**). The varieties with yields not significantly different from the highest yielding variety are marked by one asterisk (*). To determine if two varieties truly differ in yield, compare the difference between the two varieties to the LSD (Least significant difference) at the bottom of the column. If that difference is equal to or greater than the LSD, the varieties are truly different in yield when grown under the conditions at a given location. A measure of the variability of the data, the coefficient of variation (CV) is included for each column of means. Low variability is desirable. Increased variability within a study results in increased CV's and larger LSD's.

Weather data for the 1991 growing season are presented in Table 5. Temperatures at all locations were consistently greater than normal with Lexington showing the greatest deviation, having a very warm winter and spring. There was a difference in precipitation between locations. Lexington had a surplus of 2.69 inches through the end of October with the majority of the excess coming in May (2.20 inches). Bowling Green and Princeton had deficits of 0.84 and 6.54 inches, respectively.

Considerations in Selecting an Alfalfa Variety

Several varieties of alfalfa are adapted for use in Kentucky. Winter hardiness ratings and disease resistances of the 54 varieties presently in the Kentucky Alfalfa Variety Trials are listed in Table 6. In order to select a variety, many factors must be considered. A desirable alfalfa variety will be certified, high yielding, locally adapted, winter hardy, resistant to diseases, persistent, and suited for the intended use. In addition, look for varieties that perform well over a range of locations and years whenever this data are available.

Certified Seed. Certified seed is your assurance of getting high quality, genetically true seed. All certified seed must come from fields that have passed requirements for field history and previous cropping. These fields are inspected twice and must conform to isolation regulations to prevent cross-pollination from other varieties. All certified seed must meet standards for germination, purity and freedom from contamination from other crop seed, weed seed, and inert material.

Winter Hardiness. Each variety has been assigned a fall dormancy rating ranging from 1 (very dormant) to 8 (non-dormant). Varieties should have a fall dormancy rating of 5 or less to be winter hardy in Kentucky. Varieties with lower dormancy ratings are more dormant and in general are slower to start growing in the spring and stop growing sooner in the fall.

Disease/Pest Resistance. In Kentucky, producers should use varieties that have at least an "MR" (moderately resistant) rating to four major diseases: phytophthora root rot (PRR), anthracnose (An), bacterial wilt (Bw), and fusarium wilt (Fw).

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

Anthracnose is a fungus that attacks the stems of alfalfa, preventing water flow to the rest of the shoot and causing sudden wilting. The wilted shoots have a characteristic "shepherd's crook" appearance.

Bacterial wilt and fusarium wilt are infections of the water-conducting tissues of alfalfa roots that do not cause any noticeable root rot. These diseases prevent water flow to leaves resulting in wilting of shoots and eventual death of infected plants. Roots infected with bacterial wilt often have a yellowish-brown discoloration of the inner woody cylinder of the taproot. Fusarium infection can be recognized by brown to red streaks in the inner woody cylinder of the taproot.

Other Diseases and Pests. Although confusing claims exist, currently no varieties have true genetic resistance to the alfalfa weevil and potato leafhopper. In addition, there is no varietal resistance to sclerotinia crown and stem rot. Incorporating resistance to these and other pests of alfalfa is the goal of alfalfa breeders nationwide.

## Producing High Alfalfa Yields

In order to produce high yields with alfalfa, plant certified high-yielding varieties on deep, well-drained, fertile soils with near neutral pH. Alfalfa should be harvested at the bud to early flower stage and will annually produce 4 to 5 cuttings by mid-September in Kentucky. To consistently produce high yields, soil fertility levels must be maintained at recommended levels, and pests such as weeds, alfalfa weevil, and potato leafhopper should be controlled using the appropriate cultural and/or chemical methods. For further information about alfalfa management, refer to the University of Kentucky Extension publications listed in Table 7.

Dry matter yields (tons/acre) of alfalfa varieties sown on May 18, 1990, at Lexington, Kentucky.

| | 1991 Harvests | | | | | 1991 | 1990 |
|---|---|---|---|---|---|---|---|
| Variety | May15 | Jun18 | Jul23 | Aug27 | Oct29 | Total | Total |
| 2852 | 2.71* | 1.83 | 1.48 | 0.83 | 0.63 | 7.47 | 2.32** |
| 5373 | 2.53* | 1.83 | 1.55 | 0.89 | 0.72* | 7.53 | 1.88 |
| 5472 | 2.40 | 1.86 | 1.59 | 0.96* | 0.69* | 7.50 | 2.06* |
| 83T27 | 2.38 | 1.74 | 1.63* | 0.91 | 0.76* | 7.40 | 2.05* |
| 87A89 | 2.63* | 1.98* | 1.56 | 0.94 | 0.74* | 7.86* | 1.83 |
| 89-128 | 2.13 | 1.80 | 1.54 | 0.74 | 0.61 | 6.83 | 2.09* |
| Aggressor | 2.63* | 1.94* | 1.63* | 0.68 | 0.63 | 7.51 | 2.14* |
| AlfaGraze | 2.45 | 1.94* | 1.59 | 0.76 | 0.57 | 7.31 | 2.16* |
| Anstar | 2.56* | 1.73 | 1.65* | 0.99* | 0.72* | 7.66* | 2.19* |
| Apollo Supreme | 2.66* | 1.87 | 1.68* | 0.73 | 0.62 | 7.56 | 2.21* |
| Arrow | 2.50 | 2.02* | 1.70* | 1.17** | 0.78* | 8.16* | 2.00* |
| Asset | 2.49 | 1.82 | 1.70* | 0.79 | 0.66* | 7.45 | 2.09* |
| Belmont | 2.39 | 1.88 | 1.64* | 0.87 | 0.67* | 7.45 | 1.96* |
| Buffalo | 2.55* | 1.91* | 1.73* | 0.80 | 0.65* | 7.65* | 1.99* |
| B-54 | 2.83* | 1.98* | 1.50 | 0.77 | 0.59 | 7.67* | 2.16* |
| Cimarron VR | 2.71* | 1.93* | 1.70* | 0.78 | 0.67* | 7.79* | 1.99* |
| Dart | 2.86** | 1.93* | 1.76* | 0.71 | 0.70* | 7.96* | 2.30* |
| Dawn | 2.38 | 1.90* | 1.84* | 0.89 | 0.68* | 7.69* | 2.26* |
| DK 135 | 2.84* | 2.06* | 1.81* | 0.95 | 0.80** | 8.45** | 2.03* |
| Excalibur | 2.70* | 1.84 | 1.56 | 0.88 | 0.72* | 7.71* | 2.23* |
| Garst 630 | 2.68* | 2.10* | 1.89* | 0.95 | 0.78* | 8.40* | 1.76 |
| Haymark | 2.29 | 1.60 | 1.47 | 0.72 | 0.62 | 6.70 | 2.07* |
| Impact | 2.52* | 2.13** | 1.93** | 0.92 | 0.70* | 8.21* | 1.88 |
| Liberty | 2.32 | 1.71 | 1.41 | 0.82 | 0.63 | 6.90 | 1.82 |
| Majestic | 2.49 | 1.94* | 1.68* | 0.96* | 0.69* | 7.75* | 1.79 |
| MultiKing I | 2.24 | 1.71 | 1.20 | 0.78 | 0.61 | 6.56 | 1.98* |
| Sabre | 2.47 | 1.98* | 1.57 | 0.75 | 0.65* | 7.42 | 1.91 |
| Saranac AR | 2.36 | 1.73 | 1.50 | 0.87 | 0.66* | 7.13 | 2.05* |
| Top Ton | 2.73* | 1.88 | 1.62* | 0.86 | 0.68* | 7.77* | 2.00* |
| Voyager | 2.59* | 1.72 | 1.63* | 0.86 | 0.67* | 7.48 | 1.92 |
| VS 481 | 2.11 | 1.71 | 1.48 | 0.87 | 0.69* | 6.87 | 2.02* |
| Wampr | 2.82* | 2.05* | 1.72* | 0.84 | 0.76* | 8.19* | 2.26* |
| WL 225 | 2.51 | 1.67 | 1.51 | 0.76 | 0.62 | 7.06 | 1.75 |
| WL 317 | 2.30 | 1.79 | 1.71* | 0.89 | 0.66* | 7.36 | 2.12* |
| WL 320 | 2.11 | 1.79 | 1.89* | 0.82 | 0.75* | 7.35 | 2.05* |
| Mean | 2.51 | 1.87 | 1.63 | 0.85 | 0.68 | 7.53 | 2.04 |
| CV, % | 10.00 | 9.46 | 14.79 | 18.17 | 16.86 | 7.79 | 13.65 |
| LSD, 0.05 | 0.35 | 0.25 | 0.34 | 0.22 | 0.16 | 0.82 | 0.39 |

1990 Total includes 2 harvests dated Aug03 and Sep11.

**Highest numerical value in the column.

*Not significantly different from the highest numerical value in the column based on the 5% LSD.

Dry matter yields (tons/acre) of alfalfa varieties sown on April 11, 1991, at Lexington, Kentucky.

| | 1991 Harvests | | | | 1991 |
|---|---|---|---|---|---|
| Variety | Jul01 | Aug05 | Sep09 | Oct31 | Total |
| 2833 | 1.18* | 0.38 | 0.66* | 0.47* | 2.69* |
| A9004 | 1.12* | 0.37 | 0.62* | 0.41 | 2.52* |
| A9043 | 1.06* | 0.56* | 0.61* | 0.34 | 2.57* |
| Aggressor | 1.17* | 0.50* | 0.55 | 0.35 | 2.57* |
| Agri-Mate | 1.00* | 0.57* | 0.71* | 0.50* | 2.77** |
| AP8843 | 0.89* | 0.55* | 0.74** | 0.46* | 2.64* |
| Apollo Supreme | 1.16* | 0.64** | 0.62* | 0.33 | 2.76* |
| AS-BD | 0.89* | 0.45* | 0.62* | 0.41 | 2.38* |
| AS-G | 0.84 | 0.48* | 0.59 | 0.42 | 2.33* |
| Buffalo | 0.88* | 0.47* | 0.71* | 0.35 | 2.41* |
| Crown II | 0.96* | 0.45* | 0.62* | 0.34 | 2.37* |
| Dawn | 1.08* | 0.51* | 0.56 | 0.33 | 2.47* |
| DK 125 | 1.08* | 0.42 | 0.62* | 0.39 | 2.51* |
| Garst 645 | 0.81 | 0.50* | 0.63* | 0.28 | 2.23 |
| Legacy | 1.10* | 0.41 | 0.63* | 0.48* | 2.62* |
| Liberty | 1.12* | 0.42 | 0.64* | 0.52* | 2.70* |
| Saranac AR | 0.98* | 0.42 | 0.57 | 0.32 | 2.28* |
| Terminator | 0.90* | 0.32 | 0.55 | 0.47* | 2.23 |
| Un 72 | 1.07* | 0.37 | 0.67* | 0.59** | 2.69* |
| Venture | 1.01* | 0.52* | 0.62* | 0.34 | 2.49* |
| Wampr | 1.05* | 0.41 | 0.64* | 0.47* | 2.57* |
| WL 317 | 1.09* | 0.49* | 0.55 | 0.30 | 2.44* |
| WL 320 | 1.20** | 0.33 | 0.56 | 0.55* | 2.64* |
| WL 322 HQ | 0.96* | 0.43 | 0.51 | 0.28 | 2.18 |
| Mean | 1.02 | 0.46 | 0.62 | 0.40 | 2.50 |
| CV, % | 22.57 | 32.22 | 15.94 | 28.47 | 14.90 |
| LSD, 0.05 | 0.33 | 0.21 | 0.14 | 0.16 | 0.52 |

**Highest numerical value in the column.

*Not significantly different from the highest numerical value in the column based on the 5% LSD.

Dry matter yields (tons/acre) of alfalfa varieties sown on April 13, 1990, at Bowling Green, Kentucky.

| | 1991 Harvests | | | | | | 1991 | 1990 |
|---|---|---|---|---|---|---|---|---|
| Variety | May02 | Jun05 | Jul11 | Aug16 | Sep12 | Oct30 | Total | Total |
| 2852 | 2.02* | 1.40* | 1.30* | 0.90* | 0.71* | 0.64* | 6.95* | 5.10** |
| 5373 | 1.99* | 1.35* | 1.24 | 0.91* | 0.69 | 0.59 | 6.76* | 5.05* |
| 5472 | 2.03* | 1.35* | 1.27 | 0.98* | 0.79* | 0.66* | 7.08* | 4.12 |
| 87A89 | 1.91* | 1.45* | 1.27 | 0.83 | 0.65 | 0.54 | 7.01* | 4.82* |
| 89-128 | 1.97* | 1.37* | 1.36* | 0.92* | 0.71* | 0.68* | 7.24* | 4.72* |
| Aggressor | 1.97* | 1.30 | 1.42** | 1.19* | 0.76* | 0.60 | 7.20* | 4.30* |
| AlfaGraze | 2.02* | 1.33* | 1.40* | 1.21** | 0.81** | 0.44 | 6.48 | 4.86* |
| Anstar | 2.02* | 1.23 | 1.11 | 0.95* | 0.64 | 0.53 | 6.98* | 4.58* |
| Apollo Supreme | 1.94* | 1.35* | 1.26 | 1.11* | 0.72* | 0.59 | 7.03* | 3.99 |
| Arrow | 1.94* | 1.40* | 1.27 | 1.11* | 0.71* | 0.59 | 7.19* | 4.71* |
| Asset | 2.04* | 1.38* | 1.33* | 1.04* | 0.74* | 0.66* | 6.60 | 4.67* |
| Belmont | 2.02* | 1.40* | 1.24 | 0.68 | 0.69 | 0.57 | 6.26 | 4.21* |
| Buffalo | 1.66 | 1.32* | 1.15 | 0.95* | 0.64 | 0.54 | 6.71 | 5.00* |
| B-54 | 1.98* | 1.33* | 1.31* | 0.84 | 0.71* | 0.54 | 6.76* | 5.03* |
| Cimarron VR | 1.90 | 1.24 | 1.25 | 1.12* | 0.65 | 0.60 | 7.09* | 4.89* |
| Crockett | 1.88 | 1.41* | 1.36* | 1.00* | 0.74* | 0.70** | 6.96* | 5.10** |
| Dart | 1.92* | 1.40* | 1.31* | 0.99* | 0.75* | 0.59 | 6.79* | 4.41* |
| Dawn | 1.93* | 1.34* | 1.18 | 1.10* | 0.65 | 0.59 | 6.66 | 4.59* |
| Excalibur | 2.05* | 1.32* | 1.16 | 0.81 | 0.69 | 0.63* | 7.18* | 4.16 |
| Garst 630 | 2.08* | 1.44* | 1.31* | 0.96* | 0.76* | 0.63* | 6.46 | 4.76* |
| Haymark | 1.98* | 1.34* | 1.25 | 0.74 | 0.67 | 0.48 | 6.73 | 4.09 |
| Liberty | 1.87 | 1.31 | 1.19 | 1.11* | 0.71* | 0.55 | 7.30** | 4.53* |
| Magnum III | 2.11** | 1.46** | 1.32* | 1.07* | 0.72* | 0.62* | 6.90* | 4.34* |
| Majestic | 1.96* | 1.40* | 1.32* | 0.99* | 0.70 | 0.54 | 6.22 | 3.75 |
| MultiKing I | 1.71 | 1.40* | 1.18 | 0.86 | 0.58 | 0.50 | 6.66 | 4.20* |
| Sabre | 2.01* | 1.29 | 1.20 | 0.99* | 0.69 | 0.59 | 6.76* | 4.68* |
| Saranac AR | 1.85 | 1.36* | 1.24 | 1.04* | 0.59 | 0.47 | 6.55 | 4.47* |
| VS 633 | 2.01* | 1.30 | 1.32* | 0.96* | 0.75* | 0.69* | 7.02* | 4.18 |
| Wampr | 1.87 | 1.44* | 1.31* | 1.02* | 0.69 | 0.61 | 6.94* | 4.04 |
| WL 225 | 2.02* | 1.39* | 1.33 | 1.13* | 0.71* | 0.58 | 7.16* | 4.89* |
| WL 317 | 1.84 | 1.31 | 1.27 | 1.01* | 0.71* | 0.56 | 6.71 | 4.45* |
| WL 320 | 1.87 | 1.31 | 1.22 | 1.15* | 0.73* | 0.69* | 6.98* | 4.81* |
| Mean | 1.95 | 1.36 | 1.27 | 0.99 | 0.71 | 0.59 | 6.85 | 4.55 |
| CV, % | 7.83 | 7.72 | 7.75 | 24.10 | 10.98 | 10.73 | 5.85 | 14.14 |
| LSD, 0.05 | 0.21 | 0.15 | 0.14 | 0.33 | 0.11 | 0.09 | 0.56 | 0.91 |

1990 Total includes4 harvests dated Jun26, Aug10, Sep06, and Oct30.

**Highest numerical value in the column.

*Not significantly different from the highest numerical value in the column based on the 5% LSD.

Dry matter yields (tons/acre) of alfalfa varieties sown on August 22, 1990, at Princeton, Kentucky.

| | 1991 Harvests | | | | | 1991 |
|---|---|---|---|---|---|---|
| Variety | May02 | Jun06 | Jul10 | Aug14 | Sep11 | Total |
| 2852 | 1.51* | 1.29* | 1.08* | 0.73* | 0.36* | 4.98* |
| 5373 | 1.49 | 1.29* | 1.10* | 0.59* | 0.31* | 4.79* |
| 5472 | 1.74** | 1.27* | 1.05* | 0.72* | 0.36* | 5.14* |
| 83T27 | 1.43 | 1.12 | 0.92 | 0.60* | 0.26* | 4.33 |
| Aggressor | 1.60* | 1.26 | 1.19* | 0.60* | 0.31* | 4.96* |
| AlfaGraze | 1.46 | 1.20 | 0.91 | 0.46 | 0.26* | 4.29 |
| Anstar | 1.72* | 1.27* | 1.01* | 0.71* | 0.36* | 5.08* |
| Apollo Supreme | 1.39 | 1.29* | 1.12* | 0.53 | 0.27* | 4.61 |
| Arrow | 1.56* | 1.36* | 1.19* | 0.69* | 0.31* | 5.10* |
| Asset | 1.72* | 1.32* | 1.20* | 0.79* | 0.35* | 5.38* |
| Belmont | 1.36 | 1.32* | 1.10* | 0.48 | 0.24 | 4.50 |
| Buffalo | 1.31 | 1.23 | 1.14* | 0.66* | 0.31* | 4.67 |
| B-54 | 1.46 | 1.36* | 1.00 | 0.30 | 0.19 | 4.32 |
| Cimarron VR | 1.53* | 1.34* | 1.21* | 0.72* | 0.36* | 5.16* |
| Dart | 1.45 | 1.30* | 1.22* | 0.48 | 0.26* | 4.71 |
| Dawn | 1.49 | 1.25 | 1.02* | 0.60* | 0.35* | 4.71 |
| Excalibur | 1.54* | 1.34* | 0.85 | 0.54* | 0.29* | 4.55 |
| Garst 630 | 1.68* | 1.20 | 1.19* | 0.66* | 0.36* | 5.09* |
| Haymark | 1.48 | 1.16 | 1.11* | 0.77* | 0.36* | 4.89* |
| Legend | 1.40 | 1.40** | 0.89 | 0.51 | 0.27* | 4.48 |
| Liberty | 1.47 | 1.04 | 0.69 | 0.59* | 0.35* | 4.15 |
| Majestic | 1.52* | 1.37* | 1.25* | 0.52 | 0.29* | 4.96* |
| Resistar | 1.65* | 1.40** | 1.27** | 0.87** | 0.41** | 5.61** |
| Sabre | 1.41 | 0.93 | 0.69 | 0.41 | 0.20 | 3.64 |
| Saranac AR | 1.44 | 1.24 | 1.11* | 0.60* | 0.30* | 4.68 |
| Wampr | 1.56* | 1.35* | 1.14* | 0.69* | 0.27* | 5.00* |
| WL 225 | 1.71* | 1.28* | 1.05* | 0.61* | 0.30* | 4.96* |
| WL 317 | 1.47 | 1.28* | 0.93 | 0.62* | 0.29* | 4.60 |
| WL 320 | 1.64* | 1.18 | 1.07* | 0.56* | 0.32* | 4.77 |
| Mean | 1.53 | 1.26 | 1.06 | 0.61 | 0.31 | 4.76 |
| CV, % | 11.22 | 7.66 | 18.30 | 39.75 | 39.63 | 12.44 |
| LSD, 0.05 | 0.83 | 0.17 | 0.34 | 0.27 | 0.14 | 0.24 |

**Highest numerical value in the column.

*Not significantly different from the highest numerical value value in the column based on the 5% LSD.