

2009 Cool-Season Grass Grazing Tolerance Report

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Introduction

Cool-season grasses such as tall fescue and orchardgrass are the primary pasture grasses in Kentucky. Other species such as perennial ryegrass, festulolium, and prairie brome can be used in pasture systems. Little is known about the effect of variety on the grazing tolerance of these cool-season grass species.

The purpose of this report is to summarize current research on the grazing tolerance of varieties of tall fescue, orchardgrass, perennial ryegrass, and other species when they are subjected to continuous, heavy grazing pressure by cattle within the grazing season. The main focus will be on plant stand survival. Tables 15, 16, and 17 show the summaries of all tall fescue, orchardgrass and perennial ryegrass varieties tested in Kentucky during the past ten years. The UK Forage Extension website at www.uky.edu/Ag/Forage contains electronic versions of all forage variety testing reports from Kentucky and surrounding states and from a large number of other forage publications.

Description of the Tests

Grass variety tests for grazing tolerance were established in Lexington in the fall of 2005, 2006, 2007 and 2008. The soil at Lexington (Maury) is a well-drained silt loam and is well suited to tall fescue, orchardgrass, and ryegrass production. Plots were 5 by 15 feet in a randomized complete block design, with each variety replicated six times. Plots were seeded at the recommended seeding rate per acre and were sown into a prepared seedbed using a disk drill. Grazing began in April and was continuous until late September. Plots were grazed down to below 4 inches quickly by feeder steers or heifers and kept at 2 to 4 inches for the remainder of the grazing season. Supplemental hay or soybean hulls were fed during periods of slowest growth. Animals were removed from plots after all fall growth had been removed and when little regrowth was expected. Visual ratings of percent stand were made in the fall several weeks after the cattle were removed to check stand survival after the grazing season and in the spring prior to grazing to check on

winter survival and spring growth. Since trials were seeded in rows, persistence ratings were based on density within a row and not total ground cover. Grass plots were fertilized with 60 pounds of actual N per acre in the spring and 30 to 40 pounds of actual N in the fall. Other fertilizers (lime, P, and K) were applied as needed according to the University of Kentucky soil test recommendations.

Table 7 shows orchardgrass varieties under rotational grazing. For this trial, the cattle were allowed to graze the grass quickly to about 4 inches and then the cattle were removed. The grass was then allowed to regrow for four to five weeks and then grazed to about 4 inches and the cattle removed. This procedure was repeated throughout the season.

Results and Discussion

Weather data for Lexington is presented in Table 1. Data on percent stand are presented in Tables 2 through 11. Statistical analyses were performed on all entries (including experimentals) to determine if the apparent differences

Table 1. Temperature and rainfall at Lexington, Kentucky in 2006, 2007, 2008 and 2009.

| | 2006 | | | | 2007 | | | | 2008 | | | | 2009 ² | | | |
|-------|-------------|------------------|----------|-------|-------------|-----|----------|-------|-------------|-----|----------|-------|-------------------|-----|----------|-------|
| | Temperature | | Rainfall | | Temperature | | Rainfall | | Temperature | | Rainfall | | Temperature | | Rainfall | |
| | °F | DEP ¹ | IN | DEP | °F | DEP | IN | DEP | °F | DEP | IN | DEP | °F | DEP | IN | DEP |
| JAN | 42 | +11 | 4.77 | +1.91 | 37 | +6 | 2.93 | +0.07 | 33 | +2 | 4.60 | +1.74 | 28 | -3 | 2.45 | -0.41 |
| FEB | 36 | +1 | 2.13 | -1.08 | 27 | -8 | 1.83 | -1.38 | 36 | +1 | 5.37 | +2.16 | 38 | +3 | 2.86 | -0.35 |
| MAR | 44 | 0 | 3.05 | -1.35 | 52 | +8 | 1.97 | -2.43 | 45 | +1 | 6.28 | +1.88 | 48 | +4 | 2.19 | -2.21 |
| APR | 59 | +4 | 3.52 | -0.36 | 53 | -2 | 3.87 | -0.01 | 55 | 0 | 5.72 | +1.84 | 55 | 0 | 4.48 | +0.60 |
| MAY | 62 | -2 | 2.99 | -1.48 | 68 | +4 | 1.45 | -3.02 | 62 | -2 | 4.88 | +0.41 | 64 | 0 | 5.05 | +0.58 |
| JUN | 70 | -2 | 1.82 | -1.84 | 74 | +2 | 1.77 | -1.89 | 74 | +2 | 3.30 | -0.36 | 74 | +2 | 5.41 | +1.75 |
| JUL | 76 | 0 | 5.13 | +0.13 | 74 | -2 | 6.90 | +1.90 | 76 | 0 | 2.54 | -2.46 | 71 | -5 | 5.89 | +0.89 |
| AUG | 76 | +1 | 3.23 | -0.70 | 80 | +5 | 2.56 | -1.37 | 75 | 0 | 1.08 | -2.85 | 73 | -2 | 5.38 | +1.45 |
| SEP | 64 | -4 | 9.27 | +6.07 | 72 | +4 | 1.15 | -2.05 | 72 | +4 | 1.21 | -1.99 | 68 | 0 | 5.37 | +2.17 |
| OCT | 54 | -3 | 4.88 | +2.31 | 63 | +6 | 5.28 | +2.71 | 57 | 0 | 1.35 | -1.22 | 54 | -3 | 4.83 | +2.26 |
| NOV | 47 | +2 | 1.78 | -1.61 | 46 | +1 | 2.86 | -0.53 | 43 | -2 | 2.28 | -1.11 | 49 | +4 | 0.94 | -2.45 |
| DEC | 42 | +6 | 2.45 | -1.53 | 40 | +4 | 5.29 | +1.31 | 35 | -1 | 4.76 | +0.78 | | | | |
| Total | | | 45.02 | +0.47 | | | 37.86 | -6.69 | | | 43.37 | -1.18 | | | 44.85 | +4.28 |

¹ DEP is departure from the long-term average.

² 2009 data is for eleven months through November.

Table 2. Seedling vigor, grazing preference and stand persistence of tall fescue and festulolium (FL) varieties sown September 8, 2005 in a cattle grazing tolerance study at Lexington, Kentucky (continuous grazing).

| Variety | Seedling Vigor ¹ | Grazing Preference ² | | | Percent Stand | | | | | | | |
|--|-----------------------------|---------------------------------|--------|--------|---------------|--------|--------|--------|-------|--------|-------|--------|
| | 2005 | 2007 | 2008 | 2009 | 2006 | | 2007 | | 2008 | | 2009 | |
| | Nov 7 | May 19 | May 16 | May 14 | Apr 17 | Oct 20 | Mar 30 | Oct 16 | Apr 9 | Oct 15 | Apr 9 | Oct 12 |
| Commercial Varieties—Available for Farm Use | | | | | | | | | | | | |
| KY31+ ³ | 3.5 | 3.0 | 3.2 | 1.2 | 96 | 96 | 98 | 97 | 96 | 94 | 96 | 96* |
| BarOptima PLUS E34 | 2.7 | 4.5 | 5.8 | 4.7 | 85 | 88 | 91 | 89 | 90 | 93 | 87 | 96* |
| Barolex | 2.8 | 4.3 | 5.8 | 7.2 | 86 | 90 | 93 | 88 | 89 | 89 | 68 | 75 |
| Barianne | 1.3 | 5.2 | 6.0 | 7.2 | 57 | 68 | 73 | 74 | 79 | 83 | 66 | 72 |
| Jesup MaxQ | 2.3 | 2.3 | 2.3 | 3.0 | 87 | 91 | 95 | 91 | 93 | 92 | 46 | 65 |
| Select | 1.8 | 2.3 | 2.8 | 1.8 | 83 | 90 | 93 | 92 | 93 | 93 | 50 | 64 |
| Duo (FL) | 3.8 | 8.2 | 9.0 | – | 97 | 84 | 90 | 88 | 46 | 25 | 1 | 1 |
| SpringGreen (FL) | 3.7 | 8.7 | 9.0 | – | 96 | 91 | 94 | 93 | 88 | 66 | 1 | 0 |
| Experimental Varieties | | | | | | | | | | | | |
| AGRFA 144 | 2.8 | 2.2 | 2.5 | 2.2 | 89 | 92 | 95 | 93 | 93 | 93 | 76 | 84* |
| KYFA 9821/AR584 | 3.2 | 2.3 | 2.7 | 2.7 | 93 | 94 | 96 | 94 | 92 | 92 | 82 | 83* |
| KYFA 9821/AR542 | 3.2 | 2.7 | 3.0 | 2.8 | 94 | 95 | 97 | 96 | 96 | 94 | 75 | 83* |
| KYFA 9301/AR542 | 3.5 | 2.5 | 3.5 | 2.0 | 94 | 95 | 96 | 96 | 96 | 96 | 77 | 82* |
| TF 0101 | 2.5 | 2.0 | 3.5 | 3.7 | 92 | 92 | 93 | 92 | 89 | 88 | 74 | 82* |
| KYFA 9821EF | 2.8 | 2.0 | 3.0 | 3.0 | 92 | 93 | 96 | 94 | 94 | 93 | 78 | 80* |
| KY31- ³ | 3.0 | 2.3 | 2.7 | 2.5 | 94 | 95 | 96 | 95 | 95 | 93 | 78 | 79 |
| KYFA 9301/AR584 | 3.8 | 2.5 | 2.7 | 3.2 | 94 | 96 | 97 | 95 | 95 | 95 | 76 | 76 |
| AGRFA 148 | 2.8 | 2.5 | 2.2 | 2.3 | 94 | 95 | 97 | 95 | 96 | 93 | 64 | 73 |
| IS-FTF 25 | 2.5 | 2.0 | 2.3 | 1.2 | 84 | 92 | 94 | 92 | 91 | 92 | 69 | 72 |
| TF 0203G | 2.3 | 1.8 | 2.2 | 2.8 | 92 | 93 | 95 | 95 | 93 | 93 | 63 | 72 |
| TF 9801 | 2.0 | 2.7 | 2.3 | 2.2 | 81 | 84 | 88 | 88 | 89 | 88 | 68 | 68 |
| KYFA 9301 EF | 2.7 | 1.8 | 4.3 | 4.7 | 88 | 93 | 94 | 94 | 92 | 92 | 66 | 62 |
| IS-FTF 12 | 1.8 | 2.2 | 2.8 | 4.2 | 83 | 87 | 88 | 86 | 89 | 88 | 45 | 52 |
| KYFA 9304 EF | 2.7 | 2.5 | 4.5 | 4.2 | 87 | 89 | 91 | 89 | 88 | 84 | 41 | 43 |
| UMTF | 0.8 | 5.3 | 6.3 | 5.7 | 13 | 17 | 26 | 24 | 32 | 32 | 8 | 6 |
| Mean | 2.7 | 3.2 | 3.9 | 3.3 | 85.4 | 87.4 | 91.0 | 88.7 | 87.2 | 85.0 | 60.5 | 65.1 |
| CV,% | 26.0 | 25.0 | 22.7 | 48.2 | 8.2 | 8.2 | 6.7 | 6.0 | 7.2 | 7.5 | 23.5 | 22.2 |
| LSD,0.05 | 0.8 | 0.9 | 1.0 | 2.1 | 8.0 | 8.2 | 6.9 | 6.1 | 7.2 | 7.3 | 15.2 | 16.6 |

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

² Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating: 2007-25 days, 2008-17 days, 2009-16 days. Stand thinning may have been greater for preferred varieties due to closer grazing.

³ "+" indicates variety is endophyte infected; "-" indicates variety is endophyte free.

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

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

Kentucky 31 tall fescue with the endophyte (KY31+) is considered to be the most grazing-tolerant variety and was the grazing-tolerant check entry in all tall fescue trials. The central questions

in grazing tolerance among tall fescues are:

1. Can endophyte-free varieties persist as well as KY31+; and
2. Will the new novel, or “friendly,” endophyte materials persist as well as other tolerant varieties?

After three and four seasons, several fescue varieties were comparable to KY31+ in regard to grazing tolerance (Tables 2 and 3).

Table 12 (fescue and festulolium), Table 13 (orchardgrass), and Table 14 (perennial ryegrass and festulolium) summarize information about distributors and persistence across locations and years for all varieties in these tests. Varieties are listed in alphabetical order, with experimental varieties listed at the bottom. An open block indicates that the variety was not in that particular test (labeled at the top of the column); an “x” in the block indi-

cates the variety was in the test but plant survival was significantly less than the most persistent variety. A single asterisk (*) means that the variety was not significantly different from the most persistent variety in that study based on the 0.05 LSD. It is best to choose a variety that has performed well over several years.

Tables 15, 16, and 17 are summaries of stand persistence data from 1996 to 2009 of commercial tall fescue, orchardgrass, and perennial ryegrass varieties that have been entered in the Kentucky trials. In Table 15 the data is listed as a percentage of KY31+. In other words, in the tall fescue trials KY31+ is 100 percent. Varieties with percentages over 100 persisted better than KY31+, and varieties with percentages less than 100 persisted less than KY31+. In Tables 16 and 17 the data is listed as a percentage of the mean of the commercial varieties entered in each specific trial. In other words, the mean for

Table 3. Seedling vigor, grazing preference and stand persistence of tall fescue varieties sown September 8, 2006 in a cattle grazing tolerance study at Lexington, Kentucky (continuous grazing).

| variety | Seedling Vigor ¹ | Grazing Preference ² | | | | Percent Stand | | | | | |
|--|-----------------------------|---------------------------------|--------|--------|--------|---------------|--------|-------|--------|-------|--------|
| | 2006 | 2007 | 2008 | 2009 | 2006 | 2007 | | 2008 | | 2009 | |
| | Oct 25 | May 19 | May 16 | May 14 | Oct 25 | Mar 30 | Oct 15 | Apr 9 | Oct 17 | Apr 8 | Oct 12 |
| Commercial Varieties—Available for Farm Use | | | | | | | | | | | |
| KY31+ ³ | 3.8 | 5.3 | 4.3 | 1.3 | 100 | 100 | 100 | 100 | 100 | 100 | 100* |
| Jesup MaxQ | 2.7 | 3.2 | 2.0 | 2.0 | 99 | 100 | 100 | 100 | 100 | 96 | 99* |
| Tuscany II | 2.8 | 4.8 | 3.3 | 3.3 | 99 | 100 | 100 | 100 | 100 | 96 | 99* |
| Select | 3.3 | 2.7 | 2.7 | 3.7 | 100 | 100 | 100 | 100 | 100 | 91 | 96* |
| Verdant | 3.2 | 6.0 | 3.5 | 4.2 | 99 | 99 | 98 | 97 | 98 | 88 | 90* |
| Advance MaxQ | 3.2 | 7.8 | 4.3 | 5.2 | 99 | 98 | 98 | 98 | 99 | 87 | 88 |
| Barolex | 3.3 | 6.5 | 6.8 | 4.7 | 100 | 100 | 100 | 100 | 100 | 98 | 69 |
| Bariane | 2.5 | 8.5 | 8.3 | 8.4 | 96 | 100 | 99 | 100 | 99 | 42 | 40 |
| Experimental Varieties | | | | | | | | | | | |
| AGRFA 148 | 3.7 | 2.2 | 1.8 | 1.3 | 100 | 100 | 100 | 100 | 100 | 100 | 100* |
| KYFA 9301/AR542 | 4.2 | 4.3 | 2.8 | 1.7 | 100 | 100 | 100 | 100 | 100 | 100 | 100* |
| KYFA 9301/AR584 | 4.2 | 4.0 | 2.2 | 1.0 | 100 | 100 | 100 | 100 | 100 | 100 | 100* |
| KYFA 9821/AR584 | 4.0 | 2.8 | 2.7 | 1.5 | 100 | 100 | 100 | 100 | 100 | 100 | 100* |
| AGRFA 140 | 3.8 | 2.5 | 1.0 | 1.2 | 100 | 100 | 100 | 100 | 100 | 98 | 100* |
| AGRFA 144 | 3.7 | 1.3 | 1.3 | 1.0 | 100 | 100 | 85 | 100 | 100 | 98 | 100* |
| AGRFA 121 | 3.5 | 3.8 | 1.3 | 1.2 | 100 | 100 | 100 | 100 | 100 | 97 | 99* |
| KY31- ³ | 4.2 | 4.0 | 2.5 | 2.3 | 100 | 100 | 100 | 100 | 100 | 98 | 99* |
| TF 0202 | 3.2 | 6.2 | 5.3 | 4.5 | 99 | 100 | 100 | 100 | 100 | 98 | 99* |
| AGRFA 120 | 3.7 | 3.5 | 1.3 | 1.3 | 100 | 100 | 100 | 100 | 99 | 95 | 99* |
| AGRFA 155 | 3.3 | 4.7 | 2.0 | 1.2 | 99 | 98 | 99 | 99 | 99 | 98 | 99* |
| FA 2864 | 3.2 | 6.2 | 4.3 | 3.0 | 99 | 99 | 99 | 99 | 99 | 97 | 99* |
| KYFA 9301EF | 3.7 | 4.0 | 3.3 | 2.0 | 99 | 100 | 100 | 100 | 100 | 98 | 99* |
| KYFA 9304 | 3.8 | 5.2 | 4.0 | 4.3 | 100 | 100 | 100 | 100 | 100 | 93 | 99* |
| K6560QII542 | 3.0 | 8.0 | 2.0 | 1.5 | 100 | 99 | 98 | 99 | 98 | 98 | 99* |
| AGRFA 156 | 3.2 | 4.7 | 2.0 | 2.2 | 100 | 100 | 99 | 100 | 100 | 89 | 98* |
| K5666VII | 2.7 | 7.0 | 4.8 | 6.3 | 99 | 100 | 99 | 99 | 99 | 93 | 96* |
| FA2865 | 3.7 | 6.0 | 3.7 | 3.3 | 99 | 100 | 98 | 98 | 99 | 95 | 96* |
| FA2863 | 3.3 | 5.2 | 3.7 | 5.7 | 99 | 100 | 100 | 99 | 99 | 91 | 96* |
| KFa402V542 | 3.0 | 6.2 | 2.7 | 4.8 | 99 | 100 | 100 | 100 | 100 | 93 | 95* |
| K4508Q542 | 3.3 | 5.7 | 1.0 | 1.3 | 99 | 100 | 100 | 100 | 99 | 90 | 94* |
| FA 2862 | 2.7 | 4.0 | 2.8 | 3.3 | 99 | 100 | 100 | 100 | 99 | 94 | 94* |
| K4508Q | 2.5 | 6.8 | 1.5 | 2.2 | 98 | 100 | 99 | 100 | 99 | 94 | 94* |
| Mean | 3.4 | 4.9 | 3.1 | 2.9 | 99.3 | 99.7 | 99.1 | 99.6 | 99.5 | 93.6 | 94.6 |
| CV,% | 20.4 | 28.6 | 29.9 | 52.2 | 1.3 | 0.9 | 6.7 | 1.3 | 1.3 | 8.5 | 10.9 |
| LSD,0.05 | 0.8 | 1.6 | 1.1 | 1.7 | 1.5 | 1.0 | 7.6 | 1.5 | 1.5 | 9.0 | 11.7 |

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

² Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating; 2007-25 days, 2008-17 days, 2009-16 days.

Stand thinning may have been greater for preferred varieties due to closer grazing.

³ "+" indicates variety is endophyte infected; "-" indicates variety is endophyte free.

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

each trial is 100 percent. Varieties with percentages over 100 persisted better than average, and varieties with percentages less than 100 persisted less than average. Direct, statistical comparisons of varieties cannot be made using the summary Tables 15, 16, and 17, but these comparisons do help to identify varieties for further consideration. Varieties that have performed better than average over many years have very stable performance; others may have performed very well in wet years or on particular soil types. These details may influence variety choice, and the information can be found in the yearly reports. See footnote in

Tables 15, 16, and 17 to determine which yearly report to refer to.

Summary

These studies indicate that there are varieties of cool-season grasses that can tolerate overgrazing for multiple seasons and still maintain reasonable stands. Some varieties of endophyte-free as well as novel, or "friendly," endophyte tall fescue have been able to maintain equivalent stands to endophyte-infected KY31. There is no "KY31+" equivalent in orchardgrass; that is, no variety has historically been proven to be tolerant

of overgrazing. However, some varieties have exhibited good tolerance to grazing abuse even after three and four seasons.

This information should be used along with yield and other information (for example, relative maturity in spring) in selecting the best grass variety for each individual use. It is not recommended that tall fescue or orchardgrass be continuously overgrazed as was done in these trials. Although several varieties expressed tolerance to the level of grazing pressure used in these trials, overgrazing greatly reduces yield and therefore profitability of these varieties. This information should be an indication of those varieties

that will better withstand the occasional overgrazing that sometimes becomes necessary in livestock operations.

Good management for maximum life from any grass would be to allow it to become completely established before grazing and to avoid overgrazing it during times of extreme stress, such as drought.

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Table 4. Seedling vigor, grazing preference and stand persistence of tall fescue varieties sown September 5, 2007 in a cattle grazing tolerance study at Lexington, Kentucky (continuous grazing).

| Variety | Seedling Vigor ¹ | Grazing Preference ² | | Percent Stand | | | | |
|--|-----------------------------|---------------------------------|--------|---------------|-------|--------|-------|--------|
| | 2007 | 2008 | 2009 | 2007 | 2008 | | 2009 | |
| | Nov 7 | May 16 | May 14 | Nov 7 | Apr 9 | Oct 17 | Apr 8 | Oct 12 |
| Commercial Varieties—Available for Farm Use | | | | | | | | |
| BarElite | 3.3 | 6.0 | 3.3 | 97 | 97 | 98 | 98 | 99* |
| BarOptima PLUS E34 | 3.5 | 5.8 | 2.0 | 98 | 98 | 99 | 98 | 99* |
| KY31+ ³ | 3.2 | 6.0 | 1.0 | 96 | 96 | 97 | 98 | 98* |
| Nanryo | 3.2 | 1.8 | 1.0 | 98 | 98 | 79 | 97 | 98* |
| Select | 2.1 | 3.7 | 1.0 | 92 | 93 | 94 | 94 | 96* |
| Jesup MaxQ | 1.5 | 5.7 | 1.0 | 94 | 92 | 92 | 93 | 94* |
| Barolex | 2.3 | 6.8 | 3.2 | 91 | 89 | 91 | 91 | 90* |
| Bariane | 1.7 | 6.5 | 7.2 | 84 | 89 | 87 | 86 | 89 |
| Experimental Varieties | | | | | | | | |
| KRC 6581 | 4.2 | 5.0 | 1.5 | 99 | 100 | 100 | 100 | 100* |
| KYFA 9301/AR584 | 3.2 | 4.8 | 1.0 | 98 | 98 | 99 | 99 | 100* |
| AGRFA 140 | 2.8 | 2.3 | 1.0 | 95 | 97 | 97 | 99 | 99* |
| KYFA 9821 | 3.3 | 2.8 | 1.0 | 96 | 96 | 98 | 99 | 99* |
| KY31- ³ | 4.2 | 3.5 | 1.0 | 99 | 99 | 99 | 98 | 99* |
| KYFA 9821/AR584 | 3.7 | 3.7 | 1.0 | 99 | 99 | 99 | 99 | 99* |
| BARFA MT9301 | 3.0 | 5.8 | 2.2 | 95 | 96 | 97 | 98 | 98* |
| FA 2866 | 4.3 | 2.5 | 1.3 | 99 | 98 | 97 | 96 | 97* |
| AGRFA 144 | 1.7 | 7.2 | 1.0 | 98 | 97 | 96 | 96 | 96* |
| AGRGT 159 | 2.7 | 4.0 | 1.0 | 96 | 96 | 95 | 96 | 96* |
| AGRGT 160 | 2.7 | 4.3 | 1.2 | 97 | 97 | 96 | 96 | 95* |
| KYFA 9301 | 3.2 | 4.3 | 1.2 | 97 | 94 | 96 | 95 | 95* |
| KYFA 9611 | 3.3 | 7.8 | 4.2 | 95 | 95 | 96 | 92 | 94* |
| KRC 6582 | 3.0 | 7.2 | 4.8 | 97 | 96 | 95 | 95 | 92* |
| AGRFA 111 | 3.2 | 7.0 | 2.7 | 97 | 96 | 90 | 85 | 85 |
| KRC 6580 | 1.0 | 8.3 | 1.3 | 59 | 47 | 65 | 68 | 70 |
| AGRFA 156 | 1.8 | 7.8 | 1.5 | 91 | 78 | 75 | 62 | 62 |
| Mean | 2.9 | 5.2 | 1.9 | 94.3 | 93.1 | 93.1 | 93.0 | 93.4 |
| CV,% | 20.4 | 21.9 | 32.2 | 7.6 | 5.8 | 10.0 | 9.1 | 9.4 |
| LSD,0.05 | 0.7 | 1.3 | 0.7 | 8.4 | 6.3 | 10.9 | 9.9 | 10.3 |

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

² Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating: 2008-17 days, 2009-16 days. Stand thinning may have been greater for preferred varieties due to closed grazing.

³ "+" indicates variety is endophyte infected; "-" indicates variety is endophyte free.

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

Table 5. Seedling vigor, grazing preference and stand persistence of tall fescue varieties sown September 11, 2008 in a cattle grazing tolerance study at Lexington, Kentucky (continuous grazing).

| Variety | Seedling Vigor ¹ | Grazing Preference ² | Percent Stand | | |
|--|-----------------------------|---------------------------------|---------------|-------|--------|
| | 2008 | 2009 | 2008 | 2009 | |
| | Oct 13 | May 14 | Oct 13 | Apr 8 | Oct 12 |
| Commercial Varieties—Available for Farm Use | | | | | |
| HyMark | 3.8 | 2.8 | 99 | 100 | 100* |
| KY31+ ³ | 2.5 | 6.8 | 98 | 100 | 100* |
| Select | 3.3 | 2.2 | 98 | 100 | 100* |
| JesupMaxQ | 2.3 | 8.8 | 98 | 87 | 89 |
| Experimental Varieties | | | | | |
| KYFA9301/AR584 | 4.7 | 2.7 | 100 | 100 | 100* |
| KYFA9821/AR584 | 3.5 | 3.7 | 100 | 100 | 100* |
| TF0201 | 2.5 | 6.2 | 100 | 99 | 100* |
| KY31- ³ | 2.5 | 4.3 | 98 | 99 | 100* |
| AGRFA144 | 2.5 | 3.7 | 98 | 98 | 99* |
| NFTF1070 | 2.8 | 4.5 | 99 | 99 | 98* |
| GA-186 | 3.7 | 6.0 | 100 | 96 | 97* |
| GA-593R | 3.3 | 4.2 | 100 | 96 | 97* |
| Mean | 3.1 | 4.7 | 99.0 | 97.8 | 98.4 |
| CV,% | 24.9 | 41.0 | 2.4 | 5.2 | 4.2 |
| LSD,0.05 | 0.9 | 2.2 | 2.7 | 5.9 | 4.7 |
| ¹ Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth. ² Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating-16 days. ³ "+" indicates variety is endophyte infected; "-" indicates variety is endophyte free. * Not significantly different from the highest numerical value in the column, based on the 0.05 LSD. | | | | | |

Table 6. Seedling vigor, grazing preference and stand persistence of orchardgrass varieties sown September 8, 2005 in a cattle grazing tolerance study at Lexington, Kentucky (continuous grazing).

| Variety | Seedling Vigor ¹ | Grazing Preference ² | | | Percent Stand | | | | | | | |
|--|-----------------------------|---------------------------------|--------|-------|---------------|--------|--------|--------|-------|--------|-------|--------|
| | 2005 | 2007 | 2008 | 2009 | 2006 | | 2007 | | 2008 | | 2009 | |
| | Nov 7 | May 25 | May 16 | May 8 | Apr 17 | Oct 20 | Mar 30 | Oct 16 | Apr 8 | Oct 15 | Apr 9 | Oct 12 |
| Commercial Varieties—Available for Farm Use | | | | | | | | | | | | |
| BenchmarkPlus | 3.7 | 3.5 | 4.5 | 4.3 | 96 | 96 | 98 | 93 | 95 | 93 | 86 | 86* |
| Persist | 2.8 | 3.5 | 4.2 | 4.0 | 95 | 95 | 99 | 96 | 98 | 97 | 87 | 78* |
| Athos | 2.5 | 6.8 | 7.8 | 7.2 | 93 | 97 | 95 | 95 | 91 | 91 | 39 | 34 |
| Tekapo | 3.0 | 7.3 | 7.8 | 8.3 | 94 | 97 | 80 | 88 | 86 | 83 | 29 | 28 |
| Experimental Varieties | | | | | | | | | | | | |
| IS-OG28 | 3.5 | 4.7 | 6.0 | 5.5 | 96 | 95 | 98 | 97 | 97 | 95 | 88 | 88* |
| AGRDG101 | 3.3 | 8.8 | 8.2 | 6.0 | 75 | 81 | 33 | 29 | 18 | 17 | 4 | 1 |
| Mean | 3.1 | 5.8 | 6.4 | 5.6 | 91.4 | 93.3 | 83.8 | 92.9 | 80.8 | 79.4 | 55.5 | 52.3 |
| CV,% | 18.4 | 17.0 | 8.0 | 18.3 | 4.7 | 5.6 | 9.5 | 9.8 | 5.0 | 5.0 | 21.0 | 22.6 |
| LSD,0.05 | 0.7 | 1.2 | 0.6 | 1.8 | 5.2 | 6.2 | 9.4 | 9.7 | 40.8 | 4.7 | 13.9 | 14.1 |

¹ Vigor score based on a scale of 1 to 5 with 5 being the most vigorous seedling growth.
² Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating: 2007-25 days, 2008-17 days, 2009-16 days. Stand thinning may have been greater for preferred varieties due to closer grazing.
* Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 7. Seedling vigor, grazing preference and stand persistence of orchardgrass varieties sown September 22, 2005 in a cattle grazing tolerance study at Lexington, Kentucky (rotational grazing).

| Variety | Seedling Vigor ¹ | Grazing Preference ² | | | Percent Stand | | | | | | | |
|--|-----------------------------|---------------------------------|-------|--------|---------------|--------|--------|--------|-------|--------|-------|--------|
| | 2005 | 2007 | 2009 | | 2006 | | 2007 | | 2008 | | 2009 | |
| | Nov 7 | May 25 | May 8 | Jun 12 | Apr 17 | Oct 20 | Mar 30 | Oct 16 | Apr 9 | Oct 15 | Apr 9 | Oct 12 |
| Commercial Varieties—Available for Farm Use | | | | | | | | | | | | |
| Athos | 3.0 | 5.7 | 7.3 | 7.0 | 94 | 98 | 94 | 94 | 93 | 92 | 91 | 92* |
| BenchmarkPlus | 3.3 | 2.8 | 3.7 | 4.2 | 95 | 97 | 96 | 88 | 93 | 93 | 95 | 89* |
| Persist | 3.0 | 2.5 | 3.8 | 4.0 | 96 | 98 | 98 | 91 | 95 | 93 | 93 | 89* |
| Tekapo | 3.0 | 5.3 | 5.5 | 5.0 | 92 | 95 | 86 | 87 | 87 | 87 | 87 | 86* |
| Experimental Varieties | | | | | | | | | | | | |
| IS-OG28 | 2.7 | 3.0 | 5.7 | 5.3 | 94 | 97 | 98 | 93 | 93 | 94 | 95 | 94* |
| AGR DG101 | 3.3 | 8.5 | 7.8 | 6.2 | 67 | 85 | 28 | 38 | 25 | 23 | 22 | 24 |
| Mean | 3.1 | 4.6 | 5.6 | 5.3 | 89.6 | 94.7 | 83.2 | 81.8 | 80.9 | 80.1 | 80.4 | 79.0 |
| CV,% | 21.2 | 23.1 | 13.3 | 31.0 | 8.6 | 4.0 | 11.6 | 12.9 | 9.3 | 7.8 | 5.3 | 8.1 |
| LSD,0.05 | 0.8 | 1.3 | 0.9 | 1.9 | 9.2 | 4.5 | 11.4 | 12.5 | 9.0 | 7.5 | 5.1 | 8.4 |

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

² Preference score based on a scale of 1 to 9 with 9 indicating all forage grazed. Grazing time before rating: 2007-2 days, First 2009-5 days, Second 2009-one half day.

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

Table 8. Grazing preference and stand persistence of orchardgrass varieties sown April 8, 2008 in a cattle grazing preference study at Lexington, Kentucky (continuous grazing).

| Variety | Grazing Preference ¹ | Percent Stand | | | | |
|--|---------------------------------|---------------|--------|-------|--------|--|
| | 2009 | 2008 | | | 2009 | |
| | May 14 | Jul 17 | Oct 17 | Apr 8 | Oct 12 | |
| Commercial Varieties—Available for Farm Use | | | | | | |
| Persist | 3.0 | 99 | 98 | 97 | 97* | |
| Benchmark Plus | 2.8 | 98 | 96 | 96 | 95* | |
| Ambrosia | 8.2 | 97 | 96 | 93 | 94* | |
| Seco | 6.5 | 96 | 95 | 95 | 93* | |
| Harvestar | 8.3 | 98 | 97 | 94 | 92* | |
| Tekapo | 6.7 | 98 | 96 | 84 | 90 | |
| Experimental Varieties | | | | | | |
| OG0203G | 4.8 | 97 | 97 | 94 | 96* | |
| Mean | 5.8 | 97.6 | 96.2 | 94.1 | 94.0 | |
| CV,% | 20.3 | 3.2 | 2.8 | 7.5 | 6.4 | |
| LSD,0.05 | 1.4 | 3.8 | 3.4 | 8.4 | 7.2 | |

¹ Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating-16 days.

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

Table 9. Seedling vigor, grazing preference and stand persistence of perennial ryegrass varieties sown September 8, 2005 in a cattle grazing tolerance study at Lexington, Kentucky (continuous grazing).

| Variety | Seedling Vigor ¹ | Grazing Preference ² | | Percent Stand | | | | | | |
|--|-----------------------------|---------------------------------|--------|---------------|--------|--------|--------|-------|--------|----------------|
| | 2005 | 2007 | 2008 | 2006 | | 2007 | | 2008 | | 2009 |
| | Nov 7 | May 25 | May 16 | Apr 17 | Oct 20 | Mar 30 | Oct 16 | Apr 9 | Nov 20 | Apr 9 |
| Commercial Varieties—Available for Farm Use | | | | | | | | | | |
| BG34 | 3.2 | 6.0 | 8.0 | 96 | 97 | 97 | 93 | 89 | 81* | 0 ³ |
| Quartet | 4.7 | 9.0 | 8.8 | 93 | 94 | 63 | 58 | 28 | 29 | 0 |
| Tonga | 3.5 | 8.0 | 8.8 | 97 | 96 | 97 | 91 | 40 | 28 | 0 |
| Experimental Varieties | | | | | | | | | | |
| SWER3508FRI | 2.8 | 8.0 | 8.8 | 94 | 97 | 98 | 94 | 81 | 72* | 0 |
| SWER3575 | 3.3 | 8.0 | 7.8 | 95 | 96 | 97 | 94 | 78 | 66* | 0 |
| SWER3579 | 3.7 | 8.0 | 8.5 | 97 | 96 | 97 | 93 | 76 | 58 | 0 |
| Mean | 3.5 | 7.8 | 8.5 | 95.4 | 95.9 | 91.7 | 87.3 | 65.1 | 55.6 | |
| CV,% | 14.3 | 0.0 | 7.5 | 2.1 | 2.5 | 6.4 | 4.4 | 22.0 | 28.4 | |
| LSD,0.05 | 0.6 | 0.0 | 0.8 | 2.4 | 2.8 | 7.0 | 4.5 | 17.0 | 18.8 | |

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

² Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating: 2007-25 days, 2008-17 days.

³ Due to winterkill there was not enough ryegrass greenup to get a stand rating.

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

Table 10. Seedling vigor, grazing preference and stand persistence of perennial ryegrass and festulolium (FL) varieties sown September 5, 2007 in a cattle grazing tolerance study at Lexington, Kentucky (continuous grazing).

| Variety | Seedling Vigor ¹ | Grazing Preference ² | | Percent Stand | | | | |
|--|-----------------------------|---------------------------------|--------|---------------|-------|--------|-------|--------|
| | 2007 | 2008 | 2009 | 2007 | 2008 | | 2009 | |
| | Nov 7 | May 16 | May 14 | Nov 7 | Apr 9 | Oct 17 | Apr 8 | Oct 12 |
| Commercial Varieties—Available for Farm Use | | | | | | | | |
| BG34 | 2.3 | 9.0 | 7.8 | 98 | 98 | 96 | 88 | 88* |
| Power | 2.3 | 8.3 | 8.0 | 98 | 98 | 95 | 86 | 87* |
| Granddaddy | 2.3 | 8.8 | 6.3 | 98 | 96 | 92 | 80 | 80 |
| Quartet | 4.5 | 8.8 | 8.0 | 98 | 88 | 81 | 16 | 14 |
| Experimental Varieties | | | | | | | | |
| KRC 6554 | 2.7 | 8.8 | 7.0 | 100 | 100 | 100 | 98 | 99* |
| KRC 6575 | 2.8 | 9.0 | 7.2 | 99 | 100 | 99 | 94 | 97* |
| KRC 6577 | 3.7 | 9.0 | 7.2 | 100 | 100 | 99 | 95 | 95* |
| KRC 6578 | 3.5 | 9.0 | 7.7 | 99 | 99 | 99 | 93 | 94* |
| KRC 6579 | 3.4 | 9.0 | 8.2 | 99 | 99 | 99 | 86 | 91* |
| GO-ABS | 3.2 | 8.5 | 7.2 | 100 | 100 | 98 | 73 | 88* |
| GO-ABZ | 3.7 | 8.5 | 8.0 | 99 | 100 | 100 | 74 | 84 |
| KLp401 | 3.5 | 9.0 | 8.0 | 99 | 99 | 97 | 79 | 83 |
| KRC 6576 | 2.3 | 9.0 | 7.7 | 99 | 98 | 96 | 85 | 82 |
| KYF A0236 (FL) | 4.5 | 7.3 | 8.5 | 99 | 100 | 98 | 82 | 81 |
| GO-ABM | 2.3 | 8.5 | 7.5 | 96 | 94 | 94 | 73 | 75 |
| KLp507 | 4.4 | 9.0 | 8.5 | 100 | 100 | 99 | 69 | 63 |
| KYFA 9819 (FL) | 1.8 | 8.8 | 7.2 | 96 | 83 | 83 | 63 | 44 |
| Mean | 3.1 | 8.7 | 7.6 | 98.5 | 97.2 | 95.6 | 78.4 | 79.1 |
| CV,% | 19.7 | 5.7 | 14.4 | 1.6 | 4.4 | 4.7 | 17.7 | 14.7 |
| LSD,0.05 | 0.7 | 0.6 | 1.3 | 1.8 | 4.9 | 5.1 | 16.0 | 13.4 |

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

² Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating: 2008-17 days, 2009-16 days.

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

Table 11. Seedling vigor, grazing preference and stand persistence of perennial ryegrass, festulolium (FL) and tall fescue (TF) varieties sown September 16, 2008 in a cattle grazing tolerance study at Lexington, Kentucky (continuous grazing).

| Variety | Seedling Vigor ¹ | Grazing Preference ² | Percent Stand | | |
|--|-----------------------------|---------------------------------|---------------|-------|--------|
| | 2008 | 2009 | 2008 | 2009 | |
| | Oct 13 | May 14 | Oct 13 | Apr 8 | Oct 12 |
| Commercial Varieties—Available for Farm Use | | | | | |
| Boost | 3.8 | 7.3 | 99 | 100 | 100* |
| Granddaddy | 3.2 | 7.5 | 82 | 100 | 100* |
| Linn | 3.5 | 5.8 | 98 | 100 | 100* |
| SpringGreen (FL) | 3.7 | 7.7 | 98 | 100 | 100* |
| Duo (FL) | 5.0 | 6.0 | 99 | 97 | 95 |
| Experimental Varieties | | | | | |
| AGRFA 174 (TF) | 1.8 | 5.2 | 96 | 97 | 99* |
| Mean | 3.5 | 6.6 | 95.3 | 99.1 | 99.1 |
| CV,% | 11.9 | 16.0 | 15.3 | 1.5 | 1.6 |
| LSD,0.05 | 0.5 | 1.3 | 17.3 | 1.9 | 2.0 |

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

² Preference score based on a scale of 1 to 9 with 9 indicating all forage was grazed. Grazing time before rating-16 days.

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

Table 12. Summary of persistence of tall fescue and festulolium (FL) varieties under heavy grazing pressure across years at Lexington, Kentucky.¹

| Variety | Proprietor/ KY Distributor | 2005 ² | | | | | | | | 2006 | | | | 2007 | | | | 2008 | |
|--|---|-------------------|-----|------|-----|------|-----|------|-----|----------------|-----|------|-----|------|-----|------|-----|------|-----|
| | | Apr | Oct | Mar | Oct | Apr | Oct | Apr | Oct | Mar | Oct | Apr | Oct | Apr | Oct | Apr | Oct | Apr | Oct |
| | | 2006 ³ | | 2007 | | 2008 | | 2009 | | 2007 | | 2008 | | 2009 | | 2008 | | 2009 | |
| Commercial Varieties—Available for Farm Use | | | | | | | | | | | | | | | | | | | |
| Advance MaxQ | Pennington Seed | | | | | | | | | x ⁵ | * | x | x | x | x | | | | |
| BarElite | Barenbrug USA | | | | | | | | | | | | | | | * | * | * | * |
| Bariane | Barenbrug USA | x | x | x | x | x | x | x | x | * | * | * | * | x | x | x | x | x | x |
| Barolex | Barenbrug USA | x | * | * | x | * | * | x | x | * | * | * | * | * | x | x | * | * | * |
| BarOptima PLUS E34 | Barenbrug USA | x | * | * | x | * | * | * | * | | | | | | | * | * | * | * |
| Duo (FL) | Ampac Seed Company | * | x | x | x | x | x | x | x | | | | | | | | | | |
| HyMark | Fraser Seeds | | | | | | | | | | | | | | | | | | * * |
| Jesup Max Q | Pennington Seed | x | * | * | x | * | * | x | x | * | * | * | * | * | * | x | * | * | * |
| KY 31+ ⁴ | KY Agric. Exp. Station | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| Nanryo | Japanese Grassland Forage Seed/ USDA-ARS, El Reno, OK | | | | | | | | | | | | | | | * | x | * | * |
| Select | FFR/Southern States | x | * | * | * | * | * | x | x | * | * | * | * | * | * | x | * | * | * |
| Spring Green (FL) | Rose Agri-Seed | * | * | * | * | x | x | x | x | | | | | | | | | | |
| Tuscany II | Seed Research of Oregon | | | | | | | | | * | * | * | * | * | * | | | | |
| Verdant | Amer. Grass Seed Prod. | | | | | | | | | * | * | x | x | x | * | | | | |
| Experimental Varieties | | | | | | | | | | | | | | | | | | | |
| AGRFA 111 | AgResearch (USA) | | | | | | | | | | | | | | | * | * | x | x |
| AGRFA 120 | AgResearch (USA) | | | | | | | | | * | * | * | * | * | * | | | | |
| AGRFA 121 | AgResearch (USA) | | | | | | | | | * | * | * | * | * | * | | | | |
| AGRFA 140 | AgResearch (USA) | | | | | | | | | * | * | * | * | * | * | * | * | * | * |
| AGRFA 144 | Noble Foundation/ AgResearch (USA) | * | * | * | * | * | * | x | * | * | x | * | * | * | * | * | * | * | * |
| AGRFA 148 | Noble Foundation/ AgResearch (USA) | * | * | * | * | * | * | x | x | * | * | * | * | * | * | | | | |
| AGRFA 155 | AgResearch (USA) | | | | | | | | | x | * | x | * | * | * | | | | |
| AGRFA 156 | AgResearch (USA) | | | | | | | | | * | * | * | * | x | * | x | x | x | x |
| AGRGT 159 | AgResearch (USA) | | | | | | | | | | | | | | | * | * | * | * |
| AGRGT 160 | AgResearch (USA) | | | | | | | | | | | | | | | * | * | * | * |
| BARFAMT 9301 | Barenbrug USA | | | | | | | | | | | | | | | * | * | * | * |
| FA 2862 | AgResearch (USA) | | | | | | | | | * | * | * | * | * | * | | | | |
| FA 2863 | AgResearch (USA) | | | | | | | | | * | * | x | * | * | * | | | | |
| FA 2864 | AgResearch (USA) | | | | | | | | | * | * | x | * | * | * | | | | |
| FA 2865 | AgResearch (USA) | | | | | | | | | * | * | x | * | * | * | | | | |
| FA 2866 | AgResearch (USA) | | | | | | | | | | | | | | | * | * | * | * |
| GA-186 | Univ. of Georgia | | | | | | | | | | | | | | | | | | * * |
| GA-593R | Univ. of Georgia | | | | | | | | | | | | | | | | | | * * |
| IS-FTF12 | DLF International Seeds | x | x | x | x | * | x | x | x | | | | | | | | | | |
| IS-FTF25 | DLF International Seeds | x | * | * | * | * | * | x | x | | | | | | | | | | |
| K4508Q | AgResearch (USA) | | | | | | | | | * | * | * | * | * | * | | | | |
| K4508Q542 | AgResearch (USA) | | | | | | | | | * | * | * | * | x | * | | | | |
| K5666VII | AgResearch (USA) | | | | | | | | | * | * | x | * | * | * | | | | |
| K6560QII542 | AgResearch (USA) | | | | | | | | | * | * | x | x | * | * | | | | |
| KFa402V542 | AgResearch (USA) | | | | | | | | | * | * | * | * | * | * | | | | |
| KY 31- ⁴ | KY Agric. Exp. Station | * | * | * | * | * | * | x | x | * | * | * | * | * | * | * | * | * | * |
| KYFA 9301 | KY Agric. Exp. Station | x | * | * | * | * | * | x | x | * | * | * | * | * | * | * | * | * | * |
| KYFA 9301/AR542 | KY Agric. Exp. Station | * | * | * | * | * | * | x | x | * | * | * | * | * | * | * | * | * | * |
| KYFA 9301/AR584 | KY Agric. Exp. Station | * | * | * | * | * | * | x | x | * | * | * | * | * | * | * | * | * | * |
| KYFA 9304 | KY Agric. Exp. Station | x | * | * | x | x | x | x | x | * | * | * | * | * | * | | | | |
| KYFA 9611 | KY Agric. Exp. Station | | | | | | | | | | | | | | | * | * | * | * |
| KYFA 9821 | KY Agric. Exp. Station | * | * | * | * | * | * | x | x | | | | | | | * | * | * | * |
| KYFA 9821/AR542 | KY Agric. Exp. Station | * | * | * | * | * | * | x | * | | | | | | | * | * | * | * |
| KYFA 9821/AR584 | KY Agric. Exp. Station | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * | * |
| KRC 6580 | AgResearch (USA) | | | | | | | | | | | | | | | x | x | x | x |
| KRC 6581 | AgResearch (USA) | | | | | | | | | | | | | | | * | * | * | * |
| KRC 6582 | AgResearch (USA) | | | | | | | | | | | | | | | * | * | * | * |
| NFTF 1070 | Noble Foundation | | | | | | | | | | | | | | | | | | * * |
| TF0101 | FFR/Southern States | * | * | * | * | * | x | x | * | | | | | | | | | | |
| TF0201 | Winfield Solutions LLC | | | | | | | | | | | | | | | | | | * * |
| TF0202 | Allied Seed | | | | | | | | | * | * | * | * | * | * | | | | |
| TF0203G | FFR/Southern States | * | * | * | * | * | * | x | x | | | | | | | | | | |
| TF9801 | FFR/Southern States | x | x | x | x | * | * | x | x | | | | | | | | | | |
| UMTF | Univ. of Manitoba | x | x | x | x | x | x | x | x | | | | | | | | | | |

¹ For detailed stand ratings over years, see individual trial tables.
² Establishment year.
³ Date of rating of percent stand.
⁴ "+" indicates variety is endophyte infected, "-" indicates variety is endophyte free.
⁵ X in the block indicates the variety was in the test but plant survival was significantly less than the most persistent variety. An open block indicates the variety was not in the test.
* Not significantly different from the most persistent variety in the test.

| Variety | Proprietor/KY Distributor | 2005 ¹ | | | | | | | | 2008 ² | | | |
|--|----------------------------|-------------------|-----|------|-----|----------------|-----|------|-----|-------------------|-----|------|-----|
| | | Apr | Oct | Mar | Oct | Apr | Oct | Apr | Oct | Jul | Oct | Apr | Oct |
| | | 2006 ³ | | 2007 | | 2008 | | 2009 | | 2008 | | 2009 | |
| Commercial Varieties—Available for Farm Use | | | | | | | | | | | | | |
| Ambrosia | Amer. Grass Seed Producers | | | | | | | | | * | * | * | * |
| Athos | DLF-Jenks | * | * | * | * | X ⁴ | X | X | X | | | | |
| Benchmark Plus | FFR/Southern States | * | * | * | * | * | * | * | * | * | * | * | * |
| Harvestar | Columbia seeds | | | | | | | | | * | * | * | * |
| Persist | Smith Seed Services | * | * | * | * | * | * | * | * | * | * | * | * |
| Seco | FFR/Southern States | | | | | | | | | * | * | * | * |
| Tekapo | Ampac Seed Co. | * | * | X | * | X | X | X | X | * | * | X | X |
| Experimental Varieties | | | | | | | | | | | | | |
| AGR DG101 | AG Research USA | X | X | X | X | X | X | X | X | | | | |
| IS-OG28 | DLF International | * | * | * | * | * | * | * | * | | | | |
| OG0203G | FFR/Southern States | | | | | | | | | * | * | * | * |

¹ Establishment year.
² This trial was replanted in April 2008 due to poor establishment in the fall of 2007.
³ Date of visual rating of percent stand.
⁴ X in the block indicate the variety was in the test but stand survival was significantly less than the most persistent variety. Open blocks indicate the variety was not in the test.
* Not significantly different from the most persistent variety.

| Variety | Proprietor/KY Distributor | 2005 ¹ | | | | | | 2007 | | | |
|--|---------------------------|-------------------|-----|-----|-----|-----|-----|------|----------------|------|-----|
| | | Apr | Oct | Mar | Oct | Apr | Nov | Apr | Oct | Apr | Oct |
| | | 06 ² | 06 | 07 | 07 | 08 | 08 | 2008 | | 2009 | |
| Commercial Varieties—Available for Farm Use | | | | | | | | | | | |
| BG34 | Barenbrug USA | * | * | * | * | * | * | * | * | * | * |
| Boost | Allied Seed | | | | | | | | | | |
| Duo (FL) | Ampac Seed Co. | | | | | | | | | | |
| Granddaddy | Smith Seed | | | | | | | * | X ³ | X | X |
| Linn | Public | | | | | | | | | | |
| Power | Ampac Seed Co. | | | | | | | * | * | * | * |
| Quartet | Ampac Seed Co. | X | X | X | X | X | X | X | X | X | X |
| SpringGreen (FL) | Rose Agri-Seed | | | | | | | | | | |
| Tonga | Kings AgriSeeds | * | * | * | * | X | X | | | | |
| Experimental Varieties | | | | | | | | | | | |
| GO-ABM | Grassland Oregon | | | | | | | X | X | X | X |
| GO-ABS | Grassland Oregon | | | | | | | * | * | X | * |
| GO-ABZ | Grassland Oregon | | | | | | | * | * | X | X |
| KRC 6554 | AgResearch (USA) | | | | | | | * | * | * | * |
| KRC 6575 | AgResearch (USA) | | | | | | | * | * | * | * |
| KRC-6576 | AgResearch (USA) | | | | | | | * | * | * | X |
| KRC 6577 | AgResearch (USA) | | | | | | | * | * | * | * |
| KRC 6578 | AgResearch (USA) | | | | | | | * | * | * | * |
| KRC 6579 | AgResearch (USA) | | | | | | | * | * | * | * |
| KLp401 | AgResearch (USA) | | | | | | | * | * | X | X |
| KLp507 | AgResearch (USA) | | | | | | | * | * | X | X |
| KYFA 0236 (FL) | KY Agric.Exp. Station | | | | | | | * | * | * | X |
| KYFA 9819 (FL) | KY Agric.Exp. Station | | | | | | | X | X | X | X |
| SW ER3508FRI | SW Seed Ltd. | X | * | * | * | * | * | | | | |
| SW ER3575 | SW Seed Ltd. | * | * | * | * | * | * | | | | |
| SW ER3579 | SW Seed Ltd. | * | * | * | * | * | X | | | | |

¹ Establishment year.
² Date of visual rating of percent stand.
³ X in the block indicates the variety was in the test but plant survival was significantly less than the most persistent variety. An open block indicates the variety was not in the test.
* Not significantly different from the most persistent variety.

Table 15. Summary of 1996-2009 Kentucky Tall Fescue Grazing Tolerance Trials (stand persistence shown as a percent of the stand rating of KY 31+).

| Variety | Proprietor | Lexington | | | | | | | | | | Princeton | | Mean ³ (#trials) | | |
|--------------------|---------------------|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------------------------|-------------|---------|
| | | 1996 ^{1,2} 3yr ⁴ | 1997 4yr | 1998 3yr | 1998 4yr | 1999 4yr | 2000 4yr | 2001 4yr | 2002 4yr | 2003 4yr | 2004 4yr | 2005 4yr | 2006 3yr | | 2002 4yr | |
| Advance MaxQ | Pennington Seed | | | | | | | | | | | | | | 88 | |
| Barlane | Barenbrug USA | | | | | | | | | 89 | | | | | 40 | 68(3) |
| Barcel | Barenbrug USA | 92 | | | | | | | | | | | | | 75 | 40 |
| Barolex | Barenbrug USA | | | | | | | | | | | | | 78 | 69 | 74(2) |
| BarOptima PLUS E34 | Barenbrug USA | | | | | | | | | | | | | 100 | | |
| BAR9TMPO | Barenbrug USA | | | | | 75 | | | | | | | | | | |
| Bronson | Ampac Seed | | | 39 | | | | | | | | | | | | |
| Cattle Club | Green Seed | | 37 | 98 | 70 | 70 | 93 | 91 | | | | | | | | 78(2) |
| Carmine | DLF-Jenks | | | | | | | 90 | | | | | | | | |
| Cowgirl | Rose Agri-Seed | | | | | | | | | | | | 99 | | | |
| Dovey | Barenbrug USA | 92 | | | | | | | | | | | | | | |
| Festival | Pickseed West | | | | | | | 100 | 101 | | | | | | | 97(3) |
| Festorina | Advanta Seeds | 98 | 86 | | | 57 | | | | | | | | | | 80(3) |
| Fuego | Advanta Seeds | | | 27 | | | | | | | | | | | | |
| Hoedown | DLF-Jenks | | | | | | 88 | | | | | | | | | |
| Jesup EF | Pennington Seed | | 63 | 91 | | | | | | 99 | | | | | | 84(3) |
| Jesup MaxQ | Pennington Seed | | | 114 | 79 | | | | | 103 | 97 | | | 68 | 99 | 95(7) |
| Johnstone | Proseeds | | 65 | 107 | | | | 92 | | | | | | | | 88(3) |
| KY31+ | KY Agri. Exp Sta. | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100(12) |
| KY31- | KY Agri. Exp Sta. | 94 | 90 | 102 | 84 | | | 98 | 103 | 98 | 100 | 100 | 100 | 82 | 99 | 96(11) |
| Kenhy | Public | | | 116 | | | | | | | | | | | | |
| Kokanee | Ampac Seed | | | | | | 43 | | | | | | | | | |
| Martin II | International Seeds | | 59 | | | | | | | | | | | | | |
| Maximize | Rose Agri-Seed | | | | | | | 99 | | | | | | | | |
| Orygun | | | | | | | | | | 99 | | | | | | |
| Resolute | Ampac Seed | | | | | | | 23 | | | | | | | | |
| Select | FFR/Sou. St. | | | 109 | 69 | | | | | 100 | 100 | | | 67 | 96 | 94(9) |
| Southern Cross | | | 25 | | | | | | | | | | | | | |
| Stargrazer | FFR/Sou. St. | 90 | | | | | | | | | | | | | | |
| Stockman | Seed Res. of OR | | | | | | | | | | | | | | | 79(4) |
| TF33 | Barenbrug USA | | | | | 34 | | | | | | | 102 | | | |
| Tuscany II | Seed Res. of OR | | | | | | | | | | | | | | | |
| Verdant | Am.Grass Seed | | | | | | | | | | | | | | 99 | |
| Vulcan | International Seeds | | | 109 | | | | | | | | | | | 90 | |

1 Year trial was established.
2 Use this summary table as a guide in making variety decisions, but refer to specific yearly reports to determine statistical differences in stand persistence between varieties. To find actual persistence ratings, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 1997 was grazed 4 years so the final report would be "2001 Cool-Season Grass Grazing Tolerance Report" archived in the KY Forage website at <www.uky.edu/Ag/Forage>.
3 Mean only presented when respective variety was included in two or more trials.
4 Number of years of data.

Table 16. Summary of 1996-2009 Kentucky Orchardgrass Grazing Tolerance Trials (stand persistence shown as a percent of the mean of the commercial varieties in the trial).

| Variety | Proprietor | Lexington | | | | | | | | | | Princeton | | | |
|-------------------|---------------------|---|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|-------------|--------------------------------|-----|--------|
| | | 1996 ^{1,2} 3yr ⁴ | 1997 4yr | 1998 3yr | 1999 4yr | 2000 4yr | 2001 4yr | 2002 4yr | 2003 4yr | 2004 4yr | 2005 4yr | 2002 4yr | Mean ³ (#trials) | | |
| Abertop | Pennington Seed | | | | | | | | | | | | | | |
| Albert | Univ. of Wisconsin | | | | | | | | | 115 | | | | | |
| Amba | DLF-Jenks | | | | | | | | | 71 | | | | | |
| Ambrosia | Pennington Seed | | 90 | | | | | | | | | | | | |
| Athos | DLF-Jenks | | | | | | | | | 93 | | | 60 | | 77(2) |
| Benchmark | FFR/Sou. States | 100 | 105 | 115 | 94 | 118 | 114 | 123 | 114 | 123 | 114 | 133 | | | 113(8) |
| Benchmark Plus | FFR/Sou. States | | | | | | | | | | 120 | 133 | 152 | | 135(3) |
| Boone | Public | | | 131 | | 102 | | | | | | | | | 117(2) |
| Cheyenne | Western Prod. Inc. | | | 94 | | | | | | | | | | | |
| Command | Seed Research of OR | | | | | | | | | | | 81 | | | |
| Crown | Donley Seed | | 86 | 96 | | | | | | | | | | | 91(2) |
| Crown Royale | Donley Seed | | | | | 100 | | | | | | | | | |
| Crown Royale Plus | Donley Seed | | | | | | 124 | | | | | | | 83 | 104(2) |
| Hallmark | James VanLeeuwen | 107 | | 104 | 103 | | | | | 115 | 113 | | | 83 | 104(6) |
| Haymate | FFR/Sou. States | 93 | 71 | 102 | 96 | 53 | 100 | 115 | 100 | 115 | 118 | 83 | | | 92(9) |
| Intensiv | Barenbrug USA | | | | | | | | | | 51 | | | | |
| Mammoth | DLF-Jenks | | | | | | | | | 115 | | | | | |
| Megabite | Turf Seed | | | | | | | | | 77 | | | | | |
| Niva | DLF-Jenks | | | | | | | | | | | 76 | | 83 | 80(2) |
| Persist | Smith Seed | | | | | | | | | | | | 138 | | |
| Pizza | Advanta Seeds | | | 63 | | | | | | | | | | | |
| Potomac | Public | 98 | | | | | | | | | | | | | |
| Prairie | Turner Seed | | | | | 127 | | | | 121 | | 119 | | 117 | 113(4) |
| Profile | Scott Seed | 98 | | | | | | | | | 116 | | | 83 | 110(3) |
| Progress | Scott Seed | 111 | | | | | | | | | | | | | 107(2) |
| Tekapo | Ampac Seed | 93 | 166 | 92 | 104 | | | | | 55 | 74 | | 50 | 100 | 94(9) |
| Takana | Smith Seed | | 81 | | | | | | | 99 | | | | | 90(2) |
| WP300 | Western Prod. Inc. | | | 94 | | | | | | | | | | | |

¹ Year trial was established.

² Use this summary table as a guide in making variety decisions, but refer to specific yearly reports to determine statistical differences in stand persistence between varieties. To find actual persistence ratings, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 1997 was grazed 4 years so the final report would be "2001 Cool-Season Grass Grazing Tolerance Report" archived in the KY Forage website at <www.uky.edu/Ag/Forage>.

³ Mean only presented when respective variety was included in two or more trials.

⁴ Number of years of data.

Stand thinning may have been greater for preferred varieties due to closer grazing. See individual trial tables for preference ratings.

Table 17. Summary of 2000-2009 Kentucky Perennial Ryegrass Grazing Tolerance Trials (stand persistence shown as a percent of the mean of the commercial varieties in the trial).

| Variety | Proprietor | 2000 ^{1,2} | 2001 | 2003 | 2005 | Mean ³ (#trials) |
|------------|---------------------|---------------------|------|------|------------------|--------------------------------|
| | | 4yr ⁴ | 3yr | 4yr | 3-yr | |
| AGRLP103 | AgResearch USA | 133 | | 86 | | 110(2) |
| Aries | Ampac Seed | | 139 | | | - |
| BG 34 | Barenbrug USA | | | | 176 ⁵ | - |
| Citadel | Donley Seed | 112 | | | | - |
| Granddaddy | Smith Seed Services | | 121 | | | - |
| Lasso | DLF-Jenks | | 130 | | | - |
| Linn | Public | 117 | 129 | 63 | | 103(3) |
| Maverick | Ampac Seed | | 36 | | | - |
| Polly II | FFR/Southern States | 37 | 68 | | | 53(2) |
| Quartet | Ampac Seed | | 77 | | 63 | 70(2) |
| Remington | Barenbrug USA | | | 1515 | | - |
| Tonga | Kings AgriSeeds | | | | 61 | - |

¹ Year trial was established.

² Use this summary table as a guide in making variety decisions, but refer to specific yearly reports to determine statistical differences in stand persistence between varieties. To find actual persistence ratings, look in the yearly report for the final year of each specific trial. For example, the Lexington trial planted in 2000 was grazed 4 years so the final report would be "2004 Cool-Season Grass Grazing Tolerance Report" archived in the KY Forage website at <www.uky.edu/Ag/Forage>.

³ Mean only presented when respective variety was included in two or more trials.

⁴ Number of years of data.

⁵ Grazing tolerance values for these entries may have been elevated due to the low survival of the other commercial varieties in the trials for these years.