

2011 Cool-Season Grass Horse Grazing Tolerance Report

G.L. Olson, S.R. Smith, G.D. Lacefield, and T.D. Phillips, Plant and Soil Sciences; L.M. Lawrence, Animal and Food Sciences

Introduction

Cool-season grasses such as bluegrass, tall fescue, and orchardgrass are dominant pasture grasses for horses in Kentucky. Variety evaluations for yield have been carried out for many years, but little work has been done to establish the effect of variety on persistence when subjected to close, continuous grazing by horses.

The purpose of this report is to summarize current research on the grazing tolerance of varieties of tall fescue, orchardgrass, and other species when subjected to continuous heavy grazing pressure by horses within the grazing season. The main focus will be on stand survival.

The UK Forage Extension web site 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

Tests were established in Lexington in the fall of 2007, 2008, 2009 and 2010. The soils at this location are well-drained silt loams and are well suited to tall fescue, orchardgrass, and other cool-season grasses. Plots were 5 by 15 ft in a randomized complete block design, with each variety replicated six times. Plots were seeded at the recommended seeding rate per acre and were planted into a prepared seedbed using a disk drill. Grazing was continuous from April to October.

Plots were grazed down to below 4 inches quickly and were maintained

at 1 to 3 inches for the remainder of the grazing season. Individual trials were occasionally clipped to remove seedheads or weed growth not controlled by herbicides. Supplemental hay was fed during periods of slowest growth. Visual ratings of percent stand were made in the fall several weeks after the horses 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 30 pounds of actual N per acre in March, 30 pounds of actual N in May and 40 pounds of actual N in early November after horses were removed from the pasture. Other fertilizers (lime, P, and K) were applied as needed.

Results and Discussion

Weather data for Lexington for 2008, 2009, 2010 and 2011 are presented in Table 1.

Data on percent stand are presented in Tables 3, 4, 5, and 6. Table 2 presents grazing preference data.

Statistical analyses were performed on all entries (including experimentals) to determine if numerical differences 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.

In general, commercial varieties of tall fescue and orchardgrass tolerated overgrazing well (Tables 3, 4, and 5), but the

Table 1. Temperature and rainfall at Lexington, Kentucky in 2008, 2009, 2010 and 2011.

| | 2008 | | | | 2009 | | | | 2010 | | | | 2011 ² | | | |
|-------|-------|------------------|----------|-------|-------|-----|----------|-------|-------|-----|----------|-------|-------------------|-----|----------|--------|
| | Temp. | | Rainfall | | Temp. | | Rainfall | | Temp. | | Rainfall | | Temp. | | Rainfall | |
| | °F | DEP ¹ | IN | DEP | °F | DEP | IN | DEP | °F | DEP | IN | DEP | °F | DEP | IN | DEP |
| JAN | 32 | +2 | 3.91 | +1.05 | 28 | -3 | 2.45 | -0.41 | 29 | -2 | 2.40 | -0.46 | 29 | -2 | 2.10 | -0.76 |
| FEB | 36 | +1 | 6.11 | +2.90 | 38 | +3 | 2.86 | -0.35 | 29 | -6 | 1.38 | -1.83 | 39 | +4 | 6.34 | +3.13 |
| MAR | 44 | +1 | 6.51 | +1.91 | 48 | +4 | 2.19 | -2.21 | 47 | +3 | 1.05 | -3.35 | 47 | +3 | 4.76 | +0.36 |
| APR | 55 | 0 | 5.89 | +2.01 | 55 | 0 | 4.48 | +0.60 | 59 | +4 | 2.74 | -1.14 | 58 | +3 | 12.36 | +8.48 |
| MAY | 62 | -2 | 4.33 | +0.14 | 64 | 0 | 5.05 | +0.58 | 67 | +3 | 7.84 | +3.37 | 64 | 0 | 6.72 | +2.25 |
| JUN | 74 | +2 | 3.59 | -0.07 | 74 | +2 | 5.41 | -1.75 | 76 | +4 | 4.61 | +0.95 | 74 | +2 | 2.61 | -1.05 |
| JUL | 76 | 0 | 3.41 | -1.59 | 71 | -5 | 5.89 | +0.89 | 78 | +2 | 5.49 | +0.49 | 80 | +4 | 6.29 | 1.29 |
| AUG | 75 | 0 | 2.18 | -1.75 | 73 | -2 | 5.38 | +1.45 | 78 | +3 | 1.54 | -2.39 | 75 | 0 | 2.89 | -1.04 |
| SEP | 72 | +4 | 1.42 | -1.78 | 68 | 0 | 5.37 | +2.17 | 71 | +3 | 1.14 | -2.06 | 66 | -2 | 5.52 | +2.32 |
| OCT | 57 | 0 | 1.53 | -1.04 | 54 | -3 | 4.83 | +2.26 | 59 | +2 | 1.22 | -1.35 | 55 | -2 | 4.10 | +1.53 |
| NOV | 43 | -2 | 2.53 | -0.86 | 49 | +4 | 0.94 | -2.45 | 47 | +2 | 4.58 | +1.19 | | | | |
| DEC | 35 | -1 | 6.03 | +2.05 | 36 | 0 | 3.86 | -0.12 | 28 | -8 | 2.15 | -1.93 | | | | |
| Total | | | 47.24 | +2.69 | | | 48.71 | +4.16 | | | 36.14 | -8.41 | | | 53.69 | +16.51 |

¹ DEP is departure from the long-term average.

² 2011 data is for ten months through October.

Table 2. Preference rankings determined in the first week of grazing in Spring 2004 and Spring 2005 for cool season grass varieties sown September 17, 2003 at Lexington, Kentucky.

| Variety | Species | Preference Rank ¹ | | | Percent Stand Oct. 25, 2007 ³ |
|---------------------|--------------|------------------------------|-------------|------------------------|--|
| | | Spring 2004 | Spring 2005 | 2-yr Rank ² | |
| Haymate | orchardgrass | 2 | 1 | 1 | 58 |
| Barfleo | timothy | 1 | 6 | 2 | 17 |
| Peak | smooth brome | 3 | 4 | 3 | 7 |
| KYFA 9819 | festulolium | 5 | 3 | 4 | 16 |
| Ginger | KY bluegrass | 4 | 5 | 5 | 54 |
| TM 9901 | timothy | 8 | 2 | 6 | 17 |
| KYFA 0006 | tall fescue | 7 | 7 | 7 | 74 |
| KYFA 9602 | tall fescue | 6 | 11 | 8 | 37 |
| KYFA 9611 | tall fescue | 9 | 8 | 9 | 61 |
| KYFA 9304 | tall fescue | 10 | 10 | 10 | 66 |
| Select | tall fescue | 12 | 12 | 11 | 65 |
| KYTF 2 | tall fescue | 15 | 9 | 12 | 63 |
| KY 31- ⁴ | tall fescue | 11 | 14 | 13 | 69 |
| Common | KY bluegrass | 13 | 13 | 14 | 58 |
| AR 1 | tall fescue | 14 | 15 | 15 | 73 |

¹ 1=most preferred, 15=least preferred; see text for explanation of ranking process.
² 1=most preferred based on 2-year total; when two varieties had the same 2-year total, ties were broken using the 2004 rank.
³ Stand survival after 4 years of continuous grazing.
⁴ "-" indicates variety is endophyte free.

varieties of timothy in these trials did not. The sensitivity of timothy to heavy grazing was not surprising, as it is an erect species and sensitive to heavy defoliation. Perennial ryegrasses, Kentucky bluegrasses, and festuloliums vary in tolerance to grazing.

The lack of a defined "grazing-tolerant variety" for these species makes absolute interpretation difficult. For example, endophyte-infected "Kentucky 31" (KY31+) is known to be grazing tolerant. However, there are no proven grazing-tolerant varieties for the other species. Still, certain varieties were clearly more tolerant than others.

Differences in tolerance among varieties could be due to true grazing tolerance but also to preference, especially where highly palatable species such as bluegrass and ryegrass were in the same test as tall fescue. Because of potential preference between species, comparison between varieties is most accurate within a species. These data should be taken as an indication of tolerance to periods of overgrazing. For best pasture stands, forage grasses should not be abused as in this study.

Table 3. Seedling vigor, grazing preference and stand persistence of forage grasses sown September 6, 2007 in a horse grazing tolerance study at Lexington, Kentucky.

| Variety | Species | Seedling Vigor ¹ Nov 16, 2007 | Grazing Preference ² | | | Percent Stand | | | | | | | | |
|--|--------------------|---|---------------------------------|--------|-------|---------------|-------|--------|-------|--------|-------|-------|--------|-------|
| | | | 2009 | 2010 | 2011 | 2007 | 2008 | | 2009 | | 2010 | | 2011 | |
| | | | Jun 11 | May 11 | May 2 | Nov 16 | Apr 7 | Oct 20 | Apr 9 | Nov 19 | Apr 9 | Dec 3 | Mar 22 | Nov 9 |
| Commercial Varieties-Available for Farm Use | | | | | | | | | | | | | | |
| KY31+ ³ | tall fescue | 4.2 | 1.8 | 1.2 | 2.3 | 92 | 93 | 94 | 98 | 97 | 97 | 97 | 94 | 97* |
| BarOptima PLUS E34 | tall fescue | 4.0 | 1.0 | 2.5 | 3.7 | 87 | 86 | 84 | 89 | 89 | 90 | 88 | 89 | 88* |
| Throughblue | KY bluegrass | 1.3 | 4.8 | 7.7 | 7.0 | 66 | 73 | 80 | 93 | 92 | 93 | 86 | 83 | 83* |
| Select | tall fescue | 3.0 | 3.2 | 1.2 | 2.2 | 77 | 74 | 60 | 83 | 82 | 81 | 73 | 63 | 62 |
| Nanryo | tall fescue | 2.4 | 3.8 | 1.0 | 1.6 | 65 | 72 | 56 | 61 | 60 | 65 | 59 | 55 | 58 |
| Barderby | KY bluegrass | 1.0 | 6.8 | 4.7 | 4.8 | 79 | 74 | 63 | 77 | 59 | 65 | 60 | 54 | 53 |
| Benchmark Plus | orchardgrass | 3.3 | 5.2 | 1.8 | 5.0 | 89 | 84 | 83 | 88 | 81 | 86 | 41 | 41 | 38 |
| Lato | KY bluegrass | 1.8 | 5.4 | 6.0 | 7.4 | 70 | 71 | 43 | 38 | 37 | 49 | 33 | 33 | 33 |
| Granddaddy | perennial ryegrass | 4.3 | 6.2 | 8.5 | - | 78 | 83 | 71 | 35 | 37 | 39 | 7 | 1 | 1 |
| Experimental Varieties | | | | | | | | | | | | | | |
| KYFA 9301/AR584 | tall fescue | 4.3 | 2.2 | 1.0 | 1.5 | 91 | 86 | 85 | 94 | 95 | 83 | 84 | 83 | 89* |
| KYFA 9821/AR584 | tall fescue | 3.7 | 3.8 | 1.0 | 2.3 | 92 | 91 | 85 | 89 | 90 | 90 | 87 | 76 | 86* |
| KY31- ³ | tall fescue | 4.2 | 2.0 | 1.0 | 2.0 | 87 | 87 | 82 | 85 | 85 | 84 | 83 | 81 | 81* |
| Mean | | 3.3 | 3.8 | 3.0 | 3.6 | 81.9 | 81.4 | 73.9 | 77.5 | 75.2 | 76.8 | 66.4 | 62.8 | 64.6 |
| CV,% | | 21.5 | 52.4 | 33.4 | 43.5 | 16.5 | 19.5 | 21.6 | 19.0 | 20.8 | 22.3 | 26.5 | 31.2 | 29.9 |
| LSD,0.05 | | 0.9 | 2.3 | 1.2 | 1.9 | 16.4 | 18.7 | 18.8 | 17.0 | 18.1 | 19.8 | 20.4 | 22.6 | 22.9 |

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; 2009-25 days, 2010-19 days, 2011-12 days.
³ KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. AR584 is a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. The other fescue varieties in this test do not contain an endophyte.
* Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Table 4. Seedling vigor, grazing preference and stand persistence of forage grasses sown September 11, 2008 in a horse grazing tolerance study at Lexington, Kentucky.

| Variety | Species | Seedling Vigor ¹ Oct 14, 2008 | Grazing Preference ² | | | Percent Stand | | | | | | | |
|--|--------------------|---|---------------------------------|--------|-------|---------------|-------|--------|-------|-------|--------|-------|--|
| | | | 2009 | 2010 | 2011 | 2008 | 2009 | | 2010 | | 2011 | | |
| | | | Jun 5 | May 11 | May 2 | Oct 14 | Apr 9 | Nov 19 | Apr 8 | Dec 3 | Mar 15 | Nov 9 | |
| Commercial Varieties-Available for Farm Use | | | | | | | | | | | | | |
| Cowgirl | tall fescue | 3.5 | 3.5 | 1.5 | 1.0 | 96 | 98 | 99 | 99 | 97 | 97 | 98* | |
| Select | tall fescue | 3.2 | 2.7 | 1.0 | 1.0 | 95 | 98 | 100 | 100 | 99 | 97 | 98* | |
| KY31+ ³ | tall fescue | 2.7 | 5.5 | 1.2 | 1.2 | 93 | 93 | 95 | 96 | 96 | 96 | 97* | |
| Jesup MaxQ | tall fescue | 2.8 | 4.5 | 1.0 | 1.0 | 90 | 93 | 91 | 94 | 93 | 93 | 94* | |
| Benchmark Plus | orchardgrass | 3.3 | 2.5 | 4.0 | 2.2 | 93 | 98 | 93 | 96 | 59 | 73 | 49 | |
| Ginger | KY bluegrass | 1.0 | 6.8 | 3.3 | 1.5 | 27 | 79 | 74 | 70 | 45 | 43 | 43 | |
| Granddaddy | perennial ryegrass | 4.8 | 3.0 | 7.8 | 6.0 | 97 | 100 | 97 | 88 | 35 | 30 | 22 | |
| Climax | timothy | 2.3 | 4.5 | 6.8 | 4.2 | 94 | 98 | 93 | 95 | 9 | 18 | 8 | |
| Giant | bentgrass species | 2.3 | 5.7 | 6.8 | 2.0 | 89 | 88 | 83 | 86 | 8 | 11 | 7 | |
| Experimental Varieties | | | | | | | | | | | | | |
| KY31- ³ | tall fescue | 2.3 | 4.3 | 1.7 | 1.0 | 93 | 98 | 98 | 98 | 97 | 95 | 99* | |
| TF 0201 | tall fescue | 3.2 | 4.7 | 1.0 | 1.0 | 93 | 94 | 93 | 96 | 85 | 95 | 94* | |
| B-8.0082 | colonial bentgrass | 1.5 | 7.7 | 8.3 | 5.0 | 88 | 85 | 93 | 94 | 93 | 92 | 91* | |
| TM 0501G | timothy | 1.3 | 5.0 | 6.7 | 4.5 | 78 | 85 | 91 | 93 | 12 | 17 | 7 | |
| TM 0502G | timothy | 1.2 | 5.5 | 6.0 | 6.0 | 52 | 79 | 80 | 84 | 10 | 8 | 3 | |
| Mean | | 2.6 | 4.7 | 4.1 | 2.6 | 84.0 | 91.8 | 91.4 | 92.0 | 59.7 | 62.2 | 56.4 | |
| CV,% | | 26.0 | 31.6 | 27.2 | 44.6 | 17.3 | 11.8 | 8.9 | 11.7 | 24.9 | 23.4 | 22.9 | |
| LSD,0.05 | | 0.8 | 1.7 | 1.3 | 1.6 | 16.8 | 12.5 | 9.4 | 12.4 | 17.2 | 16.9 | 15.5 | |

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; 2009-25 days, 2010-19 days, 2011-12 days.
³ KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ contains a non-toxic endophyte. The other fescue varieties in this test do not contain an endophyte.
* Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Ranking Varieties by Preference

Differences in tolerance among varieties could be due to true grazing tolerance but also to preference, as horses may graze the preferred varieties more intensely than the less preferred varieties. In spring 2004 and spring 2005, the varieties sown in fall 2003 were used to assess the grazing preferences of horses. During the first week of grazing in both years, variety plots were measured for forage height and scored for forage density and evidence of grazing. Measurements were made before horses were given access to plots and on days 2, 5, and 7. Forage density was scored from 0 to 10, where 10 indicated that 100 percent of the plot was covered with the seeded variety and 0 indicated that there were no plants of the seeded variety. Similarly, grazing intensity was scored from 0 to 10; where 10 indicated that 100 percent of the plants had been grazed and 0 indicated that none of the plants had been grazed.

Preference rankings were generated using a combination of measurements including the percent reduction in forage

Table 5. Seedling vigor, grazing preference and stand persistence of forage grasses sown September 4, 2009 in a horse grazing tolerance study at Lexington, Kentucky.

| Variety | Species | Seedling Vigor ¹ Oct 12, 2009 | Grazing Preference ² | | Percent Stand | | | | | |
|--|--------------------|---|---------------------------------|-------|---------------|-------|-------|--------|-------|------|
| | | | 2010 | 2011 | 2009 | 2010 | | 2011 | | |
| | | | Jun 11 | May 2 | Oct 12 | Apr 8 | Dec 3 | Mar 15 | Nov 9 | |
| Commercial Varieties-Available for Farm Use | | | | | | | | | | |
| Jesup MaxQ | tall fescue | 2.8 | 1.0 | 1.0 | 97 | 99 | 99 | 99 | 99 | 100* |
| KY31+ ³ | tall fescue | 3.8 | 1.2 | 2.5 | 100 | 100 | 100 | 100 | 100 | 100* |
| Select | tall fescue | 3.5 | 0.5 | 1.5 | 96 | 99 | 99 | 99 | 99 | 99* |
| Benchmark Plus | orchardgrass | 3.2 | 2.7 | 1.8 | 98 | 99 | 93 | 92 | 92 | 92* |
| Tekapo | orchardgrass | 2.0 | 5.7 | 5.7 | 97 | 92 | 91 | 91 | 85 | |
| Profit | orchardgrass | 2.8 | 5.7 | 4.3 | 97 | 98 | 89 | 91 | 84 | |
| Power | perennial ryegrass | 5.0 | 5.0 | 7.2 | 100 | 100 | 85 | 88 | 81 | |
| Granddaddy | perennial ryegrass | 4.5 | 3.0 | 5.3 | 101 | 100 | 88 | 92 | 79 | |
| Persist | orchardgrass | 2.5 | 1.7 | 1.7 | 95 | 99 | 93 | 91 | 78 | |
| Ginger | KY bluegrass | 1.0 | 8.2 | 3.0 | 65 | 86 | 63 | 79 | 77 | |
| Giant | bentgrass species | 1.2 | 6.3 | 2.8 | 81 | 90 | 84 | 83 | 45 | |
| Climax | timothy | 2.0 | 4.7 | 4.2 | 91 | 94 | 58 | 44 | 26 | |
| Experimental Varieties | | | | | | | | | | |
| AgR 1521 | tall fescue | 2.7 | 0.7 | 1.0 | 98 | 100 | 99 | 99 | 100* | |
| KY31- ³ | tall fescue | 4.0 | 0.8 | 1.8 | 100 | 100 | 100 | 99 | 100* | |
| AgR 1502 | tall fescue | 2.8 | 1.0 | 1.5 | 99 | 100 | 99 | 99 | 100* | |
| KYFA 0701 | tall fescue | 3.8 | 0.8 | 2.5 | 100 | 100 | 99 | 100 | 100* | |
| B-8.0082 | colonial bentgrass | 1.2 | 8.5 | 5.8 | 69 | 84 | 88 | 82 | 93* | |
| Mean | | 3.0 | 3.4 | 3.2 | 94.2 | 96.4 | 90.2 | 89.9 | 84.6 | |
| CV,% | | 18.0 | 29.2 | 35.5 | 9.9 | 5.6 | 9.2 | 9.5 | 10.1 | |
| LSD,0.05 | | 0.7 | 1.1 | 1.3 | 11.4 | 6.2 | 9.5 | 9.8 | 9.8 | |

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; 2010-7 days, 2011-12 days.
³ KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ, AgR1502 and AgR1521 contain a non-toxic endophyte. The other fescue varieties in this test do not contain an endophyte.
* Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

height between day 0 and day 7 (greatest reduction = most preferred); the unit decrease in forage density from day 0 to day 7 (largest unit reduction = most preferred); and the grazing intensity scores from day 7 (highest grazing score = most preferred). The rankings for each characteristic were then totaled, and the varieties with the lowest totals were considered most preferred. Table 2 shows the preference rankings determined in spring 2004 and spring 2005 for the forage varieties sown in fall 2003. A two-year ranking was also determined based on the total from the 2004 and 2005 rankings. When two forages had the same two-year total, the tie was broken using the 2004 score. In general, tall fescue varieties were less preferred by horses than timothy and orchardgrass. However, only one variety of orchardgrass was included in this test. Common bluegrass also appeared to have low palatability to horses, although the "Ginger" variety of bluegrass was well accepted. This acceptance may have been influenced by maturity.

To determine whether grazing preferences might affect the grazing tolerance of cool-season grass varieties, the relationship of the two-year grazing preference ranking to the percent stand remaining in fall 2006 was plotted in Figure 1. There is a moderate relationship between preference rank and percent stand ($R^2 = 0.49$); least preferred varieties had the highest percent stand after three grazing seasons. Two varieties appear to have performed differently than the others: "Haymate" orchardgrass had a relatively high stand percentage (73 percent), even though it was highly preferred; the "Peak" variety of smooth bromegrass had an extremely low stand percentage (10 percent) compared to all other varieties.

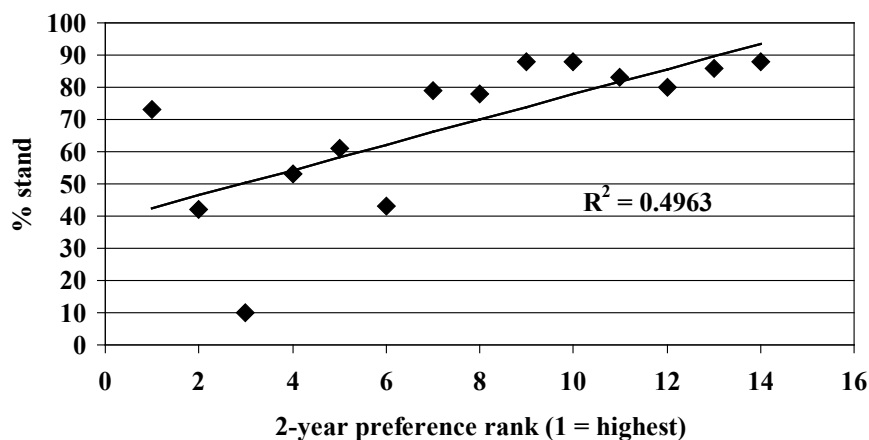
Tables 3, 4, 5, and 6 include preference ratings made two to three weeks after horses started grazing. These ratings do not provide information on initial preference but do provide a good indication of the varieties that the horses repeatedly grazed during the first few weeks on pasture.

Table 6. Seedling vigor, grazing preference and stand persistence of forage grasses sown September 1, 2010 in a horse grazing tolerance study at Lexington, Kentucky.

| Variety | Species | Seedling Vigor ¹ Oct 26, 2010 | Grazing Preference ² May 2, 2011 | Percent Stand | | |
|--|--------------------|---|--|---------------|--------|-------|
| | | | | 2010 | 2011 | |
| | | | | Oct 26 | Mar 15 | Nov 9 |
| Commercial Varieties-Available for Farm Use | | | | | | |
| Jesup EF | tall fescue | 3.2 | 1.0 | 99 | 100 | 100* |
| KY31+ ³ | tall fescue | 2.8 | 1.2 | 99 | 100 | 100* |
| Tekapo | orchardgrass | 3.3 | 2.7 | 85 | 100 | 100* |
| Jesup MaxQ | tall fescue | 1.9 | 1.0 | 96 | 97 | 99* |
| BarOptima PLUS E34 | tall fescue | 2.2 | 3.7 | 97 | 99 | 99* |
| Persist | orchardgrass | 3.2 | 1.7 | 99 | 99 | 99* |
| Select | tall fescue | 2.8 | 1.0 | 98 | 98 | 99* |
| Power | perennial ryegrass | 5.0 | 6.7 | 100 | 100 | 98* |
| Profit | orchardgrass | 3.2 | 2.8 | 99 | 99 | 97* |
| Granddaddy | perennial ryegrass | 4.3 | 6.0 | 99 | 99 | 96* |
| Benchmark Plus | orchardgrass | 4.3 | 1.7 | 100 | 100 | 84 |
| Climax | timothy | 1.9 | 5.8 | 95 | 94 | 77 |
| Ginger | KY bluegrass | 0.9 | 5.2 | 71 | 71 | 67 |
| Experimental Varieties | | | | | | |
| KY31- ³ | tall fescue | 3.3 | 1.0 | 99 | 100 | 100* |
| AgR 1521 | tall fescue | 2.3 | 1.2 | 96 | 98 | 99* |
| TM 0502G | timothy | 0.8 | 7.0 | 36 | 44 | 34 |
| Mean | | 2.8 | 3.1 | 91.6 | 93.5 | 90.4 |
| CV,% | | 27.6 | 28.8 | 12.5 | 8.0 | 13.4 |
| LSD,0.05 | | 0.9 | 1.0 | 13.2 | 8.6 | 13.9 |

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 before rating; 12 days.
³ KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ and AgR1521 contain a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. The other fescue varieties in this test do not contain an endophyte.
 * Not significantly different from the highest numerical value in the column, based on the 0.05 LSD.

Figure 1. Relationship of preference ranking to percent stand remaining, Fall 2006.



Note: species on above figure are as follows:
 1-orchardgrass, 2-timothy, 3-smooth brome, 4-festulolium,
 5-KY bluegrass, 6-timothy, 7-13-tall fescue, 14-KY bluegrass

Summary Table

Table 7 summarizes information about distributors and persistence across years for all varieties in these tests. Varieties are listed in alphabetical order, with ex-

perimental 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 indicates the variety was in the test but was significantly different from the most

Table 8. Summary of 1999-2011 Kentucky Tall Fescue Horse Grazing Tolerance Trials in Lexington (stand persistence shown as a percent of the stand rating of KY 31-).

| Variety | Proprietor/KY Distributor | 1999 ^{1,2} | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | Mean ³ (#trials) |
|--------------------|--|---------------------|------|------|------|------|------|------|------|------|--------------------------------|
| | | 3-yr ⁴ | 4-yr | 4-yr | 4-yr | 4-yr | 4-yr | 4-yr | 4-yr | 3-yr | |
| BarOptima PLUS E34 | Barenbrug | | | | | | | | 107 | | – |
| Bronson | Ampac Seed | 80 | | | | | | | | | – |
| Cattle Club | Green Seed | 95 | | | | | | | | | – |
| Cowgirl | Rose Agri-Seed | | | | | | | | | 99 | – |
| Festorina | Advanta Seed | 102 | | | | | | | | | – |
| Jesup MaxQ | Pennington Seed | | | 98 | | | 78 | | | 95 | 90(3) |
| Johnstone | ProSeeds | | 88 | | | | | | | | – |
| KY31+ ⁵ | KY Agri. Exp.Sta. | | 105 | | | | 102 | 109 | 120 | 99 | 107(5) |
| KY31- ⁵ | KY Agri. Exp.Sta. | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100(9) |
| Nanryo | Japanese Grassland For. Seed/ USDA-ARS, El Reno, OK | | | | | | | | 72 | | – |
| Seine | Seed Research of OR | | | | | 135 | | | | | – |
| Select | FFR/Southern States | 82 | | 109 | 94 | 99 | 73 | 104 | 76 | 99 | 92(8) |
| Stargrazer | FFR/Southern States | 70 | | | | | | | | | – |
| Stockman | Seed Research of OR | | | | | 125 | | | | | – |

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 2001 was grazed 4 years so the final report would be "2005 Cool-Season Grass Horse 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 KY 31- is the variety KY31 from which the toxic endophyte has been removed. KY31+ contains the toxic endophyte. Jesup MaxQ contains a non-toxic endophyte. BarOptima PLUS E34 contains a beneficial endophyte. The other fescue varieties in this table do not contain an endophyte.

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.

Table 8 is a summary of stand persistence data from 1999 to 2011 of commercial tall fescue varieties that have been entered in the Kentucky trials. In Table 8 the data is listed as a percentage of KY31-. In other words, in each trial KY31+ is 100 percent. Varieties with percentages over 100 persisted better than KY31-, and varieties with percentages less than 100 persisted less than KY31-. Direct, statistical comparisons of varieties cannot be made using the summary Table 8, but these comparisons do help 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 Table 8 to determine which yearly report to refer to.

Summary

These studies indicate that there are varieties of cool-season grasses that can tolerate overgrazing by horses for three to four seasons and still maintain reasonable stands. 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 generally recommended that tall fescue, orchard-grass, or other cool-season grasses be continuously overgrazed as was done in this trial. Although several varieties expressed tolerance to the level of grazing pressure used in these trials, overgrazing

greatly reduces forage production. This information should be an indication of those varieties that will better withstand overgrazing when it occurs.

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

Authors

- G.L. Olson, Research Specialist, Forages
- S.R. Smith, Extension Professor, Forages
- L.M. Lawrence, Professor, Horse Nutrition
- G.D. Lacefield, Extension Professor, Forages
- T.D. Phillips, Associate Professor, Tall Fescue Breeding



Mention or display of a trademark, proprietary product, or firm in text or figures does not constitute an endorsement and does not imply approval to the exclusion of other suitable products or firms.