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# 2001 Cool-Season Grass Grazing Variety Report: Tolerance to Horses

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## Introduction

Cool-season grasses such as bluegrass, tall fescue, and orchardgrass are dominant pasture grasses for horses in Kentucky. While variety evaluations for yield have been carried out for many years, 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 and orchardgrass and other species when subjected to continuous and heavy grazing pressure by horses within the grazing season. The main focus will be on plant stand survival.

## Description of the Tests

Tests were established in Lexington in the fall of 1999 and 2000. The soils at this location are well-drained silt loams and are well suited to tall fescue and orchardgrass production. Plots were 5 x 15 feet in a randomized complete block design with each variety replicated six times. In each test, 20 pounds of seed per acre 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 kept at that height or below for the remainder of the grazing season. Supplemental hay was fed during periods of slowest growth. Visual ratings of percent stand were made in the fall and spring after each grazing season. Grass plots were fertilized with 60 pounds of actual N per acre in the spring, and other fertilizer (lime, P, and K) was applied as needed.

## Results and Discussion

Weather data for Lexington for 2000 and 2001 are presented in Table 1. Data on percent stand are presented in Tables 2 and 3. Statistical analyses were performed on all entries (including experimentals) to determine if the apparent 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.

**Tall fescue**: In general, commercial varieties of tall fescue (all endophyte free) and orchardgrass tolerated overgrazing well (Tables 2 and 3), but the varieties of timothy, bluegrass, and prairiegrass (*Bromus wildenoii*) in these trials did not. The sensitivity of timothy and prairiegrass to heavy grazing is not surprising, as these are both erect species and sensitive to heavy defoliation. Bluegrass as a species is expected to be more tolerant of heavy grazing. It is impossible to know if 'Ginger' is not grazing tolerant compared to other bluegrasses, since it was the only bluegrass in the test. Future tests will include check entries such as 'Kenblue' or generic Kentucky bluegrass. Although no direct comparison is possible, perennial ryegrasses may differ greatly in grazing tolerance, based on the performance of 'Polly II' (Table 2) compared to 'Mara' (Table 3). These perennial ryegrasses certainly differ in ploidy level (tetraploid vs. diploid) but also apparently in tolerance to grazing.

Differences in tolerance among varieties could be due to true grazing tolerance but also to preference, especially where highly palatable species like bluegrass and ryegrass are alongside tall fescue. These data should be taken as an indication of tolerance to short durations of overgrazing. For best pasture stands, forage grasses should not be abused as in this study.

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 but was not used as a check in these two studies to avoid possible problems with pregnant mares. Therefore, more years of data are needed before making generalizations about the true grazing tolerance of a variety.

Table 4 summarizes 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. Shaded areas indicate that the variety was not in that particular test (labeled at the top of the column), while clear blocks mean the variety was in the test. A single asterisk (*) means that the variety was not significantly different from the top-yielding variety in that study. It is best to choose a variety that has performed well over several years.

# Summary

These studies indicate that there are varieties of cool-season grasses that can tolerate overgrazing for one or two 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* recommended that tall fescue or orchardgrass 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 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 occurs.

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


**Table 1. Temperature and rainfall at Lexington during the 2000 and 2001 growing seasons.**

| | 2000 | | | | 2001 | | | |
|---|---|---|---|---|---|---|---|---|
| | Temp | | Rainfall | | Temp | | Rainfall | |
| **MON** | **˚F** | **DEP** | **IN** | **DEP** | **˚F** | **DEP** | **IN** | **DEP** |
| JAN | 32 | +1 | 3.48 | +0.62 | 31 | 0 | 0.9 | -1.9 |
| FEB | 43 | +8 | 4.97 | +1.76 | 40 | +5 | 3.2 | 0 |
| MAR | 48 | +4 | 3.47 | -0.93 | 40 | -4 | 2.7 | -1.7 |
| APR | 53 | -2 | 4.10 | +0.22 | 59 | +4 | 1.7 | -2.2 |
| MAY | 67 | +3 | 2.96 | -1.51 | 66 | +2 | 4.9 | +0.4 |
| JUN | 73 | +1 | 3.22 | -0.44 | 71 | -1 | 2.0 | -1.6 |
| JUL | 74 | -2 | 3.42 | -1.58 | 75 | -1 | 5.6 | +0.6 |
| AUG | 74 | -2 | 3.38 | -0.55 | 76 | +1 | 4.8 | +0.8 |
| SEP | 66 | -2 | 5.47 | +2.27 | 65 | -3 | 3.0 | -0.2 |
| OCT | 59 | +2 | 0.92 | -1.65 | 56 | -1 | 3.6 | +1.1 |
| NOV | 43 | -2 | 1.59 | -1.80 | 51 | +6 | 2.8 | -0.6 |
| **AVG** | **57.5** | **+0.8** | **3.4** | **-0.8** | **57.3** | **+0.7** | **3.2** | **-0.5** |

DEP is departure from the long-term average for that location.

**Table 2. Seedling score and percent stand of forage grasses sown October 4, 1999, at Lexington, Kentucky, in a horse grazing tolerance study.**

| Variety | Type | Seedling Score[1] Nov 4, 1999 | % Stand Sep 21, 2000 | % Stand Apr 4, 2001 | % Stand Oct 15, 2001 |
|---|---|---|---|---|---|
| **Commercial varieties — available for farm use** | | | | | |
| Haymate | orchardgrass | 2 | 99 | 88 | 73* |
| Cattle Club | tall fescue [2] | 2 | 97 | 85 | 70* |
| Tekapo | orchardgrass | 1 | 99 | 81 | 70* |
| Festorina | tall fescue | 2 | 95 | 86 | 67* |
| Benchmark | orchardgrass | 2 | 98 | 86 | 66* |
| Select | tall fescue | 2 | 95 | 87 | 65* |
| Stargrazer | tall fescue | 2 | 95 | 78 | 54 |
| Bronson | tall fescue | 2 | 87 | 76 | 50 |
| Ginger | Kentucky bluegrass | 1 | 50 | 63 | 5 |
| Horseblend Dolina plus Tundra | timothy | 4 | 40 | 42 | 5 |
| Polly II | tetraploid perennial ryegrass | 5 | 61 | 63 | 5 |
| **Experimental varieties — not available for farm use** | | | | | |
| OG9705g | orchardgrass | 2 | 98 | 88 | 73* |
| KYOG 2 | orchardgrass | 1 | 100 | 88 | 71* |
| Ky31- | tall fescue | 3 | 98 | 87 | 69* |
| KYFA9304 | tall fescue | 2 | 99 | 89 | 67* |
| KYTF2 | tall fescue | 2 | 100 | 89 | 66* |
| KYFA9301 | tall fescue | 3 | 98 | 87 | 63 |
| Ampac pp6 | mixture | 3 | 89 | 79 | 41 |
| Ampac pp7 | mixture | 3 | 72 | 66 | 32 |
| KYPP9301 | timothy | 2 | 43 | 53 | 6 |
| KY-Early | timothy | 2 | 45 | 55 | 3 |
| | | | | | |
| Mean | | 2.3 | 84 | 77 | 49 |
| CV, % | | 17.0 | 13.0 | 10.1 | 21.3 |
| LSD, 0.05 | | 0.44 | 12.50 | 8.87 | 11.87 |

[1] Seedling score is based on scale of 1 to 5 with 5 being most vigorous.
[2] All tall fescues are endophyte free.
* Not significantly different from the highest numerical value in the column based on the 0.05 LSD.

**Table 3. Seedling score and percent stand of forage grasses sown September 19, 2000, at Lexington, Kentucky, in a horse grazing tolerance study.**

| Variety | Type | Seedling Score[1] Oct 31, 2000 | % Stand Apr 9, 2001 | % Stand Oct 15, 2001 |
|---|---|---|---|---|
| **Commercial varieties — available for farm use** | | | | |
| Mara | diploid perennial ryegrass | 5 | 90 | 77* |
| Tekapo | orchardgrass | 2 | 89 | 77* |
| Cattle Club | tall fescue[2] | 4 | 90 | 69* |
| Haymate | orchardgrass | 3 | 90 | 68* |
| Duo | festulolium | 5 | 90 | 66* |
| Stargrazer | tall fescue | 3 | 89 | 62 |
| Kokanee | tall fescue | 4 | 90 | 58 |
| Barcarella | tall fescue | 3 | 88 | 56 |
| Tuukka | timothy | 2 | 90 | 18 |
| Ginger | Kentucky bluegrass | 1 | 90 | 9 |
| **Experimental varieties — not available for farm use** | | | | |
| K5568k | orchardgrass | 3 | 90 | 73* |
| OG9705g | orchardgrass | 2 | 90 | 61 |
| K5633d | prairiegrass (*Bromus wildenoii*) | 5 | 81 | 8 |
| K5632m | prairiegrass (*Bromus wildenoii*) | 4 | 84 | 7 |
| | | | | |
| Mean | | 3.2 | 88.6 | 50.5 |
| CV, % | | 18.2 | 2.5 | 22.1 |
| LSD, 0.05 | | 0.67 | 2.53 | 12.83 |

[1] Vigor score is based on scale of 1 to 5 with 5 being most vigorous.
[2] All tall fescues are endophyte free.
* Not significantly different from the highest numerical value in the column based on the 0.05 LSD.

| Table 4. Persistence of forage grasses under heavy grazing pressure by horses across years. | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | | | Lexington | | | | | |
| | | | 1999[1] | | | 2000 | | |
| Variety | Species | Proprietor/KY Distributor | Sep 2000[2] | Apr 2001 | Oct 2001 | Apr 2001 | Oct 2001 |
| **Commercial varieties — available for farm use** | | | | | | | | |
| Barcarella | tall fescue | Barenbrug | | | | * | |
| Benchmark | orchardgrass | FFR Cooperative | * | * | * | | |
| Bronson | tall fescue | Ampac Seed Company | | | | | |
| Cattle Club | tall fescue | - | * | * | * | * | * |
| Duo | festulolium | Ampac Seed Company | | | | * | * |
| Festorina | tall fescue | Advanta Seeds West | * | * | * | | |
| Ginger | Kentucky bluegrass | Dye Seed Ranch, Inc. ProSeeds Marketing | | | | * | |
| Haymate | orchardgrass | FFR Cooperative | * | * | * | * | * |
| Horseblend Dolina plus Tundra | timothy | DLF-Trifolium | | | | | |
| Kokanee | tall fescue | Ampac Seed Company | | | | * | |
| Mara | diploid perennial ryegrass | Barenbrug | | | | * | * |
| Polly II | tetraploid perennial ryegrass | FFR Cooperative | | | | | |
| Select | endophyte free tall fescue | FFR Cooperative | * | * | * | | |
| Stargrazer | tall fescue | FFR Cooperative | * | | | * | |
| Tekapo | orchardgrass | Ampac Seed Company | * | * | * | * | * |
| Tuukka | timothy | Ampac Seed Company | | | | * | |
| **Experimental varieties — not available for farm use** | | | | | | | | |
| Ampac PP7 | mixture | Ampac Seed Company | | | | | |
| Ampac PP6 | mixture | Ampac Seed Company | * | | | | |
| K5568k | orchardgrass | Ampac Seed Company | | | | * | * |
| K5632m | prairiegrass | Ampac Seed Company | | | | | |
| K5633d | prairiegrass | Ampac Seed Company | | | | | |
| KY-Early | timothy | University of Kentucky | | | | | |
| Ky31- | tall fescue | University of Kentucky | * | * | * | | |
| KYFA9301 | tall fescue | University of Kentucky | * | * | * | | |
| KYFA9304 | tall fescue | University of Kentucky | * | * | * | | |
| KYOG2 | orchardgrass | University of Kentucky | * | * | * | | |
| KYPP9301 | timothy | University of Kentucky | | | | | |
| KYTF2 | tall fescue | University of Kentucky | * | * | * | | |
| OG9705g | orchardgrass | FFR Cooperative | * | * | * | * | |

[1] Establishment year.
[2] Date of visual estimation of percent stand.
* Not significantly different from the most persistent variety in the test. Shaded boxes indicate that the variety was not in the test. Open boxes indicate the variety was in the test but persistence was significantly less than the top-ranked variety in the test.



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