# 2020 Perennial Grass Variety Trial

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THE UNIVERSITY OF VERMONT EXTENSION

# 2020 PERE[illegible]IAL GR[illegible] VAR[illegible]Y TRIAL

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In 2019, the University of Vermont E[illegible]nsion N[illegible]est C[illegible]s and So[illegible] Program[illegible]ted [illegible]rial evaluating forage yield and quality of an a[illegible] cool [illegible]son pe[illegible]nial grass sp[illegible]d va[illegible] pla[illegible] in monocultures. The grass species selected were Ke[illegible]cky bluegrass, meadow brome, meadow fescue, orchardgrass, perennial ryegrass, and ti[illegible] Th[illegible]0 growing season was the first full season after establishment for these stands. These stands will continue to be monitored over multiple years to evaluate yield, quality, survivability, pest resistance, persistence, and other characteristics that will help identify the most suitable forage species and varieties in our region over a variety of weather conditions.

## MATERIALS AND METHODS

Forage species and variety information for the trial is summarized in Table 1. The plot design was a randomized ci

Aug, and 16-Sep. Plots were also rated for disease severity on 6-Sep prior to the third harvest. Plots were rated on a 1-5 scale where 1 was low infection and 5 was high infection for rust (*Puccina sp.)* and for other diseases.

**Table 2. Perennial forage trial management, Alburgh, VT.**

[redacted]**rview Research Farm Alburgh, VT**

Montana but not to the variety Macbeth. Disease rating also did not differ statistically between varieties and averaged 2.00 on a scale from 0-5 for the species.

**Table 5. Yield and quality of three varieties of meadow brome, 2020.**

| Variety | DM | Season yield | CP | aNDF | WSC | TDN | NEL | 48-hr NDFD | RFQ | Milk yield |
|---|---|---|---|---|---|---|---|---|---|---|
| | % | DM tons $ac^{-1}$ | | % of DM | | | Mcal $lb^{-1}$ | % of NDF | | lbs $ton^{-1}$ |
| Fleet | 27.1 | 4.16 | 22.1 | 52.2 | 10.8 | 58.4 | 0.580 | 82.5 | 163a | 3960 |
| Macbeth | 26.0 | 6.67 | 22.0 | 55.0 | 9.74 | 59.3 | 0.570 | 80.6 | 122b | 3869 |
| Montana | 25.9 | 4.56 | 22.7 | 52.3 | 10.6 | 59.4 | 0.590 | 82.2 | 140ab | 3953 |
| LSD ($p$ = 0.10) | NS | NS¥ | NS | NS | NS | NS | NS | NS | 26.6 | NS |
| Species mean | 26.4 | | | | | | | | | |

The variety Tetrax was the top performing variety in all quality parameters. Tetrax averaged approximately 4% lower aNDF content than all other varieties

**Figure 3. Dry matter yield of five meadow fescue varieties over four cuttings, 2020.**

***Orchardgrass***

The seven varieties of orchardgrass did not differ statistically in terms of yield but did differ in some quality parameters (Table 8). Dry matter content ranged from 23.7% to 25.6% and differed statistically suggesting that the varieties differ in maturation timing. The varieties Echelon and Niva appear to be later maturing varieties while Otello and Luxor are earlier maturing with the other varieties landing somewhere between. Yields ranged from 5.36 to 6.69 tons $ac^{-1}$ but did not differ statistically.

**Table 8. Yield and quality of seven varieties of orchardgrass, 2020.**

| Variety | DM | Season yield | CP | aNDF | WSC | TDN | NEL | 48-hr NDFD | RFQ | Milk yield |
|---|---|---|---|---|---|---|---|---|---|---|
| | % | DM tons $ac^{-1}$ | | % of DM | | | Mcal $lb^{-1}$ | % of NDF | | lbs $ton^{-1}$ |

ton$^{-1}$ to 4057 lbs ton$^{-1}$ with the varieties Luxor and Harvestar producing the highest milk yields. Orchardgrass varieties also differed statistically in disease severity rating (Table 9). The species overall averaged a rating of 1.90 on a 0-5 scale. However, individual varieties ranged from 1.40 to 2.60. While these ratings are not perfect, they can compare varietal performance under the same climatic conditions and can aide in the varietal selection process.

**Table 9. Disease rating of eight varieties of orchardgrass, 2020.**

| Variety | Disease rating |
|---|---|
| | 0-5 |
| Echelon | 1.80 |
| Harvestar | **1.40** |
| Husar | 2.00 |
| Inavale | 1.80 |
| Luxor | 2.60 |
| Niva | 1.40 |
| Olathe | 1.80 |
| Otello | 2.40 |
| Level of significance | ** |
| Species mean | 1.90 |

1-5 scale where 1 = low infection and 5 = high disease infection.
** 0.05 < p > 0.01

**Figure 4. Dry matter yield of seven orchardgrass varieties over four cuttings, 2020.**

Looking at dry matter yields by cutting, we also see differences in dry matter distribution across the season (Figure 4

2nd and 3rd harvests, Niva, Olathe, and Echelon were able to produce over 1.50 tons $ac^{-1}$, more than double their 2nd

**Table 11. Disease rating of six varieties of perennial ryegrass, 2020.**

1-5 scale where 1 = low infection and 5 = high disease infection.
*** $p < 0.0001$

When we look at the dry matter yield by cutting, we see differences in productivity throughout the season across the varieties, however it is important to note that these were not statistically significant. The variety Toronto was the lowest yielding variety at each cutting suggesting that it was less tolerant of the hot and dry weather compared to the other varieties. Interestingly, two varieties, Tivoli and Tomaso, yielded higher in their 2nd harvest than their 1st. In addition, you can see the steep decline in productivity between the 2nd and 3rd harvests for the variety Tivoli, whereas Kentaur produced biomass more evenly across the cuttings (Figure 5).

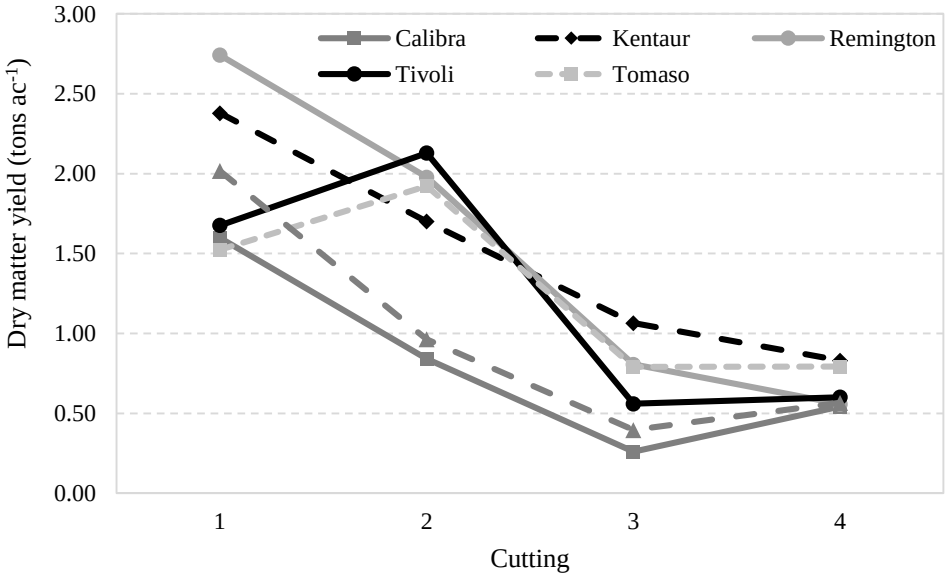


**Figure 5. Dry matter yield of six perennial ryegrass varieties over four cuttings, 2020.**

## DISCUSSION

Overall, performance of these perennial grasses was high despite hot and dry weather conditions throughout much of the season. Yields averaged over 5 tons $ac^{-1}$ over the season with orchardgrass and meadow brome producing the highest yields. While perennial ryegrass is often regarded as the gold standard for producing excellent dairy quality forage, meadow fescue often rivaled its quality and yielded similarly. However, it is also critical to recognize that forage quality is significantly impacted by harvest timing. Within species, varieties differed in maturation timing which can impact the suitability to your operation. Fields that tend to be wetter and more difficult to harvest early in the spring should be planted to later maturing varieties, allowing a longer harvest window prior to declines in quality. Finally, the distribution of dry matter production throughout the season can be important to consider, especially for use in grazing systems. Yield and quality data by variety across each cutting can be found in Tables 12 and 13 and Figure 6. It is important to recognize that these data only represent one year and should not alone be used to make management decisions.

## ACKNOWLEDGEMENTS

Funding for this project was through the USDA

**Table 12**

**Table 13. Quality of 21 varieties of four perennial grass species, 2020.**

| Variety | Species | CP | aNDF | WSC | TDN | NEL | 48-hr NDFD | RFQ | Milk yield |
|---|---|---|---|---|---|---|---|---|---|
| | | % of DM | | | | Mcal $lb^{-1}$ | % of NDF | | lbs $ton^{-1}$ |
| Fleet | Meadow brome | 22.1 | | | | | | | |

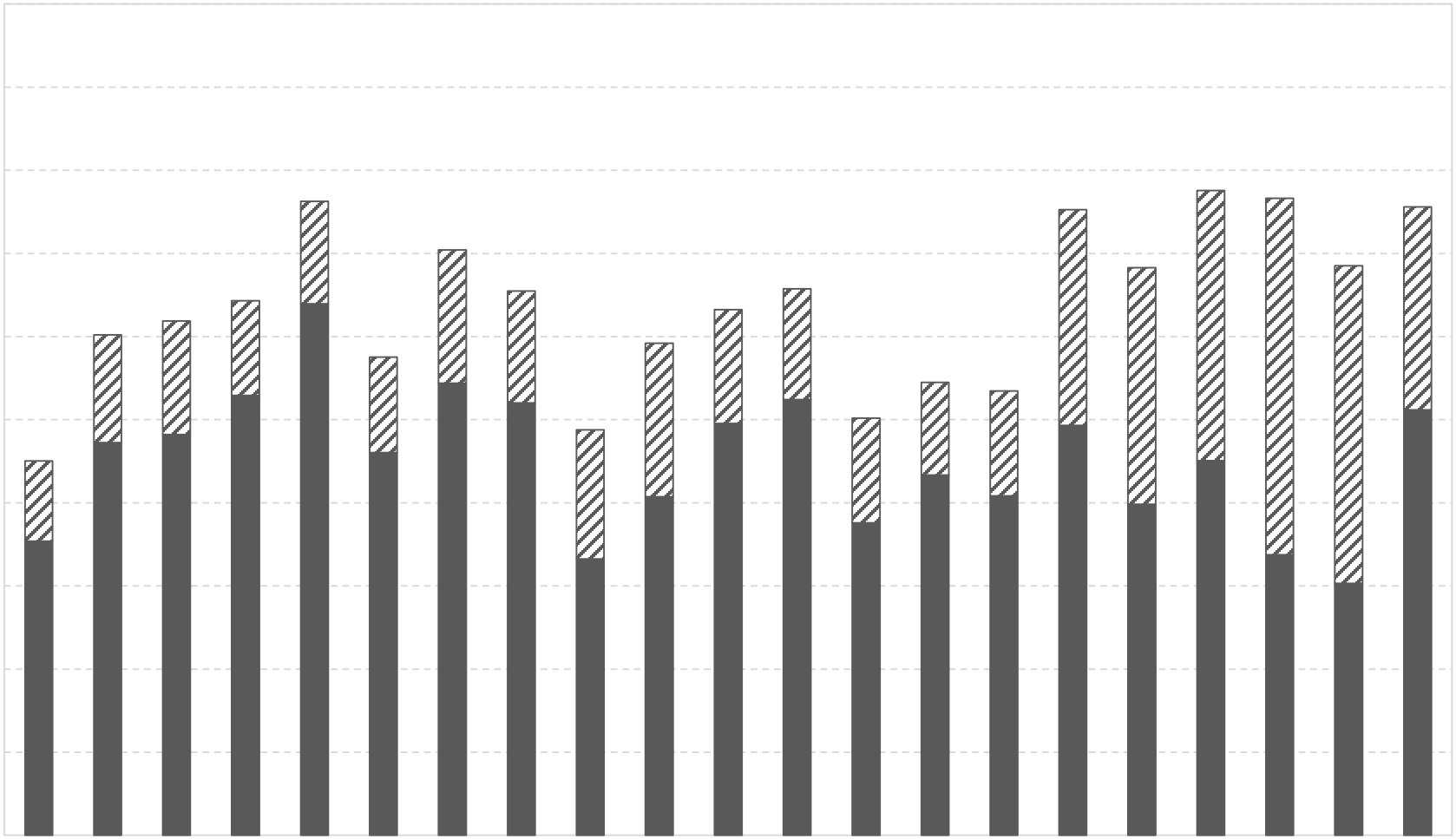

**Figure 6. Dry matter yield distribution over four harvests, 2020.**