Stockpiled Pasture: 4. Performance of Four Grass Species in Stockpiling Systems

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Stockpiling is the practice of allowing certain hay or pasture fields to regrow during mid-summer or early fall so they are available for grazing later in the season. Stockpile grazing is also known as deferred grazing or fall-saved pasture. The primary reason for using stockpiled pasture is to save on feed costs. In this report, we discussed the yield and quality of several grass species under two stockpile management systems.

This study was conducted in small research plots under clipping management. The trial was established in 1993 and harvested from 1994 to 1996. The grass species involved were: reed canarygrass, smooth bromegrass, tall fescue, meadow bromegrass, orchardgrass, and Matua prairiegrass. The Matua prairiegrass did not survive the first winter and will not be discussed further. The orchardgrass provided data in 1994 but suffered winter damage and was not suitable for harvested in the final two years of the study.

The grass species were evaluated under two management systems: the Hay system consisted of a single harvest in early July followed by stockpiling until the fall harvests were taken. The Pasture system consisted of a harvest in mid-June, another harvest in late July, followed by stockpiling until the fall harvests were taken. Thus, the Hay system had only 1 cut (early July) prior to stockpiling, while the Pasture system had two cuts (mid-June and late July) prior to stockpiling.

To assess yield and quality in the fall, sufficient plots were available to harvest one complete set in early September, early October, and early November. All yield and quality data presented below represents the average of these three fall harvest dates. The effect of harvest date on stockpile yield and quality is discussed in a separate report.

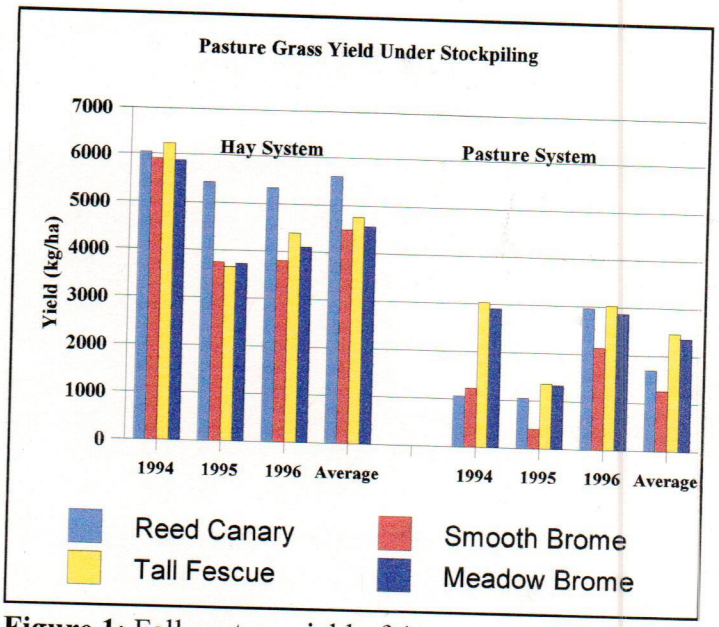

Figure 1: Fall pasture yield of 4 grass species under two systems of stockpiling management.

Results

i) Stockpile Yield in the Fall

The fall yield of grass species varied with management system. Under the Hay system, reed canarygrass was consistently the highest producer in

the fall (Figure 1). Absolute yields were quite high, averaging over 5 tonnes/ha of dry matter. There was little difference in fall yield of the other three grass species under the Hay system. Under the Pasture system, tall fescue and meadow bromegrass tended to be the highest yielding species, while smooth bromegrass was consistently the lowest.

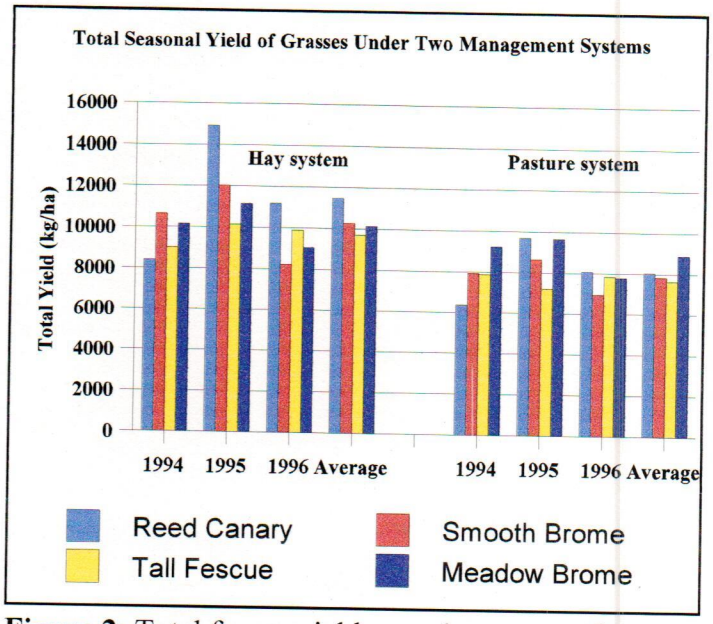

Figure 2: Total forage yield over the season of 4 grass species under two stockpiling management systems.

ii) Total Seasonal Yield

A successful stockpiling system should also provide acceptable forage yields during the spring and summer time periods. Overall, grasses under the Hay management produced more total forage per year than those under the Pasture management system. This is not unusual since under hay management the grasses are allowed to reach the period of maximum dry matter accumulation. Under the Hay management system, reed canarygrass produced the most forage when both the first cut (hay) and fall cut (stockpiled forage) are considered (Figure 2). Reed canarygrass was lower yielding in 1994 because it was a somewhat thin stand in the first year, which is normal for this grass species. Under the Pasture management system, meadow bromegrass tended to produce the most forage over the June and July harvests plus the fall harvest. Differences among the other grasses were relatively small..

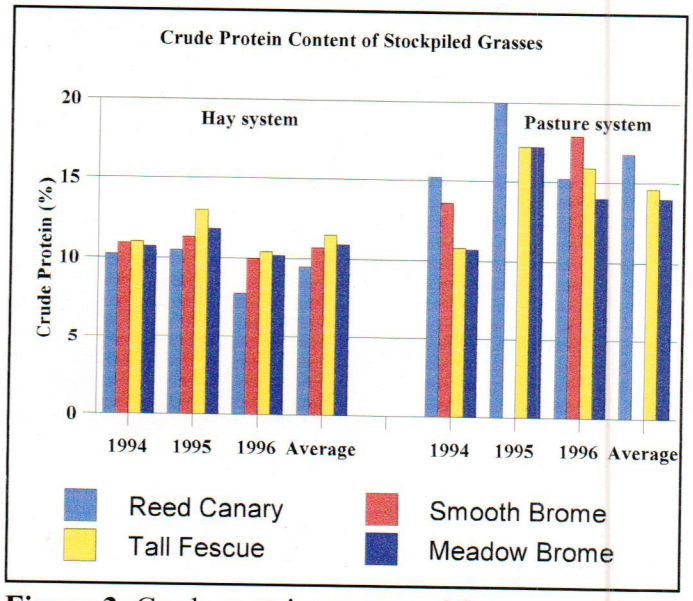

Figure 3: Crude protein content of four grasses in fall under two stockpile management systems.

Forage Quality

i) Crude Protein

The crude protein content of stockpiled grasses was consistently higher under the Pasture system

as compared to the Hay system (Figure 3). Under the Hay system, reed canarygrass tended to have lower protein values as compared to the other grass species, while under the Pasture system reed canarygrass generally had high protein values. Other differences in crude protein content among grass species were quite small. Note that under the Pasture system in 1995, smooth brome did not have enough forage available for quality analysis due to drought, therefore it is not included for that year or in the average.

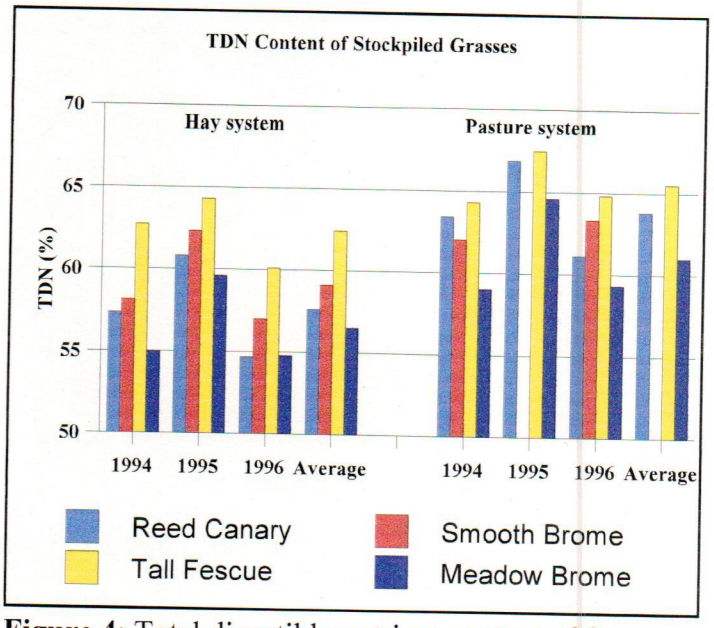

Figure 4: Total digestible nutrient content of four grasses under two stockpile management systems.

ii) Total Digestible Nutrients (TDN)

Overall, the total digestible nutrient (TDN) content of the stockpiled forage was higher under the Pasture system as compared to the Hay system (Figure 4). Tall fescue consistently had the highest TDN content under both management systems. This finding is significant for those wanting to establish forages with stockpiling in mind. Tall fescue has long been recognized in the central USA as an excellent grass for stockpiling and our data seems to support this. Meadow bromegrass consistently had the lowest TDN values under stockpiling. Meadow brome tends to form only leaves in the regrowth and it mats easily, causing the lower leaves to die. This accumulation of brown leaves is likely resulting in lower energy values. It seems likely that meadow bromegrass should be managed by using shorter regrowth intervals if it is to be stockpiled.

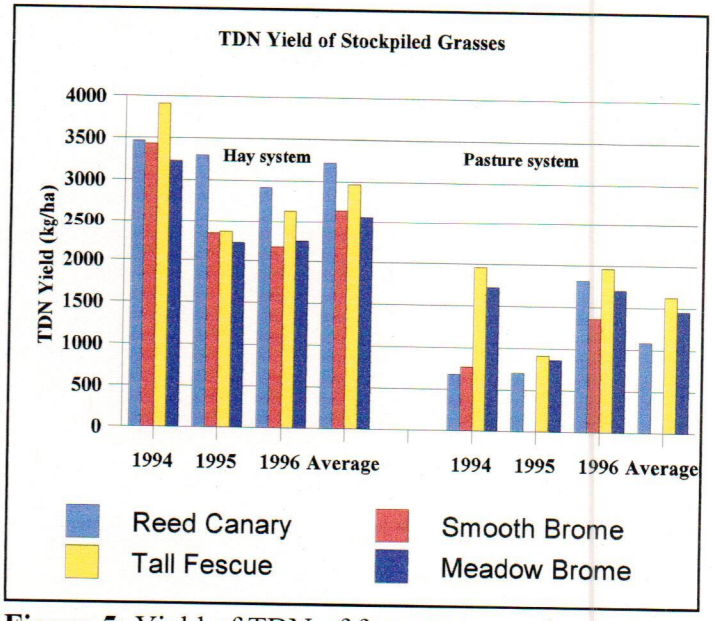

Figure 5: Yield of TDN of four grass species under two stockpile management systems.

(iv) Yield of TDN

The yield of total digestible nutrients can be calculated by multiplying the %TDN by the dry

matter yield. The result gives an indication of which grasses provide the most "energy per acre" under stockpiling. This is a useful value where animals are at medium or low levels of nutrient requirements, such as dry cows or ewes.
Overall, the TDN yield was significantly higher under the Hay management system (Figure 5). This results from the much higher yields achieved under the Hay system, despite somewhat higher TDN values under the Pasture system. Under the Hay management system, reed canarygrass tended to have the highest TDN yields, followed by tall fescue. Under the Pasture management system, tall fescue and meadow bromegrass had the highest TDN yields. Thus, the ideal pasture grass for stockpiling will vary depending on the management system used to accumulate the stockpile.

Summary and Interpretation

The results of this study show that stockpile management systems that allow long regrowth periods prior to fall grazing (ie: the Hay management system above) produce much higher stockpile yields than those that allow shorter regrowth periods (ie: our Pasture management system). At the same time, systems that allow shorter regrowth periods provide higher crude protein and energy in the forage for fall grazing.

Under the Hay management system, reed canarygrass was generally the highest yielding species both in the fall and over the entire season. When its excellent yield potential is considered along with excellent winterhardiness and drought tolerance, we would suggest that reed canarygrass should be much more widely used in Ontario, both for summer and late fall grazing (note that this would only apply to low-alkaloid varieties proven adapted in Ontario). Under the pasture management system, tall fescue and meadow bromegrass had the highest fall yields, while meadow bromegrass had the highest yields over the entire season. Both of these species have excellent potential for use in Ontario where a grass with rapid regrowth is required. Tall fescue is reputed to have palatability problems, but this seems to vary over the season and can be overcome with a combination of haying and grazing. We would have expected orchardgrass to also perform well in our Pasture system had it not been damaged after the first winter.
Tall fescue consistently had the highest TDN values in both the Hay and Pasture systems. This information supports data from the USA and indicates that tall fescue should be considered in new seedings where late-fall grazing is one of the primary objectives.

When selecting grass species for full-season use as well as fall grazing, the type of animals to be grazed should be considered. Where fall grazing is primarily for livestock with low nutrient requirements (ie: dry cows or ewes), grasses with high seasonal and fall yields should be used (ie: reed canarygrass, meadow bromegrass). Where fall grazing is primarily for livestock with medium to high nutrient requirements (ie: breeding ewes, weaned lambs or calves, stockers), species with a combination of high yields and high absolute quality need to be considered (ie: tall fescue). The usefulness of legumes in fall grazing programs is currently under investigation at NLARS.