

Materials and Methods

For this experiment, 4 lactating Holstein cows fitted with a rumen cannula were used for an in situ experiment using a nylon bag technique. Samples of orchardgrass, sudangrass, white clover, meadow fescue and millet were collected from existing field trials. Yields for each treatment were measured at harvest using a Carter plot forage harvester equipped with scales. Dry matter at harvest was calculated by weighing and drying a subsample of the material from each plot. Dried samples were then ground to 4 mm using a Wiley Mill. Approximately 7 g of dried, ground forage was added to pre-weighed nylon bags (Ankom Technologies), and the weight of the sample + bag was recorded. Duplicates of each forage were incubated in the rumen of each of the four cows for 1, 2, 3, 4, 6, 8.5, 19, 48, or 72 h (total of 18 bags per forage type per cow). Bags were attached to a weight in order to maintain the nylon bags in the fluid layer of the rumen. All nylon bags were removed at the end of the experiment, and washed in cold water on the gentle cycle in a washing machine. Bags that were not incubated in the rumen (time 0 h incubation) were also included in this wash cycle.

Once washed, nylon bags were placed in an oven and dried at 55C for 48 h, and the final bag + sample residue weight was recorded. Samples from each bag were submitted to DairyOne Laboratories (Ithaca, NY), for nutrient analysis. Nutrient content (% of DM) of CP, ADF, aNDF, and WSC are shown graphically below.

To calculate the DM, ADF, aNDF, and WSC disappearance (%) relative to the initial (time 0 h incubation), the following calculation was used:

$$\text{Disappearance} = (1 - (\text{final \%} / \text{initial \%})) \times 100$$

Results and observations

The dry matter yields for the 2nd cut, which was the harvest that the samples were collected from, and the overall season total are summarized in the table below. 2nd cut yields ranged from 0.555 to 1.62 tons ac⁻¹ with meadow fescue producing the lowest 2nd cut yield and millet yielding the highest. When the overall total yield for the season is considered, the highest yielding treatment was sudangrass that produced 4.33 tons ac⁻¹. The lowest yielding treatment over the season was white clover that only produced 1.52 tons ac⁻¹.

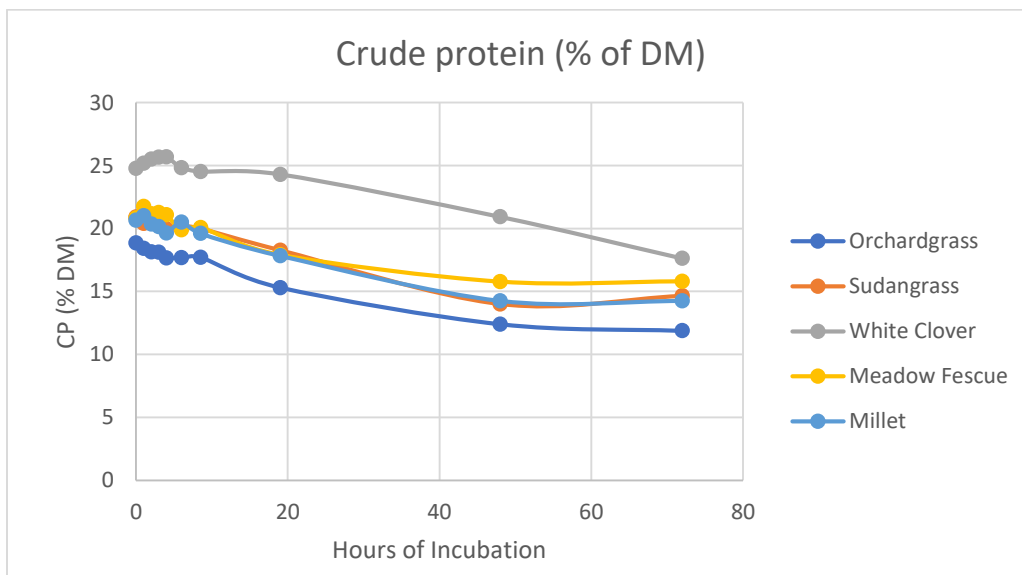
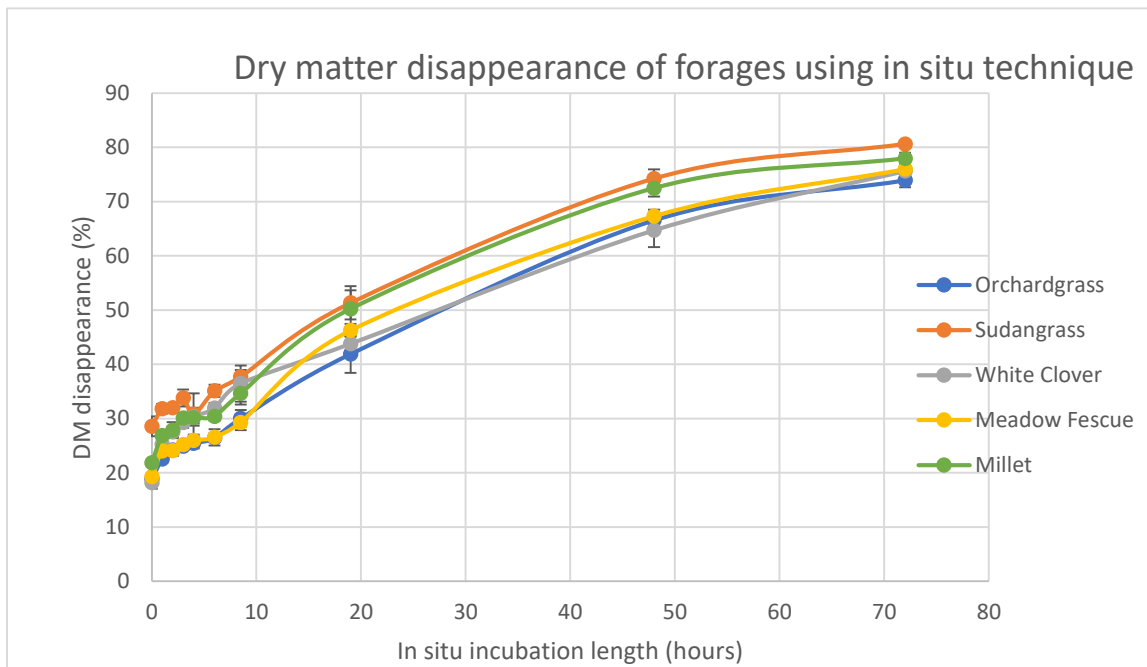
Species	DM Yield	
	2nd cut	Season total
White Clover	0.957	1.52
Sudangrass	1.61	4.33
Millet	1.62	3.99
Orchardgrass	0.743	3.6
Meadow Fescue	0.555	2.61

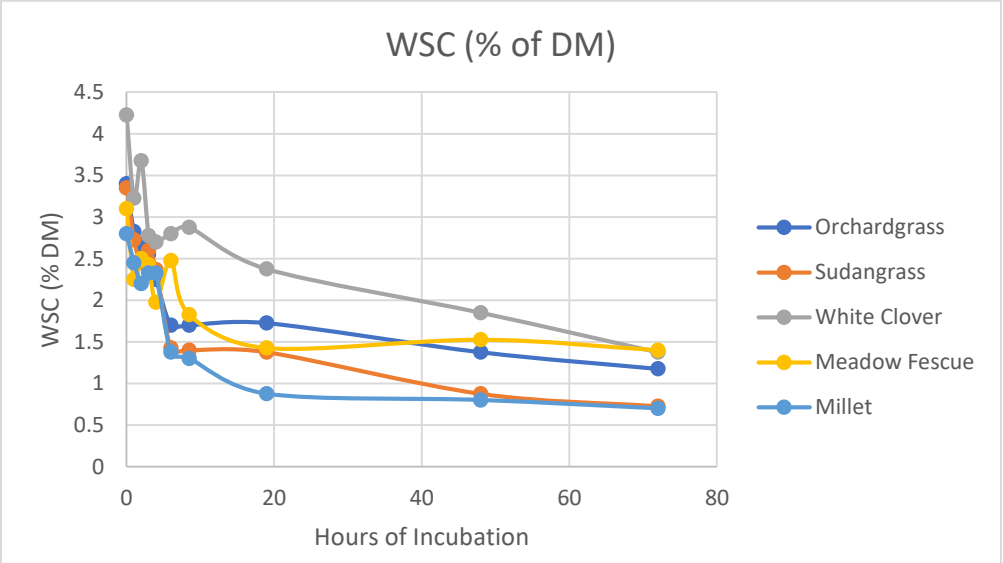
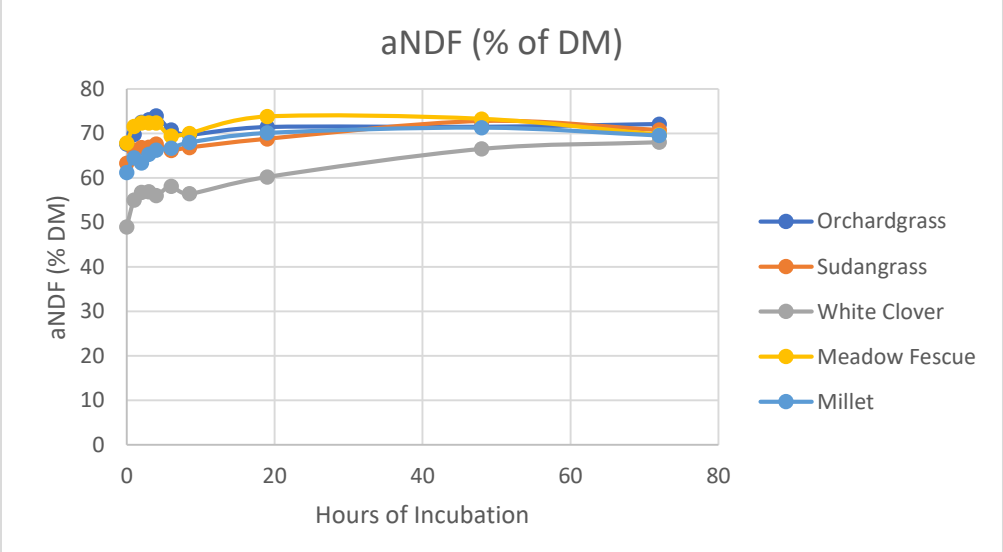
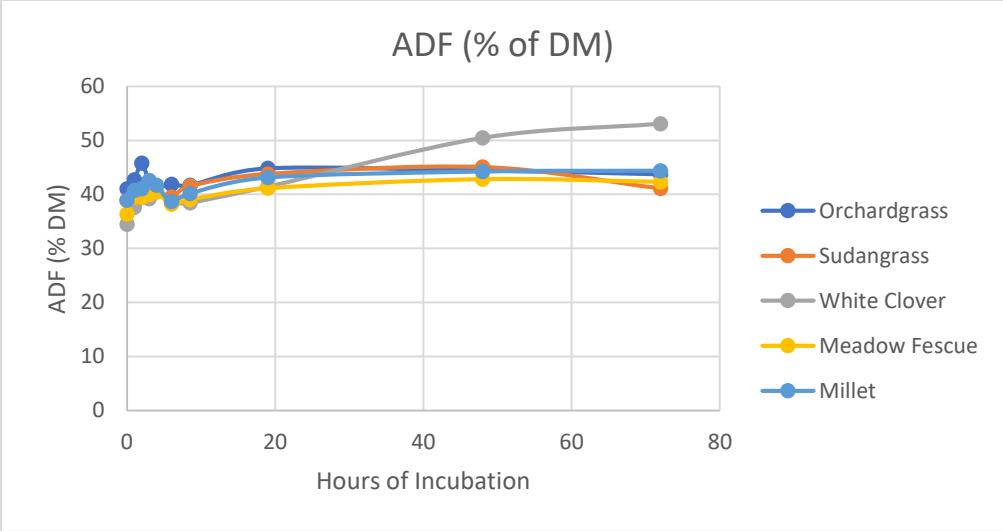
Observations to note from the following graphs are that slightly higher dry matter disappearance was observed for both the sudangrass and the orchardgrass compared to the other forages, indicating a higher nutrient availability in the rumen.

In terms of nutrient content, white clover had the highest % CP and % WSC content in the initial (time 0) samples, and the lowest aNDF content (as a % of DM).

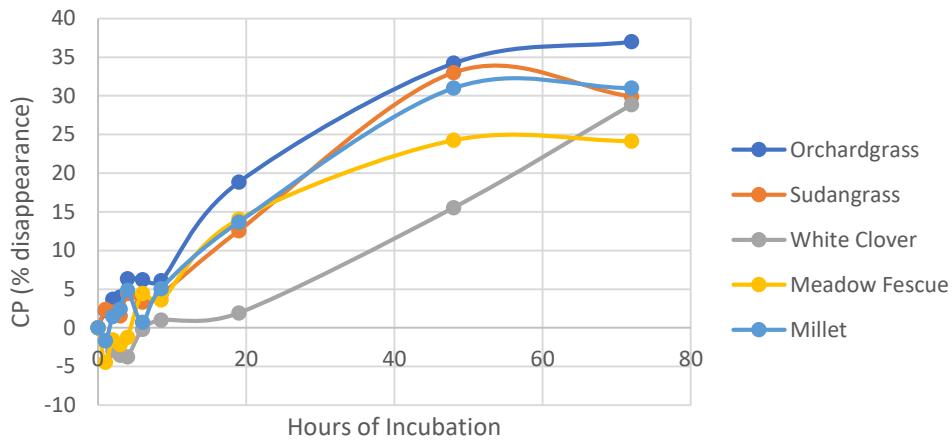
More divergence in the ADF, aNDF, CP and WSC disappearance (as a % of initial) was apparent. Both ADF and aNDF demonstrate sample enrichment with an increase in hours of incubation, indicating that they are the more slowly degraded fraction and represent a higher proportion of the remaining dry matter as incubation length increases, as is expected. Orchardgrass, sudangrass, meadow fescue and millet performed more similarly to each other, while white clover had a much smaller aNDF and ADF disappearance compared to these other 4 forages. Orchardgrass was again the forage with some of the higher disappearance rates for these cellulose-containing components.

For both CP and WSC, meadow fescue had the lower % disappearance as a % of initial, and had lower disappearance compared to the white clover while the other forages (orchardgrass, sudangrass, and millet) had approximately the same extent of disappearance or slightly higher disappearance compared to the white clover.





CP disappearance (% of initial)



aNDF disappearance (% of initial)

