

Report on SIDE Project: Pasture Analysis to Investigate the Spring Milk Production Dip

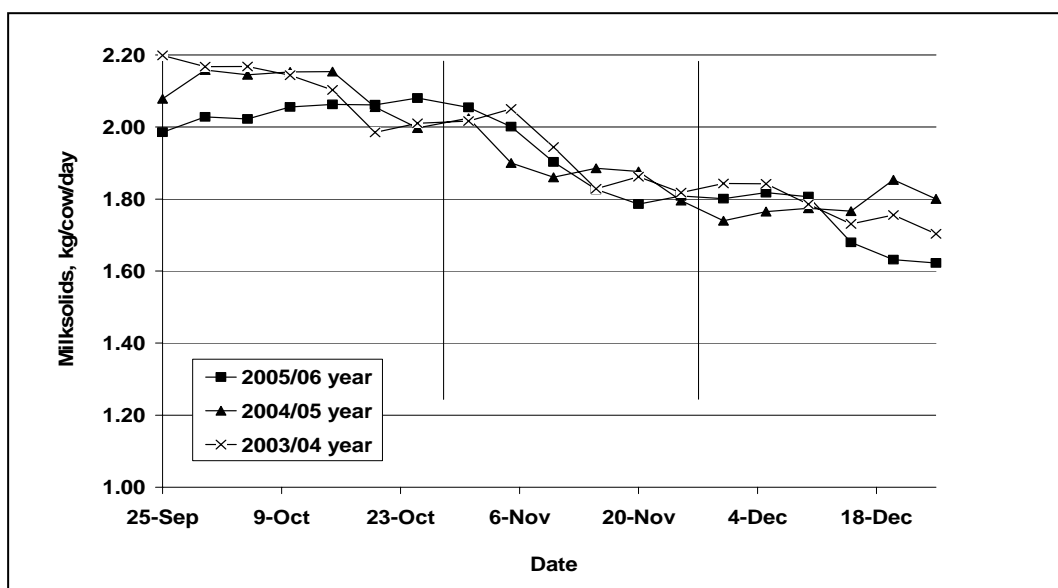
Summary

- The objective of this project was a more detailed investigation of the rapid decline in milksolids production experienced at LUDF during late October and November in the 2003/04, 2004/05 and 2005/06 seasons.
- Analysis of a sample of production curves from dairy farms across New Zealand failed to identify consistent patterns of 'Spring milk dip'. While some farms in each region showed a dip in milk production during the period of interest it was not as large as that observed on the LUDF and was not repeatable across years.
- 2006 was an atypical year at LUDF, with a wet Winter and cold Spring resulting in high sugar levels, high DM% and low protein content in the early pasture. There was no evidence of differences in pasture composition between cultivars growing at LUDF (Bealey or Tabu).
- A 'Spring Dip' in MS production was not observed at LUDF during late October/November 2006.
- This allowed us to make comparisons of pasture covers and composition with previous 'Spring Dips', notably the large dip in 2005.
- The LUDF 'Spring Dip' appears to result from lower pasture covers in the period soon after peak milk yield and is not related to pasture composition.
- It may be more of a feature of herds that adopt extremely low grazing residuals and so are more likely to run into low covers at this time, though national database information did not allow us to verify this assertion (see above). Further studies of this aspect are justified.
- The project reinforces the importance of maintaining pasture monitoring during this busy (mating) period.
- Further work should focus on ensuring a reliable indication of pasture covers during this critical phase of lactation.

Background and Objectives

The objective of this project was a more detailed investigation of the rapid decline in milksolids production experienced at LUDF during late October and November in the 2003/04, 2004/05 and 2005/06 seasons. The pronounced decline (10-15%) in MS production during this period is shown in Figure 1.

Figure 1 Daily milksolids production (kg/cow/day) from LUDF cows during Spring in the 2003, 2004 and 2005 milking seasons.



Maintaining higher yields at this early stage of lactation could have carryover benefits persisting throughout the remainder of the lactation. Production implications across intensive South Island dairying are major if the causes for the milk dip can be identified and managed.

The loss of MS production was particularly marked during late October and November of 2005 and this prompted a discussion of possible causes. Suggestions included effects of pasture species, pasture supply and pasture quality, as well as a range of animal factors such as stage of lactation and pregnancy effects.

Previous pasture analysis from LUDF had adopted a twice-monthly sampling protocol, which is not sufficient to investigate effects over this period. Problems of infrequent pasture sampling were exacerbated with the difficulty of separating effects due to differences in the management and composition of cultivars with different heading dates (Bealey vs. Tabu).

Experimental work

The primary objectives of this project were

1. Analysis of milk production curves from individual dairy farms throughout New Zealand to determine how widespread the problem might be; and
2. a more detailed investigation of the chemical composition of pasture over this critical period.

Factory supply milk curves from 10 farms in each of the following regions – Northland, Waikato, Taranaki, Manawatu, Nelson/Marlborough, Canterbury, North Otago and Southland – for the 2004-05 and 2005-06 seasons were supplied by Fonterra.

The investigation of changes in chemical composition of pasture were achieved in two ways:

- (i) Continued sampling of pasture being offered to cows, according to the procedures adopted previously- but with an increased sampling frequency (thrice-weekly on Mondays, Wednesdays and Fridays). Samples were collected using previously-established protocols- that is cutting with shears at 1300 hrs and leaving a 7 cm residual.
- (ii) Sampling from a cutting experiment in which areas of Bealey and Tabu were managed on a 21-day cutting cycle over the same period. One area per cultivar was harvested to leave a 7 cm residual each week.

All samples were analysed through the NIR-based feed testing lab at Lincoln University.

Results

Commercial farm production curves.

Analysis of the production curves failed to identify any trends either within regions, across regions or between years within a farm in the milk supply curve. While some farms in each region did show a dip in milk production during the period of interest it was not as large as that observed on the LUDF and was not repeatable across years.

Pasture Composition Analysis

The 2006/07 season has been far from typical at Lincoln, with high winter rainfall and a cold Spring. This was identified in the composition of pasture samples in early Spring (September and October), which had a higher content of water-soluble carbohydrates and lower protein content than in 2005 (Figures 2 and 3).

Figure 2 Water-soluble carbohydrate content of Spring pasture in 2005 and 2006.

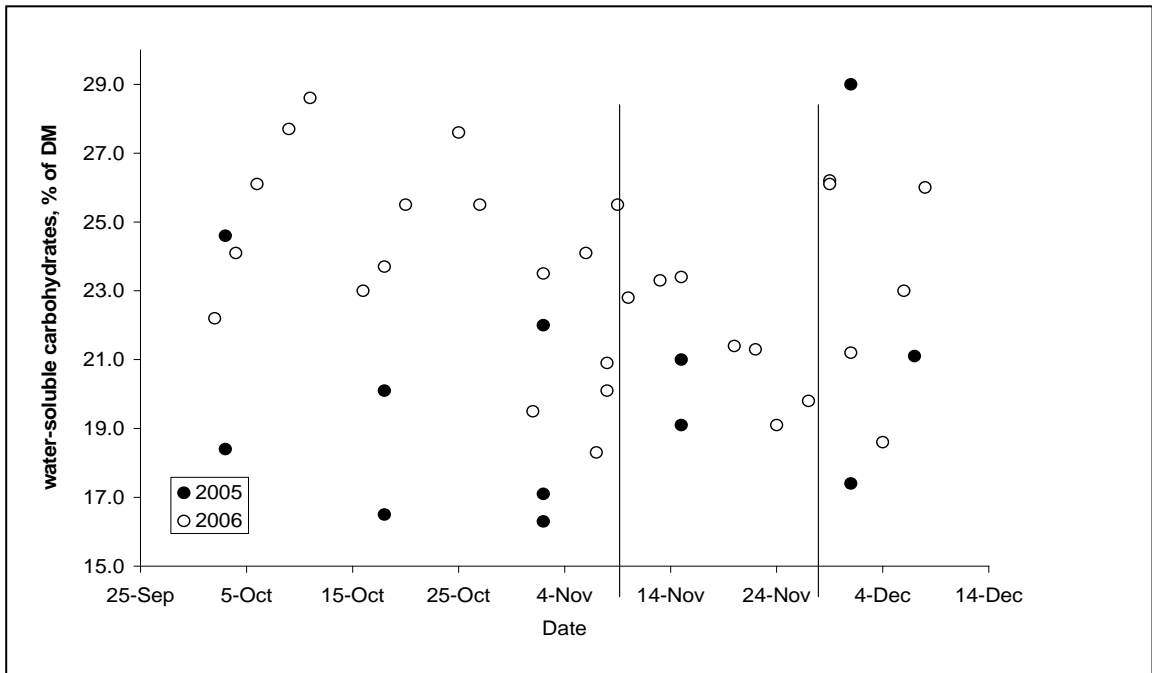
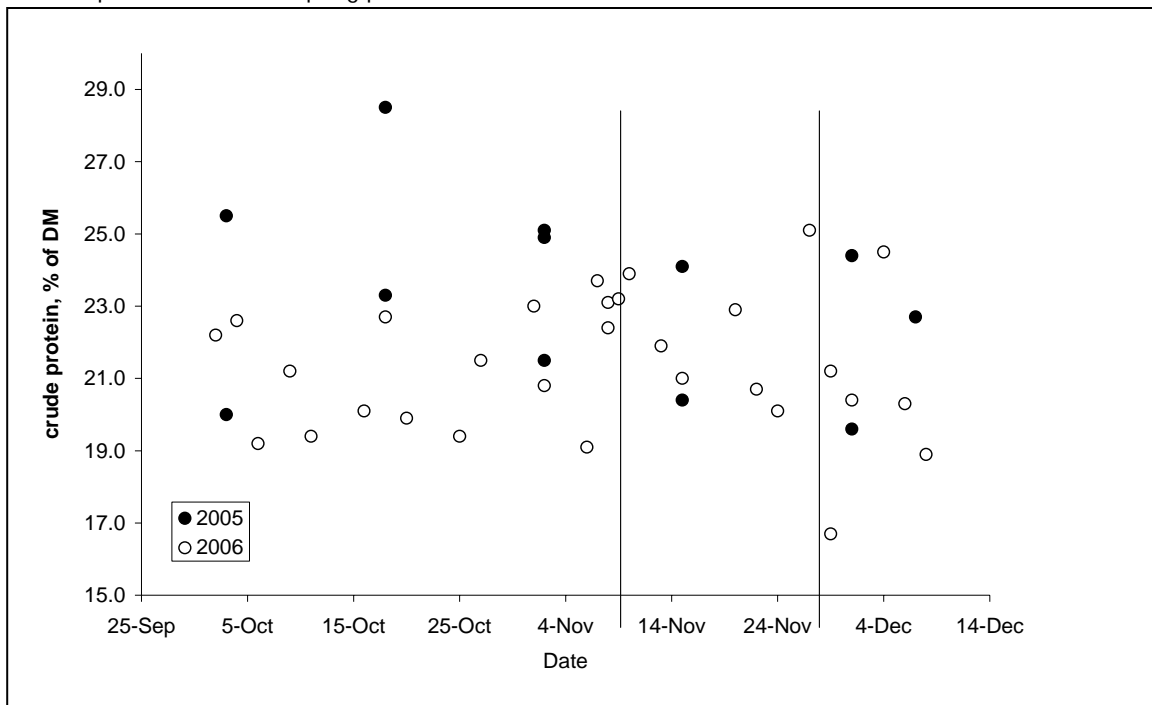


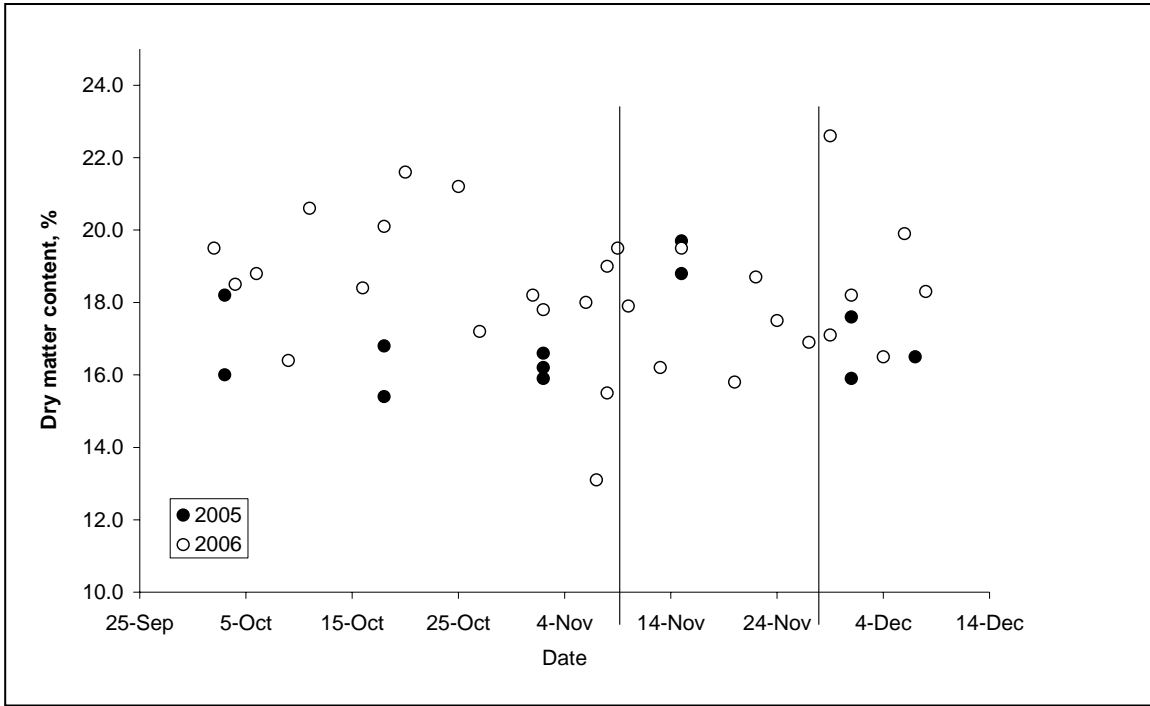
Figure 3 Crude protein content of Spring pasture in 2005 and 2006.



These compositional differences would make the pasture more acidogenic- with the cows more susceptible to production losses owing to sub-acute rumen acidosis. With all of the other confounding effects in a system study, it is not possible to comment further on whether or not this is an issue.

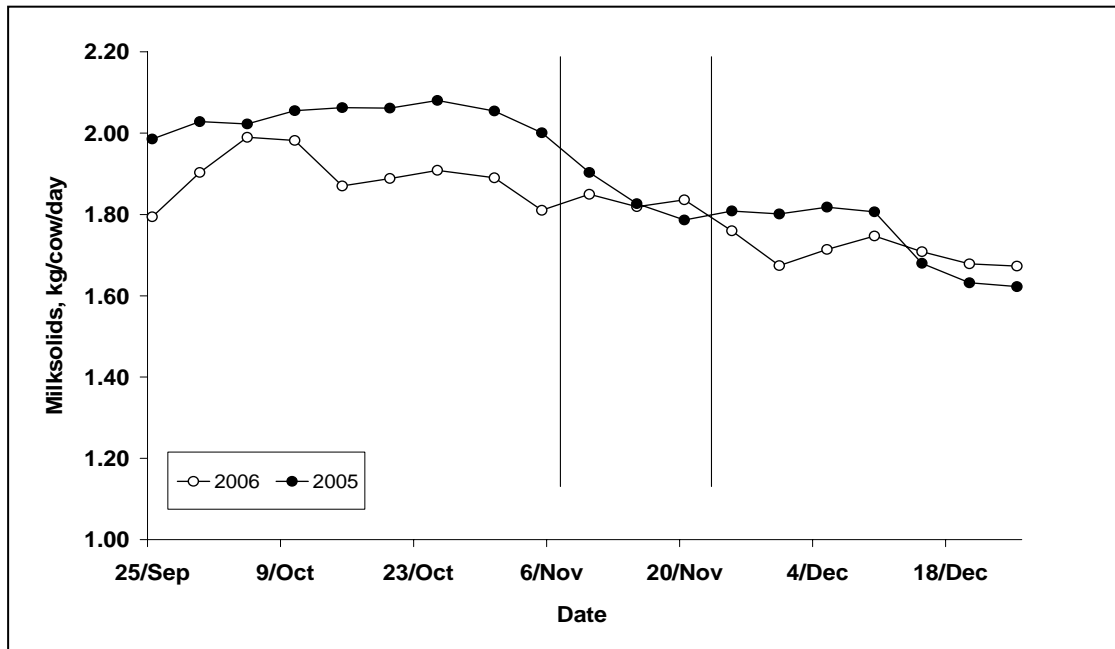
Early-Spring pasture was also of higher DM content in the 2006 season (Figure 4) and there was no evidence that pasture DM content was involved in the 2005 Spring Dip.

Figure 4 Dry matter content (%) of Spring pasture in 2005 and 2006.



These differences had disappeared by the start of the period of interest for 'Spring Dip'. In relation to the main objective of the study, we did not observe a 'Spring Dip' during October/November 2006 (Figure 5). Although MS production per cow has been lower overall during 2006/07, the rate of decline in MS production has been more gradual over the season.

Figure 5 Daily milksolids production (kg/cow/day) from LUDF cows during Spring in the 2005 and 2006 milking seasons.



The fact that we had a 'Spring Dip' on 2005 (and previous years), but not in 2006, does allow us to make some comparisons between years to identify possible causes. It eliminates some of the possible 'animal' causes of effects- notably possible effects of pregnancy stage (which was similar between years), though it does not rule out others (such as body reserves, peak milk production).

Although the amount of compositional data is much more complete for 2006 than for 2005, we can conclude that the chemical composition of pasture was generally similar between years (Figures 6 and 7). Chemical composition appears not to explain the 'Spring Dip' phenomenon at LUDF.

Figure 6 Pasture digestibility (%) during Spring in the 2005 and 2006 milking seasons.

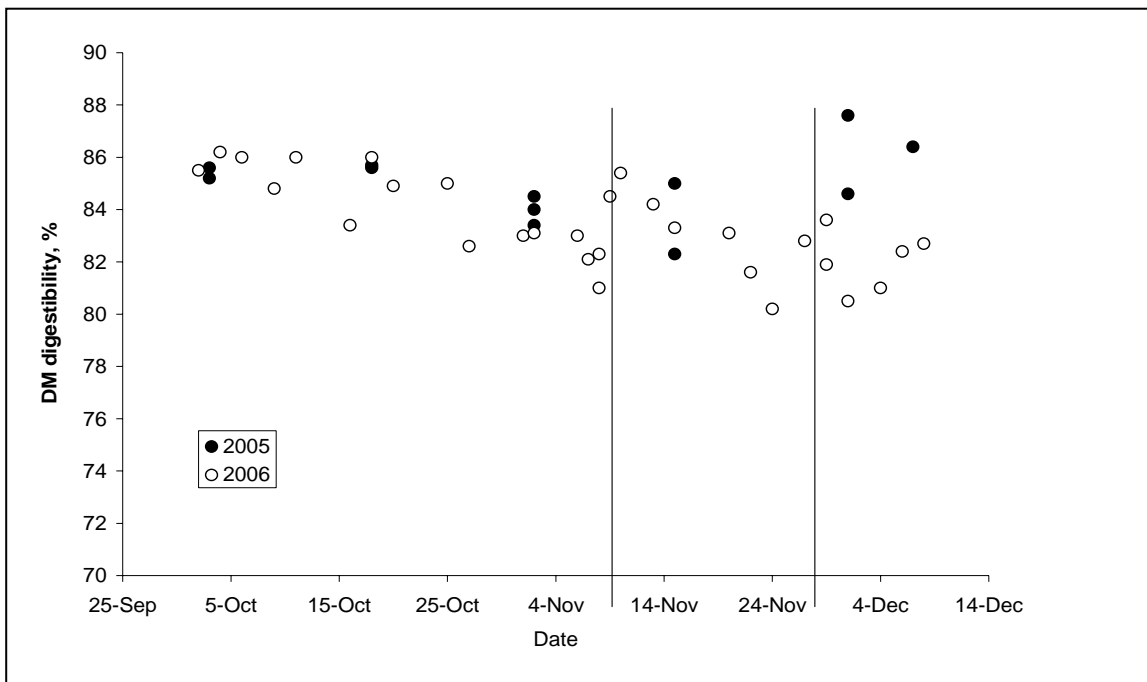
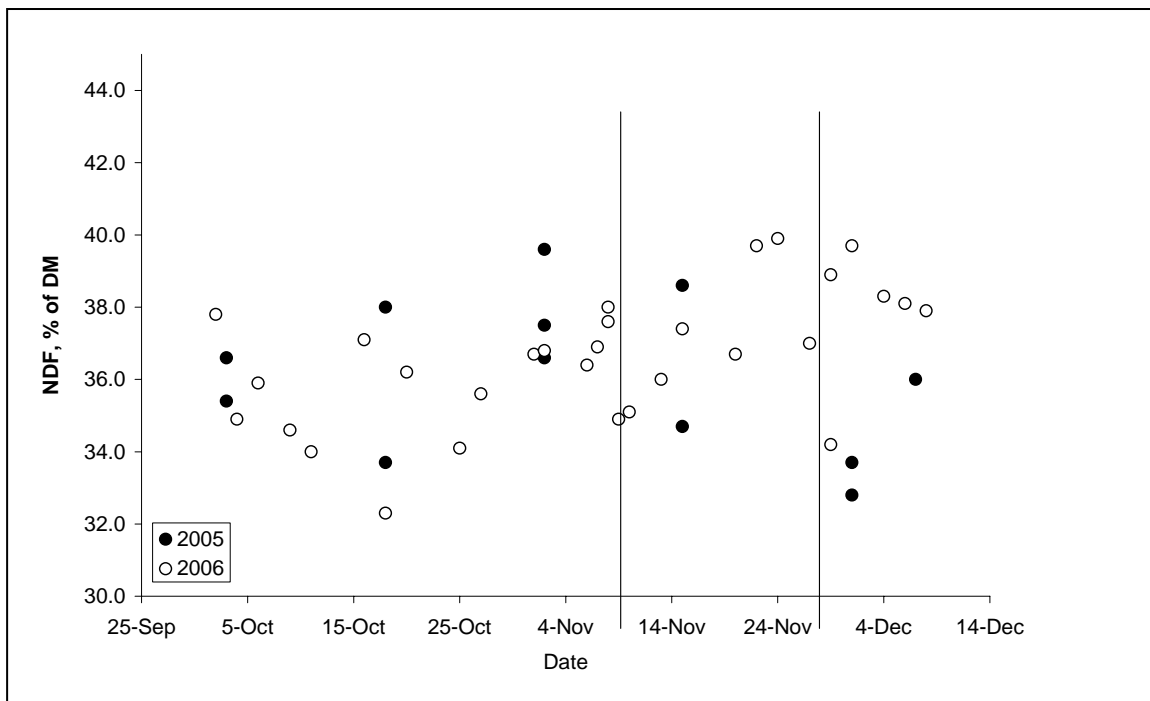


Figure 7 Pasture NDF content during Spring in the 2005 and 2006 grazing seasons.



More detailed investigation of pasture composition was done using a three-week cutting cycle. Exclosure cages (1.5m x 1.5m) were used to allow pastures on two LUDF cultivars (Tabu and Bealey) that were each sampled 21d after mowing to 1500kg DM/ ha, beginning 16th October 2006. The pasture within each cage was completely removed to the level of 1500 kg DM/ ha at each sampling, oven dried and a standard commercial analysis obtained via NIRS at Lincoln University Feed Analysis Unit.

There was a satisfactory seasonal continuity of measured parameters across the period measured, and no evidence of any unusual shift in ME, CP or NDF in the November period under investigation. It should be noted that the season under investigation was cooler than previous seasons and pasture development, growth and quality may not be typical. The graphs of these parameters are included below (Figures 8 to 10).

Figure 8 ME content (MJ/kg DM) for Tabu and Bealey pastures in Spring 2006

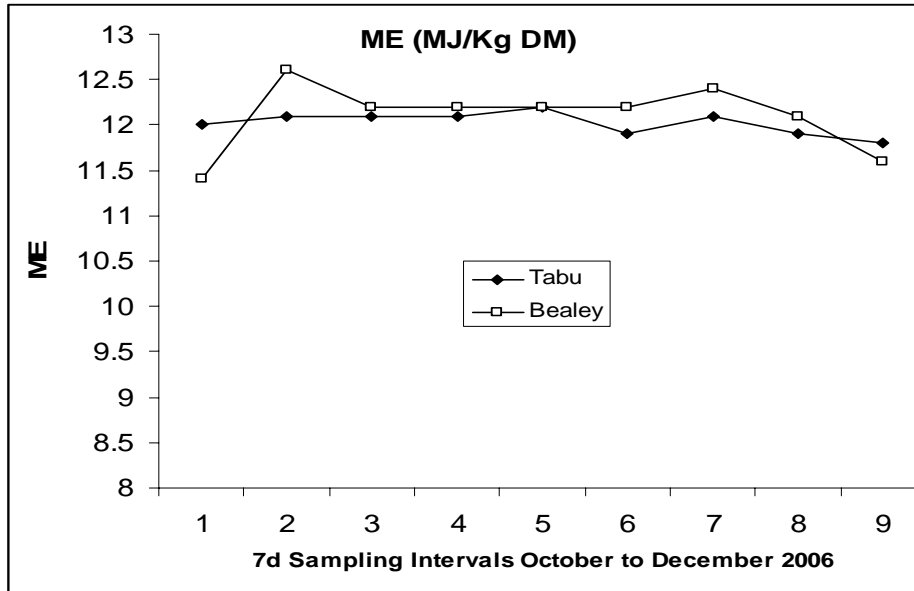


Figure 9 NDF content (% of DM) for Tabu and Bealey pastures in Spring 2006

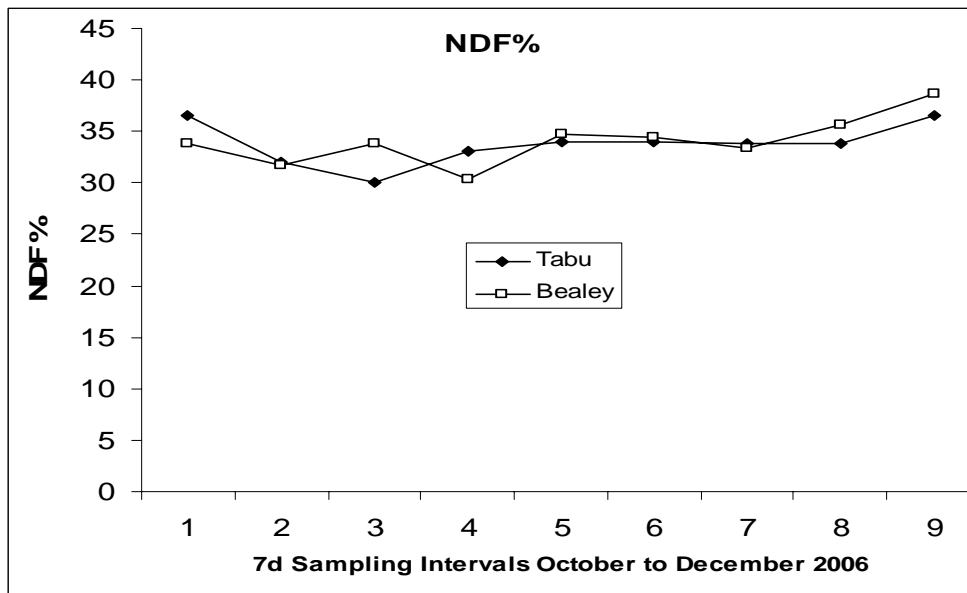
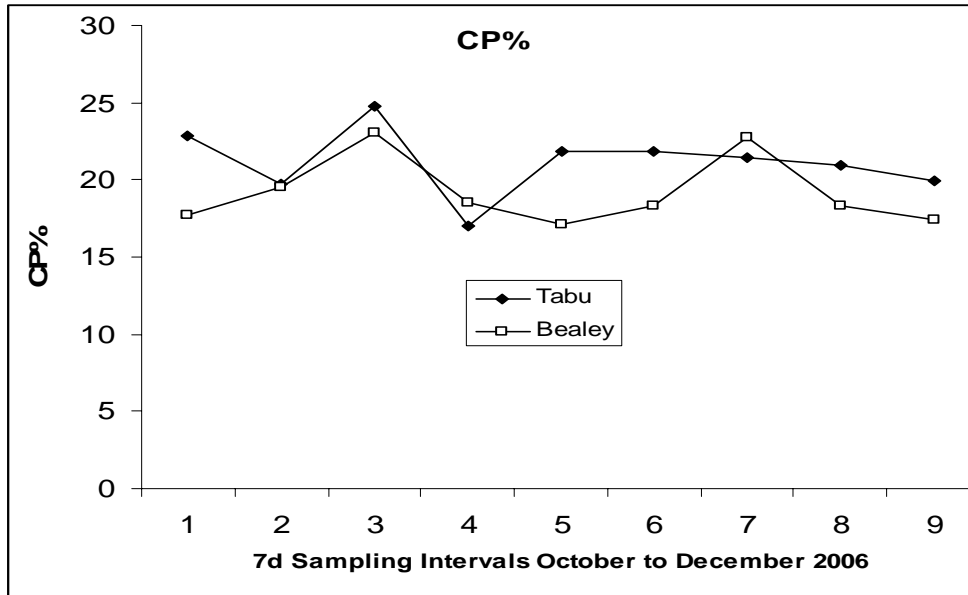


Figure 10 Crude protein content (% of DM) for Tabu and Bealey pastures in Spring 2006



Further investigation of grazing records reveals that the 'Spring Dip' problem may be related to lower pre-grazing covers during late October/November. This effect is evident in both pre-grazing and average covers over this period (Figures 11 and 12).

Figure 11 Pre-grazing pasture covers (kg DM/ha) at LUDF during Spring 2005 and 2006.

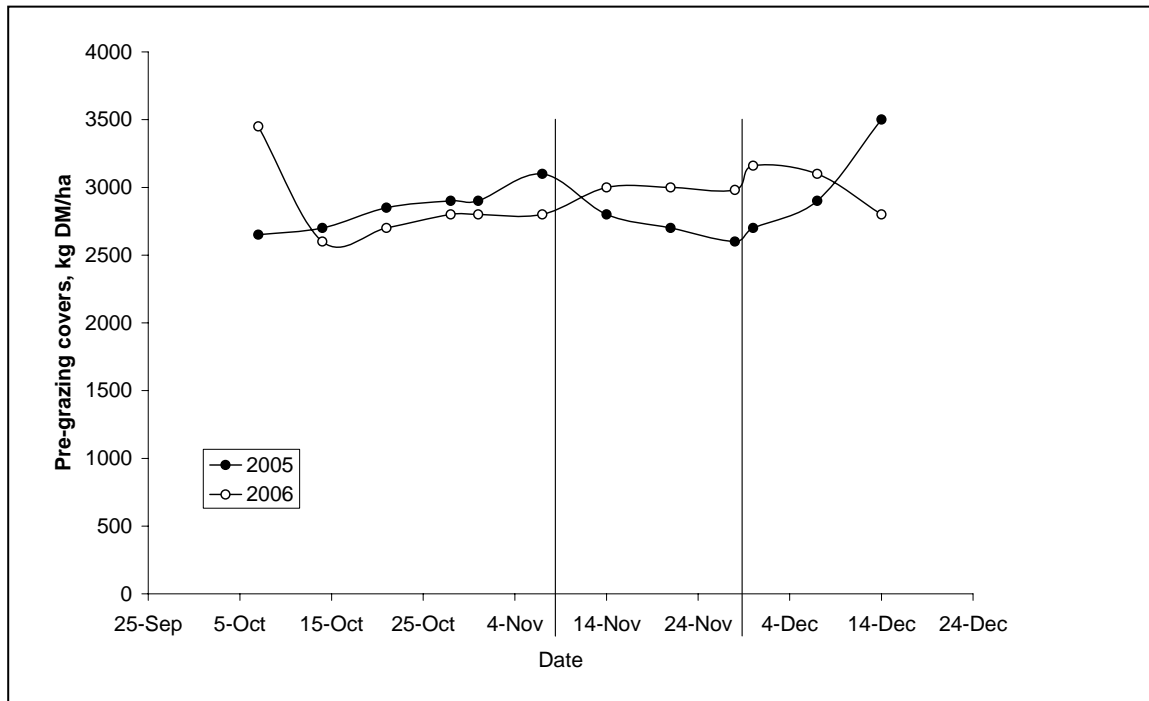
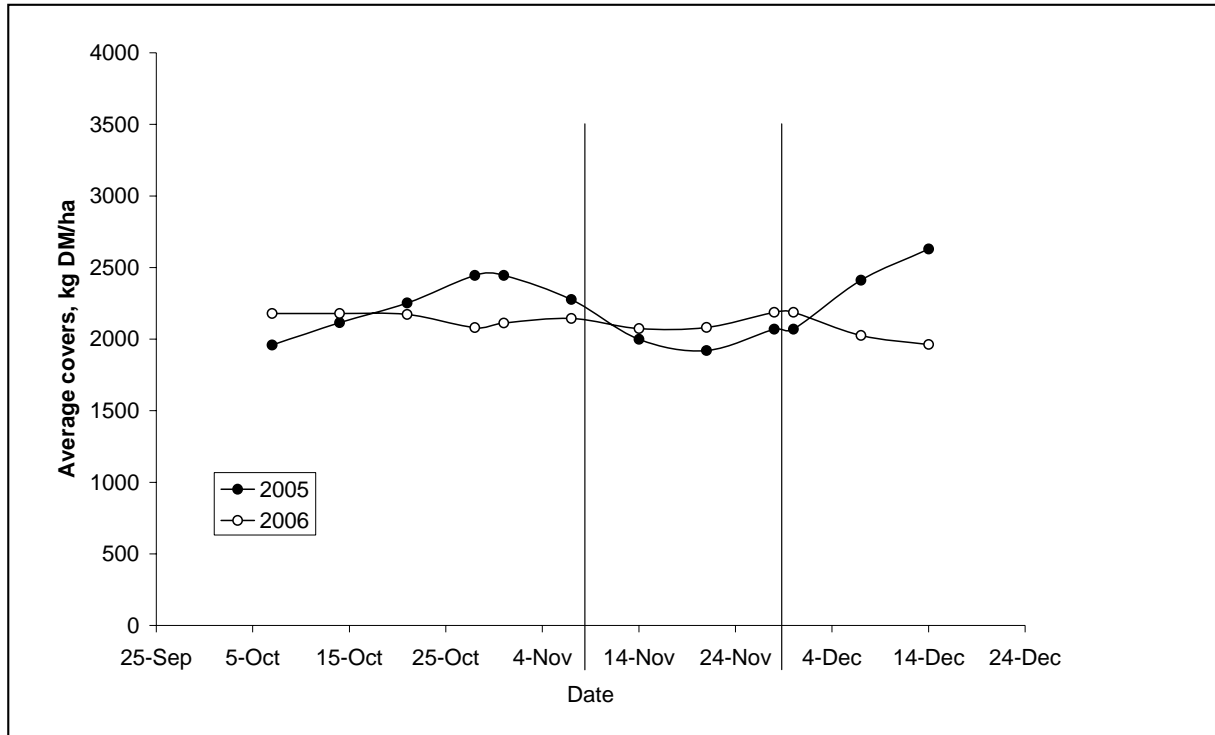


Figure 12. Average pasture covers (kg DM/ha) at LUDF during Spring 2005 and 2006.



The LUDF management team use a single (winter) calibration for estimating pasture covers from plate meter readings, justifying this on the basis that the farm has consistently high-quality leafy pasture. The fact that the 2005 'Spring Dip' coincides with a reduction in pasture cover using this calibration lends support to the reliability of this approach. However, it is also clear that the LUDF herd is delicately poised in terms of feed supply at this time and further work on verifying feed supply and intake at this time would be justified.