West Coast Monitor Farm Project

D E Dalley DairyNZ, Lincoln

On behalf of the West Coast Focus Farm Advisory Board

Summary

The West Coast dairy industry operates in a unique environment with its own set of unique challenges. The area has relatively high rainfall and soils which are often poorly drained or may have an impermeable iron pan. The development of humping and hollowing and flipping practices has improved drainage on some existing farms and expanded the area of land suitable for dairy farming. Despite being an important region for milk production, information on pasture growth and quality under West Coast dairy farming systems is scarce. The existing Kotuku Focus Farm has provided information specific to that area but farmers require more area specific information which accounts for the different soil types and rainfall in the West Coast districts. This paper describes a project designed to generate information on pasture growth and quality on dairy farms in Westport, Ikamatua, Kotuku and Kowhitirangi. The soil types represented on the selected monitor farms are typical for those regions.

Key findings of the project to date:

- Average monthly pasture growth rates varied between the West Coast monitor farms. For the majority of the season the highest growth rates were recorded in Ikamatua and the lowest in Kotuku.
- Soil temperature data can explain some of the trends in pasture growth rate, particularly in winter.
- There was a sharp drop in average pasture quality for the West Coast region between January and February but metabolisable energy content of pasture was above 12 MJME/kgDM for the majority of the recording period.
- Average dry matter content of pasture in the summer months of 17% was higher than the DM compared to 14-16% DM measured in the spring and autumn months.

The local and up to date pasture management data which this project provides allows dairy farmers to better plan their feed allocation, surplus management, pasture renovation, and farm system set-up. In the long-term, the real value in this project will be its ability to generate opportunities for the extension of pasture management principles to West Coast dairy farmers.

Introduction

The West Coast dairy industry operates in a unique environment with its own set of unique challenges. The area has relatively high rainfall and soils which are often poorly drained or may have an impermeable iron pan. The development of humping and hollowing and flipping practices has improved drainage on some existing farms and expanded the area of land suitable for dairy farming. Despite being an important region for milk production there is a scarcity of basic information on pasture growth and quality for dairy farms in the West Coast region. Such information is critical for annual feed budgeting, farm system setup i.e. calving date, stocking rate and for weekly farm management decisions. In July 2007 a 3-year project, funded by Westland Milk Products, Development West Coast, DairyNZ Inc, SIDE and Ravensdown Ltd, commenced to gather data in a controlled and systematic way. Reliable growth rate information for the region and data on pasture quality changes will give farmers more confidence in making feeding decisions and help them to evaluate the applicability of research from other regions for their situation.

The project

Region selection

Pasture growth and quality data were collected from differing regions and soil types. The following regions were chosen for the monitor farms; Westport, Ikamatua, Kotuku and Kowhitirangi.

Farm selection

For each region, severa; potential monitor farms were identified and the owners contacted. Four monitor farms were selected according to size, location, stocking rate, farming system, record keeping, soil type and willingness of the farmer to use the information generated. Details of the selected farms are provided below and their locations shown in Figure 1. All farms were GPS mapped to determine paddock sizes.

Westport

85 ha effective, peak milk 245 cows, 2.8 Jerseys/ha, 225 kgN/ha/annum, 1.7 tonnes/ha imported feed (System 2), 1039 kgMS/ha.

Ikamatua

250 ha effective, peak milk 680 cows, 2.7 Holstein Friesians/ha, 280 kgN/ha/annum, 2.7 tonnes/ha imported feed (System 4), 1476 kgMS/ha.

Kotuku

Landcorp Kotuku, 410 ha effective, peak milk 1080 cows, 2.6 crossbreds/ha, 300 kgN/ha/annum, 0.8 tonnes/ha imported feed (System 3), 838 kgMS/ha.

Kowhitirangi

95 ha effective, peak milk 230 cows, 2.4 Jerseys/ha, 150 kgN/ha/annum, 0.2 tonnes/ha imported feed (System 2), 832 kgMS/ha.

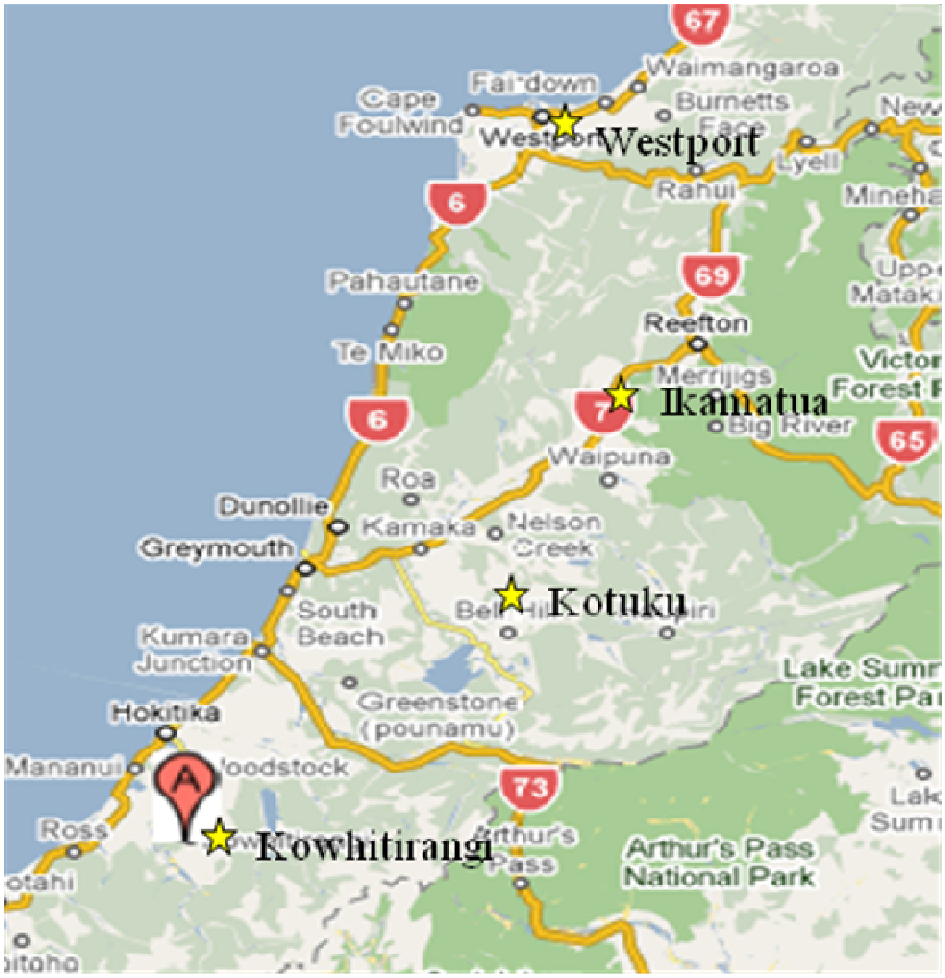

Figure 1**:** Farm location map for West Coast monitor farms

Monitoring

All farms commenced monitoring in late August 2008. On Monday/Tuesday/Wednesday of each week the contractor employed for the project walked a pre-defined route around each farm recording the average height of pasture in each paddock with the rising plate meter. Monthly, two pasture samples were collected to grazing height from the next 2 paddocks to be grazed. These samples were analysed for nutrient composition (NIRS ARL Labs, Ravensdown). The farms recorded the number of cows being milked, milk production, paddocks grazed, effluent or fertilizer applied, paddocks topped or conserved and any supplements that were offered each day. Soil temperature (10 cm) was recorded at 10 am on the day of the farm walk. At the end of each season the annual dry matter production was calculated for each paddock on the farms.

Reporting

The data were entered into Pasture Coach, growth rates calculated and a target demand line inserted on the wedge. The wedge was sent to the farmer within 24 hours along with any pasture quality information. A summary of information from the four monitor farms was uploaded onto the SIDDC website and the Westland Milk Products Portal each week (http://www.siddc.org.nz/SMF.html). An abbreviated Farmwatch was emailed weekly to Westland Milk Products suppliers.

Results

Pasture growth rates

Figure 2 shows the monthly average pasture growth rates (kgDM/ha/day) for West Coast monitor farms over the 2008/2009 season. The trends in pasture growth were similar across all farms but actual pasture growth rates varied substantially between farms. Ikamatua achieved the highest average monthly growth rate of 74 kgDM/ha/day in December and Kowhitirangi the lowest peak growth rate of 50 kgDM/ha/day in November. Pasture growth rates dropped on all farms over the summer months but in March growth rates in Westport and Ikamatua were close to those achieved at peak. Growth rates in June and July were below 10 kgDM/ha/day on all farms except Westport. Kotuku had the lowest growth rates for much of the season, and Ikamatua, the highest. The differences in growth rates between these two farms were most pronounced in Spring and Autumn with Ikamatua growing 40 kgDM/ha/day more than Kotuku in the month of March.

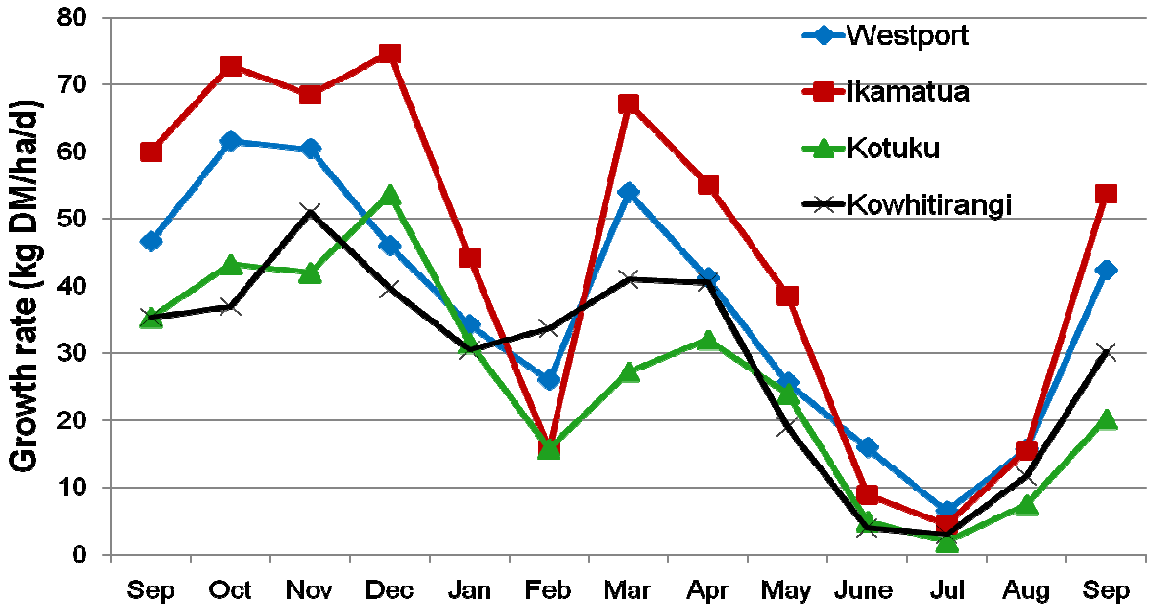

Figure 2: Monthly average pasture growth rates for West Coast monitor farms (08/09 season).

10 cm Soil temperature

Ten centimetre soil temperatures were recorded for all dairy farms from September 2008 (Figure 3). The trend in monthly average soil temperatures for the West Coast monitor farms was very similar across all farms with a tendency to increase steadily from July through to February and decline again through to June. Highest monthly average soil temperature for the season was reached in January in Kowhitirangi and Kotuku and February in Westport and Ikamatua farms. Ikamatuta recorded the highest monthly average soil temperature of 20.5ºC. All farms had average soil temperatures below 8ºC for June and July, with the exception of Kowhitirangi. This period of low soil temperatures coincided with the lowest recorded growth rates on the farms. Although soil temperatures were similar between farms throughout the season, Kowhitirangi tended to have the lowest soil temperatures when averaged over the season.

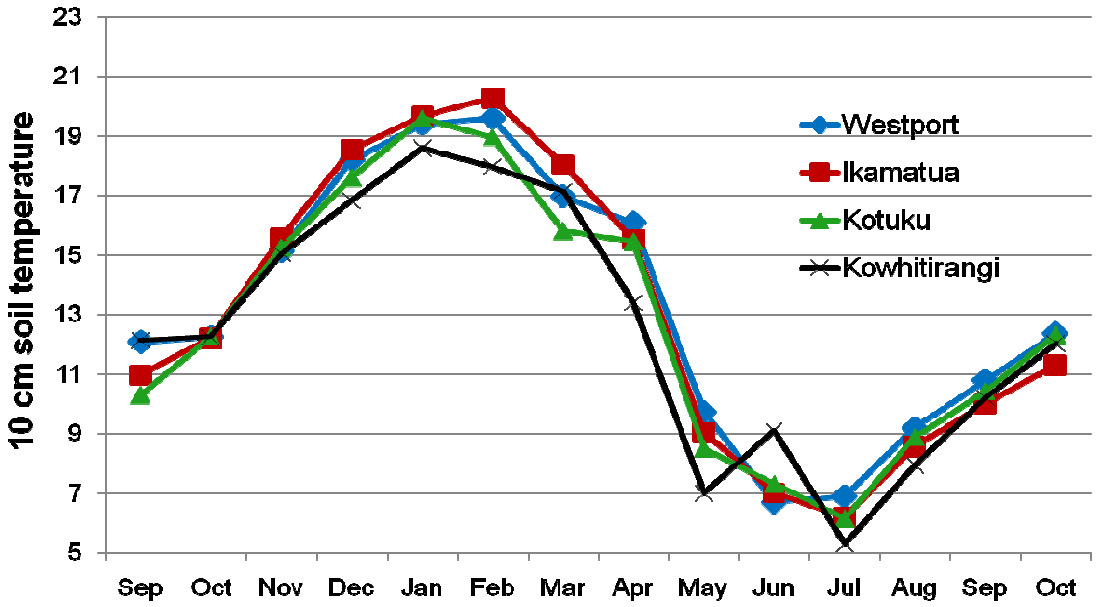

Figure 3: Average 10cm Soil temperatures for Westland monitor farms 08/09 season.

Metabolisable energy & dry matter content

Figure 4 shows average metabolisable energy (ME) and dry matter (DM) content of pastures over all the West Coast monitor farms from September 2008 to June 2009. Average metabolisable energy values for the West Coast were at 12 MJME/kgDM or above for much of the season with the highest value of approximately 12.5 MJME/kgDM recorded for the months of September, May and June. Pasture quality declined very slowly over the spring/early summer period from 12.5 MJME/kgDM in September to approximately 11.8 MJME/kgDM in January. Between January and February there was a sharp drop in average ME of nearly 1 MJME/kgDM over the one month period. After February pasture quality improved rapidly and remained at 12 MJME/kgDM or above for the duration of autumn. Figure 5 shows that the average ME of pasture over the whole season was very similar between farms.

Average DM content of pasture over all the West Coast monitor farms was variable throughout the season (Figure 4). The lowest average DM percentage was 14 % DM recorded in November and highest was 17.3 % recorded in December. Average dry matter content of pasture in the summer months ranged from 17 -17.3% DM compared to 14-16% DM in the spring and autumn months. When looking at individual monitor farms, Ikamatua had the highest average DM% over the season and Westport the lowest (Figure 5). Some of this difference could have been related to the time of the day of sampling with the Ikamatua farm being the only one sampled in the afternoon.

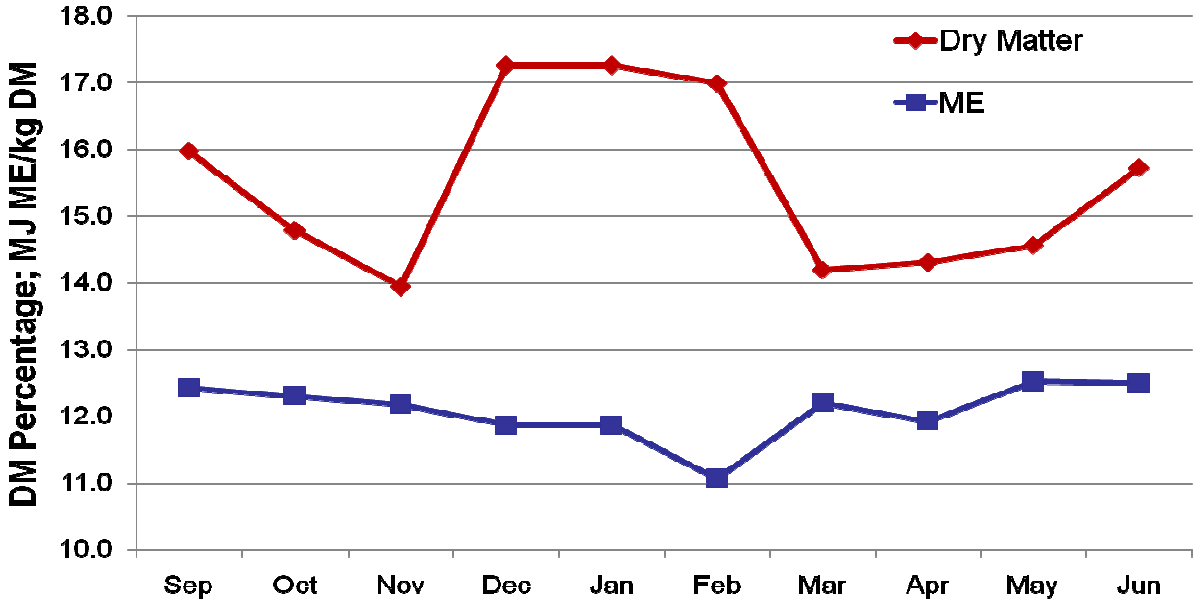

Figure 4: Average pasture metabolisable energy content and dry matter percentage for the West Coast region for the 08/09 season.

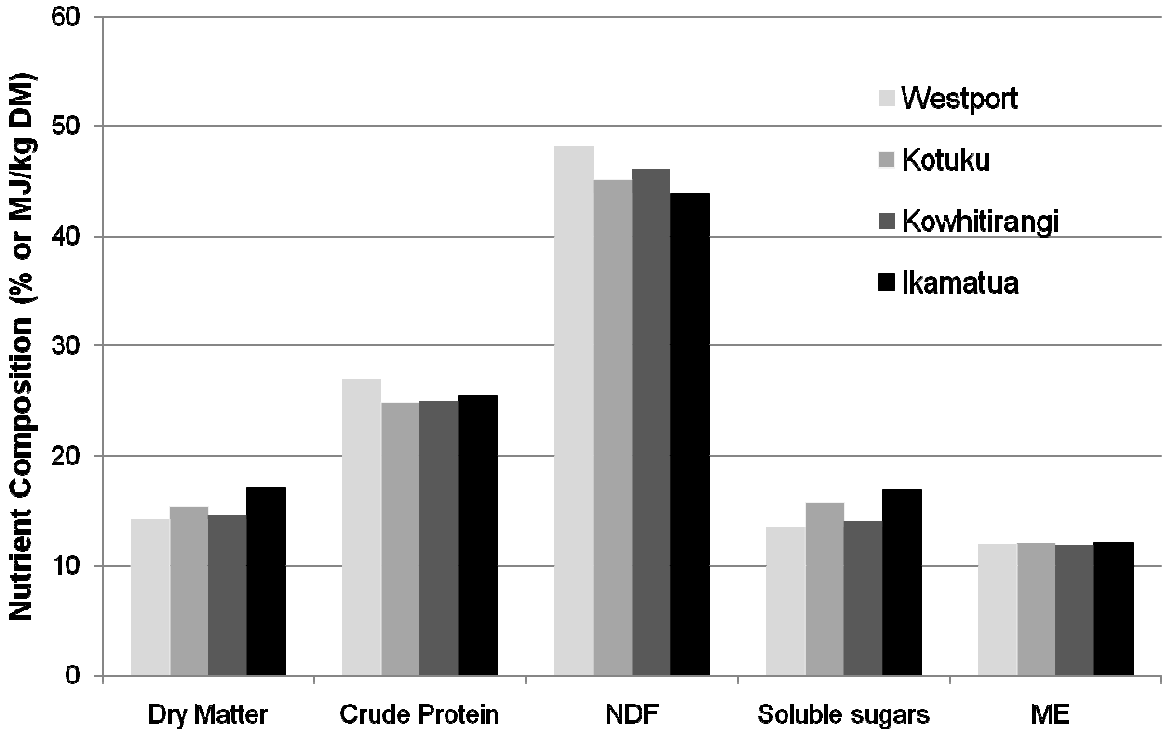

Figure 5: Average values for nutrient composition of pasture for the West Coast monitor farms 08/09 season.

Crude protein content

Figure 6 shows average crude protein (CP) and fibre content of pastures over all the West Coast monitor farms from September 2008 to June 2009. The trend shows a CP % of 26 in September declining gradually to 22.5 % CP in December and January. Peak pasture CP levels were recorded in autumn with the highest value of 29 % CP recorded in March. Figure 5 shows average CP values over the season for the individual monitor farms. Westport recorded the highest average CP % for the season (27%) and Kotuku the lowest (24%).

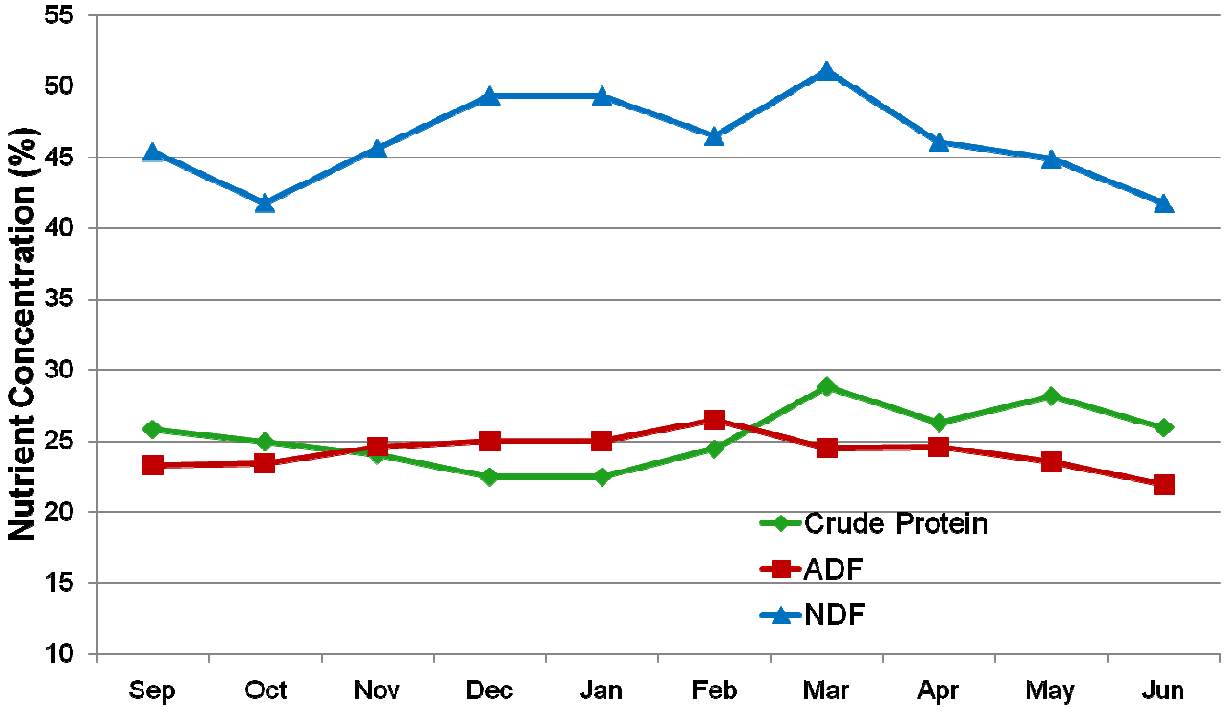

Figure 6: Average crude protein and fibre content of pasture over all the West Coast monitor farms for the 08/09 season.

Discussion

The data collected in the first year of the project has provided valuable information on pasture growth characteristics for dairy farm systems in the West Coast region. Although the trend in pasture growth over the season was similar for the farms, the actual pasture growth rates varied greatly between farms. For example, in December 2008 there was a difference in growth rate between the highest and lowest producing dairy farms of 34 kgDM/ha/day, and in March 2009 there was a difference of 40 kgDM/ha/day (Figure 2). This information highlights the impact of local climate, soils, and individual farm management practices on pasture growth rates. Soil type, soil temperature, soil moisture and solar radiation are key environmental factors affecting pasture growth, with rotation length, residual height, and

fertiliser use (particularly nitrogen) being under managerial control. Soil temperature data partially explains some of the trends in pasture growth on these farms, particularly during winter and early spring when low soil temperatures strongly inhibit pasture growth in all districts. However, the different management systems employed on these farms are also likely to be having a major influence on pasture growth rates. As data collection continues on these farms the individual effects of climatic conditions and management may become more evident.

The large variation in growth rates recorded on the monitor farms confirms the need for multiple monitor farms which are representative of the range of farming conditions and microclimates in the West Coast region. In recent years, West Coast dairy farmers not monitoring their own pasture growth rates, have had to rely on pasture growth rates generated from Landcorp's Kotuku farm to support their decision making. The monitoring carried out for this project has highlighted the inadequacy of this information for most of these farmers as growth rates on Kotuku are not representative of the wider West Coast region.

The trend in average monthly pasture quality over the monitor farms also highlighted some important points for dairy farmers. Pasture quality is significantly influenced by pasture management and grazing practices. This is particularly the case in spring when higher growth rates can lead to increasing grazing residuals and a reduction in pasture quality going into summer. This effect was evident with the data showing a sharp drop in average pasture quality between January and February from 11.8 to 11.1 MJME/kgDM. This period also coincides with drier conditions in most regions. However, for the majority of the period from September 2008 to June 2009 average pasture quality on the West Coast farms was maintained at 12 MJME/kgDM or higher and the drop in quality over the summer period was of short duration. This demonstrates the ability of West Coast farms to produce high quality pasture for feeding dairy cows.

Crude protein concentrations throughout the season exceeded dairy cow requirements. Interestingly there was no correlation between annual N fertiliser used and N content of the pasture samples collected.

In the long term this monitor farm project has the potential to provide essential information on pasture production characteristics of West Coast dairy farming districts. This information is important in a region where the dairy industry is continuing to expand and farmers require sound information on which to make farm policy decisions and farm purchases. In the short term the monitor farms generate growth rate figures which provide some basis for decision making on farms that are yet to rise to the challenge of weekly farm walks. Weekly farm walk data can be used to plan nitrogen fertiliser applications, determine the paddock grazing order for the week, assist with decisions around conservation and

supplementary feeding, target paddocks for renovation, or to alter farm policy such as stocking rate and calving date.

The real value in this project is its ability to generate opportunities for the extension of pasture management principles to West Coast dairy farmers. The project has already highlighted the variation in pasture growth and quality between farms which is a direct message to farmers that they need to be monitoring their own pasture if they want to manage it efficiently. As West Coast dairy farmers become more aware of the monitor farms and the information they are generating there is enormous potential to create some of the tension required to create change on farms with regard to pasture monitoring and management.

Acknowledgements

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