

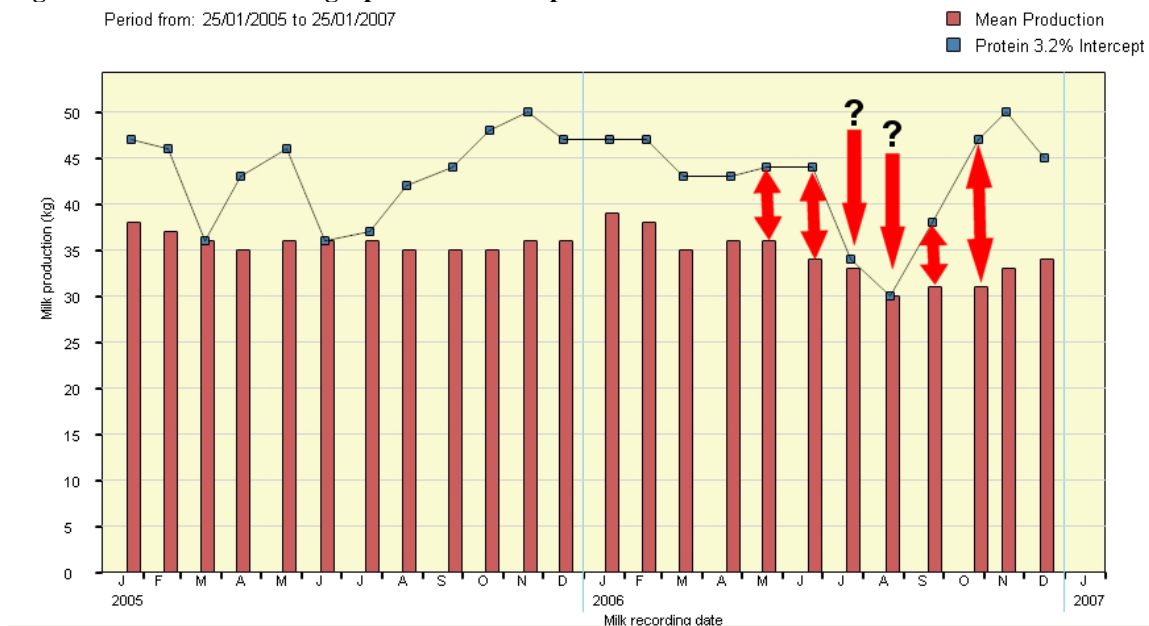
Monitoring herd nutrition with Herd Companion

Fertility Monitor in Herd Companion uses milk yield and constituents to monitor the nutritional status of the herd.

- **Milk protein:** While protein % of milk declines as the milk yield rises, inadequate energy can exaggerate this effect through lowering protein synthesis.

The Feed Monitor screen displays an analysis of yield and protein data for a herd over a two year period. This provides an overview of the average milk yield of all cows and an indication of any marked change in protein % of key groups of animals. Each vertical red bar represents the average milk yield of all cows at a milk recording, so contains animals from early mid and late lactation.

Figure 1 The Feed Monitor graph of Herd Companion



Each point on the line in Figure 1 is calculated from the individual milk yields and protein % recorded at that milk recording. Effectively each monthly point represents the milk yield at which the protein content of the milk is calculated at 3.2%. This is the **3.2% protein intercept (3.2%PI)**. So cows yielding above this level will mostly have milk of a protein % value **below** 3.2% protein.

Note in Figure 1 the relative positions of the 3.2% PI at different months. The normal gap between average milk yield and 3.2%PI suddenly declines markedly at the milk recording in July 06. As the milk yield is comprised of early, mid and late lactation cows, if the 3.2%PI is very close to the average milk yield then it is highly likely that the early lactation cows are short of energy, bringing down their protein synthesis.

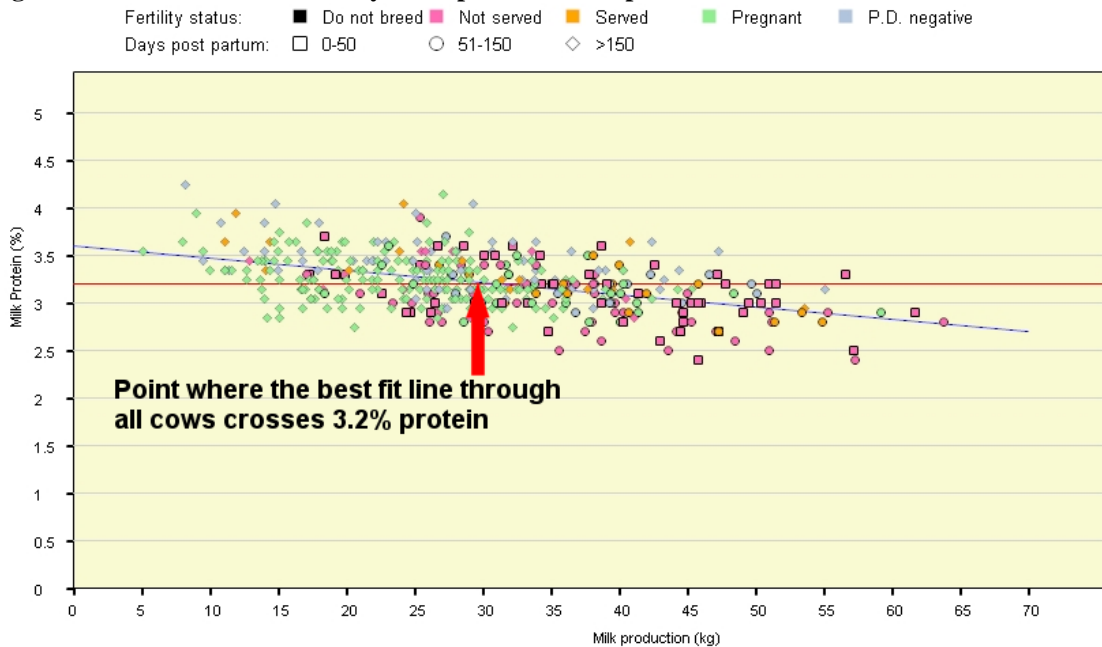
Figure 1 shows that something has happened to the management/feeding of the cows that is affecting their milk production. On those months there is clearly a need for further investigation to understand the cause of the problem. In the example above the situation recovered after two months.

Monitoring the relative positions of the line and columns in the Feed Monitor graph allows the user to compare the performance of the herd over time. In effect, it uses the milk recording data to monitor the response of the herd to the feed and management at each milk recording. It is usually possible to observe the impact of past problems with grazing, silage quality or new management changes. Similarly the Feed Monitor Graph can provide a mechanism to monitor the impact of change and to provide an early warning of any adverse (or positive) effects on the herd.

How is the 3.2% Protein Intercept calculated.

Clicking on a monthly vertical bar in the Feed Monitor Graph displays that month's data.

Figure 2 Derivation of the monthly 3.2% protein intercept



Every individual milk yield is plotted against the milk protein%. Each cow is represented by a symbol whose shape corresponds to the animal's stage of lactation. The diamond symbols (◇) represent late lactation cows (over 150 days since calving). These cows have relatively low energy demands and low yields so appear mostly in the top left of the graph. The square symbols (□) are early lactation cows (up to Day 50) where energy demand is rising rapidly. These cows tend to appear with relatively high yields and low protein %. The circle symbols (○) represent the mid-lactation cows (Day 51-150).

In Figure 2, there is a clear decline in protein % as the yield increases. The horizontal red line in Figure 2 represents 3.2% protein which is used as a reference point reflecting a desirable protein percentage where energy is not deficient.

The diagonal blue line is the best fit through all of the points displayed. Where it crosses the horizontal 3.2% protein line identifies the 3.2% Protein Intercept (from the horizontal axis) for that month.

When early lactation cows are short of energy, the yield and protein% will drop. This will drag the blue line downwards, forcing the intercept to the left to a lower 3.2% intercept. Comparing month by month, as in Figure 2, shows when the herd is in periods of nutritional stress.

Analysing the Fat:Protein Ratio

In addition to energy shortages impacting on protein synthesis, it can also affect the fat content of milk. High levels of fat in early lactation can result from excessive mobilisation of body fat due to a shortage of energy. A low fat level may indicate poor fibre digestion in the rumen, either due to poor forage quality or rumen function.

Fat:protein ratio as an indicator of energy deficiency, ketosis and acidosis: Energy deficiency may result in a decline in milk protein% and a rise in fat%. A Fat:protein ratio (FPR) (fat divided by protein) will compound these effects making this a valuable parameter for monitoring energy levels. A high FPR (high fat, low protein) may indicate a higher likelihood of sub-clinical and clinical ketosis. Low FPR values (low fat, normal protein) may indicate a higher likelihood of acidosis.

The Fat:Protein (FPR) graph shown in Figure 3 is customisable by the user. The population of cows is specified by the user (top right of the form). In this example the population studied is cows from Day 0 to Day 50 after calving. The vertical bars indicate (left hand vertical axis) how many cows there were in this population for each milk recording month over the last two years.

The blue points represent the FPR (right hand vertical axis) of the specified population each month. In this example the FPR is higher than the target range throughout.

The red points represent the percentage of the population (extreme right vertical axis) that have a very high FPR in each month. The “high” value is defined by the user (1.5 in this example). In this example over 50% of the early lactation cows have had very high FPR values for the last nine months.

Figure 3. The Fat:Protein graph

