18

Body condition scoring

This chapter:

Explains a new system of scoring the body condition of dairy stock.

The main points in this chapter:

- body condition is the amount of muscle and fat covering the cow, hence the body reserves available to provide additional nutrients for milk production and efficient reproduction
- there are 5 key areas on the body regions of cows that need to be assessed, namely the area between the tail head and pin bones, inside of the pin bones, backbone, hips and depression between the hips and pin bones
- the basis for scoring system is a flow chart, with photographs of cows in varying body condition to provide support
- target body condition scores are presented for different stages of the lactation cycle
- suboptimum body condition scores reduce milk yields and reproductive performance.

Condition scoring is the visual assessment of the amount of muscle and fat covering the bones of the cattle. It can be assessed independently of live weight, gut fill and pregnancy status and involves observing specific points on the animal. Body condition affects milk production and reproductive performance. Scoring enables farmers to compare the condition of their cows with recommended targets. Knowledge of condition scoring then enables farmers to manage their feeding programs better.

This chapter provides a common language for farmers, advisers and researchers to describe the body condition of any breed of dairy cattle. The pictures in this chapter are of Friesian cows, although the descriptors are equally applicable to Jersey (and other dairy) or Zebu cattle.

The system described in this chapter has been used for many years in Victoria and ranges from emaciated/very little flesh over the skeleton (score 1) to very fat/heavy fat

cover (score 8). Only cows in scores 3 to 6 are described in this chapter. Cows with scores of 3 or less are very thin and are either severely underfed or are suffering from disease or injury. Cows with scores of 6 and over are over fat and are at risk of suffering from metabolic diseases around calving.

These pictures and diagrams were developed for an extension package, called 'The Condition Magician' by Chrisanya Robins and Richard Stockdale, of Kyabram Dairy Centre, in northern Victoria (Robins *et al*. 2003).

18.1 The system of condition scoring

The score is determined by assessing five key areas of the cow (Figure 18.1):

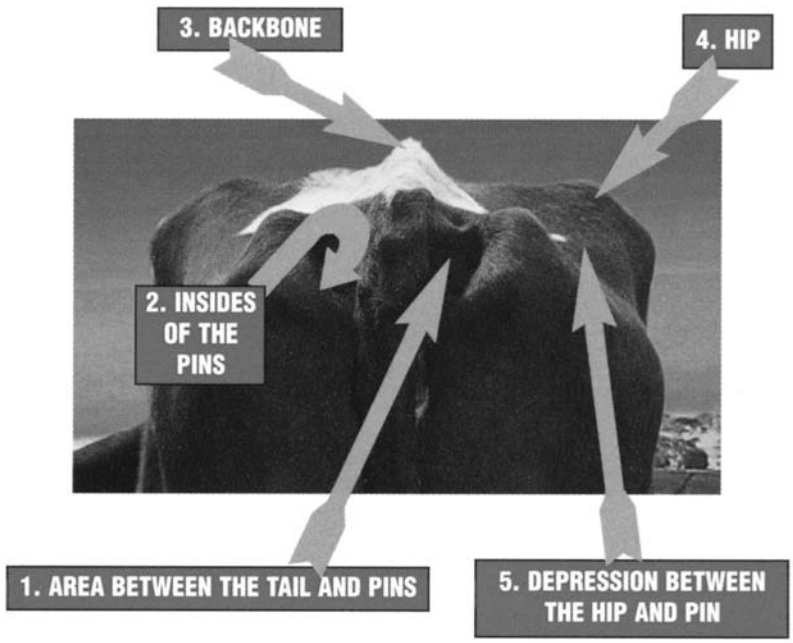


Figure 18.1 The five key areas to assess body condition score.

1 **The area between the tail and the pin bones**. This is the area where it is easiest to see if cows are starting to lay down fat. it can be described as 'deeply sunken', 'sunken', 'slightly sunken' or 'filled in' (see Figure 18.2).
2 **The insides of the pin bones.** From Figure 18.2, this area can be described either as 'hollow' or as 'not hollow'. If the area between the tail and pin bones is deeply sunken and the inside of the pins is hollow, the cow is in score 3. If this area is not hollow, the cow is in score 3.5.
3 **The backbone.** From Figure 18.2, the backbone can be described as a 'bumpy ridge' or 'not a bumpy ridge'. If the area between the tail and pin bones is sunken and the backbone is a bumpy ridge, the cow is in score 4. If the backbone is not a bumpy ridge, the cow is in score 4.5. Research has shown that cows start to lay down subcutaneous fat at score 4.5, and this is evident along the backbone.

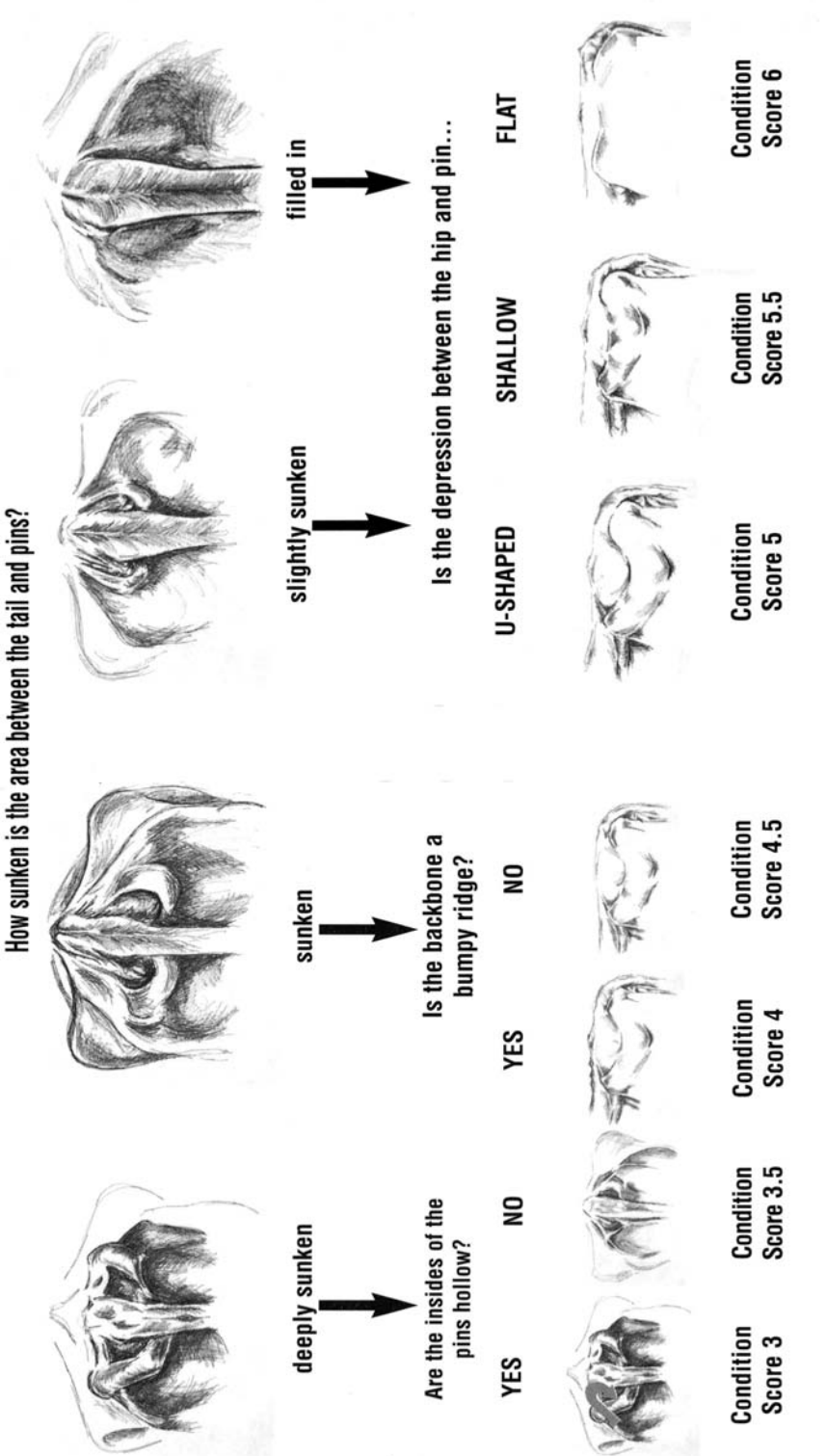


Figure 18.2 A flow chart for quantifying body condition scores using visual assessments of the area between the tail and the pin bones, the inside of the pin bones, the backbone and the depression between the hip and pin bones.

4. **The hips.**
5 **The depression between the hip and pin bones**. From Figure 18.2, the depression between the hips and pin bones can be described as 'U-shaped', 'shallow' or 'flat'. If the area between the tail and pin bones is slightly sunken and the depression between the hip and pin is U-shaped, the cow is in score 5. If the depression is shallow, the cow is in score 5.5. If the area between the tail and pin bones is filled in and the depression is flat, the cow is in score 6.

18.2 Examples of body condition scores

The following four photographs are of cows in various condition scores.

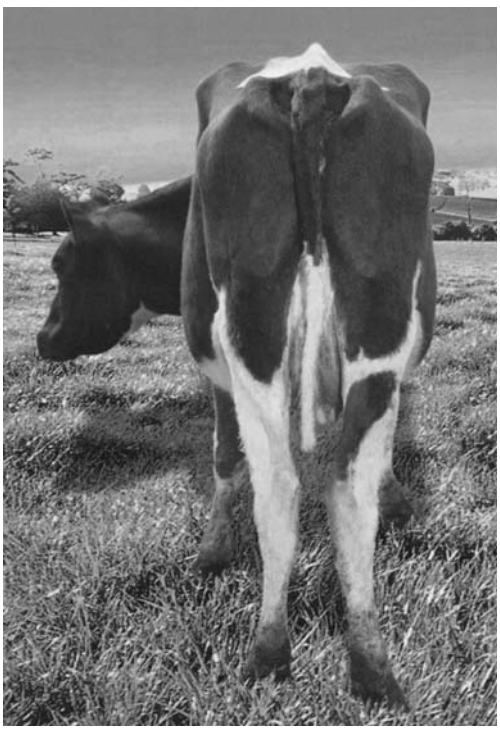


Figure 18.3 Condition score 3. This cow has:
- deeply sunken area between tail and pins
- a hollow area inside the pins
- very prominent hips and backbone
- a backbone that is a very bumpy ridge.

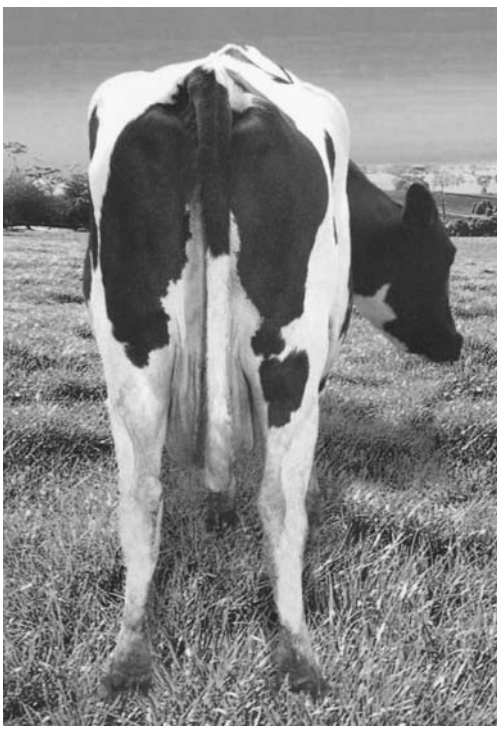


Figure 18.4 Condition score 4. This cow has:
- sunken area between the tail and the pins
- a backbone that is a bumpy ridge
- hips and pins slightly rounded.

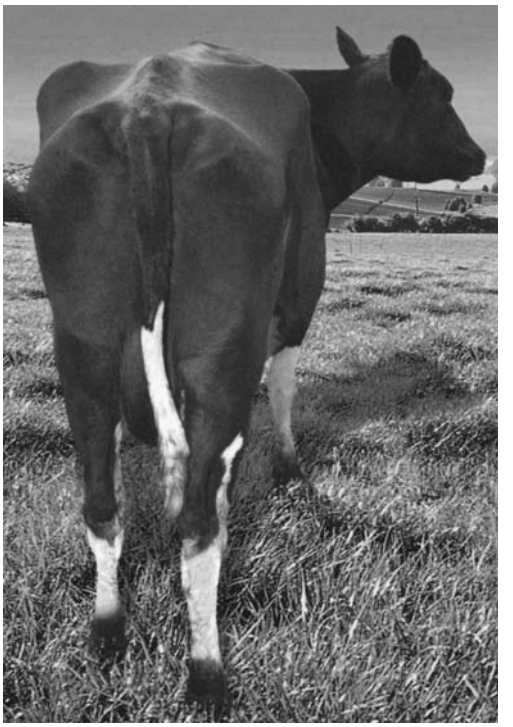


Figure 18.5 Condition score 5. This cow has:
- slightly sunken area between the tail and pins
- a U-shaped depression between the hip and pin
- rounded backbone and rounded hips and pins.

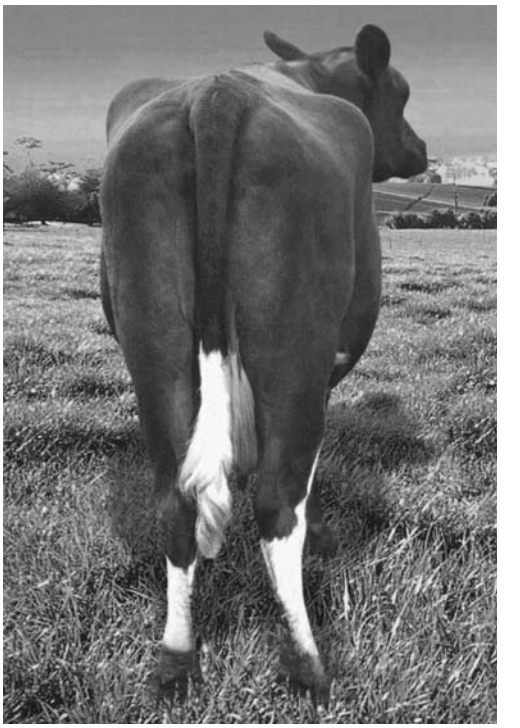


Figure 18.6 Condition score 6. This cow has:
- filled in area between the tail and pins
- flat depression between the hip and pin
- a rounded backbone.

18.3 Target body condition scores

For optimal milk production and reproductive performance (Morton *et al.* 2003), it is important to:

- ensure all cows are in body condition score between 4.5 and 5.5 at calving
- ensure cows do not lose excessive body condition during early lactation – losses of more than one condition score in early lactation are considered excessive.

Condition scoring should be done throughout the year to take account of seasonal variations in feeding management, but particularly at the following stages of the lactation cycle:

1 At drying off, when cows that are too thin or too fat should be managed to achieve the target by calving.
2 Just before calving, and if there are still too many thin or fat cows, feeding management should be changed for future calvings.
3 At 40 to 60 days after calving, to assess body condition loss in early lactation. If it is excessive, feeding management should be changed leading to the next calving and in early lactation.

Three separate scoring sheets should be used for cows: at drying off, for cows at calving and for cows scored 40 to 60 days after calving. The date, cow identity number and condition score should be recorded for each cow. On a regular basis, the proportion of cows that are outside the target condition scores (4.5–5.5) should be determined. For each cow, the condition score at calving is subtracted from the condition score 40 to 60 days after calving. The average value for the entire herd should be calculated to compare with the target (less than one condition score).

18.3.1 Interpreting body condition scores at calving

Table 18.1 should be used to decide on future feeding management.

Table 18.1 Body condition scores at calving, risk of losses in milk production and reproductive performance, and future changes in feeding management
(Source: Morton *et al.* 2003)

Proportion of cows	Interpretation	Risk	Future feeding management
Below 4.5 score			
Less than 5% (or 1 cow in 20)	Few cows are too thin	Low	No change required
5–15% (or 1–3 cows in 20)	Likely to be too many thin cows	Moderate	Consider improving feeding management
More than 15% (or 3 cows in 20)	Too many thin cows	High	Should improve feeding management
Above 5.5 score			
Less than 5% (or 1 cow in 20)	Few cows are too fat	Low	No change required
5–15% (or 1–3 cows in 20)	Likely to be too many fat cows	Moderate	Consider modifying feeding management
More than 15% (or 3 cows in 20)	Too many fat cows	High	Should modify feeding management

If more than 15% of the milking cows have condition scores below 4.5 or above 5.5 at calving, action is required. For herds with too many thin cows, this can take the form of increasing feeding levels during late lactation and/or the dry period of these thin cows or even considering drying them off early. If most of them are calving for the first time, then heifer management should be reviewed (see Chapter 16).

For herds with too many fat cows, action can take the form of reducing feeding levels of these fat cows during the dry period. If most of them are those with a poor history of fertility and with long dry periods, greater attention should be given to improving their reproductive performance (see Chapter 15).

Incorrect diet balance, such as low protein levels, may be a cause. Other dietary imbalances are discussed in Chapter 13.

18.3.2 Interpreting changes in body condition during early lactation

Table 18.2 should be used to decide on future feeding management.

If, during early lactation, more than 15% of the cows have lost more than one condition score or if the average condition score loss was more than 0.6 units, post-calving feeding management should be addressed. As well as increasing feed offered, this

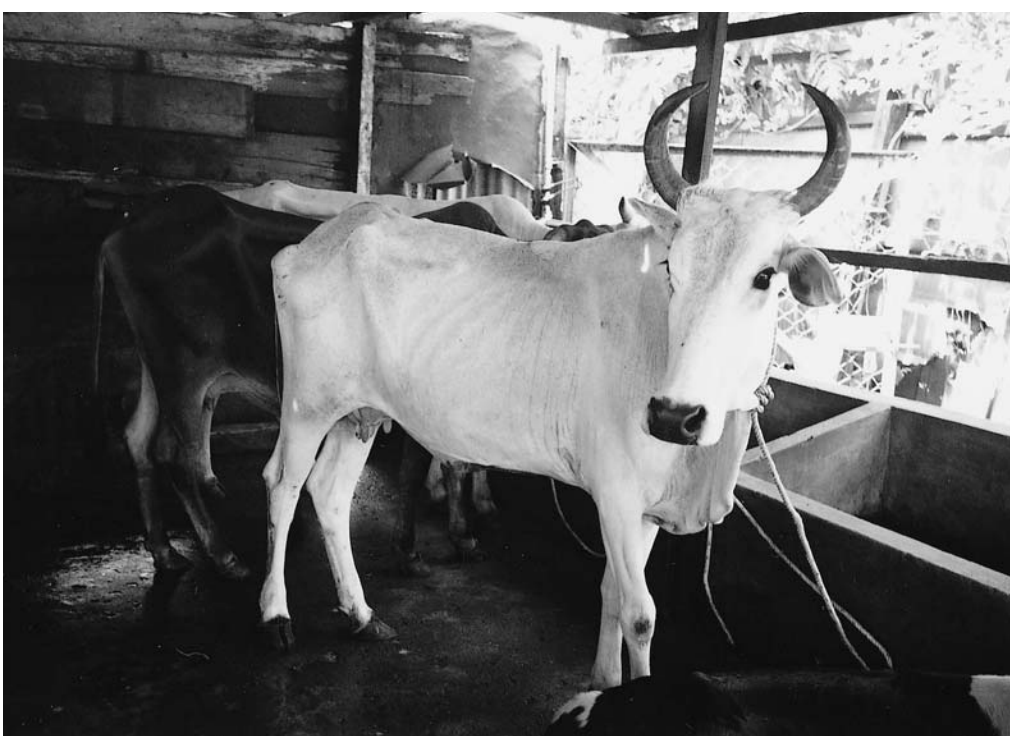
can take the form of reducing moisture levels in fresh forages through wilting, or improving forage quality through feeding less mature forages. The quality and amount of concentrates on offer should also be reviewed.

Table 18.2 Average value for body condition changes in early lactation, risk of losses in reproductive performance and future changes in feeding management
(Source: Morton *et al.* 2003)

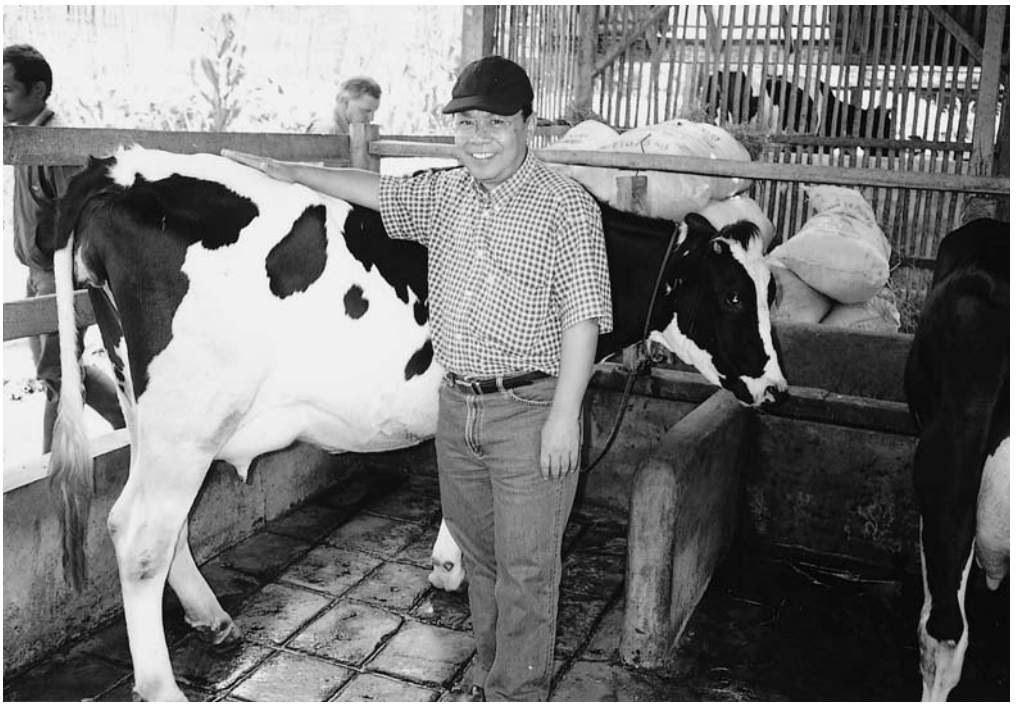
Average value	Interpretation	Risk	Future actions
Less than 0.45	Few cows have lost excessive condition	Low	Check condition at calving. If too low, improve feeding management
0.45 to 0.6	Likely to be cows losing excessive body condition	Moderate	No action required
More than 0.6	Too many cows losing excessive body condition	High	Improve feeding management

18.4 Effect of suboptimal body condition on cow performance

Australian dairy researchers and advisers have developed an extension program to address poor reproductive performance, called 'InCalf' (Morton *et al.* 2003). This program identified six key factors affecting herd reproduction, of which one was body condition (see Chapter 15). The program then quantified the benefits of improving body condition scores towards the targets described above (InCalf 2004a, 2004b). Benefits arise from improved reproductive performance and milk production.



A thin, low yielding Local Indian Dairy cow in northern Malaysia.



An imported Fresian heifer from North America. Such animals must be very well managed to ensure good fertility as well as milk yields (West Java, Indonesia).

18.4.1 Effects on reproductive performance

Condition score at calving

Cows with less than 4.5 condition score at calving have 100-day in-calf rates at least 12% percentage units lower than if they calved within the optimal range of 4.5 to 5.5. Furthermore, cows that lose more than one condition score between calving and mating have reduced reproductive performance compared to cows with more moderate losses. Excessive condition score losses are more likely in cows calving above score 5.5.

The adverse effect of body condition scores below 4.5 or above 5.5 on 100-day in-calf rate are presented in Table 18.3. This table can be used for a test herd as follows:

1 The test herd's current condition score profile is determined.
2 The particular cell in the table is identified for the percentage of cows in the test herd with <4.5 and >5.5 condition scores. This cell is the expected percentage decrease in 100-day in-calf rate compared to a herd where all cows are between 4.5 to 5.5 condition score at calving.
3 Following improvements in feeding management, the herd's new (ie expected) condition score profile is estimated.
4 That particular cell in the table is identified.
5 The difference between the two figures gives the improvement as a result of the change in feeding management.

Table 18.3 Possible changes in 100-day in-calf rate percentage units with varying percentages of cows in condition scores less than 4.5 or more than 5.5 at calving
Numbers in bold italics are those from an example in the text. (Source: InCalf 2004a).

% Cows with <4.5	% Cows with >5.5:										
	0	10	20	30	40	50	60	70	80	90	100
0	0	0	–1	–1	–2	–2	–2	–3	–3	–4	–4
10	–1	–2	–2	–2	–3	–3	–4	–4	–4	–5	
20	–2	***–3***	–3	–5	–5	–4	–5	–5	–5		
30	–3	–4	–4	–6	–6	–5	–6	–6			
40	–4	–5	–5	–7	–7	–6	–7				
50	–6	–6	–6	–8	–8	–8					
60	–7	–7	***–7***	–9	–8						
70	–8	–8	–9	–9							
80	–9	–9	–10								
90	–10	–10									
100	–11										

For example, when first monitored, the test herd of 10 cows has six cows with a score below 4.5, two cows between scores 4.5 and 5.5 and two cows above score 5.5 at calving (ie 6:2:2; score –7, Table 18.3). Following improved feeding management during late lactation and/or the dry period, the condition score profile of the herd changes to two cows below score 4.5, 7 cows between score 4.5 and 5.5 and one cow above score 5.5 at calving (ie 2:7:1; score –3, Table 18.3). This is close to the In Calf recommendation of <15% of cows below 4.5 and <15% above 5.5. Changes in the 100-day in-calf rate for this herd are from –7 to –3 (from Table 18.3), an improvement of 4% units.

The InCalf (2004a) program determined a financial benefit from improved condition score at calving on fertility, of A$310 per 100 cows per 1% increase in the 100-day in-calf rate. This is based on the assumption that condition score at calving has no effect on reproductive performance after the first three cycles (the first 63 days) of the mating period, that is up to Day 113 in a herd with a voluntary waiting period of 50 days. For dairy industries in countries outside Australia, such economic benefits still need to be determined.

Condition loss in early lactation

The average condition score loss prior to mating can provide a guide to the effect of the proportion of cows with excessive body condition loss (more than 1.0 condition score) on herd fertility (100-day in-calf rate) and infertility (200-day not-in-calf rate) (Table 18.4).

Table 18.4 Average value for body condition changes in early lactation, likely percentage of cows losing more than 1.0 score, and possible decrease in 100-day in-calf and increase in 200-day not-in-calf rates
(Source: InCalf 2004b)

Average condition score loss in early lactation	Percentage cows losing >1 condition score	Percentage decrease in 100-day in-calf rate	Percentage increase in 200-day not-in-calf rate
Less than 0.45	–	–	–
0.45–0.6	–1	–1	0
0.6–0.75	–2	–2	1
0.75–1.0	–4	–4	2
More than 1.0	–5	–5	3

The InCalf (2004b) program also determined a financial benefit from improved fertility as a result of reducing body condition losses prior to mating, namely A$590 per 100 cows per 1% increase in 100-day in-calf rate. This combines the effects of changes in both 100-day in-calf and 200-day not-in-calf rates. For dairy industries in countries outside Australia, such an economic benefit still needs to be determined.

18.4.2 Effects on milk production

Achieving improved body condition at calving affects milk yield and milk composition as well as fertility. Under Australian conditions, the effect of body condition at calving on milk production is presented in Table 18.5.

Table 18.5 Effect of condition score at calving on full lactation milk yield and milk fat content
(Source: InCalf 2004a)

Condition score at calving	Milk yield	Milk fat
Less than 4.5	–105 L	–11%
4.5 to 5.5	–	–
More than 5.5	+79 L	+7%

Cows calving with condition scores of >4.5 produce more milk with higher milk fat content than those calving with <4.5. The opposite occurs in cows calving with condition scores of >5.5.

Using the example of changes in condition score profile in Table 18.3 (ie changing from 6:2:2 to 2:7:1 for condition score profile >4.5:4.5 to 5.5:<5.5), the milk production benefits for the herd over a full lactation can be calculated from Table 18.5 as follows:

1 Milk yield. There are four fewer cows with score <4.5 and one less cow with score >5.5. Improved milk yield is then:

$$4 \text{ cows} \times 105 \text{ L}) - (1 \times 79 \text{ L}) = 341 \text{ L}.$$

2 Milk fat content. Improved milk fat content is then:

$$4 \text{ cows} \times 11\% - (1 \times 7\%) = 0.37\%.$$

This extra milk produced can be easily valued and, in countries where incentive payments are given for milk composition, the improved milk fat can also be given a monetary value.