6

Quantifying cow signals

This chapter provides scoring systems for many of the cow signals discussed in Chapter 5.

The main points of this chapter

- The body condition score provides a numerical assessment of the amount of muscle and fat covering the bones in the cow's hindquarters. It is based on a five point system for cows varying from poor condition to grossly overfat.
- The locomotion (or lameness) score provides a five point system to assess the ease with which cows can walk over a level surface. It varies from normal to severely lame.
- The hoof score provides a three point system to describe the degree of inflammation and infection of the hoof for each of three different hoof disease conditions.
- The leg score provides a three point system to assess the stance of the hind legs.
- The hygiene score provides a four point system to assess the degree of contamination of the hair and skin by dried and fresh dung on the udder and the lower hind leg regions.
- The rumen score provides a good measure of the cow's nutritional status using a five point system assessing rumen fill.
- The manure score assesses the visual composition and physical consistency of the dung using two different five point systems.

- The teat score assesses the teat health using a four point system.
- The panting score assesses respiration rate of heat stressed animals.

There are nine different scoring systems mentioned in Chapter 5 that provide many insights into cow health and wellbeing. These are fully described in this chapter and provide numerical values for:

- Body condition score: visual estimate of the amount of muscle and fat covering the bones of an animal
- Locomotion/lameness score: subjective assessment of how easily a cow walks on a level surface
- Hoof score: visual and descriptive assessment of the health of the hooves
- Leg score: the stance of the hindlegs
- Hygiene score: the contamination of manure and dirt on the udder and lower hind legs of cows
- Rumen score: the rumen fill as an indicator of the feed intake and rate of passage of feed over the last few hours
- Manure score: the visual composition and physical consistency of the faeces
- Teat score: the impact of the milking system on teat health
- Panting score: the impact of heat stress on the cow's wellbeing.

In addition to his book *Cow Signals: A Practical Guide For Dairy Farm Management* (Hulsen 2011), Hulsen (2013) has published a second book entitled *Cow Signals Checkbook*: *Working On Health, Production And Welfare* which provides a detailed series of checklists and instruction cards to help quantify various aspects of the cow and heifer's health and wellbeing. This new book contains many coloured pictures and diagrams highlighting the visual aspects of good dairy cow housing and management. Many of these pictorial standards are presented in this chapter (in black and white). An overview of the key checklists to assess cow health and welfare and also disease and distress are presented in Appendices 3 and 4 respectively.

6.1 Scoring body condition

Condition scoring is the visual evaluation of the amount of muscle and fat covering the bones of an animal. 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.

The body condition is a very useful tool to monitor feeding management by providing a subjective estimate of the amount of muscle and subcutaneous fat between the pin bones and the tail head, over the hip and covering the lumbar

vertebrae. Changes in condition take place over a matter of weeks or months. It increases when energy intake exceeds energy output and decreases when energy output exceeds energy intake.

For an overweight cow, there is a risk that around the time of calving and in early lactation, she will consume too little. A thin cow has poor immunity. Sharp falls in condition may lead to fertility problems and low resistance to disease. Fertility problems include cystic ovaries, inactive ovaries, poor non-existent heats and a poor corpus luteum.

Measuring standards have been developed to follow trends in body condition and to feed cows according to their energy requirements. Hulsen (2011) uses a five point scale where the senior author's previous books have used an eight point scale that was developed for the Victorian dairy industry; this is fully described in Chapter 18 of Moran (2005) which also discusses target condition scores at various stages during the lactation cycle and the frequency and best times to body condition your milking herd. Because the five point score is the preferred method in most Asian, European and US dairy management books, it will be used in this manual and is presented in Table 6.1 and Figure 6.1.

Target condition scores for cows and heifers are as follows:

Situation	Cows	Heifers
Pre-calving	2.5–3	2.5–3
Pre-service	2–3	2–2.5
Drying off	2.5–3	

If the average score is:

- within the normal range, the cows are receiving sufficient energy in their ration
- high, there is a risk that feed intake will be depressed at the beginning of the next lactation, so ensure cows are not too fat at the end of the current lactation
- low, energy intake has been insufficient and resistance to disease could be adversely affected, so increase feed intake and/or energy density of the ration.

If the spread of scores within the herd is:

- wide, there are big differences between cows in both energy intake and energy requirements, so determine how these large differences occurred and regroup cows according to their energy requirements
- narrow, the cows are all likely to be receiving sufficient energy.

Cows should be condition scored repeatedly to assist with feeding decisions. They can be interpreted as follows:

- if the score is within the normal range, then feeding management is correct
- if the score is below the normal range and changes by less than 0.75 points, then feeding management throughout lactation is correct but overall condition can be improved

Table 6.1. Descriptors for condition scoring of dairy cows for the 5 *(and 8 point)* scoring system.

5 point	*8 point*	Condition	Descriptors*
1	*1–3*	Very poor	Very thin Spine like teeth on a saw Transverse processes prominent with more than half the length visible Pin bones are very prominent, with a deep V shape cavity below the tail head and no fatty tissue under the skin
2	*4, 5*	Moderate	Skeleton clearly visible Individual vertebrae can be identified on the spine Transverse processes are 1/2 to 1/3 visible with the ends rounded and can be identified individually Pin bones are prominent with a U cavity below the tail head and some fat under skin
3	*6*	Good	Skeleton and covering are well balanced Spine forms a sharp ridge Transverse processes are 1/4 visible and individual vertebrae can still be identified but only by pressing on them Pin bones are rounded and smooth, with a shallow cavity below the tail head and fat cover over whole area, skin smooth, pelvis can be felt
4	*7*	Fat	There is excess fat covering Individual vertebrae cannot be identified Transverse processes have a smooth and rounded edge Pin bones are covered in fat with a shallow cavity below the tail head and patches of fat evident
5	*8*	Grossly fat or obese	Spine is covered with fat The ridge of transverse processes is barely visible Pin bones are completely covered in fat with the cavity filled with fat rolls The pelvis is impalpable, even with firm pressure

* The spine is assessed over the lumbar vertebrae; the transverse processes are the horizontal parts of the lumbar vertebrae; the pin bones are the bones on either side of the tail head.

- if the score decreases by more than 0.75 points during early lactation, then energy intake is too low hence dry cow, transition and early lactation feeding should all be reassessed
- if cows become over fat towards the end of lactation, then the energy:protein balance in the milking ration should be finetuned.

6.2 Locomotion and lameness scoring

Lameness is an increasing problem in both grazing and housed cows, and can often lead to serious economic implications. Locomotion scoring from 1 to 5 (for increasing lameness) provides a quick measure of the cow's ability to walk normally (Sprechter *et al.* 1997). The descriptors are presented in Table 6.2.

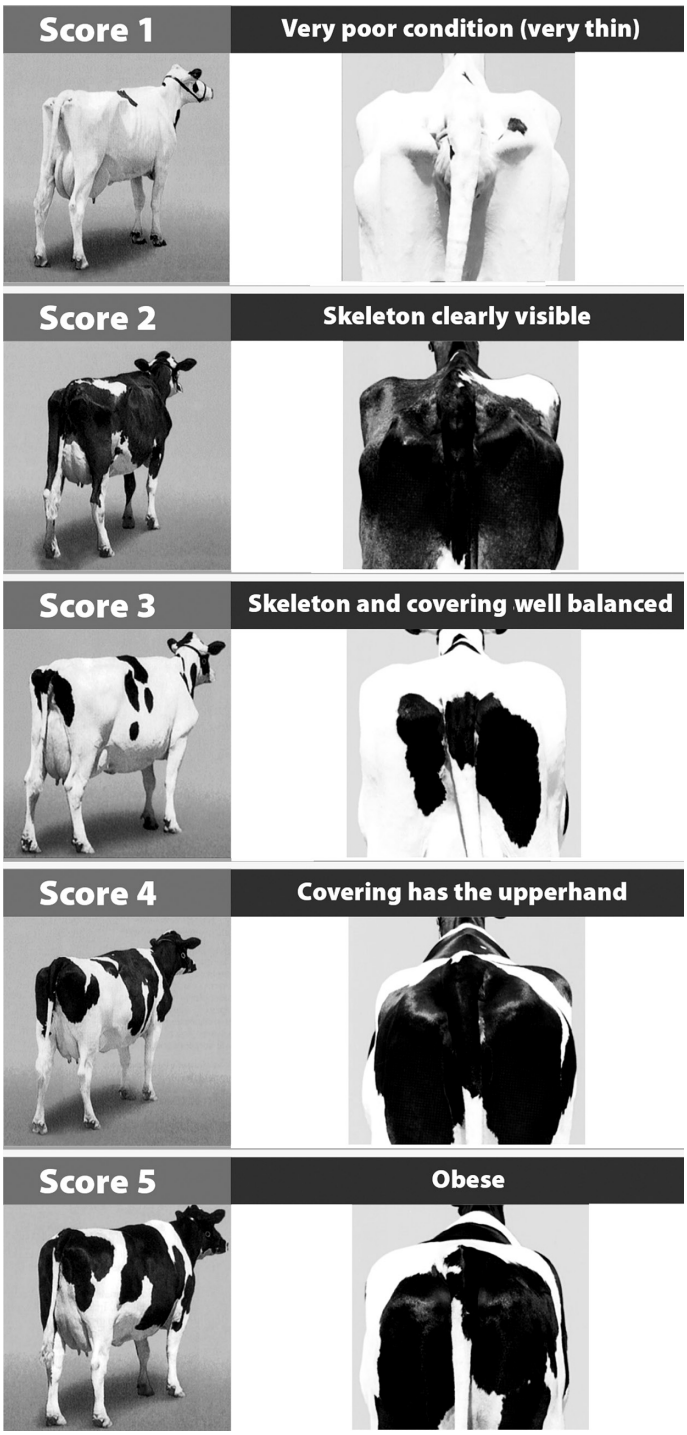


Figure 6.1: Pictorial standards of body condition scores in milking cows.

Table 6.2. Locomotion score guide based on observations of back posture, head and limb position and behaviour when walking.

Score	Clinical description	Back posture	Assessment	Decline
1	Smooth and fluid movement. *Normal.*	Flat	Cow stands and walks with a level back. All legs bear weight evenly. Joints flex freely. Head carriage remains steady as the animal moves. Gait is normal.	Feed: 0% Milk: 0%
2	Ability to move freely not diminished. *Mildly lame.*	Flat or arch	Cow stands with level back, but arches when walks. All legs bear weight. Joints slightly stiff. Head hangs lower and further from her body. Gait is slightly abnormal.	Feed: 1% Milk: 0%
3	Capable of locomotion but ability to move is compromised. *Moderately lame.*	Arch	Stands and walks with arched back. Slight limp and short strides in one or more legs. Joint shows signs of stiffness but does not impede freedom of movement. Head carriage remains steady.	Feed: 3% Milk: 5%
4	Ability to move freely is obviously diminished. *Lame.*	Arch	Arched back is always evident and gait is one deliberate step at a time. Reluctant to bear weight on at least one limp leg but still uses that limb in locomotion. Strides are hesitant and deliberate and joints are stiff. Head bobs slightly as animal moves in accordance with sore hoof making contact with the ground.	Feed: 7% Milk: 17%
5	Ability to move is severely restricted. Must be vigorously encouraged to stand and/or move. *Severely lame.*	3-legged	Extreme arched back when standing and walking. Inability to bear weight on one or more legs. Obvious joint stiffness characterised by lack of joint flexion with very hesitant and deliberate strides. One or more strides obviously shortened. Head obviously bobs as affected hoof makes contact with the ground.	Feed: 16% Milk: 36%

Observations should be made of cows standing and walking (gait), with emphasis on their back posture. The observation should be made on a flat surface that provides good footing.

Locomotion scores of individual cows can be used to select cows for hoof examination before they become clinically lame. Those with scores of 2 and 3 are considered subclinically lame and their hooves should be examined and trimmed to prevent more serious problems. Scores of 4 and 5 represent cows that are clinically lame.

The higher the lameness score, the greater the reduction in feed intake and milk yield and the poorer the body condition (see Figure 6.2). For example, a score of 4 can reduce DM intakes by 7% and milk yields by 17%, while a score of 5 can reduce DM intakes by 16% and milk yields by 36% (Sprechter *et al*. 1997). Advice should be sought if more than 3% of first-calving cows, or more than 2% of older cows, show signs of lameness.

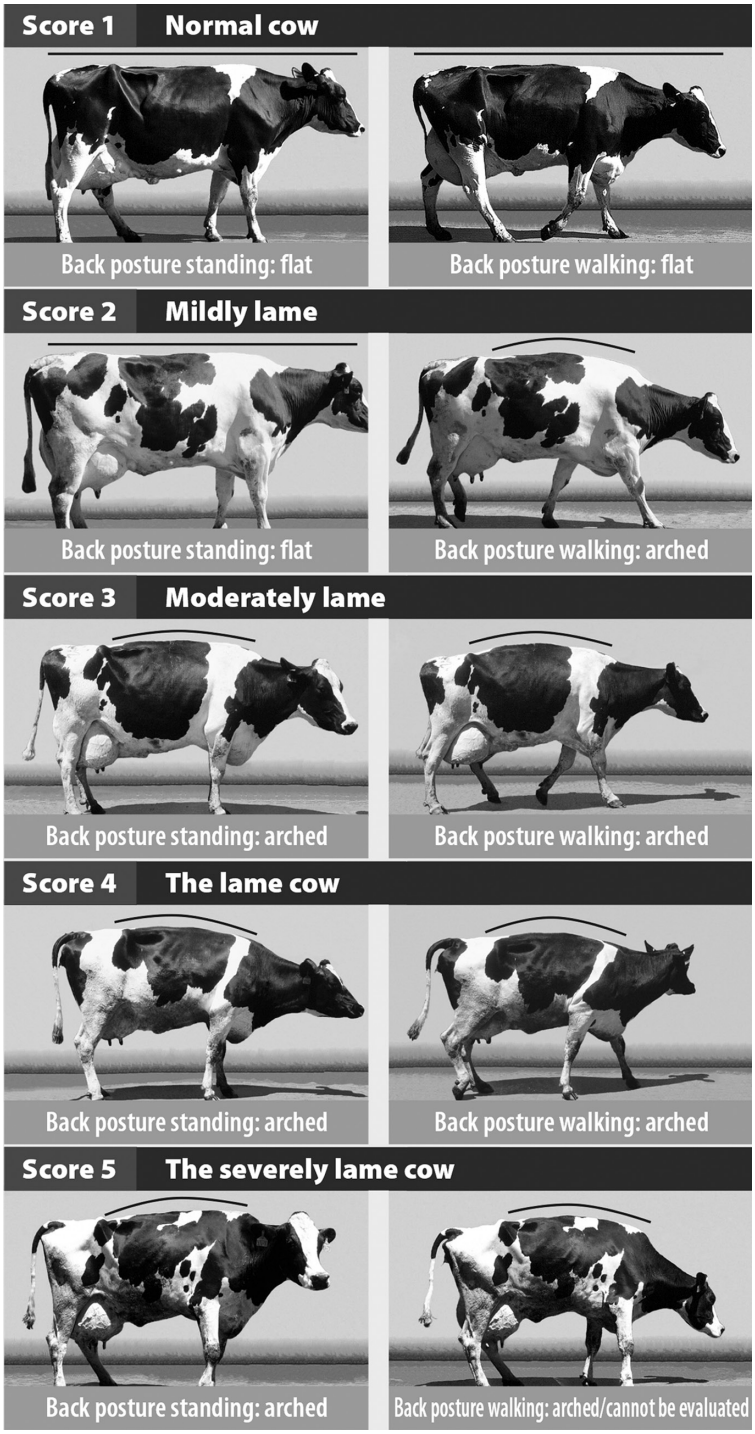


Figure 6.2: Pictorial standards of locomotion scores in milking cows.

6.3 Hoof scoring

Hoof problems can cause cows great pain and will directly affect production because lame cows visit feeding areas less frequently. It is important to detect symptoms early. Hulsen (2011) presents a 3 point hoof scoring system that can incorporate a variety of symptoms occurring simultaneously. This is presented in Table 6.3 and Figure 6.3a. The positioning of the hoof problems and their degree of intensity in the Figure is the same as in Table 6.3 with foul-in-the-foot as the top three pictures, digital dermatitis as the middle three and laminitis as the bottom three pictures in Figure 6.3a.

Other causes of cow lameness

Hulsen (2011) describes six other hoof conditions but without scoring systems for their degrees of intensity. These are presented pictorially in Figure 6.3b.

The top three pictures are:

- **Healthy hoof:** the hoof wall and the entire sole are weight bearing.
- **Solar ulcer:** inflammatory lesions in sole area which occur as a result of either laminitis or bruising to the sole (or both). Soft hooves are more likely to be affected.
- **Combination of digital dermatitis and foul-in-the-foot:** these both occur under similar conditions, namely, wet feet and dirty floors. They often occur together in which case the cow shows symptoms of both.

Table 6.3. Descriptors of three hoof problems at varying degrees of intensity (or scores) (see also Figure 6.3a).

Disease condition	1	2	3
Foul-in-the-foot C: Bacterial infection T: Foot trimming, formalin footbaths* P: same as T, dry floors	Mild inflammation of skin with yellow putrid discharge between claws	Severe inflammation of skin which affects heels (cracks, punctures)	Extensive moist inflammation of heels extending into inter-digital space
Digital dermatitis or strawberry footrot C: Bacterial infection T: Foot trimming, antibiotic spray, bandage for 3 days P: reduce level of infection	Round discrete lesion causing pain (in a healing or mild case)	Slight deterioration of hoof tissue at coronary band. Painful and bleeds easily	Large strawberry-like extremely sore lesion. Bleeds easily
Laminitis C: physical trauma T: anti-inflammatories, soft surfaces P: adequate fibre in diet, good stall design, correct/remove housing problems	Small localised discolouration	Discolouration of about one-third of sole	Discolouration of almost entire sole

Abbreviations: C, cause; T, treatment; P, prevention.
*Formalin footbaths have 4 L formaldehyde per 100 L water.

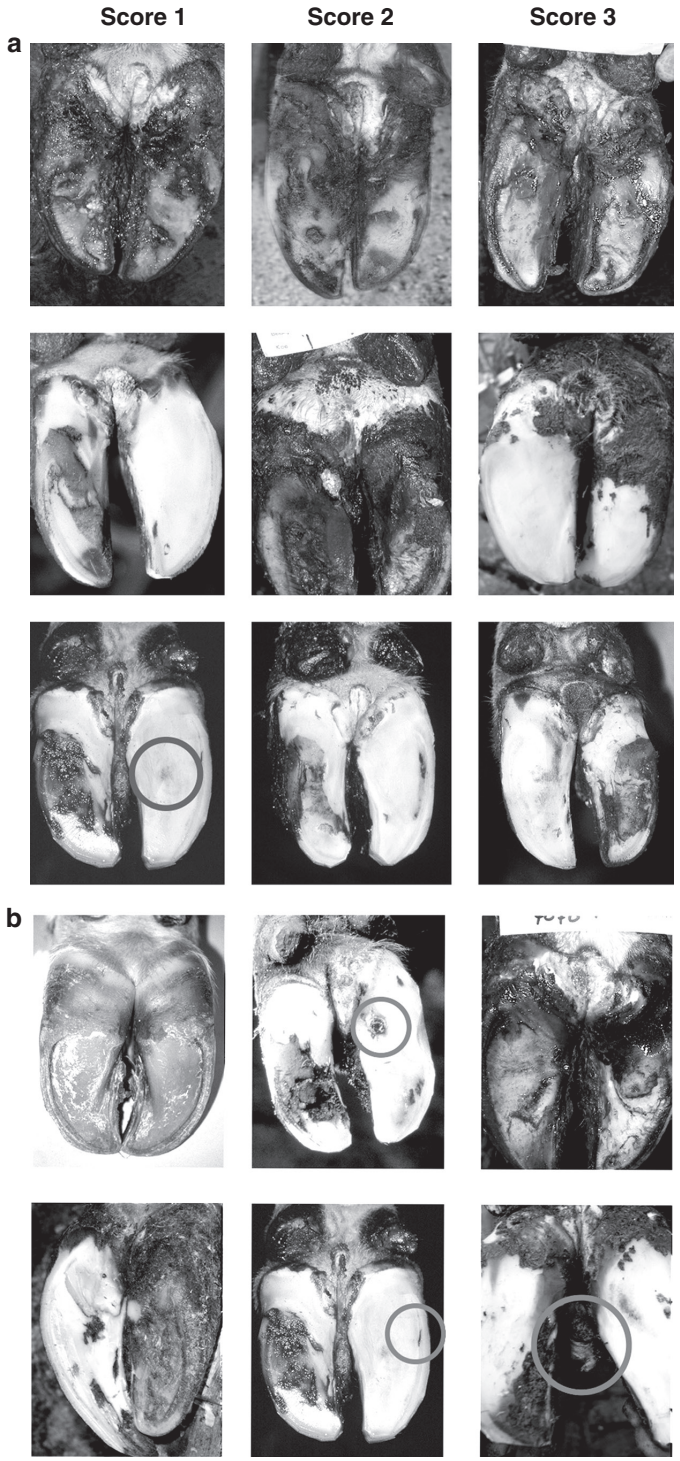


Figure 6.3: a) Pictorial standards of hoof score in dairy cattle. b) Other causes of lameness in dairy cattle.

The bottom three pictures are:

- **False sole:** false or double sole occurs after acute laminitis or radical dietary changes. In many cases there are few other signs of laminitis.
- **White line disease:** a white (or pink) line forms between the sole and the wall and white line disease occurs if there is a break in the continuity. There can be both mild and severe forms. Most important causes are laminitis and trauma (bruising).
- **Interdigital growths:** this occurs between the claws and develops because of a longstanding lesion in the cleft, which could be either digital dermatitis or foul-in-the-foot. The lesion could have developed from an infection in the cleft.

Hoof lesions are signals that can be used to make improvements in herd management with a rough classification as follows:

- Laminitis: metabolic problems, errors or changes in ration formulation and amount offered, housing problems such as overcrowding, slippery floors and poor stalls.
- Digital dermatitis: infectious diseases, associated with low resistance and high risk of infection.
- Foul-in-the-foot: infectious diseases, associated with high risk of infection.
- Solar ulcers: white line disease, trauma, when the herd is unsettled and/or slippery or uneven floors, could be associated with laminitis.

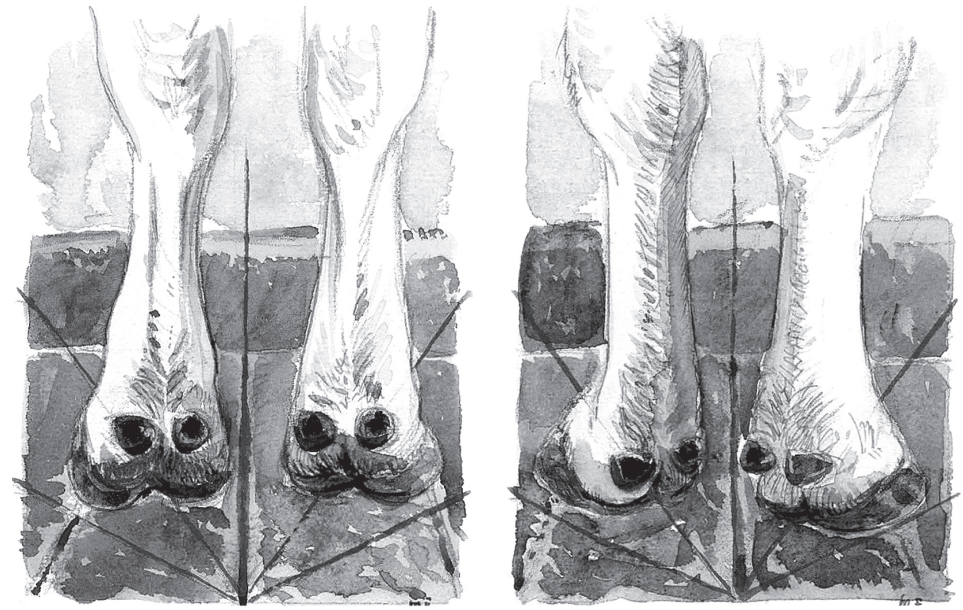
6.4 Leg scoring

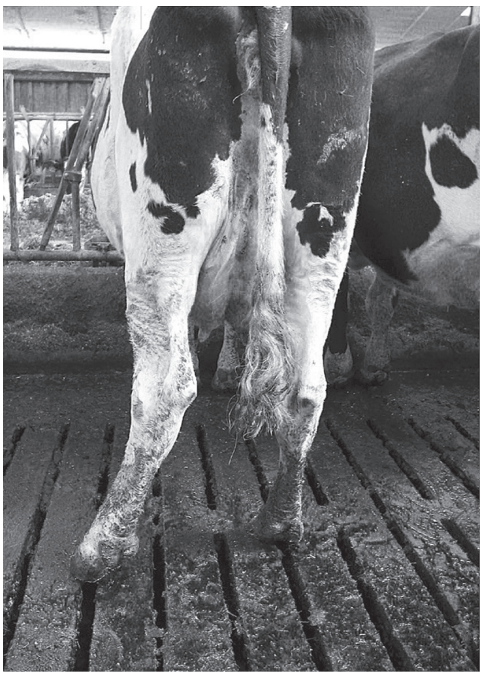
With foul-in-the-foot, the outer claw often grows faster than the inner claw causing the position of the claw to change, in that the hock turns inwards and the claw rotates outwards.

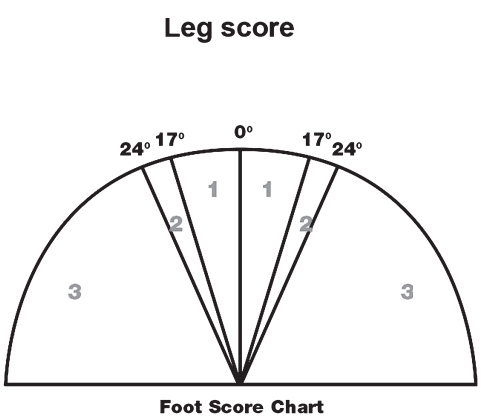
Leg scoring is a quantification of the stance of the hindlegs (Figure 6.4). It is related to the height differences between the inner and outer claws and the way the cow places her foot. Cows rotate their feet outwards to relieve painful areas in the sole and are more likely to do this on slippery floors when they walk with more weight on their heels. The score is based on the degrees rotation from perpendicular (90°) when both legs point parallel along the backbone from the back to the front of the cow. The scoring system is then:

- **Score 1**: 0° to 17° from 90°; this is the ideal situation although hoof problems can still occur
- **Score 2**: 17° to 24° from 90°
- **Score 3**: more than 24° from 90°.

Figure 6.4 presents diagrams of hindleg stances and a leg score calculator. It also includes a picture of a cow with major leg problems in that the right foot is virtually parallel with the spine (Score 1) but the left leg is turned outwards, swollen and painful. This is a score 3 requiring immediate attention and treatment.







(From J. van Amerongen)

Figure 6.4: Pictorial standards of leg scores in milking cows.

If there are high proportions of cows with Scores 2 or 3, the technique and frequency of foot trimming should be re-evaluated as well as other factors affecting leg stance.

6.5 Scoring cow hygiene and shed cleanliness

The amount of dried and fresh manure on the cow gives an idea of the level of hygiene on the farm. The dirtier the cows, the higher the chance of udder and skin infections. A decrease of one point in the herd hygiene score equates to an increase of 50 000 cells/ml in milk bulk somatic cell count. The presence of dirty cows also indicates other management factors to assess such as ventilation, nutrition, stall dimensions and cleanliness of the laneways.

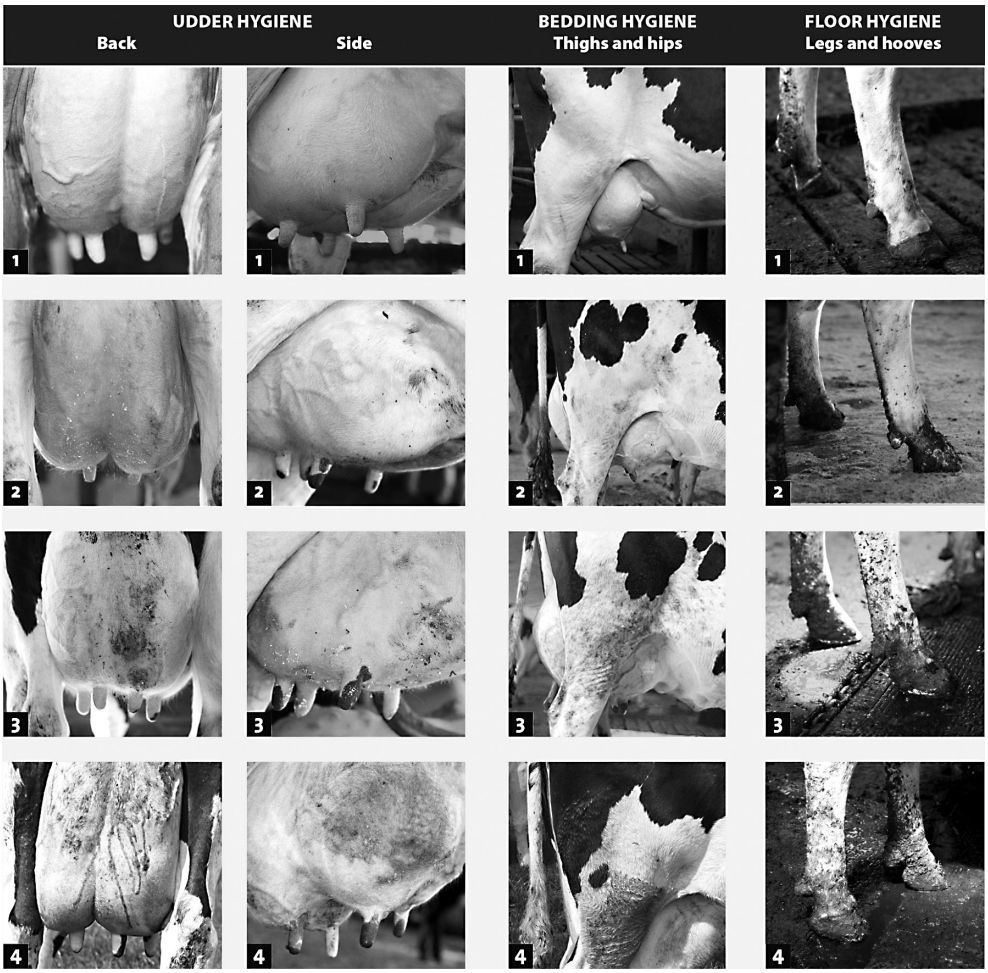


Figure 6.5: Pictorial standards of hygiene scores in milking cows.

There are three separate areas to score cow hygiene, namely, the udder (the back and the side), the abdomen and upper legs (thighs and hips) and the lower legs (legs and hooves). Individual scores are not important, just the herd average. When scoring a herd of cows, place a tick in the appropriate box for each score, then calculate the percentage of cows with each hygiene score. The scoring is very subjective using the pictures standards in Figure 6.5 to score from 1 (very clean) through to 4 (unacceptable).

As a guide to an acceptable level of cow hygiene on a well managed farm:

Udder hygiene: only 10% of the cows score 3 or 4
Thigh hygiene: only 15% of the cows score 3 or 4
Lower leg and hooves hygiene: only 20% of the cows score 3 or 4.

How clean are the udders and teats when the cow enters the milking parlour? Udder hygiene is influenced by stall cleanliness, amount and type of bedding material, cleanliness of alleyways, clipping of udders, comfort in the stall, manure consistency and health of the herd.

How clean are the stalls? Thigh hygiene is influenced by stall care and bedding, cow comfort in the stall, manure consistency and health of the herd.

How clean are the alleyways? Leg and hoof hygiene is influenced by alleyway cleaning, cleaning the holding yard for milking the cows and space allowance per cow.

6.6 Rumen scoring

Hulsen (2011) considers rumen fill as a good indicator of the nutritional status of the animal. It quantifies the intake of feed and its rate of passage of feed over the previous few hours. The rumen fill depends on a combination of:

- the quantity of feed consumed
- its rate of digestion and passage from the rumen to the abomasum and the lower gut.

The rates of digestion and passage of the feed depend on the dietary components (whether they are rapidly or slowly degraded in the rumen), its particle size when fed and the balance of dietary nutrients. It must be remembered that after 5 months pregnancy, the developing uterus visibly occupies some of the abdominal cavity. The scoring is conducted on the left flank of the cow and is presented in Table 6.4 and Figures 6.6a and 6.6b. The rumen score is assessed by observing the area between the ribs at the front, the vertebrae at the top and hook bone at the back, as indicated in drawing in Figure 6.6b.

Score all animals during the day or whenever convenient. As a rumen score is just a snapshot, it is best to score animals at different times of the day to get a good overall impression of their rumen fill. The ideal rumen scores vary for different

Table 6.4. Descriptors used to quantify rumen scores and their diagnoses.

Score	Descriptor	Diagnosis
1	A deep dip in the left flank The skin under the lumbar vertebrae curves inwards The skin fold from the hook bone goes vertically downwards The para lumbar fossa behind the last rib is more than one hand width deep Viewed from the side, this part of the flank has a rectangular appearance	The cow has eaten little or nothing which could be due to sudden illness or insufficient or unpalatable feed
2	The skin under the lumbar vertebrae curves inwards The skin fold from the hook bone runs diagonally forward towards the last rib The para lumbar fossa behind the last rib is one hand width deep Viewed from the side, this part of the flank has a triangular appearance	This score is often seen in cows in the first week after calving Later in lactation, this is a sign of insufficient feed intake or a too high rate of passage
3	The skin under the lumbar vertebrae goes vertically down for one hand width and then curves outward. The skin fold from the hook bone is not visible The para lumbar fossa behind the last rib is still just visible	This is the right score for milking cows with a good feed intake and when the feed remains in the rumen for the optimal time
4	The skin under the lumbar vertebrae curves outwards No para lumber fossa is visible behind the last rib	This is the correct score for cows nearing the end of lactation and for dry cows
5	The lumbar vertebrae are not visible as the rumen is well filled The skin over the whole belly is quite tight There is no visible transition between the flank and ribs	This is the correct score for dry cows

classes of stock, with the target for lactating cows being 3.0 and the target for dry cows being 4.0. This is because the heavily pregnant uterus alone in dry cows would lead to higher scores. Throughout the day, rumen scores should only be 0.5 above or 0.5 below these targets. The optimal rumen score for rations with low rates of passage (high fibrous diets) would be higher than for a ration with fast rate of passage (high concentrate diets).

Specific animals with low rumen scores should be monitored more closely, while high variation within the herd requires diagnosis and eliminating the causes. If the overall score is too low or too high, feed intake and composition should be monitored.

6.7 Manure scoring

Manure (or dung as it is often called) is a mirror of the digestive tract. By closely assessing the manure, you get an indication of the balance of the ration. You need to pay attention to consistency and the level of digestion. Consistency relates to the

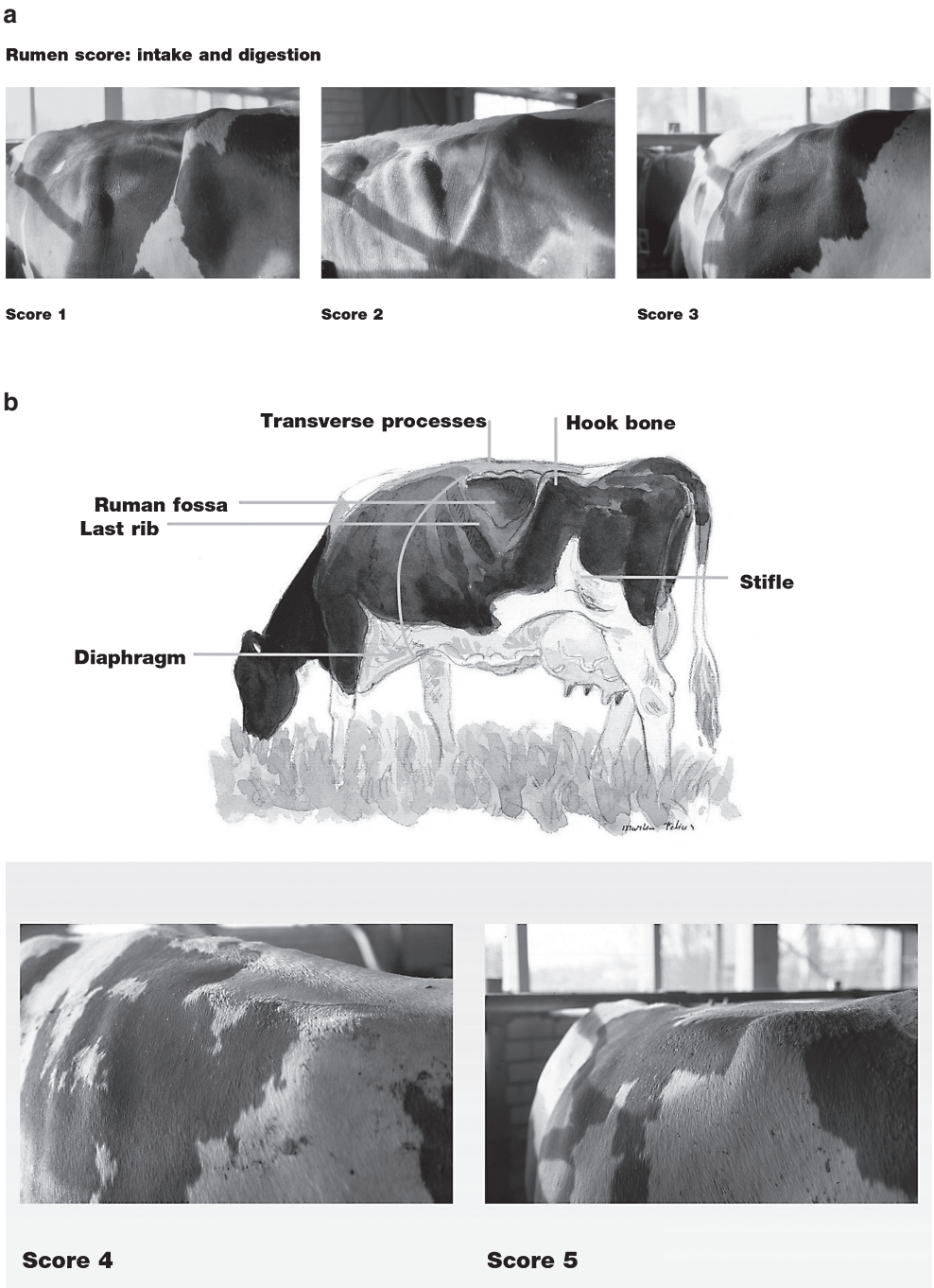


Figure 6.6: a) Pictorial standards of rumen scores 1, 2 and 3 in milking cows. b) Pictorial standards of rumen scores 4 and 5 in milking cows.

moisture content of the manure. If there are lots of abnormal breakdown products from the feed, the contents of the intestines will retain a lot of water. Other reasons for poor digestion – loose manure, include the presence of toxins or excessive minerals in the diet.

Manure can be scored for digestion and for consistency as shown in Table 6.5. The digestion score is based on taking a close look at fresh dung that has just been passed and feeling the manure with a gloved hand. The consistency score is assessed by eye and by treading into the manure with your gumboot. These two scoring systems are not necessarily related. In addition to descriptors of various manure scores, Figures 6.7a and 6.7b provide pictorial standards.

Table 6.5. Descriptors used to quantify manure for digestion and for consistency with *diagnoses in italics.*

Score	Assessment for digestion (Figure 6.7a)	Assessment for consistency (Figure 6.7b)
1	The manure glistens, feels like a creamy emulsion and is homogeneous. No undigested feed particles can be felt or seen. *This is the ideal score for milking and dry cows.*	The manure is so watery that it's barely recognisable. *This manure comes from cows that are very ill.*
2	The manure glistens and feels smooth and homogeneous. There are a few undigested feed particles that can be seen and felt. *This is acceptable for milking and dry cows.*	The manure is like a thin custard but is recognisable as manure. When it lands on a hard surface, the splatter goes a long way *This happens when grazing young, rich grass and when there is an imbalance in the ration.*
3	The manure appears slightly dull and does not feel homogeneous. After closing and opening your hand, bits of undigested fibre remain stuck to your fingers. *This manure is acceptable for in-calf heifers and dry cows but not for milking cows.*	The manure is like a thick custard forming a cowpat to a height of 2 to 3 cm. When it lands, a soft plopping sound can be heard. Boot test: when the boot is lifted, there is a footprint left in the cowpat and the manure does not stick. *This is an ideal consistency for manure as the ration is visibly well digested.*
4	The manure is dull in appearance and contains some coarse undigested feed particles, which are clearly visible. After closing and opening your hand, a ball of undigested feed remains in your hand. *The ration needs to be adjusted.*	The manure is thick, makes a heavy plopping noise when landing, is well formed and stacks in rings. The height is a finger's length or more. Boot test: when the boot is lifted, the manure sticks to it and a boot print is left behind. *This indicates an imbalance in the ration. For dry cows and in calf heifers this may be acceptable but the ration formulation should still be checked.*
5	The manure contains coarse feed particles and undigested ration components are clearly recognisable. *The ration needs adjusting.*	There are stiff balls of manure, like horse manure. Boot test: an impression of the boot is left on top of the dung. *Dry cows and in calf heifers often pass this sort of manure and it indicates the ration formulation should be checked. Check individual cows for disease (such as ketosis).*

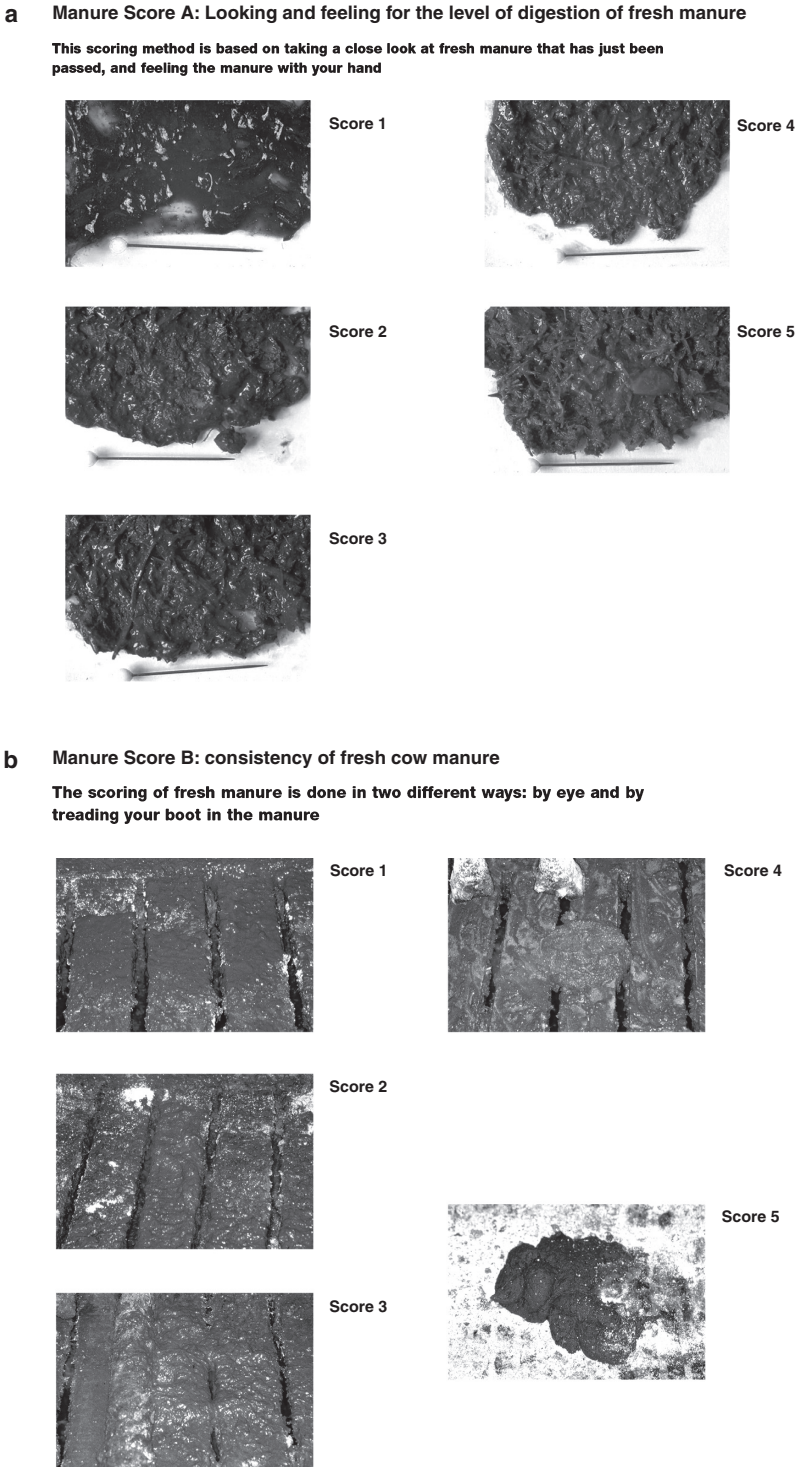


Figure 6.7: a) Pictorial standards for scoring manure for digestion in milking cows. b) Pictorial standards for scoring manure for consistency in milking cows.

The residue in a sieve after rinsing the manure with water provides a good indication of how well the feed has been digested and how much the cow is ruminating. Less than half the manure should remain in the sieve, while all the grain should have been digested and the fibre should show signs of having been chewed and digested.

When evaluating digestion you are looking for bits of undigested feed. Ideally every component of the diet should be digested. If parts are not digested, either they are indigestible or there was not enough time for complete digestion to take place. The latter occurs for instance when the rate of digestion for dietary energy and protein are not balanced, due to incorrect ration formulation. From the time feed is eaten until it is passed in the faeces takes between 36 and 72 h.

6.8 Teat scoring

The teat score provides a quantitative guide on the impact of the milking system on teat health and is presented pictorially in Figure 6.8 then described in Table 6.6. It assesses both the teat ends and the skin around the teat. Cows should be scored immediately after removal of the milk cluster and it should be conducted monthly.

Action should be taken if:

- more than 20% of the cows have scores of 3 or 4
- more than 30% of the cows between the second and fifth month of lactation have scores of 3 or 4
- when the overall score is considerably worse than the previous scoring.

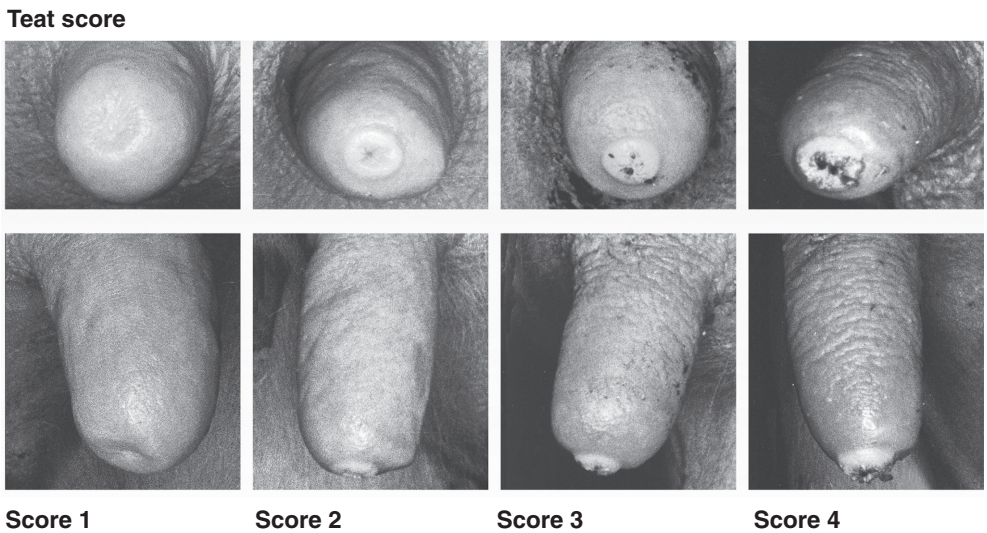


Figure 6.8: Pictorial standards for teat scoring in milking cows.

Table 6.6. Descriptors used to score teat health.

Score	Descriptor
1	No calluses
2	Smooth fairly thick callused ring around teat end
3	Moderately rough callused ring, with some fraying around the edges
4	Very rough calloused ring with a lot of fraying

6.9 Panting score

The Australian beef industry developed a panting score for use with feedlot beef cattle (Meat and Livestock Australia 2006). This could also be useful to dairy farmers to assess heat stress in milking cows. Table 6.7 summarises the key features of the panting score.

Guidelines for lofted beef cattle are as follows:

- If more than 10% of the cattle exhibit panting scores of 2 or more, cattle handling should cease and only resume when conditions become cooler and cattle have returned to normal.
- Cattle with panting scores of 3.5 or more are in danger of death.
- If more than 10% of the cattle exhibit panting scores of 3.5 or more, there is potential for a serious problem to develop unless measures are taken to cool the stock.
- The transition from 2.5 to 4.5 can happen quickly, in less than 2 h, under extreme conditions.

Table 6.7. Panting score to quantify heat stress.

Panting score	Breaths/minute	Breathing condition
0	< 40	Normal with no panting. Difficult to see chest movement.
1	40–70	Slight panting, mouth closed with no salivation. Easy to see chest movement.
2	70–120	Fast panting with salivation present. No open mouth panting.
2.5	70–120	As for 2 but with occasional open mouth panting. Tongue not extended.
3	120–160	Open mouth panting and some drooling. Neck extended and head usually up.
3.5	120–160	As for 3 but with tongue out slightly, occasionally fully extended for short periods and excessive drooling.
4	> 160	Open mouth with tongue fully extended for prolonged periods and excessive drooling.
4.5	Variable	As for 4 but head down. Cattle breathe from flank. Drooling may cease.

The panting score was developed primarily for lot-fed beef cattle often kept outside in dirt yards with or without access to shade. This is not the normal situation with milking cows which are either grazing at pasture (where heat loads are not as extreme as in dirt yards) or are maintained in sheds. Furthermore, the type of heat load is often different. In Australia, feedlot beef cattle are usually maintained in dry regions with high solar heat loads, whereas Asian dairy cows are usually kept in sheds where the heat load is more from high humidity and air movement can be poor. However, there are some dairy regions in Asia, such as Punjab in Pakistan where dairy cows are subjected to similar types of environmental management and heat stress as Australian lofted beef cattle.