

# Good practice can reduce dark cutting for better meat quality and higher returns

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## FACTSHEET 1

'Dark cutting' describes meat of inferior quality which is dark in colour and often firm and dry. Dark cutting can be prevented by implementing good practices; the like of which are often required under conformance or quality management programs.

## Key points

- Dark cutting meat is lower quality and costs millions in downgrades or waste.
- Dark cutting is predominately caused by low muscle sugar (glycogen) at the time of slaughter.
- On-farm, the risk of dark cutting can be reduced through good nutrition and handling.
- At the abattoir, the risk can also be reduced through good handling and management.
- Good practices, such as those required under conformance or quality management programs can help reduce dark cutting.

## Causes of dark cutting

- Stress created by poor handling and activities such as the inappropriate use of electric prodders.
- Poor handling facilities which cause stress or injury.
- Poor holding or lairage conditions, including design.
- Poor nutrition, including limited access to quality feed and clean water.
- Mixing with incompatible animals or isolation.
- Pre-slaughter washing.
- Excessive physical activity.

## Why dark cutting is an issue

Dark cutting meat, which often presents as dark, firm and dry, is of an inferior quality compared with bright cherry red meat because it:

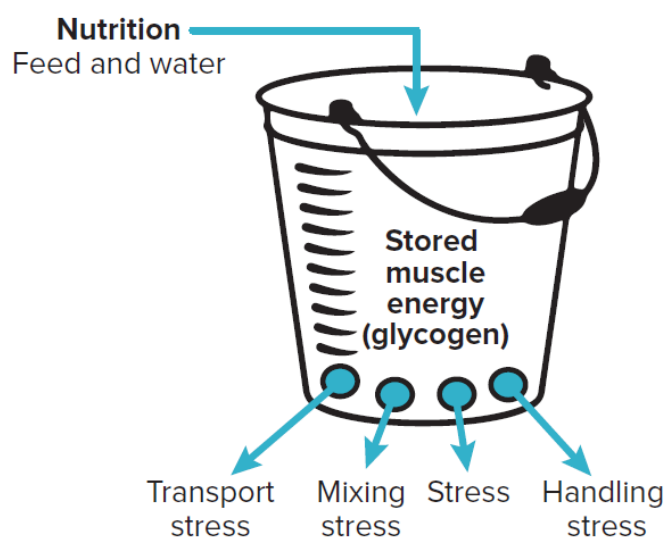
- Is drier than other meat due to an increased water holding capacity.
- Has a higher pH which creates favourable conditions for microbial growth, resulting in reduced shelf life and increased spoilage.
- Doesn't cook at the same rate as non-dark cutting meat, giving dark cutting steaks different degrees of doneness when cooked to the same internal temperature.
- Presents with a darker colour which is often discriminated against by consumers who prefer to buy bright cherry-red coloured meat.
- Has variable tenderness, with consumers perceiving dark cutting meat to be 'tough'.

## How dark cutting occurs

Glycogen is metabolised within muscles post-mortem to produce lactate and hydrogen ions. The formation of lactate lowers the pH of the muscle from a pH of around 7, which is standard in a living animal, down to a pH of around 5.4 to 5.7 within 24 hours.

If there is insufficient glycogen stored within the muscle at slaughter, there is limited formation of lactate resulting in a high pH and dark meat. Therefore it is essential to maintain high levels of muscle glycogen prior to and at slaughter.

### Factors causing glycogen loss



*The process of dark cutting*

Muscle glycogen is muscle energy. Both muscle contraction (physical stress) and adrenaline (emotional stress) need to be minimised on-farm prior to slaughter and during lairage to reduce the consumption of glycogen during the pre-slaughter period in order to reduce the incidence of dark cutting.

## Five practices which reduce dark cutting

There are five practices which help reduce the incidence of dark cutting:

1. Ensure all animals are handled quietly and calmly at all times, including during transport.
2. Reduce stress and exposure to new environments.
3. Ensure access to quality feed and clean water in the lead up to slaughter.
4. Never mix groups of different animals in the 14 days prior to slaughter even if they are from the same property.
5. Minimise the time in lairage.

### Dark cutting meat can be prevented – and it's worth it!

The implementation of well considered operating procedures to improve the management, handling, welfare, nutrition and care of animals can greatly reduce the incidence of dark cutting and improve meat quality. Other benefits such as reduced bruising and weight loss, reduced carcass shrink and increased yield can also occur when good practices are implemented that reduce the incidence of dark cutting.



## Good practices required by conformance or quality management programs to reduce dark cutting and deliver higher returns

While lairage and pre-slaughter practices vary from abattoir to abattoir, the principles of good management remain the same. These principles promote good animal welfare and optimise meat quality. It is recommended that a conformance or quality management program which aims to eliminate stress be actively adopted in your operation. Such programs formally address the following practices:

### Livestock handling

- DO ensure all handling from paddock to slaughter is undertaken by skilled handlers with animals handled as quietly as possible.
- DO use appropriate aides to livestock talkers to assist when moving animals.
- DO ensure livestock avoid vigorous physical activity such as mounting behaviour, running, fighting and excessive handling.

- DO minimise the occurrence of slipping and falling through calm handling practices and well-designed facilities.
- DO NOT use electric prodders.

### **Transport management**

- DO use transport companies with drivers trained and skilled in transporting livestock.
- DO load livestock based on recommended trucking densities.
- DO minimise unnecessary stops and delays in transport.
- DO unload in the shortest possible time.
- DO NOT transport livestock during extreme weather events like heat waves, storms or freezing weather.

### **Lairage management**

- DO assign animals to a lairage pen
- DO supply clean, fresh drinking water.
- DO assign pens which are far from the unloading area and busy laneways to at risk animals.
- DO provide non-slip, well drained surfaces and ensure animals have access to shelter.
- DO provide feed (good quality hay or pellets) to animals held in lairage for long periods (>24hrs).
- DO minimise time in lairage in order to minimise total time from dispatch to slaughter.
- DO NOT move animals from their assigned pens until they are required for slaughter.
- DO NOT mix groups of unfamiliar animals.

### **Assembly for slaughter**

- DO use well designed yards.
- DO eliminate all unnecessary procedures (such as weighing, clipping, washing and hosing) unless codes of practice necessitate their use.
- DO ensure animals are not left in the force pen or race for excessive amounts of time nor left on their own for any amount of time.

### **Source the correct animals**

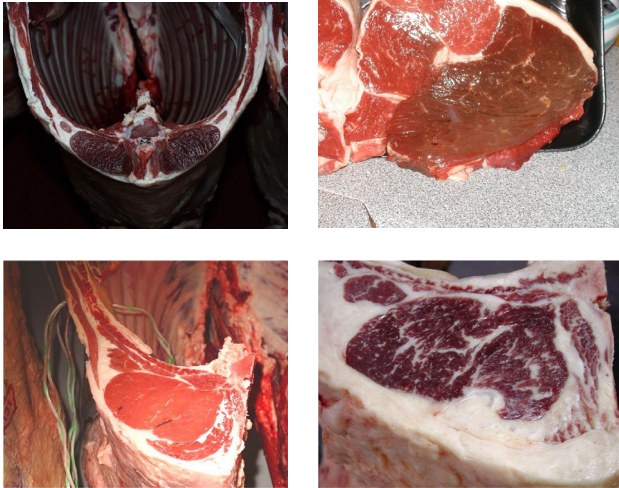
- DO procure animals gaining weight in the weeks prior to slaughter: CATTLE: more than 0.7kg per day, SHEEP: more than 150g per day.
- DO procure animals directly consigned from a property or to slaughter to minimise the number of 'new' environments prior to slaughter
- DO draft animals for slaughter at least three weeks prior to slaughter to allow the re-establishment of social hierarchy.
- DO procure yard weaned or feedlot finished livestock so they are well adapted to human contact and changes in environment.
- DO NOT procure heifers in oestrus due to changes in behaviour.

## Benefits of good practice

Dark cutting meat usually incurs a discount to cherry red meat in the market place. If this discount is known as well as the percentage of dark cutting carcasses, the daily cost of dark cutting can be estimated. For example, if 250 cattle are slaughtered each day and 25% of these are dark cutting with an average carcase weight of 185kg and a dark cutting discount of AUD 80c/kg.

= 250 x 25% x 185kg x AUD 80c/kg

= AUD \$9,250 per day in discounts due to dark cutting



*Minimising dark cutting through good practices improves meat quality and reduces wastage*  
Photo: Murdoch University

**Minimising dark cutting is simple**  
Ensure muscle glycogen on-farm is high (**provide good nutrition**) and minimise muscle glycogen losses pre-slaughter (**minimise stress and exercise**).

## Further reading

- *Factsheet 2: Good practice can reduce stress and improve eating quality*
- *Factsheet 3: Good practice can reduce acute stress and water loss from meat*
- *Factsheet 4: Good practice can reduce bruising resulting in less trimming and less carcase wastage*
- *Factsheet 5: Good practice delivers benefits from improved infrastructure*
- *Factsheet 6: Good practice can reduce animal stress and shrinkage for increased profits*
- *Factsheet 7: Good practice in the provision of quality feed and clean fresh water can improve growth rates and eating quality*
- *Factsheet 8: Good practice in reducing slipping and falling can improve hide cleanliness and carcase hygiene*
- *Factsheet 9: Good practice avoids mixing unfamiliar livestock which can reduce stress and improve eating quality*
- *Factsheet 10: Good practice in traceability delivers health and safety control and improves management decisions*
- *Factsheet 11: Good practice reinforced through training*
- *Factsheet 12: Support and training in good practice*

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# Good practice can reduce stress and improve eating quality

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FACTSHEET 2

Acute stress can affect the eating quality of meat. Good practices required by conformance and quality management programs help reduce stress and improve eating quality.

## Key points

- The tenderness and juiciness of meat influence consumer satisfaction.
- Meat from animals that have been stressed has been rated by consumers as being tougher, drier and of inferior quality.
- Acute stress prior to slaughter must be minimised to maximise an animal's potential meat quality.
- Implementing good practices prior to slaughter can reduce the incidence of acute stress.

## Why reducing stress is important

Acute stress occurs when an animals' natural "fight or flight" response is evoked, causing the release of the hormones adrenaline, nor-adrenaline and cortisol. This can affect the eating quality of the meat yielded from the animal by impacting the three most important characteristics of meat quality for consumers; tenderness, juiciness and flavour.

- **Tenderness** describes the amount of effort required to chew a piece of meat. This has a large influence on the consumers overall satisfaction with a piece of meat.
- **Juiciness** is the amount of water retained in the cooked meat product and released during the eating process. A juicy piece of meat will be more succulent and enjoyable to eat. Juiciness also increases flavour and tenderness. Marbling in meat also stimulates saliva production in the mouth, adding to the overall impression of juiciness.
- **Flavour** is the sensations felt on the tongue when eating food. These sensations include saltiness, sweetness, sourness and bitterness. Flavour is impacted by numerous chemical compounds and can be enhanced by the smell of the cooked meat.

Increased levels of acute stress reduce tenderness and juiciness and by association, the consumer's perception of flavour.

## The impact of stress

The hormones released pre-slaughter due to acute stress cause muscle energy or glycogen to be depleted which can negatively impact meat quality. Glycogen is hydrophilic or water loving meaning that high levels of glycogen mean high levels of water and juicy meat. When glycogen levels are depleted, so too are water levels resulting in dry meat.

Glycogen stores replenish very slowly and it takes a number of days after a stress related event for an animal's glycogen to return back to normal levels. This is why pre-slaughter stress management is particularly important as there is generally insufficient time for glycogen levels to recover prior to slaughter to prevent and adverse affect on eating quality.

Acute stress can be caused by an activity that makes the animal expend energy through physical activity and/or fear. These include:

- use of electric goad or prodders
- unsuitable handling practices
- increased closeness of human contact
- unsuitable handling equipment and conditions
- novel/unfamiliar environments
- loud noises
- isolation
- unfamiliar animals, and
- poor lighting.

## Five practices which reduce stress

There are five good practices which help reduce stress and these are required by conformance and quality management programs:

1. Ensure all handlers, including those handling livestock during transport, handle animals quietly and calmly.
2. Reduce stress and exposure to new environments.
3. Ensure access to quality feed and clean water pre-slaughter on-farm.
4. Never mix groups of different animals who have not been together for more than 14 days – even if they are from the same property.
5. Minimise the time in lairage.

**Acute stress prior to slaughter must be minimised to maximise an animal's potential meat quality.**

# Good practices required by conformance or quality management programs to reduce stress and improve eating quality

While lairage and pre-slaughter practices vary from abattoir to abattoir, the principles of good management remain the same. It is recommended that a conformance or quality management program which aims to eliminate stress through the five practices listed above be actively adopted in your operation as this will:

1. improve the tenderness of meat
2. improve the juiciness of meat, and
3. improve customer satisfaction and deliver greater returns.

These five practices can be reinforced through a conformance or quality management program that requires the following:

- DO handle and move livestock calmly and effectively, avoiding harm, distress and injury.
- DO ensure livestock are not subjected to procedures that cause pain or suffering.
- DO ensure all facilities used to handle the animals, including transport vehicles do not have any flaws that could cause injury to the animals.
- DO provide animals with enough space in pens to stand up, lie down and turn around.
- DO ensure animals are protected from exposure to adverse weather conditions.
- DO keep equipment used to handle animals is in good repair and working order.
- DO restrain animals effectively during the slaughter process.
- DO NOT stress livestock by isolating them unless absolutely necessary.
- DO NOT force livestock to walk over the top of other animals.

## Benefits of good practice

A consumer's decision to make a repeat purchase of red meat is governed by their previous eating experience.

If conformance or quality management programs are implemented in a value-chain and stress is minimised, the eating quality of the meat produced through that value chain will improve, potentially increasing the re-purchase rate and quantity purchased by consumers.

Through good practice, value chains can engage in livestock handling courses and access training materials as outlined in *Factsheet 11 Good practice reinforced through training* and *Factsheet 12: Support and training in good practice*.



## Further reading

- *Factsheet 1: Good practice can reduce dark cutting for better meat quality and higher returns*
- *Factsheet 3: Good practice can reduce acute stress and water loss from meat*
- *Factsheet 4: Good practice can reduce bruising resulting in less trimming and less carcass wastage*
- *Factsheet 5: Good practice delivers benefits from improved infrastructure*
- *Factsheet 6: Good practice can reduce animal stress and shrinkage for increased profits*
- *Factsheet 7: Good practice in the provision of quality feed and clean fresh water can improve growth rates and eating quality*
- *Factsheet 8: Good practice in reducing slipping and falling can improve hide cleanliness and carcass hygiene*
- *Factsheet 9: Good practice avoids mixing unfamiliar livestock which can reduce stress and improve eating quality*
- *Factsheet 10: Good practice in traceability delivers health and safety control and improves management decisions*
- *Factsheet 11: Good practice reinforced through training*
- *Factsheet 12: Support and training in good practice*
- Australian Meat Processor Corporation and Meat & Livestock Australia. *Fact sheet 13.11: Low-stress livestock handling techniques*. Access online: <https://www.ampc.com.au/uploads/cgblog/id245/Low-Stress-Livestock-Handling.pdf>
- Warner RD, Ferguson DM, Cottrell JJ and Knee BW (2007). *Acute stress induced by the pre-slaughter use of electric prodders causes tougher beef meat*. Australian Journal of Experimental Agriculture 47: 782-788.

# Good practice can reduce acute stress and water loss from meat

## FACTSHEET 3

Acute stress can affect the eating quality of meat. Good practices required by conformance and quality management programs help reduce acute stress and water loss from meat.

### Key points

- Muscle contains 70-80% water. Loss of this water from the meat means less weight to sell.
- Drip loss from the carcass, purge from a primal and water loss during cooking are three ways in which water is lost.
- Good practices can help reduce acute stress and water loss from meat.

### Why stress and water loss are issues



Meat has a high percentage of water and when this water is lost after slaughter, the weight of saleable product is also reduced, causing significant decrease in product value.

Water is lost in three ways: drip loss from the carcass, purge from the primals and cooking loss from the meat during the cooking phase.

Conformance or quality management programs require good practices that reduce stress pre-slaughter to be implemented and audited to ensure they are practiced. This can assist in identifying and eliminating incidents of acute stress prior to slaughter which can in turn deliver greater profits through increased carcass weight and higher value meat products.

*Calm handlers help avoid stressful animals during pre-slaughter handling which reduces the risk of water loss.*

## Causes of stress and water loss

Acute stress causes an increase in water loss from meat. Acute stress can be caused by any activity that causes a “fight or flight” response from the animal leading to the release adrenaline. These include:

- use of electric goad or prodders
- increased closeness of human contact
- unsuitable handling equipment and conditions
- novel or unfamiliar environments and animals
- loud noises
- isolation
- strange odours, and
- poor lighting.

Acute stress impacts the structure and composition of the muscle which then impacts its water holding capacity. Meat with low water holding capacity has increased losses of water prior to sale and is drier to eat, potentially resulting in a poor eating experience for the consumer.

The mechanism through which acute stress impacts the water holding capacity includes:

- A fast fall in muscle pH and high muscle temperatures leading to protein denaturation particularly of the sarcoplasmic proteins and of the myosin head. Change in these proteins causes shrinkage of the myofibrillar lattice increasing extracellular water and water loss from muscle.
- A shift in ions from the muscle cells into the plasma pre-slaughter. Due to a shift in osmolarity and an increase in osmotic pressure in the extracellular space, water travels from inside the muscle cells to outside the cells causing a loss of water post-mortem from the muscle.
- The release of stress hormones (adrenaline, nor-adrenaline and cortisol) and the subsequent breakdown of stored energy in the form of glycogen from the liver and muscle to produce energy. Glycogen stored in the muscle or liver is hydrated with 3-4 parts water, hence acute stress will deplete water storage in the muscle and the capacity of the muscle cells to sequester water due to a lower concentration of glycogen.

## Good practices required by conformance or quality management programs to help reduce acute stress and water loss from meat

Conformance or quality management programs with good practices aimed at eliminating stress should be actively adopted in your operation as they will:

1. reduce water loss from meat
2. improve the juiciness of meat, and
3. improve customer satisfaction and deliver greater returns.

A reduction in stress and the risk of water loss can be achieved through a number of simple practices:

- DO carry out handling and movement of livestock calmly and effectively, avoiding harm, distress and injury.
- DO ensure that all facilities used to handle the animals, including transport vehicles are free from any flaws that could cause injury to the animals.
- DO ensure animals have enough space in pens to stand up, lie down and turn around.
- DO protect animals from exposure to adverse weather conditions.
- DO ensure that equipment used to handle animals is in good repair and working order.
- DO restrain animals effectively during the slaughter process.
- DO NOT subject livestock to procedures that cause pain or suffering.
- DO NOT isolated animals.
- DO NOT force livestock to walk over the top of other animals.

**Meat with low water holding capacity can result in a poor eating experience for the consumer.**

## Benefits of good practice

Reducing the amount of acute stress during the pre-slaughter period through the implementation of good practices required by conformance or quality management programs will:

- Reduce the drip loss from a carcass resulting in a greater weight in carcasses to be sold.
- Reduce the purge in vacuum packaged meat resulting in a greater weight available for sale.
- Reduce cooking loss and purge after cooking resulting in better presentation for food service, smaller proportions needed to meet advertised serve weights and a better eating experience.

### **Economic cost to processor of drip loss from carcasses (per day)**

= 0.6% extra drip loss \* Average (Av.) carcass weight \* No. animals slaughtered \* Cost per kg

Beef example for processor killing 150 head = 0.6% \* 230kg \* 150 \* AUD \$5.50 = \$1,138.50 per day

Sheep example for processor killing 1,000 head = 0.6% \* 26kg \* 1,000 \* AUD \$5.00 = \$780 per day

### **Economic cost of purge to wholesaler from primals at six days of ageing**

= 0.6% extra purge \* Av. carcass weight \* Av. primal yield \* No. animals slaughtered \* Cost per kg

Beef example for processor killing 150 head = 0.6% \* 230kg \* 68% \* 150 \* AUD \$5.50 = \$774.18 in weight lost from primals from one days kill

Sheep example for processor killing 1,000 head = 0.6% \* 26kg \* 85% \* 1,000 \* AUD \$5.00 = \$663.00 in weight lost from primals from one days kill

## **Economic cost of purge to wholesaler from primals at 21 days of ageing**

= 1.9% extra purge \* Av. carcass weight \* Av. primal yield \* No. animals slaughtered \* Cost per kg

Beef example for processor killing 150 head = 1.9% \* 230kg \* 68% \* 150 \* AUD \$5.50 = \$2,451.57 in weight lost from primals from one days kill

Sheep example for processor killing 1,000 head = 1.9% \* 26kg \* 85% \* 1,000 \* AUD \$5.00 = \$2,099.50 in weight lost from primals from one days kill

*Values for drip loss and purge come from Warner et al. (2007)*

## **Further reading**

- *Factsheet 1: Good practice can reduce dark cutting for better meat quality and higher returns*
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- *Factsheet 4: Good practice can reduce bruising resulting in less trimming and less carcass wastage*
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- Warner RD, Ferguson DM, Cottrell JJ and Knee BW (2007). *Acute stress induced by the pre-slaughter use of electric prodders causes tougher beef meat*. Australian Journal of Experimental Agriculture 47: 782-788.

# Good practice can reduce bruising resulting in less trimming and less carcass wastage

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## FACTSHEET 4

Bruising needs to be trimmed from the carcass and reduces the amount of saleable meat. Good practice such as that required by conformance and quality management programs can reduce wastage caused by bruising.

### Key points

- When the hide or skin is removed from a carcass, a bruise or discolouration appears as a result of previous trauma.
- Bruising needs to be trimmed from the carcass resulting in less saleable meat and reduced returns.
- Bruising can occur at any stage during preslaughter delivery.
- Bruising is an indicator of poor animal welfare.
- Good practices can reduce the amount of wastage due to bruising by improving animal handling, handling facilities and trucks.

### Why reducing bruising is important

There are two types of bruises:

- **Subcutaneous bruises** occur just beneath the hide or skin. These bruises are typically caused by a minor impact or trauma which causes capillaries to rupture. The visual signs of subcutaneous bruises mean any minor trauma experienced in the 48 hours pre-slaughter will be visible when the hide is removed.
- **Intramuscular bruises** occur in the underlying muscles. Intramuscular bruises are created by a more forceful impact, where swelling and nerve pain can also be present. Damage to muscle and blood travelling under the hide or skin can create a much larger bruise and cause a larger amount of muscle and fat to be trimmed post-slaughter.



The removal of bruises prior to the sale of the carcass or the consumption of meat results in significant financial losses for the processor or purchaser of the product.

To remove or excise a bruise on a carcass could mean wastage of between 200g and 10kg of otherwise saleable product.

*Intramuscular bruising of the striploin muscle*

## Good practices required by conformance or quality management programs to help reduce bruising and deliver less trimming and less carcass wastage

Bruises are an indicator of poor animal welfare as they are caused by injury or trauma. The implementation of good practices from conformance and quality management programs improve animal welfare, reduce potential sources of bruising and therefore reduce the financial losses due to trimming and wastage of bruised product.

Conformance or quality management programs which aim to eliminate bruising should be actively adopted in your operation as they will:

1. Reduce pre-slaughter bruising and improve animal welfare.
2. Reduce meat lost through trimming.
3. Increase the amount of saleable meat leading to greater returns.

A reduction in bruising can be achieved through a number of simple practices:

- DO improve yard design so animals flow well with minimal human intervention.
- DO ensure there are no protruding objects such as rails, bolts or gate catches on trucks and in handling facilities.
- DO ensure animals are handled quietly, without dogs and electric prodders. The minimisation of grabbing sheep by the wool prior to slaughter will also reduce subcutaneous bruising.
- DO confirm individual animals are not isolated or restrained unnecessarily which would cause distress and injury to the animal.
- DO minimise the mixing of individuals in confined places such as yards or trucks.
- DO minimise the number of slips and falls through the installation of non-slip flooring during transport, loading, unloading and lairage.
- DO provide sufficient space during lairage and safeguard against animals walking over the top of each other which would cause bruising.



*Sheep handling facilities with no sharp edges or protrusions*

- DO train transport carriers and drivers in low-stress stock handling.
- DO minimise time in lairage by travelling direct to the abattoir.
- DO reduce the escape of animals from loading ramps by having sides high enough to prevent jumping.
- DO ensure animals are polled or dehorned or reduce the proportion of horned animals purchased.
- DO ensure contemporary groups of animals have similar weight or are of the same age or gender.

## Solutions provided by conformance or quality management programs

Conformance or quality management programs provide a structure that will help minimise bruising and therefore production losses within supply chains. These can help ensure:

- Staff are trained to handle animals calmly and quietly.
- Animals are not subjected to procedures that cause pain and suffering.
- There are no protrusions, sharp edges or slippery surfaces to cause injury and bruising.
- Animals are loaded, transported and unloaded with minimal stress.
- Poor quality infrastructure is not used which can cause escape, baulking, delays or stress.
- Ineffective infrastructure design or poor handling practice is not causing animals to overcrowd.
- Restraint equipment is in good working order and effective for the size and class of animals being processed.

**Poor animal welfare produces bruising which means reduced profits**



*The bruising on these carcasses had to be removed during processing which decreased yield*



## Benefits of good practice

The daily cost saving due to reduction in bruising percentage

= *Daily kill number \* Reduced % bruised carcasses \* Product waste per carcass \* c/kg purchase price*

**Example of cost saving to reduced bruising in sheep:**

= 800 \* 10% \* 0.5kg \* AUD 5.70c/kg

= AUD \$228 per day

**Example of cost saving to reduced bruising in beef cattle:**

= 250 \* 10% \* 2kg \* AUD 5.90c/kg

= AUD \$295 per day

## Further reading

- *Factsheet 1: Good practice can reduce dark cutting for better meat quality and higher returns*
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- *Factsheet 11: Good practice reinforced through training*
- *Factsheet 12: Support and training in good practice*
- Eldridge GA and Winfield CG (1988). *The behaviour and bruising of cattle during transport at different space allowances*. Australian Journal of Experimental Agriculture 28 , 695–698.
- Wythes JR, Kaus RK and Newman GA (1985). *Bruising in beef cattle slaughtered at an abattoir in southern Queensland*. Australian Journal of Experimental Agriculture 25 , 727–733.

# Good practice delivers benefits from improved infrastructure

FACTSHEET 5

Good practices required under conformance and quality management programs place significant emphasis on infrastructure that ensures animals are moved safely and calmly through facilities.

## Key points

- Well-designed facilities that utilise natural animal behaviour can reduce animal stress and improve productivity.
- Key areas include sharp edges, slippery floors and other infrastructure flaws which can lead to stress, injury and bruising.
- Even small flaws in infrastructure design can lead to delays in production, increased labour costs and increased stress on animals.
- Well-designed facilities can deliver greater returns through reduced bruising, dark cutting and labour costs.
- Existing facilities can generally be modified to significantly improve performance and deliver significant animal welfare and economic benefits.

## Why good infrastructure is important

There are many potential hazards for people and animals when moving livestock through facilities. Clear areas for concern and areas for improvement are sharp edges, slippery floors and other infrastructure flaws which can lead to stress, injury and bruising. Even small flaws in infrastructure design can lead to delays in production, increased labour costs and increased stress on animals.

Increased ease of animal movement and consistent slaughter intervals reduces labour and improves animal welfare. This results in lower costs and less wastage, e.g. using V-conveyor races for sheep and curved races for cattle.



*Facilities in good repair are more efficient*

# Good practices required by conformance or quality management programs to improve welfare and efficiency

Good practices from conformance or quality management programs which utilise natural animal behaviour can reduce animal stress and improve productivity by promoting facilities and practices which:

- present animals at the point of slaughter which are more uniform, i.e. same gender, same source and similar weight and size
- reduce labour required in the lairage area
- provide a safer environment for workers
- reduce dark cutting
- have a positive impact on tenderness, juiciness and flavour of meat
- increase the water holding capacity of meat, and
- reduce bruising.

Following a conformance or quality management program will highlight elements of facilities and infrastructure requiring maintenance and improvement. This will include areas where:

- animals are slipping or falling due to poor footing
- animals are baulking at noise, movement or distractions
- poor handling practices are being used as a result of poor infrastructure
- animals are suffering stress due to isolation
- infrastructure or handling practice is causing animals to overcrowd
- animals are likely to escape
- facilities and equipment have faults that could cause injury to animals
- poor lighting may be causing disruption to animal flow
- restraint for slaughter is causing animals to stress, and
- maintenance is required to ensure good operating procedure.

Upgrades can be done to existing facilities that can greatly improve animal's movement with the introduction of blanking, slide gates, non-slip flooring and other simple solutions which allow better animal flow and less stress for animals and workers.

Additions such as sheep V-belts are a more substantial investment but offer good return in labour savings, stress reduction and consistency of animals presenting for slaughter.

**Good infrastructure and facilities mean improved animal welfare and higher profits**

## Benefits of good practice

**Reduce bruising** due to improvement in yard facilities, forcing pen and holding race.

**The daily cost saving due to reduction in bruising by X%:**

= *Daily kill number \* % of carcasses bruised \* Average weight of bruised product \* c/kg deduction in value \* (X/100)*

Example for a 80% reduction in bruising where previously 20% were bruised =  $600 * (20/100) * 1\text{kg} * \text{AUD } \$2.50 * (80/100) = \text{AUD } \$240/\text{day}$

**Reduce stress and dark cutting** due to improved animal handling and facilities.

**The daily cost saving due to reduction in dark cutting by X%:**

= *Daily kill number \* % dark cutting \* Average carcase weight \* c/kg deduction in value \* (X/100)*

Example of cost saving to reduce dark cutting by 50%: =  $600 * 25\% * 18\text{kg} * \text{AUD } 40\text{c}/\text{kg} * 0.5 = \text{AUD } \$540/\text{day}$

**Reduce labour costs** due to more efficient handling techniques and facilities.

**The annual cost saving due to reduction in animal handlers by X%:**

= *No. animal handlers \* Average annual wage \* (X/100)*

Example for a 25% reduction in animal handlers =  $4 * \text{AUS } \$55,000 * (25/100) = \text{AUS } \$55,000/\text{year}$

Total annual cost saved for a X day/week operation =  $((52 * X) * \text{Reduced bruising cost saving}) + ((52 * X) * \text{Reduced dark cutting cost saving}) + \text{Annual saving in labour}$

Example total return on investment =  $(261 * 240) + (261 * 540) + \$55,000$

= \$285,580 per annum



*Good practices from conformance or quality management programs which utilise natural animal behaviour and good infrastructure can reduce animal stress and improve productivity*

## Further reading

- *Factsheet 1: Good practice can reduce dark cutting for better meat quality and higher returns*
- *Factsheet 2: Good practice can reduce stress and improve eating quality*
- *Factsheet 3: Good practice can reduce acute stress and water loss from meat*
- *Factsheet 4: Good practice can reduce bruising resulting in less trimming and less carcass wastage*
- *Factsheet 6: Good practice can reduce animal stress and shrinkage for increased profits*
- *Factsheet 7: Good practice in the provision of quality feed and clean fresh water can improve growth rates and eating quality*
- *Factsheet 8: Good practice in reducing slipping and falling can improve hide cleanliness and carcass hygiene*
- *Factsheet 9: Good practice avoids mixing unfamiliar livestock which can reduce stress and improve eating quality*
- *Factsheet 10: Good practice in traceability delivers health and safety control and improves management decisions*
- *Factsheet 11: Good practice reinforced through training*
- *Factsheet 12: Support and training in good practice*
- Grandin.Com. *Livestock Handling Systems, Cattle Corrals, Stockyards, and Races*. Access online: <http://www.grandin.com/design/design.html>

# Good practice can reduce animal stress and shrinkage for increased profits

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## FACTSHEET 6

Animal stress is one of the major causes of shrinkage. Good practices required by conformance and quality management programs can reduce shrinkage by addressing the main causes of animal stress.

### Key points

- Shrinkage is the amount of weight an animal loses between leaving the property of origin and slaughter.
- Stresses such as transport, sorting, weighing and standing for long periods all contribute to shrinkage.
- Shrinkage can be in either excretory or tissue form.
- Loss of weight due to shrinkage translates directly to reduced income.
- Following the practices prescribed by a conformance or quality management program can significantly reduce shrinkage and increase returns.

### Why shrinkage is an issue

Shrinkage is the amount of weight an animal loses between leaving the property of origin and slaughter. Shrinkage occurs in two forms: **excretory shrinkage** and **tissue shrinkage**. As shrinkage increases, net returns decrease. This loss can be minimised by understanding how shrinkage occurs and what causes it and by following conformance or quality management program practices and marketing strategies that help reduce shrinkage.

- **Excretory shrinkage**  
Excretory shrinkage is the loss of contents from the rumen, digestive tract and bladder. A degree of this type of shrinkage will occur during the first few hours of transport, or when cattle are taken off food and water and is unavoidable during the pre-slaughter period. Small amounts of excretory shrinkage do not harm animals. Acceptable levels of excretory shrinkage are from two to six per cent of initial live weight. Livestock usually recover quickly from excretory shrinkage once provided with rest, food and water.

- **Tissue shrinkage**

Tissue shrinkage occurs when the rumen, digestive tract and bladder are empty and the animal is dehydrated. Animals will then start compensating for the loss by drawing moisture and nutrients from tissues (muscle and fat). Tissue shrinkage can occur as a result of extensive sorting, standing, trucking or when cattle are held off feed and water for long periods of time (>12 hours). Tissue shrinkage causes:

- 1) A detrimental effect on the immediate health of ruminants. After 24 hours off feed and water, rumen microbes die resulting in animals not able to digest feed and a long recovery to pre-handling weights. This recovery period can be from 3-30 days.
- 2) Lower carcass weights and lower dressing percentages. The loss of water from fat and muscle tissue during the pre-slaughter period causes carcasses to be lighter, reducing the quantity of product that can be sold and impacting net profits.

When animals are exposed to stress, both excretory and tissue shrinkage starts to occur at the same time. Combined shrinkage of over 6% is preventable and costly.

## Factors that impact shrinkage

Many factors impact the degree of shrinkage that livestock may experience including:

- **Time-off-feed:** Longer periods of time-off-feed will increase excretory and tissue shrinkage.
- **Feed type:** The type of feed consumed will affect the rate and amount of shrinkage. There is a negative relationship between high moisture feeds (green grass) and excretory shrinkage. Sudden changes in diet can also influence the amount of excretory shrinkage.
- **Time-off-water:** The time-off-water will impact on the hydration and bladder fill of the animals. Hence longer time-off-water will increase excretory and tissue shrinkage
- **Age:** The age of the animal has a direct relation to the percentage of body weight that will be lost due to shrinkage. Young animals are most susceptible to shrinkage due to possible reliance on milk, rumens still developing and their naivety to new surroundings leading to stress.
- **Weight:** Heavier lambs shrink more but heavier cattle shrink less.
- **Weather:** Extremely high or low temperatures will cause stress and shrinkage.
- **Facilities:** Good facilities for handling livestock will reduce stress and shrinkage in livestock.
- **Animal handling:** Quiet and calm animal handling reduces animal stress and physical activity helping to reduce shrinkage.
- **Loading and unloading:** Loading and unloading are stressful. Loading and unloading quietly and calmly as well as avoiding overloading trucks help reduce shrinkage.
- **Mixing:** Stress and increased physical activity is caused when animals are grouped together with unfamiliar animals, leading to increased shrinkage.
- **Transit time:** Transit time and the duration of stationary confinement should be minimised to limit animal shrinkage.
- **Temperament:** Naive, unsettled or undomesticated livestock regardless of age will have relatively greater shrinkage.

# Good practices required by conformance or quality management programs to improve welfare and reduce shrinkage

Conformance or quality management programs can reduce shrinkage by ensuring the following good practices are maintained:

- Cool, clean water is available and accessible to all animals at all times including throughout lairage.
- Feed of sufficient quality and quantity is provided to all animals held for longer than 12 hours in lairage.
- Animals are handled to minimise stress.
- Vehicles used for animal transport and facilities are designed and operated to minimise stress.

**Reducing stress will minimise shrinkage and maximise earnings**

## Benefits of good practice

The economic benefit of reducing animal shrinkage comes in two forms:

- 1) Reduction in live weight lost due to implementation of good practices recommended through conformance or quality management programs.
- 2) Increased carcass yield and dressing percentage by reducing time-off-feed to less than 12 hours and having constant access to water.

*The daily cost saving due to increases in carcass yield = Daily kill number \* Reduction in hours of curfew \* Increase in yield per hour \* Average carcass weight \* c/kg sale price.*

Example of increased production income due to reduced lairage time of sheep from 36 to 12 hours:

$$= 800 * 24 * 0.1\% * 23\text{kg} * \text{AUD } 6.50\text{c/kg}$$

$$= 800 * 0.024 * 23 * 6.5 = \text{AUD } \$2,870.40 \text{ per day}$$

Example of increased production income due to reduced lairage time of cattle from 48 to 12 hours:

$$= 500 * 24 * 0.02\% * 250\text{kg} * \text{AUD } 7.10\text{c/kg}$$

$$= 500 * 0.0048 * 250 * 7.1 = \text{AUD } \$4,260.00 \text{ per day}$$



## Further reading

- *Factsheet 1: Good practice can reduce dark cutting for better meat quality and higher returns*
- *Factsheet 2: Good practice can reduce stress and improve eating quality*
- *Factsheet 3: Good practice can reduce acute stress and water loss from meat*
- *Factsheet 4: Good practice can reduce bruising resulting in less trimming and less carcass wastage*
- *Factsheet 5: Good practice delivers benefits from improved infrastructure*
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- *Factsheet 10: Good practice in traceability delivers health and safety control and improves management decisions*
- *Factsheet 11: Good practice reinforced through training*
- *Factsheet 12: Support and training in good practice*
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# Good practice in the provision of quality feed and clean fresh water can improve growth rates and eating quality

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FACTSHEET 7

Ongoing access to clean, cool water and quality feed is critical to maintaining animal welfare and optimising production.

## Key points

- Irregular feeding or long periods without feed and water can cause shrinkage plus severely affect the health of the rumen and reduce animal growth.
- Allowing animals to maintain hydration by providing continuous access to fresh water improves live weight gain, feed conversion ratios, carcass weight and meat yield and quality.
- Identifying and feeding to meet particular production requirements for growth rate and fat cover will help ensure the provision of feed and water which optimises animal welfare and production.
- Cool, clean water is essential for optimal rumen function and maximum weight gain.
- Feed rations should be carefully designed to meet production requirements and optimise feed conversion into muscle.

## Why water and feed quality are important

### Water quality

Water is critical for the digestion of feeds as rumen microbial attachment to feed particles is largely facilitated by the rumen fluid matrix. More water allows increased rumen microbe binding and a faster more efficient breakdown of feedstuffs leading to greater feed efficiency and weight gain.

Water intake has also been shown to directly affect grazing and feeding habits. Cattle with clean water trough access spend more time feeding or grazing compared to those with contaminated water such as that from dirty troughs or dams. Grazing cattle with a dam water source which typically contains silt and contaminants had a 23% reduction in weight gain compared to those with clean trough water access (Willms et al. 2002). Water quality is also likely to play a role in dark cutting due its impact on overall feed intake, weight gain and glycogen storage.

## Feed quality

Excretory shrinkage is the loss of contents from the rumen, digestive tract and bladder. A degree of this type of shrinkage will occur during the first few hours of transport, or when cattle are taken off food and water and is unavoidable during the pre-slaughter period. Small amounts of excretory shrinkage do not harm animals. Acceptable levels of excretory shrinkage are from 2-6% of initial live weight. Livestock usually recover quickly from excretory shrinkage once provided with rest, food and water.

## Tissue shrinkage

Tissue shrinkage occurs when the rumen, digestive tract and bladder are empty and the animal is dehydrated. Animals will then start compensating for the loss by drawing moisture and nutrients from tissues (muscle and fat). Tissue shrinkage can occur as a result of extensive sorting, standing, trucking or when cattle are held off feed and water for long periods of time (more than 12 hours).

Tissue shrinkage causes:

- a. A detrimental effect on the immediate health of ruminants. After 24 hours off feed and water, rumen microbes die resulting in animals not able to digest feed and a long recovery to pre-handling weights. This recovery period can be from 3-30 days.
- b. Lower carcass weights and lower dressing percentages. The loss of water from fat and muscle tissue during the pre-slaughter period causes carcasses to be lighter, reducing the quantity of product that can be sold and impacting net profits

When animals are exposed to stress, both excretory and tissue shrinkage starts to occur at the same time. Combined shrinkage of over 6% is preventable and costly.

## Factors that impact shrinkage

Many factors impact the degree of shrinkage that livestock may experience but those related to feed and water include:

- **Time off feed**  
Longer periods of time off feed will increase excretory and tissue shrinkage.
- **Feed type**  
The type of feed the livestock are consuming will affect the rate and amount of shrinkage. There is a negative relationship between high moisture feeds (green grass) and excretory shrinkage. Sudden changes in diet can also influence the amount of excretory shrinkage.
- **Time off water**  
The time off water will impact on the hydration and bladder fill of the animals. Hence longer time off water will increase excretory and tissue shrinkage
- **Transit time**  
Transit time and the duration of stationary confinement, particular where feed and/or water is withheld, should be minimised to limit animal shrinkage.

**Reducing stress will minimise shrinkage and maximise earnings**

# Good practices required by conformance or quality management programs improve welfare and reduce shrinkage

Reduced shrinkage can be achieved by following good practices required under conformance or quality management programs which include ensuring that:

- Cool, clean water is available and accessible to all animals at all times including throughout lairage.
- Feed of sufficient quality and quantity is provided to all animals held for longer than 12 hours in lairage.



*Keeping feed and water facilities clean is essential to minimising shrinkage*

## Benefits of good practice

The economic benefit of reducing animal shrinkage comes in two forms:

1. Reduction in live weight lost due to implementation of a conformance or quality management program.
2. Increase carcass yield and dressing percentage by reducing time off feed to less than 12 hours and having constant access to water.

The daily cost saving due to increases in carcass yield = Daily kill number \* Reduction in hours of curfew \* Increase in yield per hour \* Average carcass weight \* c/kg sale price.

Example of increased production income due to reduced lairage time of sheep from 36 to 12 hours:

$$= 800 * 24 * 0.1\% * 23\text{kg} * \text{AUD } 6.50\text{c/kg}$$

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$$= 500 * 24 * 0.02\% * 250\text{kg} * \text{AUD } 7.10\text{c/kg}$$

$$= 500 * 0.0048 * 250 * 7.1 = \text{AUD } \$4,260.00 \text{ per day}$$

## Further reading

- *Factsheet 1: Good practice can reduce dark cutting for better meat quality and higher returns*
- *Factsheet 2: Good practice can reduce stress and improve eating quality*
- *Factsheet 3: Good practice can reduce acute stress and water loss from meat*
- *Factsheet 4: Good practice can reduce bruising resulting in less trimming and less carcass wastage*
- *Factsheet 5: Good practice delivers benefits from improved infrastructure*
- *Factsheet 6: Good practice can reduce animal stress and shrinkage for increased profits*
- *Factsheet 8: Good practice in reducing slipping and falling can improve hide cleanliness and carcass hygiene*
- *Factsheet 9: Good practice avoids mixing unfamiliar livestock which can reduce stress and improve eating quality*
- *Factsheet 10: Good practice in traceability delivers health and safety control and improves management decisions*
- *Factsheet 11: Good practice reinforced through training*
- *Factsheet 12: Support and training in good practice*
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# Good practice in reducing slipping and falling can improve hide cleanliness and carcass hygiene

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## FACTSHEET 8

Good practices such as those required under conformance and quality management programs, place significant emphasis on animal handling and infrastructure to prevent slipping and falling, thereby improving hide cleanliness and carcass hygiene.

### Key points

- Animal hide, particularly faecal-contaminated hide, is a source of carcass contamination during slaughter.
- Slipping and falling dramatically increase the microbial load of cattle hides and sheep fleeces.
- Flooring in pens, laneways, races and ramps should be constructed with materials that minimise slipping, falling and injury.
- Pre-slaughter visual evaluation of animal hide cleanliness can be an effective aid to reduce contamination of carcasses and deliver improved food safety and hygiene.
- Visually clean hides generally result in more hygienic carcasses.

### Why hide cleanliness is important

Hide surfaces are recognised as a primary source of carcass contamination during slaughter and de-hiding procedures. In fact, in some instances, a filthy cattle hide will carry more food-borne pathogens than faeces.

Increasing amounts of filth on hides increases the transfer of bacteria to the carcass surface, especially when the filth is loosely attached and wet. In general, the wetter the hide of the animal, the greater the carcass coliform count.

Less slippage and falling will reduce the level of dirt, dung and organic matter adhering to the hide resulting in less contamination of carcass. Pre-slaughter visual evaluation of animal hide cleanliness can be an effective aid to reduce contamination of carcasses and deliver improved food safety and hygiene. Cleaner carcasses and lower carcass microbial counts ensure increased food safety and increased ability for longer ageing of meat without spoilage.

## Good practices required by conformance or quality management programs improve hide cleanliness

Good practices required under conformance or quality management programs which place significant emphasis on animal handling and infrastructure to prevent slipping and falling (where the animals body touches the floor), thereby improving hide cleanliness and carcass, include:

- Requirements that infrastructure be designed and maintained to eliminate slippery surfaces and hazards.
- Requirements that handling be conducted calmly and expertly by trained handlers to minimise animal responses that may lead to slipping and falling.
- A requirement that lairage area flooring be kept clean to minimise livestock slipping or falling.
- Internal audits which include measuring slips and falls. For example, scoring 100 animals from the crowd pen, lead-up race and stunning box (measure a percentage of 100 animals in each section) and mark: X = no slipping or falling, F = fell, S = slip.
- No more than 3% of animals are observed to be slipping and no more than 1% of animals are observed to fall, otherwise corrective action is taken.

**Good infrastructure and facilities mean less slipping and falling which improves hide cleanliness and carcass hygiene**

### Benefits of good practice

Good practices such as those required by conformity assessment and quality management programs help keep animals as clean as possible during the lead up to slaughter and prevent hides from becoming dirty. This avoids the situation where animals may be rejected from being admitted to the slaughter floor during the ante-mortem inspection due to excessive filth. In these instances, such animals may be required to be cleaned prior to slaughter which is costly and potentially stressful, delivering a poor animal welfare outcome and possibly leading to further losses from dark cutting. Preslaughter washing should be avoided unless absolutely necessary.

Procedures to reduce slipping and falling and improve carcass hygiene will deliver additional benefits associated with improved food safety and shelf life as well as reduced bruising and spoilage.



*Good infrastructure and handling can deliver clean hides*

## Further reading

- *Factsheet 1: Good practice can reduce dark cutting for better meat quality and higher returns*
- *Factsheet 2: Good practice can reduce stress and improve eating quality*
- *Factsheet 3: Good practice can reduce acute stress and water loss from meat*
- *Factsheet 4: Good practice can reduce bruising resulting in less trimming and less carcass wastage*
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- *Factsheet 9: Good practice avoids mixing unfamiliar livestock which can reduce stress and improve eating quality*
- *Factsheet 10: Good practice in traceability delivers health and safety control and improves management decisions*
- *Factsheet 11: Good practice reinforced through training*
- *Factsheet 12: Support and training in good practice*
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- Hauge SJ, Nafstad O, Røtterud OJ, and Nesbakken T (2012). *The hygienic impact of categorisation of cattle by hide cleanliness in the abattoir*. *Food Control*, 27(1), 100-107.
- McEvoy JM, Doherty AM, Finnerty M, Sheridan JJ, McGuire L, Blair IS, McDowell DA and Harrington D (2000). *The relationship between hide cleanliness and bacterial numbers on beef carcasses at a commercial abattoir*. *Lett Appl Microbiol*, 30(5), 390-395.



# Good practice avoids mixing unfamiliar livestock which can reduce stress and improve eating quality

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## FACTSHEET 9

Conformance and quality management programs incorporate control and traceability requirements and segregation guidelines which assist supply chains in avoiding mixing livestock from different social groups resulting in improved meat quality and higher profits.

### Key points

- When unfamiliar livestock are placed together in a group there is an increase in aggressive dominance behaviour as social hierarchies are re-established.
- Dominance behaviour causes stress which adversely affects eating quality and can lead to dark cutting.
- Bruising and injuries often occur due to dominance behaviour resulting in animal welfare issues and financial penalties.
- Where the mixing of livestock is unavoidable, horned animals should be kept separate from non-horned or polled animals to minimise dominance behaviour and bruising.
- Conformance and quality management programs require livestock to be controlled and traced through the supply chain meaning groups of livestock can be easily identified and managed as social groups.

### Why maintaining social groups is important

Cattle and sheep are gregarious meaning they tend to establish and maintain social groups. They will generally move from facility to facility and tolerate new environments quite happily provided these social groups are not disrupted. If these groups are broken up or unfamiliar livestock are mixed, it takes several weeks for a new social structure to be established. During this period, dominance behaviour is often exhibited, compounding an already stressful situation and increasing the risk of injury and bruising.

Bruising will cause damage to muscle resulting in pooling of blood under the skin. This can be exacerbated if horned cattle are mixed with unhorned cattle. Bruising will result in financial losses due to trimming and wastage of bruised product.

The stress involved in mixing groups of unfamiliar animals decreases muscle glycogen, increases meat pH and changes meat colour resulting in 'dark cutting'. This meat is visually unattractive, has poor water holding capacity, reduced shelf life and a sticky texture.

Meat with low water holding capacity is dry to eat resulting in a poor eating experience. The increased release of the hormones adrenaline, nor-adrenaline and cortisol during this stress period also negatively effects the tenderness, juiciness and flavour of the final product.

## Conformance or quality management programs to prevent mixing

Conformance or quality management programs generally include recommendations and requirements regarding the mixing of animals. The implementation of these recommendations and requirements is supported by control and traceability elements within the conformance or quality management program.

The control and traceability principles allow facilities to manage their livestock effectively and prevent the stress, bruising and subsequent meat quality issues associated with mixing unfamiliar livestock.

- **Control**  
There must be control demonstrated of all supply chain arrangements for livestock transport, management in lairage and at slaughter. With this control comes the ability to maintain social groups and avoid mixing unfamiliar animals.
- **Traceability**  
All livestock must be able to be traced through the entire supply chain, facilitating the management of social groupings.

## Benefits of good practice

Many benefits stem from maintaining social groups throughout the supply chain. These include reduced bruising and dark cutting as well as improved eating quality due to reduced stress. These benefits carry significant financial advantages which are discussed earlier in this series of fact sheets.



*Where the mixing of livestock is unavoidable, horned animals should be kept separate from non-horned or polled animals to minimise dominance behaviour and bruising.*

**Reduced mixing of unfamiliar social groups results in improved eating quality, reduced stress and dark cutting**

## Further reading

- *Factsheet 1: Good practice can reduce dark cutting for better meat quality and higher returns*
- *Factsheet 2: Good practice can reduce stress and improve eating quality*
- *Factsheet 3: Good practice can reduce acute stress and water loss from meat*
- *Factsheet 4: Good practice can reduce bruising resulting in less trimming and less carcass wastage*
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- *Factsheet 11: Good practice reinforced through training*
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# Good practice in traceability delivers health and safety control and improves management decisions

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FACTSHEET 10

Traceability of animals is important for quality assurance and disease control and ensures animals can be traced back to their property of origin and all properties and facilities visited during their life.

## Key points

- Traceability is critical in controlling biosecurity, meat safety and product integrity.
- Traceability provides the opportunity to make production and management decisions based on data and an understanding of the performance and whereabouts of individual animals.
- Traceability enables the promotion of product based on raising claims or provenance.

## Why traceability is important

Livestock identification and traceability is extremely important for:

- disease control,
- meat safety,
- product integrity and
- the collection of data for management decisions

Traceability requires three key elements:

- an animal identifier (a visual or electronic ear tag known as a device)
- identification of a physical location
- a method to record and track animal movements and associated details

In addition to tracing animals in the event of a health or meat safety issue, electronic devices can be used as a management tool in breeding and feeding operations.

When paired with reading equipment facility entry dates, performance, weight gains, treatment and withholding periods can be easily recorded to maximise efficiency in the system and provide full traceability of the product. Livestock can also be managed in groups so issues associated with mixing mobs can be avoided.

# Conformance and quality management programs underpinned by traceability

Traceability is an important pillar in conformance and quality management programs. The following conditions apply to animals exported live from Australia:

Cattle must be identified to:

- enable identification of individual cattle,
- allow for the reconciliation of cattle at each point of the supply chain, and
- be capable of giving reports on individual cattle and consignments.

For sheep and goats:

- exporters must implement a system of animal traceability based on counting and reconciliation of animals at all points along the supply chain.

## Benefits of good practice

Traceability provides the ability to manage livestock for disease control, meat safety and product integrity reasons as well as enabling the collection of data for management decisions.

## Further reading

- National Livestock Identification System website: [www.nlis.com.au](http://www.nlis.com.au)

# Good practice reinforced through training

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FACTSHEET 11

The Australian livestock export industry wants to help all members of the supply chain with information and training. The training available as part of conformance and quality management programs will assist in improving animal welfare, quality control and profitability.

## Key points

- Stressed animals will increase your instances of dark cutting and bruising, reduce water holding capacity and negatively impact tenderness, juiciness and flavour of meat.
- Meat & Livestock Australia and LiveCorp are committed to providing training and support in animal health, handling and welfare to reduce stress and increase profit.
- Improved skills through specialised training can directly contribute to better financial returns.

## Why training is important

Conformance and quality management programs require particular tasks associated with animal handling, nutrition and welfare to be conducted and often recorded in ways that may be new or different to those traditionally practiced by handlers in overseas markets.

The Australian industry has developed a range of training packages and materials to ensure handlers understand these requirements and are confident in putting them into practice. To reduce stress on animals in a supply chain, livestock handlers and transporters need to be able to:

- Understand concepts of flight zone, point of balance, position, pressure and release, movement and communication and utilise these concepts to handle animals calmly and effectively.
- Appreciate the harmful effect of electric prodders, noise, touching and other stressors on animal welfare and meat quality.
- Recognise problems and situations which may cause stress or injury and how to fix them.

Stressed animals will increase instances of dark cutting and bruising, reduce water holding capacity and negatively impact tenderness, juiciness and flavour of meat. Training and the implementation of standard operating procedures which reflect good practice are fundamental to profitability.

# Good practices required by conformance or quality management programs reinforced through training

Training programs designed by the Australian industry to support the adoption of conformance and quality management programs include topics such as:

- Standard Operating Procedures for the Welfare of Sheep / Cattle in Overseas markets.
- Low Stress Livestock Handling
- Facility Design Risk Analysis
- Livestock Transport Operators Training

Training materials available include:

- Standard Operating Procedures for the Welfare of Sheep / Cattle in Overseas markets.
- Is It Fit to Load?
- Management of unfit to Load Livestock
- South East Asian Cattle Breeding Guide
- Manual for South East Asian Cattle feedlots
- South East Asian Cattle Feedlot Treatment Guide
- Do's & Dont's of Livestock Handling
- Livestock Handling Guide
- Australian Goat Manual for Malaysian Farmers
- Best Practice use of Veterinary Drugs
- Tropical Beef Production Manual

## Benefits of good practice

The benefits of training aligned to conformance and quality management programs include:

- improved animal welfare,
- improved meat quality,
- reduced losses and greater yields and
- greater financial returns.

If you are interested in accessing assistance and material to aid training your staff within your facility, please contact your Australian exporter or your local Meat & Livestock Australia regional manager. A program tailored to your requirements can be designed and organised.



*The Australian livestock export industry wants to help all members of the supply chain with information and training.*

## Further reading

- LiveCorp website: [www.livecorp.com.au](http://www.livecorp.com.au)
- MLA website: [www.mla.com.au](http://www.mla.com.au)
- *Factsheet 1: Good practice can reduce dark cutting for better meat quality and higher returns*
- *Factsheet 2: Good practice can reduce stress and improve eating quality*
- *Factsheet 3: Good practice can reduce acute stress and water loss from meat*
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- *Factsheet 12: Support and training in good practice*



# Support and training in good practice

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FACTSHEET 12

The Australian livestock export industry is committed to supporting good practices such as those required under conformance and quality management programs. Such programs assist all sectors of the supply chain increase their skills and knowledge to improve the dressing and storage of meat products.

## Key points

- Good practice delivers good animal welfare, meat quality and food safety outcomes.
- The Australian livestock export industry is committed to supporting its partners in adopting good practices required under conformance and quality management programs through the provision of training and support.
- Training courses are run across Australia's livestock export markets to aid facilities in ensuring a high quality, clean product with prolonged shelf life and reduced risk to consumers.
- The training can help your staff to better understand and manage important issues related to hygiene, food safety and shelf life.
- Training allows supply chain participants to share in the increased returns delivered through good practices required under conformance and quality management programs.

## Why training is important

Conformance and quality management programs often require supply chain participants to perform tasks differently to how they may have in the past.

The Australian livestock export industry recognises this and is committed to assisting its partners understand and adopt new practices designed to improve animal welfare, product quality and food safety. This is done through the provision of training and support provided by experts in livestock production and meat science.

Training courses have been run across Australia's livestock export markets to aid facilities in ensuring a high quality, clean product with prolonged shelf life and reduced risk to consumers.

Conformance and quality management program training and support can help your staff better understand and manage important issues related to hygiene, food safety and shelf life. Training material is available in several languages.

# Conformance and quality management programs put into practice through training

Training can be targeted to feedlot and lairage workers, slaughter floor workmen and butchers, veterinarians, facility management or regional meat, health and safety monitoring teams.

A range of resources and training packages are available including:

- Standard Operating Procedures for Welfare of Sheep in Overseas markets.
- Standard Operating Procedures for Welfare of Cattle in Overseas Markets
- Is It Fit to Load?
- Management of unfit to Load Livestock
- South East Asian Cattle Breeding Guide
- Manual for South East Asian Cattle feedlots
- South East Asian Cattle Feedlot Treatment Guide
- Do's & Dont's of Livestock Handling
- Livestock Handling Guide
- Australian Goat Manual for Malaysian Farmers
- Best Practice use of Veterinary Drugs
- Tropical Beef Production Manual
- Knife Sharpening DVD
- On-board Ship Training DVD
- Meat Quality and Hygiene Handbook
- Temperate Beef Breeder Manual

## Contacts

Australia has regional offices to assist in providing tailored training in good practice required through conformance and quality management programs. Find contact details for your closest office below:

### General enquiries

#### ***Meat & Livestock Australia - Head Office***

Level 1, 40 Mount Street, North Sydney NSW 2060

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Email: [info@mla.com.au](mailto:info@mla.com.au)

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*Tailored training in good practice can be provided through Meat & Livestock Australia and LiveCorp*

## Further reading

- LiveCorp website: [www.livecorp.com.au](http://www.livecorp.com.au)
- Meat & Livestock Australia website: [www.mla.com.au](http://www.mla.com.au)
- *Factsheet 1: Good practice can reduce dark cutting for better meat quality and higher returns*
- *Factsheet 2: Good practice can reduce stress and improve eating quality*
- *Factsheet 3: Good practice can reduce acute stress and water loss from meat*
- *Factsheet 4: Good practice can reduce bruising resulting in less trimming and less carcass wastage*
- *Factsheet 5: Good practice delivers benefits from improved infrastructure*
- *Factsheet 6: Good practice can reduce animal stress and shrinkage for increased profits*
- *Factsheet 7: Good practice in the provision of quality feed and clean fresh water can improve growth rates and eating quality*
- *Factsheet 8: Good practice in reducing slipping and falling can improve hide cleanliness and carcass hygiene*
- *Factsheet 9: Good practice avoids mixing unfamiliar livestock which can reduce stress and improve eating quality*
- *Factsheet 10: Good practice in traceability delivers health and safety control and improves management decisions*
- *Factsheet 11: Good practice reinforced through training*