PLAN, PREPARE AND CONDUCT BEST WELFARE PRACTICE LAMB MARKING PROCEDURES

TRAINING GUIDE

Australian Wool Innovation Limited

IN CONSULTATION WITH:

WOOLPRODUCERS AUSTRALIA

LCA LIVESTOCK CONTRACTORS ASSOCIATION

Overview of the "Plan, Prepare and Conduct Best Welfare Practice Lamb Marking Procedures – Training Guide"

The National Mulesing Accreditation Program (NMAP) manual has in the past only been available to those completing NMAP training. Making this training guide more freely available to all woolgrowers, is seen as the best way forward to improve the on-farm husbandry practices for lamb marking and mulesing.

The guide has been updated by AWI with WoolProducers Australia and the Livestock Contractors Association and now published as the "Plan, Prepare and Conduct Best Welfare Practice Lamb Marking Procedures – Training Guide". This training guide is designed to assist woolgrowers and their contractors perform lamb marking and mulesing procedures with the utmost care and attention to ensure the best short and long term welfare outcomes for the animal.

This guide can be used by any Registered Training Organisation to provide competency-based training for "Plan, Prepare and Conduct Mulesing Procedures" (AHCLSK334).

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INTRODUCTION

WoolProducers Australia, Livestock Contractors Association and the Australian Wool Innovation have developed a training guide manual "Plan, Prepare and Conduct Best Welfare Practice for Sheep Husbandry Procedures". The focus of this manual is to describe best-practice techniques for the lifetime welfare of sheep focussing on lamb marking and mulesing. It can help producers provide good lifetime health, welfare and management outcomes for their livestock.

Painful death and illness from flystrike remains a risk to Australian sheep across most Australian environments. Lamb marking and mulesing are important for the sustainability and welfare of the Australian wool industry because they remain key lifetime sheep welfare tools for woolgrowers.

For most woolgrowers lamb marking and mulesing remain necessary options to protect the lifetime welfare of sheep just as crutching, shearing and chemical use are also important to protect sheep from all forms of breech, body, pizzle, poll and wound strike. Wound treatments to numb pain, relieve inflammation, reduce blood loss and disinfect and protect the wounds are regarded as best practice and have reduced the temporary welfare impacts from these practices.

Woolgrowers who still need to mules, assess the risk of causing this initial pain against the risk of death and illness from flystrike each year over the lifetime of their sheep. The benefits, once the wound has healed, from the decreased risk of breech flystrike for those mulesed sheep are substantial for lifelong welfare.

With the emergence and spread of chemically resistant blowflies, the risk to sheep has dramatically risen. Woolgrowers can no longer assume chemical applications prevent any form of flystrike (breech, body, pizzle, poll or wound).

OPERATIONS INVOLVED

Lamb marking and mulesing can include some or all of the following procedures: the mules operation and or castrating male lambs, tail docking, ear marking and tagging, vaccinating, application of pain relief products and insecticides and other animal health products. Mulesing should be carried out at the same time as lamb marking, unless there are animal health reasons for not combining the procedures. Combining the procedures reduces handling and the total stress experienced by the lambs.

BACKGROUND

Flystrike remains one of the most serious problems affecting Australia's sheep industry, costing producers an estimated $173 Million annually (Lane J, 2015).

Strikes can occur on various parts of the sheep. For example, body strike caused by fleece rot from extended periods of wet weather, pizzle strike in males, poll strike in rams and breech strike.

In most years breech strike is by far the most prevalent type of flystrike. The most common cause of breech strike is due to retained moisture in skin folds and the staining of wool by urine or faecal scouring.

Prevention of breech strike is always better than the cure and is based on:

- Breeding for lower wrinkle, cover and dag
- The mules operation
- Tail docking at the third or fourth joint
- Crutching once a year or more in addition to shearing
- Management of internal parasites and diet to prevent scouring
- Judicious application of insecticides. For example: jetting and dipping

Until adequate alternatives are developed, correctly performed mulesing and tail docking of lambs provides a good reduction in the risk of breech strike for sheep.

Flystrike on an unmulesed sheep (Agr Gazette 83:146-147, 1972)

As little as 500 grams of such stained wool can reduce the value of 500 tonnes of wool by 15% or more. Mulesing can reduce the amount of stained wool by as much as 72% (Agr Gazette 83: 146–147, 1972).

Sheep that have high dag and high breech wrinkle, in high risk environments are highly susceptible to breech strike and there can be considerable improvements in their lifetime welfare from mulesing. To minimise the temporary stress caused by the mulesing procedure it is highly recommended that pain relief is used.

This Training Guide focuses on mulesing procedures and also provides information on castrating male lambs, tail docking, ear marking and tagging, vaccinating and the application of insecticides and other animal health products.

THE HISTORY BEHIND MULESING

Mulesing takes its name from its founder, Mr J.H.W. Mules, who reported during the 1930s on the benefits in controlling breech strike by the surgical removal of wrinkles from the crutch area of sheep. Mules' original method has been modified to provide sheep producers with an improved economical and effective way of preventing breech strike.

Combined with breeding to reduce breech wrinkle and dags, careful management and correct tail length, mulesing is currently an important and effective method of reducing breech strike in sheep. Removing wool-bearing skin to reduce wrinkle and increase the size of the bare area around the breech reduces the risk of flystrike by reducing moisture, staining and dagginess, thus making the area less attractive to blowflies.

The benefits of mulesing are:

- Lifelong reduction in the risk of breech strike
- Improved lifetime welfare
- Reduced shearing cuts and damage to ewes
- Increased ease of crutching and shearing
- Increased productivity from lower levels of strike
- Reduced stain in wool, and
- Higher sheep prices

CURRENT RESEARCH

Protecting the national flock from flystrike remains a top research priority for Australian woolgrowers. Since 2001, woolgrowers through Australian Wool Innovation, the wool industry's research, development and marketing body, have invested $70 million in animal health and welfare research, development and extension (RD&E), including more than $37 million on flystrike prevention (AWI, 2018). Refer to www.wool.com for information on current research projects that are investigating a range of alternatives to mulesing for control of flystrike in sheep.

SECTION 1

OVERVIEW OF LAMB MARKING

Lamb marking and mulesing are important for the sustainability and welfare of the Australian wool industry because they remain key lifetime sheep welfare tools for woolgrowers.

Lamb marking refers to husbandry procedures including tail docking, castration of males, ear marking, ear tagging, vaccination and insecticide application.

Mulesing is the removal of wool-bearing skin from the tail and breech area of the sheep. The size and shape of the wound is created so, with healing, the natural bare area around the anus and vulva (on ewes) is stretched outward. The degree of stretching is relative to the amount of initial wrinkle and wool cover and to the size of the mules. The size of the mulesed area has been decreasing over time as sheep are being bred with less wrinkle and wool cover.

Lamb marking is best carried out between 2-8 weeks of age. It is recommended mulesing is carried out at the same time to reduce the total stress experienced by the sheep. There are exceptional circumstances where mulesing is delayed until after the fly season finishes or during times of drought.

The mulesing procedure is controlled under various legislation and regulations in most States, principally under Veterinary Surgeons' Acts or Regulations and various animal welfare or cruelty legislation.

1.1 THREE ESSENTIAL PRINCIPLES

On farm planning and preparation for the mulesing operation are crucial to its success. Three essential principles underlie this process:

1. maximise hygiene
2. minimise stress on the sheep
3. maximise recovery rate

The key strategies in achieving these principles are:

- to ensure ewes and lambs are in good health and in the best condition possible prior to marking/mulesing
- to mark and mules lambs at between 2-8 weeks of age. Exceptions are for disease control or exceptional seasonal conditions
- avoid severe fly challenge times of the year
- select paddocks with sufficient feed and ground cover with at least four weeks feed
- avoid hot, windy or wet weather
- set up the work site to facilitate efficient work practices
- ensure lambs are not daggy
- use temporary or portable yards to reduce the distance sheep need to travel before and after marking and mulesing
- use high-quality equipment, which is well maintained and clean
- correctly set, grind and sharpen all surgical equipment including shears and knives
- adhere to best practice hygiene standards for surgical equipment and procedures
- use all chemicals including disinfectants, insecticides and vaccines in accordance with label recommendations
- Use analgesia/anaesthetic products appropriate to the procedures (Consult your Veterinary Practitioner)

Photo 1.1 Ewe (left) and wether (right) showing correct docked tail length and mules area. *PHOTO: Ian Evans*

1.2 MOST IMPORTANT POINTS

The most important points in the lamb marking and mulesing operations are:

- **Correct tail length,** tails are to be docked at the 3rd or 4th joint
- **Do not** cut into or remove the bare (non wool growing) skin
- **Do not** cut into or through the selvage (muscle fascia)
- Symmetry – sides must be even in size and shape
- Leave a "V" of wool-bearing skin to one-third to two-thirds the length of the docked tail
- The degree of stretching and the size of the resulting wrinkle-free bare area is proportional to the wound size. Adjust the size of the wound created, particularly the breech mules, to give flystrike protection for the type of sheep in the environment in which they are run
- Use analgesia/anaesthetics in accordance with label and Veterinary instructions

Photo 1.2 Example of well-mulesed ewe weaner.
PHOTO: Ian Evans

Release the lamb directly onto its feet as soon as the operations are complete. Avoid wound contamination.

Facilitate mothering-up with the ewes by allowing immediate post-operative contact and minimising mob movement.

Allow paddock choice to avoid disturbance for at least four weeks, or until all mulesing wounds have totally healed post lamb marking and mulesing.

The final result will not be apparent until one or two years of age and is most readily observed immediately off-sheers.

SECTION 2

WORK HEALTH AND SAFETY

Work health and safety (WHS) is concerned with the safety and health of all workers and visitors in a workplace. Although specific laws differ in Australian States, workers have a duty of care towards themselves and others in the workplace. Employees fulfil their duty of care by minimising hazards through safe work procedures.

Employers also have an obligation to provide a safe workplace through safety training, provision of safety equipment, maintaining a hazard-free workplace and establishing safe work practices.

Regulations and advice for different Australian States and Territories can be found on the relevant website for each jurisdiction.

2.1 PERSONAL PROTECTIVE EQUIPMENT

Personal protective equipment (PPE) is clothing or equipment designed to minimize the risk of injury or illness associated with work tasks being undertaken. Examples of PPE which would suit livestock handling include:

– Boots – Hat – UV glasses – Gloves	– Long pants – Shirt sleeves – Sunscreen – Dust mask

2.2 DUTY OF CARE

Every employee has a duty of care to themselves and others around them. In its simplest form, duty of care can be described as being responsible for your own actions and decisions, and how they affect you and others around you. Similarly, employers and clients of mulesing contractors also have a duty of care to their employees, clients and visitors to the work area.

Often the animals being handled will be treated with veterinary medicines and will ultimately be headed for human consumption locally, interstate or overseas. One important aspect of duty of care is to ensure withholding periods for the designated end product (meat, wool or milk) are complied with. In many cases, the domestic regulation (withholding period) is different to the international regulation (export slaughter interval). A current list of withholding periods and export slaughter intervals can be found at the following website: http://www.apvma.gov.au/residues

Always keep records of treatment dates and application details to comply with each State's chemical usage record-keeping requirements.

2.3 REPORTING HAZARDS AND RISKS

HAZARD – is any situation that could cause injury or illness to a person. Hazards can be classified as physical, chemical, biological or radiation.

RISK – is the potential consequence of the hazard.

Some hazards can be rectified and in many cases a largely hazard-free workplace can be maintained. But, sheep are live animals and consequently hazardous situations can arise without warning. In these situations, the only option is to minimize the risk of injury or illness.

Report any hazards to the person responsible for health and safety in that workplace. Where the workplace involves a private property, the owner (or nominated representative) of the property is responsible for the health and safety of all people and sheep on the property.

2.4 PROTECTION FROM ZOONOSES

Zoonoses are diseases that can be transmitted from animals to humans. The relative effect of the transmitted illness on humans compared with other animals varies from mild to life-threatening. People with a compromised immune system are particularly susceptible to novel infections.

There are a number of zoonoses that can be transmitted from sheep to humans (see Table 2.1).

Table 2.1 Sheep zoonoses and their effects on humans

Common diseases that can cause serious health problems in humans (zoonoses)

DISEASE	TRANSMISSION	COMMON SIGNS IN PEOPLE
Q fever	Inhalation of aerosols and dust, handling aborted foetuses or foetal fluids	Headache, chills, fever, muscle pain, malaise, coughing, vomiting. Can be prevented by vaccination in people as long as they have no previous exposure
Campylobacteriosis	Ingestion of contaminated food or water	Severe diarrhoea, pain, fever, headache, nausea
Scabby mouth	Handling infected material from mouths/feet of sheep	Papule that heals spontaneously
Yersiniosis	Faeco-oral route	Acute watery diarrhoea, fever, headache
Salmonella	Faeco-oral route	Acute watery/blood flecked diarrhoea, fever, headache
Listeriosis	Food borne disease, especially chilled foods	Transient mild flu-like to acute meningoenchephalitis with case fatality rate of 30%, foetal infection can lead to abortion
Anthrax	Respiratory, ingestion or local through break in skin	Respiratory or gastrointestinal forms have very high mortality rates as does local skin infection if left untreated
Hydatids	Dogs infected with hydatid tapeworms, humans ingest tapeworm eggs from dogs. People cannot get infected from cysts in sheep	May not be obvious for some time but signs in people depend on where cysts occur – can be fatal. Prevent by not feeding dogs raw offal and treating dogs every 6 weeks with tapeworm tablets containing praziquantel

Source: www.makingmorefromsheep.com.au/healthy-contented-sheep/tool_11.18.htm

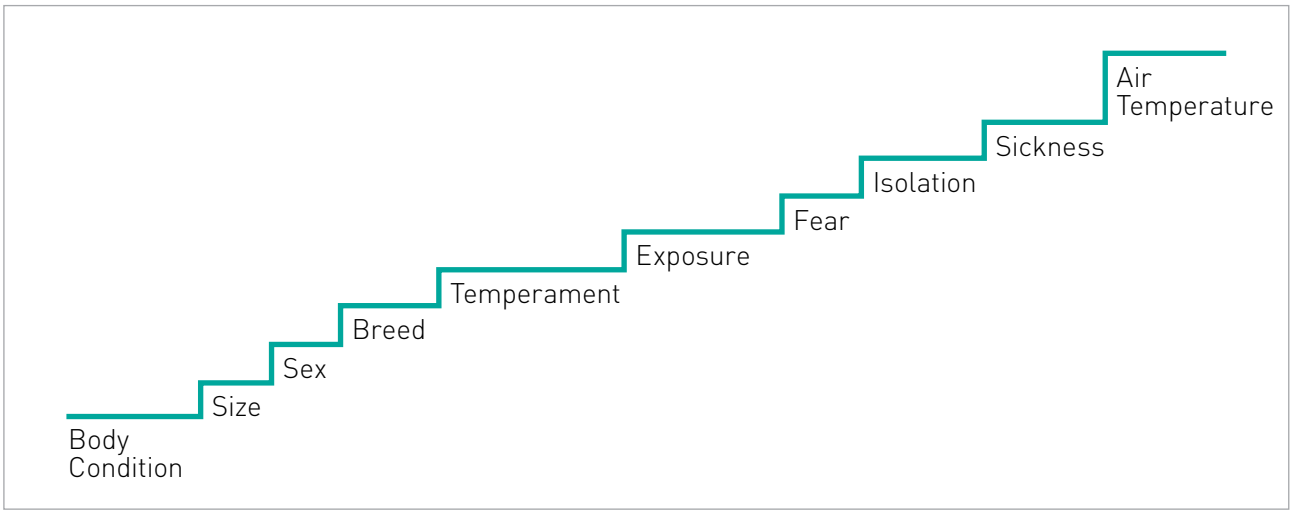
Prevention is the most effective method of dealing with the risk posed by zoonoses.

Sheep handlers need to be aware of the health status of the mobs and flocks they are dealing with and avoid contact with infected animals. Where appropriate (for example, with Q-fever) handlers are advised to ensure their vaccination status is current. If contact is unavoidable, the use of appropriate PPE (such as gloves, overalls, mask) is essential.

2.5 ANIMAL BEHAVIOUR AND HANDLING

When animal handlers acknowledge and understand the way animals think and move, the risk to the handler's safety and that of the animals, is significantly reduced. Part of this understanding is awareness of the animal's own situation and how this can affect its behaviour (see Figure 2.2)

Figure 2.2 Risk assessment stairway for animal handlers



2.6 BIOSECURITY AND TRACEBACK

2.6.1 Biosecurity

Biosecurity on Australian farms is increasingly important as agricultural industries strive to maintain disease-free status for competitiveness on both economics of production and product quality scales. Due to the environmental and geographical areas in Australia, biosecurity issues can impact in local, interstate and international markets.

All people working in the livestock industries have a duty to report suspicion of any notifiable disease outbreaks to the relevant State authorities. The disease status of States and regions differ greatly, and changes occur frequently with the increased movement of livestock across boundaries.

The Emergency Animal Disease Hotline is 1800 675 888.

Owners and their employees have a vested interest in flock health and those providing contract services, such as mulesing and lamb marking, are in a unique position of close contact with many flocks during the course of their work. These groups are the 'front line' defense through early identification of potential disease outbreaks.

People such as livestock contractors, who work with many flocks during the normal course of their business, also need to be conscious of the potential for disease spread. Common modes of spread of livestock diseases include live animals, vehicles, clothing, footwear and contaminated veterinary and surgical equipment.

Early intervention is vital in a pest or disease outbreak! If you suspect a pest or disease outbreak or have seen something unusual and you're not sure whether it's an exotic pest or disease – report it! Don't worry how insignificant it may be – small signs may be an early indication that something is wrong.

Reporting is easy – just phone the hotline, wherever you are in Australia. This will put you in touch with your department of agriculture or primary industries.

Animals – to report pests and diseases in animals (including livestock, birds and aquatic animals) phone the

EMERGENCY ANIMAL DISEASE WATCH HOTLINE ON 1800 675 888

2.6.2 Traceback Systems

Biosecurity depends on the ability to trace individual animals, or at least mobs or flocks, back to the properties where they were born and have lived on previously. A traceback system allows for tracking of origins of disease outbreaks and can mean diseases are contained and treated under quarantine before they become an industry-wide problem.

Traceback systems are being monitored and upgraded to allow improved tracking of an animal throughout its whole life. Traceback systems are entirely dependent on the quality and reliability of individual animal identification at the individual or flock level. Again, owners and their employees, and contractors providing specialized livestock services, will be at the front line of implementation for these systems. Both owners and contractors need a sound knowledge of the requirements for sheep identification (ear marking and tagging) for the State in which they reside or work.

SECTION 3

LEGISLATION AND CODES OF PRACTICE (CoP)

Veterinary surgery, veterinary practice and animal welfare legislation and enforcement are a State or Territory, not a Federal responsibility. Each State or Territory has its own veterinary surgery and/or practice and animal welfare and/or prevention of cruelty to animals legislation.

The Australian Animal Welfare Standards and Guidelines for Sheep (Jan 2016) have been adopted by State regulators. They can be found at http://www.animalwelfarestandards.net.au/sheep/

The Standards and Guidelines cover:

1. Responsibilities
2. Feed and water
3. Risk management of extreme weather
4. Facilities and equipment
5. Handling and husbandry
6. Tail docking and castration
7. Mulesing
8. Breeding and management
9. Intensive sheep production systems, and
10. Humane euthanasia

Refer to **APPENDIX 1:** Australian Animal Welfare Standards and Guidelines – Sheep: Responsibilities, Tail Docking and Castration and Mulesing.

SECTION 4

PREPARATION AND PLANNING

When good mulesing practice is combined with correct tail docking and other associated husbandry procedures, it provides sheep with reduced risk of breech strike.

4.1 HEALTH AND CONDITION

Only carry out mulesing on healthy stock as poor health and condition increases the risk of post-operative complications and deaths. Pre-operative checking of stock is essential to ensure lambs are:

- Free from diarrhoea
- Free from dags
- Free from grass seeds
- Showing sound body condition
- Protected against diseases with a suitable flock vaccination programme

4.2 SHEEP SELECTION

Mulesing should only be required on sheep carrying reasonable amounts of breech wrinkle, dags and stain (likely to have Breech Wrinkle and Dag Score of 2 or more during the fly risk periods).

A sound internal parasite control programme, for example as recommended by WormBoss, is essential to reduce the risk of worms as a potential cause of scouring.

ParaBoss is a suite of three products developed for the management of blowflies, worms and lice.

The WormBoss, FlyBoss and LiceBoss websites are sources of detailed management information and regional programs that will assist in managing the major parasite risks for sheep. They have been developed by expert panels of parasitologists and veterinarians from across Australia.

www.paraboss.com.au

4.3 SHEEP AGE

The recommended age to mark and mules lambs is 2-8 weeks and it is also recommended that both activities are carried out at the same time, except in extreme circumstances. Mulesing at this time is considered less stressful on younger animals, avoids the stress of further mustering, handling and carrying out procedures at another time and provides protection before the first major fly challenge. The physical effort to catch, cradle and release sheep for mulesing is also considerably reduced when lambs are mulesed at marking.

A person must not mules sheep that:

- Are less than 24 hours old or more than 12 months old
- Are 6-12 months old without using appropriate pain relief (refer to Section 6.3 Analgesia/ Anaesthetics)
- Are showing debilitating disease, weakness or ill-thrift

4.4 TIMING OF MULESING

The timing of lambing largely determines the timing of the marking and mulesing operations. Availability of green feed and presence of grass seeds prelambing, during lactation and post weaning, will be the major determinants of this timing.

4.4.1 Weather

Fine, sunny, cool weather is ideal for mulesing. If possible, avoid hot weather. Avoid mulesing in cold, wet, windy weather and be aware that warm, humid, showery conditions are ideal for both irritating bush fly and sheep blowfly activity. These pests can irritate wounds and delay healing, or worse still, cause wound strike. Avoid wet, muddy yards because of the increased risk of infected wounds and subsequent arthritis.

Windy conditions can lead to dust contaminating wounds under dry conditions and can interfere with mothering up.

When older weaned lambs have to be mulesed in hot weather, arrange the work so adequate feed, shade and water are available close to the yards. Under extreme summer temperatures, it is in the best interests of both animals and operators to mules during the cooler parts of the day.

4.4.2 Fly challenge

Carry out lamb marking and mulesing when fly activity is expected to be minimal. Apply a registered insecticide if there is any risk of strike occurring. In rare cases, despite use of insecticides, mulesing or marking wounds can still become flystruck. The following recommendations can reduce the need to use chemicals following mulesing:

- Avoid mulesing when conditions are ideal for flies (some areas may not be suitable for mulesing at certain times)
- Mules lambs about two weeks after lambing finishes and if lambing extends for more than six weeks, consider scanning ewes to separate into early and late lambing groups
- Maintain a high standard of instruments and hygiene. Use sharp, clean equipment
- Use an experienced operator to ensure cuts are completed quickly and do not remove non wool-bearing skin
- Ensure lambs are not disturbed for at least four weeks, or until all mulesing wounds have healed completely

4.4.3 Time of day

It is particularly important when mulesing at lamb marking, to start work early in the morning and finish by early to mid-afternoon to return the ewes and lambs to their paddock and spend time mothering them up. This avoids problems of mismothering and premature weaning of lambs.

4.5 PADDOCKS

Keep animals in the chosen paddocks after mulesing for a minimum period of four weeks, or until all mulesing wounds have completely healed, without mustering. Allow sheep to move voluntarily to adjacent paddocks with fresh feed.

Ensure the paddock has:

- Sufficient feed for the mob for four weeks
- Sufficient clean accessible water for the mob for four weeks
- Adequate shelter in the event of adverse weather
- Free of contamination hazards including potential dust areas and bogs
- Dams with a clear access without a pugged margin
- Stock-proof fencing

4.6 YARDS

It is best to mark lambs in portable yards in the paddock in which they are run, using a new yard site each year. This minimises the risk of infection and lamb stress, as lambs don't have to be mustered far before marking and can be dropped onto their feet on clean ground. They can then drift away from the yards without the dust and heating up caused by driving them back to their paddock.

4.6.1 Portable or temporary yards

Prefabricated, portable yards are convenient because they can be assembled quickly and are easily transported from paddock to paddock. Temporary yards can be made from steel panels, welded mesh or wire netting and steel posts and can be erected along an existing fence. Place the yards near water, away from sheep camps where manure is likely to harbour infections causing arthritis and gangrene.

4.6.2 Permanent yards

If permanent yards must be used for marking, take precautions to avoid wound infection. Remove sheep droppings and keep yards clean and tidy at all times. Water yards thoroughly to prevent dust. Drop lambs outside the yards onto clean grass if possible, after marking. A booster 5- or 6-in-1 vaccination for the ewes before lambing is important in this situation. This vaccination will provide some protection for the lambs during the first 6-8 weeks of life.

Photo 4.1 Portable yards – lambs released onto clean, well-grassed areas. *PHOTO: Ian Evans*

Photo 4.2 Working out of permanent yards – lambs released outside yards onto grassy area. *PHOTO: Ian Evans*

SECTION 5

LAMB MARKING AND MULESING EQUIPMENT

When high quality mulesing is combined with correct tail docking and other associated husbandry procedures, it provides sheep with lifelong protection from breech strike.

5.1 CRADLES

Most lamb marking and mulesing is now carried out in cradles. This was not always the case during the past and to mark and mules a few 'late' lambs it could be necessary to manually hold lambs if cradles were not available.

Cradles have resulted in a significant re-allocation of jobs at lamb marking and often a reduction in the labour units required. For example, three catchers and two operators have been reduced to only one catcher and two operators for small to medium sized teams. If necessary, one person can catch, mark and mules alone using cradles.

Various types of cradles are available. Cradles range from a single cradle, to sets of cradles mounted on a steel yard panel, or sets of cradles mounted on a rotating frame.

Photo 5.1 Ellis Victoria cradles shown without lambs. *PHOTO: Ian Evans*

Photo 5.2 Ellis Victoria cradles with lambs in cradles. *PHOTO: Ian Evans*

Photo 5.3 'Harvestaire' WA Cradles in portable mulesing trailer – Narrogin, WA. *PHOTO: Ian Evans*

Cradles should:

- Have proper presentation and secure holding for marking and mulesing lambs
- Hold the lamb in a symmetrical position with the hind legs close enough together so the folds of skin can be easily picked up
- Present the rear end of the lamb in a well-exposed and more horizontal than vertical position
- Allow lambs to be quickly and easily released onto their feet to avoid wound contact with the ground preventing contamination
- Be flexible enough to cater for different lamb sizes, without the need for frequent adjustment
- Be strong enough to take rough handling and to hold heavy lambs
- Be portable from one yard to another
- Be easy to clean and disinfect
- Be in good working order and with minimal risk of injury to the lamb or operator. Loading and unloading should be quick and easy

Photo 5.4 Home built 'bed' style cradles, south-west NSW. *PHOTO: Ian Evans*

Photo 5.5 Sharray cradles – Victoria. *PHOTO: Ian Evans*

5.2 SHEARS

Carefully prepared, well-set and sharpened shears gives a higher-quality, more consistent and faster mules.

Well-set shears, properly sharpened, cut more smoothly with less stress and fatigue on the operator's hand. This will allow the operator to make more precise and consistent cuts during the full length of the working day. This will result in the best, final-healed result, faster healing and most effective fly control.

5.2.1 Shear selection

Mulesers have a choice between 'factory finished' or 'ready-to-use'.

Factory finished shears:

- are 130 millimetre or 150mm (5 inch or 6 inch) dagging shears as they come from the manufacturer. Factory finished shears need to be ground and often require setting

Ready-to-use shears:

- should have been ground
- had their points rounded
- be set properly and could have been sharpened

Ready-to-use shears could also have been 'bent' by having their blades slightly angled and could have their points slightly opened.

Most shears, either factory or ready-to-use, will be right-handed. Left-handed shears are available commercially, but are much less common. The following information is equally applicable to right or left-handed shears.

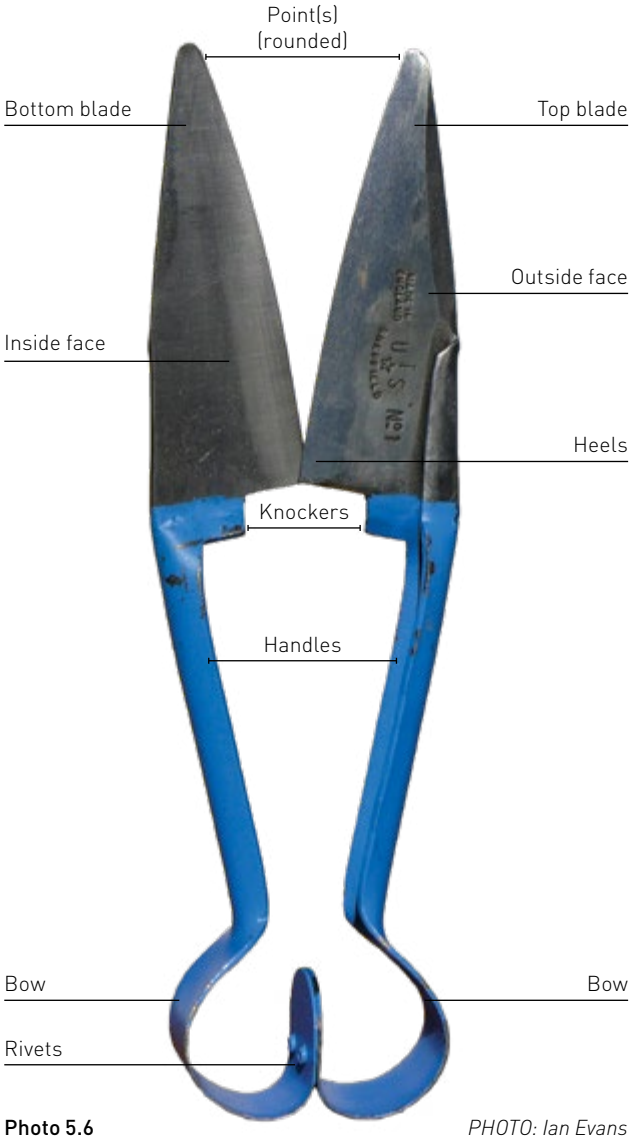


Photo 5.6 *PHOTO: Ian Evans*

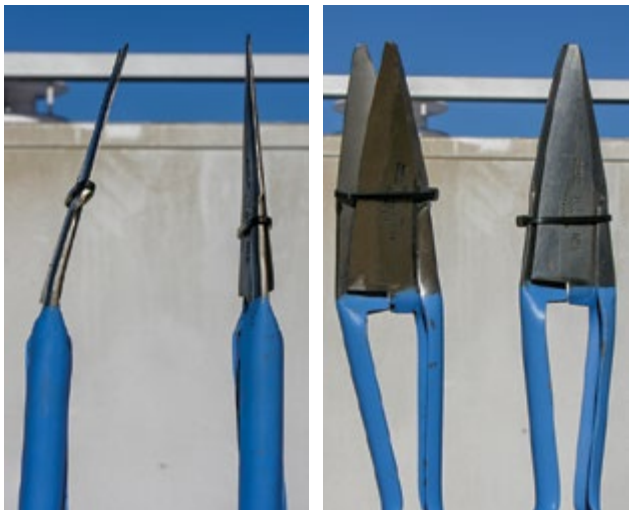


Photo 5.7 The use of bent (angled) or straight shears is a matter of personal preference. Mulesers who wish to maintain or set their own shears will need to develop high-level skills in setting and grinding. All mulesers need high-level sharpening skills. *PHOTO: Ian Evans*

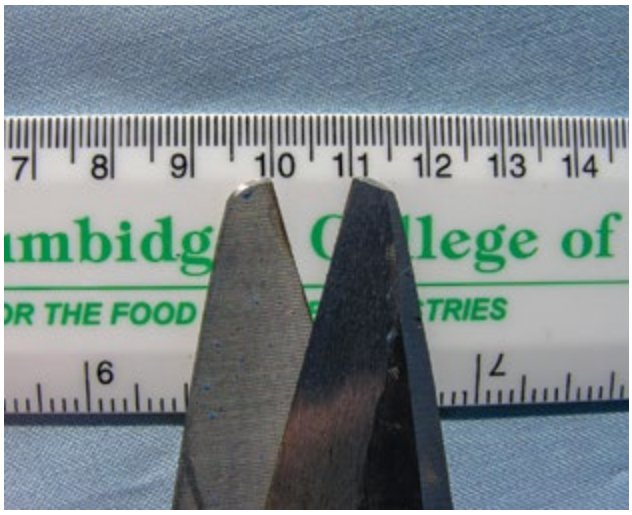


Photo 5.8 If the points are opened, the distance between the inside of the points should be about 10mm and no more than 15mm when fully closed. *PHOTO: Ian Evans*

For many mulesers the extra cost of the ready-to-use shears is warranted by the saving of labour and the specialist skills required to set, grind and perhaps bend shears from the factory finished stage to ready-to-use.

But those who wish to maintain or set their own shears will need to develop high-level skills in setting and grinding. All mulesers need to develop good-level sharpening skills.

Opening the points reduces the tendency to finish a cut prematurely (cutting out). It also encourages or allows more skin into the cutting face, which can mean more skin removed per cut. But it also tends to cause more cutting into and through the selvage and often results in removing some of the vital bare skin.

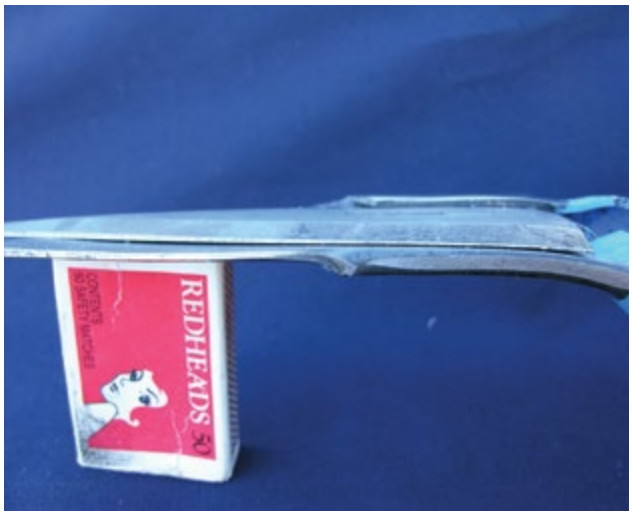


Photo 5.9 Insufficient gap at heel – no set. *PHOTO: Ian Evans*

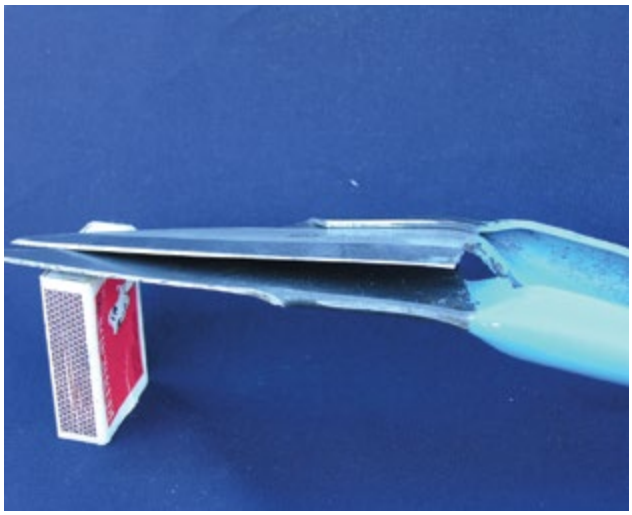


Photo 5.10 Excessive gap at heel – too much set. *PHOTO: Ian Evans*

When selecting shears, take them from the box, remove any 'keeper' holding the blades together and allow them to take their relaxed position. If they spring apart so the heels do not overlap, and/or if the top blade goes down below the bottom blade, they will require work on their set. Avoid these if possible, or only select those requiring minor adjustments to the set.

The correct set has the heels overlapping by 3-5mm when the blades are in this relaxed position.

Photo 5.11 Too wide at heels – too much tension in the bows. *PHOTOS: Ian Evans*

Photo 5.12 Too much tension between the blades. Often used to attempt to compensate for lack of set.

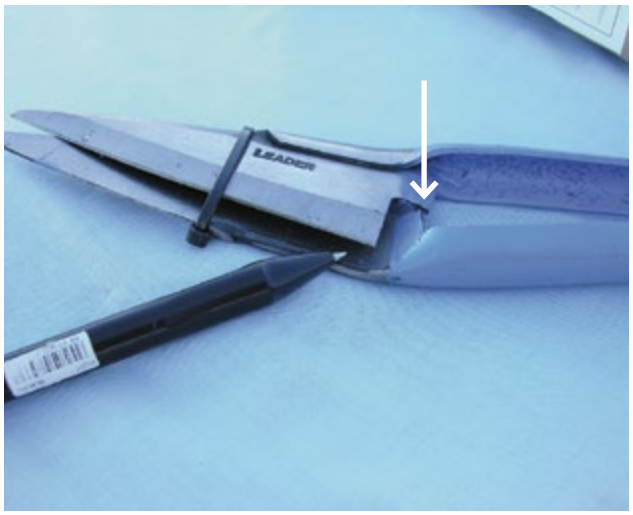


Photo 5.13 Excessive gap at heel (too much set). Note: Knockers are barely in contact which is dangerous. These shears would probably 'roll' and cut the muleser's thumb. *PHOTO:* Ian Evans

Photo 5.14 Bows mis-aligned. These shears are likely to be difficult to set properly. *PHOTO:* Ian Evans

If the shears pass this initial inspection, close the blades completely in the normal cutting manner. Holding them closed, hold them up to the light and carefully inspect the gap between the blades. If the set is correct there will be steadily increasing clearance, 'daylight', from the point of contact between the blades, at the tips, or 10 – 20mm back from the tip with open pointed shears, all the way back to the heels.

Ensure the clearance is greatest at the heels and could just allow a 50 cent piece (about 2mm thick) to slip in between the blades at the heels.

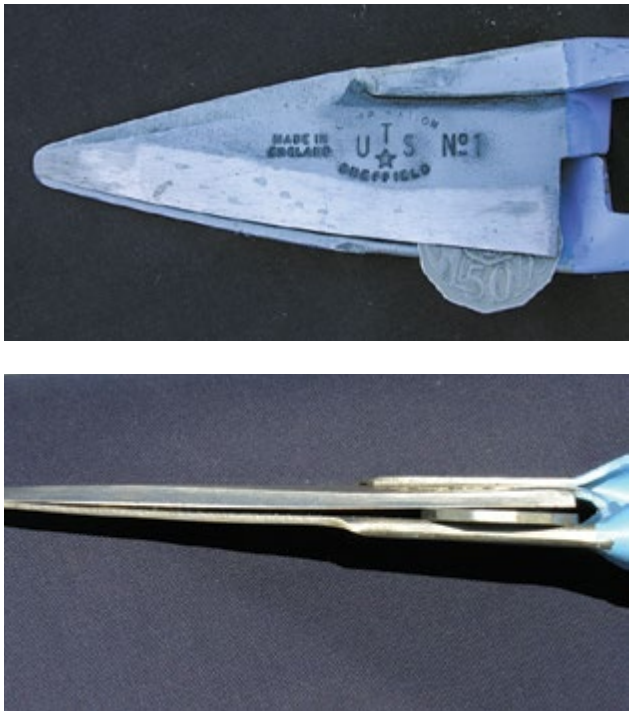


Photo 5.15 Ensure the clearance is greatest at the heels and could just allow a 50 cent piece (about 2mm thick) to slip in between the blades at the heels. *PHOTOS:* Ian Evans

Slowly open and close the shears while carefully watching the point of contact and the clearance between, the blades. There should only ever be one minuscule point of contact and there should be diminishing clearance, 'daylight', between the blades back to the heels, as the blades are opened. When the shears are fully opened there should be light contact between the top and bottom blades at the point where the heels overlap by about 5mm.

The purchaser will not be able to visually discern anything about the quality of the steel in a pair of shears. This will only become evident with sharpening, or during grinding. Differences between pairs of shears and even between blades on a single pair could be found. Discard any odd pairs during set up (they should not be found in ready-to-use shears). Return faulty ready-to-use shears to the vendor or finisher as soon as problems are identified.

Look carefully at the shear bows when selecting shears. Avoid shears where the bows are not symmetrical, have angular curves rather than being evenly rounded and where the bows do not match one another. For example, one bow higher than the other (probably due to misalignment when riveted).

Some of these problems can be fixed, but these will often require considerable skill and patience.

Photo 5.16 When shears are fully opened there should be one point of light contact between the blades. *PHOTO:* Ian Evans

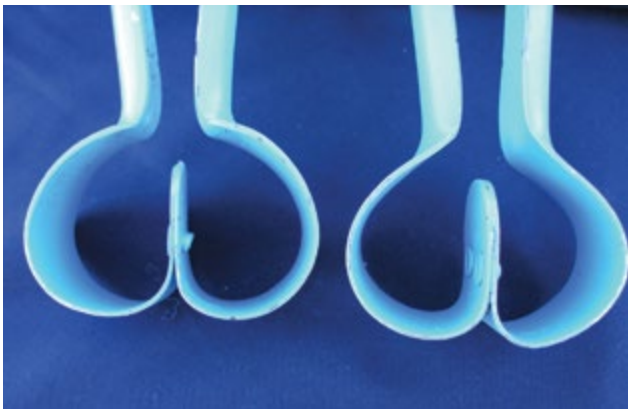


Photo 5.17 Shear bows shown on the right are not symmetrical and are not evenly rounded. Shear bows shown on the left are reasonably symmetrical and evenly rounded. *PHOTO:* Ian Evans

Photo 5.18 *PHOTO:* Ian Evans

5.2.2 Setting

Correct set is the most important aspect of shear set-up. Correctly set blunt shears will almost always cut better than sharp shears which are poorly set. Poorly set shears can also 'roll' (blades go past the knockers, which can severely cut the mulesers thumb).

The main components of the set are:

- Blade clearance – 50 cent piece thickness (about 2 – 3mm) clearance at heels when fully closed
- Bow (spring tension) – heels should overlap about 5mm when relaxed
- Pressure between the cutting edges – light contact between blades near the heels when relaxed

Note: When setting or changing any aspect of the set which involves bending the shears in any way, it is important to make the change or bend slowly. Take at least two or three attempts to achieve the desired bend. Do not attempt to make a change in a large single bend. Develop a 'feel for the steel', which means a feel for the elastic limit of the pair or blade you are working on. It is much better to take five or six attempts at bending the shear, carefully checking the outcome of each one, to achieve the final result.

Photo 5.19 Well set straight shears. *PHOTO:* Ian Evans

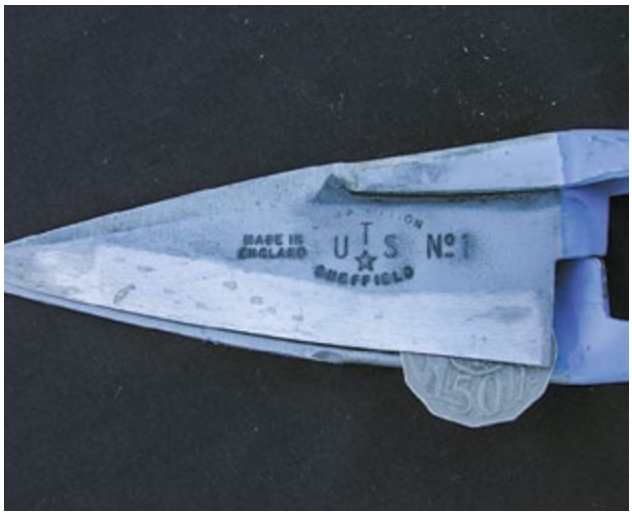


Photo 5.20 Well set, straight shears showing correct heel clearance. *PHOTO:* Ian Evans

Photo 5.21 Well set, bent and open-shears showing correct heel clearance. *PHOTO:* Ian Evans

5.2.2.1 Setting the blade clearance

Method 1:

This method is for small changes to set or where (part of) the blade or blades lay flat against one another. Changes will generally be less than 1mm per curve.

For an effective cutting action, the blades must lean toward each other so that the cutting edges touch at only one point at a time.

Correctly set blades will have a gap between the heel on one blade and the inside face of the opposing blade when fully closed. The gap should be 2 – 3mm, which is about the thickness of a 50 cent coin. This should be the same for both blades.

In this photo a sharpening jig is being used to provide a fulcrum (bending point) and additional leverage. Any workable mechanical device is acceptable. A vice is a suitable alternative, but even the notch in the top of a steel post will do the job.

Photo 5.22 Setting blade clearance on right-handed shears using a sharpening jig. *PHOTO:* Ian Evans

Photo 5.23 For an effective cutting action, the blades must lean towards each other so the cutting edges touch at only one point at a time. *PHOTO:* Ian Evans

Whatever the fulcrum, take it steady, carefully checking the result of each attempt.

In the lower left photo, pulling the handles towards the body (clockwise around the fulcrum) will increase the set (clearance) at the heels. Pushing the handles away from the body (anti-clockwise around the fulcrum) will decrease the set. The pictured shears are right-handed shears. For left-handed shears the opposite is the case.

If the blade is almost totally devoid of set (flat) as shown in the image top left page 21, it will be necessary to lightly bend the blade at about three or four points along its length to create the necessary slight bend. Remember the clearance is the sum of the curvature of both blades, so do not 'over do' the bending of each blade initially. It is much better to have to come back and bend either or both a little more to achieve the necessary clearance.

Ensure the blades are as close to identical in their curvature as possible.

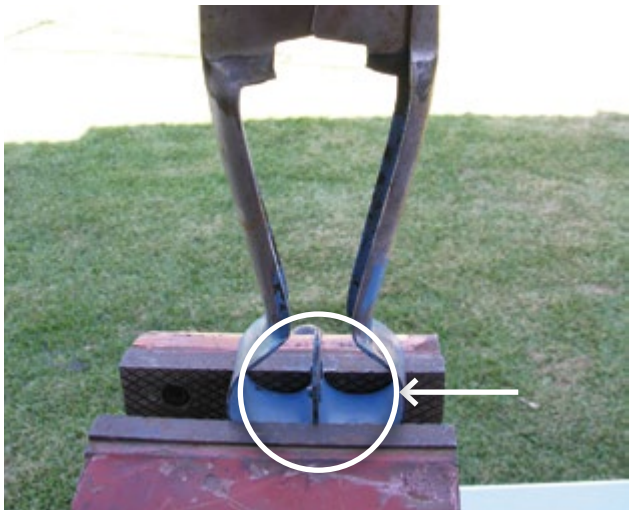


Photo 5.24 Hold the bottom 10-20mm of the shear bows in a vice. Do not over-tighten the vice and crush or deform the bows. *PHOTO:* Ian Evans

Photo 5.25 Use a large pair of multi-grips just below the knocker. To open the set (increase the clearance at the heel), gently twist the handle anti-clockwise. To close the set, decrease the clearance at the heel and gently twist the handle clockwise. *PHOTO:* Ian Evans

Method 2:

This method is for a major change of set or completely restoring set: a total change in clearance of 2mm or more. This method can be used to either increase or decrease the clearance at the heels (set).

Use a large pair of multi-grips to grip the handle just below the knocker. To open the set (increase the clearance at the heel), gently twist the handle anti-clockwise. To close the set (decrease the clearance at the heel), gently twist the handle clockwise.

Note: The instructions below are for right-handed shears only. For left-handed shears reverse the directions. For example to twist anti-clockwise to open the set becomes twist clockwise to open the set for left-handed shears.

Remember to take a number of gentle twists rather than one excessive action. Feel for the steel's elastic limit; the point at which it just starts to bend.

Photo 5.26 A 'shifter' or adjustable wrench can be used instead of multi-grips. *PHOTO:* Ian Evans

Photo 5.27 Large multi-grips. *PHOTO:* Ian Evans

Turn the shears around in the vice or move around to the other side if possible and repeat the action on the other blade if necessary. Be aware of any differences in clearance (set) between the two blades. It might not be necessary to change the clearance on one blade as much as the other, or to change it at all.

The total set between the heels of the blades is the sum of the clearances of each blade. Be careful not to overdo the clearance of either blade at the first attempt. There is a lot of leverage available in this action and it is easy to increase (or decrease) the set excessively if too much force is used.

It is much better to have to repeat the twisting action a number of times on each blade until the correct set is achieved.

When the bow tension is too great, the blades can open to a degree where the heels separate. *PHOTO:* Ian Evans

Photo 5.28 A clip can be used to keep shears closed. *PHOTO:* Ian Evans

5.2.2.2 Setting bow tension

Excessive bow (spring) tension is a common cause of fatigue in the muleser's shear hand. Excessive spring tension often results if shears are spread too wide during sharpening. Spreading the shears is often unnecessary and the use of better technique or a sharpening jig can stop the problem. Rather than using various keeper systems to physically restrain the handles, it is better for the mulesers hand to correct the bow tension.

When the bow tension is too great, the blades can open to a degree where the heels separate. If the heel separation is less than 30 – 40mm the following method can be used for small reductions in spring tension.

1. Close the shears past the knockers so the blades are as close together as possible.

2. Holding them firmly closed, either by hand or with a clip, place the joint of the bows across a solid square backing (for example, the edge of a utility tray or the sharpening jig sitting on a solid support or held in a vice).

Photo 5.29 Use a hammer to gently hit the spot exactly where the handle meets the bow two or three times. *PHOTO:* Ian Evans

Photo 5.30 Holding the shear closed turn it over and repeat the gentle hits on the other side. *PHOTO:* Ian Evans

3. Use a hammer to gently hit the spot exactly where the handle meets the bows – two or three times.

4. Holding the shear closed, turn it over and repeat the gentle hits on the other side.

5. Allow the shears to open and check the tension.

6. If the tension is not where it should be, do not worry, you could need to repeat this process a number of times to reduce the bow tension. It is best to hit lightly and repeat the process, rather than hit hard and risk damaging the shears.

Note: It is important when reducing the bow tension that the riveted joint of the bows remains pointing straight down the centreline of the shears, through the junction of the knockers to the centre of the points. If the bow joint is distorted to either side, it can cause problems with the knockers engaging, which in turn will cause the shears to 'roll'.

Photo 5.31 Close and hold the shears past the knockers, as previously shown, and using a large pair of multi-grips, grip each bow as shown below and gently squeeze each bow in turn. *PHOTO:* Ian Evans

Photo 5.32 Remember to be gentle as the leverage of the multi-grips is enough to be easily crush the bow past the necessary point and out of shape. *PHOTO:* Ian Evans

If the heels are separated by more than 30 – 40mm more force could be required to reduce the bow tension. Close and hold the shears past the knockers as previously shown, and using a large pair of multi-grips, grip each bow as shown at right and gently squeeze each bow in turn. Remember to be gentle as the leverage of the multi-grips is enough to easily crush the bow past the necessary point and out of shape.

The line of force through the bow is the same as shown above when hitting with a hammer. Take particular care not to distort the bow joint when using this method.

If the bow tension is too little and the blades overlap excessively, it is a relatively simple matter to pull the blades apart and increase the bow tension. Take care to pull the blades equally. Do not hold one blade rigid and pull the other blade away from it. Again work gently, taking several attempts to achieve the final desired result.

5.2.2.3 Setting the pressure between the cutting edges

The ideal set occurs when the top blade just comes over the bottom blade when released to a relaxed position.

The most common problem is when the top blade comes under the bottom blade when released.

Pressure set is sometimes used by unskilled operators to attempt to compensate for a poor set and improve poor cut. This is dangerous as it is easy to cut the muleser's thumb if the blades are separated past the point where the heels engage and the blades are inadvertently closed with the top blade underneath the bottom blade. This sort of pressure between the cutting edges also causes excessive wear on the inside face of the cutting edge. Such wear will appear as a shiny white line on the edge of the inside face. This also will have a tendency to make the shears roll if extra force is used in the attempt to make these shears cut properly.

Photo 5.33 Ideal set occurs when the top blade just comes across the bottom blade when released to a relaxed positon. *PHOTO:* Ian Evans

Photo 5.34 Holding a blade securely in each hand, gently push the blades with equal force in opposite directions. Do not hold one blade rigid and force the other away from it: remember equal force in opposite directions. Gloves provide protection, but reduce sensitivity. *PHOTO:* Ian Evans

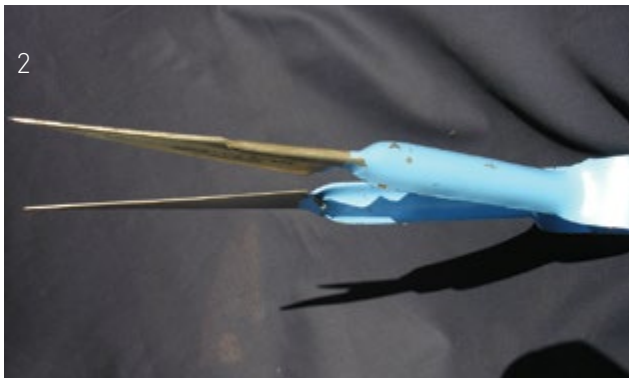


Photo 5.35 Pressure set occurs when the top blade comes under the bottom blade when released. *PHOTO:* Ian Evans

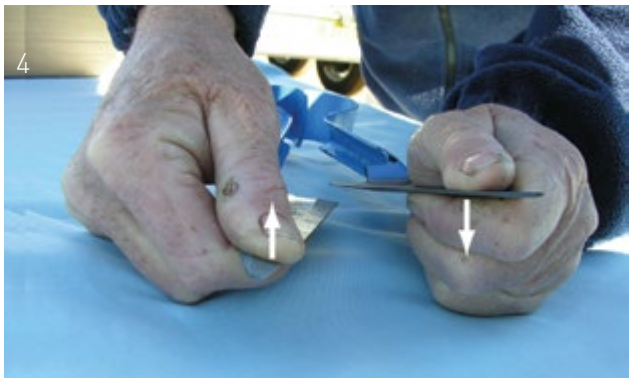


Photo 5.36 For right-handed shears this means the bottom blade is pushed downwards while the top blade is pulled equally upwards. Take two or three attempts to achieve the final results. *PHOTO:* Ian Evans

CHECKING THE SET

To test whether the set is right try this quick test.

Take a thin piece of cardboard (such as a vaccine box), piece of glossy paper, or even the side out of an aluminium drink can. Cut a straight edge on one side if it does not have one. Then, using a straight eye and steady hand, attempt to cut the thinnest possible strip from this edge. It should be possible to cut a strip less than 1mm and approaching 0.5mm wide from the heels to the points of the shears. If the material slips between the blades or the blades 'roll' over the material, it is still possible to improve the set.

Test the set before sharpening – this is the real test of a well set blade.

Photo 5.37

PHOTO: Ian Evans

5.2.2.4 Related problems

Knockers not engaging or blades rolling past the knockers

REASON 1:

Bows and bow joint out of shape and one blade is pushed up relative to the other. Check the points of the blades and the line of the riveted bow joint. The points of the blades should be of equal length, although this could have been disguised by grinding off on ready-to-use shears.

Holding the shears closed, look along the riveted bow joint, which should line up with the centreline of the shears through the junction of the knockers to the centre of the points, or where they would have been if they have been ground off ready- to-use shears.

Photo 5.38 Knockers not correctly aligned and blade points uneven lengths due to bows and bow joint being out of shape. *PHOTO:* Ian Evans

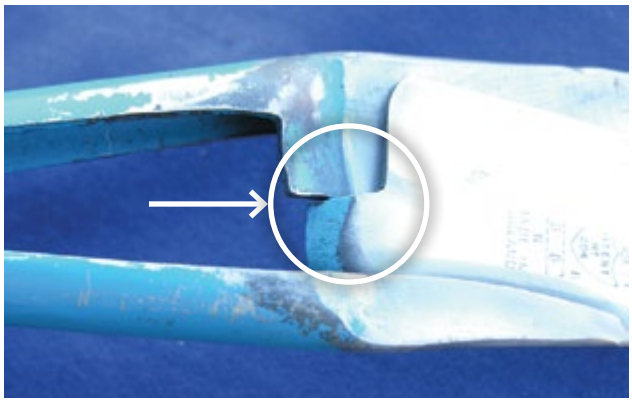


Photo 5.39 Mis-aligned knockers. *PHOTO:* Ian Evans

It is likely the bow joint will be pointing off centre. This is readily fixed using a claw hammer. Using the claw of the hammer, gently twist the bow joint back towards the centre line. Carefully watch the engagement of the knockers while doing this. It will usually be necessary to twist the bow joint past the centreline a little to achieve centring when released. Take a number of gentle attempts to centre the bow joint and ensure the knockers are equally engaged.

When the knockers are equally engaged, check the action of the shears to ensure they will reliably close and cut, and not roll past the knockers.

If the knockers are still not reliably engaging, go to **Reason 2**.

Photo 5.40 Use the claw of the hammer, to gently twist the bow joint back towards the centreline. *PHOTO:* Ian Evans

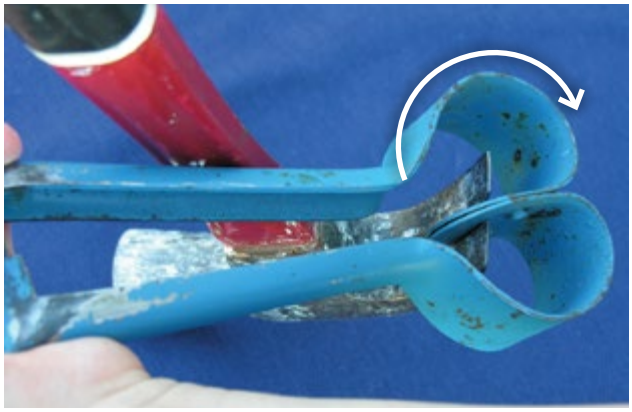


Photo 5.41 It will usually be necessary to twist the bow joint past the centreline a little to achieve centring when released. *PHOTO:* Ian Evans

REASON 2:

If the knockers are even in their engagement, but the set is too wide at the heel, this will cause the shears to roll. Another sign of this problem can be the points of the shears going past one another.

If the set is too wide, use **Method 2** (see **5.2.2.1 Setting blade clearance** above) to reduce the clearance between the heels until the set is correct and the knockers are safely and reliably engaging. For example, shear bow joint and knockers shown here on the shears at the far right of the image.

Photo 5.42 The shears on the left have a misaligned bow joint. The shears on the right are correctly aligned with knockers engaging equally. *PHOTO:* Ian Evans

5.2.3 Grinding

Mulesers purchasing ready-to-use shears should not have to grind the makers, or grinding bevel initially. Check the blade thickness at the cutting (sharpening) edge which is measured vertically through the blade at the cutting edge, not down the face of the cutting edge (see cross-section diagram below). The difference between the ready-to-use cutting edge and the factory finished edge should be quite obvious.

The blade thickness of factory finished shears is around 2mm or more. To achieve the best cutting and sharpening edge this needs to be reduced to about 0.5mm – 0.6mm.

Measuring the blade thickness of the best pair of shears belonging to five professional mulesing contractors found an average cutting edge thickness of 0.54mm, with a range of 0.35mm – 0.74mm.

Some professional contractors who work in a range of different environments grind their shears to different thicknesses for different conditions. In dry, dusty, sandy, or burry conditions the edge is used about 0.6mm – 0.7mm thick, while on clean, fat healthy lambs the edge might be ground down to about 0.4mm. The thicker edge will take a little longer to sharpen, but will stay sharp longer and be harder to gap (damage) under tough conditions. While the thinner edge will cut well and be easier and faster to sharpen, it is more easily damaged.

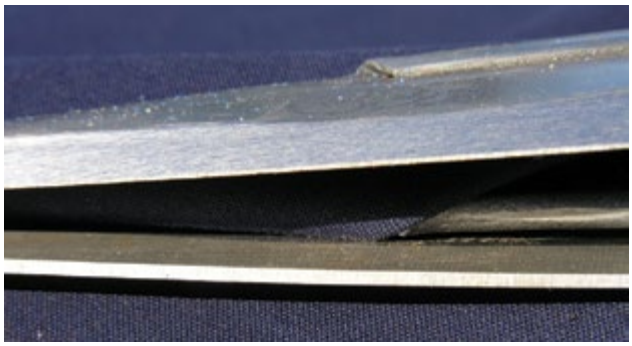
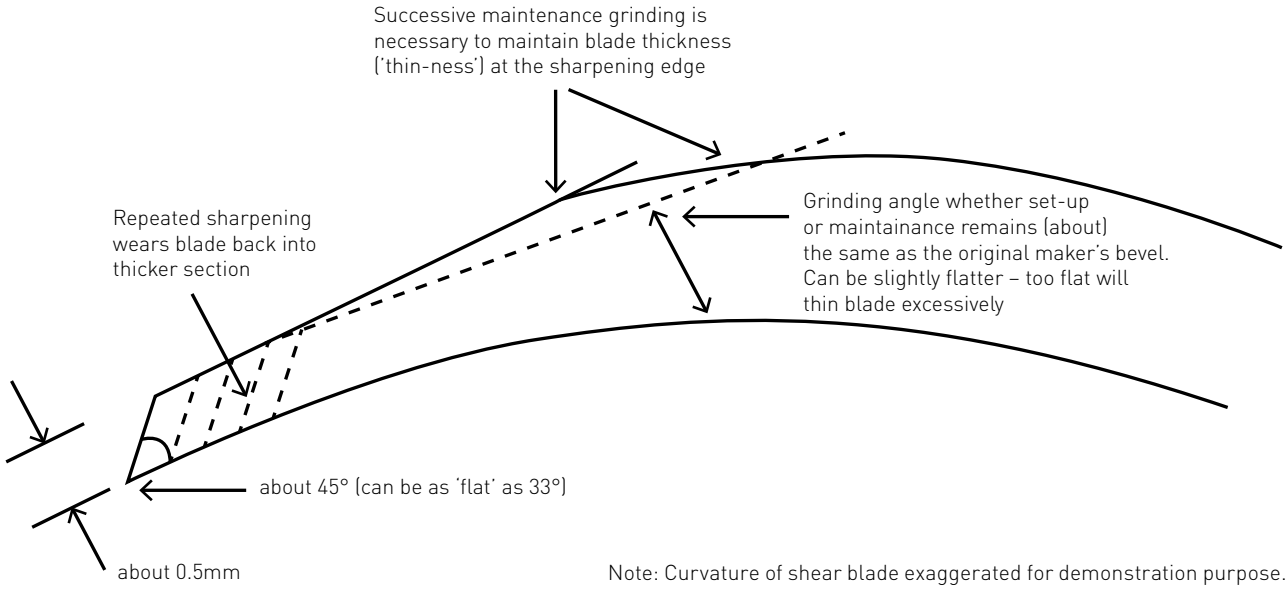


Photo 5.43 Compare the ground ready-to-use blade (top) with the un-ground factory finished blade (bottom). *PHOTO:* Ian Evans

As shears are sharpened, the cutting face is worn back into the grinding or maker's bevel. With continued sharpening, the thickness of the cutting edge increases. This requires grinding down to maintain its optimum thickness.

Figure 5.44 Cross-section of shear blade showing the effect of sharpening and the need for maintenance grinding to maintain blade 'thinness' at the cutting edge



Note: Curvature of shear blade exaggerated for demonstration purpose.
IMAGE AND CONCEPT: Ian Evans

Photo 5.45 Always wear eye protection. *PHOTO: Ian Evans*

Photo 5.46 This Multi-tool 362 attaches to a 200mm bench grinder. *PHOTO: Ian Evans*

5.2.3.1 Practical grinding

Safety first: Always wear eye protection when grinding. The use of gloves is optional: they afford protection, but the reduction in sensitivity increases the risk of catching a glove fingertip between the belt and the wheel, pulling the glove, if not the operator's hand, into the grinding machine. Unless grinding commercial numbers of shears (for example, producing ready-to-use from factory finished shears), it is unlikely hearing protection will be needed due to the relatively low level of noise produced and the low exposure of most operators.

Grinding machinery: Many steel grinding machines are commercially available (for example, bench grinders, angle grinders, shearing grinders, sandstone wheels, linishing machines and various other forms of belt grinder). The most suitable, economic and readily available today is the linishing-type machine or belt grinder. There are a number of commercially available dedicated belt grinders. But the machine shown is an attachment, which is bolted onto an existing bench (stone) grinder. The choice of grinding machine is up to the individual.

A rotating sandstone fed with a water drip or running through a water bath, can yield excellent results. Rotating sandstones have been in use for more than a century and if the blades are ground across their length (they are normally ground lengthwise) the sandstone wheel will produce a beautiful hollow ground bevel, which is easy to keep sharp. But regrinding can take more than one hour on a sandstone, so they are not widely used.

The risk with any power grinder is heat build-up in the blade. If the steel is overheated and turns blue to purple in colour (known as burning) this will impact on the temper of the steel and adversely affect the hardness, which in turn affects the blades' ability to retain a sharp edge, increasing the likelihood of 'gapping' the edge. The extent of the damage caused will depend on the degree to which the blade is overheated, indicated by the extent and depth of the discolouration. If the burning is only evident on the outside face of the blade and if it can be ground off after the blade has been allowed to cool, then little or no harm will have been done. But if the discolouration is severe and goes through

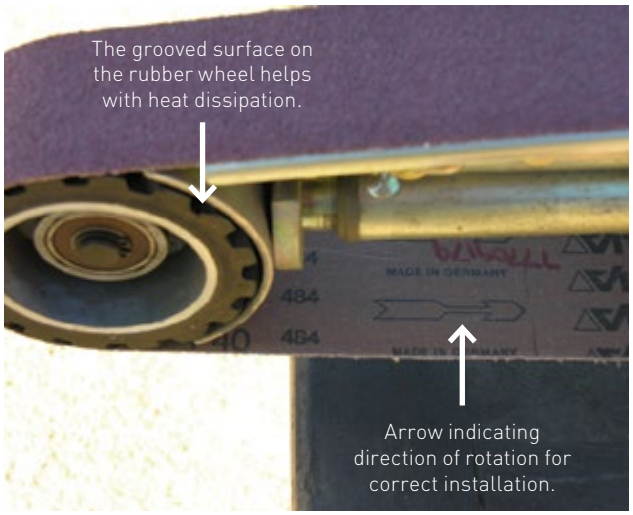


Photo 5.47 *PHOTO: Ian Evans*

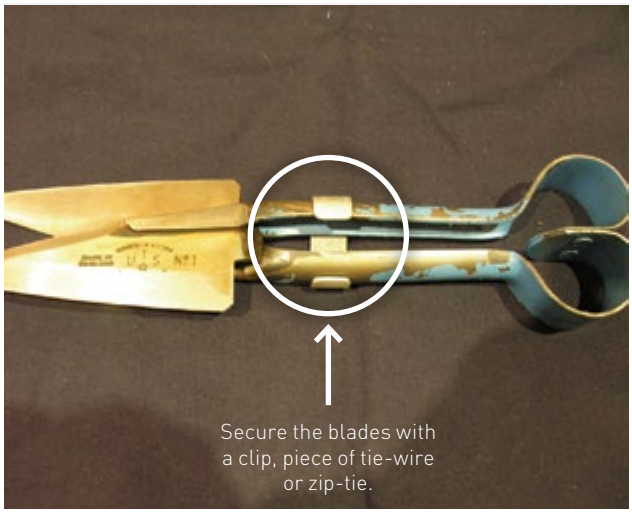


Photo 5.48 *PHOTO: Ian Evans*

to the inside face of the blade, it is likely the temper of the steel, at least in that section of the blade, has been irretrievably damaged.

Tip: When grinding shear blades, a guide to their safe maximum temperature is when the blade is too hot to hold in a bare hand. They need to be allowed to cool down before further grinding.

Belts: When using the belt grinder, the belt of choice should be 40 grit or perhaps 60 grit, but certainly no finer. The coarser the belt, the cooler the grind due to improved airflow. Do not allow the belts to become too worn as they generate more heat as they wear.

Take note of the grooved surface of the rubber wheel on the multi-tool, this appears to help with heat dissipation. It is important to install belts so they run in the direction indicated. Running belts backwards is against the bias of the belts' woven construction and risks the belts disintegrating.

Starting grinding: Try to work on a number of pairs of shears (about three as a minimum) concurrently. This will allow for most efficient use of time, as two pairs will be cooling while the third is ground.

Cross the blades of the shears over, past the knockers as far as possible, and secure with a clip as shown, piece of tie-wire or zip-tie. This will relieve the stress on the operator's hand from holding the shears fully crossed. A fatigued hand will not have the feel needed to locate and consistently guide the angle of the blade on the belt, nor to determine the pressure being applied and the rate at which the steel is being cut away. Tired hands also are more likely to drop or suddenly release the shears, which can result in them being thrown from the belt.

When preparing ready-to-use shears from the factory finish, ensure the grinding angle remains about the same at the original maker's bevel (see cross section diagram in 5.2.3 above). If the grinding bevel is made slightly flatter, this can extend the time between re-grinds. If the angle is too flat and the grinding bevel too wide, the blade can become too thin due to the slightly concave shape of the inside face of the blade. This can allow the blade to flex excessively which means the set will not remain constant during the cutting action, causing the blades to roll past one another.

Place the blade on the grinding belt, starting from the heel and drawing it all the way through to the point. Follow the angle of the original maker's bevel or the previous grinding bevel unless there is a sound reason to do otherwise. Do not use too much pressure, just guide the blade across the grinding wheel (belt) 3 – 5 times. Stop and check for contact across the full face of the grinding bevel and note the temperature of the blade. As one blade starts to warm, turn the shears around and grind the other blade. When both blades are approaching the too hot to hold stage, rotate to the next pair of shears.

Most operators find they have best control and feel when drawing the shears towards their body as shown in this sequence of photographs. But there is no hard-and-fast rule and operators should develop a method which suits them and produces the best result.

When first learning how to grind shears, it is advisable to find old pairs and practice on them first. Develop a feel for the progress of grinding; particularly setting and maintaining the desired grinding angle, and smoothly drawing the blade over the wheel. Practice the discipline required to change blades and shears before they become too hot.

Photo 5.49 Without using too much pressure guide the blade across the grinding wheel 3–5 times. *PHOTO: Ian Evans*

Photo 5.50 Start grinding from the heel of the shears. *PHOTOS: Ian Evans*

Photo 5.51 Draw the blade all the way through to the point. *PHOTO: Ian Evans*

Note: Remember to take time, do not apply too much pressure on the blades, just guide them. Be aware of heat build-up and change blades and rotate shears before they become too hot. Check progress constantly.

Rounding the points: Round the points after finishing the grinding bevel, when the blade has been thinned to the desired thickness (for example, 0.5mm) at the cutting edge.

Points also are ground on the belt grinder. Take care to work with the points of the shears slightly below centre on the wheel. Use a gentle contact as it is easy to remove more material than necessary.

For closed-point shears, remove the clip or fastening from the handle and allow the shears to open naturally. Hold the shears in their natural closed position, against the knockers. Gently bring the points into contact with the belt just below the centreline of the wheel, holding the shears at a slight (about 15) downward angle. Move the bow end in an arc to produce the rounded points as shown.

For open-point shears, it is not possible to grind the points of both blades simultaneously as with closed point shears. Grind each blade point individually, while holding the blades sufficiently apart to avoid contact between the other blade and the belt.

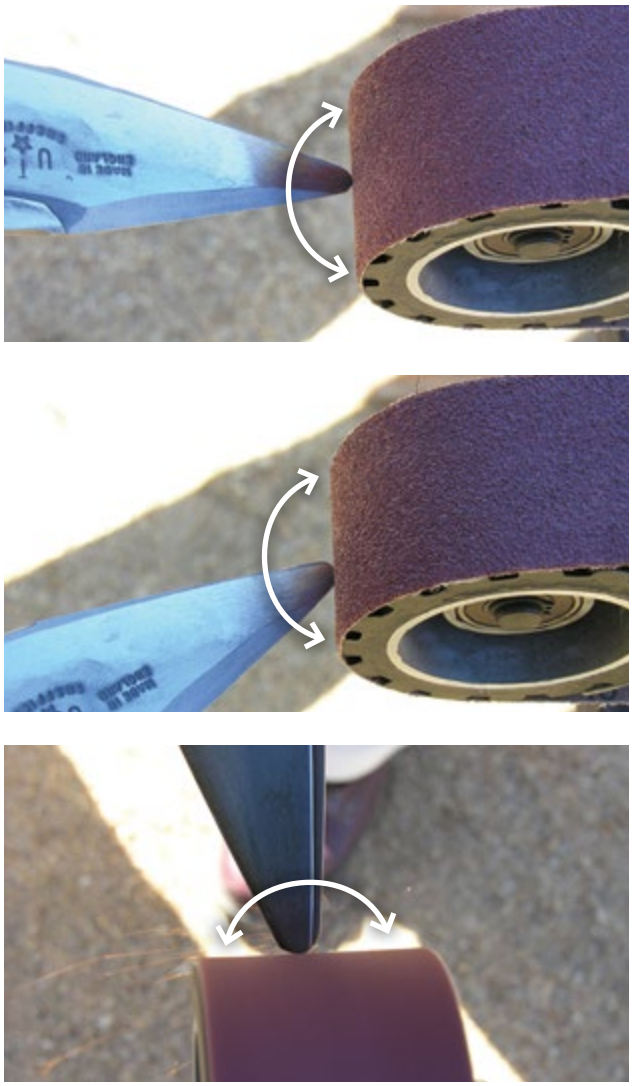


Photo 5.52 Grinding the points on 'closed-point' shears. For 'open-point' shears grind each point individually.
PHOTOS: Ian Evans

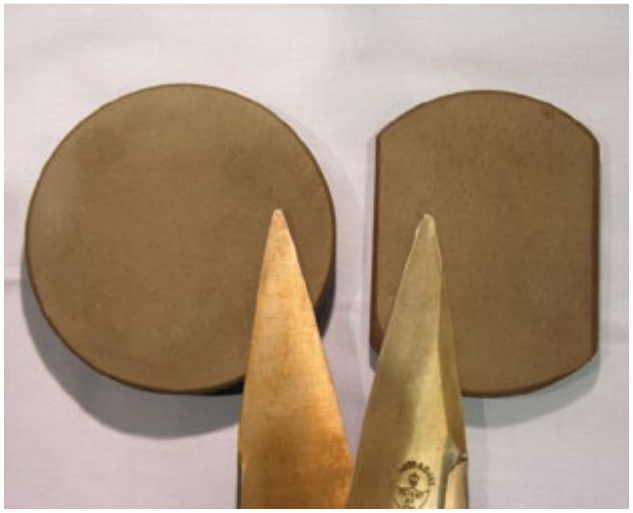


Photo 5.53 Fine (left) and medium/coarse (right) sharpening stones. Note the bevelled edges. *PHOTO: Ian Evans*

Photo 5.54 The edges of sharpening stones can be bevelled by rubbing on an old grinding belt (above) or a concrete surface (right). *PHOTO: Ian Evans*

5.2.4 Sharpening

Having set and ground shears the final stage in preparation is to sharpen them ready for use.

The minimum equipment needed, in addition to the shears, is a fine and a course sharpening stone and a sharpening jig of some kind.

The fine and coarse can simply be the opposite sides of the one stone, but enthusiasts can prefer to have an intermediate or medium grit stone. Users of the diamond stones have a wide range of grit available from as coarse as 400 through to as fine as 1200. These are not really stones in the traditional sense, but an industrial diamond coating on a carrier, usually a piece of steel. The choice of sharpening equipment is a personal one and the aim is to have a sufficient range of cutting and finishing capacity to meet all need– from 'bringing up' a new pair of shears, to giving your best pair a fine polish to keep them up to their best performance.

A sharpening jig is an essential piece of equipment if mulesers want to ensure their shears are consistently sharp at all times.

Tip: Bevelling the edges of sharpening stones as shown on the right will prevent scratching of the sharpening edge. These scratches are simply deeper scores in the sharpening edge face. They can predispose one blade to catching on the other and gapping. The edges of sharpening stones can be bevelled by rubbing on an old grinding belt or a concrete surface as shown in the images above and right.

The main function of a jig is to ensure that each time the sharpening stone is placed on the cutting edge of the shear blades, it is sharpening at the same angle. This is the most important part of high-quality sharpening practice.

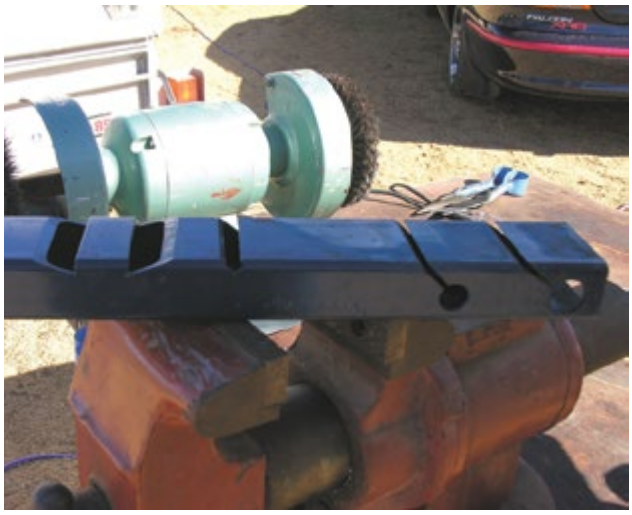


Photo 5.55 Some jigs have provision for sharpening at different angles. For example 45° (left) and 33° (right) in both of these images. *PHOTOS: Ian Evans*

The Godson jig (photos right), invented by mulesing contractor Gordon Godson, Warren, NSW, is one type of jig, but there are many others. Most have both positive and negative features including ease of use.

Examine as many different types as possible and choose the type which is most comfortable.

This jig has provision for shear sharpening at two angles: 45° and 33°. Other jigs have more alternatives and some have a variable range of settings, which require the operator to choose the desired angle. Adjustable jigs can have advantages for mulesers who work in widely varying environmental conditions such as sandy, dusty, daggy or stained lambs, clean lambs, etc.

Photo 5.56 Gently push the blade into the chosen slot until the sharpening edge just pushes the stone slightly upwards. *PHOTO: Ian Evans*

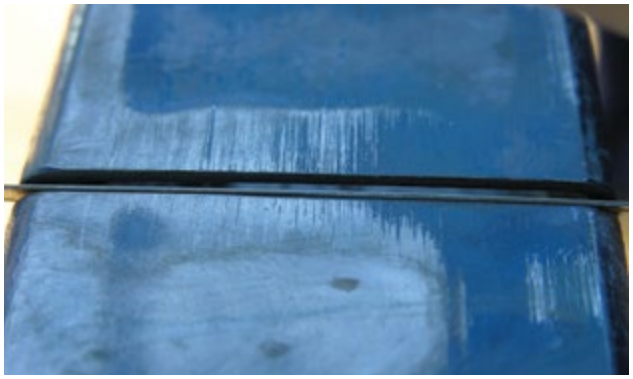


Photo 5.57 Front view – looking towards the inside face of the blade in the jig. *PHOTO: Ian Evans*

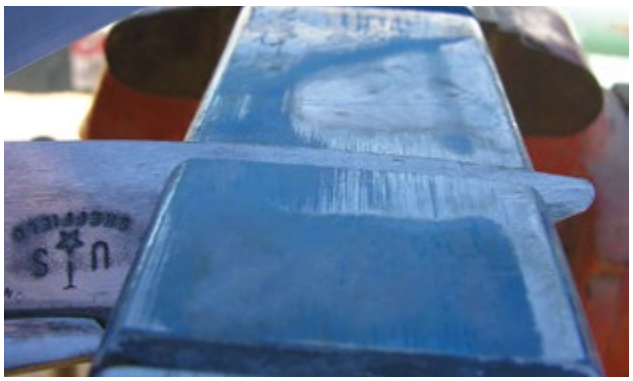


Photo 5.58 Rear view – looking towards the outside face of the blade in the jig. *PHOTO: Ian Evans*

Choosing the sharpening angle: The 45° cutting edge is the most common. This is a sharp edge and will give a clean cut while holding its edge longer when working in dirty, stained, or daggy conditions.

The 33° edge is an extremely sharp and useful cutting edge, but does not hold its sharpness for as long. It is most suited to conditions where lambs are relatively clean and free of burrs, dirt and dags.

Between 33° and 45° there is scope to choose the angle or angles which suit the working conditions at any time.

Sharpening new shears – 'bringing them up': Start by using the coarse stone. Place the shears in the appropriate position in the jig for sharpening.

The photographs and instructions on the left demonstrate sharpening using the Godson jig. For other jigs follow the instructions included with the jig.

Hold the sharpening stone flat on the surface of the jig: holding the blades sufficiently apart, but no more. Gently push the shear blade into the chosen slot (whether 45° or 33°) until the sharpening edge just pushes the stone slightly upwards. This will allow the sharpening edge to protrude just above the face of the jig, to the point where the stone will bear on it.

Slightly and gently twist the upper blade, the one out of the jig, towards your body. This will lock the blade securely in the jig, ensuring a consistent angle of contact between stone and sharpening edge face.

Rub the sharpening face of the blade, using a circular motion, (or other motions as appropriate for different jigs). Make about 10 – 15 revolutions, ensuring that you run right out to the point of the blade.

Photo 5.59 Rub the sharpening face of the blade, using a circular motion. *PHOTO:* Ian Evans

Photo 5.60 Concentrate on the points. *PHOTO:* Ian Evans

Photo 5.61 Remove the blade from the jig and while holding the stone flat against the inside face, draw the stone along the blade from the heel to the point only once. *PHOTOS:* Ian Evans

It is important to emphasise or concentrate on the points. Concentrate to a lesser degree on the heels, where much less wear occurs and most cutting is done with the foremost two-thirds of the blade back from the points. This overcomes the natural tendency to wear away the central area of the blade. Not concentrating on the points (and heels) will create a dip or concave shape in the middle of the blade, also known as 'banana blades'. This will make sharpening increasingly difficult and ultimately almost impossible.

Over-sharpening the back third of the blade will lead to an unusual wear pattern on the contact edge in this section, which will feel as if there are ripples or corrugations on the contact point as the shears reach fully closed. If this happens it will be necessary to grind back the cutting face until the corrugations are removed and then re-sharpen the back section again.

After 10 – 15 revolutions remove the blade from the jig and while holding the stone flat against the inside face, draw the stone along the blade from heel to point only once. This will remove any burr which forms on the inside face of the sharpening edge.

Turn the shears over and repeat this process on the other blade. It is important to consistently perform the sharpening actions equally on each blade. Sharpening one blade more than the other will lead to uneven wear which will adversely affect the set and thus the cutting performance.

Having sharpened each blade as described the blades need to be 'backed off' before they can be closed in a normal cutting action.

Do not attempt to close the blades before backing them off.

Photo 5.62 Backing off from point (top) to heel (bottom). *PHOTOS: Ian Evans*

Backing off: Holding the blades slightly apart, carry them over one another until they are in the fully closed, knockers in contact, position. Allow the blades to contact one another with a gentle blade-to-blade pressure without using excessive force. Holding the gentle blade-to-blade pressure, open the shears from point to heel. For open point shears this would be from first point of contact to heel.

Repeat this process three times.

This process ensures any burr has been removed from the inside face and protects the delicate newly-sharpened cutting edge from picking up on the opposing blade and gapping.

Repeat this entire process until the full width of the sharpening face is contacting the stone. The shears should now look and feel sharp. Depending on the coarseness of the stone and personal preference, the shears can now be worked with. But be aware this is a relatively coarse edge and although it will initially cut well, it will not remain sharp for long and has a high risk of gapping.

It is better, with new shears or shears which have just undergone regrinding or other repairs, to repeat the above process with the fine stone. This will polish (remove the coarser scoring from) the sharpening face and will invariably improve the sharpness and yield a longer-lasting edge.

Running or breaking in: It is best to start a number of pairs of shears, about three, together. New or extensively re-conditioned shears always feel different when first starting out. As soon as there is any indication the shears are becoming blunt, stop and sharpen them. Usually the fine stone will be sufficient, particularly if they are not allowed to become too blunt.

Stop, sharpen and work until the shears reach their optimum sharpness.

Maintaining sharpness: It is always better to stop and touch-up a pair of shears with the fine stone, or change to a sharp pair from the disinfecting container, than to push on with a steadily dulling pair of shears. To carry on with dull shears causes hand fatigue, which will lead to poor-quality results as the day wears on.

Shears that have reached their optimum sharpness, fully 'run-in' or 'going', can mules up to about 50 lambs before they need re-sharpening. This rate will be reduced under difficult conditions such as dust or sand in the wool, burrs, stain and dags.

Lubricating during the sharpening process: Lubrication of the sharpening stone removes the sharpening debris from the surface of the stone, which enhances its cutting action. Water, oil-based or even industrial cutting compounds can be used to keep the stone's surface clean and ensure the best performance. Clean water is the most practical lubricant and is usually available for use in the yards. Oil-based lubricants, for example kerosene and diesel, collect dust and can 'clog up' the surface of the stone.

Gaps or damaged cutting edges: 'Gapping' can occur for many reasons related to faults or problems in sharpening and setting shears. These have been noted in the descriptions above. In addition there is the 'bad luck' factor, which can arise from hitting hard-seeded burr or moit (small sticks or twigs) in the wool. Damage during storage and transport is avoidable, but does occur.

Gapping can also occur when sharpening through rust pit marks on the inside face of the blade. Pitting due to rust creates tiny craters in the blade surface and when the sharpening edge progresses into a crater on the inside face of the blade, a half-moon-shaped gap will appear in the sharpening edge. As soon as the blades are closed the opposing blade will bite into the gap and the blades will be gapped. This is the main reason why rust on mulesing shears is such a serious problem.

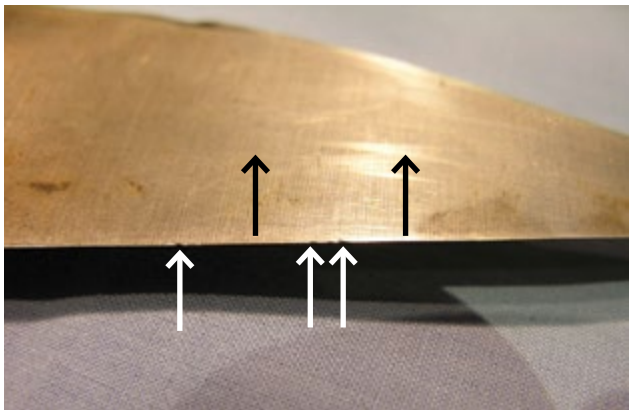


Photo 5.63 A badly gapped shear blade. *PHOTO: Ian Evans*

To remove the gaps (shown by white arrows in the image below) and restore the blade shown, it will be necessary to sharpen the cutting edge back past the bottom of the gaps, in the direction shown by the black arrows. In this case it would take considerable time using a coarse sharpening stone and out on the job it can sometimes be necessary to do this manually. This is a compelling reason to have a particularly coarse, severe cutting sharpening stone in the toolkit.

Alternatively it is much easier to simply grind the edge back using the belt grinder. But be aware it is easy to remove more than is necessary, resulting in a major re-grinding job.

Use a 100 grit belt or finer on the grinder, lock the blades over past the knockers using a clip or similar (see clip shown in image on page 37) as described in **5.2.3 Grinding**. Estimate and hold the blade as closely as you can judge to the desired sharpening angle, and grind the cutting face back until the gaps disappear.

An equivalent amount from the full length of the cutting edge face needs to be removed to retain the original shape of the blade. If the blades have developed a dip due to sharpening, this can be an opportunity to grind the entire blade back to the original profile.

Go steady: Grind a little bit at a time and inspect the progress. (you can't put it back). Try to keep the angle of the face as close as possible to the desired sharpening angle. Be careful to try and maintain the original, or as close as possible, profile of the blade. If more than about 1mm needs to be removed from the blade, it could be necessary to grind the other blade back a similar amount to keep them even and maintain set.

When the sharpening face has been ground back to just past the edge of the gaps, the shears will need re-sharpening. Start again as if they were new shears, as described above.

5.2.5 Cleaning and storage

Daily: Thoroughly clean and dry shears at the end of each day. This has two main aims; firstly to maintain best-practice hygiene standards; and secondly to prevent rust.

Be particularly careful with the inside of the handles and bows and the junction of the handle and the blade. Blood is quite corrosive and is an excellent precursor to rust. Hang shears overnight in a safe place, in a dry environment. In wetter climates where dew or rain is likely it is necessary to keep moisture off the blades overnight to prevent the establishment of rust on the blades.

Note: Some water sources, such as some bores and even some river waters, appear to have a particularly severe effect in rapidly promoting the onset of rusting, possibly the result of mineral content. If shears must be washed in this water it will be necessary to neutralise the effect of this water by coating the shears with an oil-based rust protection product. For example kerosene, diesel,'WD40', 'CRC' or Lanolin-based products. Lanolin-based products appear to be particularly effective for both short and long-term rust protection.

Long-term storage: Between jobs and seasons, store shears so the cutting edge is protected, the set is not damaged and the blades do not rust.

Thoroughly clean and dry shears before storage. Carry out any necessary maintenance grinding, set adjustment and final sharpening before storage. Wherever possible store shears in their relaxed state.

Avoid sheaths such as the one shown at top right. The pressure on the blades during this type of storage will tend, over time, to destroy the set, particularly if the blades have any additional weight placed on them.

One method of safely storing shears is to slip them into old woollen socks. This will provide adequate protection for the cutting edges and allow the shears to be stored in their natural, relaxed position. The socks can be soaked in an oil-based compound to help exclude moisture and prevent rust.

In extremely wet climates it could be necessary to also coat the blades with a heavier protective layer such as the lanolin products or a grease of some type. Storage boxes, which exclude moisture and the inclusion of moisture-absorbing gel sachets could be necessary in some situations.

Photo 5.64 Ready for the off-season.

Photo 5.65 Leather sheaths (top) can cause condensation, promote rust and damage the set. It is better to store blades in a woollen cover (bottom and below). *PHOTOS: Ian Evans*

5.3 TAILING DEVICES

Gas-heated detailers, sharp knives or elastrator rings are acceptable methods of tail removal. When mulesing at marking, remove the tail before performing the mules operation. For this reason elastrator rings cannot be used for tail removal when mulesing at lamb marking.

5.3.1 Heated de-tailers

The gas-heated de-tailer (hot knife) reduces blood loss in the lambs because the heat cauterises blood vessels in the tail as it cuts.

The hot knife produces an open wound, which is slower healing than a cold knife wound but reduces the risk of transmitting disease between animals. If flies are present the wound can be more susceptible to blowfly strike unless a reliable insecticide is applied.

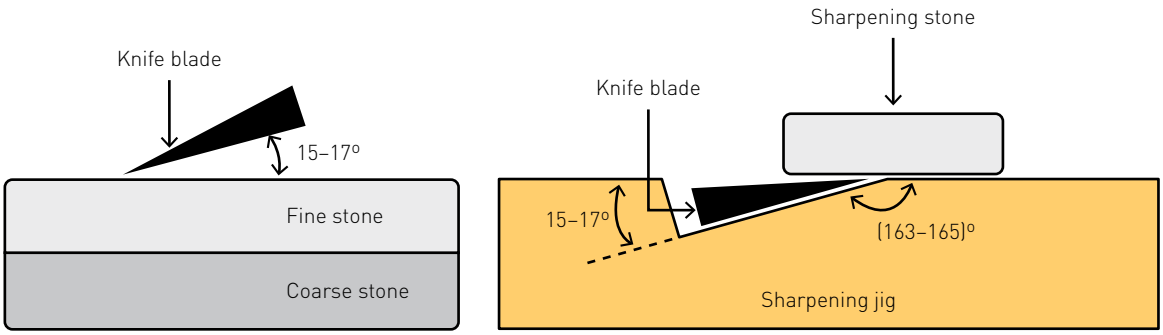
Ensure all gas jets are operating well. Blockages result in reduced, uneven heat, substandard operation and can be caused by dust and wool fibres being sucked into the gas jet when resting the de-tailer on a drum or shelf or during cleaning of the blade. However, blockages are more often a result of a build-up of a tar-like substance, which seems to be more prevalent in some gas re-fills than others. To minimise the problem, place the de-tailer into a suitable stand between lambs. Construct the hot knife stand in a way which minimises the risk of accidental contact by either sheep or people.

Photo 5.66 Correct technique with the gas-heated de-tailer (left and right) reduces the shock caused by blood loss. *PHOTO: Ian Evans*

Photo 5.67 Keep the knife blade clean using a wire brush, always brushing away from the gas jet. Clean the gas jet with air and a solvent. It is advisable to carry two or three spare clean jets in a small, sealed container with other mulesing equipment. *PHOTO: Ian Evans*

Photo 5.68 A range of gas-knife holders illustrating varying degrees of safety. *PHOTOS: Ian Evans*

Figure 5.69 Sharpening shears



Free-hand sharpening

Sharpening using a Godson jig

5.3.2 Knives

Lamb marking knives come in two main types: the first combines a blade for de-tailing and opening of the scrotum during castration with a hook for removing the testicles. The second combines a blade and a serrated clamp for testicle removal.

This second type comes in several forms. Other types of lamb marking knives are used such as the blade and scissor-clamp combination.

Keep knives as hygienic as possible. If the knife is being used to cut tails and castrate it will be in constant use. In this case do not dunk the knife into a disinfectant container between lambs. Keep the knife clean and thoroughly wash in the 'wash-down' container (see page 50, disinfecting containers) before soaking in a disinfectant container. It is likely the knife would need sharpening by this time so the routine would be wash, sharpen, soak in disinfectant. If a knife is being used in this way it can be faster to have two knives, one in use and one sharpened and soaking in the disinfectant. Then at the end of each pen the used knife is washed-sharpened-soaked and so on.

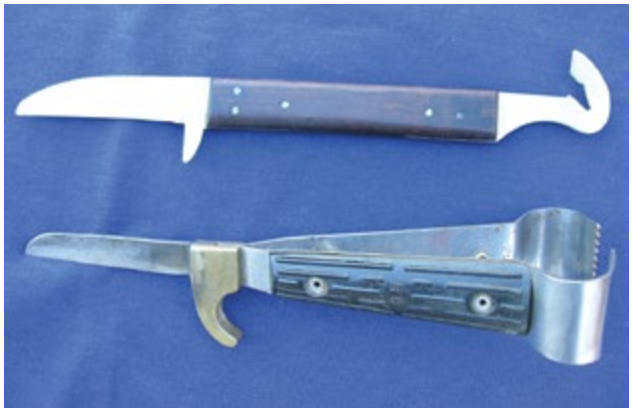


Photo 5.70 Lamb marking knives come in two main types – a blade and hook combination (top) and a blade and serrated clamp combination (below). *PHOTO: Ian Evans*

If the knife is being used only for castration then it will probably be put down between lambs. There is much less build-up on the blade with this type of use and it is acceptable to put the knife into a dedicated disinfectant container. Change the disinfecting solution as soon as there is any sign of discolouration or at regular intervals, for example at the end of each pen.

Photo 5.71 Using a jig will ensure a consistent sharpening angle. Note: The tip of this knife has been ground back for operator safety. *PHOTO: Ian Evans*

Photo 5.72 Knives can be polished with a leather strap. *PHOTO: Ian Evans*

Sharpening knives: The principles of knife sharpening are much the same as for sharpening shears but with different angles.

In most cases knives do not need the blade ground too thin for best sharpening, although there will be some exceptions. If a knife does require grinding, take particular care with heat build-up. Because of the smaller blade the build-up is much faster and dissipation much slower than with shear blades.

Knives are sharpened at an angle of about 15 – 17. As with shears, the use of a jig will ensure a consistent sharpening angle.

A coarse sharpening stone could be necessary to establish the cutting edge initially. In most circumstances after the cutting edge is established it will be easily maintained by sharpening with the fine stone.

The 'polishing' of the cutting edge of the docking knife is best done on a leather strop, an old barbershop razor strop is excellent. This is akin to the final polish of the shear blades with the fine stone.

As with shear sharpening, treat each side of the blade equally, progress slowly and check the results during the process. The principles of hygiene, cleaning and storage for knives are the same as for shears.

5.4 CONTAINERS FOR WASHING AND DISINFECTING

A minimum of two containers is required for:

1. **Soaking used shears:**

   A volume of about 10L and a sufficient size to completely cover the entire shear – this is the *'soaker'*

2. **Disinfecting clean shears:**

   A volume of about 5L and sufficient depth to completely cover the blades of the shears with disinfectant

A third container, the 'wash-down', is often useful for removing the bulk of any build-up of any contaminants such as blood or faecal material. This container is usually equipped with a heavy duty dish brush or shearer's scrubbing brush for removing any particularly stubborn matter. Disinfectant is often added to the water in this container; but the benefit is only the detergent action. Because of the high level of organic material in this solution it will not have a disinfecting effect.

A separate and dedicated disinfectant container for knives could be required (see **5.3.2 Knives**).

Ensure containers are not chipped, dirty or of a design which harbours bacteria. Stainless steel is highly recommended.

Photo 5.73 High-quality stainless steel containers recommended by the Livestock Contractors Association. These containers will last a lifetime under constant use.

Photo 5.74 Inexpensive imported stainless steel pots are quite adequate for annual use and are an economical alternative.

Photo 5.75 Stainless steel container specifically for knives. *PHOTOS: Ian Evans*

5.5 VACCINATION GUNS

Only use vaccination guns and applicators recommended by the vaccination manufacturers. Maintain the guns, needles and applicators in good working order. Change needles before they become blunt.

Detailed recommendations for care and use are contained in section **7.1.2 Preparing equipment and consumables**.

Photo 5.76 Unique recoilling suspension system for vaccination guns. Excellent for operator safety, hygiene and efficiency of use.

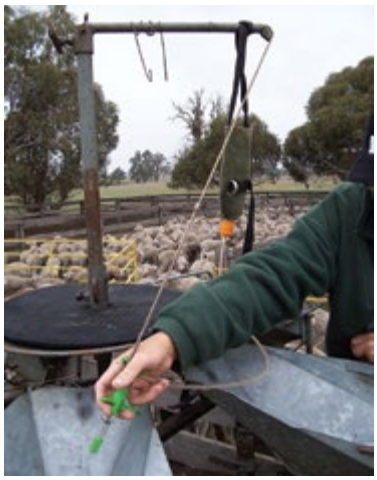


Photo 5.77 Another recoiling suspension system for a vaccine gun. Note: Vaccine pack is protected from direct sunlight and (partially) heat.

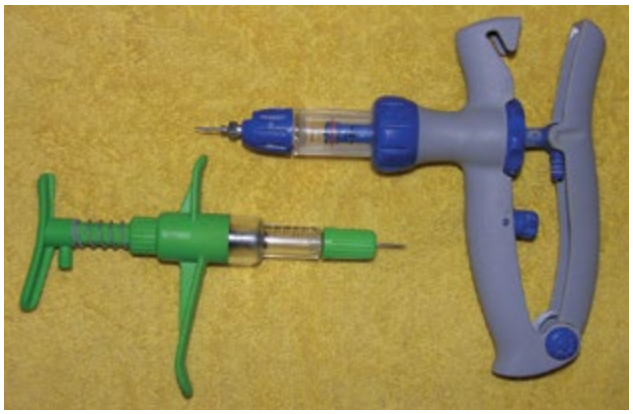


Photo 5.78 Readily available auto vaccinating guns. *PHOTOS: Ian Evans*

5.6 STOCK IDENTIFICATION EQUIPMENT

Always use the correct stock identification equipment to comply with each State's stock animal identification regulations. Maintain it in good working order. Ear marking pliers must be sharp, regularly cleaned and disinfected.

Recondition ear marking pliers as necessary to keep them sharp so they cut readily in a single closing.

Ear tagging equipment must also be sharp, regularly cleaned and disinfected. Replace the penetrating spear as often as necessary to ensure it is always sharp.

Note: Animal identification regulations differ from state to state, always check the relevant State requirement for ear marking and tagging.

Photo 5.79 Examples of ear marking and ear tagging equipment. *PHOTOS: Ian Evans*

5.7 INSECTICIDE APPLICATION EQUIPMENT

- Use the appropriate and recommended spraying or jetting equipment to apply wound dressings to or around the mulesing wound immediately after completion of the procedure and before releasing the lamb from the cradle

- Only use an applicator recommended by the insecticide manufacturer to apply the wound dressing in compliance with the label instructions

- Ensure the equipment operates at sufficient pressure to apply the wound dressing to comply with the label of the insecticide, but not at excessive pressure, which can cause wound irritation

- Do not allow the equipment to touch the animal to avoid cross contamination of blood, faeces or urine between animals

- Always use recommended safety equipment when applying insecticides

Photo 5.80 *PHOTOS: Ian Evans*

SECTION 6

CHEMICAL AND ANIMAL HEALTH PRODUCT USE

Only use chemicals registered for the appropriate use by the Agricultural Products and Veterinary Medicines Authority (APVMA).

Always read the label and follow the manufacturers' directions. Check the product is not past the use-by date. Take particular care to ensure mixing and concentration instructions are followed exactly. Always wear the recommended PPE when mixing and applying chemicals.

6.1 DISINFECTANTS

- Always use a clean disinfectant solution to disinfect the mulesing shears and other equipment used in the marking and mulesing operation
- Disinfectants only work effectively in the absence of organic material such as blood, wool and faeces. Wash any organic material off the shears and other instruments before immersing them in disinfectant
- Most disinfectants have a detergent effect which will assist with cleaning. But if separate disinfectant is used in the cleaning process, do not regard it as disinfecting the equipment
- Only use the disinfectant which is label approved for use as a surgical disinfectant
- Change the disinfectant frequently
- Dipping the shears in the disinfectant between lambs will lead to contamination
- Always disinfect the shears after sharpening and before use

Photo 6.1 *PHOTOS: Ian Evans*

6.2 INSECTICIDES

- Use only products registered for application to mulesing wounds and apply according to label directions

- When selecting appropriate chemicals to treat flystrike and mulesing wounds, there are several factors to consider. Check label withholding periods before using any product

- Keep wool from individually treated animals separate from the main clip to minimise any wool residue risk and observe the meat withholding period

- Three different chemicals are currently registered for treating mulesing wounds. These are the insect growth regulator dicyclanil (for example, Clik), spinosad (for example, Extinosad) and organophosphates (OPs). OPs are not recommended because nearly all fly populations have some degree of resistance to this chemical group and they pose a potential human health risk when they are applied. Take all possible steps to mules when flies are not active to avoid the need to use an insecticide

6.3 ANALGESIA/ANAESTHETICS

Under the Australian Animal Welfare Standards and Guidelines for Sheep, it is a legal requirement that pain relief be used when mulesing lambs between the ages of 6 – 12 months. However, there are some states that are considering updating their legislation to require appropriate pain relief to be applied at any age when mulesing is conducted. Check with your state government for relevant legislation.

There are currently 4 pain relief products on the market; a topical wound anaesthetic Tri-Solfen® and 2 anti-inflammatories: Buccalgesic® a gel inserted in the buccal cavity between the gum and cheek; and Metacam® a subcutaneous injection and Numnuts (a local anaesthetic for use with rings).

Buccalgesic, Metacam and NumNuts are all Schedule 4 medications meaning that they can only be supplied under prescription by a registered veterinarian whom the sheep producer has a bona fide relationship with. It is vital that producers seek advice and input from their veterinarian so that the appropriate pain relief medication is used. The different medications provide pain relief in different ways and for different durations, and vary in their suitability for different procedures (castration vs tail docking vs mulesing) and different techniques (knife vs rings). Livestock veterinarians are best equipped to advise producers on developing an appropriate, enterprise specific, pain control program.

Research has shown they provide similar amounts of relief, anaesthetics provide early relief and the anti-inflammatories later but longer relief.

Again consult your Veterinary Officer for advice specific to your husbandry procedures.

SECTION 7

LAMB MARKING AND MULESING PROCEDURES

7.1 PREPARATION

7.1.1 Preparing the sheep

In preparation for mulesing it is important there is sufficient feed to allow the ewes and lambs to remain undisturbed for about four weeks after mulesing. Four weeks will allow lambs to completely heal under most conditions. In favourable seasons this could be as little as three weeks or it could be longer under unfavourable seasonal conditions.

Consider the paddock situation with respect to yards. Determine whether portable yards are available and whether other mobs can be marked at the same site and released into adjoining paddocks.

Within the practical limits of number and location of paddocks, and available feed, some quiet movement of ewes and lambs before mulesing and marking can be beneficial. Concentrate on improving mothering-up and reducing the amount of movement of the ewes and lambs after mulesing. Planning at this stage can also increase the effective use of labour by eliminating unnecessary movement of the mulesing and marking team and equipment between mobs.

7.1.2 Preparing equipment and consumables

If lambs are mulesed and marked under a full contract arrangement, preparing equipment and consumables can be as simple as ensuring adequate supplies of consumables such as vaccine, disinfectant, rubber rings, insecticide and ear tags are on hand.

If contract labour is not being used, a checklist of equipment and consumables will help. The description of the equipment required, its set-up, maintenance and storage has been covered in the sections above. But the main items are worth noting again:

- Cradles – ensure cradles are clean, maintenance has been carried out since last season and all moving parts move freely
- Vaccinating guns and needles (plus spare needles)
- Animal identification equipment – ear marking pliers, ear tag applicators with clean, sharp pins, spare pins or spears for applicators
- Gas knife – check knife operation, spare jets, ensure hose and connections are in order and there is adequate gas supply
- Shears and detailing or castrating knife (if used) – ensure these are rust-free, clean and sharp
- Rubber ring pliers – have on hand spare pliers and plenty of rings
- Shear maintenance – ensure all shear maintenance has been carried out before storage so equipment is ready for mulesing
- Hygiene containers and brushes – ensure there is a sufficient supply of clean containers and brushes for shears, detailing knives and animal identification equipment
- Insecticide application equipment – ensure this equipment is in good working order, calibrated (if necessary), spares are on hand and a power source is available if required
- Portable yards and panels for marking yard
- Transport arrangements for equipment
- Labour – ensure enough skilled labour is available
- Analgesia/anaesthetic products and equipment
- All animal health products are stored according to label instructions, not out-of-date and there is sufficient product to complete lamb marking

7.2 SET-UP

- Check the set-up of the facilities and equipment
- Set up work site to facilitate efficient work practices
- Ensure the mulesing cradles are firmly in place at a comfortable height for the operator. Set multiple cradles sufficiently far apart to provide each operator with enough space to prevent accidental injury from adjacent operators
- Ensure the disinfectant containers have a supply of freshly mixed disinfectant and clean water
- Ensure the mulesing shears are sharp, correctly set and clean
- Ensure the equipment for removing tails is ready and heated or sharp
- The spray or jetting equipment for wound dressings must be available and operating efficiently together with freshly prepared insecticide
- Back-up systems such as spare parts and alternatives must be readily available so when procedures start they can be completed without undue interruption

7.3 HYGIENE

7.3.1 Mulesing shears

- Use at least three sets of shears:
  - one in use
  - one soaking in a 10L container of water or disinfectant and totally submerged
  - one soaking in a 5L strong disinfectant container, ready for use
- Change shears after at least each yard (about 40 – 50) lambs. At change over, brush used shears, clean and put in the 10L container to soak. Take the shears, which have been soaking in water, and sharpen before putting in a 5L container of disinfectant. Use the shears that have been soaking in disinfectant
- Change water and disinfectant at regular intervals. Small containers need more frequent changes. Remember blood and faeces deactivate most disinfectants
- Clean handles of shears regularly with a suitable brush
- Regularly clean sharpening equipment, jigs, stones and soaking and disinfecting containers

7.3.2 Other equipment

Clean and disinfect all other equipment as regularly as possible and store it in a way that will minimise contamination. During the day's procedures, wash and disinfect equipment as necessary to minimise build-up of organic material that provides a haven for bacteria to survive and transfer from one animal to another.

7.4 STOCK MANAGEMENT AND HANDLING

7.4.1 Mustering and drafting

Ewes and lambs can be mustered the day before marking, for an early start. When mustering on the same day as marking, do not drive ewes and lambs for more than two hours on the day of mulesing. If yarding on the day of mulesing, allow lambs to cool down for at least 30 minutes after handling, and before marking, to avoid excessive bleeding.

Muster stock in a quiet manner with minimum stress. Ensure there are sufficient competent dogs to head off potential breakaways, as young lambs unaccustomed to yarding are particularly likely to break away from the mob.

Using the principles of low stress stock handling will significantly reduce the stress on both the sheep and handlers.

When handling livestock, ensure that the handler:

- Moves animals in a calm and quiet manner
- Uses flight zones to efficiently direct flow of livestock
- Uses physical barriers (such as fences) to help control mob
- Directs dogs/stockmen to effectively control the movement of the mob
- Does not exert undue pressure on livestock
- Observes livestock behaviour and reacts appropriately
- Understands livestock behaviour

The initial disturbance of the grazing or resting activities of the mob is critical to avoid missmothering and most importantly, ewe-lamb pairs are still together for yarding to avoid lamb breakaways on yarding.

Lambs risk smothering when they are drafted off and held in yards for an extended period, particularly in large mobs in long narrow pens. It is better to draft off only enough to fill the catching pen and mark these before drafting another pen full.

Always aim to minimise the time ewes and lambs are separated.

7.4.2 Catching and handling lambs

Catch and hold lambs around the body. Rough handling and catching lambs by their legs can cause bruising and dislocation of joints.

Avoid rushing lambs. Marking lambs in an overheated or excited condition increases stress. When procedures are completed, release the lamb so it lands on its feet to avoid the risk of infection of wounds.

7.5 ORDER OF PROCEDURES

The following order of procedures works successfully for the welfare of animals and staff.

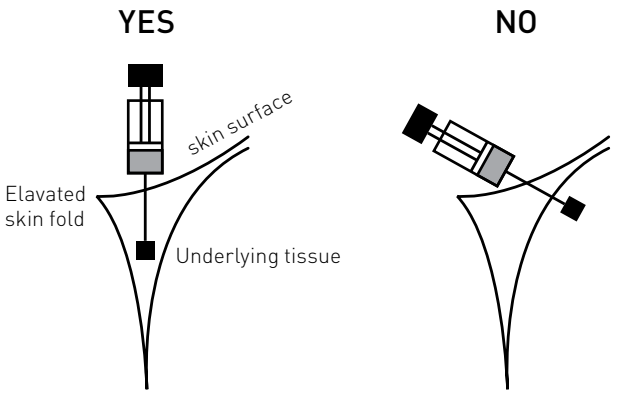
- Vaccination
- Ear marking and tagging
- Castration
- Tail docking
- Mulesing
- Analgesia/anaesthetics as required (see label requirements)
- Insecticide application if necessary (see label requirements)

7.5.1 Vaccination

Vaccination at mulesing can give protection against a number of diseases including tetanus, pulpy kidney, blackleg, black disease, malignant oedema, scabby mouth, arthritis/polyarthritis and cheesy gland. Some vaccines also contain selenium for use in selenium-deficient areas.

If ewes are vaccinated before lambing, they pass on immunity to their lambs through the colostrum (first milk). This is passive immunity. This passive immunity protects lambs against infections such as tetanus, picked up at marking. But this immunity is short-lived and a full vaccination programme is required for long-term protection. Lamb marking provides the first practical opportunity to vaccinate lambs in such a programme.

Figure 7.2 Subcutaneous injection



Make sure the vaccine is given under the skin and not into the skin or underlying muscle. *SOURCE: NSW DPI*

7.5.1.1 Vaccines – handling and storage

There are three basic rules to follow when vaccinating:

- Read the label on the vaccine transport package and follow the instructions exactly. Take particular care with storage, dose rate and vaccination site
- Check the expiry date on the vaccine, and do not use the vaccine if it is out of date

- Handle with care

Preparing to vaccinate

- Check the expiry date of vaccines at purchase, in preparation for lamb marking and everytime it is administered. Dispose of any vaccine that has passed the expiry date, become contaminated or that has been stored at the wrong temperature, as it could have lost potency

- Read the manufacturer's instructions provided with the vaccine. *Note: Check the relevant State regulations with respect to the use of the Gudair vaccine. For example, in NSW the Gudair vaccine for Ovine Johne's Disease can be given to lambs under four weeks of age*

- Have a plentiful supply of short, sharp, 18-gauge needles, 6 – 12mm long. Longer needles are likely to break

- Check condition of vaccinating gun, or buy a new disposable gun with the vaccine

When vaccinating

- Give the correct dose. (Calibrate the gun using water by adjusting it to deliver the correct number of millilitres and then check it is delivering the correct dose into a medicine flask, or similar graduated flask. For example, see if five doses equals 10mL)

- Vaccinate in the recommended site, to avoid carcase blemishes. The recommended site for vaccination is under the skin on the side of the neck, just behind and below the base of the ear

- Make sure you inject the vaccine under the skin, not into the skin or into the underlying muscle. (If the needle is within the skin, or in the muscle there will be greater resistance to the introduction of the vaccine. Resistance should be minimal)

- When working in yards, keep equipment as clean as possible to reduce the risk of infection and abscess formation at the site of injection, which can occur if needles are contaminated. Avoid putting equipment on the ground or where it can be easily knocked over. Keep the vaccine cool and out of the sun as much as is practicable

- Change the needle frequently and discard any dirty, blunt or contaminated needles. Have an appropriate container handy for used needles, and remember to dispose of them safely

- Avoid handling and inoculating wet sheep, as this increases the risk of wound contamination and infection, and the spreading of other diseases such as lumpy wool (dermatophilosis)

- At completion of vaccination, clean, disinfect and rinse vaccination equipment and store as per manufacturer's instructions

Store vaccines correctly

- To ensure vaccines retain their potency, they must be stored exactly according to directions set out on the label. Store all vaccines away from light

- Most killed vaccines need to be stored in the refrigerator (not the freezer) at 2 – 8°C; but one brand of scabby mouth vaccine must be stored in the freezer

- Anthrax vaccine is particularly fragile and rapidly loses its potency after opening. Store it in the dark and refrigerate it until opening. After opening, the entire contents must be used the same day or burn any excess vaccine, along with

the container

7.5.1.4 Vaccination hygiene

Clean and disinfect reusable vaccinating guns after use. Follow the manufacturers' recommendations regarding care of the gun, but it is advisable to store the gun with boiled water in the barrel, so the seals do not dry out. Depending on the time since last use, guns can be re-sterilised before the next use.

If using a disinfectant, mix it at the correct concentration (not too strong). Using clean boiled water, wash all disinfectant out of syringes and needles before use. Any disinfectant remaining could inactivate the vaccine.

(Syringes and needles can be damaged by disinfectants, so do not leave them soaking in disinfectant between uses.)

Note: Plastic vaccinating guns are normally regarded as disposable. Manufacturers do not recommend re-using plastic guns.

At completion of vaccination, clean, disinfect and rinse vaccinating equipment, and store as per manufacturer's instructions.

7.5.2 Sheep identification

- Maintain ear marking pliers and tag applicators in good working order. See **Section 5.6 Stock identification equipment**. Keep tag applicators clean and it is preferable to dip applicators in a disinfectant solution after each new tag is loaded for application

- Carefully locate the ear mark and/or tag site(s). The centre of ear is best midway between the veins avoiding cartilage. Insert the mark or tag with a bold action to minimise the time taken to cut through or penetrate the ear

- Place ear marking pliers and tag applicators in a disinfectant solution at least once per round of cradles and preferably between lambs if there is any likelihood of disease transmission

- Replace the disinfectant solution before it becomes contaminated

7.5.3 Castration

Castration is performed using a knife or elastrator rings.

7.5.3.1 Knife

Combination knives have a blade for opening the scrotum and a hook or serrated clamp for withdrawing the testicles. A sharp knife is quick and effective. It leaves a clean wound, which heals rapidly. Avoid using pocket knives as they cannot be boiled before use and are hard to keep clean.

Cut off the scrotum at about one third of its length from the tip and no more. Squeeze out the testicles so they can be grabbed by the hook or clamp on the knife and then draw them steadily and firmly until the cords break.

Knife wounds can make lambs more susceptible to infection from organisms found in sheep yards or camps.

7.5.3.2 Elastrator rings

Elastrator pliers are used to stretch a rubber ring to place it around the scrotum, between the testicles and the lamb's body. Take care to ensure both testicles are in the scrotum when the ring is placed in position.

Do not push the ring too hard up against the abdomen of the lamb or the resultant wound, when healed, can be prone to rupturing causing a hernia-like displacement of the internal abdominal wall. Avoid catching the small false teats found just above the head of the scrotum under or below the ring. Ensure there are no burrs, fribs or dags caught under the ring.

The ring cuts off the blood circulation to the scrotum and testicles, which wither and eventually fall off in 2 – 3 weeks.

If conditions are favourable, this area is prone to flystrike and can provide a site for bacteria and other diseases. Vaccinate ewes against tetanus before lambing.

7.5.3.3 Stags

Some ram lambs do not have both testicles in the scrotum. Easing the tension on one or both hind legs (release from cradle leg catches) can allow any undescended testicles to be grasped. If these lambs cannot be castrated properly, permanently identify them so they can be operated on later or sold as soon as possible.

7.5.4 Tail docking

7.5.4.1 Recommended tail length

The recommended tail length for mulesed sheep is at the 3rd or 4th joint (see Figure 7.5). Wether and ram lambs should be docked to cover the anus.

The healed tail aims to protect the vulva and anal areas. Sheep can lift the healed tail so wool above and surrounding the base of the tail is well clear of urine or faeces as it passes from the body.

Note: The tails of sheep mulesed at marking usually heal up to 10mm shorter than their originally docked length.

Leaving wool-bearing skin on the upper surface of the tail tends to reduce the extent of the shrinkage.

Tails docked shorter than the tip of the vulva length, in ewes, increase the risk of flystrike compared with a tail that covers the vulva and can lead to the development of vulval cancer in some ewes.

Tails docked longer than the tip of the vulva length are difficult to shear and crutch and can make sheep more susceptible to staining, dagginess and flystrike.

7.5.4.2 Hot knife

When using a hot knife to dock the tail, push the skin of the tail towards the lamb's body to locate the joint required. Place the blade on this joint and gently squeeze the lever. It will take about two seconds to cut through the average tail if the blade is operating at the correct temperature.

If the blade is too hot it will cut the tail off too quickly without sealing the blood vessels. This can cause excessive tissue damage, which will delay healing.

If the blade is too cold the operation is too slow. Blood vessels are poorly sealed.

7.5.4.3 Sharp knife

When using a sharp knife, cut off the tail at the recommended length. It is important to push the bare skin on the underside of the tail forward, towards the body of the lamb, with the knife before cutting so the severed skin slightly overlaps the bone. This ensures that when the wound heals there is no wool-bearing skin on the underside or tip of the tail, where it can become soiled attracting flies.

Sever the tail at bone joints, as cuts through the bones are slower to heal.

To avoid injury to the operator, sever the tail by keeping your elbow in contact with your hip and using a sideways body movement.

7.5.4.4 Elastrator rings

When using an elastrator ring, the ring is stretched and applied to the tail at the correct length with the elastrator pliers. The tail withers and falls off about three weeks later. Ring wounds heal more slowly than cold knife wounds.

When lambs are being mulesed at marking do not use elastrator rings for tail docking as excess skin will be removed beyond the correct ring site. Precise control over tail cover length using elastrator rings (**see 7.6.4.1 Tail cover**) is difficult to achieve when mulesing.

7.6 MULES OPERATION

The aim of the mules operation is to remove wool-bearing skin from the breech area adjacent to the bare skin at either side of the anus and vulva – the **breech cuts**. Wool-bearing skin also is removed from the sides and upper surface to the tail – the **tail cuts**.

Note: When making both breech and tail cuts ensure no bare skin is removed.

As a result of mulesing, wound contraction stretches the natural bare skin around the anus and vulva over a wider area and also pulls the bare skin on the underneath of the tail over the end and sides of the tail. Increasing the bare area reduces the amount of adjacent wool that can be soiled by faeces and urine. The smell and moisture of soiled wool and underlying skin provides suitable conditions for flystrike.

Cutting into the bare areas removes skin needed to achieve the maximum healed bare area possible and can also result in the lips of the vulva of the ewe being pulled open subsequent to healing and wound contraction. This predisposes the ewe to both infections and cancer of the vulva later in life.

Note: When making both breech and tail cuts ensure the cuts do not pass through the selvage, or muscle fascia into the underlying muscle.

This ensures minimum stress to the lamb, maximum speed of healing and eliminates the possibility of the skin adhering to the underlying muscle.

Cutting into other tissues such as selvage, should not occur under any circumstances. It will lead to:

- Delayed healing
- More pain
- More scarring
- Possible distortion of tissues during healing
- Possible distortion of the function of tissues after healing

Avoid producing cuts with jagged edges as they delay healing and can become a focus of infection and flystrike of the mulesing wound.

The aim is to stretch the bare skin out to the maximum area for the least amount of wool-bearing skin removed. Stretching the bare area downward and outward will maximise the effectiveness and minimise the amount of skin removed.

Keen observation of the operation and knowledge of the local environmental flystrike risk periods of intensity and length is necessary to determine the size of the mules operation required for the best result. Management factors which require consideration include time of shearing and crutching; time of lambing and joining; bloodline characteristics such as staple length; internal parasite burdens and control programmes; likely seasonal feed availability and composition.

7.6.1 Final appearance

The resultant healed wound will appear as a fine (1 – 2mm wide) white line of scar tissue, which is difficult to see unless closely inspected off-shears.

The breech area should have the following characteristics:

- Bare areas on sides and end of tail
- A bare area extending from beside a straight non-gaping vulva to below the vulva
- Taut skin between the bottom of the vulva and base of the udder sparsely covered in short wool that often falls out after 18 months or so

7.6.2 Sequence (order of surgery)

Either breech or tail cuts can be performed first.

7.6.3 Removing the skin from the breech

The breech cuts (see Figure 7.3) for the recommended mules start level with and next to the base of the tail. The inside edge of the cut follows the edge of the natural bare area. The cuts should be the smallest possible to achieve the desired outcome (minimising lifetime breechstrike).

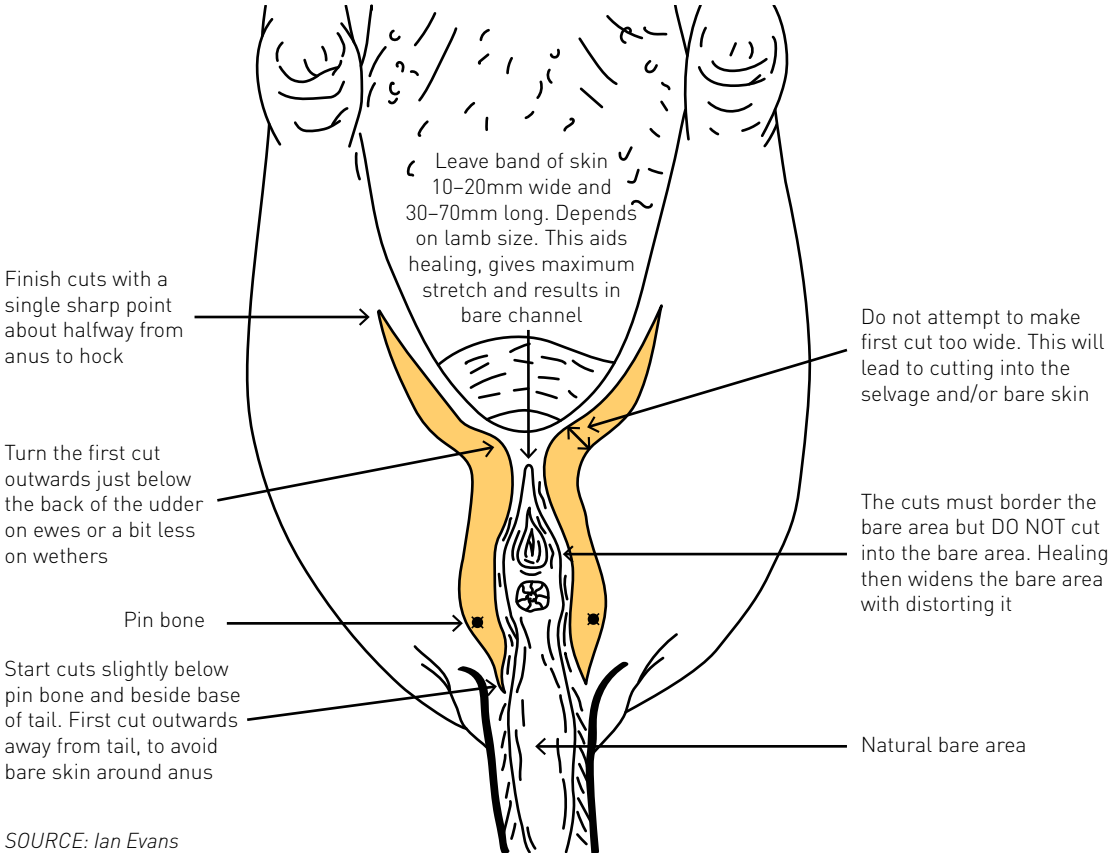
For the first part of each breech cut, aim the shears just outside the hock on that side. Make one cut outwards, then turn and aim the shears at the hock of the opposite leg, cutting around the bare skin beside the anus and vulva (on ewes). When below the natural bare area, turn and cut straight down towards the back of the udder in ewes (or equivalent on wethers and rams). Immediately below the udder, turn the shears and cut towards the outside of the hock of the same leg.

After turning, narrow the cut until it finishes halfway from the anus to hock. Extending the cut further is pointless and will delay healing.

This will usually result in a crescent or 'half moon' shape remaining outside the first breech cut. Cut this out (see Figure 7.4) to give the desired width in the wound to stretch the bare skin out to the degree required for the individual sheep.

Repeat this pattern in mirror reverse on the other side. It is important to try to ensure the shape and

Figure 7.3 The first breech cut



SOURCE: Ian Evans

size of the mules wound is symmetrical, each side a mirror image of the other. This ensures even stretching of the bare area, keeping the tail and vulva straight.

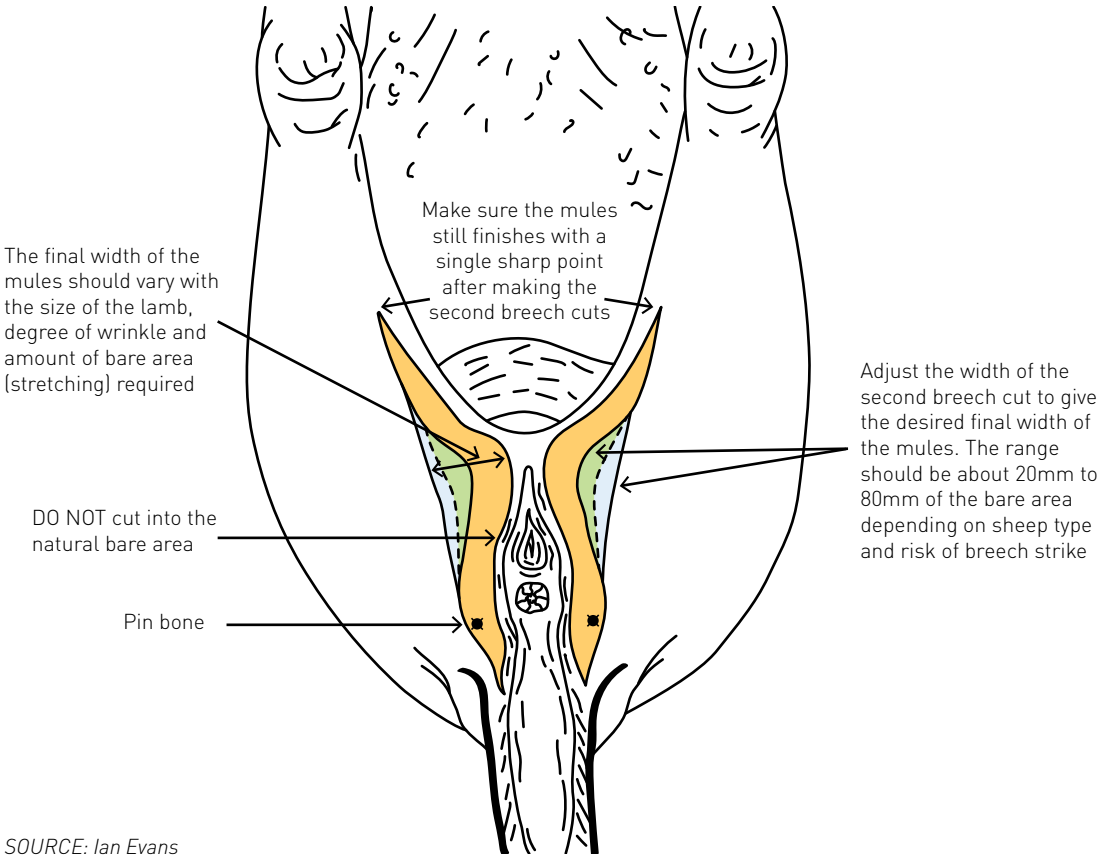
The width of the cut adjacent to or below the vulva in ewes or equivalent in wethers is a critical aspect of the mules. If this width is too narrow, the mules will be ineffective. Excess width is unnecessary.

The recommended final width varies from 20mm – 80mm depending on sheep type (amount of wrinkle and natural bare area) and the risk of flystrike in the local area.

Observations by professional mulesing contractors suggest that a slight extension of the breech cuts further down towards the back of the udder on ewes, or equivalent on wethers, produces significant benefits. This style leaves a slightly longer strip of skin, still 10 – 20mm wide, between the breech cuts. (see Figure 7.3).

It is claimed this style significantly improves the stretching of the skin below the vulva and will ultimately produce a bare 'channel' below the vulva down to the back of the udder. This further reduces urine and faecal fouling, but most importantly reduces the post-lambing collection of dried birth

Figure 7.4 The second breech cut



SOURCE: Ian Evans

discharge in the area below the vulva down to the back of the udder. In Spring lambing areas this can be a significant factor in predisposing ewes to flystrike after lambing.

Final development or 'bare-ing' of this channel will occur from two years old and onwards, after their first lambing.

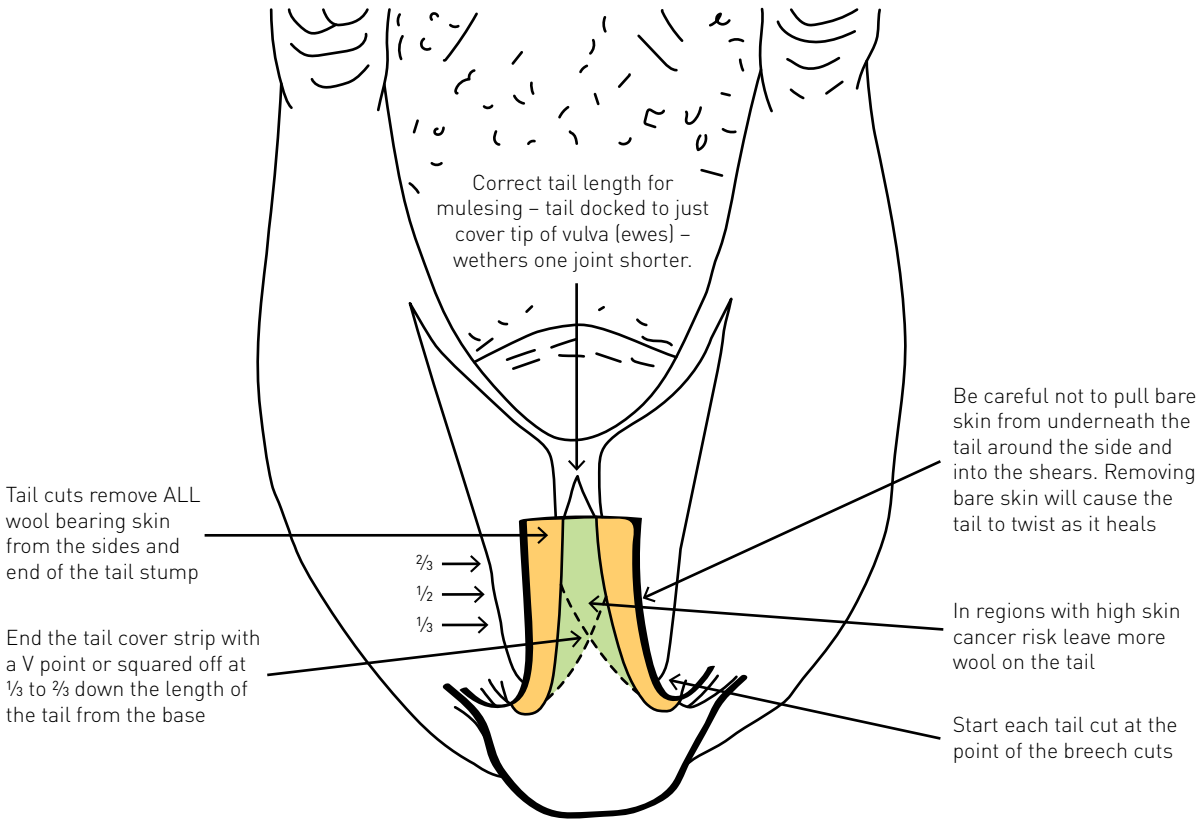
7.6.4 Removing the skin from the tail

The cut length of the tail is covered in **7.5.4.1 Recommended tail length**.

Start each tail cut (see Figure 7.5) at the same position as the breech cut was started. Cut from the base of the tail towards the end of the tail and also across at the same time. A similar cut on the other side of the tail will leave a 'V' of wool- bearing skin about one-third to one-half the length of the tail. This is the 'tail cover' and it acts as a shade for protection against the harmful effects of UV rays in sunlight of the bare skin on the tail.

Many lambs, particularly larger and heavier-skinned types, can require two or more cuts on each side. It is important to ensure all wool-bearing skin is removed from the cut end of the tail.

Figure 7.5 The tail cuts



SOURCE: Ian Evans

7.6.4.1 Tail cover (wool-bearing skin)

The aim of the tail cover is to provide shade for the bare skin on the upper surface of the tail, particularly during the summer months when solar radiation is highest. The length of the strip of wool-bearing skin, which is left down the docked tail will vary depending on:

- Time of shearing and crutching
- Staple length at shearing and crutching

For example, a medium/broad wool line of sheep, which might be expected to grow 100 – 110mm staple length in full wool, shorn during Autumn (March/ April/May) will go through summer with 9 – 10 months wool. Allowing for crutching, it is likely these sheep would only need their tail cover to extend about one-third along the length of the docked tail. Any longer and the wool will start to hang down in to the faecal and urine streams.

By comparison, a fine/superfine wool type sheep, which might be expected to grow 70-80mm staple length in full wool, shorn during Spring (September/October/November) will go through summer with 2-3 months wool and need more tail cover. Their tail cover should extend to at least half the length of their tail and some producers prefer slightly longer, approaching two-thirds.

7.6.4.2 Tail cover shape – 'V' or square

Under ideal conditions, the tail cuts will leave the tail cover strip with a pointed or 'V' shaped end. Providing this is precisely centred there will be no problems with distortion on healing.

Under more difficult conditions (for example, lambs lacking body fatness, or tight skinned), it can be difficult to consistently leave the tip of the tail cover strip precisely centred. This can cause the tail to twist on healing and will be exacerbated if any bare skin is removed from the underside of the tail.

To reduce the likelihood of this occurring the end of the tail cover strip can be cut 'square' to the centre line, at the desired length. The resultant wound healing has more points to pull towards, experience has shown this is more conducive to producing straight-healed tails under difficult circumstances.

Note: The apparent shape of the mules in the cradle will be significantly affected by the position in which the cradle design holds the lamb. In cradles which hold the lamb's legs closer to, and more parallel, with the lamb's body, the shape (style) of the mules will appear more like that shown in **Figures 7.3, 7.4 and 7.5** than some previous advisory material has shown.

It is important to carefully and regularly observe a sample of lambs as they walk away post-mulesing. This should confirm the correct shape and placement, as well as the symmetry of the completed mules on the lamb.

7.6.5 Speed – quality first

Achieving the optimum result takes time with skilled, experienced operators' mulesing an average of about 100 lambs per hour.

A favourable balance between quantity and quality is likely to be 750 – 1000 lambs per mulesing operator per day.

The overall aim is to perform operations to best practice standards to minimise discomfort/ stress to the animal and optimised mothering-up before night fall.

7.7 ANALGESIA/ANAESTHETICS

The anti-inflammatory pain relief products must be applied according to label instructions. This mostly involves application when the lamb is first placed in the cradle.

Application of a topical anaesthetic spray should be done immediately post mulesing using the recommended label application rate. Ensure that the entire wound area is evenly covered with spray, particularly the wound edges.

Insecticidal preparations can be applied to the wool around the wound (and not over the wound) after application of the spray to prevent flystrike.

7.8 INSECTICIDE APPLICATION (SEE 5.7 INSECTICIDE APPLICATION EQUIPMENT)

Insecticide application, if necessary, should occur as the final operation immediately before release. As well as correct use of the recommended equipment a number of other factors need to be remembered:

– Use only products registered for the application and apply according to label directions

When selecting appropriate chemicals, check label withholding periods.

7.9 RELEASE AND POST-OPERATIVE MANAGEMENT

7.9.1 Mothering-up

After release, allow the lambs to immediately mother-up to the ewes. Under drought conditions restricting the ewes to an adjoining or surrounding holding paddock can be necessary to prevent them roaming off in search of feed.

If necessary and practicable it will be useful to provide some supplementary feed and adequate water for ewes while mulesing and marking.

Removing dry (non-lactating) ewes at this time will also assist with mothering–up under tough seasonal conditions. Dry ewes tend to be more determined to wander off looking for a feed and can add to the confusion by leading less bonded mothers and lambs away from the mothering-up area.

Photo 7.6 After release allow lambs to mother-up immediately.
PHOTO: Ian Evans

7.9.2 Movements

- If it is absolutely unavoidable, ewes and lambs can be moved immediately after completing the operation. But only move them short distances (less than one hour) and settle or place them at their destination to ensure mothering-up occurs as quickly as possible

- Some ewes and lambs may need to be checked twice to ensure all lambs have found their mother

- It is important to complete this as quickly as possible before the healing advances to the stage where the lambs become restricted in their movement

7.9.3 Paddock management

- Avoid mustering ewes and lambs for at least four weeks after mulesing. This period allows time for the wounds to heal

- Forced movement during the healing period can cause the scabs to crack and lift. This exposes the wounds to infection from environmental contamination, which slows the healing process and makes the wound susceptible to flystrike

- Observe stock without disturbance later in the afternoon and again next morning to assist mothering up and at least every three days during the healing process checking for flystrike or any other adverse reactions

7.9.4 Treatment of flystrike after mulesing

Under a severe fly challenge it can be necessary to inspect daily for up to 10 days after mulesing, even if an insecticide is used, but care must be taken not to disturb the mob due to the risk of scabs breaking and miss-mothering. Subsequent inspection for up to three weeks after mulesing can be worthwhile when there is prolonged healing and high blowfly activity. Signs to look for include tail twitching, wound biting, lack of vigour, flies congregating on the wound and a reluctance to get up. Prompt dressing of flystruck mulesing wounds is essential. It is particularly important to treat the strike before the hairy maggot blowfly attacks the wound. Lambs are easily stressed and when flystruck they deteriorate faster than adult sheep.

Bush flies *(Musca vetustissima)* will not strike a mules wound. But they will visit a wound to obtain protein and moisture. In doing so they can irritate recently mulesed lambs and initiate wound infections. While attempting to escape the irritation, lambs can crack the healing scabs and predispose the wound to flystrike. The stable fly *(Stomoxys calcitrans)* can cause similar problems through irritation.

SECTION 8

REFERENCES

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Healthy contented sheep: Making More from Sheep
http://www.makingmorefromsheep.com.au/healthy-contented-sheep/

Managing major parasite risks for sheep: ParaBoss including FlyBoss, LiceBoss and WormBoss
https://www.paraboss.com.au/

Sheep Vaccination
https://www.sheepconnectsa.com.au/technical-information/correct-vaccination-of-lambs-is-vital

Sheep blowflies
www.wool.com/woolgrower-tools/flyboss/

www.wool.com/flystrikelatest

Victorian Farmers Federation: Livestock Factsheet – General Sheep Vaccines
http://www.vff.org.au/vff/Documents/Livestock%20Resources/Factsheet_Livestock_General%20Sheep%20Vaccines.pdf

8.3 ACRONYMS

AWI	Australian Wool Innovation
AAWS	Australian Animal Welfare Strategy
APVMA	Australian Pesticides and Veterinary Medicines Authority
AUSTVETPLAN	Australian Veterinary Emergency Plan
COP	Code of Practice
OJD	Ovine Johne's Disease
WPA	WoolProducers Australia

8.4 AWI HELPLINE

Freecall in Australia 1800 070 099

APPENDIX 1

AUSTRALIAN ANIMAL WELFARE STANDARDS AND GUIDELINES – SHEEP

CHAPTER 1 – RESPONSIBILITIES

OBJECTIVE

A person knows their responsibilities for sheep welfare and is able to perform the required tasks to minimise the risk to the welfare of sheep.

STANDARDS

S1.1 A person must take reasonable actions to ensure the welfare of sheep under their care.

GUIDELINES

G1.1 Elements of responsibility for sheep management should include:

- understanding the standards and guidelines for sheep welfare
- obtaining knowledge of relevant animal welfare laws
- understanding sheep behaviour and use of low stress stock handling techniques
- planning and undertaking actions for the enterprise to meet the welfare
- standards and address contingencies that may arise
- assessing the quantity, quality and continuity of feed and water supply
- handling to minimise stress, and using handling aids, facilities and other equipment appropriately
- undertaking hygienic husbandry procedures in a manner that minimises the risks to sheep welfare
- understanding and following chemical and drug treatment instructions for sheep
- identifying distressed, weak, injured or diseased sheep, and taking appropriate action
- knowledge of local patterns of disease and disease prevention
- maintaining appropriate records
- humanely killing sheep by appropriate methods, or seeking the assistance of someone who is capable and equipped to kill them humanely.

G1.2 Agistment responsibilities should be communicated, documented and clearly understood by all parties involved.

G1.3 Owners, managers and stockpersons of sheep should have an appropriate staff induction program, periodically review existing practices, and be aware of new developments.

CHAPTER 6 – TAIL DOCKING AND CASTRATION

OBJECTIVE

Tail docking and castration are done only when necessary, and in a manner that minimises the risk to the welfare of sheep, particularly pain and distress.

STANDARDS

S6.1 A person performing tail docking or castration must have the relevant knowledge, experience and skills, or be under the direct supervision of a person who has the relevant knowledge, experience and skills.

S6.2 A person must not tail dock sheep that are more than six months old without using appropriate pain relief and haemorrhage control for the sheep.

S6.3 A person must leave a docked tail stump of a sheep with at least one palpable free joint remaining.

S6.4 A person must not castrate or use the cryptorchid method on sheep that are more than six months old without using appropriate pain relief and haemorrhage control for the sheep.

GUIDELINES

G6.1 Tail docking and castration should only be done where there are no alternatives and the procedure results in:

- benefits to life-time sheep welfare
- better flock management
- a reduced work (occupational) health and safety risk.

G6.2 Tail docking and castration should be done after a secure maternal bond has been established, and after the lambs are 24 hours old.

G6.3 Lambs should be tail docked, castrated or made cryptorchid as young as possible and before they are 12 weeks old.

G6.4 Tail docking, castration and other marking procedures should be planned with consideration of the age of lambs, weather, staff availability and facilities, including the use of temporary or permanent yards.

G6.5 Good hygiene practices should be practiced in relation to facilities, hands, handling and instruments. Disinfectant should be used and changed frequently.

G6.6 Infection should be minimised by avoiding muddy or dusty yards, and wet or humid weather.

G6.7 Operators should adopt appropriate strategies to minimise the risk and impact of common infections, through vaccination of lambs and/or their mothers.

G6.8 Lambs should be appropriately restrained in a lamb cradle and, when released, should land on their feet to avoid contact of the wound(s) with the ground.

G6.9 Lambs should be separated from their mothers for the shortest possible time.

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G6.10 Haemorrhage should be minimised by selecting an appropriate method, preventing overheating of lambs and allowing them to settle after mustering.

G6.11 Tail docking and castration should not be undertaken during extreme weather.

G6.12 Tail docking and castration should be done when fly activity is minimal, or in conjunction with appropriate preventive flystrike treatments.

G6.13 Sheep should be inspected regularly and with minimal disturbance for signs of postoperative complications during the healing process, and appropriate action taken.

G6.14 Tail docking and castration should be accompanied by pain relief when practical and cost-effective methods become available. Operators should seek advice on current pain minimisation strategies.

G6.15 Ewes should be managed to optimise milk production to maximize protein availability for the lamb to aid wound healing.

G6.16 After placement in paddocks, lambs should not be forcibly mustered and yarded until wounds are healed.

Tail docking

G6.17 Lambs should be tail docked by the hot knife or rubber ring methods, in preference to the sharp knife method or other cutting methods, except for larger tails. The hot knife method is generally preferable for tail docking done with mulesing. Recommendations may change with future research and development.

G6.18 A hot knife should be operated at the recommended temperature.

G6.19 The tail should be docked through the joint space.

G6.20 The docked tail should be long enough to cover the vulva in female lambs and be of similar length in males.

G6.21 Tail docking should not be done for cosmetic reasons or on fat-tail sheep breeds.

Castration

G6.22 Lambs destined for slaughter before they are 12 weeks old, or before the onset of puberty, should not be castrated.

G6.23 A person should use the most appropriate tools and least painful method to castrate sheep that is applicable to the production system.

CHAPTER 7 – MULESING

OBJECTIVE

In circumstances where mulesing is necessary for the long-term welfare of the sheep, it is done in a manner that minimises the impact of the procedure.

STANDARDS

S7.1 A person performing mulesing must have the relevant knowledge, experience and skills, or be under the direct supervision of a person who has the relevant knowledge, experience and skills.

S7.2 A person must not mules sheep that are less than 24 hours old or more than 12 months old.

S7.3 A person must not mules sheep that are 6 – 12 months old without using appropriate pain relief.

S7.4 A person must not mules sheep showing signs of debilitating disease, weakness or ill-thrift.

S7.5 A person mulesing sheep must only remove wool-bearing skin.

Note: Mulesing does not include nonsurgical approaches that deliver analogous outcomes for the sheep such as clips, intra-dermal injections of chemicals or other future, non-cutting technologies.

GUIDELINES

G7.1 The options for breech strike prevention should be considered before undertaking mulesing including:

- selection for resistant conformation
- culling susceptible sheep
- clips
- crutching
- timing of shearing
- chemicals for flystrike prevention
- internal parasite control

G7.2 Selection for breech flystrike resistant conformation should include low dag score, low wrinkle score and low breech cover score.

G7.3 In areas prone to high breech flystrike risk, lambs with a high dag score and/or high wrinkle score should be culled.

G7.4 In assessing breech flystrike risk and the need for mulesing, factors that should be considered are:

- sheep are at a high risk of breech flystrike on the property on which they are kept
- lambs are intended to be kept as adult sheep
- sheep are likely to be sold and kept as adults in areas prone to breech flystrike

G7.5 The mulesing operation should only remove sufficient wool-bearing skin appropriate to the conformation of the lamb being treated to achieve flystrike protection.

G7.6 Where mulesing is performed, lambs should be mulesed at 2 – 12 weeks old.

G7.7 Mulesing should only be done where there are no alternatives and the procedure results in:

- benefits to life-time sheep welfare
- better flock management
- a reduced work (occupational) health and safety risk

G7.8 Mulesing should be accompanied by pain relief where practical and cost-effective methods are available. Operators should seek advice on current pain minimisation strategies.

G7.9 Good hygiene practices should be practiced in relation to facilities, hands, handling and instruments. Disinfectant should be used and changed frequently.

G7.10 Risk of infection should be minimised by avoiding muddy or dusty yards, and wet or humid weather.

G7.11 Operators should adopt appropriate strategies to minimise the risk and impact of common infections through vaccination of lambs and/or their mothers.

G7.12 Lambs should be appropriately restrained in a lamb cradle and, when released, should land on their feet to avoid contact of the wound(s) with the ground.

G7.13 Lambs should be separated from their mothers for the shortest possible time.

G7.14 Ewes should be managed to optimise milk production to maximise protein availability for the lamb to aid wound healing.

G7.15 Haemorrhaging should be minimised by preventing overheating of lambs and allowing them to settle after mustering.

G7.16 Mulesing should be done when fly activity is minimal, or in conjunction with appropriate preventive flystrike treatment.

G7.17 Sheep should be inspected regularly and with minimal disturbance for signs of post-operative complications during the healing process, and appropriate action taken.

G7.18 After placement in paddocks, lambs should not be forcibly mustered and yarded until wounds are healed.

G7.19 Mulesing should be planned with consideration to the age of lambs, weather, staff availability and facilities, including the use of temporary or permanent yards.

G7.20 Mulesing should not be undertaken during extreme weather.

Extract from: *Australian Animal Welfare Standards and Guidelines – Sheep*, Animal Health Australia (AHA) 2014.

NOTES

NOTES

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