

• australian wool
innovation
• limited



Progress of Australian Wool Innovation R&D on mulesing alternatives

February 2008

Background

About mulesing

Mulesing is a vital part of sheep husbandry in Australia, particularly in reference to Merino sheep. It involves surgically removing the skin around the breech (backside) and tail to enhance the naturally bare area which reduces the risk of flystrike caused by a unique and very aggressive blowfly (*Lucilia cuprina*).

Mulesing involves the surgical removal of crescent-shaped pieces of skin from the breech and tail of lambs. As the skin wounds heal, the edges are pulled towards each other, causing a tightening of the remaining wool-free skin, reducing skin wrinkles and expanding the natural bare area of the breech. As a result, the breech area becomes less susceptible to flystrike due to reduced areas of urine and faeces contamination.

Without mulesing, blowfly eggs are laid in moist wool; the flesh eating maggots create painful wounds, causing the sheep considerable pain, stress and suffering and, in many cases, death.

A ban on mulesing would kill up to three million sheep in years when conditions were conducive to flystrike – hot and wet. It would be exceptionally cruel not to mules sheep in Australia without an alternative being available.

Scientific studies clearly show that mulesing and tail docking are currently the most practical, effective and humane methods of flystrike prevention available to Australian woolgrowers. It eliminates almost all breech flystrike in sheep.

The Royal Society for the Prevention of Cruelty to Animals (Australia) and the Australian Veterinary Association accept the practice of mulesing as a necessary sheep husbandry procedure to prevent flystrike.

Documented studies have shown that this procedure does not cause long-term distress to the animals and infection is a rare occurrence after the procedure. The preventative procedure is only endured once by each sheep to prevent longer-term suffering caused by flystrike.

The decision to phase out mulesing

In October 2004 US-based extremist animal rights organisation People for the Ethical Treatment of Animals (PETA) launched a campaign against the Australian Merino wool industry over mulesing.

PETA's campaign targeted international retailers and was supported by local animal rights organisations. It put the livelihoods of 50,000 woolgrowers at risk by placing the Australian wool industry in grave danger of losing vital international customers.

Proactively moving to combat this campaign, the Australian wool industry, with the support of the Australian Government, united to form the Australian Wool and Sheep Industry Taskforce in November 2004.

Australian sheep and wool industry leaders, at a meeting in Sydney in November 2004, unanimously expressed their commitment to the phasing out of the current practice of mulesing by 2010.

The industry instructed Australian Wool Innovation (AWI), the industry's research and development company, to fast-track a number of research and development programs to enable, firstly, an end to mulesing and secondly, interim measures to ensure animal welfare continues to be an absolute priority.

The industry directed AWI to increase funding for the development of alternatives to conventional mulesing.

This report outlines the progress of the research and development into the alternatives by AWI.

Progress of AWI R&D on mulesing alternatives

1. Clips

The technology:

The concept of clipping developed from the idea that it may be possible to create a similar effect as conventional mulesing without creating an open wound and resolving the pain issues.

The clips are attached to flaps of skin that would be removed during mulesing. The clip closing pressure on the flap of skin prevents blood flow to that part of the skin. The lack of blood supply causes the flap of skin to wither and both the clip and the skin flap typically fall off within a couple of weeks to leave a closed linear scar. It is a similar effect to the elastrator ring used on the scrotum and tail.

There is no open wound at any time during the process. Another advantage of the clip method is that the amount of skin 'stretch' can be clearly seen during the process of applying the clips, making it easier to achieve the optimal bare breech result.

If it suits a grower's management practices, the lambs can be yarded and the clips removed. The clips can be re-used the next season. Otherwise, the clips will drop off in the paddock. However, the ideal solution will eventually be a biodegradable clip. Various materials have been trialled and an international search is continually undertaken to see whether new, cost-effective biodegradable materials that would suit the clips are being developed.

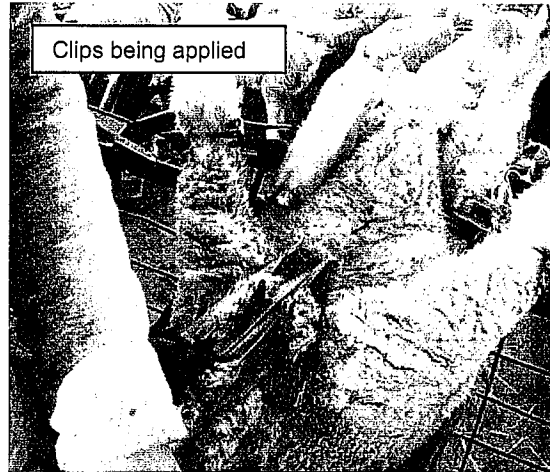
Progress:

Work on the clips began in early 2005. In 2006, the work concentrated on identifying the optimal designs, production materials and methods of application, as well as evaluating how well the process works and the advantages in terms of animal health and welfare.

Initial field trials investigated different designs and materials. Five further field sites in NSW were established to measure the effectiveness of clips compared to mulesing over a period of 18 months. Another series of field trials started in June 2006 to confirm the practicalities of using the clips across several States and different sheep types.

In the early production trials, there were instances of clips moving or falling off. The problems have been overcome through modification of the clip design. With increasing experience, operators are developing improved application techniques which are also contributing to increased retention and effectiveness.

In 2007, Australian woolgrowers were invited to take part in broad scale commercial trials of the clips – over 1100 woolgrowers responded with offers to trial the clips.



AWI is currently immersed in the data entry and analysis process of the almost one million items of data generated by the 2007 clip trials.

As would be expected from 200 sites across Australia, the results are variable. Early indications are that the clips are working towards producing an outcome similar to conventional mulesing. A very positive sign is that a number of participants in the 2007 trial have requested access to clips for their entire 2008 lamb marking.

A full analysis of the trials will be available by June 2008.

An independent review in October 2007 by the Australian Veterinary Association (AVA) of AWI R&D on mulesing alternatives stated:

“The development of clips is progressing well and the first results of the broad scale commercial trials conducted on producers’ properties are indicating satisfactory performance. Some producers who have trialled the clips on their properties have been impressed with the results and have reported good results with the technology. It has become apparent that operator training on the application of the clips is a key factor to achieving good results.”

The AVA concluded:

“We believe that the progress made so far on the bloodless skin wrinkle removal (clips) continues to indicate that it will be a viable alternative to mulesing before the project deadline of 2010 for the phasing out of mulesing.”

The AVA independently reviews AWI’s progress in R&D on mulesing alternatives on a quarterly basis and publishes a quarterly report after each review. AWI fully cooperates with this review.

Animal welfare aspects

A comprehensive animal welfare assessment provides significant support for the use of clips as an alternative to mulesing. Director of the Animal Welfare Science Centre (AWSC), the University of Melbourne’s Professor Paul Hemsworth, has assessed the animal welfare aspects of ‘breach and tail’ clips:

The AWSC specialises in studying the behaviour and welfare of farm and companion animals and the influence of human-animal interactions on animal welfare and productivity. The AWSC has conducted two separate studies of mulesed, clipped and no-treatment lambs: the first focused on the behavioural responses and the second study focused on behavioural, physiological and fitness effects to gain an insight to the welfare aspects of the clips.

Professor Hemsworth says the key conclusion is that:

“The clip treatment has only a mild impact on the biology of lambs and thus the welfare risks are considered relatively minor.”

The research included comparisons of key physiological factors in the ‘stress response’ such as plasma cortisol and haptoglobin levels, and behavioural and fitness factors such as posture, locomotion, and time spent feeding and lying-down. Professor Hemsworth also noted that the lambs treated with clips often responded in a similar manner to those in the ‘control’ treatment – in which lambs were held in a mulesing cradle for the same time as clipped animals, but not mulesed.

2. Needleless intradermal injection

The technology:

The needleless applicator delivers a measured dose of formulation one millimetre into the skin – not through the skin, nor into the muscle. This causes necrosis (death of the skin cells) in the treated area. A bruise forms, followed by a scab which dries and falls off, leaving the stretched skin underneath.

In the skin of wool bearing sheep the degree of intervention required is very high as the skin has amazing capacities to regenerate, resume follicle growth, and grow wool particularly in young animals.

AWI commercial partner's injection procedure involves the compound being delivered into the skin using needleless injection technology sourced from medical science.

The use of long (one to two centimetre) "nozzles" on the delivery head of the injector handpiece allow the face of the injector to be placed through the covering wool into contact with the skin surface.



An early prototype of an injector

Penetration into the skin is only possible when the face of each "nozzle" is in contact with the skin and depth of penetration is controlled by variation of the operating pressure, orifice size and dose delivered. The primary energy source is an inert compressed bottled gas.

Progress:

A range of chemicals have been trialled.

An anionic surfactant developed by a commercial R&D company, with potential further support from AWI shows the most promise. These chemicals are registered for human use on varicose veins – they dissolve veins and nerves very quickly.

Work is in its early stages, and although promising, it still has some way to go. The chemical is moving towards product registration is by 2009.

A number of other compounds have been evaluated and those which do not provide adequate flystrike protection or enhance the welfare of the sheep have been rejected – these include: cationic chemicals such as Cetrimide, and enzymes such as Collagenase. This is a normal process for a research and development program.

An injection "pattern" is being developed with the assistance of a plastic surgeon in conjunction with the field experience of professional mulesing operators, the aim of which is to achieve the desired area of skin stretch. On-going trial work plus field experience will provide operators with guidelines on how to apply the injection to accommodate the usual range of variations in sheep type, eg size, wrinkle score, skin thickness, skin movement, etc.

Best practice guidelines will be developed and it is the intention of the commercial partner that this technology will only be available via trained and accredited operators. The partner will manage the commercial release and will be responsible for the training and accreditation of operators. AWI will provide appropriate support in the training and accreditation process in consultation with the company.

3. Breeding

The technology:

Sires with a possible genetic make-up that are completely wool free in the crutch and inner hind legs may hold the genetic keys to breeding animals that do not need to be either mulesed or crutched.

Research into breeding sheep with an enlarged naturally bare and wrinkle-free area around their breech is being conducted at two research centres, one in Western Australia (representing winter dominant rainfall areas) and a second in New South Wales (representative of summer rainfall dominant environments).

A number of animals have been identified with naturally bare breech and/or crutch that do not require mulesing or crutching.

Groups of sheep are being selectively bred for resistance to breech flystrike via wrinkle-free and/or bare breech area. Progress is monitored by comparison with a randomly selected control line.



Progress:

Early – “first generation” – results indicate significant potential to reduce breech wrinkle, increase natural bare area, and enhance resistance to breech blowfly strike.

Research has shown that the bareness traits:

- vary between animals from very bare animals to animals with a woolly breech and crutch;
- are moderate to highly heritable;
- did not have strong unfavourable correlations with other wool quality traits; indicating that selection for finer, barer high wool producing sheep is readily achievable; and
- can be transmitted to other flocks by using bare breech rams.

On-going research is looking at:

- whether bareness traits are expressed to the same degree in all genetic groupings and varying environments;
- how many genes affect the trait and how they are inherited; and
- precisely what correlations exist with the production and quality traits that impact on Merino profitability.

The October 2007 independent review by the AVA of AWI R&D on mulesing alternatives stated:

“The projects concerning the breeding of sheep that are less susceptible to breech strike have produced some encouraging interim results.”

It must be stressed that there are a growing number of commercial and seedstock producers in Australia who have made excellent progress in this area.

Merino breeders have been breeding for reduced breech wrinkle for the last ten years. This is continuing at a rapid rate by both ram breeders and buyers.

Products that AWI has developed, which help woolgrowers select sheep for breeding that are less susceptible to flystrike are:

Sheep Genetics: In conjunction with Meat and Livestock Australia, AWI has developed Sheep Genetics. Sheep Genetics is the national genetic information and evaluation service for the wool and meat sectors of the sheep industry. It calculates the across-flock progeny breeding values for more than 40 key traits, including resistance to parasites.

Merino Superior Sires: In collaboration with the Australian Merino Sire Evaluation Association (AMSEA) and CSIRO, AWI has also produced another breeding product Merino Superior Sires. This annual report allows direct comparison of Merino sires evaluated at seven medium-wool and five fine-wool Central Test Sire Evaluation sites across Australia. It includes resistance to parasites traits.

Visual Sheep Scores guide: The first-of-its-kind pocket guide, developed by AWI and Meat and Livestock Australia, in consultation with industry, provides sheep and wool producers with a set of standardised visual scores – a new national language – to consistently describe, record and grade sheep for subjective traits. The visually assessed traits included in Visual Sheep Scores, include breech traits – breech wrinkle, breech cover, dag and crutch cover. This allows plain and bare breech sires to be better described to a standard and promoted to ram and semen buyers.

4. Genome mapping of the sheep blowfly

The technology:

This project involves genome mapping of the sheep blowfly to identify potential opportunities for alternative methods of control. A better understanding of the blowfly genome may assist in identifying areas of potential vulnerability.

The development of new products for the control of blowflies has historically relied on finding compounds that happen to kill the insect without harming sheep or humans or non target species. The new science of genomics allows researchers to systematically identify where important genes are located and how they work.



This project will create the foundation for future work towards the development of more highly targeted insecticides or vaccines. It will also create opportunities for broad-scale blowfly control techniques such as mass release of sterile male flies.

Progress:

Strategic work has been underway to map and de-code the blowfly genome, the 'instruction manual' for the fly. The aim is to identify weaknesses in the blowfly that can be successfully targeted.

The mapping of the blowfly genome has very recently been completed. The next step is to find genetic weaknesses for new chemical and biological compounds and investigate the possibility of a vaccine.

It will be some years before these developments occur but there is exciting potential for a permanent solution to the blowfly.

5. Other related technologies and initiatives

Integrated Parasite management

The Integrated Parasite Management – sheep (IPM-s) project was established to develop and prove systems for the control of worms, lice and flies that reduce our reliance on chemical control.

AWI (and others) have developed and continue to develop a set of practical management tools, based around the concept of integrated parasite management. IPM-s is about identifying and implementing strategies that use available tools in a coordinated manner, minimising parasite control costs and losses, minimising the need to apply synthetic chemicals and reducing wool residue levels from ecto-parasite control programs.

A series of 23 national demonstration farms were set up across Australia to provide an insight into the practicalities of adopting IPM-s management on-farm and its impact on parasite populations and farm productivity.

The key farm management strategies messages arising from the IPM-s project regarding flystrike are:

- correct tail docking and mulesing (or replacement technology);
- strategic timing of crutching and shearing;
- selecting sheep with reduced susceptibility to both body and breech strike;
- controlling faecal scouring through good worm control, selection for low dag score and nutritional management;
- strategic application of pesticides with regard to fly biology, flystrike risk and residues; and
- other methods that may be applicable on some properties, including choice of low-flystrike risk paddocks for the most susceptible sheep, and the strategic use of flytraps.

AWI has also issued a 'Fighting Flystrike' training CD containing a practical guide to assist woolgrowers to minimise the occurrence and extent of blowfly strike in their flocks. The key objective of the CD is to help growers better understand the factors that lead to blowfly strike and to assist in implementing management plans. The program is divided into six clearly defined modules that allow woolgrowers to quickly and effectively access information that best suits their situation. Each module is accompanied by practical tools and case studies to demonstrate how other woolgrowers are managing the risk of blowfly strike.

Biocontrol of blowflies

The use of natural enemies or other biological agents to assist in controlling pests is not new, with producers already harnessing naturally occurring nematodes for a range of pasture applications. What is new however is research looking at a microscopic worm that invades flies and kills them, making the worm a potentially useful ally for producers in the fight against blowflies.

Another option being investigated in the area of biocontrol is a fungus that attacks insects, smothers them and kills them. The fungus occurs naturally and if proven to be successful against blowflies it could be brought into use relatively quickly.

Resistance to chemicals

Parasite control chemicals are another tool used to help combat flystrike. A two year project was undertaken with the aim to enable producers to monitor and manage emerging resistance to Insect Growth Regulator (IGR) chemicals. IGRs are the most popular and commonly used class of fly (and lice) control products used by farmers.

The project was completed but the test to detect resistance to IGR chemicals was not practical as a commercially available test.

Pain relief

AWI has completed two detailed studies and CSIRO has completed a further study on pain relief options. AWI has not progressed with this line of research because a post-mulesing spray for the relief of pain has been released and is being sold through veterinarians. This pain relief product was developed by a private company Animal Ethics Pty Ltd and is licensed to Bayer. The pain relief product is being applied by a growing number of woolgrowers and contractors across Australia post conventional mulesing.

AWI will continue to review options for pain relief research and how it can assist in the registration process of pain relief products with commercial partners.

Mulesing accreditation

The National Mulesing Assurance Program (NMAP) is the initiative that has been developed to ensure that all conventional mulesing operators are encouraged to train and be assessed to a national standard. The national standard provides assurance to processors and retailers in the wool trade that we manage our livestock with world's best practice. NMAP is funded by Australian Wool Innovation and is supported by the Australian Sheep and Wool Industry Taskforce.

Industry has agreed that mulesing contractors must have been accredited by 31 December 2006 and owner operators who mules must be accredited by 31 December 2008.

A declaration form for woolgrowers to say they no longer undertake the practice of mulesing

Also aiding growers is the development of a new, simple form that allows sellers to declare the Australian woolgrower supplying the wool for sale has certified that he/she does not undertake the practice of mulesing sheep.

The Australian Veterinary Association Limited



Unit 40, 2nd Herbert Street St Leonards NSW 2065
PO Box 371 Artarmon NSW 1570
Telephone: (02) 9431 5000 Facsimile: (02) 9437 9068
Email: members@ava.com.au Website: www.ava.com.au

Nov 10, 2007

Dr Joan Lloyd
Program Manager, Animal Health and Welfare
Australian Wool Innovation Limited
Level 5, 16-20 Barrack St
Sydney NSW 2001

Dear Joan

**RE: AVA REPORT ON PROGRESS OF AWI R&D ON MULESING
ALTERNATIVES AGAINST WOOL INDUSTRY COMMITMENTS TO
INTERNATIONAL RETAILERS**

On the 12th October 2007, AVA representatives Drs David Hucker and Peter Mansell met with representative of Australian Wool Innovation Limited (AWI) to conduct the quarterly review of progress against R&D milestone commitments made to overseas retailers utilizing Australian wool.

The report detailing their findings is attached. If you require further details or clarification of any points raised, please do not hesitate to contact me.

Yours sincerely,

Dr Diane Sheehan
National President

Cc	Mr Les Targ Deputy CEO Australian Wool Innovation Level 5, 16-20 Barrack St SYDNEY NSW 2000	Mr Don Hamblin President WoolProducers PO Box E10 KINGSTON ACT 2604
----	---	---

**APRIL 2007 REPORT BY AVA REPRESENTATIVES ON PROGRESS OF
AUSTRALIAN WOOL INNOVATION (AWI) R&D ON MULESING
ALTERNATIVES AGAINST WOOL INDUSTRY COMMITMENTS TO
INTERNATIONAL RETAILERS**

Scope of Review:

To provide an independent assessment of the AWI research program commitments to overseas retailers of clothing incorporating Australian wool.

Approach:

A desktop review of the AWI research program on mulesing alternatives was undertaken at the Sydney offices of AWI on the 12th October 2007. This review was conducted as part of the commitment to retailers of apparel and other clothing products containing Australian wool. Various reports and other documents relating to the program were presented, examined and considered in the context of the projected program progress.

Following the examination of the documents, this report was prepared by the AVA representatives Drs David Hucker and Peter Mansell.

Findings:

The research program continues to progress well against commitments made by AWI. Details of the findings against the elements of the program and projected timeframes previously presented to retailers are provided in "Interim Milestones - Attachment A". To simplify the increasing complexity of the interim milestones document, we have removed completed programs from the time line section of the document. These are now attached to the end of this document under the heading "Completed Milestones - Attachment B".

As noted in earlier reviews, an important feature of this R&D program is that various prospective solutions continue to be explored in parallel. As previously reported, the project has concentrated on one company to develop the bloodless skin wrinkle removal technology (clips) and two companies to develop intradermal treatments.

The development of the clips is progressing well and the first results of the broad scale commercial trials conducted on producer's properties are indicating satisfactory performance. Some producers who have trialled the clips on their properties have been impressed with the results and have reported good results with the technology. It has become apparent that operator training on the application of the clips is a key factor to achieving good results.

Importantly, recent research on the animal welfare implications of the application of the clips has demonstrated that the behavioural changes seen in lambs immediately post application is a transitory phenomenon and has been shown not to be associated with any long term pain indicators. In addition weight gains of lambs treated with clips have been close to those of untreated control lambs and well above the weight gains of surgically mulesed lambs.

The companies negotiating with AWI on the intradermal treatments have completed their due diligence studies and have identified two areas of concern which may require some further research before proceeding further.

The lambs born in 2006 in the long term breeding trial have been assessed for breech-strike resistance traits and these will be supplemented with measurement of production traits in late 2007. Interim results indicate that the selection criteria based on the scoring system previously developed (December 2005), and updated since, are leading to marked differences in susceptibility to breech strike between the intensively selected lines and the control lines

Use of the post mulesing pain and haemorrhage control product has increased this lambing season, and there is now significant awareness and concern by producers and contractors of animal welfare issues relating to mulesing. In addition, we feel it is worth brief mention of four other projects previously not included in these reports. These programs, while not directly involving mulesing or its alternatives, do relate to fly control which may have some effect on the requirement for these procedures.

1. Test to Detect Resistance to Insect Growth Regulator Chemicals

Project completed with neither method practical as a commercially available test.

2. Integrated Pest Management Systems

This project has involved 23 demonstration farms and has used consultants to provide best practice advice on animal health and production issues including management of flystrike.

3. Fungal Biopesticide

A fungus has been identified for the control of lice. This fungus also has some effect on flies, although not at the maggot stage. A product development program for a louse control product is being planned.

4. Blowfly Genomics

Research into mapping the blowfly genome is now almost complete. This information may allow a renewed emphasis on controlling the sheep blowfly in the future.

Conclusions:

We believe that the progress made so far on the bloodless skin wrinkle removal (clips) continues to indicate that it will be a viable alternative to mulesing before the projected deadline of 2010 for the phasing out of mulesing. Although the intradermal agent has not progressed to the commercial stage at this point, it still remains an option to develop. The projects concerning the breeding of sheep that are less susceptible to breech strike have produced some encouraging interim results and the near complete mapping of the blowfly genome may provide a base for future research on fly control.

As stated previously, it is noted that delivery of commercially available products in a timely way will require continuing industry commitment to this R&D program and commitment on the part of commercial partners to make the mulesing alternatives commercially available to wool producers.

MULESING PHASE-OUT 2010

INTERIM MILESTONES (PROGRESS AS AT OCTOBER 2007)

Appendix "A" - Active Milestones

Date	Milestone	Measure of Success	Progress against Milestones
September 2005	Bloodless skin wrinkle removal technology – limited field trials and commercial partner appointed	Trials commenced and partner appointed	<p>Several major trials of the clips are continuing with the Road Test on over 80 properties across Australia now complete. The initial clip trials will run until late 2007 – early 2008. Further investigation into a universal clip which will work in both the breech region and on the tail is underway. Results of all trials to date indicate positive results on most sheep confirmations and sheep growing regions.</p> <p>AWI and a commercial company are in the final stages of negotiating a licence agreement for the technology.</p>
December 2005	Bloodless skin wrinkle removal technology full scale trials	Trials conducted	<p>A product development and testing program for the clips on up to 200 sites and approximately 45,000 lambs is approaching the halfway point. Strong producer support has been received.</p> <p>Clip trials: these are underway (see above). The clips have been evaluated on 2,000 lambs on two properties in South Australia, on 500 lambs over 5 properties in New South Wales, 2,000 lambs in 5 states and on up to 20,000 lambs in the Road Test.</p> <p>A product development and testing program for the clips on up to 200 sites and approximately 45,000 lambs is approaching the halfway point. Strong producer support has been received.</p>
December 2005	Scoring system and guidelines for breeding sheep with low breech flystrike susceptibility released	Scoring system launched and widely available	<p>The scoring system has been updated based on industry feedback with the addition of a new trait 'crutch cover'. The pictures used in the original booklet have been replaced with illustrations. The breech scores have been integrated into a Sheep Visual Scores booklet which contains scoring for wool quality and conformation traits also. This will be distributed to industry throughout October 2007.</p>
June 2006	Bloodless skin wrinkle removal technology in commercial use	Commercial availability and industry take-up	<p>Around 200 volunteer producer participants will have clip product development and testing trials established on their properties this lamb-marking season. These sites have been selected from the 1,100 expressions of interest received from producers prior to the start of the trial. The potential commercial partner is working alongside AWI during this trial.</p>

Date	Milestone	Measure of Success	Progress against Milestones
June 2006	Preliminary field trials of intradermal treatment and prototype applicators(s) completed	Publication of report detailing results from treatment of up to 1000 lambs	The critical phase of preliminary field trials of intradermal treatment has been completed (the trials will continue for two years but the most important results have been obtained). We have released some data but will reserve full reports for potential commercial partner(s). Statistical analysis of the results obtained to 12 months after treatment is now complete. Eighteen month results currently being analysed.
June 2006	Commercial partner identified, registration trials commenced	Agreement signed with commercial partner, written confirmation from AWI that trials have commenced	Two potential commercial partners have completed due diligence on intradermal, with neither indicating an interest in licensing the technology at this stage as it is considered to still be in the research phase.
December 2006	Detailed studies of pain relief options completed and, if any are feasible, agreement signed with commercial partner to launch the product onto the sheep market	Publication of report; agreement signed with commercial partner	AWI has completed two detailed studies and the national science agency CSIRO has completed a further study, which has been published in the Australian Veterinary Journal. Reasonable interest in the results has been shown by at least one product registrant but feasibility has not yet been established. AWI has begun discussions with product registrants to encourage registration of an NSAID for sheep. A post-mulesing spray for the relief of pain has been released on a limited registration basis by the private company Animal Ethics Pty Ltd, has been licensed to Bayer and is being used by some producers and contractors post conventional mulesing.
December 2006	Mulesing accreditation completed	Register and accreditation completed	Accreditation of contractors is essentially complete. The NMAP program expects to accredit a further 850 people for the calendar year 2007. This will bring the anticipated total accredited to 1,550 by the end of 2007. Of the 2,000 manuals in the initial print run, 1,800 have been distributed to contractors and owner operators. A further print run of 1,800 has been purchased, which should meet requirements through calendar 2008.
March 2007	Effective analgesia for mulesing	Registered product on the market	See above
June 2007	Registration dossier completed and lodged with Australian Pesticides and Veterinary Medicines Authority (if required)	Written confirmation of receipt of dossier from APVMA	The registration process will commence once a commercial partner takes up a licence for the intradermal technology.

Date	Milestone	Measure of Success	Progress against Milestones
December 2007	First lambs born to specially selected ewes in breeding trial, preliminary comparisons available	Publication and extension to sheep breeders of preliminary comparisons	2006 drop lambs bred in the project have been assessed for a number of breech strike resistance indicator traits. Production data (wool cut, micron, body weight) will be collected in final quarter of 2007 and analysis conducted to determine relationships between breech indicator traits and production traits.
June 2008	At least one alternative to mulesing is launched to limited market (controlled commercial use while impacts fully evaluated)	Product is available on a limited commercial basis	The product development and testing program for the clips is approaching the midpoint of its 200 site / 45,000 lamb goal, with 95 sites established, and 20,650 lambs included in the program.
June 2009	At least one alternative to mulesing launched	Product is available on an unlimited commercial basis	
June 2009	Project to test 'no-mules' husbandry alternative husbandry systems completed	Alternative husbandry systems for some wool production systems / geographic areas identified and extended	
December 2009	Detailed results from breeding trial available (first drop of lambs 2 years of age)	Publication and extension to sheep breeders of detailed comparisons	

Appendix "B" - Completed Milestones

Date	Milestone	Measure of Success	Progress against Milestones
December 2005	At least two proof-of-concept applicators ready for field trials of collagenase	Applicators demonstrated	Complete Applicators: Three proof-of-concept applicators were trialed in November 2005. One has been particularly successful and is the applicator of choice. We have shelved one of the other applicators and development of the third is on hold as it is no longer considered to be a viable alternative to the lead injector. (Note: collagenase is no longer a lead active - we have at least two replacements.)
December 2005	Complete feasibility trials on a range of pain relief agents	Publication of list of pain relief agents for detailed study	Complete <u>Pain relief agents</u> : two experiments have now been conducted, the first with two agents at various doses, the second with six agents. The second trial has highlighted two agents with potential and discussions are underway with three registrants to gauge interest in obtaining sheep registration for their products.
March 2006	Alternatives to collagenase developed	Commencement of commercialisation	Complete Trials are continuing on intradermal treatments (alternatives to collagenase). The trials are addressing efficacy, pattern of application, formulation and welfare impacts. Potential commercial company finalising due diligence on the technology. A trial has been run in conjunction with the company assessing the lead formulations, pattern and application method.
June 2006	Formulation of intradermal treatment complete	Details of formulation held by AWI	Complete Report on final trial of two most promising formulations received.
June 2007	Applicator(s) fully transferred to manufacture and available on the market	Confirmation from commercial partner that applicator is ready for large-scale manufacture	Complete MIT (Canada) applicator already available on request wholesale.

The Australian Veterinary Association Limited

ABN 63003522852



Unit 40, 2A Herbert Street St Leonards NSW 2065
 PO Box 371 Artarmon NSW 1570
 Telephone: (02) 9431 5000 Facsimile: (02) 9437 9068
 Email: members@ava.com.au Website: www.ava.com.au

26 July 2007

Dr Joan Lloyd
 Program Manager, Animal Health and Welfare
 Australian Wool Innovation Limited
 Level 5, 16-20 Barrack St
 SYDNEY NSW 2001

Dear Joan

RE: AVA Report on progress of AWI R&D on Mulesing Alternatives against Wool Industry Commitments to International Retailers

On the 13th July 2007, AVA representatives Drs. David Hucker and Peter Mansell met with representative of Australian Wool Innovation Limited (AWI) to conduct the quarterly review of progress against R&D milestone commitments made to overseas retailers utilizing Australian wool.

The report detailing their findings is attached. If you require further details or clarification of any points raised, please do not hesitate to contact me.

Yours sincerely

Dr Diane Sheehan
 AVA President

Cc	Mr Les Targ Deputy CEO Australian Wool Innovation Level 5, 16-20 Barrack St SYDNEY NSW 2000	Mr Robert Pietsch President WoolProducers PO Box E10 KINGSTON ACT 2604
----	---	--

**JULY 2007 REPORT BY AVA REPRESENTATIVES ON PROGRESS OF
AUSTRALIAN WOOL INNOVATION (AWI) R&D ON MULESING
ALTERNATIVES AGAINST WOOL INDUSTRY COMMITMENTS TO
INTERNATIONAL RETAILERS**



Scope of Review:

To provide an independent assessment of the AWI research program commitments to overseas retailers of clothing incorporating Australian wool.

Approach:

A desktop review of the AWI research program on mulesing alternatives was undertaken at the Melbourne offices of AWI on the 13th July 2007. This review was conducted as part of the commitment to retailers of apparel and other clothing products containing Australian wool. Various reports and other documents relating to the program were presented, examined and considered in the context of the projected program progress.

Following the examination of the documents this report was prepared by the AVA representatives Drs David Hucker and Peter Mansell.

Findings:

The research program continues to proceed well against commitments made by AWI. Details of the findings against the elements of the program and projected timeframes previously presented to retailers are provided in Attachment A.

As noted in previous reviews, an important feature of this R&D program is that various prospective solutions continue to be explored in parallel although at this stage of the program, the project is now concentrating on two companies to develop intradermal treatments and one company to develop the bloodless skin wrinkle removal technology (clips). It is this approach that has led to the successes so far, as some research projects have failed to provide commercially feasible solutions. In particular successes in the area of research on intradermal products and their practical application have been achieved through this approach.

Also of importance is that each of the projects involving alternative animal treatments involves a comprehensive assessment of the welfare aspects of the alternative procedure.

Conclusions:

We believe that the progress made so far on the bloodless skin wrinkle removal (clips) and the intradermal products (and applicators) continues to indicate that there will be more than one alternative to mulesing commercially available by the projected deadline of 2010 for phasing mulesing out.

Use of the post mulesing pain and haemorrhage control agent is expected to increase now that it is being progressed by a large multinational animal health pharmaceutical company. It is noted that delivery of commercially available products in a timely way will require continuing industry commitment to this R&D program and commitment on the part of commercial partners required to make the mulesing alternatives commercially available to wool producers.

**MULESING PHASE-OUT 2010
INTERIM MILESTONES (PROGRESS AS AT APRIL 2007)**

Date	Milestone	Measure of Success	Progress against Milestones
September 2005	Bloodless skin wrinkle removal technology – limited field trials and commercial partner appointed	Trials commenced and partner appointed	<p>Several major trials of the clips are continuing alongside a Road Test which encompasses over 80 properties across Australia and looks at different clip options – design, docking and timing. The initial clip trials ran until early 2007 while the second controlled trial will finish in 2 months time. Further investigations into a universal clip which will work in both the breech region and on the tail are being initiated this month. Results of all trials to date indicate positive results on most sheep confirmations and sheep growing regions.</p> <p>AWI and a commercial company are in the final stages of negotiating a licence agreement for the technology.</p> <p>Product development and testing program for clips on up to 150 000 lambs is progressing. Producers have been invited to take part in this trial and there has been a pleasing response by producers to take part in this trial. Final plans are being developed to handle the large number of lambs and trial sites.</p>
December 2005	At least two proof-of-concept applicators ready for field trials of collagenase	Applicators demonstrated	<p>Applicators: Three proof-of-concept applicators were trialled in November 2005. One has been particularly successful and is the applicator of choice. One of the other applicators has been shelved and development of the third is on hold as it is no longer considered to be a viable alternative to the lead injector. (Note: collagenase is no longer a lead active – there are at least two alternatives.)</p>
December 2005	Bloodless skin wrinkle removal technology full scale trials	Trials conducted	<p>Clip trials: these are underway (see above). The clips are being evaluated on 2000 lambs on two properties in South Australia, and on 500 lambs over 5 properties in New South Wales, 2000 in 5 states and in the Road Test – up to 20 000 lambs. The trial on up to 150 000 lambs is about to commence (see above).</p>

<p>December 2005</p>	<p>Complete feasibility trials on a range of pain relief agents</p>	<p>Publication of list of pain relief agents for detailed study</p>	<p><u>Complete</u> Pain relief agents: two experiments have now been conducted, the first with two agents at various doses, the second with six agents. The second trial has highlighted two agents with potential and discussions are underway with three possible registrants to gauge interest in obtaining sheep registration for their products.</p>
<p>December 2005</p>	<p>Scoring system and guidelines for breeding sheep with low breech flystrike susceptibility released</p>	<p>Scoring system launched and widely available</p>	<p><u>Scoring system:</u> beta-version guidelines have been published and released to over 100 key users for feedback. The response to date has been very positive with many commercial growers using them during lamb marking. A total of 1700 copies have been printed. Development of the next series of the scoring system is currently being developed. This will be integrated into a total Visual Merino Score pack as part of the genetics program.</p>
<p>March 2006</p>	<p>Alternatives to collagenase developed</p>	<p>Commencement of commercialisation</p>	<p><u>Complete</u> Trials are continuing on intradermal treatments (alternatives to collagenase). The trials are addressing efficacy, pattern of application, formulation and welfare impacts. In addition a potential commercial company is finalising due diligence on the technology. AWI and the company have run a trial to assess the lead formulations, pattern of application required to achieve the required result and the application method</p>
<p>June 2006</p>	<p>Bloodless skin wrinkle removal technology in commercial use</p>	<p>Commercial availability and industry take-up</p>	<p>The new universal clip is in production. These will be tested during winter 2007 and incorporated into the Controlled Roll Out (see Sep 2005 – Bloodless skin wrinkle technology). Over 700 wool producers have expressed interest in participating in the clip product and testing program in spring 2007. This trial is due to start in early August 2007 and aims to have clips applied to 150 000 lambs. The commercial partner is working alongside AWI during this trial.</p>

June 2006	Preliminary field trials of intradermal agents and prototype applicators completed	Publication of report detailing results from treatment of up to 1000 lambs	The critical phase of preliminary field trials of intradermal treatment has been completed (the trials will continue for two years but the most important results have been obtained). Some data has been released but will reserve full reports for potential commercial partner(s). Importantly, statistical analysis of results of early trials commenced 18 months ago comparing both clips and intradermal agents have shown promising results in managing flystrike when compared with standard mulesing. However, it is to be noted that these trials were done using early versions of both clips and intradermal agents. These trials are continuing and 24 month measurements will be taken in December after these sheep have lambed. In addition, other trials have commenced to compare performance of later versions of clips and intradermal treatments.
June 2006	Formulation of intradermal agents complete	Details of formulation held by AWI	Complete. Report on final trial of two most promising formulations received
June 2006	Commercial partner identified, registration trials commenced	Agreement signed with commercial partner, written confirmation from AWI that trials have commenced	Commercial partner identified and in final stages of due diligence (see above). Agreement progressing but not yet up to signing
December 2006	Detailed studies of pain relief options completed and, if any are feasible, agreement signed with commercial partner to launch the product onto the sheep market	Publication of report; agreement signed with commercial partner	<p><i>Outlook:</i> AWI has completed two detailed studies and the national science agency CSIRO has completed a further study. Reasonable interest in the results has been shown by at least one product registrant but feasibility has not yet been established. A paper detailing some of this work has been submitted to the Australian Veterinary Journal for publication. AWI will commence discussions with product registrants over the next few months to encourage registration of non-steroidal anti-inflammatory drugs for sheep.</p> <p>A post-mulesing spray for the relief of pain and control of haemorrhage has been approved for use under permit by the Australian Pesticides and Veterinary Medicines Authority (APVMA). It has been released by the private company Animal Ethics Pty Ltd and is being used by some producers and contractors post conventional mulesing.</p>

December 2006	Mulesing accreditation completed	Register and accreditation completed	Accreditation of contractors is almost complete. Because of drought some training sessions had to be cancelled but it is expected completion of contractor accreditation will be completed this season. The NMAP program expects to accredit over 800 mulesing contractors and producers by the end of 2007. Because of demand, a reprint of 1500 manuals has been ordered for release to owner operators who need to be accredited by 2008. <i>Outlook:</i> As for December 2006. Product is now being progressed by large multinational animal health pharmaceutical company. See detailed studies on pain relief above.
March 2007	Effective analgesia for mulesing	Product readily available to producers from veterinary surgeons under APVMA permit	Indications that this will be later due to the possible in-depth registration process, the delay in finalising the formulation selection and the upcoming re structure of the APVMA (mid 2007).
June 2007	Registration dossier for intradermal treatment completed and lodged with Australian Pesticides and Veterinary Medicines Authority (if required)	Written confirmation of receipt of dossier from APVMA	The registration process will commence at the conclusion of the successful licence sign off.
June 2007	Applicator(s) fully transferred to manufacture and available on the market	Confirmation from commercial partner that applicator is ready for large-scale manufacture	Complete MIT (Canada) applicator already available on request wholesale.
December 2007	First lambs born to specially selected ewes in breeding trial, preliminary comparisons available	Publication and extension to sheep breeders of preliminary comparisons	Lambs born and being assessed at relevant ages (birth, marking, weaning, hogget) for indicator traits. Weather monitored and level of fly challenge being measured.
June 2008	At least one alternative to mulesing is launched	Product is available on a limited commercial basis	Product development and testing program and product launch plan for clips indicate that this target will be met (as per last report).
June 2009	At least one alternative to mulesing launched	Product is available on an unlimited commercial basis	
June 2009	Project to test 'no-mules' husbandry alternative husbandry systems completed	Alternative husbandry systems for some wool production systems / geographic areas identified and extended	This project is currently being redrafted to include external parasites and extension to producers of integrated parasite management practices. Ongoing
December 2009	Detailed results from breeding trial available (first drop of lambs 2 years of age)	Publication and extension to sheep breeders of detailed comparisons	Ongoing

The Australian Veterinary Association Limited

ABN 63 008522852



Unit 40, 2A Herbert Street St Leonards NSW 2065
PO Box 371 Aramoon NSW 1570
Telephone: (02) 9431 5000 Facsimile: (02) 9437 9085
Email: members@ava.com.au Website: www.ava.com.au

13th May 2007

Ms Jules Dorian
Project Manager, Animal Health and Welfare
Australian Wool Innovation Limited
Level 6, 369 Royal Parade
Parkville, Vic 3052

Dear Jules

**RE: AVA REPORT ON PROGRESS OF AWI R&D ON MULESING
ALTERNATIVES AGAINST WOOL INDUSTRY COMMITMENTS TO
INTERNATIONAL RETAILERS**

On the 30th of April 2007, AVA representatives Drs. David Hucker and Peter Mansell met with representative of Australian Wool Innovation Limited (AWI) to conduct the quarterly review of progress against R&D milestone commitments made to overseas retailers utilizing Australian wool.

The report detailing their findings is attached. If you require further details or clarification of any points raised, please do not hesitate to contact me.

Yours Sincerely,

Kersti Seksel

Dr Kersti Seksel
National President

Cc	Mr Les Targ Deputy CEO Australian Wool Innovation Level 5, 16-20 Barrack St SYDNEY NSW 2000	Mr Robert Pietsch President WoolProducers PO Box E10 KINGSTON ACT 2604
----	---	--

**APRIL 2007 REPORT BY AVA REPRESENTATIVES ON PROGRESS OF
AUSTRALIAN WOOL INNOVATION (AWI) R&D ON MULESING
ALTERNATIVES AGAINST WOOL INDUSTRY COMMITMENTS TO
INTERNATIONAL RETAILERS**

Scope of Review:

To provide an independent assessment of the AWI research program commitments to overseas retailers of clothing incorporating Australian wool.

Approach:

A desktop review of the AWI research program on mulesing alternatives was undertaken at the Melbourne offices of AWI on the 30th of April 2007. This review was conducted as part of the commitment to retailers of apparel and other clothing products containing Australian wool. Various reports and other documents relating to the program were presented, examined and considered in the context of the projected program progress.

Following the examination of the documents this report was prepared by the AVA representatives Drs David Hucker and Peter Mansell.

Findings:

The research program continues to proceed well against commitments made by AWI. Details of the findings against the elements of the program and projected timeframes previously presented to retailers are provided in Attachment A.

As noted in previous reviews, an important feature of this R&D program is that various prospective solutions continue to be explored in parallel although at this stage of the program, the project is now concentrating on two companies to develop intradermal treatments and one company to develop the bloodless skin wrinkle removal technology (clips). It is this approach that has led to the successes so far, as some research projects have failed to provide commercially feasible solutions. In particular successes in the area of research on intradermal products and their practical application have been achieved through this approach.

Also of importance is that each of the projects involving alternative animal treatments involve a comprehensive assessment of the welfare aspects of the alternative procedure.

Conclusions:

We believe that the progress made so far on the bloodless skin wrinkle removal (clips) and the intradermal products (and applicators) continues to indicate that there will be more than one alternative to mulesing commercially available by the projected deadline of 2010 for phasing mulesing out.

Use of the post mulesing pain and haemorrhage control agent is expected to increase now it is being progressed by a large multinational animal health pharmaceutical company. It is noted that delivery of commercially available products in a timely way will require continuing industry commitment to this R&D program and commitment on the part of commercial partners required to make the mulesing alternatives commercially available to wool producers.

This report was prepared by Dr David Hucker, Past President, Australian Sheep Veterinarians (a Special Interest Group of the Australian Veterinary Association) and Dr Peter Mansell, AVA Victorian Division under the direction of Dr Matt Makin Vice President of the Australian Veterinary Association.

MULESING PHASE-OUT 2010

INTERIM MILESTONES (PROGRESS AS AT APRIL 2007)

Date	Milestone	Measure of Success	Progress against Milestones
September 2005	Bloodless skin wrinkle removal technology – limited field trials and commercial partner appointed	Trials commenced and partner appointed	<p>Several major trials of the clips are continuing alongside a Road Test which encompasses over 80 properties across Australia and looks at different clip options – design, docking, timing. The initial clip trials ran until early 2007 while the second controlled trial will finish in 2 months time. Further investigations into a universal clip which will work in both the breech region and on the tail are being initiated this month. Results of all trials to date indicate positive results on most sheep confirmations and sheep growing regions.</p> <p>A commercial company has been selected and negotiations are now in the final stages of risk assessment and due diligence of technology.</p>
December 2005	At least two proof-of-concept applicators ready for field trials of collagenase	Applicators demonstrated	<p>Producers with suitable lambs are being sought for a planned Controlled Roll out of the clips on up to 150,000 lambs. Planning for this roll out is in the final stages.</p> <p>Applicators: Three proof-of-concept applicators were trialled in November 2005. One has been particularly successful and is the applicator of choice. One of the other applicators has been shelved and development of the third is on hold as it is no longer considered to be a viable alternative to the lead injector. (Note: collagenase is no longer a lead active – there are at least two alternatives.)</p>
December 2005	Bloodless skin wrinkle removal technology full scale trials	Trials conducted	<p>Clip trials: these are underway (see above). The clips are being evaluated on 2000 lambs on two properties in South Australia, and on 500 lambs over 5 properties in New South Wales, 2000 in 5 states and in the Road Test – up to 20,000 lambs. Further trials are planned in the area of clip design work and biodegradability.</p>

December 2005	Complete feasibility trials on a range of pain relief agents	Publication of list of pain relief agents for detailed study	<p>Pain relief agents: two experiments have now been conducted, the first with two agents at various doses, the second with six agents. The second trial has highlighted two agents with potential and discussions are underway with three possible registrants to gauge interest in obtaining sheep registration for their products.</p>
December 2005	Scoring system and guidelines for breeding sheep with low breech flystrike susceptibility released	Scoring system launched and widely available	<p>Scoring system: beta-version guidelines have been published and released to over 100 key users for feedback. The response to date has been very positive with many commercial growers using them during lamb marking. A total of 1,700 copies have been printed. Because of the success of the development of these guidelines, it has now been decided to develop this system further. The expanded version is due to go to print by the end of Jun 2007</p>
March 2006	Alternatives to collagenase developed	Commencement of commercialisation	<p>Trials are continuing on intradermal treatments (alternatives to collagenase). The trials are addressing efficacy, pattern of application, formulation and welfare impacts.</p> <p>In addition a potential commercial company is finalising due diligence on the technology. AWI and the company have run a trial to assess the lead formulations, pattern of application required to achieve the required result and the application method</p>
June 2006	Bloodless skin wrinkle removal technology in commercial use	Commercial availability and industry take-up	<p>The new universal clip is in final stages of design (drawing). These will be tested during winter 2007 and incorporated into the Controlled Roll Out (see Sep 2005 – Bloodless skin wrinkle technology) in Spring 2007 along with the current breech and hockey stick clips.</p> <p>It is expected the commercial partner, if satisfied with the Roll Out results, will establish a product launch plan for 2008 and 2009.</p>
June 2006	Preliminary field trials of intradermal agents and prototype applicators(s) completed	Publication of report detailing results from treatment of up to 1000 lambs	<p>The critical phase of preliminary field trials of intradermal treatment has been completed (the trials will continue for two years but the most important results have been obtained). We have released some data but will reserve full reports for potential commercial partner(s). Trials continuing</p> <p>A potential commercial partner is currently reviewing full data reports as part of its due diligence.</p>

June 2006	Formulation of intradermal agents complete	Details of formulation held by AWI	Formulation of the preferred intradermal treatment(s) was performed in October with full pathology and histology analysis occurring during November 2006. Note: as per the Jan 2006 review, collagenase as an active ingredient is not now being progressed.
June 2006	Commercial partner identified, registration trials commenced	Agreement signed with commercial partner, written confirmation from AWI that trials have commenced	Commercial partner identified and in final stages of due diligence (see above). Agreement expected to be signed shortly
December 2006	Detailed studies of pain relief options completed and, if any are feasible, agreement signed with commercial partner to launch the product onto the sheep market	Publication of report; agreement signed with commercial partner	<p><i>Outlook:</i> AWI has completed two detailed studies and the national science agency CSIRO has completed a further study. Reasonable interest in the results has been shown by at least one product registrant but feasibility has not yet been established. A paper detailing some of this work has been submitted to the Australian Veterinary Journal for publication</p> <p>A post-mulesing spray for the relief of pain and control of haemorrhage has been approved for use under permit by the Australian Pesticides and Veterinary Medicines Authority. It has been released by the private company Animal Ethics Pty Ltd and is being used by some producers and contractors post conventional mulesing.</p>
December 2006	Mulesing accreditation completed	Register and accreditation completed	Accreditation of contractors should be complete as expected. The NMAP program expects to accredit over 800 mulesing contractors and producers by the end of 2007. 2,000 manuals have been printed for release to owner operators who need to be accredited by 2008.
March 2007	Effective analgesia for mulesing	Product readily available to producers from veterinary surgeons under APVMA permit Written confirmation of receipt of dossier from APVMA	<p><i>Outlook:</i> As for December 2006. Product is now being progressed by large multinational animal health pharmaceutical company</p> <p>Indications that this will be later due to the possible in-depth registration process, the delay in finalising the formulation selection and the upcoming re structure of the APVMA (mid 2007).</p> <p>The registration process will commence at the conclusion of the successful licence sign off.</p>
June 2007	Registration dossier completed and lodged with Australian Pesticides and Veterinary Medicines Authority (if required)	Confirmation from commercial partner that applicator is ready for large-scale manufacture	Completed – MIT (Canada) applicator already available on request wholesale.

December 2007	First lambs born to specially selected ewes in breeding trial, preliminary comparisons available	Publication and extension to sheep breeders of preliminary comparisons	
June 2008	At least one alternative to mulesing is launched to limited market (controlled commercial use while impacts fully evaluated)	Product is available on a limited commercial basis	See Sep 2005 – Bloodless skin wrinkle removal technology The draft controlled rollout and product launch plan for the clips indicate that this target will be met (as per last report).
June 2009	At least one alternative to mulesing launched	Product is available on an unlimited commercial basis	
June 2009	Project to test 'no-mules' husbandry alternative husbandry systems completed	Alternative husbandry systems for some wool production systems / geographic areas identified and extended	This project is currently being redrafted to include external parasites and extension to producers of integrated parasite management practices.
December 2009	Detailed results from breeding trial available (first drop of lambs 2 years of age)	Publication and extension to sheep breeders of detailed comparisons	

The Australian Veterinary Association Limited

ABN 62005522352



Unit 40, 2A Herbert Street, St Leonards NSW 2055
PO Box 371 Artarmon NSW 1570
Telephone: (02) 9431 6000 Facsimile: (02) 9437 6069
Email: members@ava.com.au website: www.ava.com.au

7 February 2007

Ms Jules Dorian
Project Manager, Animal Health and Welfare
Australian Wool Innovation Limited
Level 6, 369 Royal Parade
Parkville, Vic 3052

Dear Jules

**RE: AVA REPORT ON PROGRESS OF AWI R&D ON MULESING
ALTERNATIVES AGAINST WOOL INDUSTRY COMMITMENTS TO
INTERNATIONAL RETAILERS**

As you are aware on 5 February 2007 AVA representatives David Hucker, Peter Mansell and Norm Blackman reviewed AWI progress against R&D milestone commitments made to overseas retailers of products containing Australian wool. Please find attached the report from the AVA relating to this review.

In undertaking the review we were appreciative of your cooperation in providing us with updates on progress requested as part of the review.

If AWI or the overseas retailers have any queries regarding the report content we would be happy to respond.

Yours sincerely

Dr Kersti Seksel
National President

Cc	Mr Les Targ Deputy CEO Australian Wool Innovation Level 5, 16-20 Barrack St SYDNEY NSW 2000	Mr Robert Pietsch President WoolProducers PO Box E10 KINGSTON ACT 2604
----	---	--

**FEBRUARY 2007 REPORT BY AVA REPRESENTATIVES ON PROGRESS OF
AUSTRALIAN WOOL INNOVATION (AWI) R&D ON MULESING
ALTERNATIVES AGAINST WOOL INDUSTRY COMMITMENTS TO
INTERNATIONAL RETAILERS**

Scope of Review:

To provide an independent assessment of the AWI research program commitments to overseas retailers of clothing incorporating Australian wool.

Approach:

A desktop review of the AWI research program commitments to retailers of apparel and other clothing products containing Australian wool on mulesing alternatives was undertaken at the Melbourne offices of AWI. Various reports and other documents relating to the program were examined and considered in the context of the projected program progress.

Following the examination of the documents this report was prepared. It should be noted that, as has occurred in previous reports, where appropriate, the word collagenase (which appeared in some of the original) milestones has been replaced with intradermal agents for clarity going forward.

Findings:

Overall the research program is proceeding well against commitments made by AWI. Details of the findings against the elements of the program and projected timeframes previously presented to retailers are provided in Attachment A.

As was noted in previous reviews an important feature of this R&D program is that various prospective solutions continue to be explored in parallel. It is this approach that has led to the successes so far, as some research projects have failed to provide commercially feasible solutions. In particular successes in the area of research on intradermal products and their practical application have been achieved through this approach.

Also of importance is that each of the projects involving alternative animal treatments involve a comprehensive assessment of the welfare aspects of the alternative procedure.

Conclusions:

As previously reported the progress being made so far on the bloodless skin wrinkle removal (clips) and the intradermal products (and applicators) continues to indicate that there will be more than one alternative to mulesing commercially available by the projected deadline of 2010 for phasing mulesing out. It is noted that delivery of commercially available products in a timely way will require continuing industry commitment to this R&D program and commitment on the part of commercial partners required to make the mulesing alternatives commercially available to wool producers.

ATTACHMENT A

COMMENTS BY AVA REPRESENTATIVES ON PROGRESS OF INDUSTRY R&D ON MULESING ALTERNATIVES AGAINST THE WOOL INDUSTRY COMMITMENTS TO INTERNATIONAL RETAILERS – 5 FEBRUARY 2007

Date	Milestone	Measure of Success	Reviewers Comments on Progress
September 2005	Bloodless skin wrinkle removal technology – limited field trials and commercial partner appointed	Trials commenced and partner appointed	<p>Previous Review comments were:</p> <p>“Clips for skin wrinkle removal viewed and report on progress reviewed. Evidence of development and design activities for clips provided. Trials show evidence of positive results on increase of bare area post treatment. A commercial partner has not yet been appointed. Evidence of progress in appointing a commercial partner was provided (Expression of Interest document).”</p> <p>Considerable trial work has been done with refinement of the device materials and design resulting from this trial work. Commercial Partner is about to be appointed.</p> <p>Of 25 Expressions of Interest by potential commercial partners 4 were selected for further development of their proposals. One of them has now been selected and the licensing contract is being negotiated.</p>
December 2005	At least two proof-of-concept applicators ready for field trials of collagenase	Applicators demonstrated	<p>Completed.</p> <p>Evidence of three prototype applicators having been trialled was provided at a previous review.</p> <p>The preferred needleless injection applicators for intradermal treatments were trialled in November 2005.</p>

ATTACHMENT A: COMMENTS BY AVA REPRESENTATIVES ON PROGRESS OF INDUSTRY R&D ON MULESING ALTERNATIVES AGAINST THE WOOL INDUSTRY COMMITMENTS TO INTERNATIONAL RETAILERS - 5 February 2007 (Cont'd -- Page 2)

Date	Milestone	Measure of Success	Reviewers Comments on Progress
December 2005	Bloodless skin wrinkle removal technology full scale trials	Trials conducted	<p>Trial work is continuing. In summary previous review comments were: "Evidence of clips evaluated on 2500 lambs was provided. Prototype clips appear to be performing well. Flexibility of the plastic materials impacted on performance and quality of plastics used in device production being further investigated. Welfare aspects of animal response to clip use also to be evaluated. Preliminary studies of animal responses indicate the animals have minor discomfort only. Further trials are now underway. Welfare aspects at time of use of clips and subsequently pending the skin detaching to be fully investigated. Materials and design changes to clips were made for commencement of large scale trials. Trials at 80 sites are underway and will run until early 2007. Full reports on trials are now expected soon after the trials are completed. Separate welfare studies underway. These involve a comprehensive assessment of pain and cellular level inflammatory responses arising from use of the clips."</p> <p>The initial trials are now largely complete. Assessment of the revised clip design is underway See comments under June 2006 Milestones.</p>
December 2005	Complete feasibility trials on a range of pain relief agents	Publication of list of pain relief agents for detailed study	<p>Completed. The list of actives investigated were provided to the reviewers. Further milestones on this are at Dec 2006.</p>

ATTACHMENT A: COMMENTS BY AVA REPRESENTATIVES ON PROGRESS OF INDUSTRY R&D ON MULESING ALTERNATIVES AGAINST THE WOOL INDUSTRY COMMITMENTS TO INTERNATIONAL RETAILERS - 5 February 2007 (Cont'd - Page 3)

Date	Milestone	Measure of Success	Reviewers Comments on Progress
December 2005	Scoring system and guidelines for breeding sheep with low breech flystrike susceptibility released	Scoring system launched and widely available	<p>Completed. The final document was launched and distributed in May 2006.</p> <p>It was noted that AWI is aware that many producers are now using the document during lamb marking. It was also noted that consideration is being given to expand the score sheets to include other visual traits to assist producers in the selection process.</p>
March 2006	Alternative intradermal agents to collagenase developed	Commencement of commercialisation	<p>Completed. Commercialisation has commenced. Further progress now relates to subsequent milestones.</p> <p>As previously reported work on development and commercialisation of intradermal agents continues to look promising.</p> <p>At the time of the last report two formulations were being pursued based on the preliminary work. One of these was being further developed independently by private commercial interests in consultation with AWI. In relation to the second product, there were 8 expressions of interest to the detailed dossier of the proposed product development plan for development of a comprehensive commercialisation proposal.</p> <p>It is now down to 1 commercial partner and finalising the licensing agreement is expected to occur in the near future</p>
June 2006	Bloodless skin wrinkle removal technology in commercial use	Commercial availability and industry take-up	<p>Although the clips are not commercially available at this stage further improvements to the design have now been made and the new clips are being assessed.</p> <p>In conjunction with this a commercial partner is being secured to provided for a controlled release of the clips expected to commence in July 2007.</p>

ATTACHMENT A: COMMENTS BY AVA REPRESENTATIVES ON PROGRESS OF INDUSTRY R&D ON MULESING ALTERNATIVES AGAINST THE WOOL INDUSTRY COMMITMENTS TO INTERNATIONAL RETAILERS - 5 February 2007 (Cont'd - Page 4)

Date	Milestone	Measure of Success	Reviewers Comments on Progress
June 2006	Preliminary field trials of intradermal agents and prototype applicators(s) completed	Publication of report detailing results from treatment of up to 1000 lambs	<p>Agent and applicator trials completed in 5 flocks are ongoing over the next 2 years. Initial results for the 5 flocks are available and reports in the final stages of preparation. Report to be finalised in before the next review in January 2007.</p> <p>Three prototype applicators were originally trialled. At this stage one applicator (the MIT applicator) is now in commercial production. Further commercialisation and development of the other two applicators is on hold given there is now a suitable applicator available.</p>
June 2006	Formulation of intradermal agents complete	Details of formulation held by AWI	<p>Completed.</p> <p>Of the formulations initially investigated by AWI 2 are being pursued. Details of these formulations are held by AWI.</p> <p>In the January 2006 review it was noted that collagenase research is not being progressed and that this milestone now relates to formulation of the preferred intradermal treatment(s) (other than collagenase).</p>
June 2006	Commercial partner identified, registration trials commenced	Agreement signed with commercial partner, written confirmation from AWI that trials have commenced	<p>It was noted that AWI is now in the process of finalising the licence agreement between AWI and the lead candidate. Final registration trials to commence after signing of agreement. This is now expected to be in 2 to 3 months time.</p>
December 2006	Detailed studies of pain relief options completed and, if any are feasible, agreement signed with commercial partner to launch the product	Publication of report; agreement signed with commercial partner	<p>Evidence of two completed trials involving the use of pain relief agents was provided at a previous review. These trials were completed in December 2005. It was noted that in discussions with the registrants of the products trialled AWI has encouraged them to obtain sheep registration for their products.</p>

ATTACHMENT A: COMMENTS BY AVA REPRESENTATIVES ON PROGRESS OF INDUSTRY R&D ON MULESING ALTERNATIVES AGAINST THE WOOL INDUSTRY COMMITMENTS TO INTERNATIONAL RETAILERS - 5 February 2007 (Cont'd - Page 5)

Date	Milestone	Measure of Success	Reviewers Comments on Progress
December 2006	Mulesing Accreditation	Register and Accreditation	Register completed and Accreditation on target. It was noted that 650 people were accredited at the end of 2006. The next round of accreditation courses and assessments will commence in late February 2007. In addition it was noted that there has been a high level of interest in acquiring the manuals available for owner operators who require accreditation by end 2008.
March 2007	Effective analgesia for mulesing	Registered product on the market	Progress with potential registrants was noted (as previously mentioned).
June 2007	Registration dossier completed and lodged with Australian Pesticides and Veterinary Medicines Authority (if required)	Written confirmation of receipt of dossier from APVMA	For future progress reporting. Delays are anticipated due to roll on effect of delay in registration trials commencing (as previously outlined).
June 2007	Applicator(s) fully transferred to manufacture and available on the market	Confirmation from commercial partner that applicator is ready for large-scale manufacture	Completed. MIT (Canada) applicator is suitable for this use and the applicator is commercially available.
December 2007	First lambs born to specially selected ewes in breeding trial, preliminary comparisons available	Publication and extension to sheep breeders of preliminary comparisons	It was noted that this is work in progress relating to the selection of animals for objectively measured phenotypic traits desirable for sheep that would not need to be mulesed. These lambs will be the F1 generation.
June 2008	At least one alternative to mulesing is launched to limited market (controlled commercial use while impacts fully evaluated)	Product is available on a limited commercial basis	Progress to date (especially with clips) is indicative that this is likely to be successful. Further work required and progressing as noted above.

ATTACHMENT A: COMMENTS BY AVA REPRESENTATIVES ON PROGRESS OF INDUSTRY R&D ON MULESING ALTERNATIVES AGAINST THE WOOL INDUSTRY COMMITMENTS TO INTERNATIONAL RETAILERS - 5 February 2007 (Cont'd - Page 6)

Date	Milestone	Measure of Success	Reviewers Comments on Progress
June 2009	At least one alternative to mulesing launched	Product is available on an unlimited commercial basis	As above
June 2009	Project to test 'no-mules' husbandry alternative husbandry systems completed	Alternative husbandry systems for some wool production systems / geographic areas identified and extended	No progress to report at this stage. Regional variability in fly prevalence, livestock genetics and climatic conditions will be a significant issue in terms of regional variability of the success of strategies to avert the need for mulesing. It was noted that AWI proposes to promote Integrated Pest Management (IPM) techniques through producer forums which will enable producers to share experiences in IPM and other alternative husbandry techniques.
December 2009	Detailed results from breeding trial available (first drop of lambs 2 years of age)	Publication and extension to sheep breeders of detailed comparisons	It was noted that this is dependent on success of earlier genetics R&D. It was also noted that comparative results for the F1 and F2 generation should be available at this stage.

The Australian Veterinary Association Limited

ABN 63308522952



Unit 40, 2A Herbert Street St Leonards NSW 2055
PO Box 371 Artarmon NSW 1570
Telephone: (02) 9431 6000 Facsimile: (02) 9437 9069
Email: members@ava.com.au Website: www.ava.com.au

9 November 2006

Ms Jules Dorian
Project Manager, Animal Health and Welfare
Australian Wool Innovation Limited
Level 6, 369 Royal Parade
Parkville, Vic 3052

Dear Jules

**RE: AVA REPORT ON PROGRESS OF AWI R&D ON MULESING
ALTERNATIVES AGAINST WOOL INDUSTRY COMMITMENTS TO
INTERNATIONAL RETAILERS**

As you are aware on 30 October 2006 AVA representatives David Hucker, Peter Mansell and Norm Blackman reviewed AWI progress against R&D milestone commitments made to overseas retailers of products containing Australian wool. You will also recall I that took the opportunity to attend this meeting so that I had a full understanding of the R&D program and its progress from my own perspective. Please find attached the report from the AVA relating to this review.

In undertaking the review we were appreciative of your cooperation in providing us with updates on progress requested as part of the review.

If AWI or the overseas retailers have any queries regarding the report content we would be happy to respond.

Yours sincerely

Dr Kersti Seksel
National President

Cc	Mr Les Targ Deputy CEO Australian Wool Innovation Level 5, 16-20 Barrack St SYDNEY NSW 2000	Mr Robert Pietsch President WoolProducers PO Box E10 KINGSTON ACT 2604
----	---	--

**OCTOBER 2006 REPORT BY AVA REPRESENTATIVES ON PROGRESS OF
AUSTRALIAN WOOL INNOVATION (AWI) R&D ON MULESING
ALTERNATIVES AGAINST WOOL INDUSTRY COMMITMENTS TO
INTERNATIONAL RETAILERS**

Scope of Review:

To provide an independent assessment of the AWI research program commitments to overseas retailers of clothing incorporating Australian wool.

Approach:

A desktop review of the AWI research program commitments to retailers of apparel and other clothing products containing Australian wool on mulesing alternatives was undertaken at the Melbourne offices of AWI. Various reports and other documents relating to the program were examined and considered in the context of the projected program progress.

Following the examination of the documents this report was prepared. It should be noted that in this report where appropriate the word collagenase which appeared in some of the milestones has been replaced with intradermal agents for clarity going forward.

Findings:

Overall the research program is proceeding well against commitments made by AWI. Details of the findings against the elements of the program and projected timeframes previously presented to retailers are provided in Attachment A.

As was noted in previous reviews an important feature of this R&D program is that various prospective solutions are being explored in parallel. It is this approach that has led to the successes so far, as some research projects have failed to provide commercially feasible solutions. In particular successes in the area of research on intradermal products and their practical application have been achieved through this approach.

Also of importance is that each of the projects involving alternative animal treatments will continue to involve a comprehensive assessment of the welfare aspects of the alternative procedure.

Conclusions:

The progress being made so far on the bloodless skin wrinkle removal (clips) and the intradermal products (and applicators) continues to indicate that there will be more than one alternative to mulesing commercially available by the projected deadline of 2010 for phasing mulesing out. It is noted however delivery of commercially available products in a timely way will require continuing industry commitment to this R&D program and commitment on the part of commercial partners required to make the mulesing alternatives commercially available to wool producers.

This report was prepared by Dr David Hucker, Past President, Australian Sheep Veterinarians (a Special Interest Group of the Australian Veterinary Association), Dr Peter Mansell, AVA Victorian Division and Dr Norm Blackman, Past National President; 26 July 2006

ATTACHMENT A

COMMENTS BY AVA REPRESENTATIVES ON PROGRESS OF INDUSTRY R&D ON MULESING ALTERNATIVES AGAINST THE WOOL
INDUSTRY COMMITMENTS TO INTERNATIONAL RETAILERS - 26 JULY 2006

Date	Milestone	Measure of Success	Reviewers Comments on Progress
September 2005	Bloodless skin wrinkle removal technology – limited field trials and commercial partner appointed	Trials commenced and partner appointed	<p>Previous Review comments were:</p> <p>“Clips for skin wrinkle removal viewed and report on progress reviewed. Evidence of development and design activities for clips provided. Trials show evidence of positive results on increase of bare area post treatment. A commercial partner has not yet been appointed. Evidence of progress in appointing a commercial partner was provided (Expression of Interest document).”</p> <p>Considerable trial work has been done with refinement of the device materials and design resulting from this trial work. Commercial Partner(s) yet to be appointed.</p> <p>Of 25 Expressions of Interest by potential commercial partners 4 have been selected for further development of their proposals and possible licensing agreements.</p>
December 2005	At least two proof-of-concept applicators ready for field trials of collagenase	Applicators demonstrated	<p>Completed.</p> <p>Evidence of three prototype applicators having been trialled was provided at a previous review.</p> <p>The preferred needlessly injection applicators for intradermal treatments were trialled in November 2005.</p>

ATTACHMENT A: COMMENTS BY AVA REPRESENTATIVES ON PROGRESS OF INDUSTRY R&D ON MULESING ALTERNATIVES AGAINST THE WOOL INDUSTRY COMMITMENTS TO INTERNATIONAL RETAILERS - 30 October 2006 (Cont'd - Page 2)

Date	Milestone	Measure of Success	Reviewers Comments on Progress
December 2005	Bloodless skin wrinkle removal technology full scale trials	Trials conducted	<p>Trial work is continuing. Materials and design changes to clips were made for commencement of large scale trials. Trials at 80 sites are underway and will run until early 2007. Full reports on trials are now expected soon after the trials are completed.</p> <p>Separate welfare studies underway. These involve a comprehensive assessment of pain and cellular level inflammatory responses arising from use of the clips.</p> <p>In summary previous review comments were: "Evidence of clips evaluated on 2500 lambs was provided. Prototype clips appear to be performing well. Flexibility of the plastic materials impacted on performance and quality of plastics used in device production being further investigated. Welfare aspects of animal response to clip use also to be evaluated. Preliminary studies of animal responses indicate the animals have minor discomfort only. Further trials are now underway. Welfare aspects at time of use of clips and subsequently pending the skin detaching to be fully investigated."</p>
December 2005	Complete feasibility trials on a range of pain relief agents	Publication of list of pain relief agents for detailed study	<p>Completed.</p> <p>The list of actives investigated were provided to the reviewers. Further milestones on this are at Dec 2006.</p>
December 2005	Scoring system and breeding guidelines for breech sheep with low breech flystrike susceptibility released	Scoring system launched and widely available	<p>Completed.</p> <p>Final document launched and distributed in May 2006.</p> <p>It was noted that AWI is aware that many producers are now using the document during lamb marking.</p>

ATTACHMENT A: COMMENTS BY AVA REPRESENTATIVES ON PROGRESS OF INDUSTRY R&D ON MULESING ALTERNATIVES AGAINST THE WOOL INDUSTRY COMMITMENTS TO INTERNATIONAL RETAILERS - 30 October 2006 (Cont'd - Page 3)

Date	Milestone	Measure of Success	Reviewers Comments on Progress
March 2006	Alternative intradermal agents to collagenase developed	Commencement of commercialisation	<p>Completed. Commercialisation has commenced. Further progress now relates to subsequent milestones.</p> <p>As previously reported work on development and commercialisation of intradermal agents continues to look promising.</p> <p>The current situation is that two formulations are being pursued based on the preliminary work. One of these is being further developed independently of, but in consultation with, AWI by private commercial interests. In relation to the second product, there were 8 expressions of interest to the detailed dossier of the proposed product development plan for development of a comprehensive commercialisation proposal. Three of these have now been selected for further discussions on the terms of licensing.</p>
June 2006	Bloodless skin wrinkle removal technology in commercial use	Commercial availability and industry take-up	<p>Based on the success with the clips to date the commercialisation of the clips continues to look promising even though technical and design issues are still being resolved prior to progressing commercialisation.</p>
June 2006	Preliminary field trials of intradermal agents and prototype applicators(s) completed	Publication of report detailing results from treatment of up to 1000 lambs	<p>Agent and applicator trials completed in 5 flocks are ongoing over the next 2 years. Initial results for the 5 flocks are available and reports in the final stages of preparation. Report to be finalised in before the next review in January 2007.</p> <p>Three prototype applicators were trialled. At this stage one applicator is ready for commercial production. A second applicator is being further developed with a Commercial Partner. Further development of the third applicator is on hold given the likelihood of the successful commercialisation of the other two.</p>

ATTACHMENT A: COMMENTS BY AVA REPRESENTATIVES ON PROGRESS OF INDUSTRY R&D ON MULESING ALTERNATIVES AGAINST THE WOOL INDUSTRY COMMITMENTS TO INTERNATIONAL RETAILERS - 30 October 2006 (Cont'd - Page 4)

Date	Milestone	Measure of Success	Reviewers Comments on Progress
June 2006	Formulation of intradermal agents complete	Details of formulation held by AWI	<p>Completed.</p> <p>Of the formulations initially investigated by AWI 2 are being pursued. Details of these formulations are held by AWI.</p> <p>In the January 2006 review it was noted that collagenase research is not being progressed and that this milestone now relates to formulation of the preferred intradermal treatment(s) (other than collagenase).</p>
June 2006	Commercial partner identified, registration trials commenced	Agreement signed with commercial partner, written confirmation from AWI that trials have commenced	<p>It was noted that AWI pursuing Expression of Interest path for obtaining commercial partner for the intradermal agents and the dossier for this has been completed and has been sent to prospective commercial partners. Commercial partner(s) to be finalised following receipt of proposals in response to the dossier. Final registration trials to commence after signing of agreement. This is now expected to be in early 2007 depending on the commercial negotiations.</p>
December 2006	Detailed studies of pain relief options completed and, if any are feasible, agreement signed with commercial partner to launch the product	Publication of report; agreement signed with commercial partner	<p>Evidence of two completed trials involving the use of pain relief agents was provided at a previous review. These trials were completed in December 2005. It was noted that discussions are currently underway with three possible registrants to pursue interest in obtaining sheep registration for their products. It was also noted that the post mulesing anaesthetic spray is now becoming more widely used and that other products commercially available for other species need to be further investigated.</p>
December 2006	Mulesing Accreditation	Register and Accreditation	<p>Accreditation of contractors should be complete as expected.</p> <p>It is expected that 650 people will be accredited by the end of 2006. 2000 manuals are available for owner operators who require accreditation by end 2008.</p>

ATTACHMENT A: COMMENTS BY AVA REPRESENTATIVES ON PROGRESS OF INDUSTRY R&D ON MULESING ALTERNATIVES AGAINST THE WOOL INDUSTRY COMMITMENTS TO INTERNATIONAL RETAILERS - 30 October 2006 (Cont'd - Page 5)

Date	Milestone	Measure of Success	Reviewers Comments on Progress
March 2007	Effective analgesia for mulesing	Registered product on the market	Progress with potential registrants was noted (as previously mentioned).
June 2007	Registration dossier completed and lodged with Australian Pesticides and Veterinary Medicines Authority (if required)	Written confirmation of receipt of dossier from APVMA	For future progress reporting. Delays are anticipated due to roll on effect of delay in registration trials commencing (as previously outlined).
June 2007	Applicator(s) fully transferred to manufacture and available on the market	Confirmation from commercial partner that applicator is ready for large-scale manufacture	Based on the research conducted on applicators so far it was noted that there is one commercial model that is currently available being trialled for suitability and there are two other special purpose (needle-less injection) applicators under development. One of these is being developed with a commercial partner and in relation to the other (currently 100% owned by AWI) a commercial partner will be sought.
December 2007	First lambs born to specially selected ewes in breeding trial, preliminary comparisons available	Publication and extension to sheep breeders of preliminary comparisons	It was noted that this is work in progress relating to the selection of animals for objectively measured phenotypic traits desirable for sheep that would not need to be mulesed. These lambs will be the F1 generation.
June 2008	At least one alternative to mulesing is launched to limited market (controlled commercial use while impacts fully evaluated)	Product is available on a limited commercial basis	Progress to date (especially with clips) is indicative that this is likely to be successful. Further work required and progressing as noted above.
June 2009	At least one alternative to mulesing launched	Product is available on an unlimited commercial basis	As above

ATTACHMENT A: COMMENTS BY AVA REPRESENTATIVES ON PROGRESS OF INDUSTRY R&D ON MULESING ALTERNATIVES AGAINST THE WOOL INDUSTRY COMMITMENTS TO INTERNATIONAL RETAILERS - 30 October 2006 (Cont'd - Page 6)

Date	Milestone	Measure of Success	Reviewers Comments on Progress
June 2009	Project to test 'no-mules' husbandry alternative husbandry systems completed	Alternative husbandry systems for some wool production systems / geographic areas identified and extended	No progress to report at this stage. Regional variability in fly prevalence, livestock genetics and climatic conditions will be a significant issue in terms of regional variability of the success of strategies to avert the need for mulesing. It was noted that AWI proposes to promote Integrated Pest Management (IPM) techniques through producer forums which will enable producers to share experiences in IPM and other alternative husbandry techniques.
December 2009	Detailed results from breeding trial available (first drop of lambs 2 years of age)	Publication and extension to sheep breeders of detailed comparisons	It was noted that this is dependent on success of earlier genetics R&D. It was also noted that comparative results for the F1 and F2 generation should be available at this stage.

Breech and Tail Clip Product Development and Testing 2007

Newsletter – February 2008

Animal welfare study gives ‘tick’ of approval to clips

A comprehensive animal welfare assessment provides significant support for the use of clips as an alternative to mulesing.

Director of the Animal Welfare Science Centre (AWSC), the University of Melbourne’s Professor Paul Hemsworth, has assessed the animal welfare aspects of ‘breech and tail’ clips.

“The Centre has conducted two separate studies of mulesed, clipped and no-treatment lambs: the first focused on the behavioural responses and the second study focused on behavioural, physiological and fitness effects to gain an insight to the welfare aspects of the clips,” he said.

The AWSC specialises in studying the behaviour and welfare of farm and companion animals and the influence of human-animal interactions on animal welfare and productivity.

Professor Hemsworth says the key conclusion is that:

“The clip treatment has only a mild impact on the biology of lambs and thus the welfare risks are considered relatively minor.”

The research included comparisons of key physiological factors in the ‘stress response’ such as plasma cortisol and haptoglobin levels, and behavioural and fitness factors such as posture, locomotion, and time spent feeding and lying-down.

Professor Hemsworth also noted that the lambs treated with clips often responded in a similar manner to those in the ‘control’ treatment – in which lambs were held in a mulesing cradle for the same time as clipped animals, but not mulesed.

This is supported by the weight change differences between the three treatments:

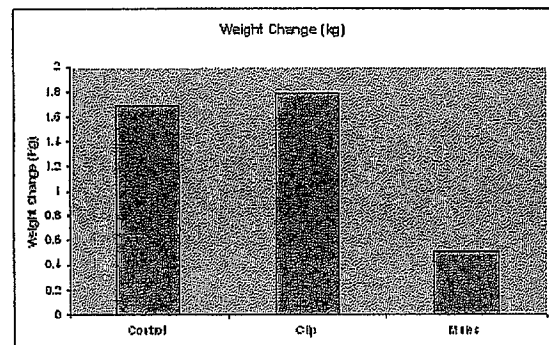


Figure: graph showing the relative change in weights for the three treatment groups over a 6 week period in the A.W.S.C. study

On-farm program summary

AWI Project Manager Blowfly Control, Ian Evans, says a huge amount of data and information is being built-up on the potential role of the breech and tail clips as a mulesing alternative.

“Our ongoing on-farm evaluations show the clips are working towards achieving a similar net effect

to that of conventional surgical mulesing for control of breech fly-strike across a range of production areas, sheep types and farm operations.”

“The research from Professor Hemsworth confirms many on-farm observations that the clips have only a relatively minor risk from an animal welfare

perspective. Indeed, they seem to offer some additional benefits, such as that clipped lambs will probably have a weight-gain advantage over mulesed lambs.

"Many farmers and our operators are very satisfied with the performance of the clips.

"We are developing a viable alternative to mulesing which is working. In addition, we have a product which meets world-class animal welfare standards."

Even so, it is apparent that the clips in their current form won't work on every sheep, and that operator

training is of utmost importance to attain maximal skin-stretch and resultant bare area.

"The work this year has identified a number of modifications to clip design and application that we can make to further improve their performance. That is what Product Development and Testing program is all about - testing a product as widely as possible, prior to commercial release," he said.

The table summarises program activities to 1 February 2008:

State	No. of V1 sites	No. of clipped lambs	Total no. of lambs in trial	No. of completed V3 sites
WA	30	4,810	7,290	30
SA	20	2,631	4,231	20
Vic	47	5,002	8,842	46
Tas	17	1,750	3,190	16
Qld	10	931	1,811	10
NSW	76	11,699	18,369	67
Totals	200	26,823	43,733	189

Note: V1 = site visit one (for clip application), V3 = site visit three (for final bare area and lamb weight measurement)

A view from the front line

The application of the clips across the country has been a very large undertaking. The four key 'stewards' of this process have been Rob Powell and Warren Godson from NSW, Jack Briscoe from Victoria and Peter Jacka from South Australia who provided the training and mentoring for 30 accredited mulesing contractors.

These four men have accumulated a vast store of knowledge and understanding about the clips, the sheep and the trial participant's reactions. Their views of the 2007 Product Development and Testing program are informative.

Rob Powell, Armidale, NSW...

"The trial overall has been very successful. The positive attitude from the participants after they see the results is very encouraging.

"Though there has been some scepticism. One grazier considered pulling out; though he went through with the trial and was glad he did because the results were better than his expectations - which were based on what he was told at a show.

"I've put clips on near 8,000 lambs in the last six months during the trial in WA, SA, Victoria and NSW. We have the technology getting closer now

to a commercial product, and with another three lambing seasons to go to refine the process, I think we're on track for December 31, 2010.

"A frequent comment from farmers was that the clipped lambs looked heavier, healthier and happier - they had a bloom about them, compared to their other conventionally mulesed lambs.

"I expect there will be some minor clip design modifications as we go forward, though the biggest factor for me is ensuring thorough training for clip applicators. There is also the 'mind-set factor' - farmers are used to seeing mulesing, and it will just take time for people to appreciate that there is another method to achieve a similar net result.

"Speed of clip application is not an issue, it's similar to mulesing. They timed me at one site, and I clipped 150 lambs in one hour and ten minutes."

Warren Godson, Warren, NSW...

"In my work over the last six months from northern NSW right around to the pastoral zone of WA, the feedback from graziers has been very positive: the vast majority are very happy, and some have said they'll be happy to keep on using the clips in the absence of mulesing.

"As a general observation, I've found the clips work best on loose skinned sheep, where we get a very consistent result.

"Farmers have put some mulesed lambs up against their clipped lambs, and the bare area around the breech is mostly just as good, and it's important to realise that the bare area grows out as the lambs mature – just like a mules.

"There are two keys to the clip's effectiveness – using the modified hot gas knife, and correct clip application technique. The new gas knife allows us to get the right skin coverage on the tail, and the clips need to be put on in a certain way to ensure maximum bare area."

Jack Briscoe, Marshall, Vic...

"The biggest impact is when we go back to the property for the 'V3' visit – where we measure the end-result in the lambs and weigh them.

"The graziers are very surprised with the amount of bare area that is achieved in the clipped lambs, especially when they compare the result with their other conventionally mulesed lambs.

"I have clipped more than 3,000 lambs in the trial and no farmer has yet been disappointed with what we've achieved in their sheep, and they are all interested to see how the lambs go as they grow out.

"And that's another point – many farmers can't get over how well the clipped lambs grow out – one

commented that his clipped lambs averaged 3kg heavier than his mulesed lambs at weaning.

"One other finding is that the size of the lamb is important – I think we get the best result if they are in the 10-14kg weight range."

Peter Jacka, Wanbi, SA...

"My team has applied the clips all over SA - up in the pastoral country, on the Eyre peninsula, in the south-east and in the Mallee - to near 3,500 lambs since August.

"I found that the clips tend to work best on plainer bodied sheep, and they also work well on loose-skin types. Very wrinkly sheep are more of a challenge.

"The farmers at the start tend to be a bit sceptical, but when they see the results, most of them were very happy. And all farmers were pleased with how the clipped lambs mothered-up and left the yards with mum.

"In many cases, at the end of the trial, its hard to see a difference between the conventionally mulesed and clipped trial sheep, as far as bare area is concerned.

"Interestingly, we had the best clip-return rate in the pastoral country. I don't know why that is, but some farmers commented that a low clip return rate would be a bit of a concern for farmers who also ran cattle, until they develop a biodegradable clip."

Biodegradable clips – one step closer

Extensive research has been undertaken to identify materials that can be used to manufacture biodegradable clips that are more environmentally-friendly.

Fourteen possible materials have been investigated so far: with three progressing to moulding of test batches. The most cost-effective way to manufacture the clips is by injection moulding, though there are a number of plastics which are biodegradable and able to be moulded in this way.

- The challenge is to find a material that:
- has a shelf life of more than six months
- is mechanically strong and holds its strength for at least 3 weeks
- can be manufactured in a low cost, high volume manner, and
- produces the same effect as the current clips.

Of the materials investigated to date, a starch-based product is the most promising. It's effectively the same as those materials used in some food products, so it is completely biodegradable, compostable, and non-toxic to people and the environment.

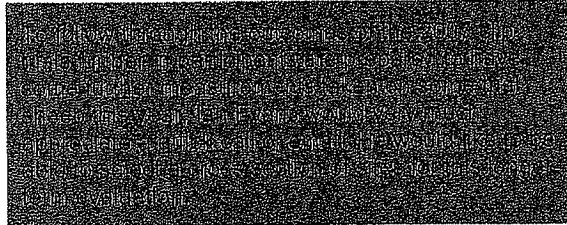
A wood based material is also being investigated.

While a 'silver bullet' biodegradable material hasn't appeared as yet - and AWI is still continuing the search - the starch-based material is being pursued to fully assess how it stands up to the requirements of woolgrowers. AWI understands the imperative of ensuring the clips are biodegradable.

For the current breech and tail clips, AWI has considered a recycling program and has tested their 're-useability'. However, as this will involve clip collection, disinfection and cleaning, labour and cost will place a limit on its practicality.

What's happening next with the Clip PDT Trial?

Jan '08 – Last sites completed – V3's – weaning	April '08 Compilation and preliminary report writing
Feb '08 Data analysis	
March '08 Data analysis completed	May '08 Final report due



Woolgrowers who would like to clip some or all of their lambs are invited to contact Ian Evans. Enquiries will assist us in ensuring the number of clips available will be sufficient to meet the demand.

Further information

For further information, contact the AWI Helpline 1800 070 099, or

Ian Evans
Project Manager - Blowfly Control
Australian Wool Innovation Limited
Level 30, 580 George Street
Sydney NSW 2000
mob: 0427 773 005
tel: 02 8295 3100
fax: 02 8295 4121
Visit our website at www.wool.com.au