Summary of Day

Bridget Peachey – AWI
17 July 2018
BREECH FLYSTRIKE STRATEGY 2017/18 – 2021/22

THE FIVE KEY PILLARS OF AWI INVESTMENT
The Breech Flystrike Strategy provides direction for AWI investment in sound, scientific solutions for the management of breech flystrike to improve lifetime animal welfare, address supply chain expectations and increase the demand for Australian wool.

BREEDING AND SELECTION
THE AIM: Long term sustainable solutions to reduce the risk of breech flystrike.
- Understand the performance and economic consequences of breeding for reduced breech flystrike.
- Investigate the, as yet unknown, factors that cause breech flystrike.
- Improve the accuracy and robustness of breech flystrike traits along with other welfare traits such as worm resistance and survival.
- Better understand how to reduce the incidence of dags and urine stain through breeding.

BREECH MODIFICATION ALTERNATIVES
THE AIM: Breech modification alternatives to reduce the reliance on mulesing.
- Undertake further R&D to refine the application protocols for breech modification alternatives to support their commercial viability.

IMPROVED MANAGEMENT PRACTICES
THE AIM: Improved management practices to advance lifetime welfare.
- Invest in getting new parasite control treatments and vaccines to market.
- Ensure access to information on parasite management and use of existing chemical treatments.
- Investigate longer acting, cost effective pain relief options for painful husbandry practices.
- Support for further National Mulesing Accreditation Program (NMAP) training.

WOOL INDUSTRY TRAINING AND ENGAGEMENT
THE AIM: Adoption of best practice strategies to improve the lifetime welfare of sheep and reduce reliance on mulesing.
- Develop and implement education, training and extension strategies to improve lifetime welfare of sheep and reduce reliance on mulesing.
- Monitor, evaluate and improve the success of education, training and extension strategies.
- Engage with woolgrower advisors on the RD&E program.

SUPPLY CHAIN ENGAGEMENT
THE AIM: International and domestic stakeholders support the Australian wool industry.
- Regularly engage with domestic and international stakeholders to ensure they understand best practice management of breech flystrike and associated welfare implications.
- Minimise the risk of regulatory measures that may restrict the ability of woolgrowers to select the most appropriate practices for their farming system.
- Consult with Australian wool and sheep industry organisations.

THE STRATEGY PILLARS FOR 2017/18 – 2021/22

THE FIVE KEY PILLARS OF AWI INVESTMENT

BREEDING AND SELECTION

IMPROVED MANAGEMENT PRACTICES

BREECH MODIFICATION ALTERNATIVES

SUPPLY CHAIN ENGAGEMENT

WOOL INDUSTRY TRAINING AND ENGAGEMENT

Copyright © 2018 - The Woolmark Company. All rights reserved.
## Annual Cost of Flystrike for Producers

<table>
<thead>
<tr>
<th></th>
<th>$ Million</th>
</tr>
</thead>
<tbody>
<tr>
<td>Treatment</td>
<td>11.34</td>
</tr>
<tr>
<td>Prevention</td>
<td>57.30</td>
</tr>
<tr>
<td>Production Losses</td>
<td>104.53</td>
</tr>
<tr>
<td><strong>TOTAL COST</strong></td>
<td><strong>173.17</strong></td>
</tr>
</tbody>
</table>

AWI Investment in Breech Flystrike RD&E

<table>
<thead>
<tr>
<th></th>
<th>$ Million</th>
<th>Percentage Spend</th>
</tr>
</thead>
<tbody>
<tr>
<td>Breeding and Selection</td>
<td>8.4</td>
<td>27%</td>
</tr>
<tr>
<td>Improved Management Practices</td>
<td>10.6</td>
<td>34%</td>
</tr>
<tr>
<td>Breech Modification Alternatives</td>
<td>12.2</td>
<td>39%</td>
</tr>
<tr>
<td><strong>TOTAL SPEND 2001 - 2017</strong></td>
<td><strong>31.2</strong></td>
<td><strong>100</strong></td>
</tr>
</tbody>
</table>

Plus all the $$ spent by research organisations, universities, state departments, animal health companies, service providers, individual growers etc...

Sheep Health & Welfare Program Budget increase in 2018/19 to $3,500,000
## What do we know?

<table>
<thead>
<tr>
<th></th>
<th>2013/2014 AWI MLA Wool and Lamb Forecasting Survey</th>
<th>2017 AWI Animal Husbandry Survey</th>
</tr>
</thead>
<tbody>
<tr>
<td>Percentage of merino lambs mulesed</td>
<td>73%</td>
<td>70%</td>
</tr>
<tr>
<td>Percentage of mulesed merino lambs receiving pain relief</td>
<td>77%</td>
<td>85%</td>
</tr>
<tr>
<td>Size of mules</td>
<td></td>
<td>50% of growers declared they reduced the size of their mules in the last 10 years</td>
</tr>
</tbody>
</table>

The number of Merinos being mulesed is decreasing and there has been large and rapid adoption of pain relief.
Breeding and Selection

*Long term sustainable solutions to reduce the risk of breech flystrike*

What do we know?

- It’s possible to breed for increased productivity and reduced susceptibility to breech flystrike.
- Medium type Merinos are showing impressive gains for improved breech traits.
- Limited suitable rams available to impact breech traits in Fines/Super Fines.

How do we help growers breed balanced profitable Merino for their specific environment?

- Find unexplained factors, to reduce emphasis on wrinkle and dags
- Increase number of animals assessed for breech traits
- Promote of high fleece weight, low breech trait sires
- Welfare enhanced selection indexes
- Genomic selection?

Review of Breech Flystrike Risk Factors
Breech modification alternatives to reduce the reliance on mulesing

SkinTraction (SKT)
• Hope to work with a commercial company to investigate further R &D to lift the restrictions with the APVMA and make SKT more commercially viable.

Liquid Nitrogen Process (LNP)
• Steinfort Agvet is redeveloping this technology, without AWI funding.

Clips
• Still in use but demand is low, no longer commercially available.

Laser Technology
• Will need to see successful results from proof of concept work before considering further investment.

<table>
<thead>
<tr>
<th>Wrinkle Reduction</th>
<th>Mulesing</th>
<th>c1.0 score</th>
<th>SkinTraction</th>
<th>c0.75 score</th>
<th>LNP</th>
<th>c0.75 score</th>
<th>Clips</th>
<th>c0.3 score</th>
</tr>
</thead>
</table>

What if....
Improved management practices to advance lifetime welfare

Sheep Ectoparasite Resistance Update

Better use of chemicals

New Chemicals for Sheep Blowfly Control

Development of new chemicals

Genetics of Blowfly Parasitism

CRISPR

Provision of pain relief

Improved methods of delivery of chemicals

New parasite control options/vaccines

Analgesia for Sheep

Residue Deletion Studies

Gap Evaluation of Pain Alleviation Studies

Nanotechnology for Flystrike and Lice Control
Nanotechnology options for Flystrike and Lice Control

• Develop and test nanocapsule formulations that can provide prolonged, safe and residue free protection against sheep flystrike and lice

• Collaborative project with an animal health company, to be delivered by UQ and QDAF

• Still being contracted.

- Pesticide (challenges)
  - Short duration of persistence
  - Low UV stability
  - High-dose and frequent administration
  - Residue and safety issues

- Nanotechnology (solutions)
  - Silica whiskers enhanced adhesion
  - Silica shell enabled UV protection
  - Hollow cavity promoted pesticide loading and sustained release
  - Silica: Bio-compatible materials
Gap Evaluation of Pain Alleviation Studies underway

• Stocktake of published research into welfare impacts of castration, tail docking and mulesing
• Alternatives to these procedures
• Potential pain relief strategies
• Methods of assessing pain and analgesic efficacy.

A gap analysis and recommendations for future research directions (due 2019)
# On-going Training and Engagement

*Adoption of best practice strategies to improve the lifetime welfare of sheep and reduce reliance on mulesing*

## Foundation Activities

- AWI Animal Husbandry Survey
- Benchmarking Australian Sheep Parasite Control Survey
- Sheep Ectoparasite Resistance Update
- Rate of Genetic Gain Update
- Stocktake of Industry Communications in Breech Flystrike Management

## Planning

- Development of a Breech Flystrike Training and Engagement Plan

## Implementing

- Monitor, Evaluate and Improve

---

National Breech Flystrike RD&E Technical Update 2018
LATEST PUBLICATIONS

AWI's latest publications on breech flystrike prevention. Click the links to view or download the publications in PDF format:

- Pain relief research for mulesing - June 2018 Beyond the Bale article (PDF 668kb)
- Observed benefits of using Buccalgescic® with Tri-Solfen® - June 2018 Beyond the Bale article (PDF 739kb)
- Welfare assessments of analgesic options in female lambs for surgical mulesing and its alternatives (May 2018) (PDF 1.8MB)
- Planning for a non-mulesed Merino enterprise (March 2018) (PDF 589kb)
- Pain relief update: Buccalgescic® formally approved for mulesing December 2017 Beyond the Bale article (PDF 487kb)
- AWI Breech Strike RD&E Program – Improving Lifetime Welfare presentation (November 2017) (PDF 4MB)
- AWI RDE and Communications Strategy – Breech Flystrike Prevention Program September 2017 (PDF 64kb).
Training and Engagement – next steps

• Implementation of individual Project Communication and Extension Plans
• Continued promotion of the use of pain relief
• Continued promotion of the NWD, transparency
• Development of a Sheep Blowfly Resistance Strategy
• ParaBoss Training for Advisors
• National Mulesing Accreditation Program (NMAP) review and update
• Moving to a Non-Mulesed Enterprise, further case studies, grower groups.
Monitoring & Evaluating

Is the Breech Flystrike RD&E Program meeting industry and stakeholder expectations:

- Biannual AVA Audit
- Annual Genetic Review
- Animal Welfare Forum
- Industry consultation

What is the Impact of the Program - changes in Knowledge, Attitudes, Behaviour, Aspirations:

- Individual project evaluation
- Benchmarking Australian Sheep
- AWEX National Wool Declaration
- Parasite Control Surveys
- AWI Survey of Husbandry Practices
- Wool Market Analysis – premiums and discounts
MONITORING PROGRESS

Merino ewes and Merino lambs, Midlands, Tasmania.

AWI and its partners are making strong progress toward reducing woolgrowers’ reliance on mulesing and improving the lifetime welfare outcome for sheep.

A proportion of woolgrowers no longer use the traditional procedure. In 2005, a survey of woolgrowers by the Sheep CRC indicated only five per cent of lambs would remain unshorn. By 2013/14, an AWI survey indicated 40 per cent of all lambs and 24% of Merino lambs would remain unshorn. This is a significant change in practice.

Where the risk of flystrike in sheep is too high, woolgrowers are replacing the traditional procedure with welfare-improved practices. Welfare-improved surgery with pain relief protect sheep from flystrike while longer term breeding programs build natural flystrike resistance in the flock.

Results from genetic research indicate breeding for enhanced flystrike resistance without a high reliance on chemical control and ensuring productivity is high can be successful but it will take a considerable amount of time to achieve particular for superfine and fine wool sheep and sheep in high dam environments. There are approximately 100 non-mules Merino and Dohne Studs.

Independent External Reviews

External reviews of the AWI breech flystrike research, development and extension (RD&E) program are regularly commissioned to ensure that the program continues to meet industry and stakeholder expectations and to identify opportunities for future research.

The Australian Veterinary Association (AVA) biannually reviews the AWI breech flystrike RD&E program, as part of an undertaking to international partners.

Click on the link to view the latest AVA Audit Report (PDF 30Kb).

Independent reviews of the genetic component of the AWI breech flystrike RD&E program are undertaken annually to identify its successes and potential for improvement.

Click on the link to view the latest Genetic Review Report (PDF 243Kb).

National Wool Declaration

Latest AVA and Genetics Review Reports can be found on wool.com
What have we achieved?

- Baseline to measure change in blowfly chemical resistance
- Fly Genome mapped
- Good understanding of fly ecology
- Sound subjective and objective genetic selection strategies using indirect traits
- Pre and post pain relief
- Best practice chemical use principles
- Credible passive extension vehicle

copyright © Commonwealth of Australia (Geoscience Australia) [1996]
Where to next?

- Unexplained causes of flystrike
- Incomplete understanding of interaction between sheep and fly/larvae
- Increasing risk of chemical resistance
- Biological controls
- Biological control ecology

- New prevention chemicals
- Vaccine development
- Commercially viable breech modification alternatives
- Comprehensive anaesthesia
- Availability of high indexing, low risk super fine/fine NM sires
- Regulation of follicle activity (expression)
- Low cost crutching
- More active extension
- Economics of managing flystrike