ENHANCED ABATTOIR SURVEILLANCE

2017 ANNUAL REPORT
2017 PROGRAM REPORT

The South Australian (SA) Enhanced Abattoir Surveillance (EAS) Program is unique.

SA producers are the only producers in the country to receive twice weekly feedback on diseases and conditions detected in their sheep at Thomas Foods International (TFI) Murray Bridge and Lobethal. Feedback provided is in addition to routine processor condemnation information and includes information on over 20 conditions (if detected in >5% or more of a line).

This timely and comprehensive feedback enables management change to maximise production efficiency on farm and minimise trimming/condemnations at the abattoir. In turn animal welfare is improved as is the health of the SA flock – both of paramount importance to secure trade access to present and future market opportunities.

This report covers the period January to December 2017.

Helping producers to:
- improve sheep health and welfare
- maximise farm productivity
- increase profits

Assisting the industry with:
- reducing waste
- trade access and market opportunities
- sheep health and disease research

For further information go to: www.pir.sa.gov.au/eas
SNAPSHOT OF 2017

2017 surveillance at Thomas Foods International (TFI) Murray Bridge and Lobethal included:

- >2.7 million Australian sheep
  - of which 70% were South Australian

- From >2,500 South Australian properties
  - across all regions of the State

- This included 49% of commercial* South Australian producers
  - resulting in >5,900 feedback letters

*Commercial producers were defined (for this report) as those who transferred >100 sheep on the NLIS database in 2017 (movements recorded as at January 15 2018)
HOW BEST TO INTERPRET THE FEEDBACK I RECEIVE

Consider all available information when interpreting your EAS results.

The following procedure may help to guide you:

1. Weigh sheep prior to loading. Keep a record of weights and use this as a guide only to calculate expected carcase weights (keep in mind curfew and transport further reduces these weights).

2. When you receive your invoice and summary feedback sheet from the processor ask yourself the following questions:
   a. Are the carcase weight ranges what you expected from the line of sheep consigned?
   b. Did you incur grid penalties for underweight carcases?
   c. How many animals were lighter than expected?
   d. Were there any carcases condemned for monitored conditions?

3. Identify any conditions present in your consignment by referring to the EAS feedback letter received. Consider the degree of trim that may be associated with each condition (refer to Table 1 below and the information within this report).

4. Compare your EAS feedback results to others in your region and the state – this information can be found in regional benchmarking reports via the link: http://www.pir.sa.gov.au/eas and within this report. How does your farm compare to others in your region?

Consider all of the above information when interpreting the meaning of your results and contact Dr Elise Matthews if you require further clarification, assistance or information (see page 16 for contact details).

Involve your private vet, livestock agent, local PIRSA animal health officer or livestock consultant to further assist on-farm decision making.

<table>
<thead>
<tr>
<th>Conditions that reduce carcase weights during processing due to trim</th>
<th>Arthritis, grass seeds, pleurisy and dog bites – trim can be significant, depending on severity.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Bruising, cheesy gland (CLA), rib fractures and vaccination lesions – trim generally less significant than for conditions listed above.</td>
</tr>
<tr>
<td>Conditions that may result in condemned carcases</td>
<td>Severe sheep measles (ovis), polyarthritis, bruising and jaundice.</td>
</tr>
<tr>
<td>Conditions only affecting offal (no impact on carcase weight at the time of processing)</td>
<td>Bladder worm, sheep measles (ovis), pneumonia, sarcocystis, nephritis, cirrhosis, knotty/pimply gut and liver fluke.</td>
</tr>
</tbody>
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Table 1: EAS monitored conditions and relative potential impacts on carcase weights (if any).
2017 RESULTS FOR CONDITIONS MONITORED

The ultimate aim for producers and processors alike is maximum carcase yield with minimal waste. Production of a carcase free of disease or other conditions ensures producers maximise production efficiency on farm as well as carcase weight and grid price at slaughter. A high value chilled product, free from trim, downgrading or offal condemnation is also the ultimate desired outcome of a carcase for processors.

With all supply chain sectors aiming for the same premium product, EAS feedback is highly valuable for producers and should be used strategically to improve sheep health/production efficiency, animal welfare and carcase value.

For the purposes of this report prevalence refers to the percentage of sheep affected out of all sheep processed for that area and age category.

The following key has been developed to display the significant information for each condition.

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= condition description and/or cause
= proportion of producers consigning affected stock
= effect of the condition on farm
= lamb and mutton specific information
= effect of the condition at the abattoir
= specific trends, regional or other information
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Grass Seeds

**Cause and consequences**

Seeds in the carcase due to spear, brome, barley, silver and Chilean needle grasses or geranium.

= ↓weaner growth rates → lighter weaners, ↓ wool production, associated pain/discomfort and ↓ carrying capacity.

= ↑ trimming (lighter carcases) which can be significant, c/kg penalty and damaged skins.

**2017 Results**

~1 in 8 producers consigned affected stock.

3% lamb prevalence (range 0.1% to 9.7% across the State).

2% mutton prevalence (range 0% to 11.5% across the State).

Grass seed prevalence continues to occur at the highest prevalence in the Murray Mallee and Upper South East.
Arthritis

**Cause and consequences**
Swollen and damaged joints caused by a bacteria entering wounds at marking/mulesing or via the umbilical cord at birth.
= deaths (+ culling cripples not fit for transport off farm), ↓ production. Arthritis is a condition of welfare concern.
= trimming of affected joints, carcase condemnation if >4 joints affected.

**2017 Results**

~1 in 2 producers consigned affected stock
1% lamb prevalence (range 0.2% to 1.7% across the State).
6% mutton prevalence (range 3.5% to 11% across the State).
Arthritis is a State wide issue. On average 1 in 15 carcases are trimmed for the condition within affected lines.

Sheep Measles (*Cysticercus ovis*)

**Cause and consequences**
Cysts detected in sheep muscle – carcase and/or offal. Cysts are the larval stage of a tapeworm parasite found in dogs.
= no effect on sheep health on-farm. Monthly de-worming of ALL dogs on farm with Praziquantel (also controls bladder worm).
= trimming or carcase condemnation if >5 cysts detected.

**2017 Results**

>7 in 10 producers consigned affected mutton.
0.5% lamb prevalence (range 0.1% to 1.5% across the State).
4.5% mutton prevalence (range 2.2% to 7.6% across the State).
Sheep Measles is found in similar levels on fox free Kangaroo Island as mainland SA. Therefore dogs should be still be considered the main carriers and should be de-wormed monthly.
Pleurisy

Cause and consequences

Extension of pneumonia (lung infection/inflammation) causing parts of the lungs to stick to the chest wall (valuable rack of ribs).

= ↓ production and deaths in some instances.

= trimming of the ribs to remove adhesions (↓ carcase weight).

2017 Results

>9 in 10 producers consigned affected mutton.

2% lamb prevalence (range 0.5% to 3% across the State).

11% mutton prevalence (range 8.8% to 15.2% across the State).

Pleurisy is a significant condition in mutton lines across all State regions. On average, in 1 in 8 carcases are trimmed for the condition in affected lines.

Pneumonia

Cause and consequences

Infection/inflammation of the lungs caused by the combination of an infectious agent, poor sheep immunity/stress and environmental conditions (hot, dry and dusty).

= ↓ production and deaths in some instances.

= condemnation of lungs.

2017 Results

2 in 5 producers consigned affected stock.

5.5% lamb prevalence (range 1.4% to 9.4% across the State).

1.5% mutton prevalence (range 0% to 5% across the State).

Pneumonia is of particular concern when it progresses to cause pleurisy. Cases of pleurisy are found in almost all lines of mutton and require carcase trimming.
Cheesy Gland (CLA)

Cause and consequences
Contagious bacterial disease causing lymph node abscesses. It is most commonly transmitted at shearing. Vaccination is effective.
- ↓ wool production (up to 7% in the year of infection), wool contamination, occasionally chronic infection causes illthrift, emaciation and poor reproductive performance.
- trimming (↓ carcase weight).

2017 Results
- 1 in 2 producers consigned affected mutton.
- <0.1% lamb prevalence (range 0% to 0.4% across the State).
- 6% mutton prevalence (range 2% to 13% across the State).
- CLA remains a problem in mutton sourced from the Northern Pastoral region with more than double the mutton prevalence when compared to the remainder of the State.

Vaccine Lesions

Cause and consequences
Abscesses from incorrect needle length, vaccinating wet sheep and/or using blunt or dirty needles. All vaccines should be given under the skin high on the neck and not into muscle.
- if vaccine is given on the face reactions can interfere with feed intake.
- trimming (↓ carcase weight), less impact if lesion is high up on the neck rather than in the legs or along the back.

2017 Results
- 1 in 10 producers consigned affected stock.
- 2% lamb prevalence (range 0% to 8% across the State).
- 4% mutton prevalence (range 0% to 24.5% across the State).
- By far the highest level of vaccine lesions are seen in sheep from properties surrounding Adelaide in the hills and northern Fleurieu.

Note – This program records all vaccine reactions; some would be caused by Gudair for which reactions can occur regardless of vaccination technique or hygiene.
Weak bones result from mineral deficiencies or imbalances (especially calcium and copper). Weak bones may break without excessive force or as a result of inappropriate handling/facilities.

= ↓ production and is of welfare importance.
= affected ribs trimmed (↓ carcase weight).

2017 Results

1 in 6 producers consigned affected stock.
1% lamb prevalence (range 0% to 4.1% across the State).
0.2% mutton prevalence (range 0% to 2% across the State).

Research estimates rib fractures cost the SA industry $3M annually, $25/carcase to the processor and $1.30/carcase to the producer.

Rib Fractures

2017 Results

~1 in 2 producers consigned affected stock.
2.5% lamb prevalence (range 0.6% to 4.3% across the State).
5.5% mutton prevalence (range 2% to 10% across the State).

The prevalence of bruising has increased significantly in the previous 2 years. Potential cause/s of this are being explored.

Bruising

Cause and consequences

A result of external trauma, usually caused during yarding, transport or if processed within 2 weeks of shears.

= a condition of welfare importance.
= trimming of discolored muscle (↓ carcase weight).
Bladder Worm

Cause and consequences
Larval cysts (‘bladders’) found in the liver. Cysts are the larval stage of a tapeworm parasite found in dogs (and foxes).

= usually no effect on sheep health, will occasionally trigger Black Disease (a clostridial disease) in unvaccinated stock.

= livers are trimmed or condemned.

2017 Results

~8 in 10 producers consigned affected mutton.

2.5% lamb prevalence (range 0.5% to 6.5% across the State).

18.5% mutton prevalence (range 7.4% to 30.5% across the State).

The advantage producers gain by controlling bladder worm is that these control measures are also controlling/preventing Sheep Measles (a condition that can result in condemnation).

Cirrhosis

Cause and consequences
Damaged/scarred liver due to ingestion of toxic plants e.g. Potato weed (heliotropes), Salvation Jane, Lesser loosestrife, Caltrop and Panic grasses.

= ↓ production.

= liver condemnation.

2017 Results

Very few producers (2.5%) consigned affected mutton in 2017, a significant reduction from the previous years of ~1 in 5.

0.1% lamb prevalence (range 0% to 0.5% across the State).

0.2% mutton prevalence (range 0% to 1.2% across the State).

Cirrhosis is usually only of concern in mutton due to prolonged and repeated exposure to toxic plants/weeds.
Jaundice was detected in only 6 SA lamb lines at ≥5% in 2017.

Liver Fluke was detected on only 4 SA properties in 2017.

Knotty gut/pimply gut, caused by the intestinal parasite Nodule worm (Oesophagostomum columbianum), was detected on 55 SA properties in 2017. The parasite prefers a summer rainfall climate.

Sarcocystis is only a concern for producers on Kangaroo Island (25% mutton prevalence). 88% of Kangaroo Island producers consigned affected mutton.

Nephritis

Cause and consequences

Due to bacterial spread from contaminated marking/mulesing wounds and inflammation of the rumen (due to grain feeding), toxic plant ingestion and some other toxins.

= obvious clinical signs of disease are only observed if >75% of kidney function is affected.

= kidney condemnation.

2017 Results

1 in 2 producers consigned affected lambs.

5% lamb prevalence (range 1.1% to 12.1% across the State).

0.1% mutton prevalence (range 0% to 1% across the State).

Nephritis appears to be a lamb specific condition. It’s significance in terms of effect on productivity is poorly understood.

LOW PREVALENCE/OTHER CONDITIONS

Nephritis – Lambs

Prevalence %

Min Max

1.1 5.0

5.7 7.3

8.0 12.1
DISCOVERY OF A NOVEL AND RARE CONDITION IN SHEEP:

OVINE ANGIOMATOSIS

In addition to the monitoring of specified diseases and conditions, occasionally unusual findings are detected by meat inspectors during processing. Biosecurity SA encourages the submission of unusual samples from meat processing facilities to assist in confirming a diagnosis and ruling out any exotic or emerging (previously unknown) diseases.

In 2017 an unusual condition was detected and subsequently investigated by Biosecurity SA. A lamb presented with multiple lesions in the muscle (Figure 1) and soft tissue (confined to the pelvic girdle) with no obvious association with external bruising or internal injury. Samples were submitted to Gribbles VETLAB for further investigation and the diagnosis of angiomatosis was made.

Angiomatosis is a rare condition that essentially means ‘a benign tumour affecting blood vessels that appears as multiple small clusters like tiny knots within the skin and other various organs’. Previous reports in other species such as in cattle (calves), horses, dogs, cats, llamas and dolphins have been published, however this is the first reported case in sheep. Causes are believed to include congenital/developmental origin or an abnormal healing response. The condition is of no concern to public health.

ON-SITE PLANT TOURS

SA producers, livestock agents and rural re-sellers from all regions of the State were fortunate to participate in regular tours of the Murray Bridge TFI plant during 2017. These tours, facilitated by Mary Chirgwin of Zoetis Animal Health, are conducted with the assistance of Dr David Rutley, the TFI Lamb Supply Chain Coordinator, in collaboration with Biosecurity SA.

These tours continue to be very popular, providing producers and their associated agents/rural re-sellers with key insights into the operation and market drivers of processors. Tours also demonstrate how the EAS program operates and how to best interpret feedback. Producers gain a greater appreciation and understanding of the financial losses that occur during processing, necessary to maintain a high standard of food safety and meat quality, that are as a direct result of conditions found at slaughter.
These tours also aim to provide key animal health information to producers. During 2017 tours were carried out at TFI Murray Bridge using the SA sheep industry funded tour guide headsets, with over 60 producers, rural resellers and stock agents participating. These units have significantly improved the value and safety of these tours and are also used for training purposes.

Producers interested in taking part in a tour should contact their local rural re-seller. In 2018 there will also be the opportunity to participate in tours through JBS Bordertown.

Additionally, a series of agent workshops (which included a tour of the JBS Bordertown plant) were conducted by the Limestone Coast Red Meat Cluster in close partnership with JBS Bordertown and PIRSA (Biosecurity SA and Rural Solutions). In total five workshops were run in 2017 with more than 40 participating agents (from agencies across the Limestone Coast). There are plans to continue the series in 2018 at both JBS Bordertown and also TFI Murray Bridge to cater for the northern agents.

Photo: Livestock Agents tour at the JBS Australia Bordertown Plant, as part of the 2017 Agent Workshop Series.
EAS DATA USE FOR RESEARCH AND OTHER PROJECTS

In addition to individual feedback, de-identified EAS data continues to contribute to research and other projects of industry benefit and progression. Most recently these have included the following projects.

Patrick Taggart – PhD on toxoplasmosis and sarcocystosis in South Australia

Patrick is now half way through his PhD project at the University of Adelaide. Patrick is continuing to investigate the ecology of two cat-borne diseases on Kangaroo Island: toxoplasmosis and sarcocystis. In particular, he is interested in why these two diseases are significantly higher on Kangaroo Island when compared to the remainder of the South Australian mainland. Both diseases are caused by parasites shed by cats and can have significant impacts on sheep production.

He is looking for alternative methods for monitoring the prevalence of toxoplasmosis (caused by *Toxoplasma gondii*) in sheep flocks across South Australia. There is currently no feasible way of conducting widespread monitoring of *T. gondii* in South Australian sheep flocks. However, since *T. gondii* and the parasites responsible for sarcocystis are both cat-borne parasites and both have similar biology, it is possible that they may be associated. If this is the case, we may be able to use sarcocystis as an indicator for *T. gondii* prevalence. This would offer another use for the EAS data at no additional cost to the sheep industry. Patrick’s studies will also use the EAS data to map sarcocystosis in sheep flocks across South Australia to identify hotspots of and risk factors associated with the disease.

He expects his research will be finished by March 2019.

Dr Colin Trengove – ‘Lamb rib fractures preliminary investigation’ and PhD

Dr Colin Trengove was granted permission to use de-identified Enhanced Abattoir Surveillance data in his research toward a PhD into the cause of rib fractures detected in lambs at slaughter. This enabled access to funding from MLA to initiate a specific abattoir study followed by on-farm investigation into factors associated with the occurrence of this condition. Colin is yet to complete his PhD, however has presented the following interim findings.

Key Findings:

- More rib fractures were seen on properties with more acidic soil types, which makes sense, as calcium and copper intake is critical to bone strength, and calcium/copper deficiency is closely associated with soil acidity.
- Most fractures were found to occur between ribs 8-10 on both sides, these ribs are considered to be the most vulnerable to injury as they are the most exposed. This indicates a pin point injury, rather than a crushing injury, therefore less likely to be caused by mechanical handling equipment.
- Rib fractures are mainly due to handling and accidents, the common belief that birth trauma was a primary cause of rib fractures has been dispelled.
- Copper spread directly as a fertiliser onto soil/pasture may not be effective in reducing fractures due to other competing elements.
The Real Cost of Rib Fractures:

1. **To the processor:** $25 per lamb carcase. This loss is mostly attributed to extra processing time and downgrading of primal cuts as a direct result of the mandatory trimming to remove the fracture site.

2. **To the producer:** approximately 3 weeks longer to finish lambs due to slower growth rates and reduced carcase weights due to trimming (estimated $1.30 per lamb). Additionally, there may be risk to producers of losing sales if they continually consign lambs with a significant proportion of the line affected with broken ribs.

3. **To the sheep industry:** rib fractures are a welfare issue with a $3 million loss annually to the South Australian sheep industry, this may equate to an estimated $21 million loss annually Australia wide (however there is no interstate data, SA is the only state currently collecting rib fracture data).

Interim Prevention Advice:

1. Ensure adequate nutrition in the pregnant and lactating ewe to promote good calcium and copper uptake and transfer to the foetus/lamb
   - High soil calcium, sulphur, molybdenum, cadmium and iron can all reduce copper uptake in the ewe/lamb.
   - Give copper via a capsule or injectable form. Injectable is preferred as it avoids rumen interference.
   - Provide ad lib calcium supplement (stock lime) when feeding grain as a major dietary component.

2. How to determine if your sheep have adequate calcium and copper uptake
   - Test the pasture during pregnancy for available dry matter (FOO or “feed on offer”) and mineral content (especially calcium and copper).
   - Blood sample ewes at joining (spring) and lambs at marking to check copper status.
   - Perform a soil test to identify calcium deficiency (applying lime, dolomite or gypsum may adequately rectify the deficiency for long-term benefit).

3. Adopt management strategies to reduce lamb trauma
   - Be gentle when yarding/handling lambs and review the use of dogs in yards (not all dogs are bad).
   - Minimise the number of times lambs are yarded by drafting into light/medium/heavy at the first draft.
   - Identify and attend to hazards in the yards (more easily said than done).

Dr Jeremy Rogers – A case study into nephritis in lambs

As the regional Veterinary Officer for the Murray Mallee Jeremy observed an increased incidence of kidney damage (nephritis) in lambs processed from the region coming through EAS reports. This observation prompted a low cost case study investigation in an attempt to answer questions of concerned producers by firstly defining the syndrome, secondly to identify risk factors and possible causes, and finally to determine both short term and long term production losses in affected sheep (if any). All of these elements will potentially assist in offering producer recommendations into the future.
CONTACTS

For further information regarding Enhanced Abattoir Surveillance, contact Dr Elise Matthews, EAS program Manager on 08 8429 0700 or email elise.matthews@sa.gov.au

FOR MORE INFORMATION ABOUT EAS

For links to all disease and conditions fact sheets and the 2017 annual benchmarking reports (by region) please visit the PIRSA website: www.pir.sa.gov.au/eas

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