Multiplex ELISA kit for measuring antibodies to VMv/CAEv, CLA and MAP in sheep and goat flocks

Emily Gascoigne MRCVS
Synergy Farm Health Ltd, Evershot, UK.
Introduction

1. The challenges faced in commercial flocks pyramid diseases
2. An escalating problem?
3. Multiplex plate
4. Strength and limitations
5. Potential applications in the field
Establishing disease status in commercial sheep flocks- the challenge

• Lack of perceived impact of diseases

• Cost of disease?
• Cost of testing?

• Lack of availability of high health replacements

• Lack of demand for high heath replacement

• If positive- what next?
Prevalence of disease (VMv, CLA, Map)

• **VMv**: Increasing individual and flock prevalence of (Ritchie et al, 2014)

• **CLA**: 18% terminal sire flocks >1 positive animal (Baird et al., 2004)

• **OJD**: Unknown in UK (6% Lovatt and Strugnell, 2013)
Cost of disease

- Limited studies looking at reduced performance in UK situation

- VMv seroprevalence increase pre-weaning lamb mortality (Arsenault et al., 2003)

- CLA (Australia) reduced fleece yields, trimming (Paton et al., 1994)

- Johnes prevalence and ewe mortality variable (Bush et al., 2006)
How did we get here?

• Alpaca TB false positives using serological testing

• Test specificity improved by looking at multiple antigens simultaneously on same plate

• Same technology used in Norway

(Nagel-Alne et al., 2014)
The Multiplex ELISA kit

MVD-Enferplex array for detecting antibodies

Enferplex Bovine TB antigen array
The antigens

• **MVV/CAEV**: Recombinant p25 core protein, TM1 gp46 synthetic peptide

• *Corynebacterium pseudotuberculosis*: Recombinant phospholipase D and CP40

• **M. avium subsp paratuberculosis**: PPA3 protoplasmic antigens
**Strengths and limitations of the Multiplex**

**Strengths**

1. Simultaneous pathogen testing
2. Reduced cost
3. Repeatability
4. Increased Sp VMv component relative to 5 other commercial test
5. Opportunities for development

**Limitations**

1. Challenges of Sn of Johnes diagnostics
2. Limitations of serological testing in iceberg diseases esp. Johnes and MV e.g. age profile of disease
The properties and performance of the test

<table>
<thead>
<tr>
<th></th>
<th>Relative Sn</th>
<th>Relative Sp</th>
</tr>
</thead>
<tbody>
<tr>
<td>VMv</td>
<td>99.4</td>
<td>97.4</td>
</tr>
<tr>
<td>CLA</td>
<td>97.5</td>
<td>98.8</td>
</tr>
</tbody>
</table>

Above relative to the Elitest (MVV/CAEV and CLA ELISAs, EAVLD Piza Proceedings 2014)

Johnes

Challenging to define, lack of gold standard. Must be interpreted bearing in mind biology. Comparable
Applications:

• Easy, lower cost serological test, comparable Sn and Sp
  – Screening tool to establish likelihood of infection in flock
  – Cull ewe screen
  – Inform biosecurity/buying habits?
  – Pre-accreditation screen?

• Sn and Sp
  – Not an individual animal test (esp. Johnes), screening tool for flock
  – Not an accreditation scheme on offer
  – Not a one off screen- Johnes
Conclusion

• Comparable performance to other tests
• £15 to vets plus carriage fee, minimum 12 samples per flocks
• Screening test establish likelihood of infection
Contact

Website:  [www.surefarm.co.uk](http://www.surefarm.co.uk)

Email:  [office@surefarm.co.uk](mailto:office@surefarm.co.uk)

Telephone:  01935 83203
References


Ritchie C, Hosie B (2014) Concern over Maedi Visna breakdowns. Veterinary Record 175: 50–1

Lovatt F., Strugnell B.W. (2014) An observational study involving ewe postmortem examination at a fallen stock collection centre to inform flock health interventions Veterinary Record May 2013