Understanding the importance of Eperythrozoon ovis infection in sheep

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A disease of sheep caused by a microscopic blood parasite called *Eperythrozoon ovis* (usually referred to as *E. ovis*) has been recognised for many years in Western Australia, but little was known about its significance to our sheep industry.

Until recently, there was no suitable test to diagnose *E. ovis* infection easily and we could not readily evaluate its extent and economic impact.

However, the development at our laboratories of an ELISA (enzyme linked immunosorbent assay) based blood test, to measure the level of a sheep's immunity to *E. ovis*, has helped us learn more about its importance and assign a research priority.

### About the disease

The *E. ovis* parasite infects the surface of red blood cells of sheep. Infected (abnormal) cells are removed from the bloodstream by the sheep's spleen. With heavy infections, sheep can become severely anaemic and this is the main effect of the disease.

The derivation of the name of the parasite *Eperythrozoon ovis* comes from the Greek 'epi' or upon, 'erythros' or red referring to red blood cells, 'zoon' of animals and 'ovis', referring to sheep.

Outbreaks of disease can last for 14 to 28 days, and are most frequently diagnosed in young sheep during spring and late summer. Sheep with *E. ovis* infection have pale or yellow gums, may pass dark urine and lag behind the mob when driven. Severely affected sheep may die, although the number of deaths during an outbreak is usually low.
The technology provides a simple, visual means of detecting low levels of antibodies in the blood. It can be automated to test large numbers of samples.

We were able to adapt ELISA technology to develop a test that detects antibodies specific for *E. ovis* infection.

Typical *E. ovis* reaction in an ELISA test. A positive reaction shows as purplish-red.

Part of a red blood cell showing budding *E. ovis* organisms attached to the surface of the cell. Photo: Courtesy of Research in Veterinary Science.

When exposed to a disease, the body releases antibodies into the bloodstream to help combat the disease.

The ELISA test uses an enzyme, linked to an antibody-detecting protein, to measure the level of antibodies in the blood. When antibodies are present in a blood sample, the linked enzyme causes the test solution to change colour.

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One of the 91 farmers whose weaner flocks were surveyed for *E. ovis* infection.
Conclusions

Our research has clarified the importance of this disease of sheep. Although it appears to be common, it is unlikely to be economically significant, except in the absence of sound sheep management practices.

Disease and productivity

Having established a reliable estimate for disease prevalence, we measured the economic impact of naturally occurring *E. ovis* infection, using a farm with a high incidence of the disease. Groups of infected and non-infected weaner sheep were identified and their wool production compared.

Infected sheep grew 250 g less clean wool than non-infected sheep; there was no difference in fibre diameter or yield.

Based on June 1992 wool prices, we estimate that infection on a farm costs on average about $112 per year. This production loss is unlikely to be economically important to an individual farmer. The total cost of this disease to the Western Australian sheep industry is estimated to be about $530,000 per year.

Disease prevalence

As the first step in defining the importance of this disease, we surveyed weaner flocks from 91 farms during the summer of 1990 to estimate the prevalence of this disease. Flocks were selected to be representative of all farms in the State. Weaners were tested for antibodies to *E. ovis* using an ELISA-based blood test.

Infection is likely to be present on half the farms in Western Australia and about 5 per cent of the total weaner flock may be infected.

Infection is more likely to occur on farms in the northern agricultural regions surrounding Geraldton and throughout the Great Southern and south coastal agricultural regions. Farmers are usually not aware of infection in their sheep.

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The dots show the likely distribution of farms with *E. ovis* infected sheep.