Developing livestock preventive medicine programs with grassland farmers

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Abstract: *Examples of some diseases (internal parasites in cattle; selenium deficiency; cobalt (and therefore vitamin B12) deficiency; pestivirus in cattle and lead poisoning) are used to illustrate how a stock manager, in consultation with an animal health adviser, might design a livestock preventive health program.*

Key words: internal parasites, selenium deficiency, cobalt deficiency, lead poisoning, theileria

Introduction

Animal health is an important component of running a productive grazing business. In this paper, I will use examples of some diseases to illustrate how a stock manager, in consultation with an animal health adviser, might design a livestock preventive health program.

Assessing animal health threats

Some livestock diseases cause a predictable production loss if untreated on central Tablelands and Slopes grazing properties. Two examples are internal parasites (in both sheep and cattle) and selenium deficiency in Merino weaners. An important component of developing a livestock health program for these diseases is an examination of the cost/benefit of preventing them.

However, some diseases such as hypomagnesaemia in cattle and clostridial diseases in both cattle and sheep simply cause sudden death less predictably and so the livestock owner needs to examine the risk of these diseases. The two components of most risk assessments are the chance of occurrence (of a disease in this instance) and the potential impact of that disease should it occur.

In the analysis of animal health issues on an individual property, I also attempt to ascertain a farmer's own attitude to risk and the likely cost-benefit of an action. In any advice to livestock producers on animal health programs, I also consider animal welfare, the broader interests of our livestock industries and the impact of a problem or disease on the community and our consumers and trading partners.

What are the most important threats to the health of grazing livestock?

There have been several attempts at quantifying the cost of various livestock diseases on the national economy. Meat & Livestock Australia commissioned the most recent study (Sackett and Holmes 2006). From our collective experience and research and from this report, the main livestock health problems on the central Tablelands of New South Wales (NSW) are listed below.

For cattle producers, gastrointestinal parasitism is a major threat to the health of young cattle, while in good seasons, bloat and hypomagnesaemia emerge as significant threats. Also, liver fluke are prevalent especially on the eastern Tablelands and represent a significant threat to young cattle if uncontrolled. Much of the Tablelands is selenium deficient and small areas are cobalt deficient. Pestivirus presents a threat to herds of cattle that are unprotected, either by vaccination or prior exposure to the virus (Watt 2007). Theileria is a cattle disease new to the Tablelands and capable of causing substantial mortality in mature cows (Bailey 2011).

For sheep producers, gastrointestinal parasites are the major threat. Widespread drench resistance exacerbates this problem. Fly strike continues to cause problems to the sheep industry and the need to consider alternatives to mulesing represents an ongoing challenge (Sackett and Holmes 2006). Also, lice infestation remains an issue in sheep. We know that about

20% of Tablelands flocks are lice infested and about another 10% have a light subclinical infestation (Watt and Eppleston 2010).

In this paper, I will discuss my approach to advising farmers on livestock health programs by considering a few examples.

Example 1. Internal parasites in cattle

Smeal *et al.* (1981) examined the effect of gastrointestinal nematodes in young beef cattle on the northern, central and southern Tablelands and the north Coast of NSW. In his study, conducted from 1965 to 1970, he found that young cattle drenched monthly with thiabendazole gained up to 23.9 kg more weight than undrenched cattle by 16 months of age. This response varied considerably with year and location. However, Smeal's study risked underestimating the cost of gastrointestinal parasitism in cattle as his choice of anthelmintics at that time was limited. He used thiabendazole, which is both short acting, providing no protection against re-infestation and is of limited efficacy especially against *Ostertagia* larvae in arrested development in the abomasal wall. Smeal acknowledged these limitations and later concluded that effective internal parasite control, through a combination of strategic grazing management and anthelmintics, could increase liveweight gains by 30–60 kg/head 9–12 months after weaning (Smeal 1991).

Jeff Eppleston and I decided to investigate the cost of internal parasites in young cattle on the central Tablelands with the benefit of a new anthelmintic, moxidectin. Injectible moxidectin (Cydectin, Fort Dodge) has the advantage of sustained action, so protecting the suppression treated portion of the mob from re-infestation and is highly effective against gastrointestinal parasites of cattle including against all stages of *Ostertagia*. We treated 20 heifers in six mobs of at least 100 heifers every three months from weaning for the next 12 months. When we compared the liveweight gains of the suppression treated portion of the mob with the completely untreated heifers on one property, we found that the treated calves weighed 50 kg more than those that were untreated. They also weighed on average 28 kg more than calves drenched using the normal program of the individual farmers (Watt and Eppleston 2011*a*).

It is cost effective to control internal parasites in young cattle with a return in the order of 10:1. Unfortunately however, the means available for us to monitor internal parasitism in cattle (worm egg counts and blood pepsinogen levels) are of limited value. Although further research into the control of internal parasites in young cattle is required, for spring calving herds, we recommend that calves are drenched at weaning in the autumn (with an effective drench and placing onto 'clean' pastures if possible), with follow up drenches in mid winter and the following spring.

Example 2. Selenium deficiency

We know from surveys that selenium deficiency is widespread on the Tablelands (e.g. Watt 2007). We also know from our own research and that conducted elsewhere that young Merino sheep are likely to respond to selenium supplementation with improved bodyweight (up to 2 kg/hd) improved fleece quality and lower parasite status (Caple *et al.* 1980; Celi *et al.* 2010). As an animal health adviser, I do not hesitate to recommend that producers who run Merinos with low levels of blood selenium (as evidenced by glutathione peroxidase levels) will get a satisfactory return on an investment in selenium supplementation.

However, it is difficult to prove an economic response to selenium in cattle. In a trial that Jeff Eppleston and I conducted recently, selenium deficient heifers did not grow faster when treated with long acting barium selenate (Deposel, Novartis) by injection (Watt and Eppleston 2011*b*). Yet I have seen a couple of mobs of young cattle with ill thrift, rough coats and diarrhoea for which the only problem detected was low blood selenium levels (Watt 2011). Others have reported infertility in selenium deficient cows (Radostits *et al.* 2007).

In the face of this somewhat unconvincing evidence, I recommend that cattle producers in selenium-deficient areas should supplement with selenium. My justification is that selenium

is involved in a wide range of functions, including the immune system and so the consequences of deficiency are unpredictable. Selenium supplementation with long acting injections is now easy, safe (as long as the correct dose is given), inexpensive and long lasting. In a grazing system, many components and in particular price and rainfall are beyond our control. However, the selenium status of our stock is under our control and supplementation removes the risk of problems associated with deficiency.

Example 3. Cobalt (and therefore vitamin B12) deficiency

Some commercial interests have argued that vitamin B12 supplementation is beneficial across wide areas of NSW. However, our surveys of sheep and cattle indicate that blood vitamin B12 levels are adequate across most of the Tablelands and Slopes, apart from a small area of granite-derived soils east of Bathurst. In collaboration with sheep producer Greg Emms, Jeff Eppleston and I investigated the response to vitamin B12 in lambs treated at marking on Greg's property near Lyndhurst. We did not find a response to vitamin B12 supplementation and blood B12 levels were normal (Watt *et al.* 2009).

I can see no rationale for supplementing livestock with vitamin B12 on the central Tablelands or Slopes except on those clearly defined areas in which blood tests demonstrate cobalt deficiency.

Example 4. Pestivirus in cattle

Several surveys demonstrate that pestivirus occurs in about 90% of beef cattle herds across Australia (e.g. Taylor *et al.* 2006). A serological survey found a similar prevalence in cattle on the NSW central Tablelands (Watt 2008). In my experience, losses are often imperceptible on properties where the disease is endemic. However, on properties (or herds within properties) without exposure to pestivirus, losses can be substantial. I therefore consider it important to establish the pestivirus status of large herds before considering a control program. For small herds, it is usually cheaper to vaccinate as a precaution than to determine the pestivirus status of the herd.

The pestivirus status of a herd can be determined by blood testing about eight cattle from three different age groups. In herds with substantial exposure, as measured by blood antibody levels to pestivirus, a vaccination program is unnecessary. However, cattle producers need to be aware that pestivirus can die out in a herd, leaving younger cattle susceptible. In herds with moderate levels of exposure, the livestock manager should consider a vaccination program depending on the level of exposure and his enterprise and attitude to risk.

Herds (or mobs within herds) with little or no exposure to pestivirus run the risk of a disastrous incursion of the virus at some stage. These herds should either adopt a vaccination program or adopt strict biosecurity measures to prevent the introduction of pestivirus. Unfortunately however, pestivirus vaccination is relatively expensive and has therefore not been as widely adopted as might be desirable. For producers reluctant to profile the entire herd, I advise that they at least test their heifers well before joining. Similarly, for producers reluctant to adopt a complete vaccination program, I suggest that they 'hedge their bets' by at least vaccinating heifers twice before the first joining.

Example 5. Lead poisoning

Lead intoxication is the most common form of poisoning of cattle worldwide (Osweiler *et al.* 1973; Humphreys 1979; Seawright 1982; Jubb *et al.* 1992; Sharpe *et al.* 2004). Our Tablelands regional animal health team, which includes LHPA staff and private veterinarians, diagnose one to two cases each year. On any one farm, the risk of exposure is low, but the potential impact on a farm can be high with substantial mortalities and constraints on selling lead exposed cattle (Watt 2006). However, if a case of lead poisoning goes undetected only to be discovered by subsequent residue testing, the ramifications for the industry could be enormous. Domestic and international trade could be threatened and consumer confidence undermined.

Livestock producers need to act to reduce the risk of lead poisoning. These measures are simple and inexpensive. They involve denying livestock access to lead. This means collecting and disposing of old batteries, lead paint and sump oil. These actions are therefore highly cost-effective when viewed against the risks posed by lead poisoning.

Conclusions

Of the wide range of diseases that pose a threat to the livestock enterprises of central Tablelands and Slopes graziers, some are amenable to regional control recommendations. Internal parasites in cattle and, to a lesser extent sheep, are examples. In other cases however, knowledge of the disease status or risk needs to be determined for an individual property. I have used a range of examples to discuss how we might determine an appropriate animal health program for a range of diseases threatening the health of our livestock.

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