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A pilot study of sheep disease surveillance in Western Australia.

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Summary

A pilot study of sheep disease surveillance was conducted in 2014-2015 on four farms in the eastern wheatbelt of Western Australia. The participants observed their sheep, sufficiently closely to notice disease, at least every second day. Most of the disease syndrome reports related to fewer than five sheep, demonstrating that farmers noticed problems in individual sheep, and not only in groups of sheep. Of a total of 66 disease syndrome observations reported over 12 months, the three most frequently occurring syndromes were found dead + sudden death (combined), skin lesions, and lameness.

Introduction

A pilot study, on mixed (wheat-sheep) farms in Western Australia was undertaken for twelve months, beginning in July 2014. The purposes of the study were

1. to determine how often the farmers inspect their sheep, sufficiently closely to detect disease, and
2. to document what disease syndromes, and how many disease events occur on sheep farms

Method

The four participants in the survey were chosen simply by asking them, when contact was made for some other sheep-related reason, if they would participate. All participating farms are wheat-sheep farms in the eastern wheatbelt of Western Australia, which is in the low rainfall agricultural zone. There are approximately 600 commercial farms in this region. Average annual rainfall varies between 290 and 325 mm approximately. The participants' farm areas range from 2,800 to 4,400 ha and cropping is their major enterprise. During the survey period the participants had between 500 and 1,700 Merino breeding ewes.

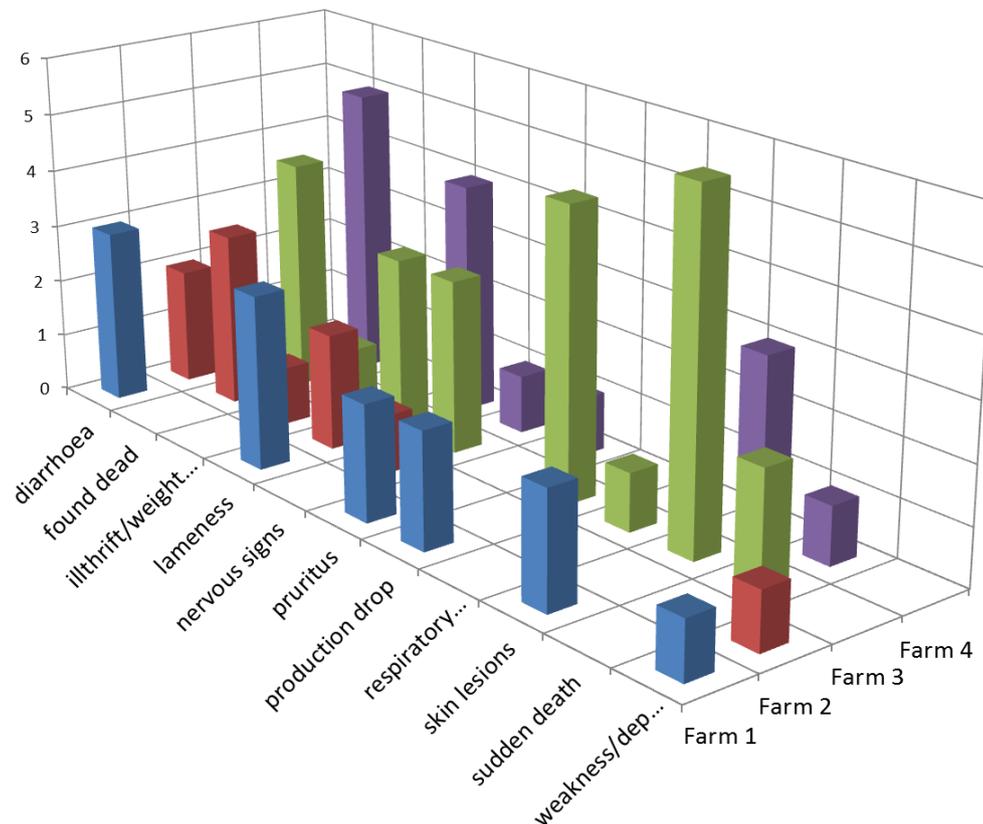
During the twelve-month survey period the farmers recorded every occasion they saw any group or groups of their sheep sufficiently closely that they would be able to notice a sick or dead animal. They also recorded every episode of illness or death that they observed. A recorded observation of a disease event could relate to only one, a few or numerous animals, provided that they all appeared to have the same condition at the same time. The farmers' records were collected by the author during regular, approximately monthly visits to the farms. The farmers recorded the clinical conditions they observed in their own words, sometimes naming a specific disease. The author then assigned each disease incident report to one of 25 clinical syndromes, using the categories listed by the Sub Committee on Animal Health Laboratory Standards (SCAHLs)¹.

Results

Over twelve months, the four farmers observed one or more mobs of their sheep on between 179 and 479 occasions, or at least every two days. Most inspections occurred during normal sheep husbandry activities, such as shearing, drenching, drafting and paddock changes. Inspections with the primary purpose of checking the health of sheep were less frequent and mainly occurred during lambing.

Sixty six disease syndrome observations were reported in total. Because of the monthly visit format of this survey it is probable that near 100% of the disease events that occurred on the four farms were reported. The three most frequently occurring syndromes were found dead + sudden death (combined), skin lesions, and lameness. See Figure 1.

Figure 1: The number and category of syndromic observations for each farm (The figure does not include syndromes which were not observed).



In most cases the causes of death of the sheep found dead/suddenly died were known or strongly suspected; they included neonatal lamb deaths, parturition-associated deaths of ewes and dog attack. The causes of lameness were apparent in some cases (visible injury or swelling) and in other cases, usually lambs, the cause was assumed to be infectious arthritis. The skin lesions were mostly due to flystrike, with two observations of dermatophilosis, in hoggets and in lambs. Also classified as skin lesions were one cancer of the tail and two cancers near the eye.

The instances of disease where more than five sheep were affected, and that were not reported (other than recording for the survey) were all common endemic diseases; these included pruritus in a known lice infected flock, diarrhoea in sheep with sudden access to cereal grain, neonatal lamb deaths and ewe deaths during lambing. In these instances the losses were not on-going and the farmers were confident that their diagnoses were correct.

During the survey period only one disease outbreak occurred that the farmer considered unusual and worthy of reporting outside the scheduled monthly report interval. The farmer reported this incident to a veterinarian within three days of first noticing two dead sheep. By the end of this outbreak approximately 40 sheep (~8%) had died. The probable cause of this outbreak was lactic acidosis.

Discussion

The disease events recorded during the twelve months of the survey were mainly attributed to common endemic diseases and mostly involved small numbers or single animals and a very low proportion of a mob. The fact that often very small numbers of sick or dead animals were noticed indicated that the “threshold prevalence” before clinical disease was recognised by these farmers was very low.

An emergency animal disease (EAD) might not be reported because a farmer assumes the condition observed is a familiar endemic disease; however various exotic diseases display clinical signs (syndromes) that are similar to signs shown by common endemic diseases. (Table 1)

Table 1 Syndromes, and exotic diseases that may show these signs².

| Syndrome | Exotic disease – Sheep and goats |
|--|--|
| acute febrile disease | contagious caprine pleuropneumonia, Nairobi sheep disease, peste des petits ruminants, sheep & goat pox, bluetongue, heartwater, rinderpest, surra, tularaemia, Louping Ill, Wesselsbron disease |
| diarrhoea | Nairobi sheep disease, heartwater, Rift valley fever, rinderpest |
| found dead | None noted |
| illthrift/weight loss | brucellosis (melitensis, abortus, suis) |
| jaundice | Rift Valley fever |
| lameness | maedi-visna, contagious agalactia, bluetongue, foot and mouth disease |
| nervous signs | maedi-visna, Aujeszky's disease, heartwater, rabies, West Nile fever (rare), louping ill, Borna disease, Wesselbron disease |
| pruritus | scrapie, Aujeszky's disease, sheep scab |
| production drop (including milk production - mastitis) | maedi-visna, contagious agalactia, Jaagsiekte, foot and mouth disease, surra |
| respiratory signs | maedi-visna, contagious agalactia, contagious caprine pleuropneumonia, Jaagsiekte, peste des petits ruminants, sheep and goat pox, Aujeszky's disease, bluetongue, heartwater |
| skin lesions | scrapie, sheep and goat pox, bluetongue, foot and mouth disease, screw worm, leishmanosis, sheep scab |
| sudden death | foot and mouth disease, heartwater |
| weakness/depression/anorexia/malaise | Nairobi sheep disease, peste des petits ruminants, bluetongue, foot and mouth disease, heartwater, Rift Valley fever, surra, tularemia, louping ill, Wesselbron disease |
| no suitable syndrome | bluetongue (facial oedema), surra, (ventral oedema) |

Passive surveillance is a major source of information on disease occurrence in livestock in Australia. Farmers voluntarily report disease incidents to a veterinarian. In WA a subsidised disease investigation program is provided to encourage farmers to report diseases by subsidising the cost of complete veterinary investigations³. The disease syndromes reported by farmers to the local DAFWA field veterinarian (the author), over the same period as the survey, corresponded reasonably closely to those occurring on the four surveyed farms (Table 2).

Table 2: Disease syndromes observed on the four surveyed farms, compared with the reports made voluntarily (passive disease surveillance), over the same period.

| Syndrome¹ | Syndromes reported on 4 surveyed farms | | Syndromes reported to the DAFWA office, Merredin* | |
|--|---|----------|--|----------|
| | Number | % | Number | % |
| abortion/stillbirth | | | | |
| acute febrile disease | | | 1 | 3 |
| circulatory/anaemia/oedema | | | | |
| congenital defect | | | | |
| diarrhoea | 6 | 9 | 2 | 5 |
| found dead | 13 | 20 | 10 | 27 |
| generalised oedema | | | | |
| genital lesions | | | | |
| illthrift/weight loss | 2 | 3 | 1 | 3 |
| infertility | | | | |
| jaundice | | | 2 | 5 |
| lameness | 12 | 18 | | |
| lymphadenopathy | | | | |
| nasal discharge | | | | |
| nervous signs | 5 | 8 | 2 | 5 |
| oral lesions or salivation | | | | |
| pruritus | 3 | 5 | | |
| production drop (including milk production - mastitis) | 7 | 11 | 1 | 3 |
| respiratory signs | | | 2 | 5 |
| skin lesions | 13 | 20 | 6 | 16 |
| sudden death | 3 | 5 | 3 | 8 |
| weakness/depression/anorexia/malaise | 2 | 3 | 5 | 14 |
| no suitable syndrome | | | 2 | 5 |
| no history available | | | | |
| no clinical signs | | | | |
| Total observations/reports | 66 | | 37 | |

* From 9 shires of the eastern wheatbelt.
Reported = phone or email and/or farm visit

Lice infestation was present or suspected on all four farms. It was an exception to the finding that most of the diseases that occurred affected only a small number or proportion of sheep, although the prevalence of lice infestation in the flocks on each farm was unknown. Internal parasites (worms), like lice, are common in Australian sheep flocks. Even in a low rainfall area, such as the eastern wheatbelt, worms can cause ill-thrift and weight loss, production drop, diarrhoea and sudden deaths, all syndromes that also occur in some EADs.

This survey, although of only four farms, was quite time consuming and required considerable travel. The process could be modified however to provide similar information from a greater number of farms, and at lower cost. After an initial personal visit by a veterinarian, monthly personal visits would be replaced by monthly reminder emails linked to a short online questionnaire re disease occurrence in the preceding month. Farmers would be asked to record syndrome occurrence (and disease if known), plus the number in mob, number sick, number dead. Each farm would participate for 12 months; they would be able to access disease information (via links) and their own submitted information as well as aggregated anonymous reports from all participants. For the sheep industry the information gained from this enhanced, ongoing and mainly electronic survey would add to general passive surveillance reports and also increase the specific and general intelligence gathering.

In wether flocks and in fleece shedding ("clean skin") flocks, the frequency of surveillance and the range of disease syndromes may differ from the findings on these surveyed farms. Such flocks (wethers and fleece shedding sheep) currently constitute only a small proportion of WA flocks although the proportion of fleece shedding flocks may be increasing.

Conclusion

Although the main enterprise on the surveyed farms was cropping, the farmers observed their sheep frequently throughout the year for the presence of disease. They noted a variety of mostly common endemic diseases and noticed disease occurrence in single sheep or small numbers of sheep. In most cases only small numbers of sheep became ill or died.

Many of the syndromes that were observed can also be shown by sheep suffering various emergency animal diseases.

There is considerable interest in increasing the level of livestock disease surveillance in Australia. This pilot study may provide some information to assist in further development of disease surveillance systems, to add to the current targeted and passive surveillance systems.

Acknowledgements

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