

# Survey for caprine arthritis encephalitis antibodies in sheep

*A total of 1,394 sheep from 17 farms were tested for evidence of caprine arthritis encephalitis (CAE) virus infection. All were found to be negative. The sheep were run on properties on which there were goat flocks with a moderate to high seroprevalence of CAE. With the exception of four properties, the sheep were grazed together with goats. On five properties the sheep had been fed goats' milk as lambs. One ewe had been fed milk from a goat known to be seropositive for CAE. These negative results provide strong evidence that there is no transmission of CAE virus from goats to sheep under New Zealand farming conditions.*

Caprine arthritis encephalitis virus (CAEV) and maedi-visna virus (MVV) are closely related small ruminant lentiviruses.<sup>1</sup> At the molecular level, the viruses share antigens on their major structural proteins causing them to cross-react serologically. However, they can be

distinguished on the basis of a slight difference in the molecular weight of their smallest structural proteins. Thus the two viruses are distinct but closely related.

Studies of the behaviour of caprine and ovine lentiviruses in sheep and goats show that both species appear to be permissive for each other's lentiviruses.<sup>1</sup> Sheep which were inoculated parenterally with a Western Australian caprine strain seroconverted, but there was no spread of infection to uninoculated sheep held in close contact with infected goats for periods of two to two and a half years.<sup>2</sup> It has, however, been shown that lambs can become infected with CAEV if fed milk from seropositive does.<sup>3</sup> CAE was first detected in goats in New Zealand in 1981.<sup>4</sup> A survey conducted by the Ministry of Agriculture and Fisheries (MAF) in 1983 showed the prevalence of CAE in goats to be low.<sup>5</sup> Infection was mainly confined to dairy breeds. In 1984 MAF introduced a voluntary scheme to accredit goat flocks as free of CAE. An estimated 41% of all goat flocks were tested for CAE at the peak of the scheme in 1986. The number of flocks tested in recent years has declined due to a general economic decline in the goat industry.

There has never been any evidence of maedi-visna in sheep in New Zealand.<sup>6</sup>

The presence of CAEV in goats in New Zealand, and the close antigenic relationship between this virus and MVV, has raised concerns amongst some of our trading partners that CAEV may have been transmitted to sheep in this country. This would result in serological reactions virtually indistinguishable from MVV and would influence our ability to certify New Zealand sheep as free of MVV. For this reason a survey was carried out to determine if there is any serological evidence of CAEV infection in sheep reared on the same property as goats known to be infected with CAE.

## The survey

The name and address of owners of goat flocks recorded as having had a moderate to high (subjective assessment) prevalence of CAE was obtained from the CAE testing database maintained for the accreditation scheme. A short questionnaire was sent to 57 goat owners to determine if they farmed sheep and goats on the same property and, if so, would they be willing for MAF to test their sheep for CAE.

MAF Veterinary Officers supervised the collection of blood samples from sheep on the properties of co-operative farmers. The veterinarians were advised to collect samples from 300 older sheep selected at random from the flock. This would give a 95% chance of detecting at least one positive animal in flocks of 300 or more, if the prevalence of seropositive sheep

was 1%. If a particular group of sheep had run with goats on the property then veterinarians were to collect their samples from these sheep rather than from the flock as a whole. If there were fewer than 300 sheep on the property, all sheep were sampled. On properties with fewer than 300 sheep, there was a 99% chance of detecting at least one positive animal if the prevalence of seropositive sheep was 0.1%.

At the time of collecting blood samples, information was obtained from the farmer on the CAE history of goats on the property and on the degree of contact between sheep and goats.

All samples were tested at the Central Animal Health Laboratory, Wallaceville, in the ELISA using antigen to CAEV.<sup>7</sup>

## Results

A total of 42 (74%) of the farmers who were approached returned a questionnaire. Of these 42 respondents, 26 (62%) farmed sheep and goats on the same property. Of these, 22 (85%) were willing for MAF to collect blood samples from their sheep to be tested for CAE. Five properties were subsequently excluded from the survey as they had either sold all their sheep or farmed only young stock that had not been in contact with CAE positive goats.

A total of 1,394 sheep from 17 properties were tested over the period October 1989 to March 1990.

None of the samples tested was positive for CAEV. One sample was a borderline reactor in the ELISA and was confirmed negative in the Western blot test.

## Discussion

The farms included in the survey ranged from small hobby farms with one sheep and a few goats to a sheep station with 5,500 sheep. However, most farms were relatively small, with only four of the farms having more than 100 sheep.

The chance of sheep coming into contact with CAE positive goats varied considerably between properties, because of variability in management practices and the prevalence of CAE in the goat flocks. On four properties there had been no contact between the sheep which were sampled and CAE-positive goats. On all the other properties the sheep were grazed either continuously or intermittently with a goat flock that contained CAE-positive animals.

A ten-year-old ewe on one property had run for her entire life with a goat flock that had a prevalence of CAE which fluctuated around 25%. It is rare for sheep and goats to be housed together in New Zealand. However, on one property pet

sheep shared a shed with goats during bad weather.

One sheep had been fed milk, as a lamb, from a goat which had tested positive for CAE. The ewe was five years old at the time of testing and was negative for CAE.

Ewes from four other properties had been fed goats' milk as lambs. The CAE status of the goats supplying the milk was not known at the time of the survey. However, they were part of a flock known to contain goats serologically positive for CAE.

The incidence of horizontal transmission of MVV is very low and appears to be particularly associated with the prolonged close contact of winter housing.<sup>1</sup> The incidence of horizontal transmission of CAE in goats is also very low and only limited spread occurs between infected and non-infected adult goats under grazing conditions. The major route of transmission of CAE is lactogenic, via the colostrum of infected does.<sup>5</sup>

Given the epidemiology of CAE, transmission of the virus from goats to sheep under natural farming conditions in New Zealand is more likely to occur on the small hobby farms where a few sheep are reared in conjunction with goats. On these farms there is a greater chance of close contact between sheep and goats, and of lambs being fed goats' milk.

Sheep that had contact with CAE-positive goats on several such farms were included in this survey and none showed evidence of infection with CAE. Although this was not a controlled study, it involved sheep at the greatest risk of becoming infected with CAE, and thus it provides strong evidence that CAEV is not transmitted from goats to sheep under New Zealand farming conditions.

## References

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