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The New Zealand scheme to accredit goat flocks free from caprine arthritis-encephalitis

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ABSTRACT

A voluntary scheme directed towards limiting the spread of caprine arthritis-encephalitis (CAE) during a period of rapid growth of the goat industry is described. The scheme was instituted at the request of the goat industry and formulated after consultation with the New Zealand Goat Council, the Animal Health Division of the Ministry of Agriculture and Fisheries and representatives of the New Zealand Veterinary Association.

Prior to the development of the programme, surveys of the New Zealand goat population indicated that the disease was present in few flocks, largely those containing imported goats of superior genetic merit. The scheme was instituted in 1984 to limit the dissemination of the infected goats throughout the national flock.

Testing was initially performed using the agar gel immunodiffusion test (AGID) but some doubts over its sensitivity lead to the development of an enzyme linked immunosorbent assay (ELISA). This test has proved to be both highly sensitive and highly specific and has continued to be used until the present time.

As a national scheme it involves some degree of cooperation between practising veterinarians, the various goat breeders' groups and goat farmers as well as the Ministry of Agriculture and Fisheries who are responsible for administering the scheme.

Results to date indicate that a large number of flocks have gained accreditation but a number of people who may be regarded as commercial growers are seeking a second tier scheme to limit the disease within their flocks without achieving accreditation.

Keywords Goats; CAE; retrovirus; national control scheme.

INTRODUCTION

Caprine arthritis-encephalitis (CAE) was first reported in New Zealand in 1982 (Oliver, 1982; Oliver *et al.*, 1983). A survey undertaken at the time revealed that there was in all probability a relatively low incidence of the infection in the New Zealand national goat flock but that the disease was both more common in dairy goat flocks and in those flocks which contained goats imported from Tasmania (MacDiarmid, 1983). The apparent reason for the higher incidence of the disease in dairy goat flocks was believed to be a result of the practice of feeding pooled colostrum to all the kids. As colostrum is the most common method of spread this virtually ensured that all the kids became infected.

DISEASE EXPRESSION

Symptoms

The disease is caused by a retrovirus, one of the so-called slow viruses in which the time between infection and the development of clinical signs may in fact exceed the lifespan of the animal.

There are several different disease forms in infected goats. One form affecting young kids tends

to occur on its own but the other forms occurring in later life may either occur on their own or with a variety of syndromes.

Encephalitis in kids 1 to 6 months of age tends to be a rarer form of the disease and as far as can be ascertained has not occurred in New Zealand. There is a generally progressive ascending weakness and paralysis.

Arthritis, primarily of the carpal joints but also hocks and stifle joints, is one of the more common manifestations. Histopathological changes may be seen as early as a few weeks after infection but it is rare to be able to observe gross clinical signs prior to 2 years of age.

Some goats develop a progressive respiratory disease which is characterized by a chronic cough and weight loss and is non-responsive to therapy for pneumonia. This condition arises from a lymphoid hyperplasia within the lung tissue. A similar lymphoid hyperplasia may occur in mammary tissue resulting in an enlarged fleshy udder and a decrease in milk production by affected does.

Effect on Production

The significance of the disease on production has never been assessed and indeed any assessment would

be very difficult. Some countries have an 80% incidence in the dairy goat population, yet the industry continues. The fact that the clinical expression of the disease varies but is generally sufficient to only warrant 16 to 19% premature loss of animals confounds the calculation. However, the impact in a herd which has a high level of infection can be quite significant in terms of sale of stock to others. Since the infection appeared to be present in New Zealand in flocks containing superior genetic materials that were more likely to be selling animals, an accreditation scheme was drafted to limit the spread of disease from these sources during a period of rapid growth in the goat fibre industry.

The effect of the disease on production may be expressed in several ways, such as a direct loss of kids, a direct loss of older animals from pneumonia or the effect of restricted movement due to arthritis. The direct loss of kids is not expected to be a significant loss. In the United States where a high percentage of the dairy goat population is infected, less than 1 goat in 5 which develops clinical signs dies as a direct cause of the disease. There are no percentage incidence figures available to indicate the direct loss of adult animals from the pneumonic form of the disease. This would require autopsy to distinguish it from other forms of pneumonia. It would appear however that within several affected dairy goat flocks in New Zealand that this form of expression of the disease is relatively common resulting in considerable expenditure in the form of attempted therapy as well as the ultimate loss of the animal. Progression of the arthritic form of the disease may stop with affected animals continuing to forage at a restricted rate. The losses due to this form of the disease would be the result of decreased grazing ability resulting in decreased body weight, fibre production and reproductive performance. The fact that the incidence of clinical expression increases with age and generally only involves 14 to 18% of infected animals, plus evidence that animals continue grazing until the disease is severe, suggests that losses due to this form of the disease might be slight. However, in view of the fact that histopathological changes can be detected almost universally in infected animals, there may be some degree of depression of productivity in all affected animals.

Losses in animals involved with a hard udder must be reflected in decreased growth rates of the kids if they are nurse-reared. This is likely to be more serious in the fibre producing goats as it is during the early neonatal period as well as the late gestational period that the hair follicles are developing. Inadequate nutrition at this time could influence the number of developing follicles and hence the animal's lifetime fibre production.

Control

Despite concerns expressed by the goat industry in

the early 1980s, which at that time was quite small, CAE was not deemed to be of sufficient importance to warrant a government funded eradication scheme. However, in response to requests from the New Zealand goat farming industry, the Animal Health Division of the Ministry of Agriculture and Fisheries undertook to supervise a voluntary scheme aimed at accrediting flocks as free from CAE. Details of the scheme were released in 1984 (Animal Health Division, 1984) and testing commenced immediately. As a result of experience gained in its administration, the scheme was revised by representatives of the goat industry groups, and Ministry of Agriculture and Fisheries in consultation with the New Zealand Veterinary Association in 1986 (Ministry of Agriculture and Fisheries, 1986).

Subsequent to the re-introduction of regulations permitting the importation of animals from Australia, several Australian states have introduced some form of CAE accreditation. Great Britain also has a CAE accreditation programme.

ACCREDITATION SCHEME

For an insidious viral disease such as CAE, flock accreditation is the only means of providing a firm assurance that goats from that flock are not carriers of the CAE virus. Whole flock testing is necessary because of the relative unreliability of single serological tests carried out on goats of unknown history. Single negative results must be regarded with caution as some goats may take a long time to develop antibodies against the CAE virus and because the levels of these antibodies can fluctuate. Sometimes an infected animal may be positive at one test and negative at a later test (Balco *et al.*, 1985).

Initially testing of sera was carried out at Wallaceville Central Animal Health Laboratory using an agar gel immunodiffusion test (AGID). Results, however, tended to indicate that while the test was specific it did not appear to be as sensitive as was required for a scheme of this nature. As the number of samples submitted for testing increased, it was also found to be very time consuming. An enzyme linked immunosorbent assay (ELISA) was developed and evaluated. It was found to be highly specific and of a much greater degree of sensitivity (Schroeder *et al.*, 1985). Testing by this method has continued since.

The scheme as set out is a voluntary scheme with provision for a goat owner to withdraw from the scheme at any time. There is no provision to force a goat owner to immediately slaughter reactors to the test, although it is considered unethical for them to dispose of them by other means. Accreditation is not possible while any reactors remain on the property regardless of the degree of separation between the groups.

The Goat Council was the original body charged with promoting the scheme and undertaking farmer

education about the disease. With the disappearance of this body the goat industry groups have now undertaken this role and the executive of all goat producer groups support the scheme in its present form. However, there appears to be a growing opinion, particularly within the goat fibre organisations, that the programme is too expensive and restrictive for commercial producers. Now many goat owners are in this category there is pressure mounting for a second tier CAE-monitoring programme. This has not yet been developed.

The Animal Health Division of the Ministry of Agriculture and Fisheries is involved with the scheme on 3 levels. Firstly to test samples submitted to it by practising veterinarians. Secondly to perform the actual accreditation test and thirdly to maintain the register of CAE-accredited flocks. The reason for the Ministry of Agriculture and Fisheries to be involved with the accreditation testing is to lend credibility to the scheme through it being carried out by an independent body.

Accreditation Procedure

Initial entry into the scheme is by an owner contacting the Ministry of Agriculture and Fisheries and obtaining a set of the rules. This is so that the owner realises his or her commitment to the scheme before entry. The owner then applies to enter the scheme and contacts their own veterinarian to perform the initial test of all goats over 12 months of age, except wethers on the property. Wethers are exempt from the scheme because with no progeny and an extensive management system it was considered they would play little or no part in the maintenance of infection within a herd.

If no CAE is present in the flock, the owner is then able to have the Ministry of Agriculture and Fisheries carry out an accreditation test 6 to 12 months after the pre-accreditation test.

Should the veterinarian discover that CAE infection is present in the flock, the owner may withdraw from the scheme and proceed no further. If they wish to proceed, a control scheme, tailored for the individual property, may be drawn up and executed by the veterinarian, with consultation from the Ministry of Agriculture and Fisheries if so desired. It is recommended that reactors should be slaughtered or sold for slaughter. When the flock has had 1 clear test it is able to be submitted for an accreditation test after 6 to 12 months.

Once accreditation status is reached, annual re-testing is necessary to maintain the status. This testing is carried out by the owner's veterinarian who then informs the Ministry of Agriculture and Fisheries when the test was carried out, and the result to ensure that the flock remains in the register. Owners of accredited flocks are entitled to use the term CAE-free as part of a description of any goats offered for sale.

Provision is made within the testing programme for goats of unknown status entering accredited properties for mating and goats from an accredited property going off for either mating, showing, or sales etc. There is also the facility for an owner to withdraw from the scheme at any time, but having done so, the flock is removed from the CAE-accredited register. Two tests are required to re-enter the register.

Effectiveness of Scheme

Since the scheme was opened in 1984 over 3000 flocks have undergone pre-accreditation testing up until early 1987. Of these 897 gained accreditation with a total of over 285,000 samples being tested. This must be taken as a significant commitment by the goat industry to the control of CAE in the national goat flock. In 1985, 355 flocks of the 2302 tested (15.4%) were positive. In 1986, 407 flocks of the 3068 tested (13.3%) were positive.

A breakdown of the 1985 data to flock type showed that 23% of all dairy flocks and 3.6% of all dairy goats were infected. However only 11.9% of all fibre flocks and 0.6% of all fibre producing goats were infected. While there appears to be a low prevalence of the disease in fibre producing goats nearly 1 flock in 8 contains 1 or more infected goats.

CONCLUSION

Shortly after it was first recognised in New Zealand in 1981 CAE was shown to be a disease of relatively low prevalence concentrated in flocks containing genetically superior imported animals. As the industry expanded there was the possibility that the CAE virus could be disseminated widely by the trade in stud animals. The high values of stud goats has provided the incentive for the expenditure required to achieve accredited CAE-free status. When the growth rate of the industry slows there will inevitably be a decline in the number of flock owners prepared to pay for the testing required to maintain accredited status. However, the elite flocks, the stud flocks which supply animals of superior genetic potential to the bulk of the industry, will probably maintain their accredited status. Many commercial breeders will no doubt seek a lesser alternative monitoring scheme. The strong commitment to CAE testing and flock accreditation during the initial rapid growth phase of the New Zealand goat farming industry will ensure that CAE remains a disease of minor importance in the future.

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