

Johne's disease surveillance in the Waikato, Bay of Plenty and Rotorua districts

Johne's disease (*Mycobacterium paratuberculosis infection*) is a *Scheduled Disease under the Animals Act (1967)*. The official register of herds and flocks in which *Johne's disease* has been diagnosed is used to monitor the disease (prevalence, incidence and distribution) on behalf of the livestock industries and to prepare the annual statement on *Johne's disease* for the Office International des Epizooties (OIE). It is also used by MAF veterinarians when certifying live animals and semen for export.

The maintenance and administration of the *Johne's disease* register presents a number of challenges in the Waikato,

Bay of Plenty and Rotorua districts. Problems are associated with the annual movement of dairy herds from property to property, and the demanding certification frequently required when ruminants are exported. Each year many share-milkers move their dairy herds to a new property; an estimated 15% of all herds shift, sometimes very long distances.

Importing countries may specify up to five years' freedom from cases of *Johne's disease* in any herd or flock of origin, and in some instances *properties* of origin likewise have to be certified. These difficulties have been compounded by the considerable expansion of exports of breeding cattle and sheep in recent years.

Five years ago *Johne's disease* surveillance in this area was reviewed, the objective being to provide better quality disease surveillance data. The methods adopted and the results obtained are described.

The surveillance system

As in most disease surveillance activities, veterinary practitioners, diagnostic laboratory staff, and MAF disease control personnel have different but key roles in *Johne's disease* surveillance. Practitioners, by virtue of their clinical expertise and presence on farms, provide the initial list of 'suspect' cases. Staff at diagnostic laboratories refine this list and define confirmed (clumps of acid fast organisms in faeces or typical

histopathology), suspicious (clinical symptoms and positive serology) and negative cases.

Laboratory reports on all confirmed and suspicious *Johne's disease* cases are sent to MAF disease control veterinarians. Suspicious cases are investigated further. This may include additional laboratory testing. Once a case is confirmed, MAF Livestock Officers establish the owner of both the herd or flock and the property on which it is grazing. These data are entered into a computerised relational database in which each case is linked both to a herd and property identifier. All cases are linked to a single herd only, but each case can be linked to a different property. At regular intervals lists of herds and properties are distributed to MAF staff who then check that all movements of herds, and changes in ownership of herds or properties, have been recorded. The database is held on a network and all MAF veterinarians in the region can access it directly.

Results

Administration: The new computerised system has allowed more efficient administration. In the export area it has allowed processing of sometimes hundreds of herds from many districts within a short period. Accurate statistical summaries can also be produced with ease.

Disease statistics: Over five years from 1985, when the new database was

Table 1: Number of confirmed cases of *Johne's disease*

Herd/flock type	'85	'86	'87	'88	'89	Total
Dairy	90	127	101	111	71	500
Beef	3	16	4	2	8	33
Other cattle	4	1	3	1	1	10
Sheep	1	11	8	7	10	37
Goat	0	6	3	1	0	10
Deer	0	0	0	0	1	1

Table 2: Number of herds and cases within herds

Herd/flock type	Herds	Cases				
		1	2	3	4	5
Dairy	399	331	48	10	7	3
Beef	30	27	3	0	0	0
Other cattle	10	10	0	0	0	0
Sheep	31	28	2	0	0	0
Goats	7	6	0	0	1	0
Deer	1	1	0	0	0	0

established, 591 confirmed Johne's disease cases were recorded (Table 1). Ninety-two percent (92%) were cattle (85% dairy cattle), the balance being sheep (6%), goats (2%, primarily dairy breeds) and one deer. In sheep and goat flocks a 'case' might be an individual animal or, more commonly, a selection of samples from a group of poor condition animals. With the exception of dairy cattle, only occasionally was more than one case per herd or flock recorded (Table 2). In dairy herds clusters of two-to-five diseased animals were also commonly reported, with 77% of all animals either single cases or in a cluster. However, of the 178 dairy herds first recorded during 1985 and 1986, additional cases, again either single or in clusters, were recorded in 21 (12%). The period between cases was from two weeks to four-and-a-half-years, with no pronounced peak.

Table 3: Percentage of dairy herds recorded with Johne's disease from 1985 to 1989

Raglan, Waikato	4.7%
Waipa	4.9%
Otorohanga, Waitomo	6.0%
Thames, Hauraki Plains	5.2%
Piako	6.0%
Matamata	5.9%
Bay of Plenty	6.5%
Rotorua, Taupo	13.6%

The percentage of dairy herds in which Johne's disease cases were reported for each district is listed in Table 3. Outside the Rotorua/Taupo district the mean is 5.6% (1.1% per year). Within the Rotorua/Taupo district the rate is 13.5% (2.7% per year), 2.3 times greater. This is a highly significant difference (Chi sq=47.956, P<0.005). 'New' herds and flocks recorded are listed in Table 4.

Discussion

Prior to the computerised system, veterinarians at each district office maintained their own list of Johne's disease herds and flocks on a card system. Checking on the status of herds was a time consuming process, frequently involving telephone enquiries to many different offices. Additionally, the card system was not sufficiently versatile to cope with the frequent herd movements and herd and property sales.

The computerised system will shortly be expanded throughout the country. A database will be established at each regional Animal Health Laboratory. Using the new generation of relation database software it will be possible to link the databases so that export service veterinarians anywhere in the country can interrogate all databases as if they were one. It is also planned to progressively bring the other Scheduled Diseases into this system.

There are many difficulties associated with the interpretation of such Scheduled Disease data, as outlined by Hellstrom³ and Thrusfield.⁴ With common endemic diseases such as Johne's

disease, there will be a variable degree of under-reporting. Despite this, it is generally accepted that these data may indicate changes in the epidemiology of the disease and can be used to formulate a more structured investigation.

The data reported above are similar to that reported in other areas in New Zealand. Johne's disease infection occurs commonly in dairy cattle, but in any year few of the infected animals lose condition and develop diarrhoea.¹ The difference in herds reported between the Rotorua/Taupo district and other districts is of interest. If there are differences in the disease pattern, further work might elucidate risk factors related to the spread and/or development of Johne's disease. The data from sheep flocks suggests that after introduction into this region in the late 1970s, Johne's disease is slowly but progressively spreading, similar to that observed in the '50s and '60s in the South Island.³ The disease in goats is like that reported in Australia.² The single case in deer is intriguing. Cattle and deer are commonly grazed together and breeding deer have not been intensively culled over the last decade while herds have been built up. Thus there has been ample opportunity for deer to develop the disease. The paucity of reported cases suggests that there are some fundamental differences in either the pathogenesis or the epidemiology of Johne's disease in deer.

References

- 1 de Lisle G W, Milestone B A, 1989: The economic impact of Johne's disease in New Zealand. In *Johne's Disease, Current Trends in Research, Diagnosis and Management*. Editors Milner A R, Wood P R, CSIRO, Melbourne.
- 2 Eamens G J, 1989: Johne's Disease in goats. In *Johne's Disease, Current Trends in Research, Diagnosis and Management*. Editors Milner A R, Wood P R, CSIRO, Melbourne.
- 3 Hellstrom J S, 1980: Utilisation of disease scheduling as a surveillance technique. *Proceedings of the Second International Symposium on Veterinary Epidemiology and Economics*. Australian Government Publishing Service.
- 4 Thrusfield M, 1986: *Veterinary Epidemiology*. Butterworths & Co., London: 114-120.

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Table 4: Number of new herds and flocks recorded as infected with Johne's disease

Herd/flock type	'85	'86	'87	'88	'89
Dairy	76	102	82	83	55
Beef	2	16	3	2	7
Other cattle	4	1	3	1	1
Sheep	1	8	7	6	9
Goat	0	3	3	1	0
Deer	0	0	0	0	1