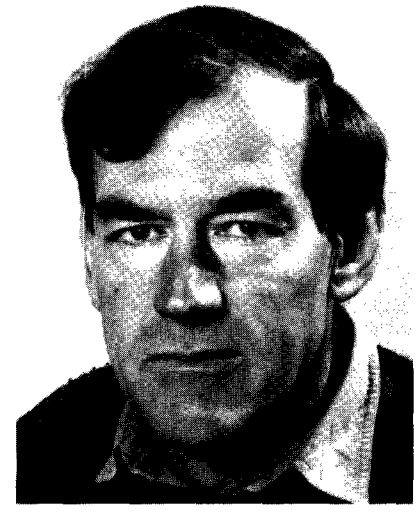
Pestivirus antibody in New Zealand pigs and lamoids

Pestivirus infections are widespread in ruminants in New Zealand.[1] Both bovine virus diarrhoea (BVD) and border disease (hairy shaker disease) viruses are endemic in the cattle and sheep populations respectively. Ruminant pestiviruses may also cause infections in other farm animals including deer[1], goats[1], alpacas[2] and pigs.[3]

Infection of pigs with ruminant pestiviruses is well recognised[3] and may, on occasion, cause clinical syndromes resembling chronic swine fever. Such infections also cause the production of cross-reacting pestivirus antibody in pig sera which complicates the diagnosis of genuine swine fever, especially when avirulent strains are involved.[4] Because of these cross reactions, it was considered important to obtain an accurate prevalence rate for pestivirus antibody in pigs from different regions within New Zealand.

A newly developed competitive ELISA[5] was used to test pig sera for pestivirus antibody. This assay has a configuration such that sera from all species can be tested for pestivirus antibody.

The opportunity was also taken to test sera from imported lamoids for pestivirus antibody. It has been shown that lamoids may be infected with BVD virus[2] and this survey was intended to provide information on the prevalence of pestivirus infection in a newly introduced, economically important, farm species.



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Pig sera were collected from different regions within New Zealand with a sample size being based on a predicted prevalence of 0.1±0.02 at the 95% confidence level. Adequate samples were obtained for all South Island regions, but some North Island regions were under-represented.

For the lamoids, 1,000 sera were selected randomly for testing.

Survey results for pigs

The results for the pig sera are shown in Table 1. For the purposes of the survey, a 40-49% inhibition reading in the ELISA was taken as a suspicious reaction, while a reading of 50% or greater was taken as positive.

The results show significant regional differences. More positive piggeries were located in the South Island, especially in Canterbury, Aorangi, North Otago and Southland. In the North Island only Horowhenua showed comparable figures and most of these positives were from one piggery.

All the positive and suspicious sera, plus a few close to the suspicious cut-off value, were also subjected to a serum

neutralisation test (SNT) using the *Bovax* strain of BVD virus. A starting serum dilution of 1:4 was selected to minimise toxicity problems. About 50% of the sera tested also reacted in the neutralisation test. The titres obtained showed little relationship with the inhibition readings obtained with the ELISA. This finding had been previously noted when testing bovine serum[5] and is believed to be due to the fact that the tests detect antibodies against different viral proteins. This is illustrated by the finding that ten out of 56 sera with inhibition readings between 37-39% had SNT titres. Other factors which may explain the apparent lower sensitivity of the SNT are the serum dilution factor (more positives would be detected if 1:2 and 1:1 dilutions had been tested) and the strain of virus used in the test (infections with homologous virus will give higher titres than infections with heterologous virus strains).

Table 1: Prevalence of pestivirus antibody in pigs from different regions of NewZealand

Region	*No. sera tested*	*No. sera suspicious*	*% suspicious*	*No. sera positive*	*% positive*
Northland	21	0	0	0	0
Auckland	129	3	2.3	0	0
Waikato	424	5	1.2	10	2.4
Bay of Plenty	64	0	0	1	1.6
Thames	140	3	2.1	0	0
Taranaki	20	2	10	0	0
Tongariro	1	0	0	0	0
Hawke Bay	23	0	0	0	0
Manawatu	4	0	0	0	0
Horowhenua	56	5	8.9	13	23.2
Wairarapa	206	36	17.5	14	6.8
Wellington	71	3	4.2	2	2.8
Marlborough	292	29	9.9	35	12
Nelson	46	1	2.2	2	4.3
Canterbury	894	129	14.4	273	30.5
Aorangi	504	22	4.4	118	23.4
West Coast	13	1	7.7	0	0
North Otago	153	11	16.7	55	35.9
Clutha	51	1	2	10	20
Southland	106	5	4.7	20	18.9
North Island	1,159	57	4.9	40	3.4
South Island	2,059	199	9.7	513	24.9
New Zealand	3,218	256	8	553	17.2

Survey results for lamoids

Of 998 alpaca sera tested, 65 (6.5%) were considered suspicious and five (0.5%) positive. None of the reacting sera showed an inhibition reading above 58%. Thirteen of these reactor sera were tested by SNT but none had detectable antibody at a 1:4 dilution. These sera were collected while the alpacas were in quarantine, so any exposure to ruminant pestiviruses would have occurred in their home country (Chile). Thus, the lack of neutralising antibody may reflect infection with heterologous strains of virus.

Conclusions

These findings indicate ruminant pestivirus infections in pigs are not uncommon in New Zealand. The cause of the regional differences needs further investigation. It may reflect different levels of contact with cattle or feed materials containing bovine protein, the age of the pigs sampled or the use of contaminated vaccines.

Further work is in progress to develop a swine fever specific ELISA and, when available, reactor sera from this survey will be tested to confirm that the antibody detected is due to ruminant pestivirus infections.

References

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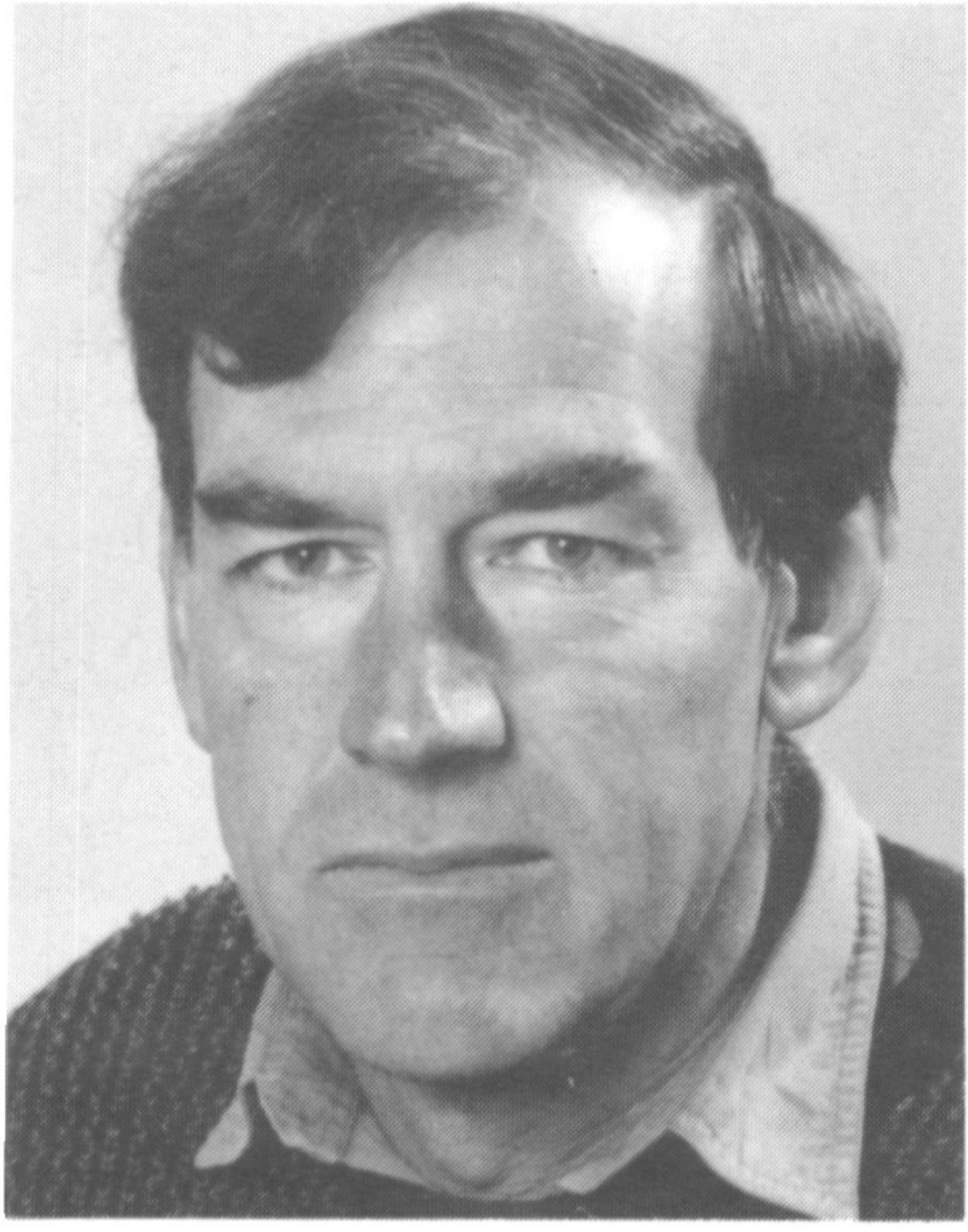

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