

From the State Veterinary Medical Institute, Helsinki, Finland.

OCCURRENCE OF ANTIBODIES  
TO GROUP SPECIFIC CHLAMYDIA ANTIGEN  
IN CATTLE AND REINDEER SERA  
IN FINNISH LAPLAND

By

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NEUVONEN, E.: *Occurrence of antibodies to group specific Chlamydia antigen in cattle and reindeer sera in Finnish Lapland.* Acta vet. scand. 1976, 17, 363—369. — The occurrence of group specific complement fixing antibodies was studied in random sera of cattle and reindeer in Finnish Lapland. Sixty-eight (40.5 %) of the 168 cattle sera were positive. Sixty-three (21.6 %) of the 291 reindeer sera were positive. The difference is statistically nearly significant in the t-test. The antibody titer  $\geq 1:16$  was regarded as positive. The antibody frequency of cattle sera was statistically significantly higher and the antibody frequency of reindeer sera was nearly significantly higher than in earlier studies on cattle sera in South and Central Finland. The reasons are discussed.

bovine chlamydia infections; reindeer chlamydia infections; group specific chlamydial antibodies.

Chlamydia organisms are widespread in nature and cause clinical manifestations in several animals (*Meyer* 1967), although the chlamydial infections are often subclinical. In mammals the Chlamydias cause pneumonia, enteritis, abortions, arthritis and encephalomyelitis. In Scandinavia there are only a few reported outbreaks; in sheep in Finland (*Estola & Salmela* 1970, *Estola* 1970), in cattle (*Dinter & Bakos* 1961) and in sheep (*Möllerberg & Jacobsson* 1972) in Sweden. In Denmark (*Friis* 1967) aborting cows have been observed to have higher chlamydial antibody

frequencies than normal cattle. This may indicate the occurrence of bovine enzootic abortion (BEA) in the country.

In serological investigations of domestic animals and man the percentage of positive sera usually varies between 10 and 30 (Jansson 1960, Schjerner-Thiesen 1964, Kaaden & Liebermann 1966, Friis, Neuvonen & Estola 1974). The year 1969 was exceptional in Finland when the percentage for sheep was 45.9. During the same year pneumonia outbreaks caused by Chlamydia were observed in the country (Estola & Salmela).

In Canada (Wyman *et al.* 1969) the antibody frequency varies very much in the human population. In certain parts of north Canada about 80 % of the people have antibodies while in southern parts only about 5 % have them. The reasons for the great variation are not known. Small rodents and arthropods may be vectors of the organism (Wyman *et al.*, Eddie *et al.* 1962, 1969).

In the present study the frequency of group specific Chlamydia antibodies from cattle and reindeer from Lapland is assayed and compared with the earlier results from other parts of Finland.

## MATERIALS AND METHODS

### *Sera*

Cattle sera were randomly collected from normal slaughter material in the 10 most important cattle farming districts of forest Lapland in 1975 (Fig. 1). The age of the animals was not determined. There was a variation of age from young calves to adult animals in the material. Three of the tested 171 sera were rejected because of the anticomplementary effect.

Two-hundred-and-ninety-one reindeer sera were randomly collected in six areas of fell Lapland in 1964—1965 and 1970—1971 (Fig. 1) during slaughter. The age of the animals was not known.

### *Antibody assay*

The assay of antibody was performed using the usual micro-technique of the group specific complement fixation (CF) test (Neuvonen & Estola 1974). A titer of 1:16 or higher was considered positive. The antigen was a commercial ornithos antigen (Behringwerke) made from strain P-4.

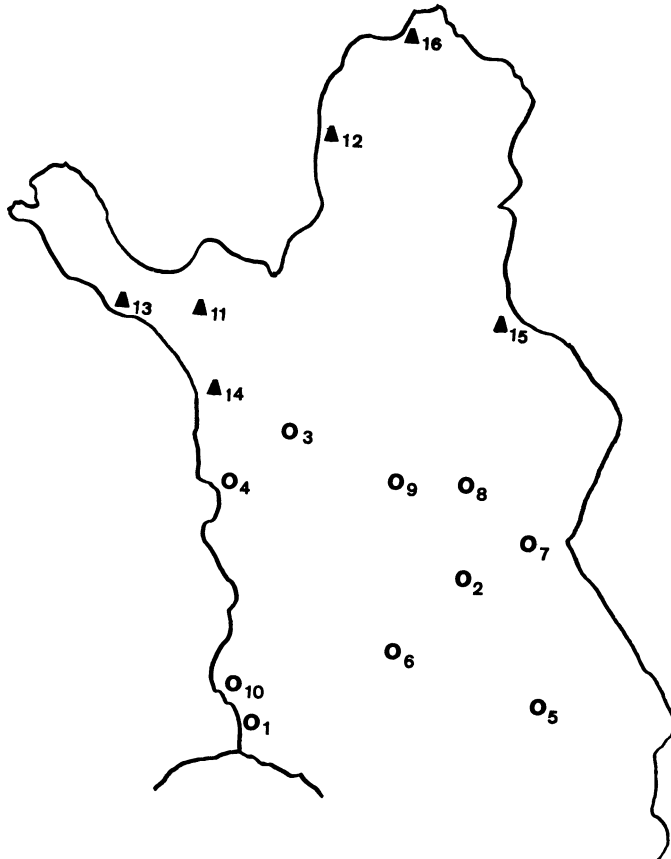


Figure 1. Geographical origin of the tested cattle and reindeer.  
○ = cattle, ▲ = reindeer.

## RESULTS

*Cattle.* Antibodies were found in 68 (40.5 %) of the 168 serum samples (Table 1). The district with 58.8 % had the highest and the district with 20.0 % had the lowest incidence.

*Reindeer.* Antibodies were detected in 63 (21.6 %) of the 291 sera (Table 2). The area with the highest incidence had the percentage of 30.6, while the area with the lowest incidence had the value of 12.5 %.

Definite geographic differences in distribution of the positive results could not be obtained for either of the animal species.

Table 1. Occurrence of antibodies to group specific Chlamydia antigen in random sera of cattle in Finnish Lapland.

Ref.no. to map	District	Total number of sera	Number of positive antibody titer			Number of negative anti- body titer $\leq 1:8$	Positive sera (%)
			1:64	1:32	1:16		
1	Alatornio	51		2	28	21	58.8
2	Kemijärvi	4			2	2	50.0
3	Kittilä	16		1	4	11	31.2
4	Kolari	5			1	4	20.0
5	Posio	5			1	4	20.0
6	Rovaniemi	46		1	14	31	32.6
7	Salla	12	1	1	2	8	33.3
8	Savukoski	4			1	3	25.0
9	Sodankylä	4			1	3	25.0
10	Ylitornio	21		1	7	13	38.1
Total		168	1	6	61	100	40.5

Table 2. Occurrence of antibodies to group specific Chlamydia antigen in random sera of reindeer in Finnish Lapland.

Ref.no. to map	Area	Total number of sera	Number of positive antibody titer			Number of negative anti- body titer $\leq 1:8$	Positive sera (%)
			1:64	1:32	1:16		
11	Enontekiö	18		1	3	14	22.2
12	Kaamasmukka	96		1	17	78	18.8
13	Karesuvanto	47		2	11	34	27.6
14	Muonio	25			6	19	24.0
15	Rajajooseppi	56			7	49	12.5
16	Utsjoki	49		2	13	34	30.6
Total		291		6	57	228	21.6

## DISCUSSION

The earlier results have shown group specific Chlamydia antibodies in domestic mammals to be almost as common in Finland as in other Scandinavian countries. The clinical manifestations, however, are unusual. Chlamydia organisms have been isolated in Finland twice from sheep and once from mink, but never from cattle. The small amount of isolations compared with the high

frequency of serologically positive cases suggests the Finnish *Chlamydia* strains to be of relatively low virulence.

The numbers of both cattle and reindeer sera were too small for a reliable investigation but these results can be regarded as suggestive.

Of the Lappish cattle sera 40.5 % were positive which is approximately a three times higher frequency than in cattle in central and south Finland in 1968—1972 (12.8 %) (*Neuvonen & Estola* 1974). The difference is statistically significant (t-test). The number of samples collected in Sodankylä, Kolari, Savukoski, Kemijärvi and Posio was too small for any definite conclusions although the results are in agreement with those from other districts in Lapland.

The percentage (21.6 %) of positive reindeer serum samples was nearly two times the percentage of positive cattle sera in other parts of the country in 1968—1972 although it did not reach the level of Lappish cattle. The difference is statistically nearly significant in the t-test. In different parts of fell Lapland the antibody frequencies of the reindeer appear to be similar.

The antibody frequencies of cattle and reindeer sera are statistically almost significantly different in the t-test.

The estimation of the results is hampered by the long storage time of the reindeer sera which may have decreased the antibody titer and by the possible annual variations in the antibody frequencies. The tested cattle sera are from forest Lapland and the reindeer sera from fell Lapland. Ecological differences between the areas may also influence the occurrence of *Chlamydia* organisms. Reasons for the difference between Lapland and the other parts of the country are not known. In Canada high titers are supposed to be caused by an organism spread by arctic birds. The high titers in Lapland may be caused by rich arthropod and small rodent populations which have experimentally been proved to be able to act as vectors and reservoirs of mammalian *Chlamydiae*. Their close contact with livestock in nature increases the infection risk. This supposition is supported by the fact that in Finnish livestock antibodies against the Inkoo virus spread by mosquitoes increase northwards the country (*Brummer-Korvenkontio* 1973).

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#### SAMMANFATTNING

*Förekomsten av antikroppar mot gruppsspecifikt Chlamydia-antigen i nöt- och rensera i finska Lappland.*

Förekomsten av gruppsspecifika komplementbindande antikroppar undersöktes från slumpmässigt tagna nöt- och rensera i finska Lappland. 68 (40,5 %) av 168 nötsera och 63 (21,6 %) av 291 rensera var positiva. Skillnaden var statistiskt nästan signifikant i t-test. Antikroppstitern  $\geq 1:16$  ansågs som positiv. Förekomsten av antikroppar i nötsera var statistiskt signifikant högre och i rensera nästan signifikant högre än i tidigare undersökta nötsera från södra och mellersta Finland. Orsaken till dessa skillnader diskuteras.

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