

An unusual sequel to imported *Salmonella zanzibar*

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SUMMARY

In August, 1980 a rare serotype *S. zanzibar* was isolated in the North of Scotland from a man home on leave from Malaysia, whence he returned in November having been bacteriologically negative 2 months previously. In December however, *S. zanzibar* was isolated from a bulk milk sample taken at a nearby dairy farm. No illness occurred among milking cows which had been brought inside from pasture in mid-October. Since 1972 a variety of different salmonella serotypes had been identified in cattle, milk and other samples at this farm, with seagulls being implicated as the vector transmitting infection from the sewage of a local town on to farmland and an adjacent loch. Although water from this source has not been used in recent years for drinking by cattle, it is utilized for washing floors within the dairy premises. Since 1979, following an outbreak affecting consumers, all milk produced at the farm has been pasteurized.

Imported infections into the British Isles have become commonplace in recent years as a result of increased travel between different areas of the world. Nevertheless, there is relatively little evidence of secondary spread of infection following introduction into developed countries of Western Europe. We wish to report an unusual sequel to an imported case of salmonellosis in Scotland.

In early August, 1980, a 51-year-old man employed in Selangor, Malaysia, arrived on leave with his wife at their home in Thurso, Caithness, in the North of Scotland. Prior to departure from Malaysia on 1 August, he had developed diarrhoea with abdominal pains and some nausea, but had not sought medical aid. A faecal sample submitted on 11 August was examined at Raigmore Hospital, Inverness, resulting in the isolation of *Salmonella* group E organisms which subsequently were identified at the Scottish Salmonella Reference Laboratory, Glasgow, as *S. zanzibar* (antigenic structure = 3, 10:k:1, 5). This was the first occasion that this serotype had been identified in Scotland since recording began in 1952.

Although never seriously ill, the patient remained unwell for a week or so, during

which time he received symptomatic treatment from his general practitioner. He was bacteriologically negative by 25 September and returned overseas in early November. His wife, and two sons who visited their parents in August, remained well and showed no evidence on bacteriological screening of having been infected.

In early December, *S. zanzibar* was isolated by the North of Scotland College of Agriculture Veterinary Investigation Centre at Thurso, from a bulk milk sample taken in the course of routine weekly monitoring at a nearby dairy farm. There was no illness among the milking cows, which had been brought inside from pasture in mid-October, 1980. Since 1972 a variety of different serotypes and phage-types (*S. typhimurium*, *S. dublin*, *S. agona*, *S. bredeney*, *S. heidelberg*, *S. bovis-morbificans*, *S. muenchen*, and *S. panama*) have been isolated from cattle, milk, mud and seagull faeces sampled at this farm, while in early 1979 *S. muenchen* and *S. panama* also infected consumers of unpasteurized milk produced at the farm (Johnston, MacLachlan & Hopkins, 1979). In several of these episodes there was considerable evidence supporting the opinion that herring gulls feeding at the Thurso sewage outfall which discharges untreated into the sea, roosted on and contaminated pastures and on an adjacent small loch on the farm (Fig. 1). Examination of the town sewage in the summer of 1979 resulted in the isolation of *S. muenchen*, and also *S. give* which earlier in the year had infected cattle on another farm in the immediate vicinity of the outfall.

Williams and his colleagues (1977) showed in Wales that herring gulls were responsible for transmitting salmonellae to cattle, while more recently a survey of seagulls feeding at sewage outfalls and refuse tips in the north-east of Scotland demonstrated a wide range of serotypes deposited via faeces on to adjacent pastures (Fenlon, 1981). Investigations elsewhere in the North of Scotland following dairy farm outbreaks by *S. heidelberg* in successive years, have indicated that black-headed gulls can be an important vehicle of infection and that these birds may also experience severe clinical salmonellosis (Dewar & Grey, 1981). Between 1973 and 1979 in Scotland, environmental pollution of pastures and water-courses were responsible for 26 episodes of animal and human salmonellosis, with seagulls implicated in three of the incidents (Reilly *et al.* 1981), while in the period 1978–80 there were 13 episodes where the same serotype was isolated from wild birds, mainly seagulls, and from farm animals or where circumstantial evidence pointed to the involvement of birds (Communicable Diseases Scotland, 1981). In recent years there has been an increase in the herring gull population in Great Britain of approximately 13% per annum, equivalent to doubling in number every 6 years (Coulson & Monaghan, 1978).

In the earlier incidents in Caithness in which sewage effluent and seagulls were suspected in the transmission of salmonellae, there was some uncertainty whether human infection had preceded bovine infection or *vice-versa*. In the most recent episode however, there would appear to be little doubt that imported human disease resulted in the subsequent contamination of a milk supply with seagulls once more acting as the most likely intermediate vector in the transmission of infection. Although untreated water from a stream discharging from the loch has not been used in recent years for drinking by cattle, this source has continued to be utilized for washing floors within the dairy and possibly contaminated the milk without necessarily having infected cattle. Alternatively, sub-clinical infection with inter-

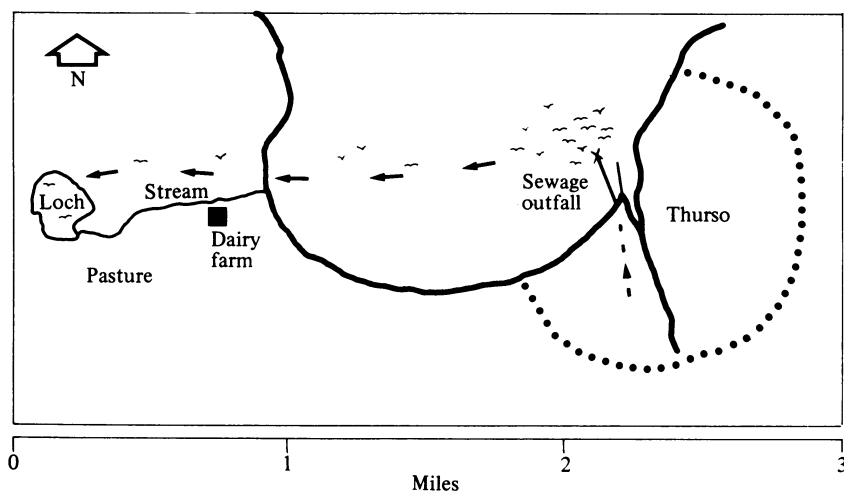


Fig. 1. Sketch map of dairy farm and adjacent district.

mittent excretion may have been acquired earlier in the autumn while grazing outside on contaminated pasture. Dilution of organisms in the sewage and stream water must have been considerable and there was an interval of 4 months between the two isolations, during which time the outside weather conditions were very wet. The continued survival of salmonellae in these circumstances may have been accounted for by multiplication within a host animal, possibly bovine or avian.

In January 1981, *S. muenchen* was identified in a subsequent bulk milk sample, although this may have arisen from an excreting milking cow consequent to the clinically severe outbreak involving animals in early 1979. Since that time, all milk produced at the farm has been pasteurized and therefore there is little danger of further spread back into the human population by this route.

ADDENDUM

In April, 1981, *S. zanzibar* was isolated from one of several young calves which died from acute enteritis on another farm in the district, situated inland approximately 5 miles south-eastwards from Thurso. Calves had grazed on pasture which had been polluted by wild birds, including seagulls, and which was subjected to flooding during severe weather conditions in March. There was no known connection via personnel or livestock with the dairy-farm.

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