



Veterinary Science Division, Avian Health

Unit, Ayr

DEATHS IN FINCHES AND SPARROWS



Fig 1 and Fig 2. In the mid 1960s deaths from salmonellosis were reported in greenfinches and house sparrows feeding at bird tables in gardens.

Introduction

Outbreaks of mortality in wild birds in gardens in the U.K. were first reported in the mid 1960s, when members of the general public began to put out bags of peanuts to feed the wild birds. In these first outbreaks most deaths were due to infection with the bacterium *Salmonella typhimurium* and occurred in greenfinches (*Carduelis chloris*) and house sparrows (*Passer domesticus*).

Mortality incidents have continued, and since 1994 post mortem examinations have been carried out by the Veterinary Science Division of S.A.C. on over 200 finches or sparrows found dead in Scotland. The results from these investigations have shown that, in addition to *Salmonella typhimurium*, a strain of the bacterium *Escherichia coli* referred to as *E. coli* O86

is responsible for many of the deaths in wild birds.

During these seven years a seasonal pattern has emerged. *Salmonella typhimurium* (often a particular type referred to *S. typhimurium* DT40) typically causes mortality in the months December to March, mostly in greenfinches and to a lesser extent in house sparrows. *E. coli* O86 usually causes mortality in the months March to June, especially in greenfinches and siskins (*Carduelis spinus*). Both bacteria have also caused deaths in goldfinches (*Carduelis carduelis*) and chaffinches (*Fringilla coelebs*), although in smaller numbers, and occasionally *Salmonella* spills over into other species such as the great tit (*Parus major*). Dead birds or sick birds are usually found in the vicinity of the bird feeders. If seen alive the birds appear fluffed up, reluctant to fly, appear to be breathing heavily and may look as if they are having difficulty in swallowing.



Fig 3, Fig 4, Fig 5. Deaths from *E coli* O86 have occurred in (left to right) goldfinches, siskins and chaffinches.

The post mortem examination of birds dying from salmonellosis often reveals substantial yellow/orange areas of damage to internal organs such as the gullet, liver, spleen (an organ that tries to fight off diseases) and sometimes the lungs and lower part of the digestive tract. The damage to the gullet can be so severe that it causes a partial blockage, preventing food getting to the bird's stomach even if it continues to eat. The post mortem findings in birds dying from *E. coli* O86 are different. This bacterium doesn't cause such obvious damage to the internal organs but has the ability to produce toxins (poisons) that prevent the digestive tract from working properly. Birds dying from *E. coli* O86 typically have much food in the gullet but little further down the digestive tract. Confirmation of the cause of death requires special laboratory media for the culture and identification of the bacteria from the carcasses.



Fig 6, Fig 7, Fig 8. Post mortem lesions of salmonellosis – (left to right) ulceration and necrosis (cell death) of oesophagus (gullet); necrotic spots in liver; enlarged spleen with necrotic areas.



Fig 9 and Fig 10. Post mortem appearance of two siskins with E coli O86 infection – no necrotic areas but typically oesophagus (and sometimes gizzard) packed with food material such as peanuts, sunflower seed etc.

Deaths in the UK - 2001

Deaths in garden birds in the U.K. have become a regular occurrence each winter, and the winter of 2000-2001 looks like being the same. On January 12th 2001 The Royal Society for the Protection of Birds reported unprecedented numbers of telephone calls from the public reporting sick and dead birds in gardens. Some dead birds have been examined by the Zoological Society of London, some by the Veterinary Science Division of SAC in Scotland, and the results confirm that *Salmonella* is again the major cause of the mortality. So far in 2001, salmonellosis has been confirmed by SAC in the greenfinch, chaffinch, goldfinch, house sparrow, and also the tree sparrow (*Passer montanus*), another bird whose population in the U.K. is in dramatic decline. Deaths in siskins in the second week of February 2001 were the result not of salmonellosis but of *E coli* O86 infection, which in past years has usually occurred later in the year, from March onwards.



Fig 11 and Fig 12. In January 2001 deaths from salmonellosis were diagnosed in tree sparrows, another species of bird whose population is in decline in the UK. As before, substantial damage to the oesophagus can be seen.

Deaths in wild birds in North America and New Zealand

Deaths from salmonellosis have not been confined to sparrows and finches at bird tables in the U.K. Since 1988, many finches have been found dead around garden feeders in the United States and Canada, mostly pine siskins (*Carduelis pinus*) and common redpolls (*Carduelis flammea*), also evening grosbeaks (*Coccothraustes vespertinus*), house sparrows, and American goldfinches (*Carduelis tristis*). As in the U.K. incidents, the type of *Salmonella* involved was *Salmonella typhimurium* phage type 40. Cases of salmonellosis were also reported in domestic cats that had preyed on sick birds around bird feeders.

A different strain of *Salmonella typhimurium* described as *S. typhimurium* DT160 caused outbreaks of mortality in house sparrows in New Zealand in 1999/2000. At the same time there was evidence of disease in humans (including one death), and in young farmed ducks and quail, dogs and cats, deer and horses. In one incident more than 400 dead birds were found at one location on one day. This strain of *Salmonella typhimurium* also caused a small outbreak of mortality in house sparrows in Central Newfoundland, Canada, in February/March 1999.

Why are the deaths occurring?

Although the mortality incidents in the U.K. usually occur at sites providing supplementary feeding for wild birds, the food is not believed to be the initial source of the bacteria but rather the cause of the congregation of large flocks of birds in a small area. Some birds probably carry small numbers of *Salmonella typhimurium* and *E. coli* O86 in their intestines, and when the birds congregate at the bird tables and feeding stations a build up of these bacteria occurs, contaminating the food and water, the feeders and drinkers, and the surrounding environment. Under these conditions, the bacteria then have the chance to overwhelm the birds and cause their deaths.

Clearly prevention is very important, and is based on preventing a build up of these potentially lethal bacteria. Regular cleaning and disinfection of bird tables, feeders and drinkers will help, as will a periodic change of feeding sites. If the birds can be spread out by using several different feeding sites, so much the better. The areas beneath the feeders can also quickly become contaminated, and should be kept as clean as possible, with any uneaten food removed.

Declining populations

This greater awareness of the causes of mortality in finches comes at a time when the populations of some of the UK's wild birds are in decline, especially woodland species (down by 20% since the mid 1970s) and farmland species (down by 40% in the same period). In the report *The State*

of the UK's Birds 1999, published by The Royal Society for the Protection of Birds and The British Trust for Ornithology, attention is drawn to the continued and alarming decline of once-common species such as the redpoll (down by 92% since the 1970s), the house sparrow (down by 58%) and the tree sparrow (down by 87%), three bird species known to be susceptible to salmonellosis. Indeed, the Report suggests that, such is the severity of the decline in house sparrow and redpoll numbers, they should be considered for inclusion on the Birds of Conservation Concern (BoCC) red list of endangered species.

Illness in humans

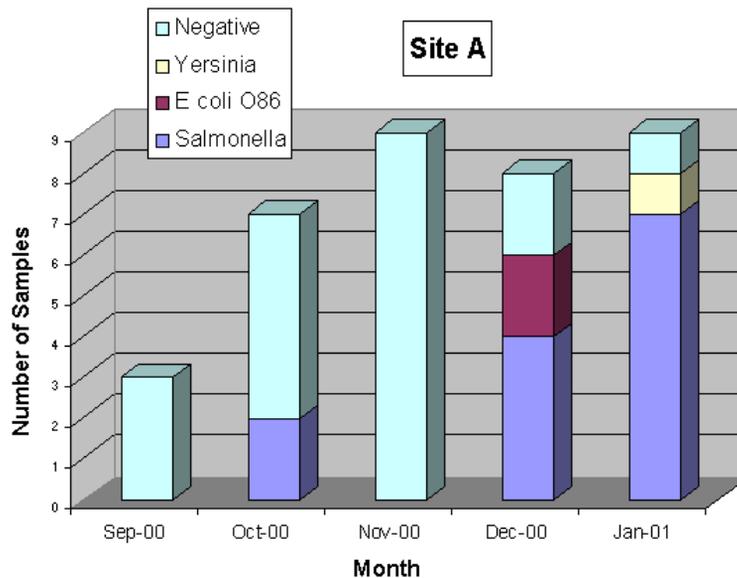
In addition to causing disease in finches, *E. coli* O86 and *Salmonella typhimurium* phage types 40 and 160 can also occasionally cause disease in humans, especially young babies. Rubber gloves should therefore be worn when cleaning bird tables or if the carcasses of dead birds have to be handled, and hands must be thoroughly washed.

Further investigations

Much remains unknown about the occurrence of *E. coli* O86 and *Salmonella typhimurium* in healthy and sick wild birds of different species, and about the factors that allow these organisms to build up and cause disease. Two Trusts with an interest in wild bird conservation, **The Dulverton Trust** and **The Game Conservancy Trust**, are therefore funding a three-year study to look at the significance of these organisms in wild birds.

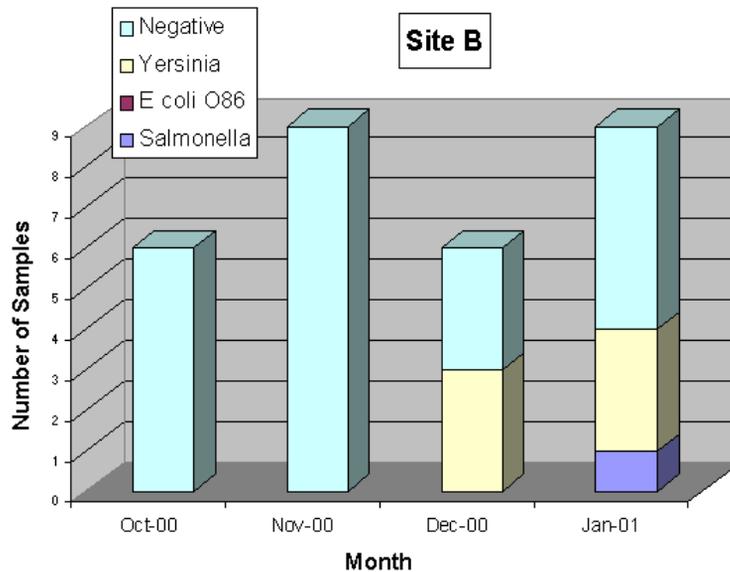
To further investigate the role of healthy carrier wild birds feeding at bird tables, composite samples of droppings from apparently healthy wild birds are being collected on a regular basis from two sites in southwest Scotland and tested for *Salmonella*, *E. coli* O86, and other important bacteria.

One of the sites (Site A) has a history of deaths in wild birds from *Salmonella* and *E. coli* O86 in previous years, the other site (Site B) has no history of mortality in garden birds. Thirty-five samples have been collected at Site A from September 2000 to the end of January 2001, and 30 samples from Site B between October 2000 and the end of January 2001. On Site A, the site with the history of deaths in garden birds in previous years, 13 of the 35 samples were positive for *Salmonella typhimurium* and two for *E. coli* O86. One sample was also positive *Yersinia enterocolitica*, another bacterium that can cause illness in humans but doesn't cause problems in birds.



In contrast, on Site B where there has been no such history of illness in birds, only one of 30 samples was positive for *Salmonella* (a different phage type of *Salmonella typhimurium*) and none for *E. coli* O86. However six of the samples from Site B were positive for *Yersinia enterocolitica*. Most of the isolations of *Salmonella*, *E. coli* O86 and *Yersinia enterocolitica* occurred in December and January. Despite the frequent isolation of *Salmonella* from the faeces

at Site A, few ill birds have been seen and salmonellosis has only been confirmed in one bird, a chaffinch, from this site to the end of January.



Although this project is at a very early stage some interesting (and perhaps surprising) trends are beginning to emerge. The examination of wild bird faeces at bird tables has shown that a remarkably high proportion of samples of pooled faeces from some bird tables may be positive for *Salmonella* without major mortality being observed. It is possible that the majority of birds at Site A remained healthy despite the presence of *Salmonella*, or alternatively wild birds were indeed dying but their carcasses were not found. It is therefore possible that the same thing is happening at other bird tables, and that the extent of the problem of salmonellosis in garden birds is far greater than is currently realised. However the study also highlights the differences between populations of wild birds at different sites. This difference in bacterial populations in birds at different sites may help to explain why deaths in garden birds are observed in some areas but not others, and possible reasons for the differences will be explored.

This study will continue in 2001 and 2002, but the results so far support the view that potentially dangerous bacteria build up around some bird tables in the late autumn, posing a threat to the birds feeding there. The results also reinforce the fact that wild bird droppings at bird tables frequently contain bacteria that can cause illness in humans, and proper personal hygiene must be observed after cleaning bird tables or handling sick or dead birds.

Are you finding dead garden birds?

Anybody finding dead garden birds can contact Tom Pennycott, Senior Veterinary Investigation Officer of the Avian Health Unit, S.A.C. Veterinary Science Division, Ayr at 01292 520318 for further information and advice. If a post mortem examination of small birds such as garden finches is to be carried out and the bodies are to be sent by Royal Mail, they must be securely packaged as follows:

- a) Wrap the body in sufficient absorbent material (e.g. kitchen roll) to absorb all possible leakage.
- b) Place the wrapped body in a leak-proof plastic bag (e.g. a freezer bag) and seal with a metal or plastic tie or something similar.
- c) Place the sealed bag in a strong clip-down container (e.g. a margarine container) or a strong cardboard or polystyrene box, filling any empty space with absorbent material and sealing the container with self-adhesive tape.
- d) Details such as name, address and telephone number of sender, and any other additional relevant information such as number and species of birds found dead, should be enclosed in a separate sealed plastic bag and attached to the outside of the container.
- e) All the above should be secured in a padded bag or covered by strong brown paper.
- f) The outer cover should be labelled in bold capitals **“PATHOLOGICAL SPECIMENS – FRAGILE – HANDLE WITH CARE”** and addressed to Tom Pennycott, Avian Health Unit, S.A.C. Veterinary Science Division, Auchincruive, Ayr, KA6 5AE. The sender’s name and address should also be included on the outer cover.