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Short communication

Salmonella spp. as a cause of mortality and clinical symptoms in free-living garden bird species in Poland

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Abstract

Some species of garden birds are considered to be sensitive to *Salmonella* (*S.*) spp. infections. The aim of this study was to determine the cause of mortality of six free-living birds in one private property in suburban area of Wrocław (Poland). In 2013 Poland experienced prolonged winter, with low temperatures and snow precipitations. During March and April, two dead individuals of the Eurasian siskin (*Carduelis spinus)* and four dead individuals of the Greenfinch (*Carduelis chloris*) were found in proximity of the bird feeder. At the time of ringing procedure in the same area, faecal samples of all individuals belonging to these two species of birds were collected, regardless clinical symptoms. In total, twenty two faecal samples of birds belonging to both bird species were collected in the same property. All of them were *Salmonella enterica* subsp. *enterica* serovar Typhimurium positive. The visible illness among European siskins and Greenfinches, caused by *S.* Typhimurium, suggests that both Eurasian siskin and Greenfinch may be potential reservoirs of *Salmonella* spp. Therefore they might play a role in transmission of zoonotic pathogens to other garden bird species or to people.

Key words*:* *Salmonella* Typhimurium, free-living birds, Eurasian siskin, Greenfinch

Introduction

According to European Food Safety Authority reports, *Salmonella* (*S.*) *enterica* subsp *enterica* serovar Typhimurium is the second main cause of human salmonellosis outbreaks (EFSA 2013). Infection of birds with different serotypes of *Salmonella* was documented in poultry but also in free-living birds such as: gulls, corvids, pigeons, hawks and songbirds (Daoust and Prescott 2007). Depending on the bird species and *Salmonella* serotype, infection may occur as a disease with clinical presentation or asymptomatically. The clinical signs are not specific and are similar whichever *Salmonella* serovar is involved. The morbidity and mortality varies considerably and deaths, only in some exceptional cases, may approach 100% (Lister and Barrow 2008). Among free-living birds, the songbirds are considered to be much more sensitive for salmonellosis than other groups of birds (Hernandez et al. 2012).

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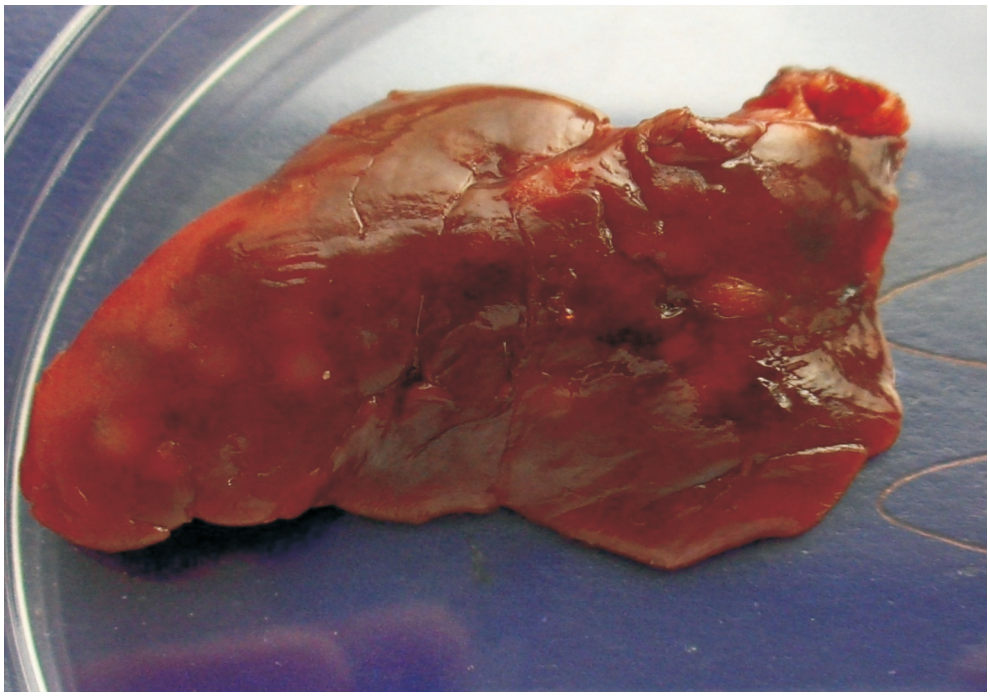

Fig. 1. Nodular lesions in the enlarged liver of a male Greenfinch.

Materials and Methods

The material was collected during March and April 2013, in the private property in suburban Wrocław (Poland), during a routine ornithological bird ringing in proximity of the bird feeder. Samples were collected from twenty two birds: six dead birds (two dead siskins and four dead greenfinches) and sixteen alive individuals (eleven siskins and five greenfinches). From alive birds, only faeces were collected. From birds that were found dead, the faecal samples as well as four tissues (liver, spleen, lungs and intestines) were collected during necropsy. The feaces and integral organs were analyzed for isolation of *Salmonella* strains using the International Organization for Standarization procedure PN- EN ISO 6579: 2003/A1: 2007. *Salmonella* isolates were serotyped using single factor antisera (Sifin, Berlin, Germany), according to the White-Kauffman-Le Minor scheme. Identification of *Salmonella* at the genus and subspecies level was performed in according to the method written by Lee et al. (2009). *Salmonella enterica* subsp *enterica* ser. Typhimurium ATCC14028 was used as a positive control strain.

Results

Eleven out of sixteen alive birds (six siskins and five greenfinches) showed both signs of emaciation and diarrhoea. The necropsy examination of dead-birds revealed nodular lesions in the liver (four greenfinches, one siskin), spleen (two greenfinches, one siskin) and intestines (two greenfinches) (Fig. 1). One siskin showed an enlargement of the liver and spleen without nodular lesions. All of dead greenfinches were males. The results of microbiological analysis confirmed that all the samples were *Salmonella* positive. The products of PCR used in this study, gave the signal of 137 bp, 179 bp, 244 bp, 501 bp and 848 bp. Such results confirmed that examined bacteria strains belonged to *Salmonella enterica* subsp. *enterica*. During serotyping all of the bacteria showed agglutination with antisera: O4, O12 and Hi, what is characteristic to serotype *Salmonella* Typhimurium.

Discussion

The presence of *Salmonella* visible illness among European siskins and Greenfinches suggests that these two species of birds might be particularly susceptible for salmonellosis. It has been documented by Daoust and Prescott (2007) that among free-living birds the most commonly isolated serovar is *Salmonella* Typhimurium, which appears to be adapting to some avian species such as songbirds. The appearance of clinical symptoms of birds examined in the present study was probably also connected with prolonged wintertime in Poland in 2013 and feeding

the birds by people during this season. Supplemental feeding creates high densities of birds, high concentrations of feaces and stress owing to social interactions what also leads to an increasing in some bacterial species prevalence within wild birds populations (Hamer et al. 2011). Hernandez et al. (2012) hypothesized that the pine siskin epizootic of *Salmonella* Typhimurium infection in USA was related to human outbreaks at the same time in similar regions, because of feeding the birds with peanuts that were eaten also by people.

In conclusion, salmonellosis cases in populations of free-living bird species, which are common in urbanized areas, may suggest a potential risk to public health. Particularly regarding health of people who fed free-living birds by themselves.

Acknowledgements

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