# SALMONELLA RODS PREVALENCE IN WATERFOWL IN SOUTH-EASTERN POLAND OVER 2001–2005

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## ABSTRACT

The present work aimed to evaluate prevalence frequency of Salmonella rods as well as serovars isolated from goose and duck flocks investigated in the years 2001–2005 in the south – eastern part of Poland.

The work was performed on the grounds of the data supplied by the Regional Laboratory of Veterinary Hygiene in Lublin. The material for examination was made by the cloacal swab cultures and the internal organs (hearts and livers) taken from the flocks of geese and ducks, slaughter, layer and reproductive, maintained in the south-eastern part of Poland Salmonella rods were isolated inoculating into selective-multiplying media and differentiating according to the procedure applied currently. Salmonella was classified into serovars using the glass agglutination test with diagnostic sera.

Prevalence frequency of Salmonella rods in the south-eastern Poland in the years 2001–2005 in the goose flocks reached 5%,whereas in ducks – 6,8% at all the studied flocks. Total bacteria obtained from geese on the basis of cloacal swabs constituted 3,6% of the investigated flocks, whereas from the internal organs – 1,2%. The presence of *S. enteritidis* (44,4%) was recorded in goose flocks most frequently and S. typhimurium (33,3%) more rarely. In ducks, though, S. Enteritidis (27,3%) as well as S. Hadar and Salmonella from group B (ca 18%) and S. from group C, $C_1$, $C_2$, E was reported. The reproductive geese were free from infections developed by salmonella, while these bacteria were identified in the slaughter geese. The highest infection level in geese and ducks was detected in 2001, it was 8% in the goose flocks and 11% in the duck ones. In the years 2002 and 2005 no cases of ducks infected with salmonella were recorded.

The more stringent requirements concerning the standard zoohygienic conditions as well as obligatory monitoring of flock health state resulted in a decrease of Salmonella infections rate in waterfowl. Detectability of these organisms did not show any serious differences as compared to their presence in the waterfowl in Poland as well as in other EU states.

**Keywords:** *Salmonella* rods, geese, ducks

## OBJECTIVE

The extensive commercial water fowl breeding comprising a high number birds poses a threat of various infectious diseases incidence, in that salmonellosis.

In the breeding farms, the water fowl is usually reared in the outdoor voliers that may increase birds` exposure to infection with salmonella frequently found in feedstuffs, livestock, wild animals, rodents and other free living birds. The microbes are also transmitted by the poultry

hatcheries as pathogens` presence was confirmed in 64% of samples obtained there [Hoszowski and Wasal, 2005].

Among the salmonella isolated from the geese, the following serovars were detected: *S. Typhimurium, S. Enteritidis, S. Anatum* and *S. Thompson* [Samorek-Salamonowicz et al., 1998]. The Salmonella rods are characterized by long survivability in the environment. It was shown that S. Typhimurium bacteria can survive in ducks droppings for about 190 days, while in the duck yard substrate even up to 240d [Szeleszczuk, 1998]. Despite the bird monitoring for Salmonella rods [Davies et al., 1997; Trawińska et al., 2003] as well as the pathogens control, they have been still hazardous for human and animal health.

Therefore, the objective of the present work was to assess the salmonella prevalence in duck and goose flocks in the south – eastern part of Poland over 2001–2005.

## METHODS

The work was realized on the basis of the findings provided by the Regional Laboratory of Veterinary Hygiene in Lublin. Prevalence of Salmonella rods in geese and ducks was evaluated in the south – eastern region of Poland during the years 2001–2005.The studies also included bacteria classification into serological groups. The examination material was constituted mainly by the cloacal swab cultures collected from the layer, reproductive and slaughter geese as well as ducks. There were investigated diseased and died birds, in that day -old chicks. Salmonella rods isolated from the internal organs – hearts and livers, were inoculated on the selective-multiplying and differentiating media according to the procedure applied currently. Salmonella pathogens were classed into serovars on the grounds of the glass agglutination test with diagnostic sera.

## RESULTS

Prevalence of Salmonella rods in the water fowl flocks is presented in Table 1.The examinations towards Salmonella – induced infections were carried out in 971 goose flocks and 218 duck flocks over 2001–2005.The studies covered 794 slaughter goose flocks (the highest rate) and 57 layers (the lowest rate). Throughout the research period, the reproductive geese did not show any signs of infection caused by these pathogens. As for geese layers, Salmonella presence was reported only in one flock, which made up 1,7% of total number. The highest rate of geese infected by Salmonella was recorded in slaughter goose flocks, where in 2001 this pathogen percentage proved the highest (8,1%) and the lowest (1,8%) in 2002. Prevalence frequency of Salmonella rods in geese reached 3,7% whereas in ducks – 5,0%. The studies run in the duck flocks in 2002 and 2005 did not reveal the presence of these bacteria in any flock. The highest infection level in the ducks was recorded in 2001 – ca 11%, while the lowest in 2004 (2,8%). Besides, salmonella classification into serologic types was performed and given in Table 2.It was shown that among the serovars determined in the goose flocks, S. Enteritidis prevailed (44,4%). Salmonella from this serological group were detected most frequently in 2001 (66,6% of infected flocks), while S. Typhimurium pathogens were reported more rarely (33,3%) in these birds. Moreover, S. Dublin, S. Derby and Salmonella from B and C group were also determined, yet to a smaller extent. In the duck flocks, no presence of *S. Typhimurum* was confirmed. However, *S. Enteritidis* pathogens (27,3%) as well as S. Hadar and from group B, C, $C_1$, $C_2$ and E were detected.

## CONCLUSION

The highest percentage of Salmonella infections in both geese and ducks was reported in 2001. The more stringent requirements concerning the standard zoohygienic conditions as well as the obligatory monitoring of the flock health state decreased a Salmonella pathogens infection rate in the water fowl flocks in the successive years, especially in 2005. Salmonella detectability in the water fowl from south – eastern Poland, Salmonella Enteritidis, did not show any substantial differences as compared to their presence in Poland or other EU member states [Bugajak and Bugajak, 2002].

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**Table 1.** Salmonella rods presence in goose and duck flocks

| Poultry | Flocks studied | Number of infected flocks | % infected flocks | Year |
|---|---|---|---|---|
| Layers geese | 19 | 1 | 5,3 | 2001 |
| | 10 | 0 | 0 | 2002 |
| | 7 | 0 | 0 | 2003 |
| | 13 | 0 | 0 | 2004 |
| | 8 | 0 | 0 | 2005 |
| Total | 57 | 1 | 1,7 | 2001 –2005 |
| Reproductive geese | 20 | 0 | 0 | 2001 |
| | 25 | 0 | 0 | 2002 |
| | 36 | 0 | 0 | 2003 |
| | 18 | 0 | 0 | 2004 |
| | 21 | 0 | 0 | 2005 |
| Total | 120 | 0 | 0 | 2001–2005 |
| Slaughter geese | 172 | 14 | 8,1 | 2001 |
| | 168 | 3 | 1,8 | 2002 |
| | 180 | 9 | 5,0 | 2003 |
| | 134 | 6 | 4,5 | 2004 |
| | 140 | 3 | 2,1 | 2005 |
| Total | 794 | 36 | 4,5 | 2001–2005 |

**Table 1.** Continuation

| Poultry | Flocks studied | Number of infected flocks | % infected flocks | Year |
|---|---|---|---|---|
| Ducks | 64 | 7 | 10,9 | 2001 |
| | 42 | 0 | 0 | 2002 |
| | 46 | 3 | 6,5 | 2003 |
| | 35 | 1 | 2,85 | 2004 |
| | 31 | 0 | 0 | 2005 |
| Total | 218 | 11 | 6.8 | 2001–2005 |

**Table 2.** Salmonella serovars isolated from water fowl farms

| Poultry | Year | Number of studied flocks | Flocks infected num./% | S. Typhi-murium num./ % | S. Enteri-tidis num. / % | S. Derby num. / % | S. Ana-tum num. / % | S. Dublin num. / % | S. Hadar num. / % | S. of group B num. / % | S. of group C num. / % | S. of group $C_1$ num. / % | S. of group $C_2$ num. / % | S. of group E num. / % |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Geese | 2001 | 211 | 15 (7,1) | 2 (13,3) | 10 (86,6) | 1 (6,7) | 0 | 1 (6,7) | 0 | 1 (6,7) | 0 | 0 | 0 | 0 |
| | 2002 | 203 | 3 (1,5) | 2 (66,7) | 0 | 0 | 0 | 0 | 0 | 1 (33,3) | 0 | 0 | 0 | 0 |
| | 2003 | 223 | 9 (4,0) | 5 (55,5) | 2 (22,2) | 0 | 0 | 2 (22,2) | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2004 | 165 | 6 (3,6) | 1 (16,7) | 3 (50,0) | 1 (16,7) | 0 | 0 | 0 | 0 | 0 | 1 (16,7) | 0 | 0 |
| | 2005 | 169 | 3 (1,8) | 2 (66,7) | 1 (33,3) | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 2001/ 05 | 971 | 36 (3,7) | 12 (33,3) | 16 (44,4) | 2 (5,56) | 0 | 3 (8,3) | 0 | 2 (5,6) | 0 | 1 (2,8) | 0 | 0 |
| Ducks | 2001 | 64 | 7 (10,9) | 0 | 2 (28,6) | 0 | 0 | 0 | 0 | 2 (28,6) | 1 (14,3) | 0 | 1 (14,3) | 1 (14,3) |
| | 2002 | 42 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| | 2003 | 46 | 3 (6,5) | 0 | 1 (33,3) | 0 | 0 | 0 | 1 (33,3) | 0 | 0 | 1 (33,3) | 0 | 0 |
| | 2004 | 35 | 1 (2,8) | 0 | 0 | 0 | 0 | 0 | 1 (100,0) | 0 | 0 | 0 | 0 | 0 |
| | 2005 | 31 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 2001/ 05 | 218 | 11 (5,0) | 0 | 3 (27,3) | 0 | 0 | 0 | 2 (18,2) | 2 (18,2) | 1 (9,1) | 1 (9,1) | 1 (9,1) | 1 (9,1) |