THE ETIOLOGY OF AVIARY PARATIPHOSIS

Cercetări Agronomice în Moldova

INVESTIGATION ON THE ETIOLOGY OF AVIARY PARATIPHOSIS

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ABSTRACT – The increasing role played by domestic and wild fowls in infecting human food has determined us to carry out a study on the etiology and frequency of paratiphic infections in fowls. A number of 102 fowls were necropsied, of which 43 from the A enterprise and 61 from the B enterprise. In the A enterprise, 18 fowls (43.9%) have been diagnosed positively, in comparison with the B enterprise with 22 positively diagnosed fowls (36.06%). The bacteriological determinations, performed from ovarian follicles, resulted in nine Salmonella enteritidis strains and three Salmonella typhimurium strains, in comparison with liver determination that revealed two (9.07%) Salmonella enteritidis strains and one (4.58%) Salmonella typhimurium strain.

Key Words: Salmonella, food infection, ovarian follicles

REZUMAT - Observaţii privind etiologia paratîfozelor aviare. Deoarece rolul păsărilor domestice şi sălbatici, ca şi al produselor acestora (ouă şi carne) în apariţia imbolnăvirilor, dar şi a toxinfectiilor alimentare la om a crescut, ne-am propus a investiga etiologia şi prevalenţa (frecvenţa) infecţiilor paratîfice la păsări. S-au necropsiat un număr de 102 păsări, din care 43 din unitatea A şi 61 din unitatea B. Din unitatea A au fost diagnosticate cu leziuni de paratîfă 18 (43,9%) păsări, iar din unitatea B, 22 de păsări, adică 36,06%. S-au făcut însămânări din folicule ovarei, ce au dus la izolarea a nouă (42,85%) tulpi de Salmonella enteritidis şi a trei (14,29%) tulpi de Salmonella typhimurium, în timp ce însămânărilor din ficat au condus la izolarea numai a două (9,07%) tulpi de Salmonella enteritidis şi o (4,58%) tulpină de Salmonella typhimurium.

Cuvinte cheie: Salmonella spp., toxinfection alimentară, foliculii ovarei

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INTRODUCTION

In the past, cattle represented one of the most important sources of infection with *Salmonella enteritidis* and *Salmonella typhimurium*. Nowadays, in all the developed countries, once with the extension of industrial poultry breeding, fowls became the main carrying species. However, this phenomenon is not a stereotype one, other typical aspects being found according to country and region (Cooper & Gerard, 1994).

Among poultry species, hens and web-footed poultry (duck and goose) have a great sanitary-veterinary importance, and infections may be grouped in two categories. The infection caused by *Salmonella pulorum-gallinarum* is included in the first category and affects especially hens and turkeys, determining typhosis and pulorosis. The second category of infection is caused by paratipic *Salmonella*.

Because we have noticed the increasing role of domestic and wild fowls and of their products (eggs and meat) in causing human diseases and food infection, our purpose was to investigate the etiology and frequency of paratipic infections in fowls.

MATERIALS AND METHODS

The observations were conducted during 2003-2004, in two enterprises for poultry breeding. At the necropsic examination, lesions of *Salmonella* infection were found. The poultry from the two enterprises reacted negatively to the serological examination for typho-pulorosis.

The content of the ovarian follicles with clear modifications (pediculate and green-bluish coloured) (Davies et al., 2003) in 102 fowls was cultured in broth, on bent gelose or Petri dishes and in the Kauffman-Muller medium.

RESULTS AND DISCUSSION

We have necropsied 102 fowls, of which 43 from the A enterprise and 61 from the B enterprise. From the A enterprise, 18 fowls (43.9%) were diagnosed with paratiposis lesions and from the B enterprise, 22 fowls (30.06%) (*Table 1, Figure 1*).

<table>
<thead>
<tr>
<th>Enterprise</th>
<th>Necropsied fowls</th>
<th>Paratiposis lesions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>A</td>
<td>41</td>
<td>18</td>
</tr>
<tr>
<td>B</td>
<td>61</td>
<td>22</td>
</tr>
<tr>
<td>Total</td>
<td>102</td>
<td>40</td>
</tr>
</tbody>
</table>

*Table 1* Results of necropsic examination
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![Graph showing necropsied fowls and number of paratiphosis lesions]

Fig. 1 - Necropsic examination

Table 2
Anatomo-pathological lesions

<table>
<thead>
<tr>
<th>Enterprise</th>
<th>Necropsied fowls</th>
<th>Macroscopic lesions</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Salpingitis</td>
<td>Ovaritis</td>
</tr>
<tr>
<td></td>
<td>Vitelline</td>
<td>peritonitis</td>
</tr>
<tr>
<td></td>
<td>Fat spleen</td>
<td>Hypercholie</td>
</tr>
<tr>
<td></td>
<td>No</td>
<td>%</td>
</tr>
<tr>
<td>A</td>
<td>41</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>61</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>102</td>
<td></td>
</tr>
</tbody>
</table>

![Graph showing different anatomopathological lesions]

Fig. 2 - Anatomo-pathological lesions
We have noticed a number of 15 (14.70%) salpingite lesions, 30 (29.70%) ovaritis lesions, 22 (21.56%) lesions of vitelline peritonitis, 17 (16.66%) cases of fat spleen and 18 (17.38%) of fat liver.

In order to isolate Salmonella strains and confirm the suspicion of paratipic infection, inoculations for the bacteriological examination were done from modified ovarian follicles and liver. We have used the usual mediums (gelose and culture broth), Kauffman-Müler mediums and selective mediums (Wilson-Blair).

The colonies from the selective mediums resembling to the Salmonella ones have been examined as concerns the agglutinability with polyvalent anti-Salmonella serum O (A, B, C, D and D). The positive ones have been transplanted on bent gelose and studied as concerns the culture aspect, agglutinability with group serum, mobility and biochemical traits.

On bent gelose, some strains developed as big round colonies, with smooth edges, similar to the colon bacillus ones, and others as small colonies similar to the pasteurella ones. All the isolated strains were mobile (Table 3, Figure 3).

<table>
<thead>
<tr>
<th>Organ</th>
<th>No. samples</th>
<th>No. isolated strains</th>
<th>Salmonella enteritidis</th>
<th>Salmonella typhimurium</th>
<th>Esch. coli</th>
<th>Coliform germs</th>
<th>Proteus v.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
<td>%</td>
<td>No</td>
</tr>
<tr>
<td>Ovary</td>
<td>40</td>
<td>21 (52.5)</td>
<td>9 (42.85)</td>
<td>3 (14.29)</td>
<td>4 (19.05)</td>
<td>4 (19.05)</td>
<td>2 (9.52)</td>
</tr>
<tr>
<td>Liver</td>
<td>40</td>
<td>22 (55.0)</td>
<td>2 (9.07)</td>
<td>1 (4.58)</td>
<td>8 (36.36)</td>
<td>4 (18.18)</td>
<td></td>
</tr>
</tbody>
</table>

Table 3

Results of bacteriological examination

![Fig. 3 - Results of bacteriological examination](image-url)
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The results obtained have shown that the germs, isolated from liver and ovary, were different as weight. The inoculations from ovarian follicles have determined the isolation of nine (42.85%) strains of Salmonella enteritidis and of three (14.29%) strains of Salmonella typhimurium, while from liver, they isolated only two (9.07%) strains of Salmonella enteritidis and one (4.58%) strain of Salmonella typhimurium. In the liver, other Gram negative germs prevailed, such as Escherichia coli - eight (36.36%) strains, coliform germs - seven (31.81%) strains and four (18.18%) Proteus vulgaris. From the ovary of three fowls, both Salmonella enteritidis and Escherichia coli were isolated.

Data from the specialty literature (Keller et al., 1997; Mânzat Moga, 2001) showed that in Romania, the incidence of infections with mobile Salmonella in poultry, investigated in a selection and crossing centre of meat and laying breeds, was the following: Salmonella enteritidis 50.8%, Salmonella typhimurium 30.4%, Salmonella gallinarum 5.8%, Salmonella heidelberg 2.4%, Salmonella agona 2.10%, Salmonella derby 2.9 %, Salmonella haifa 2.4% and Salmonella newport 2.4%.

The results obtained have shown that from the modified ovarian follicles, mobile Salmonella could be isolated, especially Salmonella enteritidis and Salmonella typhimurium. These data are similar to the ones obtained by Davies et al. (2003), which showed that mobile Salmonella could be isolated from ovarian follicles, but they did not know if it could be transmitted to pathogens and what was its epidemiological role in spreading the infection.

CONCLUSIONS

The necropsic investigations conducted on 102 fowls have shown paratiphosis lesions in 39.20% of cases.

Lesions were caused by salpingite (14.70%), ovaritis (21.56%), vitelline peritonitis (16.66%) and fat spleen (17.38%).

The inoculations from liver and ovary on culture mediums have resulted in isolating, from ovarian follicles, nine (42.85%) strains of Salmonella enteritidis and three (14.29%) strains of Salmonella typhimurium, and from liver, two (9.07%) strains of Salmonella enteritidis and one (4.58%) strain of Salmonella typhimurium.

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Keller L.H., Schifferli D.M., Benson C.E., Aslam S. and Eckroade R.J., 1997 - Invasion of chicken reproductive tissues and forming eggs is not unique to Salmonella enteritidis. Avian Diseases, 41, 535-539
