

INVESTIGATION ON THE ETIOLOGY OF AVIARY PARATIPHOSIS

Doina Anca HÎRȘU¹, T. PERIANU², Irina Oana TĂNASE^{2*}, C. PAVLI²

¹Sanitary-Veterinary Board of Brăila

²University of Agricultural Sciences and Veterinary Medicine of Iași

Received March 30, 2007

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 - *Observații privind etiologia paratifozei aviare. Deoarece rolul păsărilor domestice și sălbatice, ca și al produselor acestora (ouă și carne) în apariția imbolnăvirilor, dar și a toxiinfecțiilor alimentare la om a crescut, ne-am propus a investiga etiologia și prevalența (frecvența) infecțiilor paratifice la păsări. S-au necropsiat un număr de 102 păsări, din care 43 din unitatea A și 61 din unitatea B. Din unitatea A au fost diagnosticate cu leziuni de paratifoză 18 (43,9%) păsări, iar din unitatea B, 22 de păsări, adică 36,06%. S-au făcut însămânțări din foliculii ovarieni, ce au dus la izolarea a nouă (42,85%) tulpini de *Salmonella enteritidis* și a trei (14,29%) tulpini de *Salmonella typhimurium*, în timp ce însămânțările din ficat au condus la izolarea numai a două (9,07%) tulpini de *Salmonella enteritidis* și o (4,58%) tulpină de *Salmonella typhimurium*.*

Cuvinte cheie: *Salmonella* spp., toxiinfecție alimentară, foliculii ovarieni

* E-mail: tanase_oana@yahoo.com

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 paratiphic *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 paratiphic 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 greenish 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 paratiphosis lesions and from the B enterprise, 22 fowls (30.06%) (Table 1, Figure 1).

Table 1

Results of necropsic examination

| Enterprise | Necropsied fowls | Paratiphosis lesions | |
|------------|------------------|----------------------|--------|
| | | No | % |
| A | 41 | 18 | 43.9% |
| B | 61 | 22 | 36.06% |
| Total | 102 | 40 | 39.2% |

THE ETIOLOGY OF AVIARY PARATIPHOSSIS

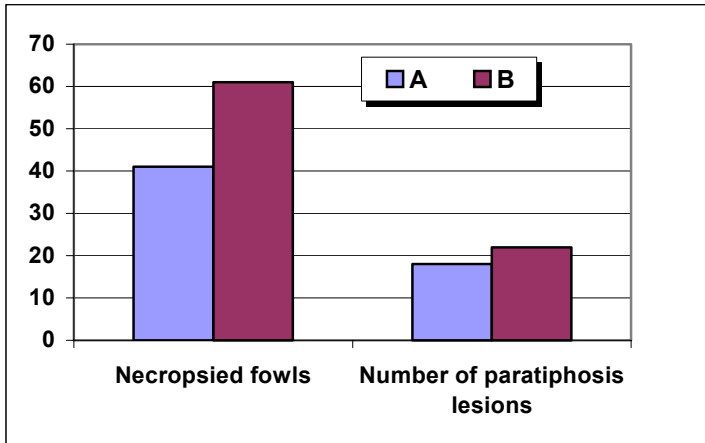


Fig. 1 - Necropsic examination

Table 2

Anatomo-pathological lesions

| Enterprise | Necropsied fowls | Macroscopic lesions | | | | | | | | | |
|------------|------------------|---------------------|-------|----------|-------|-----------------------|-------|------------|-------|----------------------|-------|
| | | Salpingitis | | Ovaritis | | Vitelline peritonitis | | Fat spleen | | Fat liver Hyperchole | |
| | | No | % | No | % | No | % | No | % | No | % |
| A | 41 | 6 | 14.65 | 14 | 36.58 | 7 | 14.87 | 6 | 14.42 | 8 | 19.84 |
| B | 61 | 9 | 14.75 | 16 | 26.95 | 15 | 23.88 | 11 | 18.03 | 10 | 16.39 |
| Total | 102 | 15 | 14.70 | 30 | 29.70 | 22 | 21.56 | 17 | 16.66 | 18 | 17.38 |

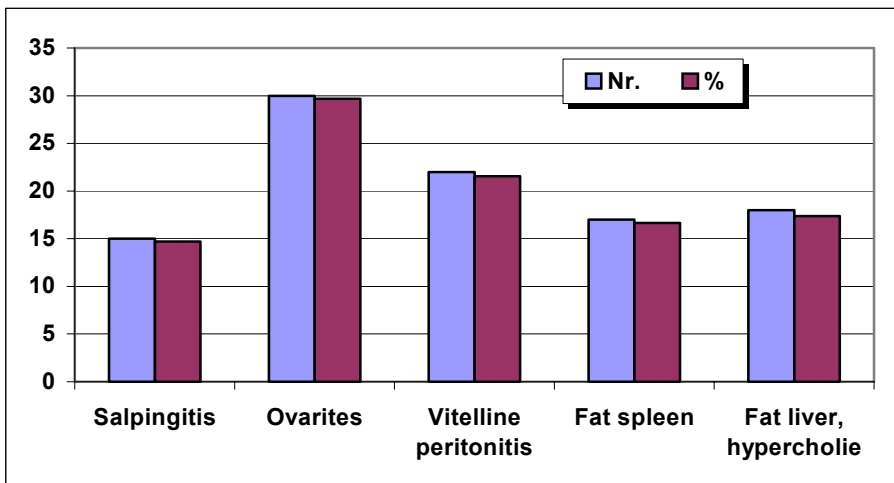


Fig. 2 - Anatomo-pathological lesions

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 paratiphic 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-Müller 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 3

Results of bacteriological examination

| Organ | No. samples | No. isolated strains | | <i>Salmonella enteritidis</i> | | <i>Salmonella typhimurim</i> | | <i>Esch. coli</i> | | Coliform germs | | <i>Proteus v.</i> | |
|-------|-------------|----------------------|------|-------------------------------|-------|------------------------------|-------|-------------------|-------|----------------|-------|-------------------|-------|
| | | No | % | No | % | No | % | No | % | No | % | No | % |
| Ovary | 40 | 21 | 52.5 | 9 | 42.85 | 3 | 14.29 | 4 | 19.05 | 4 | 19.05 | 2 | 9.52 |
| Liver | 40 | 22 | 55.0 | 2 | 9.07 | 1 | 4.58 | 8 | 4.58 | 8 | 36.36 | 4 | 18.18 |

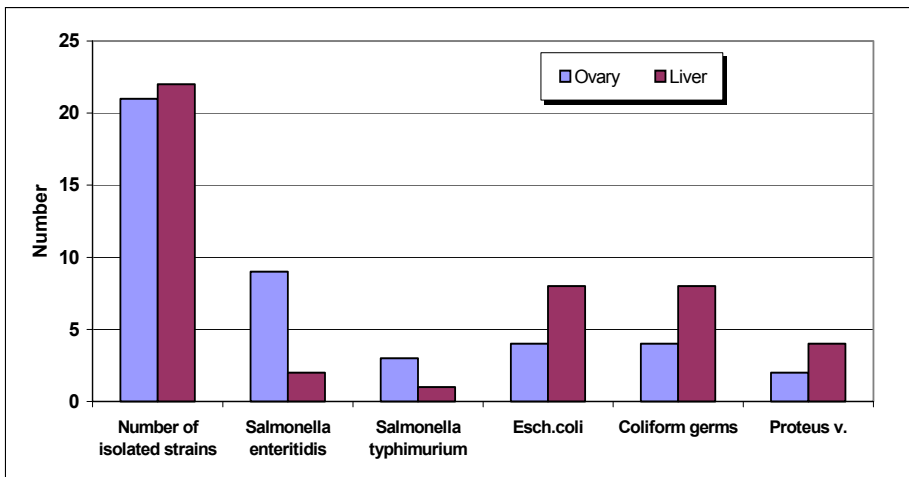


Fig. 3 - Results of bacteriological examination

THE ETIOLOGY OF AVIARY PARATIPHOSSIS

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 *Sallmonela 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 *Sallmonela typhimurium*, and from liver, two (9.07%) strains of *Sallmonela enteritidis* and one (4.58%) strain of *Sallmonela typhimurium*.

REFERENCES

- Carp-Cărare M., Guguianu Eleonora, Timofte Dorina, 1997** – *Practical works of veterinary microbiology*. "Ion Ionescu de la Brad" University of Agricultural Sciences and Veterinary Medicine of Iași
- Cooper & Gerard I.,1994** – *Salmonellosis – infections in humans and the chicken pathogenesis and the development of live vaccines – A review – Veter. Bull. Vol.64, no.2,123-135*

Doina Anca HÎRȘU ET AL.

- Davies R., Liebane E. and Breslin M., 2003** - *Investigation of the distribution and control of Salmonella enterica serovar Enteritidis PT6 in layer breeding and egg production.* Avian Pathology (June 2003) 32(3), 227-237
- Gast R.K. and Holt P.S., 1998** - *Persistence of Salmonella enteritidis from one day of age until maturity in experimentally infected layer chickens.* Poultry Science, 77m1759-1762
- 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
- Mânzat Moga R., 2001** – *Animal infectious diseases – bacterioses.* Brumer Publishing House, Timișoara
- Perianu T. (coordinator), 2003** – *Infectious diseases in domestic animals.* Bacterioses. vol I, Venus Publishing House, Iași