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Short communication

Antimicrobial resistance in bacteria isolated from pigeons in Poland

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Abstract

The present study investigated the drug-resistance to the selected antibiotics in *Escherichia coli*, *Salmonella typhimurium* and beta-haemolytic coagulase-positive staphylococci isolated from pigeons bred in Poland. In the case of *E. coli*, tetracyclines and amoxicillin were least effective. In the staphylococci, the highest resistance was detected for oxytetracycline and quinolones and 5% were resistant to methicillin. The lowest drug-resistance was reported for *Salmonella typhimurium*.

Key words: antimicrobial resistance, *E. coli*, pigeons, *Salmonella typhimurium*, Staphylococci

Introduction

Today, bacterial infections *per se* are a rare problem in the pathology of pigeons. The majority of disease cases involve bacterial infections associated with circoviral infections. Caused by pigeon circovirus Young Pigeon Disease Syndrome (YPDS) is a treatable condition and it is recommended to use protective treatment with antibiotics (Raue et al. 2005, Stenzel et al. 2012).

The objective of the studies was to evaluate antimicrobial-resistance in *Escherichia coli*, *Salmonella typhimurium* and beta-haemolytic coagulase-positive staphylococci isolated from pigeons bred in Poland.

Materials and Methods

The studies were carried out with cloacal swabs and droppings samples collected from healthy and diseased pigeons between 2010 and 2012. The birds originated from 634 flocks located all over Poland.

For staphylococcus isolation, samples were directly cultured on Chapman medium (Biomedica, Poland). The grown strains were tested for the presence of catalase, ability to haemolysis and production of coagulase. The diagnostics for *Escherichia coli* and *Salmonella* was performed after multiplication in buffered peptone water and culturing on the MacConkey medium. The differentiation into serovars of grown

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Table 1. Susceptibility of examined bacteria strains to selected antibiotics.

	<i>Escherichia coli</i>			<i>Staphylococcus</i> β -hemolytic coagulase-positive			<i>Salmonella typhimurium</i>		
	S (%)	I (%)	R (%)	S (%)	I (%)	R (%)	S (%)	I (%)	R (%)
Amoxicillin	34	3	63	88	0	12	100	0	0
Amoxicillin/clavulanic acid	86	6	8	97	0	3	100	0	0
Oxacillin	X	X	X	95	0	5	X	X	X
Enrofloxacin	61	17	22	23	2	75	100	0	0
Flumequine	39	8	53	23	3	74	100	0	0
Norfloxacin	76	2	22	31	1	68	100	0	0
Doxycycline	21	5	74	18	39	43	98	2	0
Oxytetracycline	21	4	75	5	0	95	98	2	0
Lincomycin/spectinomycin	91	2	7	31	0	69	100	0	0
Colistin	96	2	2	17	36	47	98	0	2
Sulfamethoxazole/trimethoprim	47	0	53	93	0	2	100	0	0
Florfenicol	86	6	8	99	0	1	100	0	0
Neomycin	14	71	15	62	27	11	89	9	2

Abbreviations: S – sensitive strain, I – intermediate sensitive strain, R – resistant strain, X – not examined

Salmonella colonies was performed with the plate agglutination method using diagnostic sera (Immunolab, Poland).

The resistance to antibiotics was assessed with the disc diffusion method according to the CLSI (Clinical and Laboratory Standards Institute, USA).

Results and Discussion

In the case of *E. coli* isolates, tetracyclines and amoxicillin were least effective. In the staphylococci, the highest resistance was detected for oxytetracycline and quinolones. About 5% of the staphylococci were resistant to methicillin. The lowest drug-resistance was reported for *Salmonella typhimurium*. The *E. coli* isolates were most sensitive to colistin, the combination of lincomycin with spectinomycin and to florfenicol and amoxicillin with clavulanic acid. The staphylococci were most sensitive to florfenicol, sulfamethoxazole potentiated with trimethoprim and beta-lactams (Table 1).

The presented data indicate a very high level of drug-resistance of the bacteria isolated from pigeons and are consistent with the results reported in other countries (Kimpe et al. 2002, Futagawa-Saito et al. 2007, Radimersky et al. 2010). In the context of poten-

tial infections in humans, it is very alarming that beta-haemolytic coagulase-positive staphylococci resistant to methicillin were identified (Prosperi et al. 2013).

In summary, the drug-resistance of the bacterial strains isolated from pigeons is very high. It may pose a real risk to human health due to the easy transmission of the bacteria from birds to humans which is facilitated by long-term exposure to the microorganisms.

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