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SALMONELLA IN FREE LIVING BIRDS

(With 4 Tables)

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السالمونيلا في الطيور الطليقة

مصطفى شحاته ، محسن الدمرداش ، شعبان أحمد ، عبدالخالق الطماوي
مختار الطرابيلسى

من ١٩٦ عصفور تم عزل ٤ عترات من السالمونيلا : واحدة ستانلى و ٢ تيفيموريوم .
فى حين تم عزل ٥ عترات من ٨٥ حمامة وبالتصنيف السيرولوجي إتضح أن ٢ منها كانت سان -
جوان و ٢ برازافيلي و واحد إدينبرج . كما أن العدوى الصناعية أثبتت أن كل العترات كانت
ضارية للكناكيت عمر يوم واحد وتراوحت نسب النافق بين ٦٠ - ٩٠٪ . وقد أظهرت إختبار
الحساسية في المعمل أظهرت أن العترات كانت حساسة للكلورامفينكول والفليموكسين .

SUMMARY

Out of 196 sparrows subjected to bacteriological examinations, 4 *Salmonella* strains "one *S. stanley* and 3 *S. typhimurium*" were isolated, while 5 strains were detected from 85 doves "two strains of both *S. san-juan*, and *S. brazzaville*, and one strain of *S. edinburg*".

All the isolated strain were pathogenic for one-day-old chicks, with 60-90% mortality.

In *vitro* sensitivity test revealed that the tested Strains (9) were highly sensitive to chloramphenicol and flumequine.

INTRODUCTION

There is no doubt that the free living birds are considered as potential source of introduction of many diseases to domestic birds. HUDSON and TUDOR (1957) isolated *S. typhimurium* from several varieties of free flying birds. The authors drew attention to the possibility that these birds may spread the infection to man, domestic animals and birds. EL-AGROUDI and SADEK (1966) recorded that *S. enteritidis* and *S. typhimurium* were the most common isolates (10, 9 strains respectively) from 98 wild birds at Cairo ZOO.

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M.A. SHAHATA et al.

SMITH and TUCKER (1980) found that *S. typhimurium* killed 79% of one-day-old chicks. STEFANOV, et al. (1986) reported that all or most of 23 *S. typhimurium* strains isolated from birds were sensitive to neomycin, sulfadoxine + trimethoprim, kanamycin, gentamycin and oxytetracycline.

The present work was planned to cover the following points:

- a- Isolation and identification of different salmonellae from sparrows and doves.
- b- Pathogenicity of isolated strains to one day-old-chicks.
- c- In vitro susceptibility of Salmonella strains to antibacterial agents.

MATERIAL and METHODS

Specimens:

196 sparrows and 85 doves trapped from Assiut surroundings.

Media :

- Tetrathionate-broth, selenite F-broth, and nutrient-broth.
- MacConkey-agar, S.S. agar, brilliant green-agar, XLD- agar and sensitest-agar.

Media were prepared and sterilized according to instructions of producers (Oxoid). ANON (1982).

Antisera:

Polyvalent O,H and monovalent Salmonella agglutination sera obtained from Wellcome Research Laboratories, Beckenham, England were used.

Experimental birds:

Seventy, one day-old-chicks "Fayoumi breed" obtained from Faculty of Agriculture, Assiut University Poultry Farm.

Sensitivity discs:

Mono-discs produced by Oxoid including: Chloramphenicol 30 ug, Flumequine 30 ug, Nalidixic acid 30 ug, Ampicillin 10 ug, Furazolidone 100 ug, neomycin 10 ug, Kanamycin 30 ug, Garamycin 10 ug, Streptomycin 10 ug, oxytetracycline 30 ug tetracycline 30 ug and erythromycin 15 ug were used.

Isolation and identification of Salmonellae:

Cloacal swabs, as well as samples from liver, spleen, heart, kidneys and intestinal contents (collected from sacrificed birds) were inoculated into tetrathionate and selenite F broth, incubated at 37°C for 18 hours, followed by plating out on to MacConkey, S.S., brilliant green and XLD. The selective media were incubated at 37°C for 48 hours, suspected Salmonella colonies "pale yellow, or nearly colourless on MacConkey and S.S. agar; pink red on brilliant green agar, and red with or without black centers on X.L.D." were picked and subjected to different biochemical reactions (EDWARDS and EWING, 1972). Biochemically identified isolates were serologically typed according to Modified Kauffmann White Scheme, described by MCWHORTER, et al. (1977).

SALMONELLA IN FREE LIVING BIRDS

Experimental infections:

Random samples of 10 baby chicks were sacrificed for post-mortem as well as bacteriological examinations which proved that the chicks were healthy and Salmonella-free. sixty chicks were divided into 6 equal groups each of 10, the birds of the first five groups were given orally with 10×10^6 viable organisms/bird of different Salmonella strains, while the last group (control) was inoculated with 0.5 ml/bird of sterile broth. The experimental chicks were kept under observation for 3 weeks, clinical signs, and postmortem findings were recorded, and reisolation of the organisms was attempted.

Sensitivity test:

Disc diffusion technique was carried out, according to FINEGOLD and BARON (1986) to test 9 Salmonella strains against "12" antibacterial agents.

RESULTS

Table 1, 2 illustrate different Salmonella serotypes isolated from sparrows and doves, while Tables 3, 4 show results of experimental infections and sensitivity test respectively.

Table (1): Salmonella serotypes isolated from (196) sparrows.

Sr. No.	Salmonella	Serogr oup	Antigenic structure		No. of isolates	%	
			O Factors	H Factors			
				I			II
1	<u>S. stanley</u>	B	1,4(5),12,27	d	1,2	1	0,51
2	<u>S. typhimurium</u>	B	1,4(5),12	i	1,2	3	1,53

Table (2): Salmonella serotypes isolated from (85) doves.

Sr. No.	Salmonella	Serogr oup	Antigenic structure		No. of isolates	%	
			O Factors	H Factors			
				I			II
1	<u>S. san-juan</u>	C ₁	6,7	a	1,5	2	2,35
2	<u>S. brazzaville</u>	C ₁	6,7	b	1,2	2	2,35
3	<u>S. edinburg</u>	C ₁	6,7	b	1,5	1	1,18

M.A. SHAHATA *et al.*Table (3): Results of experimental oral infections of one day-old chicks *Salmonella* serotypes.

Group No.	Inoculated Serotypes	No. of infected chicks	No. of deaths, per day post-infection										Total deaths			
			1st.	2nd	3rd	4th	5th	6th	7th	8th	9th	10th	No.	%		
1	<i>S. stanley</i>	10		1	2	3	2								8	80
2	<i>S. typhimurium</i>	10		2	2	2	1	2							9	90
3	<i>S. brazzaville</i>	10		1	1	2	1	1	1	1					8	80
4	<i>S. edinburg</i>	10			1			1	3	2	1				8	80
5	<i>S. san-juan</i>	10		1			1	1	1	1	1				6	60
6	<i>Sterile broth</i>	10													-	-

Table (4): In vitro sensitivity of (9) *Salmonellae* to antibacterial agents.

Sr. No.	Antibacterial agents	No. of sensitive strains				No. of resistant strains
		+++	++	+	Total	
1	Chloramphenicol	9	-	-	9	-
2	Flumequine	9	-	-	9	-
3	Nalidixic acid	6	2	1	9	-
4	Ampicillin	4	2	1	7	2
5	Furazolidone	4	1	2	7	2
6	Neomycin	3	2	1	6	3
7	Kanamycin	3	1	2	6	3
8	Garamycin	2	1	3	6	3
9	Streptomycin	2	1	2	5	4
10	Oxytetracycline	1	2	1	4	5
11	Tetracycline	1	1	2	4	5
12	Erythromycin	-	-	-	-	9

DISCUSSION

Sparrows and doves because of their propensity to nest and roost near human activity, so they may harbour and disseminate *Salmonellae* to human, domestic birds and animals. The present work revealed that one strain of *S. stanley* (0.51%) and three strains of *S. typhimurium* (1.53%) were isolated from 196 sparrows. A comparatively high percent (15%) of *S. typhimurium* was detected from free flying sparrows by TIZARD, *et al.* (1979), and from other wild and psittacine birds by EL-AGROUDI and SADEK (1966) and SAWA, *et al.* (1981) (9.2% and 14.5% respectively).

Bacteriological examinations of 85 doves showed that two strains of both *S. san-juan*, *S. brazzaville* and one strain of *S. edinburg* were recovered. Although there is no available data about detection of such *Salmonella* strains from wild birds, but

S. edinburg, S. stanley and S. san-juan were isolated from chickens and/or turkeys in U.S.A. (HOFSTAD, et al., 1972).

The isolated strains were pathogenic to one day-old-chicks, leading to 60-90% mortality within 8-days, post-infections. Some-what similar findings were reported by SMITH and TUCKER (1980) who found that S. typhimurium killed 79% of one-day-old-chicks, and RAO and CHAUHAN (1987) who recorded that the experimental chicks were highly susceptible to the infection with S. stanley during the first few-days post-inoculations, while the resistance was significant after 10-days.

Concerning the in-vitro susceptibility of the isolated strains to antibacterial agents, chloramphenicol, flumequine and nalidixic acid were the most effective ones, followed by ampicillin, furazolidone, neomycin, kanamycin, garamycin and streptomycin, while oxytetracycline and tetracycline were of low inhibitory effect on the tested strains. Finally erythromycin did not affect any of the isolates. Similar work, but with different results were previously carried out by NABBUT, et al. (1981) who found that, out of 333 Salmonella strains, 99% were sensitive to furazolidone, 98.8% to chloramphenicol, 98.2% to ampicillin and 91% to streptomycin. THRELFALL, et al. (1983) recorded that S. typhimurium was resistant to gentamycin, STEFANOV, et al. (1986) reported that all or most o 23 strains of S.typhimurium were sensitive to neomycin, kanamycin, gentamycin and oxytetracycline.

The present work indicated that the free living birds may act as a reservoir of Salmonella affecting human and domestic birs, leading to severe problems.

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SALMONELLA IN FREE LIVING BIRDS

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