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دراسة عن عزل ميكروب الميكوبلازما من الطيـــور المائية المهاجرة

محسن الدمرداش ، صلاح موسى ، عادل سليمان

تم عزل ثلاثة عترات من ميكروب الميكوبلازما وصنفين من الاكوليبلازما وكـــذلك عترتين لم يتم تصنيفها من ٥٥ طائر من الطيور البرية المهاجرة .

تم تصنيف هذه العترات كيمائيا وسيرولوجيا .

وبعمل العدوى الصناعية فى كتاكيت البط البكينى ثبت أن هذه العـــترات ضارية وأحدثت آفات تشريحية ورد فعل سيرولوجى .

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AN INVESTIGATION ON THE RECOVERY OF MYCOPLASMA FROM MIGRATING WATER FOWLS (ANAS C. CRECCA' GALLINULA C. CHOROPUS AND FULICA ARTA ARTA)

(With 3 Tables)

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SUMMARY

From 55 migrating water fowls 3 mycoplasma spp. (M. anatis, M. gallinarum and M. iners), 2 Achole plasma spp. (A. laidlawii and A. axanthum) and 2 untyped strains were isolated. The isolated strains experimentally proved to be pathogenic to white pekin ducklings.

INTRODUCTION

During the recent decades, avian mycoplasmas have increasingly been found to be pathogens for birds of different species such as chikcens and turkeys. There are few references in the literature on the isolation of mycoplasma from domestic ducks (SOLIMAN, 1985; AMIN and JORDAN, 1978; EL-EBEEDY, 1976; KARPAS, 1969; ROBERTS, 1964 and FAHEY, 1955). However the prevalence of mycoplasmas in migrating water fowls as well as the importance of these birds in the transmission of the organism to domestic ducks is not yet well investigated. The aim of this work is to detect such prevalence and to examine the pathogenicity of the isolated strains to domestic ducks.

MATERIAL and METHODS

55 migrating birds (25 Anas C. crecca, 15 Gallinula C. choropus and 15 fulica arta arta) were captured from the banks of the river Nile at Assiut governorate.

Samples were taken from the respiratory tract (Trachea, Lungs and air sacs) as well as nasal and cloacal swabs. They were cultured on brain heart infusion broth then subculturec on brain heart infusion agar, incubated und low oxygen tension and humidity (SABRY, 1968).

I – Examination of the isolates:

All isolates were examined for the presence of the "common fried egg form". B acterial reversibility was excluded by maintaining the strains in proper medium in the abscence of penicillin and thallium acetate over 3 passages as well as filtration through millipore fiters.

Characterization of the strains:

All isolated strains were biochemically characterized using the methods described by FREUNDT et al. (1979). Serological identification of the strains was achieved by using the growth inhibition (GI) test according to DIERKS et al. (1967).

II - Experimental infection of ducklings:

140 one week old white pekine ducklings were used in this experiment. Before starting the experiment 20 ducklings were sacrificed and examined both bacteriologically and serologically to prove the freedom from mycoplasma. The rest 120 ducklings were divided in 6 equal groups of 20 each (5 test groups and one control).

Every group was intranasally infected with the representative strain. The dose was 0.2 ml broth suspension of the organism containing a known CFU (Table 3). All birds were kept in isolation for 8 weeks where 5 from each test group were sacrificed every other week and subjected to both bacteriological and serological examination.

RESULTS

Results of experiment no. I:

3 Mycoplasma strains (M. gallinarum, M. iners and M. anas) as well as 2 acholeplasma strains (A. Laidlawii and A. axanthum) and 2 untyped strains were isolated from the examined migrating ducks.

Results of experiment II:

Results of this experiment revealed no deaths in groups inoculated with M. anatis, M. gallinarum; M. iners and A. Laidlawii while 1 bird died in the group inoculated with A. axanthun. Clinical manifestations were observed from the 7th day post inoculation up to the 5th week then subsided. Observed signs in all groups were coughing, sneezing, nasal discharge which started as serous and ended as mucous. Sinusitis was noticed in the group inoculated with M. gallinarum. Symptoms were accompanied by loss of weight. Beside the above mentioned symptoms, birds infected with A. laidlawii revealed nervous signs as ataxia and circling that appeared at the 3rd week and persisted till the end of the experiment. The post mortem findings were varying degrees of air sacculitis and pericarditis more over birds infected with A. a anthum showed gelatinous fluid in the abdominal cavity. The inoculated strains were reisolated mainly from the respiratory organs, liver, intestine and cloaca of all birds except the group infected with M. anatis where the organism was only reisolated from the respiratory organs. Antibody response was detected by both rapid serum agglutination and growth inhibition tests.

DISCUSSION

3 Mycoplasma strains (M. anatis, M. gallinarum and M. iners) as well as 2 Acholeplasma strains (A. Laidlawii and A. axanthym) as well as untyped Mycoplasmas were isolated from the examined migrating water fowls. A higher percentage of A. laidlawii was recovered from the respiratory tract.

While A. axanthum was additionally isolated from the ovary and oviduct of birds (RAWZIA, 1976 and EL-EBEEDY, 1976). On the other hand M. gallinarum was recovered in a higher percentage from the respiratory tract and to a less degree from the cloaca. The same conclusion was recorded by JORDAN and AMIN (1980). M. anatis was equally recovered from the respiratory system and cloaca. These results are parallel with those of AMIN (1977) but they are not in agreement with those of ROBERTS (1964) and FABRICANT (1969), where they were unable to isolate the organism from the lungs. (Experimental infection revealed that A. axanthum was highly pathogenic followed by M. anatis, M. gallinarum and A. laidlawii and the least pathogenic was M. iners).

During 8 week observation no deaths were noticed in the inoculated groups with M. anatis, M. gallinarum, M. iners and A. laidlawii while one bird died in the group inoculated with A. axanthum. These results are in agreement with those of STIPKOVITIS et al. (1975), EL-EBEEDY (1976), KISSARY et al. (1976) and STIPKOVITIS et al. (1984) who recorded that A. axanthum was highly pathogenic for goslings. Birds gave symptoms from the 7th day post inoculation and persisted up to the 6th week then subsided while birds infected with A. laidlawii showed both respiratory and nervous manifestations, this agreed with the observations of EL-EBEEDY (1976) and KISSARY et al. (1976). On the other hand ADLER and SHIFRINE (1961) considered A. laidlawii to be saprophytic. The involvment of the infraobital sinuses was observed only following M. gallinarum infection and this verified the work of ROBERTS (1964) and AMIN and JORDAN (1978). Concerning the reisolation of the inoculated strains, all strains except M. anatis were mostly recovered from the respiratory tract and cloaca. Similar conclusions were recorded by AMIN and JORDAN (1978). Concerning the serological examination of sera collected from all slaughtered birds, our results revealed that most inoculated birds showed antibody response specially in birds with clea p.m. findings. The above results draw attention to the importance of migrating fowls as a reservoir of mycoplasma infection and the role which may be played by them in the epidemiology of the disease among local duck breeds. The rapid serum test proved to be more relaiable than the growth inhibition test, also the number of positive sera were decreased aging.

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Table (1)

The primary isolation of Mycoplasmas and Acheloplasmas from migrating waterfowls

Bird and species	Examined material	No. of examined birds	No. of positive isolates	Differentiation of the isolates	
				Mycoplasmas	Acholep.
Anasc.crecca	Resp.organs	25	9	3	6
	cloacal swabs.	25	4	1	3
Gallinula C.	Resp.organs	15	7	5	2
choropus	Cloacal swabs	15	3	2	1
Fulica arta	Resp.organs	15	7	4	3
arta	cloacal swabs	15	3	1	2

Table (2)

Biochemical and serological identification of the recovered isolates from migrating waterfowls

Bird species	No. of isolates	Biochemical characters			Serotyping of isolates by(GI)test						
					Mycoplasmas				Acholeplasmas		
		Glucose+ Arginin	Glucose - Arginin	Glucose+ Arginin+	M.gallarum.	M.iners	M.anatis	Untyped	A.laidlawii	A.Axanthum	Untyped
Anas C.crecca											
Respiratory system	9	7	2	-	2	-	1	-	4	1	1
Cloacal swabs	4	3	1	-	-	1	-	-	2	-	1
Gallinula C.chorpus											
Respiratory system	7	4	3	-	4	-	1	-	1	1	-
Cloacal swabs	3	2	1	-	1	1	-	-	1	-	-
Fulica arta arta											
Respiratory system	7	4	3	-	2	1	1	-	2	1	-
Cloacal swabs	3	3	-	-	-	-	1	-	1	1	-

Table (3)

The reisolation and serological response of experimentally infected ducks

Strain	Weeks post-inoculation	No. of birds	No. of positive Reisolation		No. of positive Serology	
			Resp.organs	Other organs	RSA	GI
M. Anatis	2	5	4	-	3	2
CFU $8x10^5$ ml	4	5	3	-	3	3
	6	5	1	-	2	-
	8	5	1	-	2	-
M.gallinarum	2	5	3	2	3	1
CFU $2x10^7$ ml	4	5	2	2	4	-
	6	5	2	-	3	-
	8	5	1	1	1	-
M.iners	2	5	5	-	2	2
CFU 10^8	4	5	3	-	3	1
	6	5	2	1	3	-
	8	5	2	1	2	-
M.Laidlawii	2	5	2	1	2	-
CFU $2x10^7$ ml	4	5	2	1	3	2
	5	5	2	2	3	1
	8	5	1	2	2	2
M.axanthum	2	5	2	2	2	2
CFU 10^7 ml	4	5	4	1	4	1
	6	5	3	-	3	-
	8	4	1	-	3	-