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MYCOPLASMAS PREVALENT IN QUAILS AND SOME WILD BIRDS IN EGYPT

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SUMMARY

The total incidence percentage of mycoplasma which isolated from living quails was 5.75% while it was 3.75% in dead ones, although total recovery rate in dead in sheel eggs was 10% and 6% in infertile quail eggs. Also the total recovery rate of mycoplasma isolated from kestrel falcons was 28.75% and it was 30% in Black-shoulder kite. On the other hand, the total incidence percentage of mycoplasma isolated from Moorhen fowls was 12.5% and it was 20% in Doves. Biochemical tests for glucose and arginine were done and the results were recorded. Serological examination was done by growth inhibition and growth precipitation tests which revealed that 23 strains were *M.gallisepticum*, 21 strains were *M.gallinarum*, 11 strains were *M. columborale*, 9 strains were *M.gallinaceum*, 4 strains were *M. pullorum*, one strain was *M. synoviae*, one strain was *M. columbinum*, one strain was *M. iners* and 32 strains were untyped from quails and wild birds. Serodiagnosis by using ELISA test for both sera and egg yolk of quails had no any detectable antibody titres for both *M. gallisepticum* and *M. synoviae*. The results of serodiagnosis of samples collected from living quails which were experimentally infected by *M. gallisepticum* S 6 strain and *M. gallisepticum* "field strain" under stress factors by both environmental and biological stresses, proved that no detectable antibodies were present in their sera samples indicating that these birds may act as reservoir for such mycoplasma microorganisms.

INTRODUCTION

During the last two decades a great attention was payed toward quails farming as a trial to fulfill ex-

cessive demands of the increased population from animal protein. Falcons and other wild birds play an important role in environmental balance and such birds are affected by mycoplasma which considered as one of the common poultry pathogens. Bencina et al. (1987) isolated mycoplasma species from six avian species (chicken, chick embryos, turkeys, ducks, geese, pigeons and Japanese quail and their embryos) as 411 out of 792 (52%) were infected with mycoplasmas. *Mycoplasma gallisepticum* and *M. synoviae* were the most frequently isolated species, *M. anatis* was found only in ducks and geese while *M. columbinasal, M. columbinum* and *M. columborale* were only present in pigeons. *Mycoplasma meleagridis* and *M. gallopavonis* were isolated from turkeys and *M. synoviae* from pigeons and Japanese qualis. Also different species of mycoplasma were isolated from different poultry species and their eggs and embryos (El-Ebeedy et al., 1987, Kardel, 1987 and Molokwu et al., 1987).

Poveda (1988) found the prevalent mycoplasma species in Peregrino falcon in captivity fed on chicken carcasses, were M. gallisepticum, *M. gallinarum*, *M. gallinaceum* and *M. iners*. The presence of mycoplasma species in wild birds were investigated by some authors as El-Shater et al. (1990), Poveda et al. (1990), Cobb et al. (1992) and Cookson and Shivaprasad (1994). The serodiagnosis of mycoplasma species were done by Optiz et al. (1983), Lin and kleven (1984), Avakian et al. (1988), Dingfelder et al. (1991), Ortiz and Kleven (1992) and Samuel et al. (1996). This study was planned as an attempt to throw spot lights upon the mycoplasma prevalent in quails and some wild birds via studying the pathogenicity of the prevalent isolated strains and serodiagnosis trial by using enzyme-linked immunosorbent assay (ELISA) for determining the antibody titre for the most pathogenic mycoplasma.

MATERIAL AND METHODS

Samples:

a) Birds: A total of 1020 bacteriological swabs were collected from trachea, lungs, air sacs and genital organs "testicles or ovaries". Including 100 living quails (400 samples), 100 dead quails (400), 20 kestrel falcons (Falco-tinnunculus, 80 samples), 10 Black-shoulder kite (Elanus savigny, 40); 20 Moorhen fowls (Gallinula chloropus, 80) and 5 doves (Columbiformes, 20). In addition to 300 living quails were also used for pathogenicity test.

b) Eggs:

1- Infertile eggs: 100 samples were randomly collected from the egg yolk then suspended in 5 ml PPLO broth for the possible mycoplasmal isolation and 90 samples out of them were also taken for serological examination.

2- Dead-in shell embryos: 100 samples were taken and then suspended in 5 ml PPLO broth in a trial for mycoplasma isolation.

The basal PPLO broth (Difco) media was prepared and enrichment with the following ingredients: yeast extract 5% Difco (10 ml/100ml), sterile horse serum (15 ml/100 ml), D.N.A. and inhibitors as (2%) thallium acetate (5 ml/100ml) and penicillin G-Na (2000 IU) were aseptically added. The same previously ingredients were also used for preparation of PPLO - agar plates.

Preparation of samples for mycoplasma isolation: was done according to Razin and Tully (1983). Samples were cutted by sterile scissors and grinded with sterile sand, and 5 ml of broth was then added. About 0.2-0.3 ml of the mixture was transferred into the PPLO broth and incubated at 37∞C for 3 days and then subcultured onto PPLO-agar plates which were incubated at 37∞C under reduced oxygen tension in humidified candle jars. Suspected colonies were examined after 48 hours under a stereomicroscope daily up to 7-10 days. The purification and characterization of mycoplasma isolates were done according to Sabry (1968).

Digitonin sensitivity test (Erno and Stipkovitis, 1973) was used for differentiation of myocplasma and acholeplasma colonies. Suspected typical mycoplasma colonies were biochemically identified by using glucose fermentation test and arginine deamination test (Sabry, 1968). Serological identification were done by using growth inhibition test (Clyde, 1964) and growth precipitation test (Krogsgaard, 1972).

Egg yolk preparation for ELISA test (Piela et al., 1985): 0.5 ml from egg yolk examined was taken and inserted in a test tube containing 0.5 ml buffer solution, and 1 ml chloroform solution was added and then centrifuged at 3000 r.p.m. for 3 minutes. The supernatant fluid was used for ELISA test.

Preparation of the serum dilution plate for ELISA test was done according to Mohammed et al. (1985).

ELISA test procedure: Mycoplasma coated test plate must be removed from the protective bag, then 50 ml dilution buffer was added to all wells, then 50 ml diluted mycoplasma positive control serum into well A1, A3 and H11. After that 50 ml/well from the dilution uncoated plate must be transferred to corresponding well of coated test plate. Incubation of such plates was done for 30 minutes at room temperature, then washing three to five times by using automatic washer, then 100 ml diluted conjugate into each well was dispensed. Incubate for 30 minutes at room temperature, then washed again by automatic washer and dispensed 100 ml of substrate solution into each well. Incubated for 15 minutes at room temperture and dispensed 100 ml of stopping solution into each well to stop the reaction. Then measured and recorded absorbance values "optical denisities "O.D." at 405 nm for samples and controls.

The calculation was done by using manual and computerized methods according to Briggs and Skeels (1984).

Pathogenicity test for *Mycoplasma gallisepticum*: Preparation of inocula: Local and standard isolates of M.G. were inoculated in PPLO broth without thallium acetate, incubated aerobically at 37∞C for 48 hours and diluted to give an inoculum which contained 105 to 106 C.F.U./ ml. Three hundred quails were divided into 3 groups (each of 100). Each group was subdivided into 5 subgroups (20 quails each). The 1st subgroup were infected intratracheally (I/T) with *M. gallisepticum* (S6). The 2nd subgroup were intranasally infected (I/N) by *M. gallisepticum* (S6), while the birds of 3rd ones were intratracheally infected by *M. gallisepticum* "Field strain". The 4th subgroup were experimentally infected intranasally by *M. gallisepticum* "field strain", while the birds 5th group was kept as a control. All groups were kept separately. The birds of 1st group received a balanced daily ration and kept in good ventillation condition with good source of light, the birds of 2nd group were stressed by unbalanced ration (containing no adequate amount of both protein and vitamin necessary for their growth) and very bad ventilation condition, while the birds of the 3rd group were biologically stressed by their "La Sota N.D.V. Vaccination" beside unbalanced ration and bad ventilation. The quails of these groups were daily checked to observe any characteristic signs of the C.R.D. syndrome and gross pathological lesions, then 5 birds of these subgroups were weekly slaughtered for post-mortem examination and for mycoplasma reisolation. In addition, sera from birds of the severely stressed group "third group" were collected and serologically examined by ELISA test to investigate the presence of any detectable antibodies.

RESULTS

The recovery rate of mycoplasmas from examined samples were recorded in table (1). The obtained isolates of mycoplasmas were subdivided into three groups according to their biochemical reactions (glucose fermentation and arginine utilization) as shown table (2). Serological typing of such isolates by using growth inhibition test (G.I.T.) and growth precipitation test (G.P.T.) was recorded in table (3) which revealed that from 23 isolates obtained from living quails, 4 strains were related to each of *M. gallisepticum* and *M. pullorum* (1% each), 2 strains belonged to *M. gallinaceum* (0.5%), 6 strains were related to *M. gallinaurm* (1.5%) and 7 still as untypable strains (1.75%). Meanwhile, from 15 isolates collected from dead quails, 4 strains were related to *M. gallisepticum* (1%), two strains belonged to *M. gallinaceum* (0.5%), 3 strains were *M. gallinarum* (0.75%), one strain belonged to *M. iners* (0.25%) and five strains were untypable (1.25%). From 15 isolates obtained from quail eggs, 9 strains were related to *M. gallisepticum* (3 strains originated from infertile eggs 3% and 6 strains were from dead in shell eggs 6%) and 7 were untypable strains.

As regards to kestrel falcons, *M. gallisepticum*

Table 1: Recovery rate of mycoplasma from quails and some wild birds.

Localities	Condition of samples	Qualis: Birds: No. of birds	No.of samples	Trachea	lungs	Air sacs	genital organe	Total	%	Eggs: Infertile: No. of cases	Myco. (+)	%	Eggs: Dead in shell egg: No. of cases	Myco. (+)	%
Al-Azhar fac. of agriculture	Living	25	100	1	1	1	1	4	4	20	--	--	--	--	--
	Dead	30	120	1	1	1	1	4	3.3	--	--	--	10	1	10
Bilbias	Living	15	60	1	1	1	1	4	6.7	20	2	10	--	--	--
	Dead	40	160	2	1	1	1	5	3.13	--	--	--	30	3	10
Kafr El-Sheikh	Living	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Dead	--	--	--	--	--	--	--	--	--	--	--	20	1	5
Mina Al-Kameh	Living	25	100	4	2	3	2	11	11	40	3	7.5	--	--	--
	Dead	30	120	2	1	2	1	6	5	--	--	--	40	5	12.5
Abo-Al Matameer	Living	35	140	2	1	1	-	4	2.8	20	1	5	--	--	--
	Dead	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Domiate	Living	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Dead	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	Living	100	400	8	5	6	4	23	5.75	100	6	6	--	--	--
	Dead	100	400	5	3	4	3	15	3.75	--	--	--	100	10	10

Localities	Condition of samples	Moorhen fowls: No. of birds	No.of samples	Trachea	lungs	Air sacs	genital organe	%	Falcons: No. of birds	No.of samples	Trachea	lungs	Air sacs	genital organe	%	Type	Doves: No. of birds	No.of samples	Trachea	lungs	Air sacs	genital organe	%
Al-Azhar fac. of agriculture	Living	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Dead	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Bilbias	Living	--	--	--	--	--	--	--	8	32	5	--	3	--	25	K	--	--	--	--	--	--	--
	Dead	6	24	1	1	2	--	16.7	1	4	1	--	1	--	50	B	5	20	3	--	1	--	20
Kafr El-Sheikh	Living	--	--	--	--	--	--	--	12	48	8	1	6	--	31.25	K	--	--	--	--	--	--	--
	Dead	4	16	1	--	1	--	12.5	9	36	7	2	1	--	27.80	B	--	--	--	--	--	--	--
Mina Al-Kameh	Living	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Dead	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Abo-Al Matameer	Living	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Dead	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Domiate	Living	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
	Dead	10	40	3	1	--	--	10	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
Total	Living	--	--	--	--	--	--	--	20	80	13	1	9	--	28.75	K	--	--	--	--	--	--	--
	Dead	20	80	5	2	3	--	12.60	10	40	8	2	2	--	30	B	5	20	3	--	1	--	20

Table 2: Biochemical characterization of mycoplasma species isolated from quails and some wild birds.

Criteria			Site of isolation	No of Samples*	Gl. (+) Ar. (-)	Gl. (-) Ar. (+)	Gl. (+) Ar. (+)
Quails	Birds	Living Quails	Trachea	8	5	2	1
			Lungs	5	3	2	--
			Air-Sacs	6	3	3	--
			Genital	4	4	--	--
			Sum	23	15	7	1
		Dead Quails	Trachea	5	3	2	--
			Lungs	3	1	2	--
			Air-Sacs	4	3	1	--
			Genital	3	3	--	--
			Sum	15	10	5	--
	Eggs	Infertile		6	6	--	--
		Dead-in-shell		10	9	1	--
			Sum	16	15	1	--
Falcons		Kestrel F.	Trachea	13	8	5	--
			Lungs	9	1	--	--
			Air-Sacs	1	2	1	--
			Genital	--	--	--	--
			Sum	23	11	6	--
		Blackshoulder kite F.	Trachea	8	6	2	--
			Lungs	2	1	1	--
			Air-Sacs	2	2	--	--
			Genital	--	--	--	--
			Sum	12	9	3	--
Moorhen Fowls			Trachea	5	4	1	--
			Lungs	2	2	--	--
			Air-Sacs	3	2	1	--
			Genital	--	--	--	--
			Sum	10	8	2	--
Doves			Trachea	3	2	1	--
			Lungs	--	--	--	--
			Air-Sacs	1	--	1	--
			Genital	--	--	--	--
			Sum	4	2	2	--
Total				103	70	26	1

*All samples were sensitive to 1.5% digitonin.
Gl. Glucose fermentation test. Ar.: Arginine deamination test.

Table (3): Results of serotyping of mycoplasma isolates by "G.I.T." according to biochemical grouping.

Type of mycoplasmal isolates	Quali samples								Falcon samples				Moorhen fowls samples (80)		Doves samples (20)	
	Birds						Eggs		Kestrel F. (80)		Bkack-shoulder kite (40)					
	Living (400)		Dead (400)		Infertile (100)		Eggs									
	No. of isolates	Incidence %	No. of isolates	Incidence %	No. of isolates	Incidence %	No. of isolates	Incidence %	No. of isolates	Incidence %	No. of isolates	Incidence %	No. of isolates	Incidence %	No. of isolates	Incidence %
Group (1):																
M. gallisepticum	4	1	4	1	3	3	6	6	2	2.5	1	2.5	3	3.75		
M. synoviae													1	1.75		
M. pullorum	4	1														
M. givcophilum																
M. gallinaceum	2	0.5	2	0.5							1	2.5	4	5		
M. anatis																
M. gallopavonis																
M. columborale									8	10	1	2.5			2	10
Untyped	5	1.25	4	1	3	3	3	3	7	8.75	6	15				
Group (2):																
M. anseris																
M. cloacale																
M. meleagridis																
M. gallinarum	6	1.5	3	0.75					6	7.5	3	7.5	2	2.5	1	5
M. iners			1	0.25												
M. columbinasal																
M. columbinum															1	5
Unt yped	1	0.25	1	0.25			1	1								
Group (3):																
M. iowae																
M. lipofaiens																
Untyped	1	0.25														
Total	23	5.75	15	3.75	6	6	10	10	23	28.75	12	30	10	12.5	4	20

G.I.T. Growth inhibtion test

G.P.T. Growth precipitation test

M. columborale, *M. gallinarum*, and untypable isolates were identified in an incidence of 2.5 %, 10%; 7.5% and 8.75% respectively.

From 12 isolates obtained from Black-shoulder - kite falcons, *M. gallisepticum*, *M. gallinaceum*, *M. columborale* and *M. gallinarum* were identified in an incuidence of 2.5%, 2.5%, 23.5% and 7.5% respectively and 6 strains still untypable (15%). From 10 isolates collected from Moorhen fowls, 3 strains belonged to *M. gallisepticum* (3.75%), one strain belonged to *M.synoviae* (1.25%), 4 strains were related to *M. gallinaceum* (5%) and two strains belonged to *M. gallinarum* (2.5%).

From 4 isolates obtained from doves, 2 strains were related to *M. columborale* (10%), one strain was each of *M. gallinarum* and *M. columbinum* (5% each).

Frequency distribution of mycoplasma isolated from various sites:

A total of 8 isolates were recovered from trachea of living quails (2%), 2 were identified as *M. gallisepticum* (0.5%), one isolate was each of *M. pullorum*, *M. gallinaceum*, *M. gallinarum* (0.25% each) and 3 isolates were untypable (0.75%). Five isolates were obtained from lungs of living quails (1.25%), two of them were identified as *M. pullorum* (0.5%), one isolate was *M. gallinaceum* (0.25%) and two isolates were *M. gallinarum* (0.5%). Six isolates were isolated from air sacs of living quails (1.5%), one isolate from each of *M. gallisepticum* and *M. pullorum* (0.25% each), 3 isolates were *M. gallinarum* (0.75%) and one isolate was untypable (0.25%).

Four isolates were recovered from genital organs of living quails (1%) "2 isolates from the ovaries and 2 isolates from testes", one isolate was *M. gallisepticum* (0.25%) and the other 3 isolates were untypable (0.75%). In addition to five isolates were obtained from trachea of dead quails (1.25%) from both one isolate from each of *M. gallisepticum*, *M. gallinaceum*, and *M. iners* (0.25% each) was identified and two isolates were untypable (0.5%). Also, three isolates were collected from lungs of dead quails (0.75%), one of them was *M. gallinaceum* (0.25%) and two of them were indentified as *M. gallinarum* (0.5%).

Four isolates were secured from air sacs of dead quails (1%), one isolate from each of *M. gallisepticum* and *M.gallinarum* (0.25% each) and the remaining were untypable (0.5%). Lastly, three isolates were obtained from quail genital organs (0.75%), two of them were identified as *M. gallisepticum* (0.5%) "one isolate from ovary and another one from testes" and one isolate still untyped was recovered from ovary.Sixteen isolates were recovered from quail eggs, six isolates were from infertile eggs (6%), three of them were serologically typed as *M. gallisepticum* (3%) and 10 isolates were from dead in shell eggs (10%), six

of them were *M. gallisepticum* (6%) and 7 isolates were untypable (7%) as shown in table (4).

Thirteen isolates were collected from the trachea of Kestrel falcons (16.25%), two of them were identified as *M. columborale* (2.5%), one isolate was *M. gallisepticum* (1.25%), five of them belonged to *M. gallinarum* (6.25%) and the other five isolates were untypable (6.25%). Also one untyped isolate was obtained from lung of kestrel falcons (1.25%). While nine isolates were collected from air sacs of kestrel falcons (11.25%), six of them were *M. columborale* (7.5%), one isolate was identified as each of *M. gallisepticum, M. gallinarum* and untyped strain (1.25% each). Eight isolates were collected from trachea of Black-shoulder-kite falcons (20%), on identification, one of them was *M. gallisepticum* (2.5%), two isolates were *M. gallinarum* (5%), one isolate was *M. gallinaceum* (2.5%) and four isolates were untypable (10%). Also two isolates were secured from lungs of Black-shoulder-kite falcons (5%), one of them was *M. gallinaurm* (2.5%) and another one was still untyped (2.5%). Besides two isolates were obtained from air sacs of Black - shoulder-kite falcons (5%), one isolate was *M. columborale* (2.5%) and one isolate was untyped (2.5%). No isolates could be obtained from genital organs of falcons as shown in table (4).

Five isolates were collected from trachea of Moorhen fowls (6.25%), one of them was each of M. gallisepticum, *M. gallinarum* and *M. synoviae* (1.25% each) and two isolates were identified as *M. gallinaceum* (2.5%). Also two isolates were recovered from lungs of Moorhen fowls (2.5%), and identified as *M. gallisepticum* and *M. gallinaceum* (1.25% each). While three isolates were obtained from air sacs of Moorhen fowls (3.75%), on identification, *M. gallisepticum, M. gallinaceum* and *M. gallinarum* were recorded (1.25% each).

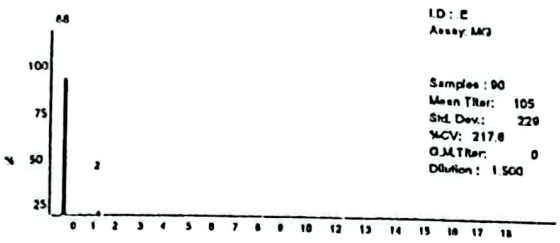
Three isolates were obtained from trachea of doves (15%), two isolates belonged to *M. columborale* (10%) and one was *M. gallinarum* (5%). While only one strain belonging to, *M. columbinum* (5%) was obtained from air sac. No isolates could be obtained from lungs and genital organs of doves. The previously data are recorded in table (4).

Results of serodiagnosis of *M. gallisepticum* and *M. synoviae* by using ELISA technique:

A) For *M. gallisepticum*: The results of serodiagnosis of *M. gallisepticum* revealed that only two serum samples gave positive immunoresponse at 1st group of titre (2.22%) and the remaining 88 serum samples lied in (0) group of titre (97.8%) and the mean titre was 105 under the mean titre of group "0" (0-499) as in (Fig.1). While in quail eggs the obtained data indicated that two sera out of examined 90 samples were positive at 1st group of titre (2.22%) and one sample was positive each of 2nd and 3rd titre group (1.11%) and (1.11%)

Table(4): Frequency distribution of mycolplasmas isolated from quails and some wild birds.

No. of samples and site of isolations		M. gallisepticum		M. pullorum		M. gallinaceum		M. galinarum		M. iners		M. columborale		M. synoviae		M. columbinum		Untypable mycoplasma		Total	
		No.of isolates	%	No.of isolates	%	No.of isolates	%	No.of isolates	%	No.of isolates	%	No.of isolates	%	No.of isolates	%	No.of isolates	%	No.of isolates	%	No.of isolates	%
Living Quails (400) samples	Trachea	2	0.5	1	0.25	1	0.25	1	0.25	-	-	-	-	-	-	-	-	3	0.75	8	2
	Lungs	-	-	2	0.5	1	0.25	2	0.5	-	-	-	-	-	-	-	-	-	-	5	1.25
	Air-Sacs	1	0.25	1	0.25	-	-	3	0.75	-	-	-	-	-	-	-	-	1	0.25	6	1.5
	Genital ovary	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2	0.5	2	0.5
	organs testes	1	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.25	2	0.5
	Total (400)	4	1	4	1	2	0.5	6	1.5	-	-	-	-	-	-	-	-	7	1.75	23	5.75
Dead Quails (400) samples	Trachea	1	0.25	-	-	1	0.25	-	-	1	0.25	-	-	-	-	-	-	2	0.5	5	1.25
	Lungs	-	-	-	-	1	0.25	2	0.5	-	-	-	-	-	-	-	-	-	-	3	0.75
	Air-Sacs	1	0.25	-	-	-	-	1	0.25	-	-	-	-	-	-	-	-	2	0.5	4	1
	Genital ovary	1	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.25	2	0.5
	organs testes	1	0.25	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	0.25
	Total (400)	4	1	-	-	2	0.5	3	0.75	1	0.25	-	-	-	-	-	-	5	1.25	15	3.75
Quail eggs	Infertile (100)	3	3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	3	3	6	6
	Dead inshell (100)	6	6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4	4	10	10
	Total	9	9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	7	7	16	16
Kestrel falcons (80 samples)	Trachea	1	1.25	-	-	-	-	5	6.25	-	-	2	2.5	-	-	-	-	5	6.25	13	16.25
	Lungs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	1.25	1	1.25
	Air-Sacs	1	1.25	-	-	-	-	1	1.25	-	-	6	7.5	-	-	-	-	1	1.25	9	11.25
	Total (80)	2	2.5	-	-	-	-	6	7.5	-	-	8	10	-	-	-	-	7	8.75	23	28.75
Blackshoulder kite falcons (40 samples)	Trachea	1	2.5	-	-	1	2.5	2	5	-	-	-	-	-	-	-	-	4	10	8	20
	Lungs	-	-	-	-	-	-	1	2.5	-	-	-	-	-	-	-	-	1	2.5	2	5
	Air-Sacs	-	-	-	-	-	-	-	-	-	-	1	5.5	-	-	-	-	1	2.5	2	4
	Total (80)	1	2.5	-	-	1	2.5	3	7.5	-	-	1	2.5	-	-	-	-	6	15	12	30
Moorhen Fowl (80 samples)	Trachea	1	1.25	-	-	2	2.5	1	1.25	-	-	-	-	1	1.25	-	-	-	-	5	6.25
	Lungs	1	1.25	-	-	1	1.25	-	-	-	-	-	-	-	-	-	-	-	-	2	2.5
	Air-Sacs	1	1.25	-	-	1	1.25	1	1.25	-	-	-	-	-	-	-	-	-	-	3	3.75
	Total (80)	3	3.75	-	-	4	5	2	2.5	-	-	-	-	1	1.25	-	-	-	-	10	12.5
Doves (20 samples)	Trachea	-	-	-	-	-	-	1	5	-	-	2	10	-	-	-	-	-	-	3	15
	Lungs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Air-Sacs	-	-	-	-	-	-	-	-	-	-	-	-	-	-	1	5	-	-	1	5
	Total (80)	-	-	-	-	-	-	1	5	-	-	2	10	-	-	1	5	-	-	4	20

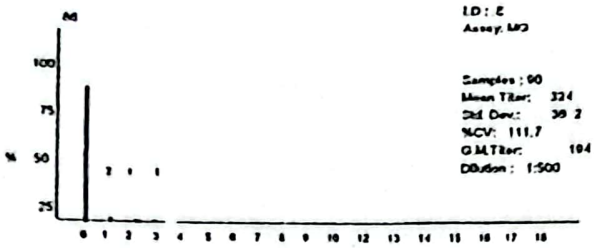


E
MG DIL:1:500
NEAN TITER: 105 % CV: 217.6
G.M.T.: 0

WELL	RAW O.D.	S/P RATIO	Titre	TITR GROUP
- A01	0.147	00.04	72	0
- A02	0.093	00.00	0	0
+ A03	0.895	00.90	2047	3
+ A04	0.820	01.10	2538	3
1 A05	0.163	00.07	121	0
2 A06	0.182	00.10	180	0
3 A07	0.229	00.17	334	0
4 A08	0.132	00.02	30	0
5 A09	0.190	00.11	208	0
6 A10	0.194	00.12	219	0
7 A11	0.080	00.00	0	0
8 A12	0.011	00.00	0	0
9 B01	0.042	00.00	0	0
10 B02	0.511	00.61	1344	1
11 B03	0.267	00.23	462	0
12 B04	0.151	00.05	84	0
13 B05	0.249	00.20	401	0
14 B06	0.180	00.09	174	0
15 B07	0.207	00.14	261	0
16 B08	0.225	00.16	320	0
17 B09	0.121	00.00	2	0
18 B10	0.041	00.00	0	0
19 B11	0.042	00.00	0	0
20 B12	0.001	00.00	0	0
21 C01	0.034	00.00	0	0
22 C02	0.086	00.00	0	0
23 C03	0.117	00.00	0	0
24 C04	0.192	00.11	212	0
25 C05	0.457	00.53	1143	0
26 C06	0.127	00.01	16	0
27 C07	0.222	00.16	310	0
28 C08	0.163	00.07	121	0
29 C09	0.060	00.00	0	0
30 C10	0.015	00.00	0	0
31 C11	0.022	00.00	0	0
32 C12	0.022	00.00	0	0
33 D01	0.139	00.03	49	0
34 D02	0.209	00.14	267	0
35 D03	0.085	00.00	0	0
36 D04	0.084	00.00	0	0
37 D05	0.067	00.00	0	0
38 D06	0.266	00.23	459	0
39 D07	0.110	00.00	0	0
40 D08	0.101	00.00	0	0
41 D09	0.030	00.00	0	0
42 D01	0.009	00.00	0	0
43 D11	0.019	00.00	0	0

WELL	RAW O.D.	S/P RATIO	Titre	TITR GROUP
44 D12	0.0158	00.06	105	0
45 E01	0.0198	00.12	232	0
46 E02	0.001	00.00	0	0
47 E03	0.188	00.11	199	0
48 E04	0.089	00.00	0	0
49 E05	0.377	00.40	851	0
50 E06	0.028	00.00	0	0
51 E07	0.054	00.00	0	0
52 E08	0.073	00.00	0	0
53 E09	0.035	00.00	0	0
54 E10	0.045	00.00	0	0
55 E11	0.091	00.00	0	0
56 E12	0.026	00.00	0	0
57 F01	0.004	00.00	0	0
58 F02	0.122	00.00	4	0
59 F03	0.122	00.00	4	0
60 F04	0.082	00.00	0	0
61 F05	0.176	00.09	161	0
62 F06	0.047	00.00	0	0
63 F07	0.031	00.00	0	0
64 F08	0.020	00.00	0	0
65 F09	0.018	00.00	0	0
66 F10	0.025	00.00	0	0
67 F11	0.007	00.00	0	0
68 F12	0.025	00.00	0	0
69 G01	0.044	00.00	0	0
70 G02	0.039	00.00	0	0
71 G03	0.144	00.04	64	0
72 G04	0.036	00.00	0	0
73 G05	0.076	00.00	0	0
74 G06	0.199	00.12	235	0
75 G07	0.033	00.00	0	0
76 G08	0.299	00.28	573	0
77 G09	0.058	00.00	0	0
78 G10	0.068	00.00	0	0
79 G11	0.009	00.00	0	0
80 G12	0.072	00.00	0	0
81 H01	0.133	00.02	32	0
82 H02	0.124	00.01	0	0
83 H03	0.094	00.00	0	0
84 H04	0.097	00.00	0	0
85 H05	0.062	00.00	0	0
86 H06	0.104	00.00	0	0
87 H07	0.212	00.14	277	0
88 H08	0.024	00.00	0	0
89 H09	0.006	00.00	0	0
90 H10	0.048	00.00	0	0

Fig. (1): *Mycoplasma gallisepticum* antibody titre in sera of quails.

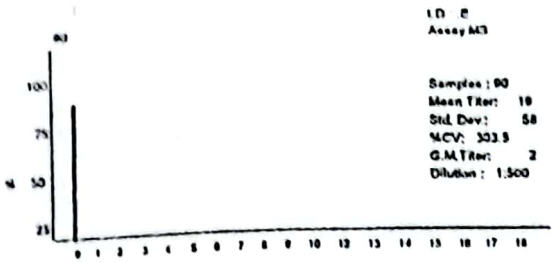


E
MG DIL:1:500
NEAN TITER: 324 % CV: 111.7
G.M.T.: 194

WELL	RAW O.D.	S/P RATIO	Titre	TITR GROUP
- A01	0.005	00.00	1	0
- A02	0.010	00.01	10	0
+ A03	0.418	00.15	2663	3
+ A04	0.312	00.85	1923	2
1 A05	0.083	00.21	420	0
2 A06	0.019	00.03	54	0
3 A07	0.033	00.07	128	0
4 A08	0.029	00.06	106	0
5 A09	0.069	00.17	336	0
6 A10	0.384	01.05	2423	3
7 A11	0.075	00.19	372	0
8 A12	0.193	00.52	1120	1
9 B01	0.286	00.78	1744	2
10 B02	0.060	00.15	283	0
11 B03	0.035	00.08	139	0
12 B04	0.069	00.17	336	0
13 B05	0.015	00.02	33	0
14 B06	0.020	00.03	59	0
15 B07	0.073	00.18	360	0
16 B08	0.013	00.02	24	0
17 B09	0.063	00.16	300	0
18 B10	0.016	00.02	38	0
19 B11	0.088	00.23	451	0
20 B12	0.023	00.04	74	0
21 C01	0.034	00.07	134	0
22 C02	0.047	00.11	207	0
23 C03	0.105	00.27	555	0
24 C04	0.083	00.21	420	0
25 C05	0.051	00.12	230	0
26 C06	0.105	00.27	555	0
27 C07	0.043	00.10	184	0
28 C08	0.144	00.38	802	0
29 C09	0.056	00.14	259	0
30 C10	0.066	00.16	318	0
31 C11	0.030	00.06	112	0
32 C12	0.039	00.09	162	0
33 D01	0.030	00.06	112	0
34 D02	0.045	00.10	196	0
35 D03	0.002	00.00	1	0
36 D04	0.065	00.16	312	0
37 D05	0.015	00.02	33	0
38 D06	0.017	00.03	43	0
39 D07	0.101	00.26	531	0
40 D08	0.031	00.07	117	0
41 D09	0.042	00.10	179	0
42 D01	0.027	00.05	96	0
43 D11	0.041	00.09	173	0

WELL	RAW O.D.	S/P RATIO	Titre	TITR GROUP
44 D12	0.033	00.07	128	0
45 E01	0.042	00.10	179	0
46 E02	0.039	00.09	162	0
47 E03	0.034	00.07	134	0
48 E04	0.976	00.19	378	0
49 E05	0.023	00.04	74	0
50 E06	0.140	00.37	776	0
51 E07	0.039	00.09	162	0
52 E08	0.065	00.16	312	0
53 E09	0.039	00.09	162	0
54 E10	0.087	00.22	444	0
55 E11	0.022	00.04	69	0
56 E12	0.056	00.14	259	0
57 F01	0.142	00.38	789	0
58 F02	0.031	00.07	117	0
59 F03	0.028	00.06	101	0
60 F04	0.059	00.14	277	0
61 F05	0.048	00.11	213	0
62 F06	0.053	00.13	242	0
63 F07	0.061	00.15	288	0
64 F08	0.019	00.03	54	0
65 F09	0.213	00.57	1252	1
66 F10	0.035	00.08	139	0
67 F11	0.019	00.03	54	0
68 F12	0.035	00.08	139	0
69 G01	0.026	00.05	90	0
70 G02	0.163	00.43	924	0
71 G03	0.091	00.23	469	0
72 G04	0.017	00.03	43	0
73 G05	0.071	00.18	348	0
74 G06	0.052	00.12	236	0
75 G07	0.057	00.14	265	0
76 G08	0.146	00.39	814	0
77 G09	0.088	00.23	451	0
78 G10	0.097	00.25	506	0
79 G11	0.004	00.00	1	0
80 G12	0.023	00.04	74	0
81 H01	0.64	00.16	306	0
82 H02	0.133	00.35	731	0
83 H03	0.066	00.16	318	0
84 H04	0.065	00.16	312	0
85 H05	0.049	00.12	219	0
86 H06	0.086	00.22	438	0
87 H07	0.043	00.10	184	0
88 H08	0.075	00.19	372	0
89 H09	0.077	00.19	384	0
90 H10	0.057	00.14	285	0

Fig. (2): *Mycoplasma gallisepticum* antibody titre in eggs of quails.

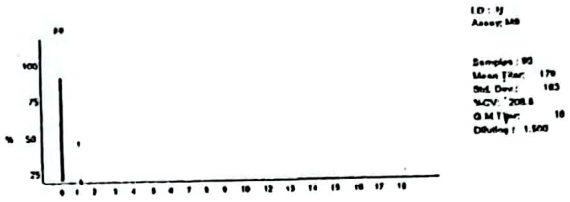


E
MG DIL:1:500
NEAN TITER: 19 % CV: 303.5
G.M.T.: 2

	WELL	RAW O.D.	S/P RATIO	Titre	TITR GROUP
-	A01	0.098	00.00	1	0
-	A02	0.145	00.04	71	0
+	A03	0.508	00.68	1507	2
+	A04	0.866	01.32	3097	4
1	A05	0.014	00.00	1	0
2	A06	0.147	00.05	78	0
3	A07	0.017	00.00	1	0
4	A08	0.083	00.00	1	0
5	A09	0.005	00.00	1	0
6	A10	0.034	00.00	1	0
7	A11	0.055	00.00	1	0
8	A12	0.088	00.00	1	0
9	B01	0.139	00.03	51	0
10	B02	0.143	00.04	65	0
11	B03	0.129	00.01	20	0
12	B04	0.072	00.00	1	0
13	B05	0.146	00.04	74	0
14	B06	0.170	00.09	157	0
15	B07	0.094	00.00	1	0
16	B08	0.189	00.12	228	0
17	B09	0.082	00.00	1	0
18	B10	0.174	00.09	172	0
19	B11	0.116	00.00	1	0
20	B12	0.193	00.13	240	0
21	C01	0.203	00.14	277	0
22	C02	0.071	00.00	1	0
23	C03	0.047	00.00	1	0
24	C04	0.032	00.00	1	0
25	C05	0.026	00.00	1	0
26	C06	0.029	00.00	1	0
27	C07	0.030	00.00	1	0
28	C08	0.044	00.00	1	0
29	C09	0.065	00.00	1	0
30	C10	0.054	00.00	1	0
31	C11	0.071	00.00	1	0
32	C12	0.020	00.00	1	0
33	D01	0.007	00.00	1	0
34	D02	0.004	00.00	1	0
35	D03	0.011	00.00	1	0
36	D04	0.013	00.00	1	0
37	D05	0.003	00.00	1	0
38	D06	0.075	00.00	1	0
39	D07	0.051	00.00	1	0
40	D08	0.001	00.00	1	0
41	D09	0.051	00.00	1	0
42	D01	0.201	00.14	270	0
43	D11	00.084	00.00	1	0

	WELL	RAW O.D.	S/P RATIO	Titre	TITR GROUP
44	D12	0.006	00.06	1	0
45	E01	0.088	00.00	1	0
46	E02	0.095	00.00	1	0
47	E03	0.016	00.00	1	0
48	E04	0.066	00.00	1	0
49	E05	0.013	00.00	1	0
50	E06	0.048	00.00	1	0
51	E07	0.005	00.00	1	0
52	E08	0.091	00.00	1	0
53	E09	0.95	00.00	1	0
54	E10	0.094	00.00	1	0
55	E11	0.027	00.00	1	0
56	E12	0.097	00.00	1	0
57	F01	0.049	00.00	1	0
58	F02	0.014	00.00	1	0
59	F03	0.012	00.00	1	0
60	F04	0.052	00.00	1	0
61	F05	0.001	00.00	1	0
62	F06	0.042	00.00	1	0
63	F07	0.009	00.00	1	0
64	F08	0.095	00.00	1	0
65	F09	0.094	00.00	1	0
66	F10	0.075	00.00	1	0
67	F11	0.079	00.00	1	0
68	F12	0.049	00.00	1	0
69	G01	0.035	00.00	1	0
70	G02	0.041	00.00	1	0
71	G03	0.022	00.00	1	0
72	G04	0.081	00.00	1	0
73	G05	0.080	00.00	1	0
74	G06	0.105	00.00	1	0
75	G07	0.062	00.00	1	0
76	G08	0.03	00.00	1	0
77	G09	0.039	00.00	1	0
78	G10	0.052	00.00	1	0
79	G11	0.058	00.00	1	0
80	G12	0.091	00.00	1	0
81	H01	0.048	00.00	1	0
82	H02	0.038	00.00	1	0
83	H03	0.018	00.00	1	0
84	H04	0.061	00.00	1	0
85	H05	0.058	00.00	1	0
86	H06	0.037	00.00	1	0
87	H07	0.090	00.00	1	0
88	H08	0.083	00.00	1	0
89	H09	0.113	00.00	1	0
90	H10	0.085	00.00	1	0

Fig. (3): *Mycoplasma synoviae* antibody titre in sera of quails.



E
MG DIL:1:500
NEAN TITER: 79 % CV: 206.8
G.M.T.: 16

	WELL	RAW O.D.	S/P RATIO	Titre	TITR GROUP
-	A01	0.004	00.00	2	0
-	A02	0.008	00.01	11	0
+	A03	0.315	00.17	2719	3
+	A04	0.225	00.83	1868	2
1	A05	0.011	00.02	30	0
2	A06	0.006	00.00	2	0
3	A07	00.06	00.00	2	0
4	A08	0.001	00.00	2	0
5	A09	0.002	00.00	2	0
6	A10	0.038	00.12	229	0
7	A11	0.007	00.00	5	0
8	A12	0.016	00.04	64	0
9	B01	0.027	00.08	145	0
10	B02	0.012	00.02	37	0
11	B03	0.008	00.01	11	0
12	B04	0.002	00.00	2	0
13	B05	0.002	00.00	2	0
14	B06	0.001	00.00	2	0
15	B07	0.005	00.00	2	0
16	B08	0.017	00.04	71	0
17	B09	0.003	00.00	2	0
18	B10	0.022	00.06	107	0
19	B11	0.004	00.0	2	0
20	B12	0.023	00.06	115	0
21	C01	0.003	00.00	2	0
22	C02	0.087	00.31	631	0
23	C03	0.145	00.53	1138	1
24	C04	0.002	00.00	2	0
25	C05	0.006	00.00	2	0
26	C06	0.010	00.02	23	0
27	C07	0.006	00.00	2	0
28	C08	0.001	00.00	2	0
29	C09	0.015	00.03	57	0
30	C10	0.018	00.05	78	0
31	C11	0.025	00.07	130	0
32	C12	0.037	00.12	221	0
33	D01	0.017	00.04	71	0
34	D02	0.096	00.34	708	0
35	D03	0.014	00.03	50	0
36	D04	0.014	00.03	50	0
37	D05	0.003	00.0	2	0
38	D06	0.001	00.00	2	0
39	D07	0.035	00.11	206	0
40	D08	0.015	00.03	57	0
41	D09	0.013	00.03	43	0
42	D01	0.013	00.03	43	0
43	D11	0.016	00.04	64	0

	WELL	RAW O.D.	S/P RATIO	Titre	TITR GROUP
44	D12	0.032	00.10	183	0
45	E01	0.004	00.00	2	0
46	E02	0.006	00.00	2	0
47	E03	0.009	00.01	17	0
48	E04	0.014	00.03	50	0
49	E05	0.003	00.00	2	0
50	E06	0.004	00.00	2	0
51	E07	0.009	00.01	17	0
52	E08	0.013	00.03	43	0
53	E09	0.021	00.06	100	0
54	E10	0.024	00.07	122	0
55	E11	0.030	00.09	167	0
56	E12	0.033	00.10	190	0
57	F01	0.006	00.00	2	0
58	F02	0.022	00.06	107	0
59	F03	0.001	00.00	2	0
60	F04	0.010	00.02	23	0
61	F05	0.001	00.00	2	0
62	F06	0.011	00.02	30	0
63	F07	0.011	00.02	30	0
64	F08	0.026	00.08	137	0
65	F09	0.034	00.11	198	0
66	F10	0.043	00.14	269	0
67	F11	0.048	00.16	308	0
68	F12	0.051	00.17	333	0
69	G01	0.007	00.00	5	0
70	G02	0.003	00.00	2	0
71	G03	0.011	00.02	30	0
72	G04	0.009	00.01	17	0
73	G05	0.001	00.00	2	0
74	G06	0.005	00.00	2	0
75	G07	0.007	00.00	5	0
76	G08	0.006	00.00	2	0
77	G09	0.012	00.02	37	0
78	G10	0.014	00.03	50	0
79	G11	0.004	00.00	2	0
80	G12	0.007	00.00	5	0
81	H01	0.013	00.03	43	0
82	H02	0.017	00.04	71	0
83	H03	0.007	00.00	5	0
84	H04	0.001	00.00	2	0
85	H05	0.006	00.00	2	0
86	H06	0.003	00.00	2	0
87	H07	0.004	00.00	2	0
88	H08	0.005	00.00	2	0
89	H09	0.008	00.01	11	0
90	H10	00.09	00.01	17	0

Fig. (4): The level of Mycoplasma synoviae in quail eggs.

E
MG DIL: 1:500
NEAN TITER: 58 % CV: 96.3
G.M.T.: 0

	WELL	RAW O.D.	S/P RATIO	Titre	TITR GROUP
-	A01	0.004	00.00	0	0
-	A02	0.004	00.00	0	0
+	A03	1.294	01.00	2287	3
+	A04	1.297	01.00	2293	3
1	A05	0.030	00.02	32	0
2	A06	0.021	00.01	20	0
3	A07	0.006	00.00	1	0
4	A08	0.043	00.03	50	0
5	A09	0.050	00.04	60	0
6	A10	0.047	00.03	58	0
7	A11	0.065	00.050	82	0
8	A12	0.035	0.02	39	0
9	B01	0.025	00.02	25	0
10	B02	0.073	00.05	94	0
11	B03	0.071	00.05	91	0
12	B04	0.011	00.01	7	0
13	B05	0.121	00.09	167	0
14	B06	0.057	00.04	70	0
15	B07	0.035	00.02	39	0
16	B08	0.079	00.06	102	0
17	B09	0.025	00.02	25	0
18	B10	0.52	00.04	63	0
19	B11	0.005	00.00	0	0
20	B12	0.047	00.03	58	0
21	C01	0.027	00.02	28	0
22	C02	0.020	00.01	19	0
23	C03	0.035	00.02	39	0
24	C04	0.035	00.02	39	0
25	C05	0.035	00.02	39	0
26	C06	0.005	00.00	0	0
27	C07	0.010	00.00	6	0
28	C08	0.010	00.00	6	0
29	C09	0.052	00.04	63	0
30	C10	0.031	00.02	33	0
31	C11	0.025	00.02	25	0
32	C12	0.019	00.01	17	0
33	D01	0.099	00.07	133	0
34	D02	0.062	00.04	77	0
35	D03	0.091	00.07	121	0
36	D04	0.010	00.00	6	0
37	D05	0.036	00.02	40	0
38	D06	0.016	00.01	13	0
39	D07	0.033	00.02	36	0
40	D08	0.111	00.08	151	0
41	D09	0.016	00.01	13	0
42	D01	0.050	00.04	60	0
43	D11	0.046	00.03	54	0

	WELL	RAW O.D.	S/P RATIO	Titre	TITR GROUP
44	D12	0.003	00.00	0	0
45	E01	0.030	00.02	32	0
46	E02	0.115	00.09	157	0
47	E03	0.137	00.10	192	0
48	E04	0.213	00.16	314	0
49	E05	0.045	00.03	53	0
50	E06	0.034	00.02	37	0
51	E07	0.032	00.02	35	0
52	E08	0.105	00.08	142	0
53	E09	0.028	00.02	29	0
54	E10	0.09	00.08	148	0
55	E11	0.062	00.04	77	0
56	E12	0.013	00.01	10	0
57	F01	0.038	00.03	43	0
58	F02	0.058	00.04	71	0
59	F03	0.069	00.05	88	0
60	F04	0.054	00.04	66	0
61	F05	0.070	00.05	89	0
62	F06	0.001	00.00	0	0
63	F07	0.025	00.02	25	0
64	F08	0.031	00.02	33	0
65	F09	0.045	00.03	53	1
66	F10	0.084	00.06	110	0
67	F11	0.023	00.01	23	0
68	F12	0.028	00.02	29	0
69	G01	0.125	00.09	173	0
70	G02	0.012	00.01	8	0
71	G03	0.011	00.01	7	0
72	G04	0.072	00.05	92	0
73	G05	0.030	00.02	32	0
74	G06	0.014	00.01	11	0
75	G07	0.018	00.01	16	0
76	G08	0.114	00.09	156	0
77	G09	0.026	00.02	29	0
78	G10	0.033	00.02	36	0
79	G11	0.026	00.02	27	0
80	G12	0.027	00.02	28	0
81	H01	0.158	00.12	225	0
82	H02	0.054	00.04	66	0
83	H03	0.014	00.01	11	0
84	H04	0.049	00.03	59	0
85	H05	0.107	00.08	145	0
86	H06	0.039	00.03	44	0
87	H07	0.046	00.03	54	0
88	H08	0.052	00.04	63	0
89	H09	0.006	00.00	1	0
90	H10	0.011	00.01	7	0

Fig. (5): Level of *Mycoplasma gallisepticum* antibodies in sera of group of quails experimentally infected with this microorganism under stress conditions.

for each respectively, while the remaining 86 samples gave no detectable immunoresponse (95.6%) and the mean titre was 324 under the mean titre group "O' (0-499) as shown in (Fig. 2).

B) For *M. synoviae*: The result of the serodiagnosis of *M. synoviae* by using ELISA technique revealed that all collected isolates obtained from sera of the examined 90 quails were presented under titre group (0) 100% as specific antibodies did not present and the mean titre were (19), Geometric mean titre were (2), which lies under group zero (0-499) as illustrated in (Fig. 3).

The *M. synoviae* antibodies titre in quail eggs revealed that the one smaple was lied under the group (I) "1.11%" and the remaining 89 samples gave no detectable immunoresponse (98.9%). The mean titre was (79), Geometric mean was (16) which lies under group Zero (0-499) as in (Fig.4).

Results of experimental infection of quails with both local field strain and S6 strain of *M. gallisepticum*:

The obtained data revealed that all groups of quails bred under various stress factors did not clinically succumb the infection and there were no characteristic *P.M. lesions* of *M. gallisepticum* infection. When serum samples of quails of the 3rd group "stressed by both environmental and biological stresses" were collected and serologically examined by ELISA they gave no detectable specific antibodies (Fig. 5).

DISCUSSION

Like most creatures quails and wild birds may play a considerable role in the dissemination of many pathogens and their role for the transmission of mycoplasma organisms in still a point of argument, so this study was planned to detect their anticipated role as reservoirs for these microorganisms . In order to attain this goal random samples were collected from quails, Falcons (Kestrel and Black-shoulder kite), Moorhen fowls and Doves. The obtained data revealed that 23 mycoplasma isolates were recovered from 400 samples collected from 100 living quails (5.75%). The serological identification and frequency distribution of such isolates were recorded in tables (3&4). Six mycoplasma isolates originated from 100 infertile quail eggs (6%), three out of them were *M.gallisepticum* (3%) and 3 were untyped (3%). In addition to 10 mycoplasma isolates were secured from 100 dead in shell embryos eggs (10%), 6 out of them were *M. gallisepticum* (6%) and 4 were untyped (4%). These results agree with whose reported by Tiong (1978) who isolated and identified *M. gallisepticum* from three quails, suffering from contagious purulent sinusitis. Moreover, Maria and Elmiro (1985) isolate

M. gallisepticum from sinuses of Japanese quails. Also, Reece et al. (1986A) isolated *M. gallisepticum* from two flock of quails but with high incidence rates of 10% and 13%. While Shah-Majid and Nihayah (1987) proved that no mycoplasmas could be isolated from 20 examined quails indicating that they did not contracted the infection. Also, Cookson and Shivaprasad (1994) detected mycoplasmal from samples collected from quails and added that such isolates were other than *M. gallisepticum, M. synoviae, M. meleagridis* or *M. iowae*. On the other hand, there was a gap between the obtained findings and that repoted by Lin and Liu (1985) who found that the mycoplasmas were isolated from tracheal swabs of 209 samples out of 437 fowls, *M. gallisepticum* (27%), *M. synoviae* (42%), *M. gallinarum* (56%), *M. gallinaceum* (9%) and *M. gallipavonis* (8.6%), were identified and near these incidence rates were obtained by Kardel (1987). These may be attributed to the difference in environment of quails.

As regards to the incidence of mycoplasmas in some wild birds, the obtained results were supported by the findings of Howse and Jordan (1983), Poveda (1988) and Poveda et al. (1990) who found 13 mycoplasma isolates in various types of flacons. Six isolates could be identified, 3 isolates from black vulture were *M. gallinarum*, 2 isolates from peregrine falcons were *M. columborale* and one isolate from suker falcon was identified as *M. anatis*. A higher incidence rates were reported by Chiocco and Bisceglia (1990) who found that the incidence of *M. gallisepticum* from 22 pigeons were 55% and identified them as *M. columbinum* (92.5%), *M. columborale* (65%) and *M. columbinasale* (15%). Moreover, higher prevalence rates of mycoplasmas were mentioned by the findings of Reece et al. (1986B), Astorga et al. (1994), Cookson and Shivaprasad (1994) and Goldberg et al. (1995).

Concerning the use of ELISA for the serodiagnosis of the natural infection of quails with both *M. gallisepticum* and *M. synoviae*, the recorded data proved that, for the mean *M. gallisepticum* titre was 105 and Geometric mean titre (0) under the mean titre group Zero (0-499), while in egg yolk of quails its mean titre was (324) and geometric mean titre (194), under the mean titre of group (0). While the mean *M. synoviae* titre in sera was (19) and geometric mean titre (2) which layed under the mean titre group "zero", and it was (79) in quail eggs with geometric mean titre (16) which layed under the mean titre of group "zero". These results agreed with those reported by Ansari et al. (1982) who proved that ELISA was more sensitive tool than the (HI) test used to detect antibodies of M. gallisepticum. Moreover, Khokhar and Prasad (1985) who stated that 65 out of 175 serum samples were positive to ELISA, compared with 33 were positive to the (HI) test and 18 were positive to the serum plate agglutination test. Also, Mohammed et al. (1985) proved that no statistical difference between ELISA geometric

mean titre of *M. gallisepticum* present in serum and chloroform extracted yolk individual birds. They added that no differences were observed in (HI) or ELISA antibody levels between both egg yolk samples and sera collected samples. Furthermore, Piela et al. (1985) concluded that the chloroform extracted yolks were unsuitable for the use in the HI test for *M. gallisepticum* but produced significant titres with ELISA test. Moreover, Kobisch and Nicolet (1987) reported that the ELISA technique appeared to be the most sensitive procedure recommended to detect early and late antibody titre.

The aformentioned results were contradicted with that reported by Ikoev et al. (1972) who serologically demonstrated specific antibodies to *M. gallisepticum* in Japanese quails proving that such birds were able to contract the natural infection with such microorganisms.

As regard to the results of serodiagnosis of the experimental infection of quails with *M. gallisepticum* by using ELISA technique. The obtained data revealed that the serum samples of quails of the 3rd group, stressed by both environmental and biological stress, gave no detectable specific M. gallisepticum antibodies indicating that such birds did not succumb to the infection. These results agreed with those reported by Yoder and Hofstad (1964) who stated that non of 12 quails inoculated with the first yolk passage of *M. gallisepticum* developed evidence of infection or detectable antibodies. Moreover, Talkington et al. (1985) mentioned that ELISA test was found to be less sensitive but more specific than S.P.A. test and more sensitive than (HI) test in the detection of antibodies against experimental *M. gallisepticum*.

The considerable gap was present between the obtained findings and that reported by Avakian et al. (1988) who found that the antibodies detected in chickens after experimental infection with *M. gallisepticum* in the first three weeks were better to be detected by S.P.A. test than by ELISA or HI test.

With a meticulous vision one can conclude that the quails, falcons, moorhen fowls and doves as wild birds can act as a reservoir host carrying mycoplasmal organisms. The obtained data revealed that neither such microorganisms nor their specific antibodies could be present, proving that these birds can act as transient carrier for mycoplasmal organisms.

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