National surveillance of poultry diseases in Lebanon

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Summary

From 1992 to mid-1996, a national survey of poultry diseases in Lebanon was conducted. This surveillance included meat breeder, layer breeder, commercial layer and chicken broiler flocks. The history, signs, lesions and laboratory tests of poultry were used in the diagnosis of prevalent poultry diseases. Culture techniques were used to screen for bacterial diseases; serological techniques and, to a lesser extent, culture techniques were used to diagnose viral diseases; and both serological and culture techniques were used to diagnose Mycoplasma infections. The outbreaks of diseases detected in broiler breeder flocks and the number of such flocks experiencing these diseases were as follows: femoral head necrosis (6), egg-drop syndrome (3), reovirus-associated malabsorption syndrome (3), synovitis (Mycoplasma synoviae infection) (7), swollen head syndrome (SHS) (3), tenosynovitis (viral arthritis) (1), lymphoid leukosis (3), avian encephalomyelitis (1), fowl pox (1) and aortic rupture (1).

The disease outbreaks detected in layer breeders were as follows: SHS (2), bumble foot (2), egg-drop syndrome (3) and avian infectious bronchitis (IB) (1). The disease outbreaks detected in commercial layer flocks were as follows: egg-drop syndrome (5), avian infectious laryngotracheitis (2), avian IB (nephrogenic strain) (1), malabsorption (1), avian tuberculosis (Mycobacterium avium) (1), Marek’s disease (1), fowl pox (1), Salmonella enterica subsp. enterica Enteritidis infection (1), salpingitis (1) and Heterakis gallinae infestation (1). The disease outbreaks detected in broiler flocks were as follows: colibacillosis (40), infectious bursal disease (Gumboro disease) (15), malabsorption syndrome (8), avian infectious laryngotracheitis (8), paratyphoids (salmonellosis) (7), femoral head necrosis (8), SHS (6), avian mycoplasmosis (Mycoplasma gallisepticum infection) (6), synovitis (7), avian IB (6), botulism (1), avian encephalomyelitis (1) and gangrenous dermatitis (1).

Diseases which occurred and which were reported for the first time in Lebanon were as follows: bumble foot, femoral head necrosis, avian IB (nephrogenic strain), malabsorption syndrome and SHS.

This surveillance helped to establish baseline data concerning the predominant poultry diseases in Lebanon. Such information is a prerequisite for future regional and international collaboration to identify the source of the aetiological agents and to control their spread to neighbouring countries.

Keywords
Disease control – Lebanon – Poultry diseases – Surveillance.
Introduction

Owing to the new era of peace in the Middle East, and with the increase in trade among Middle Eastern countries, including Israel, surveillance of animal and poultry diseases in each country is becoming indispensable to regional projects aimed at controlling their spread. Surveillance of poultry diseases was discontinued in Lebanon during the fifteen years of civil war between 1976 and 1991, but was reinstated in the middle of 1992. This surveillance has revealed for the first time the occurrence of some poultry diseases which are new to Lebanon.

Materials and methods

Clinical signs and post-mortem findings

A total of 166 flocks were surveyed, comprising 29 broiler breeder flocks, 8 layer breeder flocks, 15 commercial layer flocks and 114 chicken broiler flocks. The surveyed flocks represent approximately 50% of the total population of broiler breeders in Lebanon, 40% of the layer breeders, 18% of the commercial layers and 40% of the chicken broilers. The history, signs and gross lesions of each disease outbreak were recorded for each flock (Table I). Flocks with farm records showing poor production and a recurrent history of diseases

<table>
<thead>
<tr>
<th>Disease</th>
<th>History, signs and lesions</th>
<th>Isolation of causative pathogen</th>
<th>Serological test</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aortic rupture</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Avian encephalomyelitis</td>
<td>+</td>
<td>+</td>
<td>+ (virus neutralisation)</td>
</tr>
<tr>
<td>Avian infectious bronchitis</td>
<td>+</td>
<td>-</td>
<td>+ (ELISA)</td>
</tr>
<tr>
<td>Avian infectious bronchitis (nephrogenic strain)</td>
<td>+</td>
<td>+</td>
<td>+ (virus neutralisation)</td>
</tr>
<tr>
<td>Avian infectious laryngotracheitis</td>
<td>+</td>
<td>-</td>
<td>+ (AGPT)</td>
</tr>
<tr>
<td>Avian mycoplasmiosis</td>
<td>+</td>
<td>+</td>
<td>+ (slide agglutination, ELISA)</td>
</tr>
<tr>
<td>Avian tuberculosis</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Bovulism</td>
<td>+</td>
<td>+</td>
<td>+ (toxin neutralisation)</td>
</tr>
<tr>
<td>Bumble foot</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Colibacillosis</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Egg-drop syndrome</td>
<td>+</td>
<td>-</td>
<td>+ (HI)</td>
</tr>
<tr>
<td>Femoral head necrosis</td>
<td>+</td>
<td>-</td>
<td>+ (AGPT)</td>
</tr>
<tr>
<td>Fowl pox</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Gangrene dermatitis</td>
<td>+</td>
<td>+</td>
<td>+ (toxin neutralisation)</td>
</tr>
<tr>
<td>Heterakis gallinae infestation (a)</td>
<td>+</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>Infectious bursal disease</td>
<td>+</td>
<td>-</td>
<td>+ (ELISA)</td>
</tr>
<tr>
<td>Lymphoid leucosis</td>
<td>+</td>
<td>-</td>
<td>+ (ELISA)</td>
</tr>
<tr>
<td>Marek's disease</td>
<td>+</td>
<td>-</td>
<td>+ (AGPT)</td>
</tr>
<tr>
<td>Paratyphoids</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Reovirus malabsorption syndrome</td>
<td>+</td>
<td>-</td>
<td>+ (AGPT)</td>
</tr>
<tr>
<td>Salmonella enterica subsp. enterica Enteritidis</td>
<td>+</td>
<td>+</td>
<td>Serotyping (b)</td>
</tr>
<tr>
<td>Salpingitis</td>
<td>+</td>
<td>+</td>
<td>-</td>
</tr>
<tr>
<td>Swollen head syndrome</td>
<td>+</td>
<td>-</td>
<td>+ (ELISA)</td>
</tr>
<tr>
<td>Synovitis</td>
<td>+</td>
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<td>+ (slide agglutination, ELISA)</td>
</tr>
<tr>
<td>Tenosynovitis</td>
<td>+</td>
<td>+</td>
<td>+ (AGPT)</td>
</tr>
</tbody>
</table>

ELISA: enzyme-linked immunosorbent assay
AGPT: agar gel precipitation test
HI: haemagglutination inhibition test
(a) Microscopy was used in diagnosing this disease
(b) Serotyping was performed at the Pasteur Institute in Paris, France
were chosen from different provinces of Lebanon. Approximately 0.4% of birds per flock were examined for signs and lesions and had blood sampled for serum.

Culture

Ten birds with similar signs and lesions were picked randomly from each affected flock and subjected to culture. The laboratory procedures were followed according to the standard procedures of the American Association of Avian Pathologists (1). The following diseases were diagnosed by isolation and culture of the aetiologic agents, namely: avian encephalomyelitis (Picornaviridae), botulism (*Clostridium botulinum*), bumble foot (*Staphylococcus aureus*), colibacillosis (*Escherichia coli*), gangrenous dermatitis (*Clostridia sp.*), avian infectious bronchitis (IB) (nephrogenic strain) (Coronaviridae), avian tuberculosis (*Mycobacterium avium*), avian mycoplasmosis, paratyphoids (*Salmonella sp.*) and salpingitis (*E. coli*). It is worth mentioning that the avian IB virus (nephrogenic strain) was isolated from swollen pale kidneys with urolithiasis and associated with significant mortality in the commercial layers; further identification was achieved by virus neutralisation assay. The signs, lesions and virus neutralisation assay confirmed the nephrogenic nature of the avian IB strain.

Serology

Serum antibodies specific to infectious bursal disease virus and avian IB virus were detected by an indirect enzyme-linked immunosorbent assay (ELISA). A similar protocol was followed for testing serum antibodies to swollen head syndrome (SHS) virus or what is known as avian rhinotracheitis. A direct ELISA was used to detect the retrovirus of lymphoid leukosis disease.

Avian mycoplasmosis and synovitis (*M. synoviae* infection) were serologically tested by a rapid plate test, followed by ELISA.

<table>
<thead>
<tr>
<th>Disease</th>
<th>Number of flocks giving positive results in different chicken types</th>
<th>Broilers (114)</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Egg-drop syndrome</td>
<td>3</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Reovirus malabsorption syndrome</td>
<td>3</td>
<td>8</td>
<td>12</td>
</tr>
<tr>
<td>Colibacillosis</td>
<td>6</td>
<td>15</td>
<td>14</td>
</tr>
<tr>
<td>Femoral head necrosis (b)</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Infectious bursal disease</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Swollen head syndrome (b)</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>Paratyphoids</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Avian encephalomyelitis</td>
<td>1</td>
<td>2</td>
<td>7</td>
</tr>
<tr>
<td>Bumble foot (b)</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Fowl pox</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Avian infectious laryngotracheitis</td>
<td>1</td>
<td>2</td>
<td>10</td>
</tr>
<tr>
<td>Synovitis</td>
<td>7</td>
<td>7</td>
<td>14</td>
</tr>
<tr>
<td>Aortic rupture</td>
<td>1</td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>Botulism</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Gangrenous dermatitis</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td><em>Heterakis gallinae</em> infection</td>
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<td>1</td>
<td>1</td>
</tr>
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<td>Avian infectious bronchitis</td>
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<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Avian infectious bronchitis (nephrogenic strain) (b)</td>
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<td>1</td>
</tr>
<tr>
<td>Lymphoid leukemia</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>Marek’s disease</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Avian tuberculosis</td>
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</tr>
<tr>
<td>Avian mycoplasmosis</td>
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<td>1</td>
</tr>
<tr>
<td><em>Salmonella enterica</em> subsp. enterica Enteritidis</td>
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<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Salpingitis</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
<tr>
<td>Tenosynovitis</td>
<td>1</td>
<td>1</td>
<td>1</td>
</tr>
</tbody>
</table>

a) Figures in brackets designate the number of flocks
b) Diagnosed for the first time in Lebanon
Results

Results of laboratory investigations and/or records of the history, signs and lesions in the flocks were used for a final diagnosis, as summarised in Table I.

The frequency of diseases in all flocks surveyed is given in Table II. A total of 25 different poultry diseases were confirmed. The most frequent diseases diagnosed were as follows: colibacillosis (40 flocks), infectious bursal disease (15), femoral head necrosis (14), synovitis (14), malabsorption (12), egg-drop syndrome (11) and SHS (11).

Five poultry diseases were diagnosed for the first time in Lebanon, namely: bumble foot, femoral head necrosis, avian IB (nephrogenic strain), malabsorption and SHS (Table II).

Discussion

Among the twenty-five different poultry diseases confirmed in this survey, the most frequent were colibacillosis and infectious bursal disease. Bacterial diseases had a low frequency compared to the other poultry diseases diagnosed in broiler breeders, layer breeders and commercial layers (Table II).

Viral diseases were predominant in broiler breeders, layer breeders and commercial layers. A total of three out of seven viral diseases in broiler breeders were associated with the detection of antibodies to members of the Reoviridae family, namely: femoral head necrosis, malabsorption and tenosynovitis. These three diseases are known to have transovarian transmission, with a high potential of inducing infection in the offspring. Aortic rupture was principally observed in male broiler breeders, which accords with a previous report on the disease (3).

Colibacillosis was found to be a prevalent economically important disease in Lebanon. This disease seems to be the predominant one in other Middle Eastern countries (2). The other two economically important chicken broiler diseases were infectious bursal disease and malabsorption. The economic losses in Lebanon caused by these three diseases are of primary importance.

The occurrence of certain diseases which had not been reported previously in Lebanon could have been due to the absence of monitoring or control programmes for the imported parent flocks during the civil war. Laws in regard to such programmes should be reinforced in order to raise the competitiveness of the Lebanese poultry market within the world market (4).

Conclusion

This surveillance programme helped to establish baseline data concerning the predominant poultry diseases in Lebanon. Such information is a prerequisite for future regional and international collaboration to identify the source of the aetiological agents, leading to the control of their spread among neighbouring countries.

Enquête nationale de surveillance des maladies aviaires au Liban

E.K. Barbour, S.K. Hamadeh, C. Hilan, M. Kallas, A. Eid & W. Sakr

Résumé

Une enquête sur les maladies aviaires a été menée de 1992 à juin 1996 sur l’ensemble du territoire libanais. La surveillance portait sur des reproducteurs de poulets de chair, des reproducteurs de poules pondeuses, ainsi que sur des élevages industriels de poules pondeuses et de poulets de chair. Le diagnostic des maladies aviaires les plus répandues dans le pays a été réalisé en se basant sur les commémoratifs, les symptômes et les lésions ainsi que sur des tests de laboratoire. On a recouru à la mise en culture pour le dépistage des maladies bactériennes et, dans une moindre mesure, des maladies virales. Celles-ci ont surtout fait l’objet d’épreuves sérologiques. Quant aux infections à Mycoplasma,
elles ont été diagnostiquées par les deux méthodes à la fois. Les foyers décelés chez les reproducteurs de poulets de chair et le nombre d'élevages où ces maladies étaient présentes s'établissaient comme suit : nécrose de la tête du fémur (6), syndrome de chute de ponte (3), syndrome de malabsorption liée à un réovirus (3), synovite infectieuse (à Mycoplasma synoviae) (7), syndrome de la grosse tête infectieuse (3), ténosynovite (arthrite virale) (1), leucose lymphoïde (3), encéphalomyélite aviaire (1), variole aviaire (1) et rupture de l'aorte (1).

Les foyers décelés chez les reproducteurs de pondeuses étaient les suivants : syndrome de la grosse tête (2), boiterie due à Staphylococcus aureus (2), syndrome de chute de ponte (3) et bronchite infectieuse aviaire (1).

Dans les élevages industriels de pondeuses, les foyers se répartissaient comme suit : syndrome de chute de ponte (5), laryngotrachéite infectieuse aviaire (2), bronchite infectieuse aviaire (souche néphrogène) (1), syndrome de malabsorption (1), tuberculose aviaire (Mycobacterium avium) (1), maladie de Marek (1), variole aviaire (1), infection à Salmonella enterica subsp. enterica Enteritidis (1), salpingite (1) et infestation par Heterakis galliniae (1).

Chez les poulets de chair, les foyers suivants ont été diagnostiqués : colibacillose (40), bursite infectieuse (maladie de Gumboro) (15), syndrome de malabsorption (8), laryngotrachéite infectieuse aviaire (8), paratyphoïde (salmonellose) (7), nécrose de la tête du fémur (8), syndrome de la grosse tête (6), mycoplasmose aviaire (à Mycoplasma gallisepticum) (6), synovite (7), bronchite infectieuse aviaire (6), botulisme (1), encéphalomyélite aviaire (1) et dermatite gangreneuse (1).

Les maladies signalées pour la première fois au Liban sont les suivantes : boiterie due à Staphylococcus aureus, nécrose de la tête du fémur, bronchite infectieuse aviaire (souche néphrogène), syndrome de malabsorption et syndrome de la grosse tête infectieuse.

Cette enquête a permis de réunir les premières informations générales relatives aux maladies aviaires les plus répandues au Liban. Ces informations constituent la condition préalable à une collaboration régionale et internationale ultérieure en vue d'identifier l'origine des agents étiologiques et de lutter contre leur extension aux pays voisins.

**Mots-clés**
Liban – Maladies aviaires – Prophylaxie des maladies animales – Surveillance.
síndrome de baja de la puesta (3), síndrome de absorción defectuosa de origen reoviral (3), sinovitis (infección por Mycoplasma synoviae) (7), síndrome de la cabeza hinchada (3), tenosinovitis (artritis viral) (1), leucosis linfóidea (3), encefalomielitis aviar (1), viruela aviar (1) y ruptura aórtica (1).

Los brotes detectados entre gallinas ponedoras fueron: síndrome de la cabeza hinchada (2), cojera debida a Staphylococcus aureus (2), síndrome de baja de la puesta (3) y bronquitis infecciosa aviar (1).

En cuanto a las bandadas de ponedoras comerciales, se detectó lo siguiente: síndrome de baja de la puesta (5), laringoqueratitis infecciosa aviar (2), bronquitis infecciosa aviar (cepa nefrógena) (1), síndrome de absorción defectuosa (1), tuberculosis aviar (Mycobacterium avium) (1), enfermedad de Marek (1), viruela aviar (1), infección por Salmonella enterica subsp. enterica Enteritidis (1), salpingitis (1) e infestación por Heterakis gallinae (1).

En lo que concierne a las bandadas de pollos asaderos, los resultados fueron: colibacilosis (40), bursitis infecciosa (enfermedad de Gumboro) (15), síndrome de absorción defectuosa (8), laringoqueratitis infecciosa aviar (8), infecciones paratifoideas (salmonelosis) (7), necrosis de la cabeza femoral (8), síndrome de la cabeza hinchada (6), micoplasmosis aviar (infección por Mycoplasma gallisepticum) (6), sinovitis (7), bronquitis infecciosa aviar (6), botulismo (1), encefalomielitis aviar (1) y darmacitis necrótica (1).

Algunas de las enfermedades se manifestaban o describían por primera vez en el Líbano, a saber: cojera debida a Staphylococcus aureus, necrosis de la cabeza femoral, bronquitis infecciosa aviar (cepa nefrógena), síndrome de absorción defectuosa y síndrome de la cabeza hinchada.

Esta encuesta ayudó a obtener datos fundamentales sobre las enfermedades avícolas predominantes en el Líbano. Semejante información es un requisito previo necesario para futuras colaboraciones a nivel regional e internacional que permitan descubrir la fuente de los agentes etiológicos y controlar su eventual propagación a países vecinos.

Palabras clave
Enfermedades avícolas — Líbano — Profilaxis de enfermedades animales — Vigilancia.

References


