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Novel Pan Scanning Of Prevailing Diseases Affecting National Egyptian Poultry Industry

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Abstract

The infectious causes of mortality (and / or) decrease in egg production in broiler breeder and layer flocks were monitored in the main poultry producing goveronerates in Egypt (Alexandria, Behera, Dakhlia,Giza, Monofya, Sharqia and Qaliobia) from October 2014 to September 2016. on 1.3 millions layer (in 25 flocks) and 890000 broiler breeder (in 18 flocks). Result reveled infection with Avian influenza (H5N1,H9N2), Newcastle (NDV),Infectious bronchitis(IBV),E coli ,Mycoplasma(MG&MS) single or in combination. The co infection was a prevailing phenomenon and superior to single infection in breeders while the opposite in layers.Co infection in breeders was 61.2% and 38.8% of single infection while in layers Co infection was 36.0% and single infection was 64.0%. the most prevalent single infection in breeders was infectious bronchitis and in layers influenza H5 was the highest. Moreover infectious bronchitis was common factor in coinfection in breeders while Influenza H9 was the commenest in layers.

Introduction

Poultry sector is confronted with infectious diseases, among them respiratory tract pathogens are of major concern (Ali and Reynolds, 2000), which cause heavy economical losses both in terms of production and cost of treatment (Anonymous, 2010). Infected birds expressed respiratory signs such as cough, rales and respiratory distress, poor growth and production leading to high economic losses (Pang et al., 2002). The bacterial pathogens include Mycoplasma gallisepticum, Mycoplasma synoviae, E. coli . while viral pathogens may include Newcastle disease virus (NDV), Infectious bronchitis virus (IBV) and Avian influenza virus (AIV). These pathogens may cause disease alone or in combination bacterial/bacterial, bacterial/viral and viral/viral infections (Ali and Reynolds, 2000).

In Egypt, poultry industry represents a major economic activity. Lately, the rates of mortalities and drop in egg production have been increased in Egyptian commercial chicken flocks. Avian influenza virus (AIV) is believed as one of the main causes of losses to the poultry industry since February 2006 (Saad et al., 2007).

The H9N2 has been recorded in the Middle East region for several years, indicating additional risk factor to the poultry industry. Although H9N2 viruses are typed as LPAI viruses, they caused high morbidity and mortality. (Park et al., 2011)

They also found that the spread of H9N2 in Egypt can negatively affect poultry health overall and increase the risk of infections of H5N1 HPAI, which is already endemic there (Park et al., 2011).

Also, Newcastle disease (ND) is an economically important and highly contagious disease of both wild and captive birds (Saif et al., 2003).

Morbidity of IBV is almost always 100%, but mortality varied between 0% and 82%, depending on the age and the immune status of the birds, the virus strain, and secondary bacterial or viral infections (Jackwood MW, De wit S ,2013). Co-infections of avian respiratory viruses including IBV may induce similar clinical signs or lesions and thus complicate diagnostic decisions, as well as complicating its control (Nguyen et al., 2013).

Owing to the substantial losses caused in both performance and production, M. gallisepticum has been described as the most economically important of the four pathogenic Mycoplasma species affecting poultry (Evans J.D et al., 2005) Losses attributed to mycoplasmosis, mainly M. gallisepticum infection, are due to:

– a decrease in egg quantity and quality
– poor hatchability (a high rate of embryonic mortality and culling of day-old birds)
– poor feed efficiency
– an increase in mortality and carcass condemnations
– and medication costs (Nascimento E.R., et al., 2005)

Mycoplasma synoviae infection causes infectious synovitis and sometimes upper respiratory disease of chickens especially when MS infection is

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combined with Newcastle disease (ND), IB infections or vaccination , Kleven et al., 1991.
Avian colibacillosis is responsible for large economic losses in poultry rearing resulting in low performances, weight loss,delayed onset of egg production and increased mortality.

Materials And Methods

Samples, serum, organs, cloacal and tracheal swabs were colleacted from 43 flocks (18 broiler breeder and 25 layers chicken flocks).
Data collected from the investigated farms was taken and recorded on especially designed form that contain all relevant data about the birds(clinical and postmortem) and their performance (lemire S and Gauthier R 2015).
Materials used for the isolation, cultivation, identification and purification of E. coli isolates MacConkey agar (Oxoid), Eosin methylene blue agar (EMB) (LIVENE AGAR - Liofil chem) (Oxoid), Congo red dye

Haemagglutination Inhibition (HI) test for serological detection of AI & ND virus antibodies: (OIE, May 2012)
Enzyme-linked immunosorbent assay (ELISA) test for IB & MG & MS: (Synbiotic Kit)
Reagents Required for RNA extraction:
RNeasy Mini Kit (Qiagen, Valencia, CA, USA) protocol.
To detect influenza virus, Newcastle disease virus, Infectious bronchitis virus, Mycoplasma gallisepticum and Mycoplasma synoviae, primers and the probe described as below, Table(1)

Table (1) show the primers and probes used in real time PCR

Gene	Primers	Primer 5'-3'	References
(ND)	NDV-F (4011-4030)	5'-GTCCCAAATACCGGAGACCT 3'	Spackman et al.,2002
	NDV-R (4142-4162)	5'-TTGTTTGCCACAACCCTACAG 3'	
	NDV-P (4116-4135)	5'-YAK-GTGCAGGCACCCCRAGTGCT-BBQ2-3'	
H5 (AI)	H5-For	5'- TTATTCAACAGTGGCGAG-3'	Catolli et al., 2006
	H5NE-Rev	5'-CCAGTAAAGATAGACCAGC-3'	
	H5 probe	5'- CCCTAGCACTGGCAATCATG-3'	
H9 (AI)	H9-For	5'- ATGGGGTTTGCTGCC-3'	Catolli et al., 2006
	H9-Rev	5'- TTATATACAAATGTTGCACTCTG-3'	
	H9 probe	5'- TTCTGGGCCATGTCCAATGG-3'	
IBV	IBV5_GU391 forwar	5-GCTTTTGAGCCT AGC GTT-3'	Callison et al.,2006
	IBV5_GL533 reverse	5-GCC ATG TTG TCA CTG TCTATT G-3'	
	IBV5-G probe	5'-FAM-CACCACCAGAACCTGTCACCTBHQI-3	
MG	MGLPU26-F	5'-CTA GAG GGT TGG ACA GTT ATG - 3'	Callison et al.,2006
	MGLP164-R	5'-GCT GCA CTA AAT GAT ACG TCA AA - 3'	
	MGLP-P	5'-FAM) -CAGTCATTAACA ACT TAC CAC CAG AAT CTG - (MGB) – 3'	
MS	MS1	5'-GAA GCA AAA TAG TGA TAT CA - 3'	Callison et al.,2006
	MS2	5'-GTC GTC TCC GAA GTT AAC AA - 3'	
	MS-P	5'-(VIC) -AGCTACGCTACGGTGAATACG TTC TC - (TAMRA) – 3	

Results and conclusion

Typical E. coli colonies grown on XLD agar medium showed yellow colonies, pink colonies on MacConkey agar, and on EMB agar colonies showed dark green metallic sheen
Pathogenic E.coli colonies grown on congo red dye showed orange colonies

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Table (2). Incidence of infectious cause recovered from broiler breeder flocks:

Isolated pathogen flocks	Number of examined flocks =n	Results	
		+ve (=n)	%
H5N1	18	1	5.5
H9 & IB	18	1	5.5
H9 & ND & IB	18	1	5.5
H9 & ND & IB & E.coli	18	2	11.1
H9N2 +ND	18	2	11.1
IB	18	3	16.6
IB & MS	18	2	11.1
IB & MS & ND	18	1	5.5
IB & ND	18	1	5.5
IB & ND & MG	18	1	5.5
MS	18	1	5.5
ND	18	2	11.1

Table (3). Incidence of diseases recovered from layer flocks :

Type of flocks	Number of examined flocks =n	Results	
		+ve (=n)	%
E coli	25	1	4
H5N1	25	7	28
H9N2	25	2	8
H9N2+MG	25	1	4
H9N2+ND	25	4	16
IB	25	1	4
IB+MG	25	2	8
MG+Ecoli	25	2	8
ND	25	3	12
management	25	2	8

Table (4) Co-infection in vaccinated breeder flocks

	NO	%
Mixed infection with IB	9	81.8
Mixed infection with ND	8	72.7
Mixed infection with H9	6	54.5
Mixed infection with MS	3	27.2
Mixed infection with E.coli	2	18
Mixed infection with MG	1	9

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Table (5) Co-infection in vaccinated layer flocks

	NO	%
Mixed infection with H9	5	55.5
Mixed infection with MG	5	55.5
Mixed infection with ND	4	44.4
Mixed infection with IB	2	22.2
Mixed infection with E.coli	2	22.2

Table (6) Co-infection and single infection in vaccinated broiler breeder and layer flocks

	NO	%
Single infection in breeder	7	38.8
Mixed infection in breeder	11	61.2
Single infection in layer	16	64
Mixed infection in layer	9	36

Conclusion

Infection with NDV alone can cause sharp reduction in egg production but the production can return within 2-4 weeks in 95% or more from the normal level after immunity improvement.

If mixed infection with ND and H9 or mycoplasma or the combination of them occurs, the production takes 6 week or more to return but not to the normal level and may reaches to 85% from the percent before the infection.

Infection with low pathogenic avian influenza(H9N2) virus alone can affect egg production and cause upper respiratory signs.

Increase percent of infection of H9N2 in Egypt.

Co infection of H9N2 with IBV caused high losses.

Co infection of mycoplasma with H9N2 and other bacteria or virus increase losses.

HPAI(H5N1) virus was detected in vaccinated flocks with AI vaccines with slight increase in mortality and decrease in egg production

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الملخص العربى

هذا البحث يستعرض نتائج استقصاء اسباب الوفيات (و، او) انخفاض انتاج البيض فى مزارع امهات التسمين والبياض فى محافظات الاسكندرية، البحيرة، الدقهلية، الجيزة، المنوفية، الشرقية والقليوبية في الفترة من أكتوبر 2014 حتى سبتمبر 2016
حيث اظهرت النتائج ان اشتراك اكثر من مسبب مرضى كان الظاهرة السائدة والمتفوقة على العدوى المنفردة فى الامهات بينما العكس فى البياض.
فى الفترة الاخيرة زادت نسبة الامراض نتيجة زيادة اشتراك اكثر من مرض او العدوى المتزامنة وكانت نسبة العدوى المتزامنة فى الامهات 61.2 % والعدوى المنفردة 38.8 % بينما فى البياض نسبة العدوى المتزامنة 36.0 % والعدوى المنفردة 64.0 %. وكانت اكثر الامراض انتشارا فى الامهات بصورة منفردة التهاب القصبة المعدى وفي البياض كانت الانفلونزا اتش 5 هى النسبة الاعلى. والجدير بالذكر ان فيروس التهاب القصبة المعدى هو العامل المشترك الاكبر فى العدوى المتزامنة فى الامهات بينما فيروس الانفلونزا اتش 9 هى العامل المشترك الاكبر فى البياض .