

## FREQUENCY OF BACTERIAL AND VIRAL DISEASES, AND MORBIDITY IN BROILER BREEDER STRAINS: A MAJOR FARMER PROBLEM

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### ABSTRACT

This study was conducted on the basis of last 10 years un-balanced diseases status data of morbidity, mortality and sign/symptoms of diseases (not avian influenza) in private sectors to investigate the prevalence of diseases in broiler breeder flocks. Different available strains of Hubbard and Arbor acre broiler breeder farms in the vicinity of Lahore were conducted during the year 2011. The diseases records of 30 Hubbard and Arbor Acre broiler breeder farms collectively, where different diseases and outbreaks were known to be suffered were surveyed. Newcastle disease, infectious bronchitis (IB), respiratory diseases, avian influenza (A.I) and hydro were found to be the major diseases and prevalence of cholera, omphatitis, pullorum, necrotic enteritis, ulcerative enteritis, coccidiosis and styphloco was also noted. The prevalence of coccidiosis was highest ( $28.83 \pm 2.12\%$ ), followed by stypholoco and necrotic enteritis with average prevalence of ( $25.00 \pm 2.24$ ) and ( $25.00 \pm 2.50$ ), respectively. The overall disease prevalence in the studied broiler breeders (all strains) was ( $24.44 \pm 0.887\%$ ). Coccidiosis was commonly most prevalent disease and Styphloco or Necrotic enteritis showed almost similar prevalence in the broiler breeders in the study area. Morbidity data concluded 41.20 % symptoms of conjunctivitis, followed by exposed rales/abnormal breathing sound (38.50%) and warts/scabs (35.20%). The prevalence of Hydro, Newcastle, IB, Respiratory, AI and Gumboro in Hubbard and Arbo Acre broiler breeder flocks was ( $24.03 \pm 2.49$ ), ( $23.86 \pm 2.41$ ), ( $22.73 \pm 2.43$ ), ( $22.13 \pm 2.34$ ), ( $21.46 \pm 2.53$ ) and ( $19.43 \pm 2.05$ ), respectively. In Hubbard and Arbor Acre strains, Hydro and coccidiosis showed dominating occurrence as compared to other poultry diseases in the study area. The trend of diseases occurrence showed similarity at random at all the broiler breeder farms invested and statistically, the differences were non-significant ( $P > 0.05$ ). Good managerial practice, strict biosecurity and recommended vaccination schedules must be adopted by the farmers which is highly helpful to prevent diseases at the farm level. Cautions must be taken during out breaks to monitor titers against viral diseases.

**Keywords:** Broiler breeder, parent stock, diseases occurrence, newcastle disease, gumboro, infectious bronchitis, respiratory, AI, Hydro and coccidiosis

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### INTRODUCTION

Poultry production has grown very fast during last four decades and developing counties including Pakistan tend to be main beneficiaries of intensive production. The significant growth in poultry production and consumption in the country has important implications for the global trading of all poultry products (Taha. 2003).

Disease outbreak causes mortality and culled birds are considered more susceptible to diseases (Farooq *et al.* 2000). A negative and significant association of mortality with net profit was observed which suggest that high mortality rate would result in a downfall of net profit. A higher percentage culled birds is a proportion of function of bad quality chicks, feed and poor management or care of the flock.

Diseases of chicken are mostly infectious in nature and hence unexpected variability in losses due to such diseases is expected in egg type layers (Naeem *et al.* 2003; Naeem and Siddique (2005). Infectious bronchitis (IB) and infectious barsal disease (IBD) are currently the most widespread diseases having higher mortality rates among layers (Anjum *et al.* 1990). Newcastle disease (ND) resulted in higher death losses in egg type layers upto 60%, coccidiosis (20%), infectious coryza, enteritis, hydro-pericardium (HP), colibacillores, aflatoxicosis, lymphoid leucosis, brooder pneumonia, fatty liver hemorrhagic syndrome, salmonellosis, chronic respiratory disease (CRD), gumboro, fowl-typhoid, fowl-cholera, infectious bronchitis (IB), infectious laryngotracheitis (IL) and mareks disease were observed to turn out mortality rates within the range of 0.81% to 18% in layers (Anjum *et al.* 1993). Yashpal *et al.* (2004) have reported wide variety of pathogens associated with respiratory infections in poultry including avian infectious bronchitis virus, avian pneumo virus, influenza virus, newcastle disease virus and Mycoplasma gallisepticum (MG). Al-Natour and Abo-Shehada (2005) and Gharaibeh and Algharaibeh (2007) reported sero-

prevalence of avian pneumo-virus in 5 broiler flocks out of 23 (21.7%), 6 layer flocks out of 8 (75%), and 7 out of 7 broiler breeder flocks (100%). The most dominant poultry diseases include E.coli, newcastle disease, infectious coryza, infectious bronchitis, coccidiosis, enteritis, gumboro, salmonellosis, hydro-pericardium, cholera, omphatit, pullorum and avian influenza (Bano *et al.* 2003).

## MATERIALS AND METHODS

### Sample size and primary data

Records maintained at 30 broiler breeder farms situated in the vicinity of Lahore city of Punjab province were examined during the years 2010-2011 to assess prevalence of various poultry diseases, which included cholera, omphatit, pullorum, necrotic enteritis, ulcerative enteritis, coccidiosis and styphloco. Information in respect of farm location, flock size, number of dead birds, date of disease occurrence, age of the birds, vaccination schedule, given floor space/broiler, coccidiosis presence, vitamin supplementation in the flock before the onset of disease and duration between two batches during which mortality observed was composed. For the collection of data on prevalence of various poultry diseases in the study, the techniques of purposive selection were adopted through pre-tested questionnaire.

### Morbidity

Morbidity is an incidence of ill health and measured in various ways, but generally by the probability that a randomly selected bird in a population at some particular date and location would become seriously ill at certain period of time. For measuring morbidity 10 farms were included in the investigation and morbidity was measured by examining the disease symptoms in birds. The morbidity was assessed considering the symptoms such as clinical signs coughing, sneezing, shaking head, railes (abnormal breathing sound), gasping, discharged eyes, nasal discharge, swelling of face and/or wattles, discoloration of face, lameness, growth retardation, green-watery diarrhea, general diarrhea, , swollen joints, paralysis, twisting of head and neck, Conjunctivitis, warts/scabs, red/white spots on legs and comb, and prostration. Furthermore, the occurrence of gumboro, IB, other respiratory problems, and hydropericardium, symptoms of morbidity were also examined.

### Data Analysis

The collected data were tabulated in the statistical format using SPSS version 9.5 (SPSS, NC,USA) statistical analysis program. P value of <0.05 was considered as significant difference among groups (Steet *et al.*, 1997).

## RESULTS AND DISCUSSION

In order to investigate the prevalence of diseases at Hubbard and Arbor acre broiler breeder farms in the vicinity of Lahore, a baseline study was conducted during the year 2011. The results are interpreted on aspects relevant to study objectives under different sub-headings as under:

### Prevalence of diseases

At all 30 Hubbard and Arbor Acre broiler breeder farms surveyed in the vicinity of Lahore, the common diseases prevalent in the flocks were cholera, omphatit, pullorum, necrotic enteritis, ulcerative enteritis, coccidiosis and styphloco.

The data (Table 1) indicate that prevalence of coccidiosis was the highest ( $28.83 \pm 2.12\%$ ), followed by that of styphloco ( $25.00 \pm 2.24\%$ ), necrotic enteritis and ulcerative enteritis ( $25.00 \pm 2.50\%$ ), respectively. The prevalence of cholera and ulcerative enteritis was found ( $23.20 \pm 2.38\%$ ) and ( $23.03 \pm 2.39\%$ ) respectively, in broiler breeder birds. It was further observed that omphatit was prevalent in ( $22.93 \pm 2.27\%$ ) % broiler breeders while pollorum was prevalent in ( $22.46 \pm 2.49\%$ ) % broiler breeders. The results indicate that coccidiosis was most commonly prevalent disease at broiler breeder farms, and styphloco or necrotic enteritis showed almost similar prevalence in the broiler breeders. The overall disease prevalence in the studied broiler breeders was ( $24.44 \pm 0.887\%$ ) %. However, statistically the differences in the diseases prevalence among the visited farms were non-significant ( $P > 0.05$ ). The significance of the differences in the diseases prevalence was mainly influenced by the high coefficient of variation i.e. the variation within the breeder farms in case all the diseases prevalent in the flocks. The findings of the present investigation have also been supported by Naeem and Siddique (2005) who reported 20 % prevalence of coccidiosis in the broiler breeder farms; while prevalence of enteritis and fowl-cholera in the broiler breeder farms. Similarly, prevalence for coccidiosis, enteritis, cholera, omphatit and pullorum prevalence has been reported by Bano *et al.*

(2003). Khawaja *et al.* (2005) reported that diseases spread due to unscheduled vaccination and imbalanced nutrition in poultry were necrotic enteritis, ulcerative enteritis, coccidiosis and staphylococcus.

Table 1a. Overall analysis of diseases data observed in 30 private sector farms.

Diseases	Observations	Minimum	Maximum	Mean	SE±
Cholera	30	3.00	50.00	23.20	2.38
Omphatitits	30	4.00	47.00	22.93	2.27
Pullorum	30	4.00	49.00	22.46	2.49
Necrotic enteritis	30	3.00	46.00	25.00	2.50
Ulcerative enteritis	30	3.00	50.00	23.03	2.39
Coccodiosis	30	5.00	47.00	28.83	2.12
Styphloco	30	5.00	47.00	25.66	2.24
Overall	210	3.00	50.00	24.44	0.887

Table 1b. Analysis of variance

Diseased Birds	df	Sum of Squares	Mean Square	F	Prob/Sig.
Between Groups	6	923.990	153.998	0.930	0.475
Within Groups	203	33629.933	165.665		
Total	209	34553.924			0.475

### Morbidity/Disease symptoms

The results indicated (Table 2) that the conjunctivitis symptoms were observed in  $41.20 \pm 8.66$  % birds, followed by  $(38.50 \pm 10.99)$ ,  $(35.20 \pm 4.46)$  % birds exposed rales (abnormal breathing sound) and warts/scabs symptoms, respectively. The symptoms of face discoloration  $(33.40 \pm 16.28\%)$ , swollen joints  $(31.30 \pm 18.88\%)$ , shaking head  $(30.60 \pm 6.58\%)$ , green/watery diarrhea  $(30.30 \pm 12.33\%)$ , red/white spots on legs and comb  $(28.70 \pm 8.99\%)$ , general diarrhea  $(26.90 \pm 9.74\%)$ , swelling of face and/or wattles  $(26.80 \pm 14.32\%)$ , discharged eyes  $(26.20 \pm 14.83\%)$ , sneezing  $(25.60 \pm 5.58\%)$ , nasal discharge  $(24.80 \pm 9.70\%)$ , lameness  $(20.70 \pm 13.15\%)$ , coughing  $(20.60 \pm 12.34\%)$ , twisting of head and neck  $(18.20 \pm 11.04\%)$ , gasping  $(18.00 \pm 19.13\%)$ , retarded growth  $(14.40 \pm 15.55\%)$ , prostration  $(10.20 \pm 10.69\%)$ , clinical signs  $(9.90 \pm 14.40\%)$  and paralysis  $(6.80 \pm 4.18\%)$  were also observed in the studied birds. The overall average morbidity was observed in  $24.68 \pm 14.83\%$  birds. Similar results regarding the symptoms of diseases have also been earlier reported by Japiot *et al.* (1990), Nasser (1998), OIE (2000), Tadesse (2000), Yongolo (1996), Ashenafi (2000) and Zeleke *et al.* (2005) who have reported symptoms of newcastle disease and some other poultry diseases from Ethiopia; while from Pakistan Razzaq *et al.* (2011) listed all the above symptoms represent different poultry diseases.

### Comparative diseases in Hubbard and Arbor Acre breeder strains

The common diseases prevalent in the Hubbard and Arbor Acre broiler breeder flocks were gumboro, newcastle, infectious bronchitis, respiratory, AI and Hydro. The prevalence of gumboro at Hubbard and Arbor Acre farms was highest  $(24.03 \pm 2.49\%)$ , followed by the prevalence of Hydro and IB diseases with average prevalence of  $(23.86 \pm 2.41)$  and  $(22.73 \pm 2.43)$  %, respectively. The prevalence of Newcastle disease was  $(22.13 \pm 2.34)$  % and respiratory was found in  $(21.46 \pm 2.53)$  % broiler breeder birds. However, AI was found to be lowest prevalent disease in the Hubbard and Arbor Acre broiler breeders  $(19.43 \pm 2.05\%)$ . This indicates that in Hubbard and Arbor Acre strains of broiler breeders, gumboro showed dominating occurrence as compared to other poultry diseases at the broiler breeders farms in the study area. However, statistically, the differences in the occurrence of diseases were non-significant ( $P > 0.05$ ), because of higher standard deviation and coefficient of variation

Table 2. Morbidity (diseases) symptoms observed in different farms study in breeder flocks.

Disease symptoms	Mean	Std. Deviation
Clinical signs	9.90	14.40
Coughing	20.60	12.34
Sneezing	25.60	5.58
Shaking head	30.60	6.58
Rales (abnormal breathing sound)	38.50	10.99
Gasping	18.00	19.13
Discharged eyes	26.20	14.83
Nasal discharge	24.80	9.70
Swelling of face and/or wattles	26.80	14.32
Discoloration face	33.40	16.28
Retarded growth	14.40	15.55
Lameness	20.70	13.15
General diarrhea	26.90	9.74
Green, watery diarrhea	30.30	12.33
Swollen joints	31.30	18.88
Paralysis	6.80	4.18
Twisting of head and neck	18.20	11.04
Red/white spots on legs and comb	28.70	8.99
Warts/scabs	35.20	4.46
Conjunctivitis	41.20	8.66
Prostration	10.20	10.69
Total	24.68	14.83

Table 3a. Comparative diseases in Hubbard and Arbor Acer broiler breeder strains.

Diseases	Observations	Mean	Std. Deviation	Std. Error	Minimum	Maximum
Gumboro	30	24.03	13.65	2.49	4.00	48.00
Newcastle	30	22.13	12.85	2.34	3.00	48.00
IB	30	22.73	13.32	2.43	4.00	47.00
Respiratory	30	21.46	13.90	2.53	3.00	50.00
AI	30	19.43	11.26	2.05	6.00	47.00
Hydro	30	23.86	13.20	2.41	4.00	49.00
Total	180	22.27	12.97	0.96	3.00	50.00

Table 3b. Analysis of variance.

Diseases	Df	Sum of Squares	Mean Square	F	Sig.
Between Groups	5	437.51	87.502	0.513	0.766
Within Groups	174	29690.60	170.636		
Total	179	30128.11	-	-	-

### Comparative diseases prevalence in Hubbard ad arbor acre

Comparative analysis of occurrence of Newcastle Disease, IB and Hydro with some other diseases was carried out (Table 3). The difference between Newcastle disease with Gumboro, IB, respiratory, AI and Hydro were

( $-1.90 \pm 3.37$ ), ( $-0.60 \pm 3.37$ ), ( $0.66 \pm 3.37$ ), ( $2.70 \pm 3.37$ ) and ( $-1.73 \pm 3.37$ ) %, respectively. Similarly, the difference between IB with gumboro, newcastle disease, respiratory, AI and Hydro were ( $-1.30 \pm 3.37$ ), ( $-0.60 \pm 3.37$ ), ( $1.26 \pm 3.37$ ), ( $3.30 \pm 3.37$ ) and ( $-1.13 \pm 3.37$ ) %, respectively. The comparison of Hydro with gumboro, newcastle disease, infectious bronchitis, respiratory and AI showed the differences of  $-0.16 \pm 3.37$ , ( $1.73 \pm 3.37$ ), ( $1.13 \pm 3.37$ ), ( $2.40 \pm 3.37$ ) and ( $4.43 \pm 3.37$ ) %, respectively. Disease causing bacteria and viruses can be transported from one flock to other on bird transporting trucks, equipment, tractors and other farm equipment as well as egg suites and cases. Humans and animals are also important means of transporting disease causing organisms. Disease causing micro-organisms have been found on human's clothes, skin, shoes, and hair. As a result, many hatcheries and breeder facilities utilize shower in and shower out protocols as part of their bio-security programs. Animals such as dogs, cats, mice, rats and free flying birds are also known to be carriers of disease organisms. Insects such as flies, beetles, and mosquitoes are well known to be carriers of disease microbes as well. Another, but less risky form of transmission is through the air. The extra meat yield in these broilers, most of which is concentrated in the breast, makes the broiler more sensitive to high temperatures, ammonia, and dust. As a result, much of the difference in performance of broiler flocks can be attributed to how well the in-house environmental conditions are managed, especially temperature and air quality. As rodents and wild birds, might also be a source of poultry flocks diseases.

### Diseases Spread and out breaks in Pakistan

The diseases spread due to unscheduled vaccination, imbalanced nutrition, housing and also spread of diseases through wild and migratory birds. The prevalence of poultry diseases such as Necrotic Enteritis, Ulcerative Enteritis, coccidiosis and staphylococcus have been found commonly in the poultry (Khawaja *et al.* 2005). Since last few years Avian Influenza become an independent subject, to deal separately in practical by other avian diseases. Any how it can not be ignored, but still it is encouraging that since 2008 there is no outbreak of A.I. was observed with any serious consequences. On 15 December 2007 the Ministry of Health in Pakistan has informed WHO of 8 suspected human cases of H5N1 avian influenza infection in the Peshawar area of the country. These cases were detected following a series of culling operations in response to outbreaks of H5N1 in poultry. One of the cases has now recovered and a further two suspected cases have since died. Global alert and responses (2007) informed that Multiple poultry outbreaks of H5N1 influenza have been occurring in Pakistan since 2006. In 2007, there have also been outbreaks in wild birds. A majority of the outbreaks discovered have been in the 'poultry belt' of North-West Frontier Province, particularly in the Abbottabad and Mansehra area and cases of infection in wild birds have been identified in the Islamabad Capital Territory. Some diseases that attacks to broiler, layer and broiler breeder and layer breeder flocks in Pakistan, in rotation and phases to each other like, Fowl Cholera, Omphalitis, Pullorum, Necrotic Enteritis, Ulcerative Enteritis, Staphylococcus, Species, Avian Encephalomyelitis, Egg Drop Syndrom Whereas the fertility and hatchability partially affected by the Viral Diseases (non-respiratory) such as , Marek's Disease, Lymphoid Leukosis. Infectious Bursal Disease, Respiratory Diseases, Fowl Pox, Newcastle Disease, Infectious Bronchitis, Avian Influenza, Infectious Coryza, Infectious Laryngotracheitis, Mycoplasma gallisepticum etc.

### Conclusion and Suggestion

The overall disease prevalence in the breeders (all strains) maintained in Lahore area was ( $24.44 \pm 0.88\%$ ). Coccidiosis was most commonly prevalent disease and Styphloco or Necrotic enteritis showed almost similar prevalence in the broiler breeders in the study area. Morbidity data showed (41.20%) symptoms of conjunctivitis, followed by exposed rales/abnormal breathing sound (38.50%) and warts/scabs (35.20%). In Hubbard and Arbo Acre strains, gumboro showed dominating occurrence as compared to other poultry diseases in the study area. The trend of disease occurrence showed similarity at random at all the broiler breeder farms invested and statistically, the differences were non-significant ( $P > 0.05$ ). It is suggested through this study that a good manage mental practice, strict bio-security and recommended vaccination schedules may highly helpful to prevent diseases at the farm level. Cautions must be taken during out breaks to monitor titers against viral diseases. Cannibalism, feather picking, lambing birds, dulls carried into culling pens to obtain the feed level for normal production levels. Data of disease prevalence and record must be updated to ensure exact disease situation in the region at poultry research and management organizations and institutional level.

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