



RESEARCH PAPER

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Infectious coryza in broiler and layer flocks of Balochistan

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Abstract

The present study has been conducted to analyze prevalence of coryza in commercial poultry at different regions (Zhob, Quetta, Nasirabad, Dalbandin, Lasbella and Sibi) of Balochistan. The incidence of infectious coryza in Zhob, Quetta, Nasirabad, Dalbandin, Lasbella and Sibi was 34.9%, 38.0%, 33.9%, 35.0%, 39.9% and 34.8% respectively. Season wise distribution of infectious coryza was more in winter (12.9%) and less in summer (5.6%). Moreover the incidence in layer was recorded higher (20%) than broilers (15.9%). However the breed wise susceptibility to coryza in layer and broiler has been in distinguishable. The age wise disease in broiler increased from first to 8th week (0.98% to 9.98%). While in layer there has also been significant increase in the incidence (4.14% to 6.40%) from day old to culling age. The flock size wise disease incidence showed increased (7.79% to 10.77%) with increasing size of flock. The feed brand wise disease has been higher 8.32%, 8.19% and 7.94% with feed brands A, C and D respectively and comparatively low 6.14% and 5.66% using B and E feed brands. Farm building material wise incidence was relatively higher (39.9%) in bush made farms than mud made (35.0%) farms. There was no visible effect of humidity and altitude on incidence of coryza in any region of Balochistan. The study Elaborated various factors of prevalence of coryza. Identifies factors enhance the incidence of coryza in Balochistan.

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Introduction

Infectious coryza is a severe respiratory disease of poultry caused by *Avibacterium paragallinarum* (Wafaa and Abd-El-Ghany 2011). In early days the name *Bacillus haemoglobinophilus coryza gallinarum* was proposed for the causal organism of the “contagious catarrh” (De Blicck, 1932). Later on the name *Haemophilus gallinarum* was suggested for the causative agent of infectious coryza (Elio and Lewis, 1934). The bacterium is today known as *Avibacterium paragallinarum*. The bacterium belongs to the family *Pasteurellaceae*. The organism is gram-negative, non-motile and appears coccobacilli in fresh cultures, however filamentous after 48 hrs (Deshmukh, 2015).

Majority of the *Avibacterium paragallinarum* isolates require Nicotinamide adenine Dinucleotide (NAD) for their growth its their isolation process requires skill and availability of special artificial media (Blackall *et al.*, 2008). There are several X-factor-independent segregates of *Haemophilus gallinarum* that cause coryza infection in poultry (Page, 1962).

The disease is extremely infectious and produces congestion of the upper respiratory tract of poultry, which can convert into a persistent respiratory ailment when complicated by other pathogens (Blackall *et al.*, 2005). This infection has been found throughout the world and the majority of financial victims related with this ailment led to less weight gain in broilers and reduced laying in layers (Blackall and Soriano, 2008).

In undeveloped countries, the incidence of secondary pathogens and improper arrangements can cause outbreaks with larger financial losses (Blackall and Soriano, 2008). The usual process for diagnosis of coryza in poultry is the clinical signs of diseased birds, isolation and biochemical characterization of the causative organism to confirm *Avibacterium paragallinarum* (Thenmozhi and Malmarugan, 2013).

Apart from other problems being faced by poultry sector in Balochistan, financial losses as a result of different poultry diseases is still one of the major problems in the province.

Among poultry diseases, respiratory diseases are more common in Balochistan as compared to other diseases.

Losses because of respiratory system pathogens noted to the tie of thirty million US dollars by Federal Inspection Service, in Brazil 1994. About 34,000 tons chicken meat loss was recorded at the completion of production cycle (Cornly *et al.*, 2000).

The aim of present study is to know about the prevalence of infectious coryza in different regions of Balochistan. This study will be helpful in revealing different factors that promote the incidence of coryza in the province. The study will play an important role in the enhancement of economic growth and production of poultry by controlling coryza in Balochistan.

Materials and methods

Study Area

Multiple dynamics of infectious coryza in broiler and layer flocks were explored in different regions of Balochistan (Zhob, Quetta, Nasirabad, Dalbandin, Lasbella and Sibi).

Procedure

A questioner was developed to collect the required information regarding coryza. The mentioned study regions were visited on monthly bases. The required information's were collected from poultry farmers. Some information were also confirmed through government civil veterinary hospitals, disease investigation labs and poultry dealers of the concern regions.

Results

According to this study the size of broiler and layer flocks was from one to eight thousand in these regions. Results of region wise incidence of coryza revealed that coryza was less in region Nasirabad that was 33.9% and more in region Lasbella which was 39.9% while average prevalence of the regions was 36.0% as shown in Fig. 1.

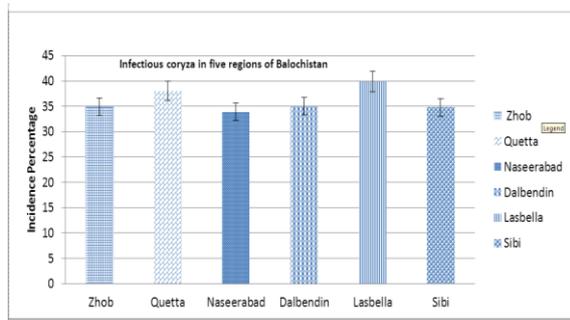


Fig. 1. Region wise incidence (%) of infectious coryza in commercial poultry of Balochistan, Pakistan.

Season wise incidence results revealed that of coryza was highest during winter (12.2% to 14.0%), followed by autumn (9.6% to 11.0%), spring (6.3% to 8.2%) and lowest (4.8% to 6.5%) in summer.

Poultry flocks of Sibi were less (5.4%) affected in summer and that of Lasbella were more affected (14.0%) in winter as shown in Table 1. Results about species wise incidence of coryza exposed that the incidence of coryza in broiler flocks was 13.9 to 18.2% and in layer flocks was 19.1 to 21.5%. Both broiler (18.34%) and layer (21.5%) flocks of region Lasbella were more affected than other regions of Balochistan as shown in Table 2.

Study about broiler breed wise incidence of coryza exposed that the incidence was 6.16% to 7.30%, 6.36% to 7.16% and 6.1% to 7.32% in broiler breeds Cob, Hubbird and Arbraker respectively. Among the broiler breeds Arbraker and Hubbird were found more (7.32%) and (7.16%) susceptible in Lasbella region while cob was more affected (7.30%) in Zhob as shown in Table 3. Findings concerning layer breed wise incidence of coryza were 5.0% to 6.8%, 4.0% to 6.2% and 4.6% to 6.0% in layer breed Bovan, white, L.S.L. and Bibcock respectively.

The breeds Babcock and L.S.L showed more incidences in Lasbella than other regions however, Bovan white breed was more affected in Quetta as shown in Table 4. Results about broiler age wise incidence of coryza revealed that the incidence of coryza was 0.89 to 1.53%, 2.86 to 3.44%, 6.2 to 7.31% and 8.27 to 9.98% during 0-2, 2-4, 4-6 and 6-8 weeks of age respectively.

At the age of 0-2 week maximum incidence was (1.53%) that was noted in Nasirabad region, while at the ages 2-4, 4-6 and 6-8 high incidences (3.52%), (7.31%) and (9.98%) were recorded in Dalbandin, Lasbella and Zhob regions respectively as shown in Table 5. Study findings regarding layer age wise incidence of coryza showed that the incidence of coryza was 4.14 to 5.20%, 2.21 to 3.53%, 2.99 to 5.24% and 3.15 to 6.40% during 0-2, 2-4, 4-6 and above 6 month of age respectively. During the ages 0-2, 2-4, 4-6 and above 6 month high incidences (5.20%), (3.53%), and (3.38%) were found in regions Lasbella, Quetta, and Sibi respectively as shown in Table 6.

Results about size wise incidence disclosed that the incidence of coryza was 7.79 to 9.5%, 8.13 to 10.37%, 8.35 to 9.50% and 8.04 to 10.77% in 0-2 thousand, 2-4 thousand, 4-6 thousand and 6-8 thousand flock size respectively. Maximum incidence was noted in flock size between 6-8 thousand birds in region Lasbella, while minimum incidence was found in flocks of size 1-2 thousand in region Nasirabad as shown in Table 7. Study results related to feed brand associated coryza incidence revealed that there was 7.46 to 9.12%, 5.69 to 6.78%, 7.44 to 9.17%, and 7.32 to 8.3% and 5.34 to 6.38 with feeds A, B, C, D and E respectively. Higher incidences were recorded using feeds A, C & D while comparatively lower incidences were noted with feeds B and E as shown in Table 8.

Humidity wise coryza incidence of different study regions was 35% at 41% humidity, 38% at 45% humidity, 35% at 55% humidity, 35% at 31% humidity, 39.9% at 69% and 34% at 41% humidity, Zhob, Quetta, Nasirabad, Dalbandin, Lasbella and Sibi respectively.

There was no connection between humidity and incidence of coryza in any region except, Lasbella which cannot be considered as a cause of increase in the incidence as shown in Table 9. Study results about coryza incidences associated to farm building material showed that coryza incidence was 39.9% in bush made (region Lasbella) farms and 34.9, 38,

35.0 and 34.8% in mud made farms i.e. Zhob, Quetta, Nasirabad, Dalbandin and Sibi respectively. In mud made farms maximum incidences were noted in region Quetta, while minimum incidence was recorded in region Nasirabad as shown in Table 10. Study findings about altitude wise incidence of coryza

revealed that the incidence was 34.9% at 2198m, 38% at 1680m, 34% at 52m, 35% at 847m, 39.9% at 25m and 35% at 136m in Zhob, Quetta, Nasirabad, Dalbandin, Lasbella and Sibi respectively. These results showed that there was no dependency between coryza incidences and altitude of the regions as shown in Table 11.

Table 1. Season wise incidence (%) of coryza in poultry at different regions of Balochistan, Pakistan.

Regions	Summer	Autumn	Winter	Spring
Zhob	5.1%	10.1%	12.7%	6.8%
Quetta	5.93%	10.7%	13.54%	7.70%
Nasirabad	4.83%	10.1%	12.3%	6.3%
Dalbandin	5.7%	9.6%	12.4%	7.0%
Lasbella	6.50%	11.0%	14.0%	8.2%
Sibi	5.4%	10.0%	12.2%	7.0%

Table 2. Species wise incidence (%) of coryza in commercial poultry of Balochistan, Pakistan.

Regions	Incidence in layer	Incidence in broiler
Zhob	20.9%	13.9%
Quetta	19.7%	18.2%
Nasirabad	19.2%	14.54%
Dalbandin	19.6%	15.4%
Lasbella	21.5%	18.34%
Sibi	19.1%	15.6%

Table 3. Broiler breed wise incidence (%) of coryza in commercial poultry of Balochistan, Pakistan.

Regions	Incidence in Cob breed	Incidence in Hubbird breed	Incidence in Arbraker breed
Zhob	7.30%	6.80%	6.90%
Quetta	6.88%	6.56%	6.34%
Nasirabad	6.70%	6.40%	6.1%
Dalbandin	6.61%	6.53%	6.40%
Lasbella	7.00%	7.16%	7.32%
Sibi	6.16%	6.36%	6.46%

Table 4. Layer breed wise incidence (%) of coryza in commercial poultry of Balochistan, Pakistan.

Regions	Incidence in Bovan white	Incidence in L.S.L.	Incidence in Babcock
Zhob	5.0%	4.2%	4.6%
Quetta	6.8%	6.0%	5.4%
Nasirabad	5.68%	4.02%	4.84%
Dalbandin	5.26%	5.12%	5.01%
Lasbella	6.13%	6.21%	6.00%
Sibi	5.00%	5.40%	5.20%

Table 5. Broiler age wise incidence (%) of coryza in commercial poultry of Balochistan, Pakistan.

Regions	Incidence at 0 to 2 weeks age	Incidence at 2 to 4 weeks age	Incidence at 4 to 6 weeks age	Incidence at 6 to 8 weeks age
Zhob	1.46 %	3.34%	7.10%	9.98%
Quetta	1.18%	3.34%	6.89%	8.27%
Nasirabad	1.53%	2.88%	6.33%	8.44%
Dalbandin	0.98%	3.52%	6.27%	8.82%
Lasbella	1.50%	3.44%	7.31%	9.24%
Sibi	1.52%	2.86%	6.30%	8.40%

Table 6. Layer age wise incidence (%) of coryza in commercial poultry of Balochistan, Pakistan.

Regions	Incidence at 0 to 2 month age	Incidence at 2 to 4 month age	Incidence at 4 to 6 month age	Incidence at Above 6 th month age
Zhob	4.14%	2.27%	2.72%	4.75%
Quetta	4.87%	3.53%	3.38%	6.40%
Nasirabad	4.47%	2.23%	2.99%	4.82%
Dalbandin	4.28%	2.21%	3.32%	5.57%
Lasbella	5.20%	3.36%	3.33%	6.52%
Sibi	4.89%	2.30%	5.24%	3.15%

Table 7. Flock size wise incidence (%) of coryza in commercial poultry of Balochistan, Pakistan.

Regions	Incidence in 0 to 2 thousand birds	Incidence in 2 to 4 thousand birds	Incidence in 4 to 6 thousand birds	Incidence in 6 to 8 thousand birds
Zhob	8.71%	9.07%	8.37%	8.73%
Quetta	9.13 %	9.11%	9.50%	9.88%
Nasirabad	7.79%	8.13%	8.47 %	9.15%
Dalbandin	8.75%	8.40 %	8.40%	9.45%
Lasbella	9.57%	10.37%	9.17 %	10.77%
Sibi	8.80%	8.60%	8.35%	8.04%

Table 8. Feed Brand wise incidence (%) of coryza in commercial poultry of Balochistan, Pakistan.

Regions	Incidence using Feed A	Incidence using Feed B	Incidence using Feed C	Incidence using Feed D	Incidence using Feed E
Zhob	8.03%	5.93%	8.01%	7.32%	5.58%
Quetta	9.12%	6.08%	8.74%	8.36%	5.7%
Naseerabad	7.46%	6.10%	7.44%	7.79%	5.42%
Dalbandin	8.54%	5.69%	8.18%	7.83%	5.34%
Lasbella	9.17%	6.78%	9.17%	8.37%	6.38%
Sibi	7.65%	6.26%	7.65%	8.00%	5.56%

Table 9. Humidity wise incidence (%) of coryza in commercial poultry of Balochistan, Pakistan.

Regions	Incidence at 30 to 40% humidity	Incidence at 41 to 50% humidity	Incidence at 51 to 60% humidity	Incidence at 61 to 70% humidity
Zhob		35.0%		
Quetta		38.0%		
Nasirabad			35%	
Dalbandin	35.0%			
Lasbella				39.9%
Sibi		34.8%		

Table 10. Farm building material wise incidence (%) of coryza in commercial poultry of Balochistan, Pakistan.

Regions	Incidence in Mud made farms	Incidence in Bush made farms
Zhob	34.9%	
Quetta	38%	
Nasirabad	33.9%	
Dalbandin	35.0%	
Lasbella		39.90%
Sibi	34.8%	

Table 11. Regional altitude wise incidence (%) coryza in commercial poultry of Balochistan, Pakistan.

Regions	Incidence at 0 to 500 m altitude	Incidence at 50 to 1500 m altitude	Incidence above 1500 m altitude
Zhob			34.9 %
Quetta			38%
Nasirabad	34%		
Dalbandin		35.0%	
Lasbella	39.9%		
Sibi	35%		

Discussions

This study revealed that incidence of infectious coryza was less in region Nasirabad which was 33.9% and more in region Lasbella that was 39.9%. During this study, season wise incidence was highest during winter followed by autumn spring and lowest in summer in different regions of the province. Our findings are in line with findings of Razia *et al.*, (2012).

There was nominal difference in the incidence of coryza between broiler and layer flocks of the same region. Average prevalence of infectious coryza of layer and broiler of regions was 36.0% and. our broiler flocks results are almost in line with findings of Younus *et al.*, (2008).

Study about broiler breed wise incidence of coryza revealed that there were no constant and reasonable disparities in the incidence of coryza among different breeds of broiler. These negligible differences could either be due to manage mental or climatic variations of different farms of the regions.

The results regarding layer breed wise incidence of coryza revealed that Bovan white breed was more susceptible then L.S.L. breed. In the same way L.S.L. breed was more susceptible then Babcock. These findings were on the same configurations as found in broiler breeds. These minor variations may also be the result of uneven farm management as well as climate of these regions.

The findings of broiler age wise incidence study of coryza revealed that the incidence of coryza increases with age. Similar findings were reported by Younus *et al.*, (2008) that the incidence of respiratory diseases increases with increase in age.

Results about layer age wise incidence revealed that there were more incidences during the 1st & 2nd month of age than the 3rd to 4th and 5th to 6th month of age however, after 6th month it increased again. Our findings are partially in line with Thitisak *et al.*, (1988) who have reported that the most common cause of death in chickens less than 2 month old and more than 6 months old was coryza.

Results about size wise incidence disclosed that incidence of coryza increased with increase in size of flocks and our findings were in line with Mukhtar *et al.*, (2012).

Study concerning feed brand related of coryza revealed that there was reasonable difference in the incidence of coryza regarding feed quality. Good quality feeds are mostly supplemented with certain feed additives that boost immunity and enhance resistance against diseases. Our findings that there were fewer incidences in feed brand B & E then feed brand A, C & D are in line with finding of Blackall and Masakazo, (2003) who has reported that poor housing, parasitism, in adequate nutrition, imbalance feed and such other stress inducing factors may decline resistance of an entity/being against a disease.

Results regarding humidity showed that there was no reasonable connection between humidity and incidence of coryza in any region of our study except, Lasbella region in which there was comparatively more i.e. 39.99% coryza incidence at 69% humidity which could not be linked to each other, if we compare this situation to other regions.

Results concerning farm building material linked incidences of coryza exposed that there was comparatively more incidence of coryza i.e. 39.9 in bush made (region Lasbella) farms than mud made (all other regions) farms.

Bush made farms have no proper walls and roof. They are porous and unreliable in term of disease protection. Polluted/contaminated air easily passes through these porous structures i.e. walls and roofs of these farms leading to an easy spread of disease from diseased flocks to surrounding healthy flocks.

Results pertaining to altitude wise incidence of coryza revealed that although there was comparatively more i.e. 39.9% incidence of coryza at relatively less i.e. 25 meters altitude in Lasbella region of our study however, results of other regions such as Quetta where there was 38% coryza incidence at 1680 m altitude indicated that there was no connection between altitude and incidence of coryza in any region of our study.

Conclusions

There could be several factors for any matter/problem however, only those factors are always elaborated and addressed which have more effect in that matter. In case of coryza cold season of the year (winter and autumn) was found the major common contributing factor leading to high incidence of the disease in Balochistan. Farm building material associated incidence was another important factor that was limited to region Lasbella was also responsible for high incidence of the disease. Poultry farms of Lasbella region were very close to each other, these poultry farms were made up of bush (which had no proper walls and roof). These bush made porous cages type structures were unable to prevent free flow of contaminated air from farm to farm. Majority of these farms have been made on dry sandy lands and were very close to each other. All the above factors encourage an easy spread of the disease from one farm to another farm resulting in high incidence of coryza in this region.

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