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Short Communication

Prevalence and molecular detection of infectious laryngotracheitis virus in chickens in selected areas of Bangladesh

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Abstract

Infectious laryngotracheitis (ILT) is a viral disease of poultry species caused by infectious laryngotracheitis virus (ILTV) that shows high morbidity and mortality. The present study was under taken for ILTV prevalence in broiler and layer chickens from four different geographical areas including Bogura, Gazipur, Chattogram and Dhaka districts during 2017 to 2018. Total 350 tracheal swabs were collected and were evaluated by real time RT-PCR (rRT-PCR). The overall 5.14% (18/350) ILTV prevalence was found that included 6.5% (13/200) in layer and 3.33% (5/150) in broiler chickens. The prevalence of ILTV was highest (10%) in layer chickens under age below 20 weeks and broiler chicks showed ILTV (1. 42%) infection when they were 7-14 days old. Winter season showed highest 6.6% prevalence whereas 5% and 3% prevalence were noticed at summer and rainy seasons, respectively.

Key words: Infectious laryngotracheitis virus, chicken, rRT-PCR, prevalence

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Introduction

Infectious Laryngotracheitis (ILT) is an important respiratory disease of chicken caused by gallid herpes virus-I belonged to family *Herpesviridae*, subfamily *Alphaherpesvirinae*, genus *Iltovirus*. It is an enveloped, non-segmented and linear double-stranded DNA virus. Clinical signs associated with the acute form of the disease include gasping, depression, nasal discharge, conjunctivitis, and secretion of bloody mucus (OIE, 2008). On postmortem infected chickens shows hemorrhages and mucus plugs in trachea (Ali, 2020; Ali and Hasan, 2018; Bhuiyan *et al*., 2019a). The birds do not show any clinical disease also show few pathological signs and lesions that include closed eyes, conjunctivitis, swelling of the infraorbital sinuses, persistent nasal discharges and mild tracheitis. The disease has been reported in Bangladesh in 2010 (Islam *et al.*, 2010; Ali *et al*., 2015). The aim of the research was to determination of the prevalence of ILTV in selected areas of Bangladesh, and identification of ILTV in the samples collected from the areas.

Materials and Methods

A total of 350 tracheal swabs were collected from suspected cases of ILT disease from broiler (n=150) and layer (n=200) chickens of selected farms of Gazipur, Bogura, Chattogram and Dhaka district of Bangladesh. After collection, the samples were kept in viral transport medium (VTM) containing antibiotics and then transported to the Virology Laboratory, Animal Health Research Division, BLRI, Savar, Dhaka and stored at -80^{0}C until tested. The swab samples were grinded and homogenized, and 10% suspension was prepared by using phosphate buffer solution (PBS). The suspension was centrifuged at 4500 rpm for 10 min for the

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collection of supernatant and genomic DNA was extracted by QIAamp DNA Mini Kit, according to the manufacturer's guidelines. Then rRT-PCR was performed for the confirmation of ILTV positive samples by reference primer and probe (Table 1).

Results and Discussion

The overall prevalence of ILTV in the chickens tested were 5.14% (18/350) of which the prevalence was 3.33% in broiler and 6.50% in layer chickens. Bogura showed the highest (7.00%) detection whereas Dhaka was the lowest (2.00%) (Figure 1). Islam *et al.*, (2010) demonstrated the comparative highest infection of ILTV in Gazipur district. Bogura has the highest density of *Sonali* chickens (cross-bred) in Bangladesh that may influence the rapid transmission of infectious pathogens (Islam *et al.*, 2010; Ali, 2018). Population density increases the chance of ILTV transmission in India (Gowthaman *et al.*, 2014) and Thailand (Couto *et al.*, 2015).

Table 1. Primer and probe sequence used for the detection of infectious laryngotrachitis virus.

Primer and prove	Primer sequence (5' to 3')	Target gene	Reference
gB-S	CAGTATCTGGCATCGCCTCAT	gB gene	Zhao *et al.* (2013)
gB-A	CCTGGGAACAGAACCTGAACT		
Probe	FAM-CTAACCCGTTCG CCGCACTCG-BHQ		

Additionally, the prevalence was highest 6.5% in layer chickens which was highest during 20 weeks of age as 10% (6/60), then 3.75% at 21-40 weeks of age and 6.67% (4/60) at above 41 weeks of age. On the other hand, in broiler chickens showed highest 5% prevalence at mid-age (between 15-32 days), (Table 2). Highest incidence of ILTV was recorded as 25.00% in layer chickens in Kazi farm and the lowest incidence was recorded as 14.28 % in layer chickens of Paragon poultry farm in Bangladesh, and they showed 100% mortality of chickens described by Islam et al. (2010). The samilar observation was also made by Andrease *et al.* (1989), Beltrán *et al.* (2017), Nadimpalli *et al.* (2017) and Mijanur *et al.* (2018) in several investigations. The detection was highest in winter than in any other seasons (Figure 2). Similar highest prevalence in winter season was recorded by several researchers (Lowen *et al.*, 2008; Gilchrist, 2005; Ali *et al.*, 2019; Bhuiyan *et al*., 2019b).

Table 2. Prevalence of infectious laryngotrachitis virus of chickens at different ages

Type	Age	Number Sample	Positive	No. of positive sample (%)	95% CI	p value
Broiler	7-14 Day	70	1	1 (1.43)	0.04-7.0	0.02
	15-32 Day	80	4	4 (5.00)	1.38-12.31	
	Total	150	5	5 (3.33)	1.09-7.61	
Layer	≤20 week	60	6	6 (10.00)	3.76-20.51	0.332
	21-40 week	80	3	3 (3.75)	0.78-10.57	
	≥41 week	60	4	4 (6.67)	1.85-16.20	
	Total	200	13	13 (6.50)	3.51-10.86	

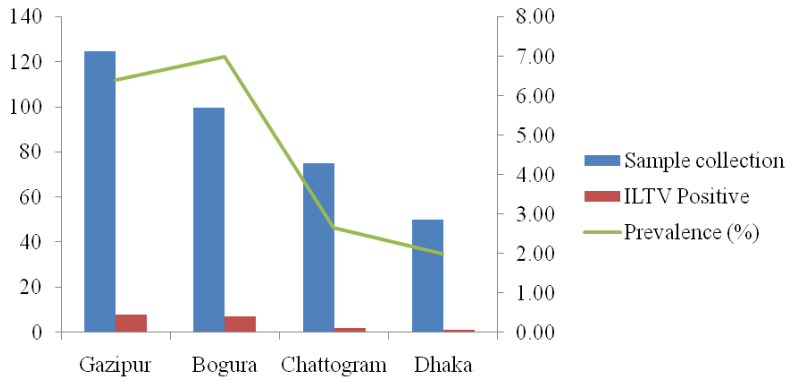

Figure 1: Prevalence of infectious laryngotracheitis disease at different areas of Bangladesh.

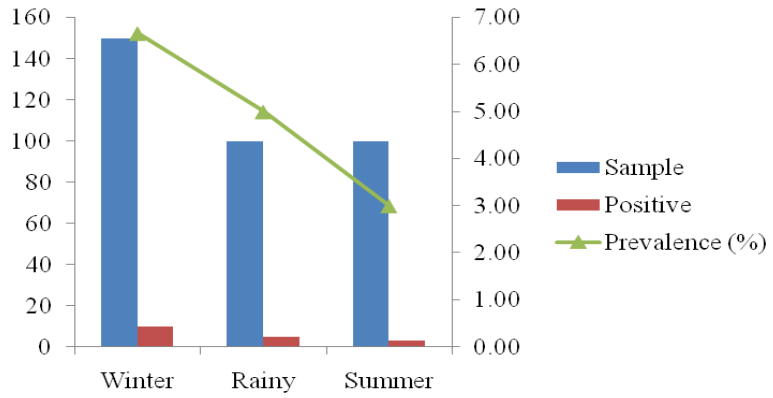

Figure 2: Prevalence of infectious laryngotracheitis disease at different seasons.

Conclusion

In the study, the overall prevalence estimates of ILTV in broiler and layer chicken were demonstrated. Altogether, this study indicates that ILTV is circulating in both commercial layer and broiler chicken and its prevalence is higher in winter season.

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