**First report of QX-like infectious bronchitis virus in India**

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**ABSTRACT**

**Background:** Infectious bronchitis virus (IBV) strains of Massachusetts and 793B have been reported in India. As a RNA virus, IBV constantly undergoes either point or recombination, which results in the emergence of new strains. Alternatively, many new strains of IBVs are spread from one country to another. Through our recent research collaboration with Indian partners, we are reporting the first detection of QX-like IBV in Indian poultry.

**Methods:** Eleven small holder flocks presenting with respiratory signs were sampled with oropharyngeal swabs. DNA was extracted and analysed by RT-PCR and subsequently, positive samples were sequenced, and genotype was determined.

**Results:** Out of the 11 flocks, four were IBV positive and confirmed as IBV QX-like, with nucleotide similarity of 98.7-99.4%.

**Conclusion:** The detection of IBV QX in India poses new disease threat to the rapidly developing poultry industry and the sustainability of rural chicken flocks.

**LETTER**

Infectious bronchitis (IB) is one of the most economically significant diseases that impacts poultry production, health and welfare worldwide (1). Previous work in India have reported the presence of infectious bronchitis virus (IBV) strains of Massachusetts (Mass) or 793B (2, 3). Since the first report of IBV QX variant in China (1996) (4), QX-like strains have been detected in many other countries (5, 6), and we are reporting the first detection of IBV QX-like in India.

Between April to June 2019, a pool of oropharyngeal samples were collected separately from eleven small holder chicken flocks (45 – 60 days old) in Tamil Nadu, India. Birds presented with signs of dullness, depression, oculonasal discharge, respiratory distress, sneezing, head shaking, prostration and increased mortality rates (up to 6.3%). Post-mortem examination revealed presence of catarrhal exudates in the sinuses and trachea, moderately congested and oedematous lungs and cloudy air sacs with frothy exudates.

The oropharyngeal swabs were processed for detection of IBV by nested RT-PCR targeting the S1 gene hypervariable region (393 bp) (7). Four positive samples were sequenced and BLAST analysis revealed greater similarity to QX (98.7 – 99.4%; accession numbers KY933089 and KF297571), with strains divergent to Mass (79.8%; AY561711) and 793B (82.9%; AF093794) genotypes. Phylogenetic analysis demonstrated clustering of this Indian strain with previously reported QX strains (Figure 1).

In India, the small holder poultry industry comprises of 317.07 million birds (37.22% of total population) (8) and detection of QX-like IBV in such flocks could raise serious industry concerns. Though, clinical signs and lesions associated with QX strains of IBV have been found in commercial birds in India, to date, there have been no reports of its confirmation. IBV QX are able to replicate to greater titres when compared to Mass or 793B strains (8). In this context, potential transmission of QX from smallholder to commercial poultry is highly possible. Combined Mass and 793B serotype vaccination (9) or homologous vaccination (10) have been shown to confer protection against virulent QX challenge. Given potential disastrous economic effects of QX, wider epidemiological studies alongside attempts to isolate IBV QX from Indian poultry, would allow for improved control programmes including development of appropriate local vaccines or vaccination programs. This will safeguard the income and welfare of backyard and smallholder poultry keepers, and help avoid commercial poultry losses in India.

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Figure 1. Maximum likelihood phylogenetic analysis of sequences from Indian small holder flocks. Sequenced QX-like strains are indicated with a black triangle. Analysis was carried out with the Tamura 3-parameter model and invariant distribution. Bootstrap values below 70 are not displayed. The scale bar represents nucleotide changes per site.