An overview on Epidemiologic investigations of Infectious coryza

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Abstract

Among infectious diseases, Infectious coryza is one of the major problems affecting commercial poultry industry in the developing country like India. It is an upper respiratory tract disease of chickens caused by Haemophilus paragallinarum. The economic impact of the disease is mainly due to increased number of culls and significant reduction (10 to 40 %) in egg production, especially on multi-age farms (Blackall et al., 1997). The research work on infectious coryza so far in India is so scanty that does not provides necessary impact analysis of the disease on the commercial poultry rearers in the country. This paper presents an overview of the occurrence of the disease in India and other countries. The paper compares the economic losses to the poultry owners due to the disease in developed and developing countries.

Keywords: Epidemiology, Infectious Coryza, Investigation, Poultry, Economy, Incidence, Serotype.

Introduction

Infectious Coryza (IC) is an infectious contagious respiratory bacterial disease of several avian species and the etiological agent responsible for the diseases is Haemophilus paragallinarum. The disease at initial stages may be acute to sub acute but progresses to a chronic state as the disease works through the flock. Common names for the disease are roup, cold and Coryza (Blackall et al., 1997). The clinical syndrome was first diagnosed in 1931 by De Blieck. Since the disease proved to be infectious and primarily affected nasal passages, the name "infectious coryza" was adopted (Blackall, 1989). Coryza is a disease of the upper respiratory tract- trachea, sinuses and air passages of the head. Common names for the disease are roup, cold and Coryza (Blackall et al., 1997). Disease is characterized by nasal discharge, facial swelling, sneezing, labored breathing and fetid odor of the exudates.

The disease occurs worldwide and the reasons behind success of survival for this bacterium is that after recovering from infection, birds become carriers, therefore aiding the spread of H. paragallinarum (De Blieck, 1948). Secondly, the bacterial strain belongs to one of nine serovars, which makes combating the spread of the disease through inactivated vaccination ineffective especially due to low cross protection among these serovars (Rimler et al., 1977; Kume et al., 1980a). Due to the phenomenon that the disease proved to be infectious only in the nasal passages the name "Infectious Coryza" was adopted (Beach and Schalm, 1936). Involvement of the lower respiratory tract may be due to synergism between H. paragallinarum and other respiratory tract pathogens (Blackall, 1989). Economic magnitude of the disease is due to its effect in both broiler and layer birds. Egg production in affected laying flocks may drop 10-80 per cent. Affected birds have severe respiratory difficulties resulting in 2 per cent to more than 10 per cent mortality. Young birds grow poorly and hence, there is loss of condition in broiler, ultimately resulting in increased number of culls. It is observed that there is a unique group within the bacterial family Pasteurelloceae associated with avian hosts and these bacteria are rarely isolated from any other host species, a proposal for new nomenclature for these species is suggested. This new nomenclature of Haemophilus paragallinarum, now proposed as Avibacterium paragallinarum (Blackall et al., 2005). This new nomenclature has been accepted in few countries.

Epidemiology

The disease occurrence is worldwide. Early workers identified the causative organism as Haemophilus gallinarum, an organism that required both as Hemin factor X and NAD factor V for growth in vitro. However from 1960s to 1980s, all isolates of the disease producing agents have been shown to require only V factor and have been termed H. paragallinarum.

V factor independent isolates of H. paragallinarum have been encountered in the Republic of South Africa since 1989. Thus the causative agent of this disease is regarded as H. paragallinarum, an organism that can be either V-factor dependant or independent (Blackall et al., 1997).

The potential impact of coryza on meat chicken has been emphasized by reports on economically important outbreaks in two states of the United States (Droual et al., 1990). Unusual clinical signs have been reported in the America. In both North and South America, outbreaks of coryza in which chickens have shown clinical signs more typical of a swollen head like syndrome have been reported (Sandoval et al., 1994). In Alabama, an Infectious coryza outbreak in broilers, which was not complicated by any other disease agent, caused a condemnation rate of 69.8 percent virtually all due to air saculitis(Hoerr, et al., 1992).

The enormously different nature of infectious coryza complicated by other pathogens and stress factors has been demonstrated by reports from countries such as Argentina, India, Morocco and Thailand. Unique clinical presentations such as arthritis and septicemia, presumably complicated by presence of pathogens detected, such as Mycoplasma gallisepticum, M. synoviae, Pasteurellla spp. Salmonella spp. and infectious bronchitis virus, have been found in broiler and layer flocks in Argentina. The isolation of H. paragallinarum from non respiratory sites such as liver, kidney and tarsus was reported for the first time in these outbreaks (Sandoval et al., 1994). A study in Morocco reported on 10 coryza outbreaks that were associated with drop in egg production of 14 to 41% and mortalities of 0.7 to 10% (Thitisak et al., 1988). A study of village chicken in Thailand has reported that infectious coryza was the most common cause of death in chicks less than 2 months old and those over six months old (Thitisak et al., 1988).

It has been estimated that over the three year period the disease caused losses of about 100 million yuan (app $ US 16.5 million at 1996 exchange rate) in China (Chen et al., 1993). In the US it is most prevalent in California and the southeastern US. In New England AIC has occurred in Connecticut in the 80's, but has not been diagnosed in Maine during the last 20 years.

In Indonesia, the isolation of H paragallinarum has been reported in 1975, 1978 and 1987. Unfortunately, none of the isolates from these studies were maintained and, therefore, there is no information of the serovars to which they belonged. Akhtar et al. (2001) observed the effects of an outbreak of infectious coryza in a layer farm with total population of 20 000, white leghorns Arifwala, Pakistan.

Status of the disease in India

Incidences in India: In India there is very scanty information available on H. paragallinarum because the laboratory diagnosis of H. paragallinarum infection is based mainly on demonstration and confirmation by isolation and identification of the organisms. This diagnosis proves to be a difficult task for routine isolation and identification.

As per the reports found in renowned journals, the coryza cases in India are being reported since 1967 (Table 1.1). The first reported and published isolation of this organism from India was reported in 1950 (Rao, 1958, as cited by Adalkha, 1967) followed by a second report after 11 years by Saxena and Sawhney in 1961.

In Karnool district of India, infectious coryza has been reported as the second most important bacterial disease associated with mortality after Salmonellosis (Shrinivasa et al., 1989). It has been reported as an epidemic in Madhya Pradesh. In India it is most common in areas of high altitude, Bihar plateau but may occur elsewhere in cold damp weather. Some outbreaks of Infectious coryza reported in India are presented in Table No. 1.1

No systematic documented reports on status of the disease in Gujrat are available though the clinical symptoms are commonly and regularly observed. The incidences can be summarized as they are common in some parts of Saurashtra, Anand and Kheda where intensive commercial poultry rearing is practiced. Here majority cases are found in layers birds. Navapur which is at the border of Gujarat and Maharashtra states is known as home town of IC.

Prevalence of serotypes: Serogroups A and C have been reported in Japan (Kume et al., 1978), Australia (Thornton & Blackall, 1984), Indonesia (Takagi et al., 1991) and Malaysia (Zaini et al., 1992). In Germany, serogroups A and B have been identified (Hinz, 1973). Serogroup A has been reported in China (Chen et al., 1993), while serogroup C has been found in Taiwan (Lin et al., 1995). In Mexico, national or international commercial vaccines containing strains of A, B and C or A and C serogroups are used. Page serovars A and C have been identified in India (Tongaonkar et al., 2003).

Currently, the most accepted method for the serological characterization of H. paragallinarum as per described by Kume et al. (1983).

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Table-1. Reports of Infectious coryza in India

Sr. No	State	References	Area	Type of bird	Farm capacity	No. of the isolates
1.	Uttar Pradesh	Adlakha, 1967	Delhi	Layer	-	-
2.	Hariana	Verma et al., 1985	Hissar	Broiler	-	2
3.	Andhra Pradesh	Rao, 1988	Hydrabad	Broiler	-	-
4.	Tamilnadu	Prabhakar et al., 1998	Namakkal	Layer -55 wk	-	3 / 54
5.	Andhra Pradesh	Prasad et al.,1999	Tanuku	-	-	58
6.	Madhya Pradesh	Sobti et al. 2000	Jabalpur	Layer	-	28 / 253
7.	Maharashtra	Kurkure et al., 2001	Vidarbha, Nagpur	Layer	22, 500 layers 7500 growers	-
8.	Andhra Pradesh and Orisa	Tongaonkar et al., 2003	Vijaywada, Bhuvaneshwara	Layer	-	53
9.	Panjab	Jaswinder Kaur et al., 2004	Ludhiana	Layer	-	-