Disease challenges in layers and broilers

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Indian Poultry Industry

- One of the fastest growing segments of the agricultural sector
- Transformation from a mere backyard activity into a major commercial agri based industry over a period of four decades.
- Development of high yielding layer (340 eggs) and broiler (2.4-2.6 kg at 6 wks)
- Layers (4-6%) and broilers (8-10%) growth rate per annum.
- Annual per capita availability - 86 eggs and 3.1 Kg of meat.
- Ranks 3rd in egg production and 4th in chicken meat production

Disease challenges in layers

Chicks

- Omphalitis/Yolk sac infection
- Colibacillosis
- Salmonellosis
- Infectious coryza
- Fowl cholera
- Aspergillosis
- IBD
- Fowl pox
- Newcastle disease
- ILT

Grower

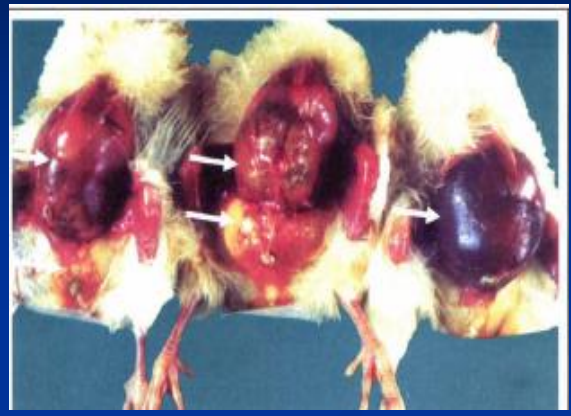
- Gangrenous dermatitis/Wing rot
- Colibacillosis
- Chronic Respiratory Disease
- Infectious coryza
- Fowl cholera
- Fowl pox
- Newcastle disease
- ILT
- Marek's disease
- Chicken infectious anaemia
- Avian metapneumo virus

Layer

- Colibacillosis
- Fowl typhoid
- Infectious coryza
- Necrotic enteritis
- Chronic Respiratory Disease
- Fowl cholera
- Fowl pox
- Newcastle disease
- Avian Influenza
- ILT
- MD
- IB
- Avian metapneumo virus
- Leucocytozoonosis
- Crop mycosis

Omphalitis

- Improper closure of the navel with subsequent bacterial infection with
  - *E. coli, Pseudomonas sp., Salmonella spp. and Proteus sp.*
- Contributing factors
  - Dirty eggs, improper incubator and hatchery sanitation, excessive humidity in the incubator and chilling or over heating of newly hatched chicks
- Clinical signs
  - Enlarged abdomen, inflamed navels, pasty vents, and weakness
  - Infected chicks will huddle together and most will die within the first week after hatch.
  - Mortality as high as 15%
- Lesions
  - Discoloration/ Precipitation of yolk
- Prevention
  - Good management and sanitation procedures in the hatchery and during the first few days following hatching
  - Broad spectrum antibiotics help reduce mortality and stunting in affected groups, but they do not replace sanitation.



Colibacillosis

- Caused by strains of the *Escherichia coli*
- Infections may result in
  - a respiratory disease from air sac infection
  - a septicemic (blood) disease from generalized infections,
  - an enteritis from intestinal infection or
  - a combination of any or all of these conditions
- All ages are susceptible
- Transmission
  - Contaminated feed and water
  - The disease may result from a coliform infection alone or in combination with other disease agents
- Clinical signs
  - Depression, decrease in appetite and diarrhoea
- Lesions
  - Airsacculitis, pericarditis and perihepatitis

Colibacillosis

- Diagnosis
  - Clinical signs and lesions
  - Isolation of organism
- Prevention
  - Providing adequate ventilation
  - Good litter conditions
  - Properly cleaned and disinfected equipment and facilities
  - High quality feed and water
- Treatment
  - ABST

Salmonellosis

- Cause: S. PULLORUM – Pullorum disease /Bacillary white diarrhoea
  S. GALLINARUM – Fowl typhoid
  Intracellular bacteria
- Susceptibility
  - S. PULLORUM – under 14 days of age
  - S. GALLINARUM – 12 weeks and above age
- Transmission
  - Vertical
  - Contaminated environment, feed and water
- Clinical signs
  - Depression, diarrhoae, pasty vent

Salmonellosis

- Lesions
  - Small necrotic foci on the liver, enlarged spleen and distended gall bladder
  - Copper coloured liver and oophoritis in layers

- Diagnosis
  - Isolation of organism
  - Plate agglutination test
- Treatment and control
  - Antibiotics
  - Live and inactivated vaccines

Infectious coryza

- Cause : *Avibacterium paragallinarum*
- Chickens are the main species affected
- Transmission
  - Bird to bird contact
  - Contaminated water and food
- Clinical signs
  - Depression, nasal discharge, sneezing and edema of the face and wattles along with decreased feed and water consumption and decreased egg production
  - The course of the disease is usually 2 to 3 months
- Lesions
  - There is edema of the face with exudates that usually emit a foul odour

Infectious coryza

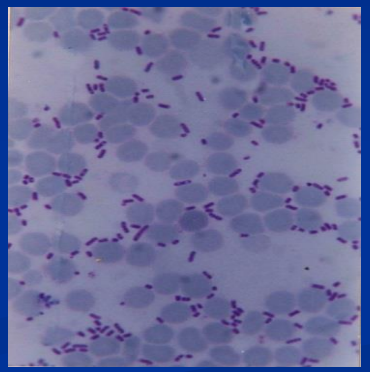
- Diagnosis
  - Staining of smear prepared from infraorbital exudate
  - Isolation of organism
- Treatment
  - Antibiotics
  - Inactivated vaccines

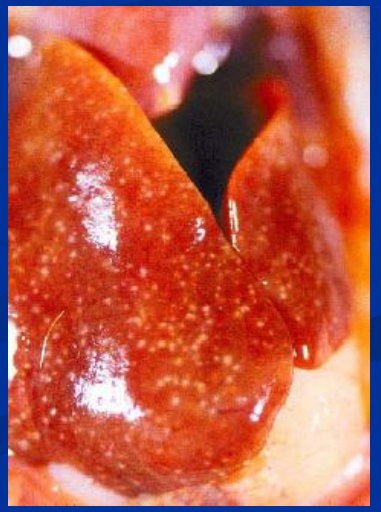
Fowl cholera

- Cause : *Pasteurella multocida* – Many serotypes
- All domestic fowl species are susceptible
- Transmission
  - Cats, wild birds and rodents can act as carriers
  - Spread from bird to bird by contact
  - It is a stress disease occurring at point of lay and with seasonal change
- Clinical signs
  - Peracute death without signs can occur
  - Acute disease -high fever, thirst, cyanotic, anorexia and ruffled feathers
  - Chronic disease – torticollis, otitis, emaciation, severe mortality, enlargement of wattles, combs, legs, footpads and wing joints and peritonitis

Fowl cholera

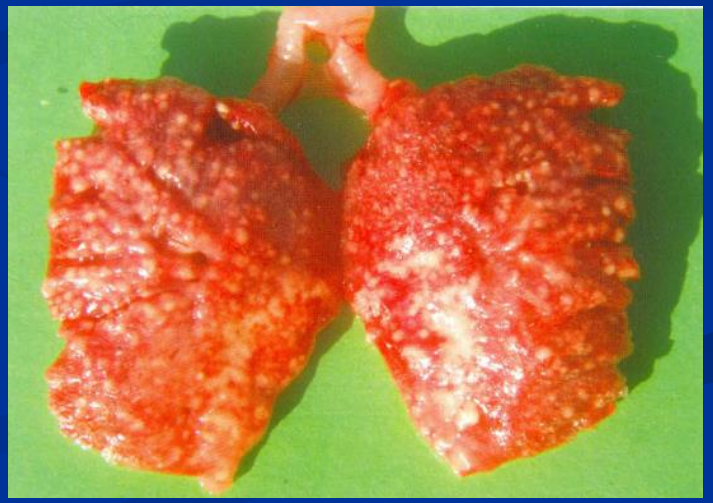
- Lesions
  - Septicaemia with haemorrhages in the heart and abdominal linings
  - White necrotic foci on the liver
- Diagnosis
  - Clinical signs and lesions
  - Isolation of organism- Bipolar
- Treatment and control
  - Antibiotics
  - Eliminating potential reservoirs
  - Inactivated vaccine





Aspergillosis

- **Causal Agent** – *Aspergillus fumigatus*
- **Susceptibility**
  - Young birds especially chicks
- **Transmission**
  - Inhalation of fungal spores
- **Clinical signs**
  - Loss of appetite, gasping, convulsion and sleepiness
  - Mortality is usually 5 to 20%
- **Lesions**
  - Yellow or gray nodular lesions in the lungs
- **Diagnosis**
  - Clinical signs and lesions
  - Isolation of *Aspergillus fumigatus*
- **Treatment**
  - Housing and incubation equipment should be thoroughly cleaned and fumigated
  - Copper sulphate @ 1gm per litre of drinking water for 3 days

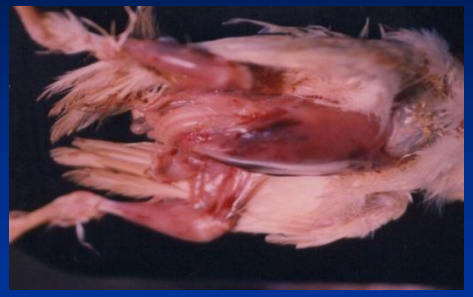


Infectious Bursal Disease (IBD)

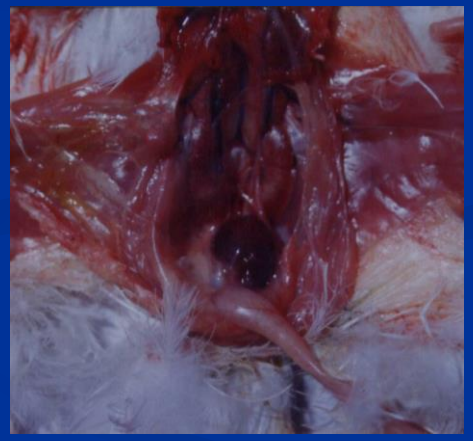
- An acute, highly contagious viral infection (Birna) of young chickens
- Birds may be infected upto 12 weeks of age
- Two serotypes
  - Serotype 1 is pathogenic & serotype 2 in non-pathogenic
- Lymphoid cells, specially the B-cells are the primary target cells and lymphoid tissue of bursa of Fabricius - immunosuppression
- Immunosuppression enhances the susceptibility of chickens to other infections and interferes with vaccination against other diseases
- Transmission
  - Direct contact of young birds with infected flocks in multi age units (rolling infection)
  - Indirect infection via contaminated equipment, non-pelleted feed containing inadequately heat treated poultry by product meal, housing and clothing of personnel are frequent sources of infection

Infectious Bursal Disease (IBD)

- Clinical Signs
  - Affected birds are depressed and show recumbency, ruffled plumage and white diarrhoea
  - Vent pecking can be noticed at early stages



- Lesions
  - Enlargement of the bursa Fabricius which is often surrounded by gelatinous exudates
  - Ecchymotic haemorrhages in the thigh and leg muscles and in proventriculus gizzard junction



- Prevention
  - Virus is very stable : good management and sanitation practices are important to limit the potential of outbreaks with in the flock
  - Vaccines
    - Modified live (Standard & Hot vaccines)
    - Inactivated vaccines
    - Immune complex vaccines

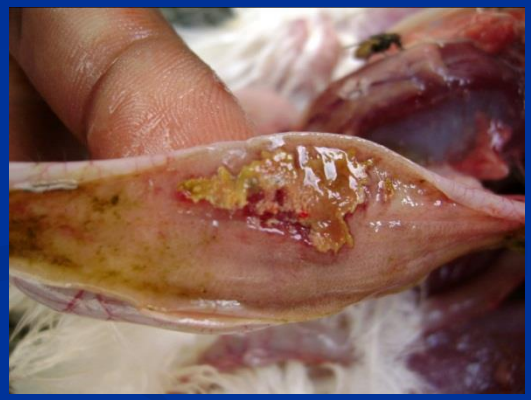
Newcastle Disease/ Raniket

- **Causal Agent :** Newcastle Disease Virus
  - Respiratory & nervous disease of poultry
  - Highly contagious
  - All ages are susceptible
  - Stable virus: Persists in flocks and carcasses
  - Devastating epidemics in poultry
  - A threat to the poultry industry
  - One serotype

- **Transmission**
  - aerosols, bird to bird, fomites & visitors
  - not vertical but via poor hatchery hygiene

- **Clinical Signs**
  - Death
  - Respiratory (coughing, dyspnoea)
  - Nervous (star gazing, paralysis, twisted necks)
  - Diarrhoea
  - Shell less eggs

- **Lesions**
  - Petechial haemorrhages in the proventriculus, Caecal tonsil haemorrhage & button ulcers in the intestine



Newcastle/Ranikhet disease

- Diagnosis
  - Clinical signs and lesions
  - HA & HI
  - Correlation between HI titres and egg production

- Control
  - Live **NDV** Vaccines
    - Lentogenic NDV vaccines
    - Mesogenic
      - Mukteswar, Komarov and RB strain
      - Not recommended -chickens less than 8 weeks or older chickens (not primed)
  - Inactivated/Killed vaccines
    - humoral immune response is very high and of long duration
    - provide high levels of maternal antibody for the progeny
  - Genotype Vaccines

Infectious laryngotracheitis

- Herpes virus
- Morbidity of 50-100% and a mortality usually 10-20%
- Recovered and vaccinated birds are long-term carriers
- The route of infection is via upper respiratory tract and conjunctiva or possibly oral and the course of the disease is up to 6 weeks

Transmission

- Between farms can occur by airborne particles or fomites

Clinical Signs

- Dyspnoea, Gasping, Coughing of mucus and blood, Ocular discharge

Lesions

- Severe laryngotracheitis, often with blood in lumen, caseous plugs may be present

Prevention

- Quarantine, vaccination -after 4 weeks of age: Attenuated chicken Embryo vaccine and Tissue culture vaccines
- All-in/all-out operation
- Keep susceptible stock separate from vaccinated or recovered birds
- Apply strict biosecurity in moving equipment or materials between these categories of stock

Indian Vet. J., January 2014, 91 (01) : 92 - 93

Isolation and Identification of Infectious Laryngotracheitis Virus from Field Outbreaks of Layers in Namakkal District

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Archives of Virology
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ORIGINAL ARTICLE

Characterization of infectious laryngotracheitis virus isolates from laying hens during 2019–2020 outbreaks in Tamil Nadu, India

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Received: 6 October 2021 / Accepted: 11 April 2022

Abstract

Infectious laryngotracheitis (ILT) is an acute respiratory disease in chickens that is a serious threat to poultry-producing countries worldwide. In the present study, we isolated and characterized infectious laryngotracheitis (ILTV) virus isolates by sequencing and restriction fragment length polymorphism analysis of PCR-amplified products (PCR-RFLP). A total of 26 ILTV outbreaks were investigated that occurred between 2019 and 2020 in flocks that had not been vaccinated against ILTV. ILTV was isolated by cultivating tracheal samples in embryonated chicken eggs, which showed multiple opaque pock lesions and thickening of the chorioallantoic membrane after 120 hours of infection. The ILTV isolates were identified and characterized by PCR and sequencing a portion of the ICP4 and TK genes. Phylogenetic analysis based on the ICP4 region showed that the sequences clustered with chicken-embryo-origin vaccine-like strains. Sequence analysis of the ICP4 region differentiated chicken-embryo-origin (CEO), tissue-culture-origin (TCO), and field ILTV strains, with significant differences in nucleotide and amino acid sequences. Furthermore, PCR–RFLP analysis of the TK gene showed that the patterns were identical to those obtained with low-virulence and vaccine strains. In conclusion, sequencing of a portion of the ICP4 region of ILTV allowed differentiation of ILTV field, CEO, and TCO vaccine strains. In this study, CEO-vaccine-like strains were found to be the cause of ILTV outbreaks between 2019 and 2020 in Tamil Nadu in southern India.

Avian mycoplasmosis

- *Mycoplasma gallisepticum* –chronic respiratory disease (CRD)
- *M. synoviae* - synovitis and air sacculitis
- Usually affects all chickens in a flock
- More severe and of longer during winter
- Frequently complicated with *E. coli*, IBV and NDV
- **Transmission**
  - Bird to bird contact
  - Inhalation of aerosolized particles, fomites
  - Vertical transmission
- **Clinical signs**
  - Respiratory rales and sinusitis
- **Lesions**
  - Airsacculitis with cheesy, yellow exudates
- **Prevention & Control**
  - birds infected for life
  - establish flock from negative donor flocks
  - routine serological surveillance
  - appropriate biosecurity measures
  - vaccination (live attenuated or mild strains)
  - Antimycoplasmal drugs

Avian mycoplasmosis

Indian Vet. J., May 2017, 94 (05) : 36 - 37

Incidence of Mycoplasma Synoviae Induced Eggshell Apex Abnormality in Desi Chicken

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Abstract

Three desi chicken reared in extensive system exhibited signs of egg shell apex abnormalities mainly in apex region of egg, suggestive of *Mycoplasma synoviae* infection Cloanal cleft and oropharyngeal swabs were collected from affected chicken in modified Frey's broth medium. Culture and polymerase chain reaction assay amplifying the conserved region of 16S rRNA gene and *vlhA* gene was applied for the confirmation of *M. synoviae*. The isolates from culture were confirmed by specific amplification of 16S rRNA gene (207 base pair) and vlhA (~350-400bp). The current report described egg shell apex abnormality associated with *Mycoplasma synoviae* infection in desi chicken for the first time in India.

Materials and Methods

Desi chicken reared in extensive system around 35 weeks old birds exhibited eggshell abnormalities mainly pronounced in apex region of the egg. Rough patches of various sizes with different densities were found on the blunt end of the eggs. A clear demarcation zone separating the normal part of the shell from the affected portion of the eggs. Specks and cracks were also observed in the eggs with EAA. Birds had not been vaccinated against none of the diseases. Oropharyngeal and Cloanal cleft swabs from suspected live birds. After sampling, swabs placed in to 3 ml modified Frey's media and transported to the laboratory, then agitated on a vortex mixer for 30 sec and then swab discarded. Then broth media were incubated under micro-

Indian J. Vet. Pathol., 41(4) : 283-286, 2017: DOI: 10.5958/0973-970X.2017.00066.9

Pathology of *Mycoplasma synoviae* and other concurrent infections affected oviduct in commercial layer chicken

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ABSTRACT

Sumitha, P., Sukumar, K., Arthanari Eswaran, M. and Arulmozhi, A. (2017). Pathology of Mycoplasma synoviae *and other concurrent infections affected oviduct in commercial layer chicken. Indian J. Vet. Pathol., 41(4) : 283-286.*

Pathology of oviduct affected with *Mycoplasma synoviae* and other concurrent infections was studied. Eggshell apex abnormalities (EAA) outbreak was reported in ten commercial layer farms in Namakkal district of Tamil Nadu which was suspected for *M. synoviae* infection. Oviduct samples were collected to study the pathology of oviduct and for the molecular confirmation of *M. synoviae* infection and other possible oviduct infections *viz. Mycoplasma gallisepticum, E. coli* and Infectious bronchitis virus by specific PCR. Out of ten farm samples screened eight were positive for *M. synoviae*, nine were positive for *E. coli*, all ten were positive for *M. gallisepticum* and all were negative for infectious bronchitis virus. On post-mortem examination, EAA affected birds exhibited no gross lesions except egg bound and congested oviduct in few cases. Microscopically, oviduct revealed degeneration, necrosis and desquamation of lining epithelial cells and atrophy of tubular glands. Serofibrinous exudates in the lumen and marked infiltration of macrophages and heterophils were also noticed. These findings showed that Eggshell apex abnormality producing oviducts had combined infection rather than individual etiology.

Keywords: Combined infection, eggshell apex abnormality, layer, *Mycoplasma synoviae*, oviduct, pathology

Indian Journal of Animal Sciences **87** (2): 212–214, February 2017/Article

Mycoplasma synoviae induced eggshell apex abnormalities in commercial layer chicken in Namakkal region of Tamil Nadu

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ABSTRACT

Commercial Babcock layer chicken, 60 to 70 week-old, in 3 flocks housed in Namakkal region of Tamil Nadu exhibited leg weakness and eggshell abnormalities mainly pronounced in apex region of the egg, suggestive of *Mycoplasma synoviae* infection. Choanal cleft and oropharyngeal swabs were collected from affected layer flocks in modified Frey's broth medium. Culture and polymerase chain reaction assay amplifying the conserved region of 16S rRNA gene was applied for the confirmation of *M. synoviae*. The isolates from culture were confirmed by specific amplification of 16S rRNA gene (207 base pair). The current report describe the first eggshell abnormality associated with *Mycoplasma synoviae* infection in India.

Indian Vet. J., November 2017, 94 (11) : 26 - 27

Occurrence of Mycoplasma Synoviae Infection in Different Age Group of Commercial Layer Chicken

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Abstract

The present study was undertaken to screen the age wise occurrence of *Mycoplasma synoviae* infection in commercial layers chicken. A total of 1200 sera samples from different age groups of commercial layer chicken were collected from 118 flocks in 36 randomly selected poultry farms in Namakkal district. These samples were pooled and tested for the presence of *M. synoviae* antibodies by indirect ELISA. Recorded seroprevalence in 20-30, 30-40, 40-50, 50-60, 60-70 and >70 weeks (72-100 weeks) old layer chicken were 90.80, 94.60, 98.26, 97.36, 96.55 and 100 per cent respectively. Among different age groups of tested layers, 100 per cent seroprevalence of *M. synoviae* antibodies were recorded in age group of 70 weeks and above.

airsacculitis and arthritis (Peebles *et al.* 2011). Although research on the prevalence of *M. synoviae* is limited, several studies have shown that the prevalence of *M. synoviae* in layer stock in various parts of the world is very high. The present communication deals with occurrence of *M. synoviae* infection in different age group of commercial layer chicken.

Materials and Methods

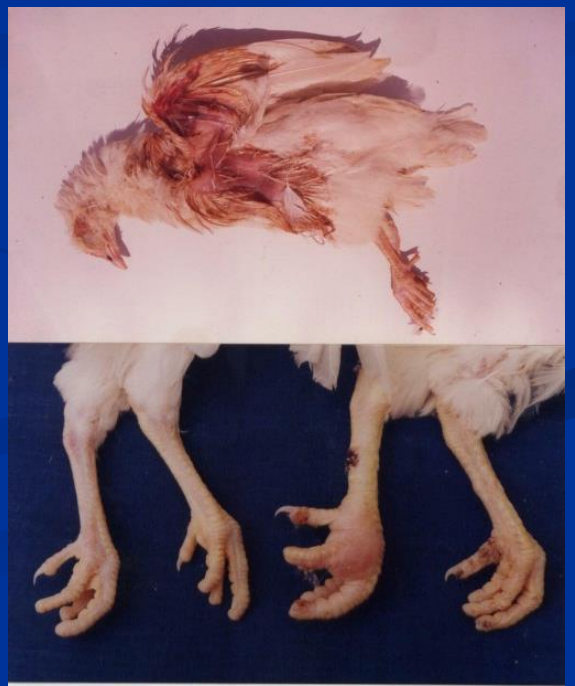
A total of 1200 sera samples from different age groups of commercial layer chicken were collected from 118 flocks in 36 randomly selected poultry farms in Namakkal district of Tamil Nadu. These samples were pooled and tested for the presence of *M. synoviae* antibodies by indirect ELISA. Titres greater than 1076 were

Growers

- Gangrenous dermatitis/Wing rot
- Colibacillosis
- Chronic Respiratory Disease
- Infectious coryza
- Fowl cholera
- Fowl pox
- Newcastle disease
- ILT
- Marek's disease
- Chicken infectious anaemia
- Avian metapneumo virus

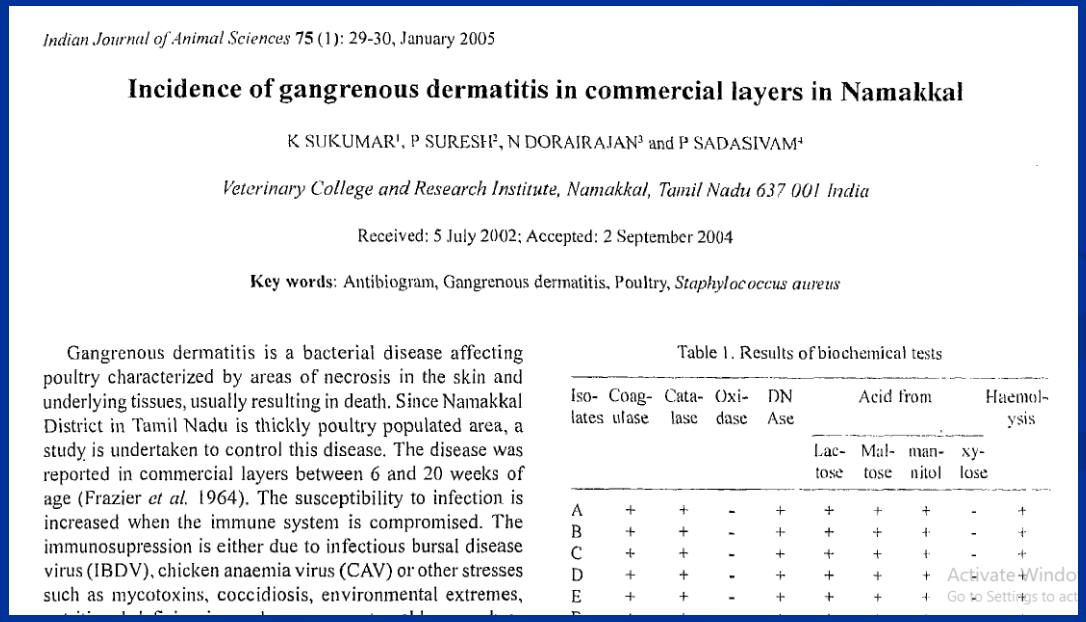
Wing rot/ Gangrenous dermatitis

- Etiology
  - *Staphylcoccus aureus, Clostridium novyi, Cl. Perfringens, Cl. septicum*
- Susceptibility
  - 6 weeks to 14 weeks
- Transmission
  - Trauma are invaded by the bacteria which is found in skin, feces and dust
- Clinical sigs
  - Loss of appetite, depression, listlessness, lameness, dehydration, loss of weight and bumble foot
- Lesions
  - Areas of dark, gangrenous skin and necrotic muscle tissue in wings, breast, thigh and legs. Swelling and darkening of liver, & breast blisters



Wing rot/ Gangrenous dermatitis

- Diagnosis
  - Isolation of organism
- Treatment and control
  - Antibiotics
  - Providing recommended feeding space to prevent injury
  - Avoid overcrowding
  - Vit. E, Biotin/Zinc oxide in feed



Indian Journal of Animal Sciences **75** (1): 29-30, January 2005

Incidence of gangrenous dermatitis in commercial layers in Namakkal

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Received: 5 July 2002; Accepted: 2 September 2004

Key words: Antibiogram, Gangrenous dermatitis, Poultry, *Staphylococcus aureus*

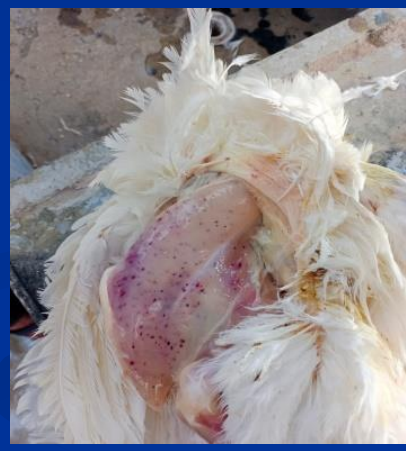
Gangrenous dermatitis is a bacterial disease affecting poultry characterized by areas of necrosis in the skin and underlying tissues, usually resulting in death. Since Namakkal District in Tamil Nadu is thickly poultry populated area, a study is undertaken to control this disease. The disease was reported in commercial layers between 6 and 20 weeks of age (Frazier *et al.* 1964). The susceptibility to infection is increased when the immune system is compromised. The immunosupression is either due to infectious bursal disease virus (IBDV), chicken anaemia virus (CAV) or other stresses such as mycotoxins, coccidiosis, environmental extremes,

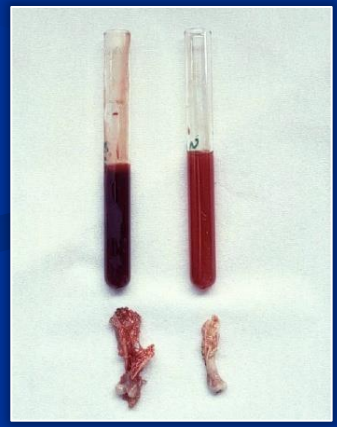
Table 1. Results of biochemical tests

Isolates	Coagulase	Catalase	Oxidase	DNAse	Acid from				Haemolysis
					Lactose	Maltose	mannitol	xylose	
A	+	+	-	+	+	+	+	-	+
B	+	+	-	+	+	+	+	-	+
C	+	+	-	+	+	+	+	-	+
D	+	+	-	+	+	+	+	-	+
E	+	+	-	+	+	+	+	-	+

Chicken infectious anaemia

- **Cause** : Chicken anaemia virus- Ciro viridae
- **Transmission**
  - Vertical
    - Roosters shedding CAV in semen
    - Hen to the chicks
  - Horizontal
    - fecal-oral route
- **Clinical Signs**
  - Poor growth
  - Pale birds
  - Sudden rise in mortality (usually at 13-16 days of age)
- **Lesions**
  - Pale bone marrow
  - PCV of 5-15% (normal 27-36%)
  - Atrophy of thymus and bursa
  - Discoloured liver and kidney
  - Gangrenous dermatitis on feet, legs wings or neck
- **Diagnosis**
  - Reduced hematocrit and PCR for detection of CAV nucleic acids in thymus or bone marrow
- **Prevention**
  - Live vaccines are available for parents -used at least 6 weeks prior to collecting eggs for incubation

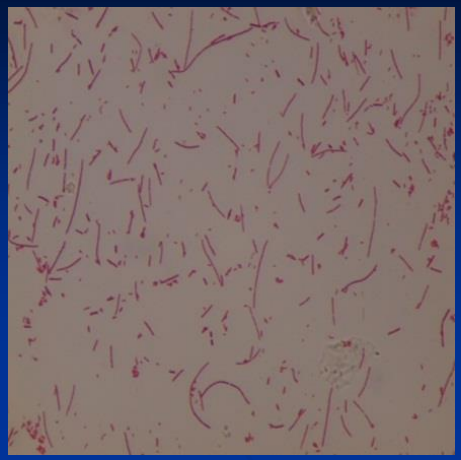




Layers

- Colibacillosis
- Fowl typhoid
- Infectious coryza
- Necrotic enteritis
- Chronic Respiratory Disease
- Fowl cholera
- ORT
- Fowl pox
- Newcastle disease
- LPAI
- ILT
- MD
- IB
- Avian metapneumo virus
- Leucocytozoonosis
- Crop mycosis

Ornithobacterium rhinotracheale



- Acute, contagious respiratory disease of chickens and turkeys
- Gram-ve, non-sporulating rod shaped bacterium, *Ornithobacterium rhinotracheale*
- The course and duration of the disease depend on
  - climate, stocking rate and other simultaneous infections
- Clinical signs
  - Coughing, nasal discharge, sinusitis, respiratory distress and oedema of the head
  - In broilers - occur between 3 and 6 weeks of age, with nasal discharge, sneezing, facial oedema, depression, increased mortality and low growth. Increased slaughterhouse condemnations may occur
- Lesions
  - Rhinitis, sinusitis, tracheitis, airsacculitis, pneumonia, pericarditis, and arthritis
  - Foamy or cheesy exudate in the air sacs is often seen
- Treatment
  - Resistant to Gentamicin. Use other antibiotics

Indian Vet. J., August 2015, 92 (8) : 78 - 79

Prevalence of *Ornithobacterium rhinotracheale, Mycoplasma gallisepticum* and *Mycoplasma synoviae* Antibodies in Layers *

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Abstract

A study was conducted to reveal prevalence of *Ornithobacterium rhinotracheale, Mycoplasma gallisepticum* and *Mycoplasma synoviae* antibodies in layers of Namakkal district by ELISA. The seropositivity of 43.25, 67.56 and 96.04 per cent were recorded for chicks, growers and layers respectively for *Ornithobacterium rhinotracheale*. The seropositivity of 9.09, 20.14 and 62.15 per cent were recorded for chicks, growers and layers respectively for *Mycoplasma gallisepticum* and the seropositivity of 27.27, 30.21 and 91.60 per cent were recorded for chicks, growers and layers respectively for *Mycoplasma synoviae*. The seroprevalence was found to be higher among layers followed by growers and chicks.

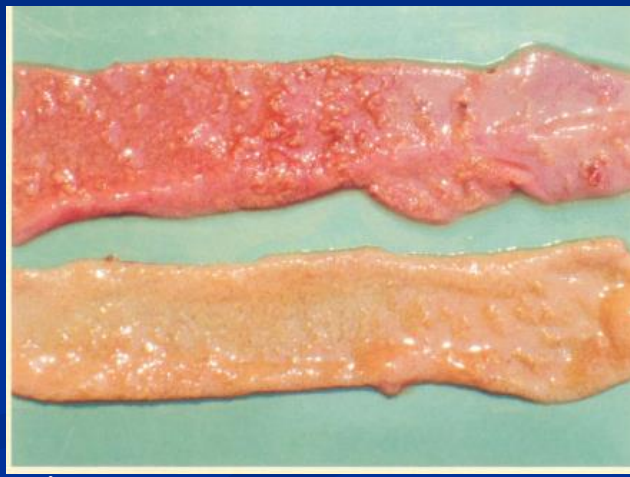
flocks performance and reduction of egg production in chickens and other avian species. Hence, this study is undertaken to determine the prevalence of ORT, MG and MS antibodies in layers of Namakkal district of Tamil Nadu.

Materials and Methods

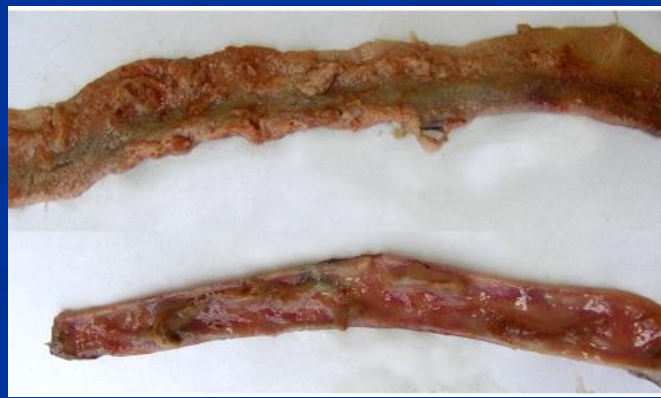
Blood samples were collected from commercial layers in Namakkal districts of Tamil Nadu which had not been vaccinated against *Ornithobacterium rhinotracheale, Mycoplasma gallisepticum* and *Mycoplasma synoviae*. Serum was extracted by centrifugation at 1,500 × *g* for 10 min at 4°C and then inactivated at 56°C for 30 min and kept at −20°C before use. A total of 32 sera samples from chicks, 148 sera samples from growers and 657 sera samples

Necrotic Enteritis

- Cause: *Clostridium perfringens*
- Coccidiosis may be a contributing factor
- Most of the damage to the intestinal lining apparently is due to toxins produced by the bacterial organisms



- Transmission
  - Birds contract the disease from infected droppings
- Clinical signs
  - Loss of appetite, depression and die within hours
- Lesions
  - The intestine is dilated, will have a coarse Turkish-towel appearance and portions of the lining may slough off and pass out with the intestinal contents
- Diagnosis
  - Based on lesions and isolation of organism
- Prevention
  - Antibiotics
  - House fly control
  - An effective coccidiosis control program

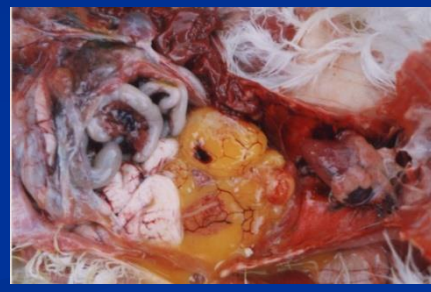


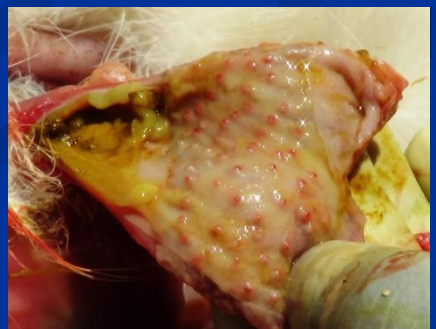
Avian Influenza

- Notifiable disease
- IVPI greater than 1.2 (or as an alternative at least 75% mortality)
- All type of poultry and wild birds are affected
- Transmission
  - Bird to bird contact
  - Fomites
  - Airborne transmission
  - Contaminated feed and water
- AI strains characterized by pathogenicity in chickens
  - LPAI (Low-pathogenic avian influenza)
    - Mild disease in poultry
    - Most strains are LPAI
  - HPAI (Highly pathogenic avian influenza)
    - Severe illness and high fatality in poultry

Avian Influenza

- Clinical signs
  - IP- 3 to 14 days
  - Neurological signs
  - Depression, anorexia, ruffled feathers
  - Comb swollen and cyanotic
  - Conjunctivitis and respiratory signs
  - Morbidity and Mortality – 100%
- Lesions
  - Septicaemia, airsacculitis, peritonitis and tracheitis
- Prevention
  - Vaccination suppresses clinical occurrence of disease but the virus persists in the poultry population of the affected region, impeding exports
  - Absolute eradication of the flock
  - Quarantine and concurrent surveillance with subsequent disposal of flocks demonstrating antibodies to AI
  - Restriction on movement of flocks and products from foci of infection should be imposed





Infectious bronchitis

- Cause : corona virus
- IB is highly contagious
- Many serotypes
- Four forms are reported
  - Respiratory, Reproductive, Nephritic and Milder form

- **Transmission**
  - Spreads by air and mechanically by fomites

- **Clinical signs**
  - Respiratory rales (gurgling and snicking) and ocular discharge
  - Production drop, Misshapen eggs and watery albumen

- **Lesions**
  - Hyperemia of the trachea and accumulation of mucus in the nasal cavity
  - In nephritic form blockade of kidney and ureters are noticed. Gout also is common in nephritic form

Infectious bronchitis

- Diagnosis
  - Based on clinical signs and lesions
  - HA and Elisa test
- Prevention
  - Live vaccines and inactivated vaccines
  - The most commonly used live vaccines in the India – Mass serotype

Avian encephalomyelitis

- Cause : Avian encephalomyelitis virus (Picorna virus)
- Susceptibility
  - Young chickens from 1 to 6 weeks
  - Older chickens may be infected but show no clinical signs

- Transmission
  - Transmitted through eggs laid by infected hens for up to 1 month
  - Lateral transmission also occurs in chicks
- Clinical signs
  - Tremors of the head and neck may be at hatch time or delayed for 2 to 3 weeks. Most commonly appear at 7-10 days.
  - Feed and water consumption decrease followed by weight loss
  - Adult birds- drop in egg production

Avian encephalomyelitis

- Lesions
  - No visible lesions. Cataract in layers
- Diagnosis
  - History of the flock and clinical signs
- Treatment and control
  - Vaccination of breeder hens or commercial layers. Passive immunity prevents disease in baby chicks
  - Modified live vaccine – before onset of production
    - Vaccinate birds after 7 weeks of age – often given with fowl pox
    - Vaccinate laying hens with only killed vaccines
  - Don't expose chicks under 3 weeks of age

Detection of avian encephalomyelitis virus antibodies in commercial layer belt of Tamil Nadu.

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Publication date	2016
Journal	Indian Veterinary Journal
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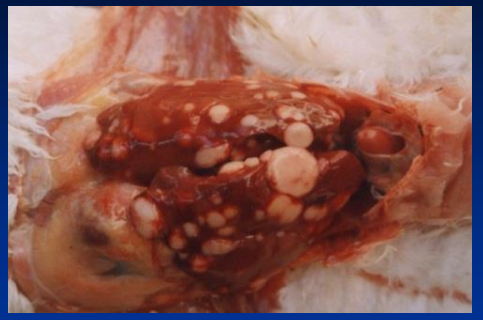
Pages	75-77
Publisher	Indian Veterinary Association
Description	In this study antibodies against avian encephalomyelitis virus was detected by indirect ELISA to test for prevalence of avian encephalomyelitis infection in commercial layer belt of Tamil Nadu. A total of 920 sera samples were collected from different age groups of commercial layers. A total seropositivity of avian encephalomyelitis virus was 79.35% and seropositivity of chicks, growers and layers were 28.13, 40.67 and 89.43 respectively. The seroprevalence was found to be higher among layers followed by growers and chicks. The examined layer flocks had no clinical signs, or noticeable drop in egg production. The detection of avian encephalomyelitis antibodies indicates that these flocks were exposed to a field strain of avian encephalomyelitis virus.

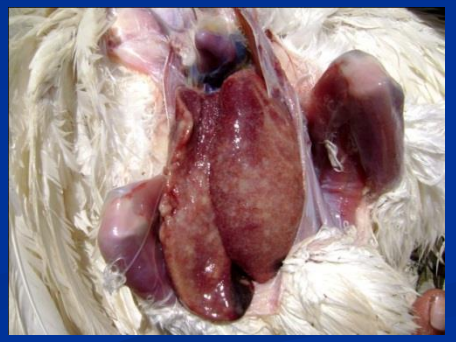
Fowl pox

- **Cause**: Fowl pox virus
- **Susceptibility**: All age groups
- **Transmission:**
  - Direct or indirect contact
  - Mosquitoes are common vector
- **Signs & Lesions**
  - Scabs are seen on areas without feathers
  - Tracheal plug and diphtheritic lesions
- **Diagnosis**
  - Based on lesions
- **Control**
  - Pigeon pox/ Fowl pox vaccination during 7th week

Marek's Disease (MD)

- A lymphoproliferative disease of chickens involving different tissues
- Progressive paralysis, incoordination, drooping wings
- Transmission:
  - by aerosol (infectious virus shed in dust and dander from the feather follicles)
- MDV serotype
  - Serotype 1 – oncogenic
  - Serotype 2 – nononcogenic
  - Serotype 3 – HVT – nonpathogenic
- Sings & lesions
  - Lameness, weakness, paleness, eyes have grey irishes and enlarged feather follicles.
  - Visceral tumors
  - Mortality up to 50% in unvaccinated birds





Marek's Disease (MD)

- **Prevention**
  - MDV free flocks
  - Genetically resistant chicken lines
  - Vaccines:
    - Monovalent HVT
    - HVT+SB1 bivalent vaccine

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Complete nucleotide sequence analysis of the oncogene *"Meq"* from serotype 1 Marek's disease virus isolates from India

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Research Article

INCIDENCE OF MAREK'S DISEASE IN VACCINATED FLOCKS

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ABSTRACT
A study was undertaken to assess the incidence of Marek's Disease (MD) in vaccinated flocks. Blood, organ and feather follicle samples were collected from fifteen commercial layer farms in which Marek's Disease outbreak was occurred even after vaccination with monovalent and bivalent vaccines. Blood samples were screened for serotype 1 specific132bp repeats and lymphocytes from corresponding positive samples for 132 bp repeats alone used for virus isolation. Organ samples were processed by routine procedure for isolation of virus and treated with antibiotics and filtered (0.45µ) before inoculation. Feather follicles were soaked in SPGA/EDTA buffer and extract used for isolation. 11 days old duck embryos were used to prepare Duck embryo fibroblast culture (DEF). Three passages were carried out in DEF and presence of positive serotype 1 virus was confirmed by PCR for 132bp repeats. Subsequently the isolates were adopted in Chicken Embryo Fibroblast (CEF) culture and produced typical MD plaques. There were three isolates of serotype 1 MD virus recovered from fifteen (20%) field cases. The finding suggests that the Marek's Disease occurrence is prevalent in vaccinated flocks.

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Quantitative profiling of Marek's Disease Virus in vaccinated layer chicken

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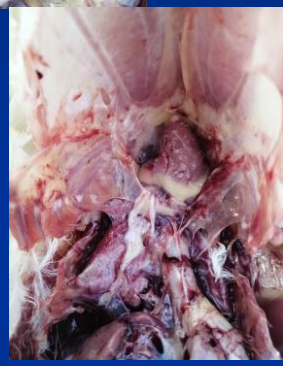
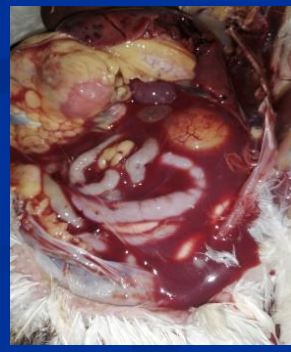
ABSTRACT

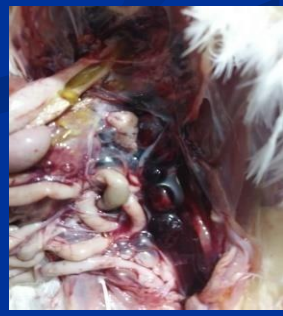
The present study was undertaken to quantify the Marek's Disease Virus (MDV) serotypes in vaccinated commercial layer flocks at 7, 14, 21, 28, 35 and 60-90 days post vaccination (dpv) and to correlate the pathogenic *Gallid herpesvirus 2* (*GaHV-2*, MDV1) load with vaccine viral load of *Gallid herpesvirus 3* (*GaHV-3*, MDV2) and *Meleagridis herpesvirus 1* (*MeHV-1*, MDV3). A total of 25 commercial layer flocks were selected in and around Namakkal district of Tamil nadu, India and the feather pulp (FP) and blood samples were collected. Out of 25 flocks, 14 were revaccinated with bivalent vaccine, six were revaccinated with monovalent vaccine apart from the initial bivalent vaccination done at hatchery and five flocks were not revaccinated. SYBR green based real time PCR was used for absolute quantification of MDV serotypes. The pathogenic MDV1 load had shown an increasing trend until 21 dpv followed by a dip and again had shown a constant uptick between 60 and 90 dpv in the flocks that went on to develop MD outbreak. The flocks which had not encountered any Marek's Disease outbreak had shown increasing trend of MDV2 and 3 load until 21 dpv followed by a slight decrease but maintained a higher load when compared to MDV 1 which had marked a sharp decline between 60 and 90 dpv. Outbreak of MD was observed in seven (28%) out of 25 flocks between 18 and 27 weeks of age. It includes, two out of fourteen farms (14%) revaccinated with bivalent vaccine, two out of six farms (33%) revaccinated with MDV3 vaccine and three out of five farms (60%) without revaccination. The overall mean of vaccine viral load at various stages of dpv was constantly low where as pathogenic MDV 1 load was constantly high between 60 and 90 dpv in the flocks that went on to develop Marek's Disease during later part of life.

Leucocytozoonosis

- **Cause**: *L caulleryi*, *L sabrazesi*, and *L schoutedeni*
- **Transmission**
  - *Arthropod borne- Culicoides spp.*
  - Recovered birds remain carriers and serve as a reservoir for young, susceptible birds
- **Clinical signs**
  - Mortality varies greatly with the strain of parasite, species, degree of exposure, age and immune status of the bird
  - Anemia, leukocytosis, tachypnea, anorexia, diarrhoea with green droppings, and CNS signs
- **Lesions**
  - Hemorrhages from liver and kidney, splenomegaly and hepatomegaly
  - Nodules on the heart
- **Diagnosis**
  - Clinical signs and lesions
  - In blood smears, gametocytes may be seen, especially along the edges of the smear
- **Treatment**
  - Sulphanomides







Crop mycosis

- Cause
  - *Candida albicans*
- Susceptibility
  - All ages are susceptible
- Transmisson
  - Through contaminated feed and water
- Clinical signs
  - Impacted crop with feed
- Lesions
  - White and thickened areas in the crop
  - Sloughing of crop epithelium
- Diagnosis
  - Isolation of *C. albicans* from the crop
- Treatment
  - Adding mould inhibitor in the feed
  - Copper sulphate in drinking water

Disease challenges in Broilers

Commercial broilers

- Omphalitis/Yolk sac infection
- Colibacillosis
- Salmonellosis
- Necrotic enteritis
- Chronic Respiratory Disease
- Bumble foot
- Aspergillosis
- IBD
- Newcastle disease
- Avian influenza
- IB
- CAV
- Avian encephalomyelitis
- Reo
- Inclusion body hepatitis
- Swollen head syndrome
- Avian nephritis
- Coccidiosis

Breeders

- Omphalitis/Yolk sac infection
- Colibacillosis
- Salmonellosis
- Necrotic enteritis
- Chronic Respiratory Disease
- Bumble foot
- Aspergillosis
- IBD
- Newcastle disease
- Avian influenza
- IB
- Marek's disease
- CAV
- ILT
- Avian encephalomyelitis
- Reo
- Inclusion body hepatitis
- Swollen head syndrome
- Coccidiosis

Avian metapneumo virus (Swollen head syndrome)

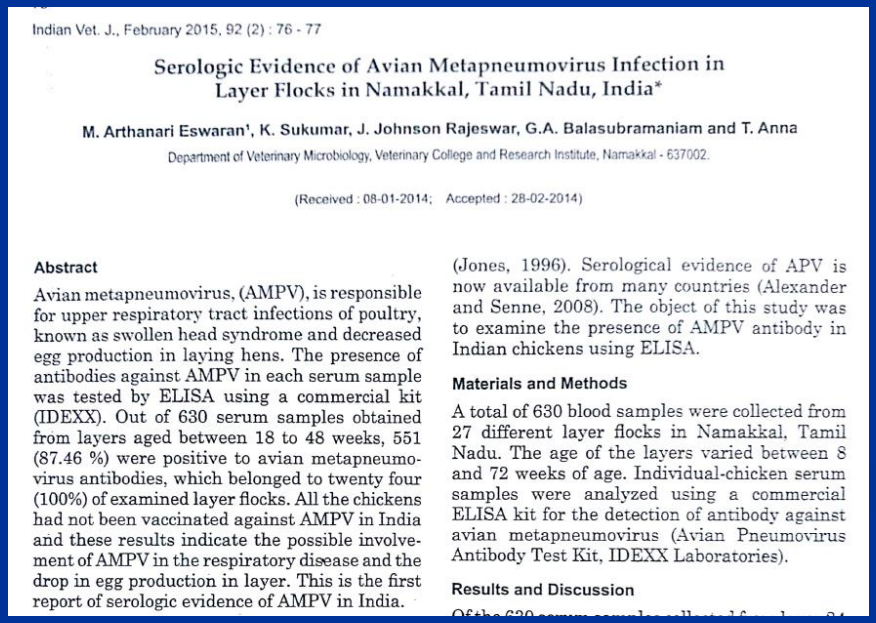
- A chronic disease affecting chickens and turkeys of all ages
- Cause: Avian metapneumo virus subtypes A to D
- Immunosuppression plays a role, and *E. coli* is a common secondary invader
- Swollen heads are typically seen following a severe reaction to NDV-IBV vaccination

- Transmission
  - by airborne and mechanical routes (feed, water, and equipment)
  - Highly contagious
  - The enveloped virus is rapidly destroyed after release from the host to the environment
  - Avian metapneumovirus affects all age groups, although younger birds seem to be more susceptible

- Signs
  - snicking, rales, sneezing, nasal discharge, foamy conjunctivitis, and swelling of the infraorbital sinuses. Submandibular oedema, mortality 0-10%, torticollis, and cerebral disorientation may occur
- Lesions
  - Yellow oedema and/or haemorrhaging in nasal turbinates, larynx, trachea and subcutaneous layer of skin around head can be evident

Avian metapneumo virus

- **Diagnosis**
  - Virus detection and serology is necessary to diagnose avian metapneumovirus infection
- **Prevention**
  - Vaccination (live or inactivated) and improved biosecurity
  - Good management practices can significantly reduce the severity of avian metapneumovirus infection



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Serologic Evidence of Avian Metapneumovirus Infection in Layer Flocks in Namakkal, Tamil Nadu, India*

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Abstract

Avian metapneumovirus, (AMPV), is responsible for upper respiratory tract infections of poultry, known as swollen head syndrome and decreased egg production in laying hens. The presence of antibodies against AMPV in each serum sample was tested by ELISA using a commercial kit (IDEXX). Out of 630 serum samples obtained from layers aged between 18 to 48 weeks, 551 (87.46 %) were positive to avian metapneumovirus antibodies, which belonged to twenty four (100%) of examined layer flocks. All the chickens had not been vaccinated against AMPV in India and these results indicate the possible involvement of AMPV in the respiratory disease and the drop in egg production in layer. This is the first report of serologic evidence of AMPV in India.

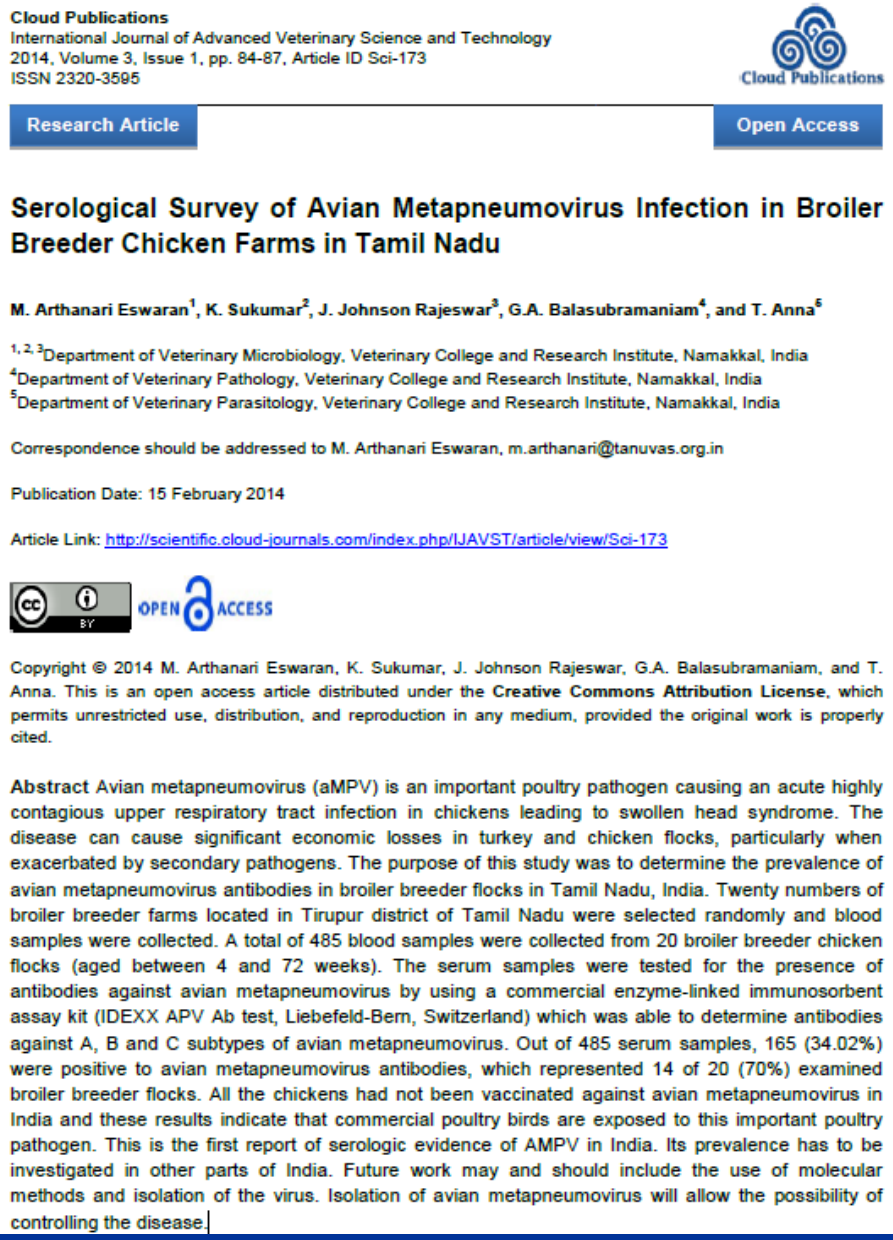
(Jones, 1996). Serological evidence of APV is now available from many countries (Alexander and Senne, 2008). The object of this study was to examine the presence of AMPV antibody in Indian chickens using ELISA.

Materials and Methods

A total of 630 blood samples were collected from 27 different layer flocks in Namakkal, Tamil Nadu. The age of the layers varied between 8 and 72 weeks of age. Individual-chicken serum samples were analyzed using a commercial ELISA kit for the detection of antibody against avian metapneumovirus (Avian Pneumovirus Antibody Test Kit, IDEXX Laboratories).

Results and Discussion

Of the 630 serum samples collected from



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Research Article | Open Access

Serological Survey of Avian Metapneumovirus Infection in Broiler Breeder Chicken Farms in Tamil Nadu

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OPEN ACCESS

Abstract Avian metapneumovirus (aMPV) is an important poultry pathogen causing an acute highly contagious upper respiratory tract infection in chickens leading to swollen head syndrome. The disease can cause significant economic losses in turkey and chicken flocks, particularly when exacerbated by secondary pathogens. The purpose of this study was to determine the prevalence of avian metapneumovirus antibodies in broiler breeder flocks in Tamil Nadu, India. Twenty numbers of broiler breeder farms located in Tirupur district of Tamil Nadu were selected randomly and blood samples were collected. A total of 485 blood samples were collected from 20 broiler breeder chicken flocks (aged between 4 and 72 weeks). The serum samples were tested for the presence of antibodies against avian metapneumovirus by using a commercial enzyme-linked immunosorbent assay kit (IDEXX APV Ab test, Liebefeld-Bern, Switzerland) which was able to determine antibodies against A, B and C subtypes of avian metapneumovirus. Out of 485 serum samples, 165 (34.02%) were positive to avian metapneumovirus antibodies, which represented 14 of 20 (70%) examined broiler breeder flocks. All the chickens had not been vaccinated against avian metapneumovirus in India and these results indicate that commercial poultry birds are exposed to this important poultry pathogen. This is the first report of serologic evidence of AMPV in India. Its prevalence has to be investigated in other parts of India. Future work may and should include the use of molecular methods and isolation of the virus. Isolation of avian metapneumovirus will allow the possibility of controlling the disease.

Reo virus (Runting/stunting syndrome)

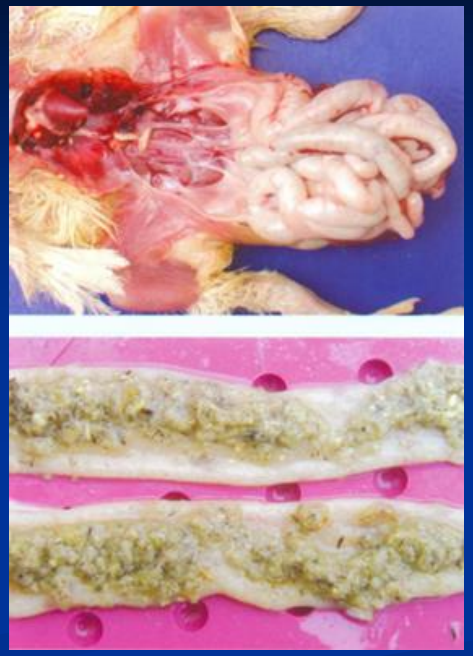
- Ubiquitous viruses in nature, and are commonly isolated from a variety of tissues in poultry affected by multiple disease conditions such as
  - viral arthritis/tenosynovitis
  - stunting syndrome
  - respiratory disease
  - enteric disease and
  - malabsorption syndrome

- Transmission
  - Horizontal transmission
    - Intestinal tract (faecal contamination)
    - Respiratory tract
    - Age related resistance
  - Vertical Transmission

- Carriers
  - Persists in caecal tonsils

Malabsorption syndrome

- Species affected
  - Chicken, turkey. Age affected: Young (2-20 weeks)
- Causes
  - Reovirus related to tenosynovitis virus as well as other viruses. Spread by vertical or horizontal routes and faecal contamination
- Incubation period of 7-14 days
- Clinical signs
  - Stunting (stunting or runting syndrome), abnormal feathering (helicopter disease), pale comb, wattles and legs in broilers (pale bird syndrome) are seen
- Lesions
  - Higher early mortality, weak legs, CNS signs (tremors, incoordination) and passage of undigested food in faeces can occur
- Prevention
  - Vaccination of pullets with killed antigenic reovirus subtypes has been shown to provide parental immunity and the reduction of this syndrome in layers and broilers



Avian nephritis

- Contagious infections of chickens characterized by renal damage and visceral urate deposits, growth retardation, and limited mortality
- Seen mainly in chickens < 7 days old
- **Transmission**
  - occurs by direct or indirect contact
  - Vertical transmission
- **Clinical signs**
  - vary from none to mortality resulting from kidney disease or severe growth retardation
  - Diarrhea and growth retardation are common in broilers
  - Outbreaks with mortality of 0%–10% can occur in chicks newly hatched to as old as 7 days
- **Lesions**
  - Swelling, paleness, or yellowish discoloration with excessive urate deposition in kidneys
  - Renal damage and visceral urate deposits (baby chick nephropathy)
- **Prevention**
  - Inactivated vaccine to the parent birds

Incidence of avian nephritis from commercial broiler flocks in Palladam region of Tamil Nadu.

Authors K Sukumar, P Sumitha

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Description Avian nephritis virus (ANV) is known as a potential causative agent of the baby chick nephropathy. In this study, kidney samples from one to two week-old broiler chicks diagnosed with acute nephritis and gout were subjected to an RT-PCR assay for the molecular confirmation of ANV. The detection of ANV specific nucleic acids in the specimen (amplicon size 182 bp) in broiler chicks indicates that this virus is probably endemic in the flocks or the environment. This study represents the first detection of ANV from broiler from Namakkal district of Tamil Nadu.

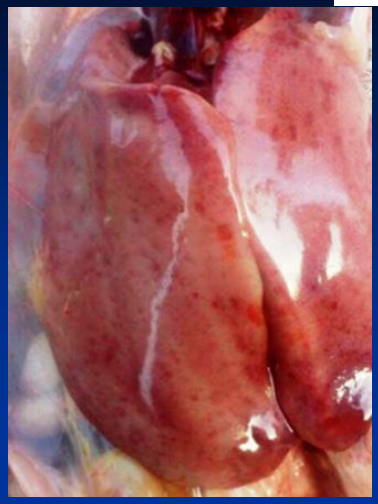
Inclusion Body Hepatitis

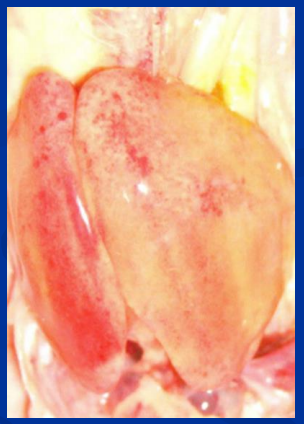
- FAdV in chickens
  - Inclusion body hepatitis (IBH)
  - Hepatitis hydropericardium syndrome (HHS)
  - Gizzard erosion
- 13 serotypes
- Susceptibility
  - 3 to 9 weeks old are mostly affected
  - Adult birds show no symptoms
- Transmission
  - Horizontal and vertical transmission
- Clinical signs
  - Sudden mortality usually is seen in chickens < 6 weeks old and as young as 4 days of age
  - Mortality normally ranges between 2% and 40% in IBH and between 20% and 80% in HHS
  - Lethargy, huddling, ruffled feathers and yellow, mucoid droppings due to excess bile acids. Mortality usually lasts for 5 days in IBH and longer in HHS

Inclusion Body Hepatitis

- Lesions
  - Liver is often swollen and enlarged and has yellowish discoloration and multiple pale and/or red (hemorrhagic) foci.
  - HHS- 10 ml of a straw-colored transudate in the pericardial sac
  - Haemolytic anaemia, jaundice, mildly swollen spleen and kidneys

- Prevention
  - Inactivated vaccines are used to control IBH and HHS
  - The FAdV most frequently used to prepare commercial vaccines belong to serotypes 4, 8 and 11
  - Primary breeders with stringent biosecurity practices. Use autogenous inactivated vaccines to ensure the transfer of maternal immunity from breeding flocks to their progeny
  - Broilers are vaccinated at < 10 days of age





Indian Vet. J., December 2018, 95 (12) : 34 - 36

Molecular Confirmation of Fowl Adenovirus Associated with Inclusion Body Hepatitis in Broiler Chicken in Tamil Nadu

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Abstract

Liver tissues were collected from 35 numbers of commercial broiler flocks suspected for fowl adenovirus infection during the period between September 2016 to October 2017. The affected birds showed reduced feed intake, ruffled feathers, depression and leg weakness in some flocks. Mortality recorded in this study was 2 to 6%. Histopathological examination of liver revealed the presence of acidophilic intranuclear inclusion bodies. DNA was extracted from affected liver tissues and PCR amplification 897 bp hexon gene was carried out using hexon A and hexon B primer. Out of 35 flocks screened 19 flocks found positive for fowl adenovirus associated with inclusion body hepatitis by PCR. This study confirmed the presence of fowl adenovirus infection in commercial broiler birds of Tamil Nadu in India by PCR.

reaction (PCR) has been used as more sensitive and rapid detection of fowl adenovirus infection in chicken (Meulemans *et al*., 2001). The present study was undertaken for detection FAdV infection from field outbreaks of IBH in broiler chicken in Tamil Nadu in India by PCR.

Materials and Methods

Liver samples from 35 flocks of commercial broiler chicken suspected for inclusion body hepatitis (IBH) were collected from different parts of Tamil Nadu in India between September 2016 to October 2017. The liver tissues from 3 to 4 affected birds in a flock were collected in 50% glycerol saline and pooled as single sample and stored at - 80°C until used. For histopathological examination, suspected liver samples were fixed in 10 % formalin and sent it to Department of Veterinary Pathology, Veterinary College and Research Institute, Namakkal, Tamil Nadu

Indian Journal of Animal Sciences **90** (7): 80–85, July 2020/Article

Molecular typing of fowl adenovirus associated with gizzard erosion in commercial layer grower chicken in Tamil Nadu

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Received: 14 October 2019; Accepted: 11 November 2019

ABSTRACT

The present study was undertaken to characterize fowl adenovirus associated with commercial layer grower chicken showed gizzard erosion. Ninety four commercial layer grower chicken flocks from Namakkal districts of Tamil Nadu had shown reduced feed intake, reduced weight gain, uneven growth and mortality of 0.3 to 7.7%. On postmortem examination of affected birds showed mild to severe gizzard erosion, blackish discoloration of gizzard contents, pale liver and no major lesions were seen in other organs. Total DNA was extracted and 897 bp fowl adenovirus specific hexon gene was amplified by PCR. Out of 94 flocks screened seven flocks were found positive of fowl adenovirus. Chicken embryo liver cell culture was prepared to isolate field fowl adenovirus from suspected flocks. Concurrent infection of chicken anaemia virus (CAV) was also screened by PCR for 419 bp VP2 gene of CAV and found that all the seven flocks which were PCR positive for FAdV also found positive for CAV. Sequencing and phylogenetic analysis of 897 bp FAdV hexon gene revealed that, it was belonged to FAdV serotypes 2 and 3 of species D.

Tropical Animal Health and Production (2021) 53:412
https://doi.org/10.1007/s11250-021-02851-8

REGULAR ARTICLES

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Molecular typing and pathogenicity assessment of fowl adenovirus associated with inclusion body hepatitis in chicken from India

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Received: 24 March 2021 / Accepted: 9 July 2021

Abstract

Recently, inclusion body hepatitis (IBH) outbreaks have been increasingly reported in different regions of India, particularly in broiler flocks**.** The present study was undertaken to characterize fowl adenovirus associated with IBH in chicken and assessment of its pathogenicity. Liver samples were collected from fowl adenovirus (FAdV) suspected 100 commercial broiler and six broiler breeder flocks from eleven different States of India from 2016 to 2019. All the samples were subjected to 897-bp FAdV hexon gene-specific PCR for confirmation and primary chicken liver cells were used to isolate the field FAdVs. Sequencing and phylogenetic analysis of 897-bp FAdV hexon gene revealed that all the isolates have showed close evolutionary relationship with fowl adenovirus serotype 11 of species D. For pathogenicity assessment, 0.5 ml of $10^{6.5}$ $TCID_{50}$/ml of field FAdV serotype 11 isolate was orally inoculated in 1-day-old SPF chicks and observed for 21 days. This experimental study revealed that there was no mortality in infected chicks and showed clinical signs of dullness, depression and diarrhoea between third and fifth day of oral inoculation. The FAdV was reisolated and confirmed by PCR from experimentally infected chicken. Based on this study, among all serotypes, FAdV serotype 11 is involved in pathogenesis of inclusion body hepatitis in broiler-type chickens in India.

Indian J. Comp. Microbiol. Immunol. Infect. Dis.
Vol. 39 No. 1 (Jan-June), 2018: 20-22

Research Article

CONCURRENT INFECTIONS ASSOCIATED WITH FOWL ADENOVIRUS IN COMMERCIAL BROILER CHICKEN

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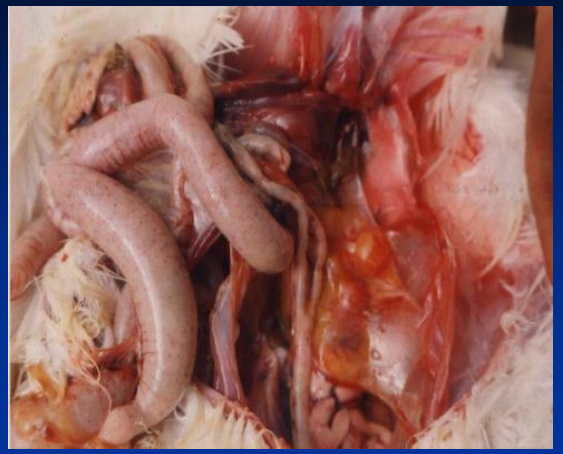
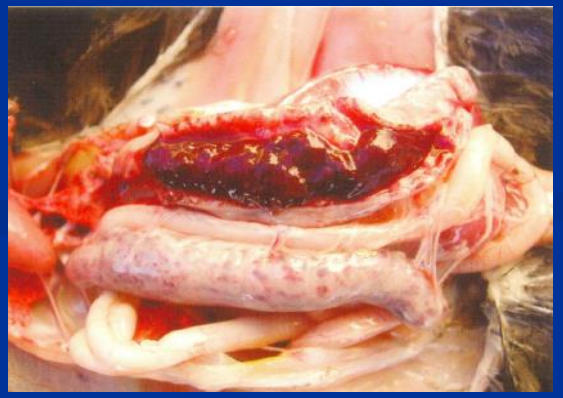
ABSTRACT

The objective of the present study was to find out the presence of concurrent viral infections associated with fowl adenovirus confirmed flock of commercial broiler birds. The liver samples were collected from 27 nos of FAdV confirmed commercial broiler farms. All the fowl adenovirus positive DNA was used to screen the Marek's disease virus (MDV), Avian leucosis virus (ALV), Reticular endothelial virus (REV) and Chicken infectious anaemia virus (CIAV). Out of 27 FAdV positive flocks, no flocks were positive for MDV and REV whereas 21 flocks (77%) were positive for ALV by PCR and 16 flocks (59%) were positive for CIAV by PCR. Though FAdV is a primary causative factor for IBH and HPS, the immunosuppression induced by ALV and CIAV plays a major role for aggravating the FAdV infection in broiler chicken. Further studies needed to elucidate the interaction of these viruses and their impact on the poultry health.

Coccidiosis

- **Cause**
  - *Protozoa of Eimeria* spp
- **Susceptibility**
  - Affects young birds because of immature immune system
- **Transmission**
  - Spread via the environment- litter
- **Clinical signs**
  - Unthriftiness
  - Diarrhoea
  - reduced feed and water consumption
  - High mortality
- **Lesions**
  - Bloody intestinal contents, enteritis and mottled intestinal wall
- **Diagnosis**
  - Fecal flotation
  - The lesions are almost entirely in the intestinal tract and often have a distinctive location and appearance





Coccidiosis

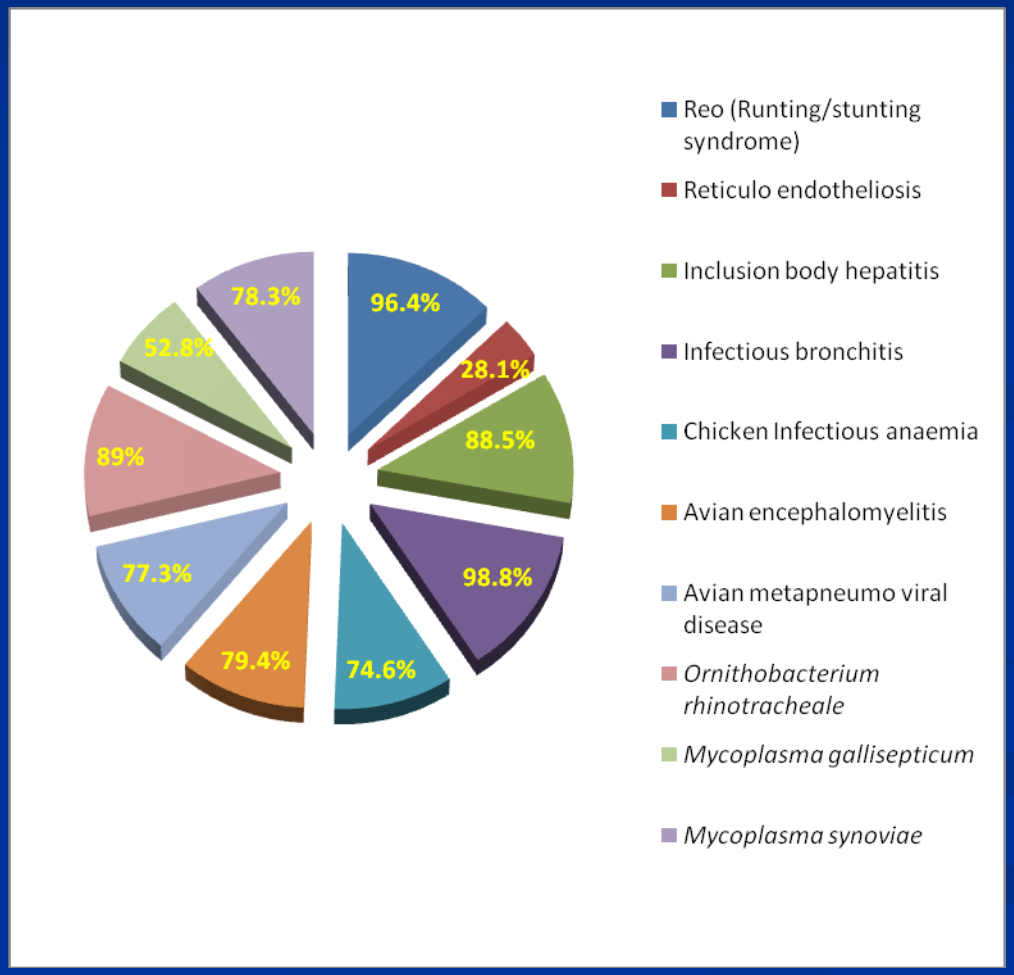
- Treatment
  - Use of anticoccidial compounds in feed or water, vaccination, or a combination of both to prevent clinical signs
  - Once clinical signs appear, use of antibiotics and supportive care is advisable to minimize dehydration and secondary bacterial infection

Incidence of Poultry Diseases by molecular diagnosis

S.No.	Month & Year	Disease
1	Jan-20	ANV
2	Jan-20	Coryza- B & C Strain
3	Jan-21	IBH
4	Jan-23	IBH
5	Feb-22	IB
6	Mar-20	MG
7	Mar-21	MG
8	Mar-21	ANV
9	Mar-22	IB
10	Apr-21	FAV
11	May-22	MG
12	Jun-20	NDV
13	Jun-20	AE
14	Jun-21	IBH
15	Jul-20	ALC
16	Jul-21	FAV
17	Jul-21	FAV
18	Jul-23	FAV
19	Jul-23	FAV
20	Aug-20	IBH

S.No.	Month & Year	Disease
21	Aug-20	ORT
22	Aug-23	FAV
23	Aug-23	REO, FAV
24	Aug-23	ANV
25	Aug-23	MS
26	Aug-23	FAV
27	Aug-23	FAV
28	Sep-20	ALC, REV
29	Sep-20	ASTRO
30	Sep-21	FAV, IB
31	Sep-23	REO, IB
32	Sep-23	REO, FAV
33	Sep-23	IB
34	Oct-21	FAV
35	Oct-22	FAV
36	Nov-19	IBH
37	Nov-19	CAV
38	Nov-19	IBH-HPS
39	Nov-19	ANV
40	Dec-19	ANV
41	Dec-20	IBH

The per cent seroprevalence of poultry diseases at Namakkal



Prevention and control of poultry diseases

- Following all in all out system
- Practicing strict biosecurity measures
- Avoid stress to the high genetic potential bird for achieving its target
- Change in the environmental conditions due to global warming
- Reduction of ammonia levels in the shed
- Provision of Balanced feed
- Serosurveillance and molecular surveillance
- Proper application of vaccine
- Immunization of parent birds against vertically transmitted diseases
- Routine monitoring of vaccination programs for efficacy
- Do not introduce new vaccines without knowing the existence of the particular serotype of virus
- Good management practices
- Adequate down time
- Potential for spread of endemic diseases through large naive populations of birds should be avoided
- Avoid immunosuppression due to fungal toxins and pesticides in feed

Thank you