

WELCOME
to
WEBINAR

Poultry Respiratory Diseases
Economic Importance
&
Control



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PoultryTroubleshooter_BDutta
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What is Respiration?

- Respiration is the act of Breathing; the Trachea, Bronchi & lungs allow chicken to breathe
- They bring Oxygen into the body (inspiration, or inhalation) and send Carbon Dioxide out (expiration, or exhalation)
- This exchange of O₂ and CO₂ is called respiration

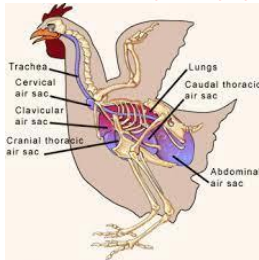
A process in living organisms involving the production of energy, with the intake of O₂ and the release of CO₂ from the oxidation of complex organic compounds

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Respiratory System of Chicken



Chicken Respiratory has few major differences from the mammals

1. Presence of 9 air sacs allow Chicken to fly
2. Chicken lungs are relatively small, firmly attached to the ribs and do not expand
3. Birds have an incomplete diaphragm and chest muscles & the sternum (keel) do not lend themselves to expand like a mammal's chest muscles and sternum

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Functions of Poultry Respiratory System

1. Gas Exchange

- O₂ from the ambient air is exchanged for CO₂ produced by the cells in the alveoli of the lungs.
- Fresh air with O₂ is inspired into the lungs through the conducting airways.
- At the same time, venous blood returning from the various body tissues with high CO₂ content is pumped into the lungs by the right ventricle of the heart.
- In the pulmonary capillaries, CO₂ is exchanged for O₂
- The blood leaving the lungs with high O₂ & low CO₂ content, is distributed to the tissues of the body by the left ventricle.
- During expiration, gas with a high CO₂ is expelled from the body

2. The respiratory system participate in **acid-base balance** by removing CO₂ from the body

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Functions of Poultry Respiratory System

3. **Phonation**; production of sounds by the movement of air through the vocal cords

4. Pulmonary Defense Mechanisms

- Each breath brings into the lungs a small sample of poultry house environment, including microorganisms, dust, litter, toxic gases & smoke
- The cilia & mucous layer of Trachea protects the entry of all non-desirable substances into the lungs and remove them from the body
- During inhalation, the mucus traps dust, microbes & other small particles to keep them away from traveling to lungs. The small hair-like cilia in trachea move in rhythm to push mucus out of trachea to expelled or swallow

5. **Pulmonary Metabolism**; the cells of the lung metabolize substrates to supply energy and nutrients for their own maintenance

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Poultry Respiratory Health means



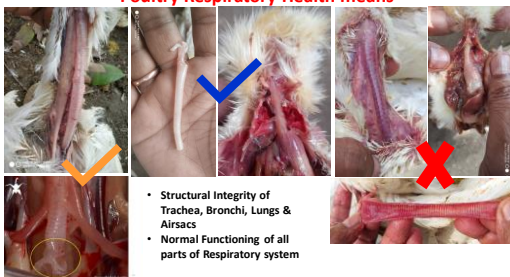
- Structural Integrity of Respiratory organs; trachea, bronchi, lungs & airsacs
- House Environment for Easy & Free Breathing of Fresh air without Toxic Gas & Dust
- Free from Respiratory Disease

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Poultry Respiratory Health means



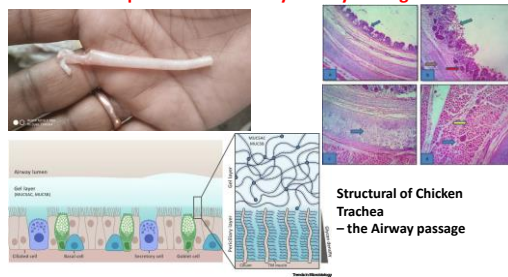
- Structural Integrity of Trachea, Bronchi, Lungs & Airsacs
- Normal Functioning of all parts of Respiratory system

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Importance of Healthy Airway Passage



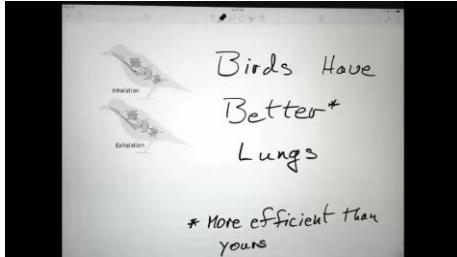
Structural of Chicken Trachea – the Airway passage

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Chicken Respiratory Process



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Challenges to Poultry Respiratory System

Environmental: Dust, microbes, litter material & toxic gasses are always inside poultry house environment posing challenges to mucous layer & ciliary structures

- 1gm of dry feces may contain 1 million *E coli*
- Total bacteria in poultry litter were detected by culture at 10^9 CFU/g of material
- Microorganisms of respiratory infections like *E coli*, *Mycoplasma*, *Coryza*, RD, Bird Flu, IB, Pox, ILT, HPS, etc. spread through droplet/dust in poultry house
- In Poultry farming, chicks live as community where Horizontal Spread of Microorganisms by direct contact or through airborne droplets on dust from sneezing & coughing is continuous process
- Toxic Gas like Ammonia destroy the cilia & opens the door for dust & microbes

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Challenges to Poultry Respiratory System

Anatomical Structure:

The Lungs of chicken can not expand like mammalian lungs as they are small, rigid, can't enlarge and are fitted tightly into the thoracic cavity

Non-Respiratory Route:

Many dreaded respiratory infections comes via blood. They enters the body through mouth, produces clinical disease when Microbes produces septicaemia and enters lungs, Bronchi & trachea, e g *E coli*, ND, AI, etc

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Reasons of Poultry Respiratory Disease

Predisposing Factors:

They are very important which mostly invites the Disease causing microorganisms to enter

Respiratory Infections:

They are diseases of respiratory tract caused by Bacteria, Virus, *Mycoplasma* & Fungus

Aggravating Factors:

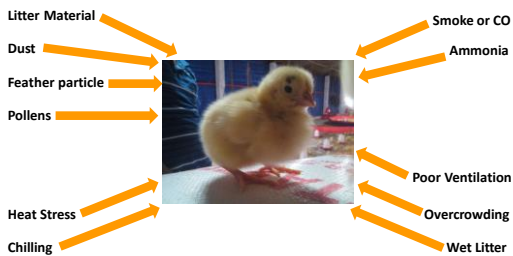
E coli is ubiquitous & present in all our poultry area. Both *E coli* & *Mycoplasma* are waiting for any respiratory infections to aggravate the situation

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Pre-Disposing factors of Respiratory Problem

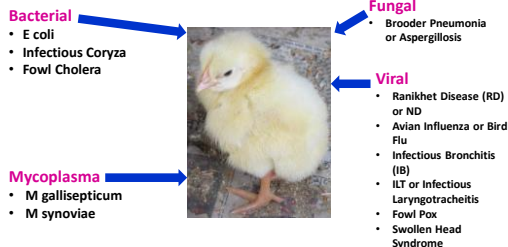


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Poultry Respiratory Diseases



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Ranikhet or Newcastle Disease

- ND or RD is the most dreaded contagious viral poultry disease of the globe causing huge loss every year
- ND can be acute lethal causing heavy mortality in all ages or may be mild & asymptomatic form causing respiratory signs but with poor productivity



- Disease enters through nose, mouth & eye and transmit through direct contact via aerosol or through contaminated feed, water, equipment, human clothing
- ND or RD virus can survive in dead birds for several weeks in cold weather and several years in kept frozen. The virus survive in contaminated faeces @ 37°C for over a month
- Symptoms include Dullness, Inactivity, Huddling at any age, poor feed intake, poor body WT Gain & poor Egg Production, Respiratory Distress, labored breathing, Watery discharges from Mouth & Nose, Head Swelling, closed eyes with Conjunctivitis, Dehydration, Enteritis, Paralysis, Fever, Shivering and mortality up to 100%
- **Can only be controlled by Strict Biosecurity & scientific Vaccination program with local data**

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Avian Influenza or Bird Flu

- Bird Flu is a fatal viral disease in poultry with extremely high mortality globally
- Faeco - oral Route is most common after shedding of virus through faeces, saliva, nasal & eye discharge
- **Poultry Traffic, Migratory Birds & Chicken Vehicle are main source disease transmission**



Biosecurity is the only way to minimize losses from Bird Flu

Major 2 types: HPAI causes almost 100% mortality in 2 – 5 days and LPAI causing slow mortality & respiratory problem inviting secondary infections
Symptoms are coughing, sneezing, gasping, rales, head swelling, discharges from mouth, eye & nose, Blue discoloration of comb, shank & footpad, Green diarrhoea, Prostration and death

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Infectious Bronchitis

- IB is an acute highly contagious respiratory disease of chickens
- Infection via conjunctiva or upper respiratory tract with an incubation period of 18-36 hours.
- The infection spreads rapidly by contact through fomites or aerosol
- Poor ventilation & overcrowding are predisposing factors
- Symptoms include depression, huddling near heat source, tracheal rales, coughing, sneezing & gasping, watery eyes, nasal discharge
- **Caseous plug in bronchi is typical PM sign along with lesions in trachea & lungs**
- Mycoplasma & E coli aggravates the already existing respiratory distress



Control of IB can be done by Biosecurity and Vaccinating Breeder Flock with both Live & Inactivated Vaccines and Broiler Chicks with Live Vaccines

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Fowl Pox

- Fowl pox is a slow-spreading viral disease of chickens characterized by lesions on the unfeathered skin areas and mucous membranes of the oral cavity, larynx or trachea
- Two different forms of fowl pox can occur in chickens; a dry cutaneous form and wet diphtheritic form
- **The dry pox is the most common; lesions are small, wart-like growths on the face, comb, wattles, eyelids, skin, legs and feet**
- They gradually increase in size & color and turn into dark brown, roughened, dry scabs.
- The scabs usually last about 2 - 4 weeks, after which they drop off on their own.
- **These dry scabs contain the poxvirus and are highly infectious for horizontal spread**



- Pox is self-limiting infection and treatment is primarily supportive care.
- Antibiotics may be needed if secondary infection develops.
- Vaccination is the best way to prevent productivity loss in Breeder & Layer birds

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Aspergillosis or Brooder Pneumonia

- Brooder Pneumonia is a Fungal respiratory disease of chicken during brooding time
- High mortality rates can be seen in chicks and poults that inhale large numbers of spores during hatching or when placed on bedding contaminated with mold spores
- In older birds, infection is caused primarily by inhalation of spore-laden dust from contaminated litter, feed, or dusty environment



- Clinical signs are Dyspnea, Labored breathing, Inappetence, Fever & Emaciation
- **Typical PM lesions include Poppy seed like Yellowish-green or whitish, caseous (cheesy) nodules in lungs**
- Plaques & nodules may appear in trachea, syrinx, liver, intestines, and occasionally the brain
- Mortality used to continue till harvesting due to Airsacculitis (CCRD) & Ascites which developed in all cases resulting huge loss



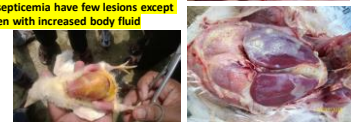
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Colibacillosis or E coli infection

- *E coli* infection caused by Avian pathogenic *E coli* (APEC), it may be localized or systemic
- Diverse manifestations, like acute fatal septicemia, subacute pericarditis, airsacculitis, salpingitis, peritonitis, and cellulitis
- **It is one of the most commonly occurring and economically devastating bacterial diseases of poultry worldwide**
- Signs are nonspecific; vary with age, organs involved, and concurrent disease.
- **Young birds dying of acute septicemia have few lesions except for an enlarged liver & spleen with increased body fluid**
- Survived chicks develops subacute fibrinopurulent airsacculitis, pericarditis, perihepatitis.
- Pneumonia, arthritis, osteomyelitis, peritonitis & salpingitis seen sporadically



E coli control is very difficult but Strict Biosecurity, Avoiding Stress, dust & Immunosuppression are the keys

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Infectious Coryza

- Infectious Coryza is an acute upper respiratory disease of chicken, caused by *Avibacterium paragallinarum*
- Breeder & Layer are most susceptible but infections in broiler 5th week onwards may be seen.
- Abrupt onset, chickens showing signs within 24 - 72 hours
- The typical symptoms are facial swelling and sinuses with a clear discharge progressively become purulent & foul smelling. Males have swollen wattles.
- Marked conjunctivitis, eyes partially closed due to the excessive discharge
- Early antibiotic treatment via drinking water is effective



Prevention is the only key to control; all-in all out system and biosecurity practices are important

- Vaccination of Breeder & Layer 2 times during their life cycle helps preventing the disease outbreak.



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Mycoplasma Infection or CRD

- *M gallisepticum* (CRD), *M synoviae* (Infectious Synovitis) & *M meleagridis*
- Infection spreads both vertically & horizontally
- Once infected the chicken remains so until death and act as silent carrier
- It only lives 5 days outside host body, may survive longer if protected by exudate and/or cold climate
- Mortality usually low but Egg Production & Body Weight gain are heavily impacted
- Symptoms are Sneezing, Coughing, Head Shaking, Rales, gasping, discharge from eyes & nose, head swelling, reduced growth, Poor egg production & hatchability
- Mycoplasma is sensitive to Antibiotic and Infections can be controlled temporarily
- Mycoplasma control involves control both Vertical & Horizontal transmission



Mycoplasma control in Broiler involves Chicks from Mycoplasma free parents & hatchery, All in All Out system, Entry point biosecurity, Traffic control, Dust control, and Shed to shed distance

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Symptoms of different Poultry Respiratory Disease

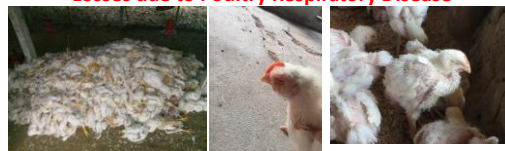
	ND	AI	IB	ILT	Pox	E coli	Coryza	CRD	Aspergillosis
Coughing	+	+			+			+	
Sneezing	+	+			+	+	+	+	
Head Shaking	+	+		+	+	+	+	+	
Rales	+	+	+	+	+	+	+	+	
Gasping	+	+	+	+	+	+	+	+	+
Eye Discharge	+	+	+	+	+	+	+	+	
Nasal Discharge	+	+	+	+		+	+	+	
Head Swelling	+	+				+	+	+	
Blue Discoloration	+	+		+					+
Reduced Growth	+	+			+	+	+	+	+
General Diarrhoea	+	+				+	+	+	
Green Diarrhoea	+	+							
Paralysis									+
Head/Neck Twisting	+								+
Conjunctivitis	+	+		+			+		
Prostration	+	+						+	

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Losses due to Poultry Respiratory Disease



- Loss from **Mortality** in disease like Ranikhet (ND), Bird Flu, Aspergillosis, E coli, CRD
- Loss due to **Poor Productivity** in IB, ILT, Coryza, Pox, E coli, CRD, etc with Reduced Egg Production in Layer/Breeder and Poor Body Weight with high FCR in Broiler

- Loss from **Medicine Expenses**
- Loss from **Excess Manpower**

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What is Respiratory Distress/Problem?

- A condition when chicks are unable to breathe freely because of internal or External factors
- **Most frequent Internal factor is obstruction & structural damage in respiratory passage due to inflammation of Trachea and/or Bronchi** by toxic Gas, Smoke, Dust and/or Infectious organisms
- Another Important Internal factor is inefficiency of respiratory organ/organs due to damage caused by infections or Toxic gasses or Smoke, e g Pneumonia
- **External factors are mostly Management inefficiencies & mistakes like Poor Ventilation, High Litter Ammonia, Overcrowding, Chilling, High Temp & Humidity**
- Symptoms are runny watery eyes, swollen sinuses, nasal discharge, wheezing, sneezing, gurgling/rattling, gasping and mortality

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Minimize Respiratory Distress/Problem for Free Breathing

Pre-Disposing factors of Respiratory Problem



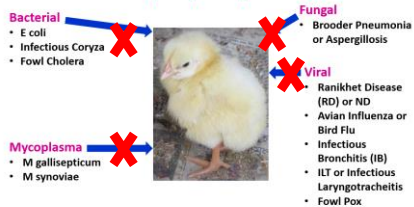
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Minimize Respiratory Distress/Problem for Free Breathing

Poultry Respiratory Diseases



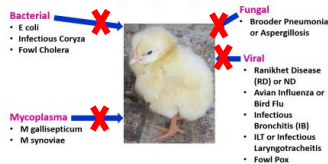
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Minimize Respiratory Distress/Problem

Poultry Respiratory Diseases



- **Supportive Immunomodulator in case of Viral infections**
- **Multivitamin Support, especially Vit AD3EC**
- **Supportive Bronchodilator to ease breathing**

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- **Preventive Vaccination against all Respiratory Disease**
- **Immediate & best possible Antibiotic Treatment of Bacterial & Mycoplasma Disease**

Respiratory Health for optimum Performance



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Thank You



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