My Chickens Have The Sniffles….What Could It Be?

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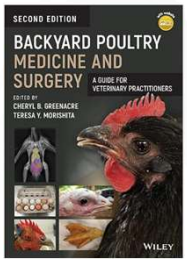
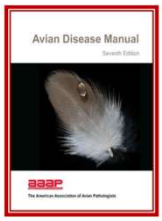
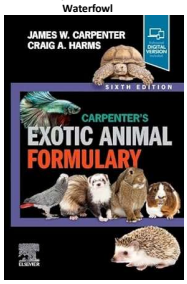
RESOURCES





Chapter 6: Backyard Poultry, Gamebirds and Waterfowl



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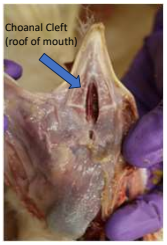
Avian Respiratory System

- Chicken respiratory system is <u>not</u> identical to mammals
  - Flight animals --- need buoyancy
- Components of Respiratory System
  - Eyes – contain Harderian Gland (immune)
  - Nostrils
  - Choanal cleft – connects nasal passages to oral cavity
  - Trachea & Syrinx (voicebox)
  - Lungs
  - Airsacs
  - Pneumatic Bones



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Avian Trachea

- Complete cartilaginous rings
- Functions
  - Warm & moisten air
  - Protect against irritants (dust, NH_3, pathogens)
  - Mucus production
  - Surface antibody (IgA) production
- Lined by ciliated (hair-like) epithelium
  - Helps remove dust, viruses, bacteria via <u>mucociliary elevator</u> & mucus production
  - If overwhelmed, undergoes <u>ciliostasis</u>
    - Can't eliminate bad stuff; produces a lot of mucus

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Avian Trachea


Normal


Abnormal

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Avian Respiratory System

- Lungs are static --- do not inflate/deflate like mammals
  - Embedded in backbone
- No diaphragm --- cannot cough & clear airways
  - ↑ susceptibility to irritation (NH_3, dust), viruses, bacteria, etc.
- Respiratory Cycle
  - 2 inspirations and 2 expirations to complete cycle

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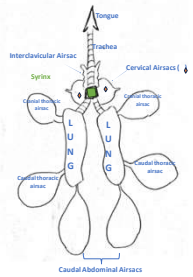
Avian Respiratory System

- 9 airsacs (think balloons)
  - Interclavicular (1), cervical (2), cranial thoracic (2), caudal thoracic (2), caudal abdominal (2)
  - Very little blood supply
  - Great place for germs to hide from immune system!
- Pneumatic (hollow) bones which air sacs communicate with
  - Skull, humerus, clavicle, keel, pelvic girdle, lumbar & sacral vertebrae



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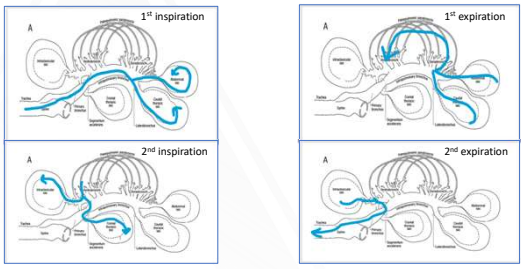
Avian Respiratory Cycle



Figures adapted from: Ludders, JW. 2001

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Airsacs

Normal Caudal Abdominal Airsac

Airsacculitis – Caudal Abdominal Airsac

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Respiratory Diseases

- Very common in poultry
- Viral and/or bacterial etiologies
- Often clinically indistinguishable
  - Decreased egg production & water consumption, anorexia, ruffled feathers
  - Mild respiratory signs (snicking, oculonasal discharge, etc.)
  - Severe respiratory signs (swollen sinuses, bloody exudate, etc).
  - Sudden, drastic mortality +/- neurological signs
- Transmitted via horizontal spread, some vertically (via egg)…
  - Aerosol, fecal-oral, fomites (humans!), etc.
- Some are reportable!
  - Importance of traceability, proximity to integrated industry

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Respiratory Diseases

VIRAL
- Avian Influenza
- Newcastle Disease
- Fowl Pox
- Infectious Laryngotracheitis

BACTERIAL
- Mycoplasmosis
- Infectious Coryza

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Avian Influenza --- REPORTABLE

- Type A, RNA virus of the *Orthomyxoviridae* family
  - Human flu are Types A, B and C
- Segmented, enveloped virus
- High Pathogenicity (HPAI) and Low Pathogenicity (LPAI)
- H5 & H7 subtypes - most common avian influenza viruses
  - Not all subtypes are HPAI, but all have the potential to become HPAI
- Major reservoir: migratory waterfowl and shorebirds
  - Cause little clinical disease in these species

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Avian Influenza --- REPORTABLE

- LPAI – mild respiratory signs, decreased water consumption/egg production, diarrhea
- HPAI – sudden, marked increase in mortality (<24 hours post-infection)
  - Prior to death: Tremors, torticollis, opisthotonos, halted egg production, diarrhea, diffuse petechial to ecchymotic hemorrhages (including shanks), swollen comb/face
  - Necropsy: hemorrhages throughout coelomic cavity

Avian Diseases, 14th Ed.

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Avian Influenza --- REPORTABLE

- Avian Influenza affects many other avian species, not just chickens
  - Ducks, geese, pheasants, quail
  - Bald eagles, blue winged teal, black vultures
  - Red-tailed hawks, etc.
- Also identified in mammalian species
  - Dairy cattle, cats, coyotes, sea lions, etc.
  - Humans via close contact w/ positive animals

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Newcastle Disease

- Avian Paramyxovirus -1 (AMPV-1); enveloped RNA virus
- Three pathotypes – determine clinical signs
  - Lentogenic, mesogenic, viscerotropic velogenic
- Virulent Newcastle Disease (vNDV)
  - formerly Exotic NDV
  - Pathotype: viscerotropic velogenic
  - Clinically indistinguishable from HPAI
  - REPORTABLE

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Fowl Pox

- *Avipoxvirus* - Enveloped DNA virus of the *Poxviridae* family
  - Canary Pox, Fowl Pox, Pigeon Pox, etc.
- Slow spreading disease --- mosquitoes!
- Two clinical presentations
  - Cutaneous (Dry) Pox
    - Nodular, proliferative skin lesions on non-feathered parts of body
    - Common in backyard flocks
  - Diphtheritic (Wet) Pox
    - Caseous lesions on mucous membranes of upper respiratory tract
      - Mouth, larynx, trachea/esophagus

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Fowl Pox

- Transmission
  - Respiratory Tract
    - Inhalation of dust-containing infective particles (scabs, feather dander, etc)
  - Oral
    - Ingestion of food/water/litter contaminated with virus particles (scabs, feather dander, etc)
  - Mechanical Transmission
    - Skin lacerations
    - MOSQUITOES!!!!!
- Incubation Period of 6-14 days

Sunandshadegardening.com

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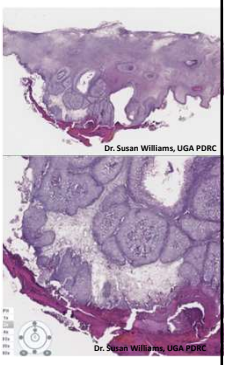
Fowl Pox

- Diagnosis
  - Often presumptive in backyard flocks
    - Rules outs: pantothenic acid/biotin deficiency, mycotoxins, Infectious Laryngotracheitis, trauma
  - PCR – tracheal swab, eyelids..
  - Histopathology of lesions – most common dx
    - Classic histo findings – epithelial ballooning degeneration, eosinophilic intracytoplasmic inclusion bodies



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Infectious Laryngotracheitis

- Acute viral respiratory disease of chickens
  - *Gallid alphaherpesvirus 1* – enveloped DNA virus
  - Can also infect pheasants, peafowl and turkeys …. (no intermixing!)
- Clinical signs/mortality often presents 7-10 days after infection
- Herpesvirus…latency in trigeminal nerve
- Common in areas where vaccinated and unvaccinated birds are co-mingled

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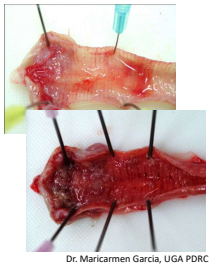
Infectious Laryngotracheitis

- Clinical Signs & Gross Lesions:
  - Mortality
  - Coughing, head shaking, dyspnea, bloody mouths
  - Fibrinonecrotic tracheal/oral exudate, conjunctivitis
  - *mild infections can appear similar to wet pox
- Diagnosis
  - PCR (tracheal swabs)
  - Histopathology
    - syncytial cell formation & intranuclear inclusion bodies – trachea + conjunctiva epithelium



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Mycoplasmosis

- "Chronic Respiratory Disease" or "Infectious Sinusitis"
- *Very common among backyard/small flocks*
- Causative agent – *Mycoplasma gallisepticum*
  - Obligate intracellular bacterium which lacks a cell wall
  - Affects many avian species!!!
- Chickens:
  - *M. galliseptcium, M. synoviae*
- Turkeys:
  - *M. gallisepticum, M. meleagridis, M. iowae*
- Transmission – slow → horizontal and vertical
- Once infected, always infected!

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Mycoplasmosis

- Clinical Signs:
  - Inapparent to mild or severe respiratory signs
    - Dyspnea, rales, snicking, oculonasal discharge, swollen faces
    - Lethargy, increased mortality
    - Decreased egg production
  - *M. synoviae*: swollen joints, lameness
- Diagnosis
  - PCR – choanal cleft swab (contact veterinary diagnostic lab)
  - ELISA – serum
  - Culture – gold standard

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Mycoplasmosis

- Treatment
  - Tylosin and tetracyclines decrease severity of clinical signs
  - No cell wall → beta lactams ineffective
  - ONCE INFECTED, ALWAYS INFECTED
    - Passed through the egg to chick!!
- Prevention
  - Quarantine any new birds before introduction to existing flock
  - Purchase birds from MS/MG-free sources (NPIP participants)

Tylosin soluble cannot be used in chickens laying eggs for human consumption

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Infectious Coryza

- Can infect chickens, pheasants, guinea fowl, etc.
- Causative agent – *Avibacterium paragallinarum*
- Spreads rapidly, clinical disease can persist for weeks to months
- Clinical presentation – catarrhal sinusitis
  - Facial edema, swollen wattles, swollen infraorbital sinuses
- Asymptomatic carriers are common!!
  - Once infected, always infected…

Deresse, et. al. 2023: A review on Infectious Coryza Disease in Chicken

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Infectious Coryza

- Diagnosis
  - Aerobic culture and/or PCR – aseptic swab of infraorbital sinus
  - Contact diagnostic lab for sampling guidance
- Treatment
  - Antibiotics w/ gram-negative spectrum (sulfonamides, tetracycline, erythromycin)
  - **caution antibiotic therapy in flocks laying eggs for human consumption
  - Will never clear infection
- Prevention
  - Biosecurity, cleaning & disinfection
  - Depopulating chronic/asymptomatic carriers
  - Vaccination: serotype must match field strains, uncommon in small flocks

Deresse, et. al. 2023: A review on Infectious Coryza Disease in Chicken

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Diagnosing Respiratory Disease

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Diagnosing Respiratory Disease

- Contact state veterinary lab for guidance!
- PCR most common (& quickest)
- Preferred swab: synthetic/semi-synthetic swab + plastic handle
  - Avoid cotton or calcium alginate swabs + wooden handles
    - PCR inhibitors!
- Bacterial culture:
  - Swab with transport media
  - Don't freeze samples!

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Diagnosing Respiratory Disease

- Viral Etiologies
  - Oropharyngeal/choanal cleft swab - PCR
  - Pox & ILT → trachea, eyelids in formalin for histopathology
- Bacterial Etiologies
  - Mycoplasma:
    - Oropharyngeal/choanal cleft swab - PCR
    - Serum – ELISA
  - Infectious Coryza
    - Infraorbital sinus swab + sinus exudate → culture + PCR

Figure 3. Be sure to insert swab into the choanal cleft when collecting oropharyngeal swabs.

Hy-Line Technical Update: Proper Collection and Handling of Diagnostic Samples

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Treating Respiratory Diseases

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Treatment

- No curative treatment for most respiratory diseases
- Mycoplasma & Infectious Coryza
  - Antibiotics decrease severity of clinical signs + shedding but never resolves infection!!
  - Ex: Tylosin, Oxytetracycline → caution with laying hens!
- Prevention:
  - BIOSECURITY, BIOSECURITY, BIOSECURITY
    - Source from disease free flocks!
    - Quarantine!
  - Vaccination when/where applicable…
    - Newcastle Disease, Fowl Pox

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Respiratory Disease Vaccination

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NDV Vaccination

- Not common in backyard flocks
  - often limited to endemic areas
- Does not prevent infection
  - mitigates clinical illness
- Minimum of 2 vaccinations recommended
  - Live vaccines will not produce lifelong immunity
- Application via spray, drinking water or eye drop
  - Some NPIP certified hatcheries may provide day of hatch vaccination
- Withdrawal: 21 days

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Fowl Pox Vaccination

- Two forms of live pox vaccine
  - TCO → given as early as day 1
  - CEO → must be 6 weeks of age
- Performed between 12-16 weeks of age
- Pox vaccines administered via wing web
  - WW is aberrant site; pluck feathers in area
  - NEVER EYE DROP!!!
- Evaluate "takes" 7 days post-vax
- Cost - $13/1000 doses
- Withdrawal Time = 21 days

Source: ValleyVetSupply

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Fowl Pox Vaccination

- A slow spreading viral disease
- Many pox strains exist
  - Fowl, Turkey, Pigeon, Canary, etc.
- Vaccination recommended for temperate climates, exhibition poultry, etc.
- Can vaccinate in face of outbreak to slow spread
- Vaccines exist for many strains
  - Fowl/Pigeon does not cross protect against other strains

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Respiratory Vaccinations

- No vaccines available for Avian Influenza
- MS/MG vaccines are available but require approval of Alabama State Veterinarian for use
- Infectious Coryza inactivated vaccines available but rarely (if ever) used in small flocks.
- Withdrawal times for live vaccines: 21 days

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Case Example

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Small-Flock Case

- **Flock started August 2023**
- **Breeds**
  - **Coronation Sussex (2 hens, 1 pullet)**
  - **Hampbar chicks (hatched Oct. '23, arrived at 3 days)**
  - **Crevecoeur chicks (hatched Oct. '23, arrived at 3 days)**
- **Illness started Spring 2024**
  - **Rooster with respiratory signs**
  - **Laying hen – unilateral lameness, respiratory signs**
  - **Young chicken – unilateral lameness**

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Small-Flock Case

- Unilateral lameness all happened in Crevecoeur chickens
  - 1 rooster unilateral lameness, no respiratory signs…died
  - 4 weeks later, 1 hen affected with unilateral lameness…died
  - 6 weeks later, another hen affected with unilateral lameness…died
  - 1 bird with respiratory signs, still alive today

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Small-Flock Case

- Late July 2024
  - Sussex Rooster began snicking which lasted 3+ weeks
  - Crevecoeur pullet (hatched April 1st) with lameness and respiratory signs
  - Sussex hen arrived in June, laid two eggs then no more
    - 1 year old
    - Lethargic
    - Submitted to Auburn veterinary diagnostic lab

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Necropsy Results – Sussex Hen

- Gross Lesions:
  - Abundant fat stores
  - Roundworms
  - Multiple inspissated ovarian follicles
  - Peritonitis
  - Mild cecal cores

- Diagnostics
  - *Mycoplasma synoviae* ← NO CURE
    - CT value 27.4
  - Infectious Bronchitis Virus
    - CT value 31.4
  - Histomoniasis ← NO CURE
  - Ascaridiasis
  - Bacterial peritonitis

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Summary

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- Avian respiratory anatomy predisposes to disease
- Many respiratory diseases are clinically indistinguishable
  - Confirmatory diagnosis is important!
- Biosecurity is paramount!
- PCR is available for most diseases
  - Confirmatory diagnosis + quick turnaround
- Don't overlook the reportable diseases!
  - Avian Influenza, Virulent Newcastle Disease
  - Varies by state: Mycoplasma, ILT
- State veterinary diagnostic labs are an invaluable resource!

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Additional Resources

- Disease Prevention & Control, Diagnostics, Biosecurity
  - Dr. Maggie Thompson
- Biosecurity, Husbandry, Behavior, Diet, 4-H, etc…
  - Dr. Brigid McCrea (mccreba@aces.edu)
  - Cooperative Extension websites

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Questions?

THANKS FOR YOUR ATTENTION!

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