

Diseases of Backyard Poultry
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Backyard Poultry:

- From small hobby flocks to show flocks to small production/businesses, backyard poultry has become an increasingly prominent part of veterinary medicine. This course focuses on topics affecting the backyard poultry owner and veterinarian with a focus on field investigation and clinical medicine of chickens, turkeys, waterfowl (ducks, geese, swans), and gamebirds (quail, pheasant, peafowl, chukar partridge). This course looks at basic nutrition, housing, handling, clinical medicine, diagnostic testing, and key poultry diseases.

Associations:

- American College of Poultry Veterinarians
- American Association of Avian Pathologists
- American Board of Veterinary Practitioners (Avian Medicine and Surgery)
- Association of Avian Veterinarians

Examination of Backyard Poultry:

- Utilization of the “FLAWS” system ensures a complete look at the flock whether in a field or clinic setting.
- F = Feed
 - A clean, fresh, complete pelleted feed should be provided that is appropriate for the purpose, age, and stage of production of the bird. Mixed feeds may cause an imbalanced diet due to loss of small particulates or selective eating. Feed should be stored in a rodent/pest and water proof container in a cool, dry area to prevent the growth of mold. Numerous supplements exist for poultry but commonly utilized ones include grit or oyster shell for laying birds. Treats should be provided sparingly.
- L = Light & Litter
 - Light stimulation will bring birds into egg production. A recommended lighting plan to bring chickens in egg production calls for increasing the light to 16 hours, stepwise by 30 minutes every week. Molt lighting recommendations call for reduction of light from 16 hours to 8 hours the next day. A drop in egg production will occur over the next few days. During this time, the feed should be switched to a molt feed.
 - Litter should adequately cover the ground and should be monitored for ammonia, moisture, must and mold. Commonly used materials include pine shavings, corn cobs, straw, sand, or newspaper.

- A = Air
 - When entering a poultry house, evaluate the ammonia levels, mold and mildew odors, air movement, patches of cold and hot air, stale air, and humidity. Evaluate the ventilation system and methods utilized by the client in all seasons.
- W = Water
 - Birds should have access to fresh, clean water at all times. Regular cleaning of water equipment will prevent the build up of biofilms. Evaluate the height of water access to ensure all birds have access, leaks, and spills.
- S = Sanitation, (bio)Security, Space
 - Cleaning with a flock typically happens once a year. If the flock is depopulated, recommended downtime between flocks is 3-4 weeks following throughout clean out of the house and disinfection.
 - Birds should be purchased from a reliable source and quarantined for 4 weeks before joining the existing flock.
 - Care should be taken in avoiding contact with wild birds, ordering care routines (young birds to older birds, healthy birds to sick birds), reporting sick birds, and proper set up of on-site quarantine.
 - Consequences of inadequate space for flocks include disease outbreaks, cannibalism, reduced production, and more.

Respiratory Diseases:

- Respiratory disease in poultry is a common issue, especially in times of temperature and humidity fluctuations such as spring and fall. Clinical signs include snicks, rales, sneezes, gasping, and coughing for 7-10 days. Samples to collect: choanal/tracheal swab, serum, sinus exudate, trachea, lung, air sac. Focus should be on ventilation, humidity, and ammonia of the house. Tetracyclines have been utilized to reduce clinical signs and disease duration.
- Mycoplasmosis (*M. gallisepticum*, *M. synoviae*)
 - All ages are susceptible and infections are complicated by additional respiratory viral and bacterial pathogens (infectious laryngotracheitis virus, infectious bronchitis virus, Newcastle disease, *Escherichia coli*, *Pasteurella multocida*, *Avibacterium paragallinarum*, *Gallibacterium anatis*, aspergillosis). *Mycoplasma* is labile and relies on horizontal transmission, vertical transmission, and carrier birds (particularly in multiage flocks). Clinical signs can be slow to develop (weeks to months) and result in respiratory signs and a drop in feed consumption / egg production. Grossly, mycoplasmosis can cause catarrhal inflammation of nasal passages, sinuses, trachea, lungs, and air sacs. Turkeys often develop swollen infraorbital sinuses. Diagnosis can be achieved by serum plate agglutination, HI, ELISA, and molecular testing. Culture is often time consuming. Mycoplasmosis cannot be cured but can be treated with tylosin and tetracyclines.

Relapses often occur when treatment is discontinued. Management and biosecurity practices are necessary for the prevention of mycoplasmosis. This includes quarantining new birds and purchasing birds from reliable sources.

- Infectious Coryza (*Avibacterium paragallinarum*)
 - While many avian species are susceptible, this is most often seen in chickens, pheasants, and guinea fowl. Grossly, avibacteriosis will cause oculonasal discharge, facial edema, and swollen infraorbital sinuses. Diagnosis requires culture. Should avibacteriosis be suspected, noting this on the submission form will prompt the lab to set specialized plates to isolate the organism. Management practices similar to mycobacteriosis and common treatment options involve tetracyclines.
- Infectious Laryngotracheitis (gallid herpesvirus-1)
 - Chickens are primarily affected with fewer cases documented in pheasants and guinea fowl. Clinically, ILT can manifest as an elevated flock mortality (1-50%) and mild to severe conjunctivitis, rales, dyspnea, and blood stained nares and feathers. Grossly, the trachea is often hemorrhagic with caseous plugs in the lumen and larynx. Diagnosis is achieved by histopathology or molecular testing. No treatment is available. Vaccination is practiced in commercial poultry but is not often utilized in backyard poultry. Good biosecurity is needed to prevent introduction and spread on site.
- Fowl Pox (avipox)
 - There are many strains (fowl pox, turkey pox, pigeon pox, canary pox, etc) of this slow-spreading viral disease in avian species. Virus can be inhaled or enters the skin through minor abrasions, cannibalism, and blood-sucking insects. Virus-containing crusts are desquamated into the environment. Two forms of fowl pox are recognized, cutaneous and diphtheritic. The cutaneous form manifests as proliferative pock lesions on unfeathered portions of skin such as the head and legs. The diphtheritic form causes proliferative lesions in the oral cavity and can cause starvation or suffocation if the lesions block the esophagus or trachea respectively. Diagnosis can be presumptive based on the gross lesions with confirmation by histopathology. There is no treatment. Mortality is typically low to moderate in uncomplicated cases and the course of disease is 2-3 weeks. Recovery is more common in the cutaneous form and results in strong immunity.

Gastrointestinal Lesions

- Coccidiosis
 - A common, species-specific protozoa that multiplies in the intestinal mucosa causing tissue damage, which can lead to clostridial necrotic enteritis. Outbreaks are common at 3-6 weeks of age. Many infections are relatively mild and clinical signs include depression and diarrhea. Feed and digestion are disrupted, leading to

decreased nutrient absorption and decreased production. There are numerous *Eimeria* species of chickens, turkeys, and other avian species. Each species has a specific site of multiplication and tissue damage, often with specific gross lesions such as typhlitis and caseous cecal cores, “salt and pepper” enteritis, or linear tracts of necrosis in the duodenum. Diagnosis is achieved by fecal examination, necropsy with intestinal scrapings, or histopathology. Coccidial oocysts are hardy and can persist in the environment for extended periods of time. Preventative measures are essential for controlling coccidia on site and include the use of medications in starter feeds, rotation of anticoccidial compounds to reduce the chance resistance, avoiding litter build-up and replacement of the top 3 inches, rototilling, and ensuring proper space for the flock. Differentials for caseous cecal cores include coccidiosis, histomoniasis, and salmonellosis. Other intestinal parasites, such as ascarids, cecal worms, and tapeworms can be seen on fecal examination or necropsy. Large infestations of ascarids can result in impactions.

- Histomoniasis (*Histomonas meleagridis*)
 - This protozoal organism affects turkeys, peafowl, grouse, quail and chickens. For turkeys in particular, histomoniasis can result in high morbidity and mortality. Transmission is fecal-oral, often by ingestion of hardy cecal worm ova (*Heterakis gallinarum*) containing the labile protozoan or earthworms containing cecal worm larvae with protozoa. Clinically, histomoniasis results in depression, diarrhea (classically “sulfur-colored feces”), and death. On necropsy, targetoid lesions are present on the liver and caseous cecal cores expand the ceca. Coelomitis and airsacculitis can result from perforation of the cecal wall. Chickens are considered less susceptible to histomoniasis and can harbor *Heterakis* sp. For this reason, the mixing of turkeys and chickens can result in high mortality of turkeys. It is important to make clients aware of this risk. *Heterakis* ova are hardy and raising turkeys on sites formerly populated by chickens can have similar results. Good soil drainage and rotation of ranges periodically and replacement of the top three inches of soil every few years can help reduce exposure.
- Fatty Liver Hemorrhagic Syndrome
 - FLHS is a multifactorial disease involving high energy diets, limited exercise, hormonal and genetic factors, and aflatoxins. This often presents as sudden death of a backyard bird and necropsy reveals abundant fat stores, yellow liver, and a hepatic tear with abundant coelomic hemorrhage. Management of this disease involves feeding a pelleted feed, cutting out high energy treats, and offering opportunities for exercise.

Musculoskeletal / Nervous Diseases

- Bumblefoot
 - Bumblefoot, or pododermatitis, is a lesion in backyard poultry resulting from trauma to the foot and introduction of normal skin flora. Waterfowl are particularly susceptible. When bumblefoot is noted, special care should be taken to investigate the enclosure for perch design and height (4 ft), proper bedding thickness, and areas where feet can be punctured or caught. In cases of pododermatitis, warm Epsom salt baths 1-2 times a day for 7-14 days and wrapping both feet can help relieve pressure and exfoliate foot pads. Antibiotics and surgery are utilized in cases of acute pododermatitis with hallmark signs of inflammation.
- Marek's disease (gallid herpesvirus-2)
 - Marek's disease, a herpesvirus resulting in the development of lymphocytic tumors in organs and nerves, is most commonly seen in young sexually immature chickens (2-7 months). Clinically, nerve infiltration results in bilateral to asymmetric paralysis, diarrhea, and crop dilation. Visceral infiltration results in depression and cachexia. Gross lesions include enlarged discolored peripheral nerves, discrete visceral tumors and diffuse organ enlargement, iris discoloration and inappropriate pupil dilation, and feather follicle enlargement and red shanks. The history and clinical signs are used in conjunction with the gross lesions, histopathology and/or molecular testing for diagnosis. Virus is shed during times of stress in feather follicle dander which is inhaled. There is no treatment and prevention requires vaccination of chickens that will be brought on the site. Development of strong immunity following vaccination (SQ at day of hatch) requires 7-10 days and careful biosecurity will reduce the dose of virus naive chicks are exposed to.
- Lead toxicity
 - Chickens can be exposed to lead via lead shot, paint chips, or batteries. Clinically, lead toxicity will manifest as lethargy, ataxia, tremors, paralysis of the GI tract and diarrhea. Diagnosis requires blood, liver, or kidney samples to be submitted to toxicology. There are no definitive necropsy lesions. However, there could be impaction/dilation of the crop or proventriculus, lead shot or other foreign material within the ventriculus, emaciation, or pale watery blood due to anemia. In the realm of poultry, chicken are fairly resistant to lead toxicity and lead can still be deposited into the egg products of layer chickens.

Skin Diseases

- Lice (*Menacanthus tramineus*)
 - The chicken body louse is a chewing louse spread by direct contact, fomites, flies, and contact with loose feathers on the ground. Infestation can cause skin irritation

and weight loss. Treatment includes dips, dusts, or powders in 7-10 day intervals. Special care should be taken to determine which can be used directly on the bird (ex. GardStar) and which can be used on the environment (Ravap EC, Malathion 50). Treatment must penetrate down to the skin to be effective.

- Mites (*Ornithonyssus sylviarum*)
 - The Northern fowl mite affects chickens and a variety of wild birds. These mites are hematophagous and all life stages take place on the bird. Mites can survive without a host for weeks. A rotation of powders, dusts and sprays is recommended (ex. GardStar, Atroban, Prozap, Poultry Shield, Malathion 50, diatomaceous earth) and clean up of the environment. Special care should be taken to determine which can be used directly on the bird and which can be used on the environment.
- Mites (*Dermanyssus gallinae*)
 - The red mite affects chicken and a variety of wild birds. These mites are hematophagous and life stages occur on and off the host. Mites will hide in cracks and crevices so care should be taken to clean the environment (nest boxes, slats, roosting areas, scratch areas). Treatment is similar to the Northern fowl mite. Exzolt is approved for use in pullets, breeders, and layers.
- Mites (*Knemidocoptes mutans*)
 - The scaly leg mite affects wild and domesticated fowl. These mites burrow into the skin of shanks and feet, resulting in depression, weight loss, leg deformity, and lameness. Treatment involves dipping the limbs (linseed oil, petroleum jelly, cooking oil) for at least 2 weeks and gentle washing of the affected area.

Multisystemic Diseases

- Colibacillosis (*Escherichia coli*)
 - *E. coli* can cause variably morbidity and mortality in all ages of poultry. It is frequently a secondary infection. Colibacillosis can manifest in several syndromes including airsacculitis, omphalitis, septicemia, salpingitis, and coligranulomas. Predisposing factors include concurrent disease, stress, and high levels of ammonia. Diagnosis is achieved by culture (and sensitivity to assist with treatment choices), necropsy, and supportive histopathology. Tetracyclines have been used as a treatment choice but efficacy can diminish with continued use. To help prevent colibacillosis, examine the flock for concurrent disease, evaluate sanitation and ventilation of the house, remove dead birds quickly, and avoid overcrowding.
- Fowl Cholera (*Pastuerella multocida*)
 - Fowl cholera can manifest as acute mortality or chronic, localized lesions. Common signalments include turkeys over 8 weeks of age, particularly males, and mature chickens and waterfowl. Sources of infection include contaminated

water, cannibalism, rodent and feline bites, and chronically infected birds. Diagnosis is achieved by culture (and sensitivity to assist with treatment choices), necropsy, and supportive histopathology. Samples to submit for culture include liver, spleen, cardiac blood, and bone marrow. Management and prevention of fowl cholera includes elimination of sources, all-in all-out practices, single species sites, timely removal of dead birds, and pest control.

- Mycobacteriosis (*M. avium* subsp. *avium* and *M. genavense*)
 - Avian TB can survive in soil for several months and the incubation period within the bird is lengthy. Infection occurs via inhalation or ingestion of fecal material or contaminated material. Clinically, infected birds exhibit chronic weight loss and unthriftiness. Diagnosis is via demonstration of acid-fast organisms in tissue. There is no efficacious treatment and the recommendation is to cull.
- Avian Influenza (Influenza A, orthomyxovirus)
 - Risks to backyard poultry include access to migratory waterfowl, bodies of water, or travel. Clinical signs vary depending on the strain and species of birds. Mild strains can manifest as snickering, coughing, rales, sneezing, and production losses. More pathogenic strains can see massive mortality overnight, neurologic signs, and cessation of egg production. Gross lesions include multisystemic hemorrhages, particularly of the proventricular mucosa, cecal tonsils, and shanks. These lesions are not specific to AI and can be seen in other virulent processes so proper sample collection, communication with state agencies, and selection of diagnostic tests is crucial. Diagnosis of AI is achieved by molecular testing on swabs (synthetic tip swabs) inoculated in BHI broth, sterile saline, or viral transport media. Choanal and tracheal swabs are utilized for gallinaceous birds and cloacal swabs are utilized for waterfowl.
- Newcastle Disease
 - Outbreaks of Newcastle disease are uncommon outside of California. Risks to poultry include international or unregulated interstate bird movement. Clinical signs vary depending on the pathotype, ranging from no signs, mild respiratory signs, neurologic signs and respiratory signs, and high mortality. Gross lesions, samples to take, communication of findings, and diagnostic tests are similar to that of AI.

Other Diseases

- Egg Bound
 - Chickens often present with a history of cessation of lay with difficulty walking (ex. Penguin stance). Causes include precocious onset of lay, limited exercise and obesity, excessively large eggs, and trauma to the reproductive tract. Fluids will help the chicken remain hydrated and assist in lubrication. Warm towels and massage can be performed on site, but excessively large eggs requires surgery.

- Egg Yolk Peritonitis
 - This is a common necropsy finding of backyard poultry that can be induced by rough handling, trauma, or startling. Irritation of the body cavity by free yolk will lead to inflammation that can be complicated by secondary bacterial infection, often *E. coli*. Prevention includes careful handling of egg-laying birds and avoiding startling the birds.
- Ovarian adenocarcinoma
 - This is a common neoplasm of older laying hens that results in emaciation and occasional abdominal distension due to ascites. On necropsy, beige firm nodules are disseminated throughout the parenchymal organs and serosal surfaces (carcinomatosis). Presumptive diagnosis is achieved by signalment, history and gross lesions with confirmation by histopathology. Differentials for these lesions include avian TB, Hjarre's disease (coligranulomas), or another neoplasm such as Marek's disease.