

# BIOSECURITY FOR BACKYARD POULTRY FLOCKS

## SIMPLE RULES TO PREVENT INTRODUCING DISEASE

BRIGETTA ALLEN HUGHES DVM, MAM – BREATHITT VETERINARY CENTER, MURRAY STATE UNIVERSITY, HOPKINSVILLE, KY

### INTRODUCTION :

**Biosecurity** refers to the measures taken to prevent introduction and stop the spread of harmful organisms to humans or animals. With the increased popularity of backyard and pet poultry flocks, challenges in diagnosing and treating avian diseases have been brought to the small and large animal veterinarians. The veterinarian accepting these cases is responsible for diagnosing the presence of reportable pathogens (eg. avian influenza, exotic Newcastle Disease) and reducing the incidence of zoonotic Salmonella infections related to poultry. Owners often develop a strong human animal bond with their poultry and may not have flock health as their top priority. Often they do not realize the “flock/herd” dynamics as they grow a flock, and they develop habits that place their flocks, human health, and the commercial poultry industry at risk. It is important for veterinarians to have resources for diagnostic assistance and assist their clients with biosecurity advice.

Commercial poultry has long utilized biosecurity programs to prevent the introduction of pathogens. In conjunction with preventing the introduction and spread of disease, biosecurity programs can also contain management techniques to improve environmental quality in poultry houses and decrease overall stress that can affect the body's immune/defense mechanisms. This presentation is designed to assist the non-avian veterinarian with biosecurity concepts, evaluating flock health and management, and provide resources for appropriate advice/information to improve flock health. Please note that each backyard flock situation is unique. Not every biosecurity or management suggestion will be applicable to every situation.

### STARTING POINT - KNOW YOUR FLOCK

- Proceed with caution when evaluating poultry for a disease. Each flock has many dynamics (age, sexes, when introduced, origin, housing, environmental quality, food and water quality, rodent/insect/wild bird access etc) that can influence which disease may be present and the severity of the effects on a bird. Resources and forms available at <https://breathitt.murraystate.edu/department/PoultryToolbox/PoultryToolBox.html>

### GUIDELINES

- Visit the flock. Nothing replaces a flock visit to evaluate the health of the flock and the living conditions. If visiting the flock is not possible, then request pictures or videos of what the owner is seeing as well as the housing conditions. This can lead to better discussions and assist your owner in preventing disease. Carefully gather information on the bird or flock to make appropriate recommendations from the suggestions below
- Collect a full evaluation. Include an assessment of the housing, food, water, and current biosecurity measures.
- Take a full history. Include not only the signalment, vaccination history, and problem description, but also a general evaluation of all factors that might influence disease. These might include introduction of new birds, all species of poultry kept, an evaluation of quarantine procedures, rodent/insect/wild bird or animal issues or control efforts, litter/floor condition, feed source (conditions of storage), water testing, air quality (ammonia, dust, freshness), and any known issues on neighboring farms.
- Examine and necropsy 5 birds - Seeing a single bird from a group may not give the diagnosis for the flock situation. When possible, examine and necropsy up to 5 birds that represent the problem. If working with a single or very small number of pet poultry this will not work. In these cases, utilize concepts from small animal evaluations including any visits with other birds, treats given, new experiences or changes in the environment, and illnesses in owners and other animals. Collect samples for diagnostic testing accordingly.

### PREVENT ENTRY OF DISEASE FROM INDIRECT CONTACT

#### People –

- No unnecessary visitors – use fences, gates, and locks to prevent unauthorized entry.
- Prevent introduction of disease on clothes or footwear.
  - Workers and necessary visitors should wear disposable or dedicated boots / coveralls.
  - Shoes, boots, hats and gloves worn off the farm should not enter the poultry house or yard.
  - Dedicated boots for each species, house, age group or division should be available.
- Provide a closed receptacle for disposable boots/coveralls.
- If you have other contact with birds (hunter, visiting farm, shows, sales) change clothes/boots and shower before caring for poultry. Allow 48 hours to pass before caring for your poultry if possible.
- Disinfectant foot baths may be used to enter poultry areas.
  - Footbaths must be kept clean of debris and changed daily to be effective.
  - Good reference for owners – <http://www.farmbiosecurity.com.au/biosecurity-basics-make-your-own-footbath/>
  - Common choices for disinfectants – see Table A below



#### Equipment –

- Equipment can be a fomite capable of spreading many diseases. It is common practice for small poultry producers to borrow necessary equipment for cleaning or raising poultry from other producers or neighbors. This can compromise even the best biosecurity efforts.
- Encourage a “no borrowing” policy.
- ASK “Is the risk worth the cost savings for borrowing this equipment?”
- INSPECT, DRY CLEAN, WET CLEAN, DISINFECT – And REINSPECT
  - If it is necessary to borrow, owners should inspect all equipment before bringing it to their farm.
  - Remove as much visible dirt as possible while the equipment is dry.
  - Look specifically for areas that are not easily cleaned – hinges, folded areas, covered areas, covered wheels, engine areas etc.
  - Dismantle these areas if possible to facilitate cleaning.
  - Use soap and warm water to fully remove the remaining dirt.
  - Disinfect using an appropriate disinfectant. Table A below.
  - After cleaning and disinfection of a borrowed item, REINSPECT it for areas that may have been missed.
- Clean and disinfect all equipment before entering the poultry raising area. See Table A below.
- Disinfectants should be newly purchased, freshly mixed according to label directions, and used on surfaces that are cleaned and organic material removed.
- Clean and disinfect waterers and feeders regularly. Waterers should be cleaned daily and feed pans weekly. All equipment should be cleaned between flocks.
- Having two sets of waterers and feeders allows one set to be cleaned and dried during routine use.
- Use separate equipment in the quarantine area.
- Ideally, use separate equipment with different ages, species, and houses. If this is not possible, clean and disinfect all equipment and allow it to dry completely before transferring to different groups. Allowing drying in the sun also destroys many pathogens.

### PREVENT DISEASE INTRODUCTION BY DIRECT CONTACT

#### Avians – Poultry -- New Additions and Mixed Flocks

- New poultry additions –**
  - Only buy new additions from a reputable source and have tested BEFORE entering your poultry house.
  - Establish a quarantine area for new additions.
    - NO DIRECT CONTACT OR SHARED AIRSPACE
    - NO SHARED EQUIPMENT
    - CARE FOR QUARANTINE BIRDS LAST EACH DAY
  - Quarantine area should be separate from the regular flock. Ideally, it is located in a separate building without sharing ventilation with the regular flock. Feed and waterers should not leave the quarantine area. The quarantine area would be entered with dedicated boots/coveralls and cared for last.
    - Quarantine time – Recommended 30 days
    - Beware – various chicken related websites will recommend less time. A reduced quarantine comes with risks of exposure to disease
  - Watch quarantine group closely for any indication of disease symptoms.
  - Samples can be collected and tested for common diseases.
    - Blood collected from the wing vein for Avian Influenza, MG, MS
    - Fecal samples for coccidiosis/roundworms
  - The Safer Way to Introduce Additions
    - New additions, or your current flock, may be carriers of a disease from which they have been exposed and recovered. While new additions may bring disease to your flock, your flock may also expose new additions to pathogens that the flock has recovered from in the past.
    - Instead of introducing the new birds to the flock, introduce one or more birds from the current flock to the group of new additions. This results in a controlled exposure of the disease and reduces losses, should there be a disease that either group is immune to but actively carrying.
  - Good reference for owners – <http://blog.mcmurrayhatchery.com/tags/flock-integration-series/>

#### Mixed flocks – just say NO

- ONE SPECIES --** Mixed species flocks are not recommended since some species can harbor pathogens and remain asymptomatic. This can result in disease being introduced to a susceptible species.
- ONE AGE ---** If multiple ages of birds are present on one farm, it is best to keep them in separate areas and provide care from youngest to oldest birds. Older birds may have been exposed and recovered from a disease that may be carried to younger groups.

#### Avians – Wild Birds

- Prevent wild birds from contacting your flock.
  - Waterfowl are the main carriers for Avian Influenza (AI). However, AI and other pathogens can be transmitted by a variety of birds.
- Keep doors closed and place wire mesh over all yards, windows and vents.
- Clean up feed spills
- Prevent nesting and feeding of wild birds in the flock house and yard. Eliminate areas where wild bird congregate by making these areas less attractive.

### Rodents

- Rodents harbor and disseminate many poultry pathogens.
- Rodent control includes sanitation, rodent-proof construction, population reduction, and preventative evaluations




#### 1. Sanitation

- Perimeter --- Plan a perimeter by adding a gravel or bare dirt perimeter of at least 3 feet .This is less attractive to rodents and discourages insects. Prevent vegetation, dead plant material or debris from accumulating near your poultry house.
- Feed --- Keep all feed in sealed containers. Clean up any spills.
- Do not allow any debris (eg. old boards, feed bags, trash bins, unused equipment) to be placed near the perimeter.

#### 2. Rodent Proof Construction

- Eliminate openings ¼ inch or greater. Use concrete or metal to cover or fill them.
- Eliminate unprotected end of corrugated metal siding using concrete or metal to block these completely.
- All feed and grain storage should be rodent proof.
- Rubber or vinyl weather stops are easily eaten through and should be avoided.

#### 3. Population Reduction – eliminate the rodents

- Capture traps and bait stations can be used to decrease rodent populations and eliminate new intruders.
- Capture traps are best used when there is a significant concern for accidental poisoning from rodenticides.
- Capture traps (A,B) should be baited with a material attractive to rodents (eg. peanut butter, oats and chocolate, cotton nesting material) and checked daily.
  - 
  - 
- Bait stations (C) should be checked daily until activity has decreased, then maintenance checked every week.
  - 
- Placement – Traps and stations should be placed near areas of rodent activity and where rodents would travel. Ideal areas are near feed storage, along wall/floor junctions (C), under cabinets, and in corners.
- Snap traps are the preferred capture trap– inexpensive, easy to find and use, can be placed inside a bait box to prevent accidental trapping of non-target species.
- Multiple capture traps capture mice in a humane fashion, but the mice then must be euthanized humanely or relocated and released. Glue boards result in distress. Each of these have humane and ethical concerns.

#### 4. Preventative evaluations -- daily to weekly checking for rodent activity in and around poultry areas and bait stations.

- Areas around feed storage should be checked daily for rodent activity.
- Bait stations should be checked weekly and baits replaced as needed.
- Rodent activity is highest in the spring and fall but can occur at any time.

### PRACTICES THAT PROMOTE HEALTHY FLOCKS AND PREVENT DISEASE

#### Monitor Health – Know the symptoms, proper testing, and your resources

- Each veterinarian and flock owner should recognize common symptoms and know when to seek diagnostic help. A checklist is included on the Evaluation Form posted below.
- Seek diagnostic assistance if there is increased mortality, symptoms of respiratory disease, or possible introduction of a pathogen.
- Know your resources
  - Due to the economic impact of avian diseases, many states have funding available for testing backyard flocks. The definition of a backyard flock can vary (up to 25,000 birds may still be defined as backyard in some states). Testing may include full necropsy and diagnostics when a disease problem is present. Call the office of your state veterinarian for complete information regarding your state and available funding.
  - State laboratories, universities/college of veterinary medicine, and extension services may have printed/online references, and may be able to provide you with assistance in diagnosis, collection of be samples, submission for diagnostic testing, and flock assessment. Scan their websites for resources and know your area poultry experts.
  - Routine surveillance testing is available at many state labs and is inexpensive.
  - When in doubt on sample collection and test requests, contact your state lab. Correct collection of proper samples can save time and money. Submitting several birds for necropsy that are exhibiting signs can be the best way get a correct diagnosis.

#### Poultry Flock Management – Items to evaluate

- Start by noting the cleanliness of the facility and presence of foot baths and use of dedicated or disposable boots.
  - Note the condition of the waterers and feed containers.
    - Waterers should be cleaned daily and feed pans weekly.
    - Waterers and feed pans should be placed at the height of the back of the birds. This height allows the birds to access the food and water but prevents litter from getting into the food and water. Nipple drinkers have become very popular and should be placed so that the bird can easily reach the tip (see picture above). Check nipple drinkers to be sure they are operating properly. There should be water drops released when the drinker tip is touched and no excessive leakage.
  - Note the species, ages, and sexes present.
- Note any odor associated with the housing environment.
  - Observe if the floor is covered in straw or litter. Evaluate the condition of the litter – dry, dusty, acceptable, damp, wet. Also note the amount of fecal material present and if the droppings are normal in amount and consistency. Normal droppings are formed into a mound and are greenish with a white cap. Poultry produce a cecal dropping about once daily that is pudding consistency and may be dark green in color.
- Quarantine any sick birds. Begin your diagnostic workup based on clinical signs. Be sure that quarantined poultry are cared for last and remain separated. Stress ways to prevent cross contamination.
- Discuss dead bird removal and disposal. Assure that dead birds are removed quickly and that appropriate burial or incineration occurs.



#### Prevent Zoonotic Disease

- An increase in the human cases of Salmonella have been linked to backyard poultry flocks as reported by the CDC. Other diseases may also be transmitted to humans through contact with poultry. The birds may be asymptomatic carriers. Owners of pet poultry may be affectionate with their birds which increases the chance for transmission of pathogens. Owners of backyard flocks need to be reminded of the dangers of Salmonella and its transmission especially to young children, the elderly, and those with reduced immune system function.
  - Wash hands before and after contact with poultry, eggs, and manure.
  - Do not eat or drink in the poultry house.
  - Do not kiss the chickens.
  - Do not keep chickens in your house, especially areas of food preparation.
  - Do not wash eggs in water. This forces bacteria into the egg through the pores of the shell. Use a fine brush or sandpaper to remove any dried manure.
  - Refrigerate eggs after collection.

Clifford J.R., Biosecurity Guide for Poultry and Bird Owners, April 2014, United States Department of Agriculture, Animal and Plant Health Inspection Service, Program Aid No. 1885.

Loven J., Williams R., Animal Damage Management, 2010, Purdue Extension ADM-3-W

McDonnell G., Russell, A.D., Antiseptics and Disinfectants : Activity, Action, and Resistance, Clinical Microbiology Reviews, 1999, 12:1, 147 – 1

Spickler, A. R., "Poultry Biosecurity Training Material. 2015. At <http://www.cfsph.iastate.edu/DiseasesInfo/factsheets.php>

Spickler, A. R., "General Prevention Practices Checklist for Poultry Producers." 2015. At [http://www.cfsph.iastate.edu/Animal\\_Response/English/pdf/Prevention%20Practices%20Poultry%20Checklist.pdf](http://www.cfsph.iastate.edu/Animal_Response/English/pdf/Prevention%20Practices%20Poultry%20Checklist.pdf)

Stringfellow K., Anderson P., Caldwell D., Lee J., Byrd J., McReynolds J., Carey J., Nisbet D., Farnell M.; Evaluation of disinfectants commonly used by the commercial poultry industry under simulated field conditions. *Poult Sci* 2009; 88 (6): 1151-1155. doi: 10.3382/ps.2008-00455

Table A* Disinfectant Use Chart		
Class of Disinfectant	Advantages	Disadvantages
Quaternary Ammonium (Germex, Virex, Pine sol, Fantastik)	Odorless, non-irritating May be used on skin and hard surfaces Detergent action; deodorizing Bacteriocidal, Antiviral on enveloped viruses only; Sporastatic	Longer contact time with organic debris – 10 minutes Can be inactivated by some soap residues Not effective on Mycobacterium
Oxidizing Agents (H2O2)	Environmentally safe Bacteriocidal, Virocidal/Fungicidal, Sporocidal at higher concentration (10-30%) and longer contact time Good surface cleaner at 7.5% concentration	Affects dyes/color – results in whitening effect
Phenols (Lysol, Tek-trol, Environ)	Bacteriocidal, antiviral, antifungal, More effective than other classes in presence of organic material	Pine tar odor Water will appear milky
Chlorhexidine (Nolvasan)	Bacteriocidal Can be used on skin; non-irritating	Not sporocidal, variable effects on viruses Not effective on Mycobacterium Activity reduced by organic matter Activity reduced with pH alteration
Iodophors (Betadine)	Rapid acting; broad spectrum 1 minute contact time; may be used on skin	Staining Hypersensitivity reactions can occur
Chlorine releasing agents – eg. Sodium Hypochlorite (Bleach)	Inexpensive; Bacteriocidal, virucidal, Sporocidal (at higher concentration) Effective in organic matter (higher concentration may be needed). Recommended concentrations vary 10% to 25% solutions (1 part bleach to 4-10 parts water) 30 second contact time	Irritating to skin / corrosive to metal with long term exposure Affects dyes/colors – results in whitening effect

\*Follow all label directions and use PPE when mixing or using any disinfectant.