

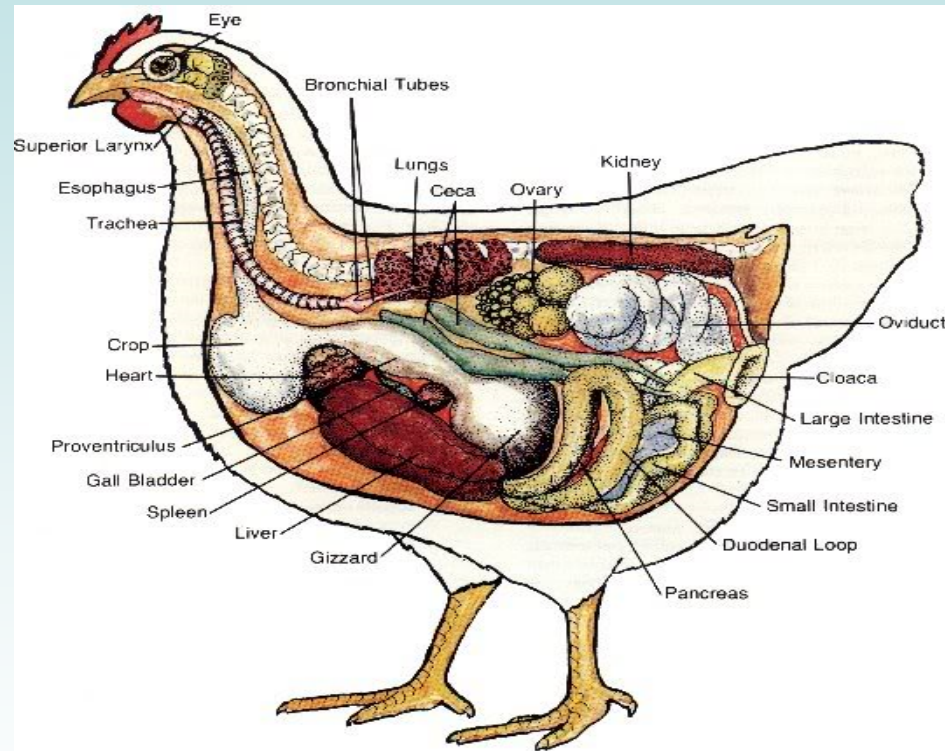
**Washington State
Department of Agriculture
Avian Health Program**

Chickens 101 Training Course

The goal of this course is to provide you with a basic understanding of poultry.



Anatomy and Physiology of Poultry



Birds vs. Mammal

- Birds:
 - Feathers instead of fur
 - No teeth
 - Lay eggs
 - Float and fly
 - Excrete waste through one orifice only



Photo by Kimberly Engelkes



Anatomy vs. Physiology

- Anatomy: The science and structure of animals
- Physiology: The science dealing with how an organism functions



Body Systems of Poultry

- Below are a few body systems of poultry:
 - Integumentary
 - Respiratory
 - Skeletal
 - Digestive

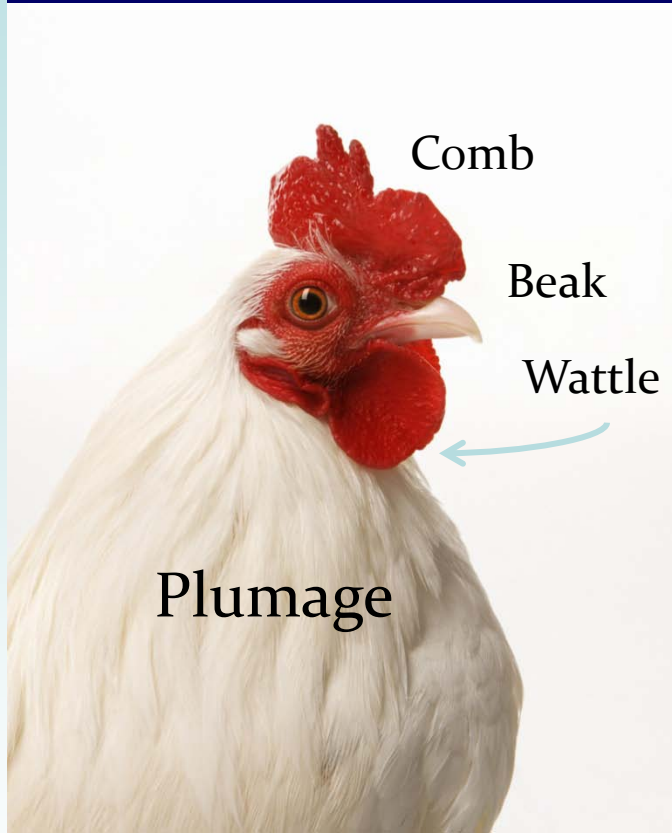


Integumentary System

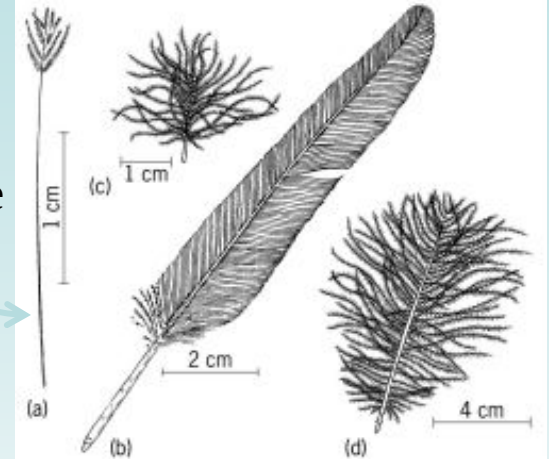
- The skin, feathers and beak
 - Protect the bird from external harm
- Skin
 - Plumage: outer covering of the bird's body
 - Feather, scales and filoplumes
 - Filoplumes: hair-like structures at the base of the feathers
 - Wattle: Red (usually) growth under the beak, works with the comb, growth located on top of their head
 - Wattle and comb circulate blood to regulate body temperature
 - The size of the comb is an indicator of the level of testosterone.
 - » Large comb = more testosterone present



Integumentary System



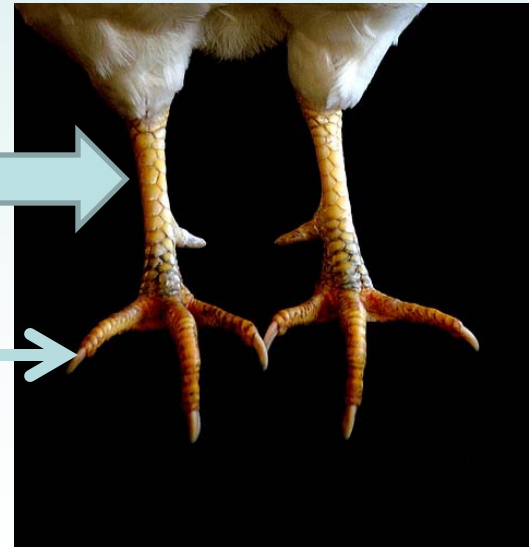
Filoplume



Scales



Nails



Scale and Plumage

- Scales
 - Located on feet and legs
- Plumage
 - Protects against cuts and bruises
 - Helps regulate body temperature
 - This is important because birds do not have sweat glands



Respiratory System

- Unlike mammals, birds lack a diaphragm to inflate and deflate the lungs
 - Birds have air sacs located in their neck and body cavity that inflate their lungs
 - Gas exchange occurs in the lungs and the air sacs function to move air in and out of the respiratory system
- Nares: Nostrils located on their beak



Skeletal System

- **Pneumatic (hollow) Bones**
 - Connect with respiratory system
 - Light bones allow for flight
- **Medullary Bone**
 - Contain a high amount of calcium
 - Calcium is stored in the bones to assist with producing the shell of the egg
- **Fused Bones**
 - Bones in the feet are fused
 - Causes birds to walk upright
 - Bones in the back are fused for flight

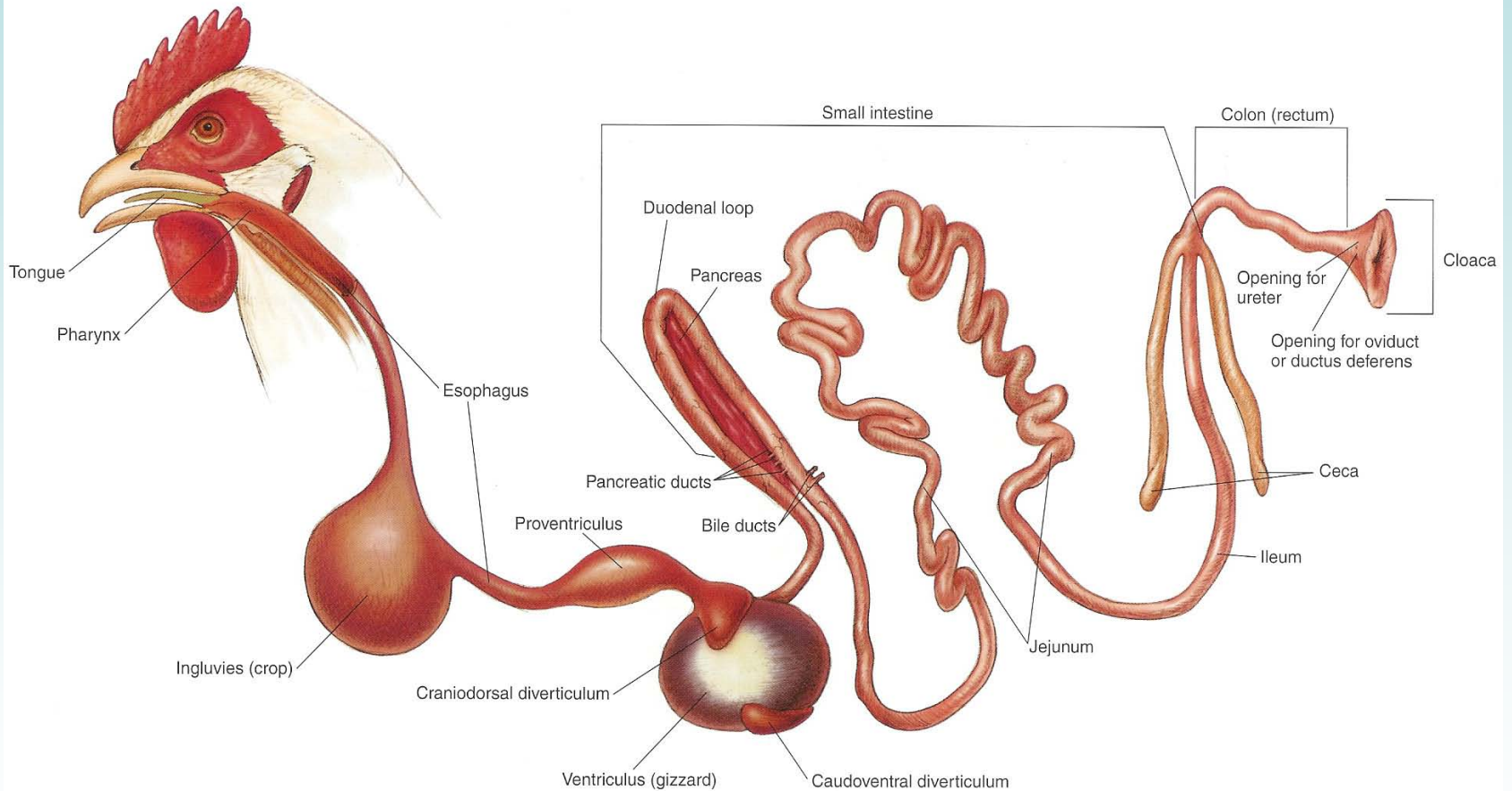


Digestive System

- **Mouth**
 - Tongue
 - Beak
 - Taste buds
- **Esophagus**
 - Flexible tube that connects the mouth to the crop
- **Crop**
 - Moistens and temporary storage of food
- **Proventriculus**
 - Stomach
 - Uses acids to breakdown food
- **Gizzard**
 - Grinds up food particles
- **Small intestines (3 sections)**
 - Duodenum
 - Ileum
 - Jejunum
 - Absorbs nutrients from food
- **Ceca**
 - Ferments left over food and absorbs water
- **Colon (large intestine)**
 - Absorbs water
- **Cloaca**
 - Expels feces and urine through the vent



Digestive System



Commercial Broiler Breeds

- Broiler
 - Hybrids or combinations of different breeds
 - Developed for specific characteristics
 - Grow faster and larger
 - Large breast meat yield
 - More efficient feed conversion
 - More disease resistance
 - Used by commercial broiler producing companies
 - Weakness: Do not lay as many eggs as layer breeds



Commercial Broiler Breeds

- Cornish Cross
 - White Cornish x White Plymouth Rock
 - Reach 4 - 5lbs in 6 weeks
 - Reach 6 - 10lbs in 8 - 12 weeks
 - White Cornish
 - Broad and meaty
 - White Plymouth Rock
 - Docile and good dual purpose breed (layer and broiler)



Commercial Broiler Breeds



Cornish Hen



Cornish Cross



White Plymouth Rock



Commercial Layer Breeds

- Layer
 - Genetically selected for high egg production
 - Small bodied birds
 - Two types
 - Birds that lay white eggs and birds that lay brown eggs
 - White ear lobes = White eggs
 - Red ear lobes = Brown eggs



Commercial Layer Breeds

- White Leghorns
 - Very good layers of white eggs
- Rhode Island Red
 - Very good layers of brown eggs



Examples of Non-Commercial Breeds

- Laying breeds
 - **Ameraucana:** Lays blue eggs
 - **Araucana:** Lays blue to bluish green eggs
 - **Maran:** Lays large dark brown eggs
 - Dual purpose bird
 - **Plymouth Rock:** Dual purpose bird
 - **Welsummer:** Lays dark, deep red eggs
- Meat breeds
 - **Brahma:** One of the largest breeds, good winter layer
 - **Delaware:** Good for small scale operations
 - **Jersey Giant:** Good disposition for backyard flocks
 - **Orpington:** Good dual purpose bird
 - **Wyandotte:** Good dual purpose bird, and does well in the cold



Examples of Non-Commercial Breeds

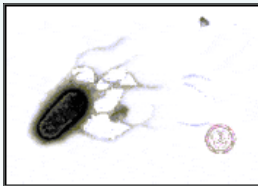
- Ornamental breeds
 - **Cochin:** Good winter layer and popular show bird
 - **Langshan:** Good dual purpose bird that lays brown eggs
 - **Polish:** A favorite as a pet chicken, and known for its topknot of feathers
 - **Silkie:** Unique looking, ideal as a pet chicken, and excellent broody hen



Pathogens

- Bacteria

- Salmonella Pullorum
- Mycoplasma Gallisepticum
- Botulism



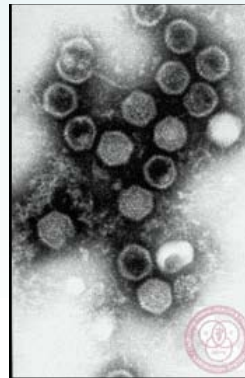
- Fungi

- Aspergillosis



- Viruses

- Avian Influenza
- Fowl Pox
- Infectious Bronchitis
- Infectious Bursal Disease



Pathogens

– Parasites

- Internal

- Worms

- » Round Worms

- Protozoa

- » Coccidia

- External

- Lice

- Mites



Salmonella Pullorum

- **Background**

- Infections occur in chickens, turkeys, and game birds
- Spread through parent to chick

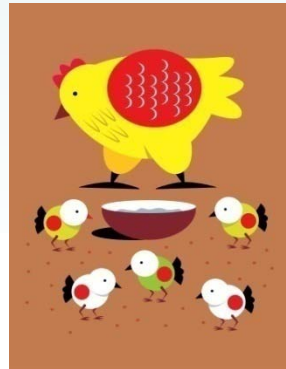
- **Symptoms**

- Characterized by white diarrhea & high mortality rate in birds

- Sick birds are sleepy and weak
- Chicks huddle near heat source
- Chicks that survive become carriers

- **Prevention**

- Purchase birds and hatching eggs from National Poultry Improvement Plan (NPIP) participants



Mycoplasma Gallisepticum(MG)

- **Background**

- Affects primarily chickens and turkeys, but can effect game birds and waterfowl
- Can be transmitted through the egg
 - Can be coughed into the air, contaminating feed, water & the environment
 - Infection my be dormant until the birds are stressed

- **Symptoms**

- Coughing
- Sneezing
- Nose and eye discharge
- Drop in egg production and consumption of food

- **Prevention**

- Purchase birds and hatching eggs from MG-free breeders (usually NPIP participants)



Botulism

- **Background**

- Caused by ingesting the toxins of *Clostridium botulism*
- *C. botulism* can be found in dead poultry, and rotting feed and food

- **Symptoms**

- Symptoms occur within a few hours to a few days
- Drowsiness
- Weakness

- Loss of control of legs, wings, neck
- Ruffled feathers
- Diarrhea (broilers)

- **Prevention**

- Prevent access to *C. botulism*
- Dispose of dead birds properly
- Do not feed birds spoiled food or feed



Aspergillosis

- **Background**

- Occurs in chickens, turkeys and game birds
- Chicks and poults may become infected during hatching
 - Due to inhaling spores from contaminated machines or litter
- In older birds, infection may be caused primarily by inhalation of contaminated dust

- **Symptoms**

- Gasping

- Accelerated and labored breathing
- Diarrhea
- Anorexia
- Dehydration
- Increased thirst
- High mortality

- **Prevention**

- Keep feed and litter dry so mold doesn't grow
- Clean out feeders regularly
- Avoid wet litter under the feeders and waterers
- Provide good ventilation in the poultry house



Avian Influenza (AI)

- **Background**

- 2 types of AI
 - Low-Path
 - High-Path
- Low-path AI is commonly found in wild waterfowl
- AI viruses are further divided into 15 hemagglutinin (H1-15) and 9 neuraminidase (N1-9) subtypes
- Most AI viruses (H1-15 subtypes) are of LP
 - However, some H5 and H7 subtypes can mutate into high-path in domestic chickens, turkeys, and game birds

- **Symptoms**

- Low-Path
 - Coughing
 - Sneezing
 - Depression
 - Inflammation of the sinuses
 - Nasal and eye discharge
 - Decrease egg production
- High-Path
 - Sudden mortality
 - Mortality can reach up to 100%
 - Respiratory signs may be present, but not always
 - Bluish wattle and comb
 - Discoloration of feet and legs
 - Blood-tinged mouth and nose discharges.



Avian Influenza (AI)

- **Prevention**

- Keep wild waterfowl away from your birds
- Separate the species of birds (i.e. separate the chickens from the ducks)
- Clean and disinfect equipment that has been used around other birds
- Have your birds routinely tested for AI
- Purchase birds from NPIP AI Clean flocks

- Separate new birds from your flock for at least 3 weeks



Photo by Joan McClenny



Fowl Pox

- **Background**

- Slow spreading virus
- Affects chickens, turkeys and other species of birds
- Can be transmitted through mosquitoes
- Two forms of Fowl Pox
 - Cutaneous
 - Diphtheritic

- **Symptoms**

- Cutaneous
 - Mild reduction in weight gain

- Temporary loss of egg production
- Lesions on the head, neck, legs and feet
- Low mortality
- Diphtheritic
 - Lesions in the upper respiratory system, digestive tract, nasal cavity
 - May lead to nasal or eye discharge
 - Low mortality

- **Prevention**

- Fowl Pox vaccination



Infectious Bronchitis (IB)

- **Background**

- A virus that occurs in chickens
- Rapidly spreads and highly contagious
- Spread through respiratory discharge and
 - Airborne droplets
 - Ingestion of contaminated feed and water

- **Symptoms**

- Chicks
 - Coughing
 - Sneezing

- Nasal discharge
- Weakness
- Depression
- Huddling near heat source

- Adult birds

- Coughing
- Sneezing
- Drop in egg production
- Soft-shelled or misshapen eggs

- **Prevention**

- Vaccines can be used



Infectious Bursal Disease (IBD)

- **Background**

- Occurs primarily in chickens
- Clinical signs and mortality are more severe in birds 3-6 weeks old
- Birds less than 3 weeks old do not show symptoms
- Shed in feces

- **Symptoms**

- Tremors or unsteadiness
- Depression
- Anorexia
- Ruffled feathers
- A droopy appearance
- Diarrhea
- Dehydration
- Vent pecking
- Low mortality

- **Prevention**

- Vaccines are available



Roundworms

- **Background**

- There are many different types of roundworms that can infect poultry
- Younger birds are more likely to become ill
- But can affect birds of any age
- Spread through feces
- Earthworms are common carriers of some roundworms

- **Symptoms**

- Thin
- Poor feather quality
- Pale inside of mouth
- Diarrhea or droppings pasted to their feathers near their vent
- Birds can die from severe infections
- If one or two birds are showing signs of roundworm, then the whole flock should be treated

- **Prevention**

- Use feeders and waterers designed to minimize contamination



Round Worms

- Don't allow birds to eat off of the ground
- Use deep litter in the coop so the birds do not eat feces
- Clean out coop frequently to remove feces

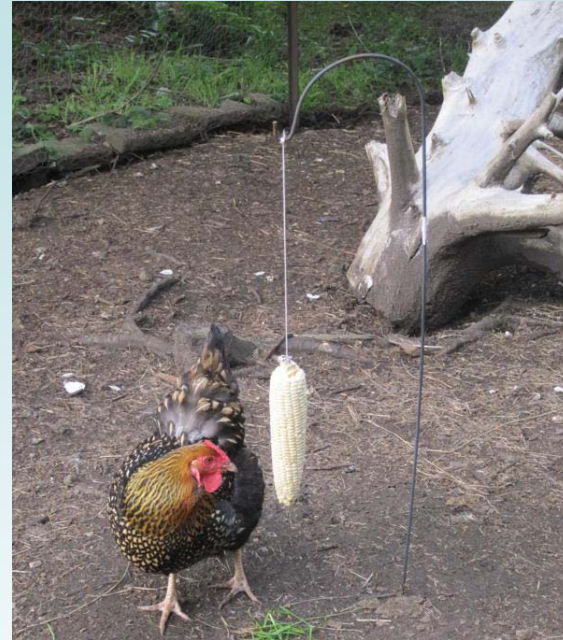


Photo by Sue Young



Coccidia

- **Background**

- Protozoal disease of poultry
- Caused by the protozoa *Eimeria*
- 9 species of *Eimeria* in chickens & 7 in turkeys
- Wide range of symptoms depending on the type of *Eimeria*
- Shed in feces which can contaminate feed, water, dust, soil and litter

- **Symptoms**

- Diarrhea (may have mucous or blood present)

- Inflammation of the small intestines
- Decreased growth rate
- Decreased egg production
- Dehydration
- Listlessness
- Weakness

- **Prevention**

- Purchase feed with Anticoccidial Compounds
 - Does not affect all types of *Eimeria*
- Vaccines are available



Lice

- **Background**

- There are over 40 species of lice that are specific to domestic poultry
- Examine the vent area, underside of the wings, the head, and legs to locate the lice
- Most lice are straw-colored

- **Prevention**

- Pesticide treatments
 - Use a treatment that is approved for use on birds
- Lice do not live in the environment, so remove infected feathers from the premises
- Inspect birds on a monthly or bi-weekly basis



Mites

- **Background**

- Mites feed on blood, feathers, skin, or scales
- Some mites are known or suspected of causing other diseases
- There are many different types of mites that affect poultry
- A few are:
 - Chicken Mite-Red Mite
 - Can cause anemia and death (especially in young birds)
 - Northern Fowl Mite
 - Heavy infestations appear as blackened feathers
 - After handling the bird, the mites may transfer to humans

- Depluming Mites

- Live on feathers or in the quills
- Resulting in loss of feathers, causing inability to regulate temperature

- Scaly Leg Mites

- Affected skin becomes thickened and crusty
- Without treatment the bird can become crippled.

- **Prevention**

- Insecticides can be used
 - Powders, sprays or dusts



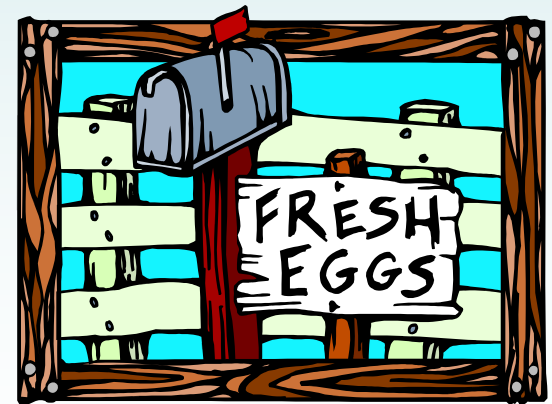
Preventing Disease on the Farm

- Biosecurity is the main way of preventing the introduction of diseases onto your farm
 - Biosecurity reduces the risk of pathogens from forming, which prevents the spread of diseases from one flock to another
 - Preventing illness in birds and other animals, is very similar to preventing illness in humans
 - Good hygiene is imperative



Benefits of Biosecurity

- Biosecurity reduces the number of pathogens on a farm
- Biosecurity also :
 - Increases productivity and production
 - Decreases the use of medication (antibiotics)
 - Enhances the value of the flock



Biosecurity Steps

- Keep your birds in a protected area
 - Keep them fenced in to prevent animals and people from entering the pen
 - A hard roof or tarp will prevent wild birds from entering the pen
 - Keep wild waterfowl droppings out of the coop
- Fresh water should be available at all times
 - Nipple drinkers or rabbit type drinkers reduce the spread of disease



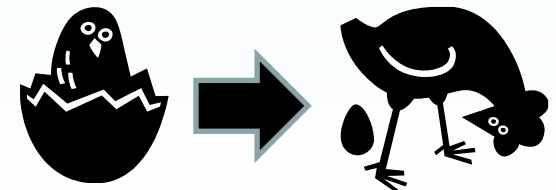
Biosecurity Steps

- When visitors visit your farm, provide them with boots or disposable booties
 - This will prevent the transmission of disease on your farm
 - Clean and disinfect the boots when they leave and dispose of disposable booties
- Do not let people that own birds enter your bird area.



Biosecurity Steps

- Clean and sanitize equipment and supplies
 - Sanitizing equipment and supplies reduces pathogens
 - This is especially important when vehicles, equipment or supplies have been near other birds (i.e. fairs, auctions, etc.)
- Wear coveralls or special clothing when working with your birds.
 - Clean your clothes after working with your birds
- Work from youngest to oldest birds
 - Young birds are highly susceptible of being infected with a pathogen



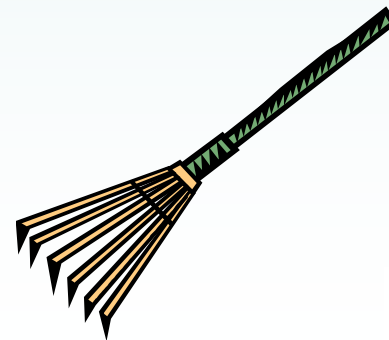
Biosecurity Steps

- Eliminate excess trees, grass, and debris around the chicken pen
 - These items can harbor rodents and other animals that can spread disease in your flock, or harm your birds
 - Control rodents in order to reduce the spread of disease in your flock
- Keep feed in a sealed container
 - Keeping feed away from rodents and other birds is essential when trying to keep your flock healthy



Biosecurity Steps

- Stir or rake bedding (litter) often so manure is evenly spread throughout and moisture is absorbed
 - This will reduce flies and odors
- Sick and dying birds should be separated from the flock immediately
- Thoroughly clean and disinfect poultry housing between flocks to ensure that there aren't pathogens present



Report a Sick Bird

Contact the WSDA Avian Health Program if
your birds are sick

1-800-606-3056

lbadoe@agr.wa.gov

Or

Contact your local veterinarian



Helpful Contacts

Dr. Lyndon Badcoe (WSDA)

Avian Health Veterinarian

(360) 725-5763

lbadcoe@agr.wa.gov

WSU Avian Health Laboratory

(253) 445-4537



References

- Slides were adapted from the following resources:
 - The Poultry and Egg Institute “Poultry & Egg Production Curriculum”
 - <http://www.poultryegginstitute.org/training/index.cfm>
 - Merck Veterinary Manual
 - <http://www.merckvetmanual.com>
 - Roundworms in Poultry - Dr. Jeanne Marie Smith
 - <http://animalscience.ucdavis.edu/phi/PHI/ROUNDWORMS%20PHI%20Handout%20from%20Dr.%20Smith.pdf>

