

On-Farm *Salmonella* Control Measures For  
Layers

# Pest Control

# Rodents And Other Animals

- All animals, including birds and reptiles, can carry *Salmonella* spp.
- Control of *Salmonella* spp. from mammals such as cats, dogs, livestock and humans is relatively simple
- Keep livestock penned away from houses
- Do not keep cats and dogs on farm



# Human Control Measures

- Provide proper restroom facilities for workers
- Encourage hand washing
- Use of soap and water helps prevent transmission from workers to eggs



# Rodents

## Norway Rats

- Occupy 20' – 300' home range
- One female produces 48 – 144 offspring a year
- Burrow openings: 2" – 4" wide
- Nocturnal

## House Mice

- Occupy 9' – 30' home range
- One female produces 15 – 121 offspring a year
- Burrow openings: 1" – 2" wide
- Nocturnal, but may be seen in daylight

# Rodents

- Perpetuate on-farm *Salmonella* spp. problems
- Hard to keep out of buildings due to their size
- *Salmonella typhimurium* was first discovered from cecum of a mouse
  - *Typhi* – Latin for ceca
  - *Murium* – Latin for mouse
- *Salmonella* strains can become more virulent for birds after infecting mice

# Rodents

- As few as 15 *Salmonella* organisms may result in the infection of a mouse
- An infected mouse may excrete 1,000 *Salmonella* bacteria per dropping
- Mice do not have large roaming territory, so infection may remain restricted to one house

# Rodents

- Pregnant mice may infect their babies
- Infected mice can become carriers for months
- Two months after infection, droppings may still contain low numbers of *Salmonella* spp.
- Carriers can infect layers when droppings mix with feed

# Rodents

- Rodents are attracted by feed, warmth, water and hiding places
- Steps needed to limit a rodent population when feed, warmth and water are present
  - Clean up spilled feed or broken eggs
  - Area under tanks and feeders should be kept clean





# Rodents

- Establish 10' area around buildings with no vegetation
- Use 3'-wide section of crushed rock
- Do not store old equipment in buildings
- Move any debris piles 150' from poultry buildings



Weeds should be removed from side of this building

# Rodents

- Rodent reduction requires daily effort
- Rodent traps and bait boxes should be placed parallel to walls



# Rodents

- Traps have added advantage of providing means of monitoring rodent control program
- Rodent indexing programs involve recording the number of rodents caught in traps over a time period (weekly, monthly)
  - Some Egg Quality Assurance Programs use a formula to adjust this number to a standard index
- Less quantitative methods of rodent monitoring include looking for droppings, gnawings, trails, holes and rodents themselves

# Rodents

- Active ingredients in baits generally fall into two categories
  - Anticoagulants
  - Neurotoxins
- Anticoagulants prevent clotting and lead to death through bleed-out
  - Most common baits
  - New generations require only single feeding
  - Useful for high populations

# Rodents

- Neurotoxins kill by poisoning the brain and central nervous system
- Alternate between an anticoagulant and a neurotoxin if using a rotation program
- Rotation may not be necessary as long as rodents continue to eat bait

# Rodents

- Use single-dose bait initially
- Possible to switch to cheaper multi-dose bait once control is achieved
- Check bait stations frequently
- Start with twice a week and then step down to weekly or monthly once control has been achieved
- Double amount of bait placed if all bait at a station has been consumed

# Weeds Around Buildings Provide Food And Habitat For Rodents And Birds



# Birds

- Birds carry *Salmonella* spp., Avian Influenza, Newcastle Disease and Northern Fowl Mites
- Active measures of bird control are covered by State and Federal laws
- Be sure to check applicable laws in your area prior to hunting or baiting
- Employees hunting game birds should have downtime requirements prior to returning to work




# Maintain Proper Drainage To Discourage Birds And Mosquitoes





# Birds

- Keep screens repaired and doors closed to exclude birds from buildings
  - Keep feed spills cleaned up to remove food sources that attract birds
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# Insects

- Flies are mechanical vectors of *Salmonella* spp.
- Fly control requires multi-pronged approach:
  - Eliminate breeding
  - Kill larva
  - Kill adults
- Controlling flies in-house involves controlling flies on entire farm
  - Any in-house manure management techniques also apply to on-farm manure storage areas

# Insects

- Flies breed in moist, organic material
- Rapidly drying manure disrupts breeding
- Eliminating water system leaks aids manure drying
- Frequent manure removal also disrupts fly lifecycle
- Balancing airflow through pit encourages manure drying



# Insects

- Lifecycle shortens as temperature increases
- During hotter months, manure needs more frequent removal
- Belt systems make frequent manure removal easier

# Insects

- Chemical control products available for fly larva
  - Kill beneficial insects as well
  - Not allowed in all regions
- Absence of fly breeding in houses and in manure piles demonstrates success of control programs

# Insects

- Adult control is achieved through use of traps and chemicals
- Pheromones and food represent two of the most common attractants

# Insects

- Chemical controls come in the form of sprays, fogs and dry bait
- Baits contain both poison and attractant
- Sprays and fogs need to have label indication that they kill flies
  - Must be labeled for use around chickens and eggs for human consumption



# Insects

- To measure fly activity hang dated 3" x 5" index cards and check for fly spotting
  - Cards should be checked and replaced on regular basis
- Alternate method is to count number of flies that congregate on a specific location
- When counts are performed:
  - Use same location
  - Count at same time of day