Big Red Biosecurity Program

MODULE 4

Biosecurity Principles and Practices

University of Nebraska Lincoln

Description of Module 4

- Module 4 reviews NPIP Biosecurity Principles 6 through 8 and provides examples of management practices and strategies to comply with these principles.
- Resources:
  - View the Official OSA Training on the NPIP Program Standards Biosecurity Principles Audit at: https://www.poultryimprovement.org/documents/BiosecurityPrinciplesAuditGuidelines.pdf

Biosecurity Principle 6 – Wild Birds, Rodents and Insects

Poultry operations should have control measures to prevent contact with and protect poultry from wild birds, their feces and their feathers as appropriate to the production system. These procedures should be reviewed further during periods of heightened risks of disease transmission. Control programs for rodents, insects, and other animals should be in place and documented.

Audit Guidelines—Wild Birds, Rodents and Insects

6.1. Are there control measures in the biosecurity program and/or site-specific biosecurity plan to prevent contact with and protect poultry from wild birds, their feces and their feathers as appropriate to the production system?

6.2. Does the biosecurity program and/or site-specific biosecurity plan contain control programs for rodents, insects, and other animals?

6.3. Are these programs documented?

6.3.1. Provide description of control programs and examples of the documentation [e.g., log sheets, rodent control company contracts, Best Management Practices (BMP) audits, maintenance records, etc.].

Biosecurity Principle – Wild Birds, Rodents and Insects

- Poultry operations should have control measures to prevent contact with and protect poultry from wild birds, their feces and feathers as appropriate to the production system.
- These procedures should be reviewed further during periods of heightened risks of disease transmission.
- Control programs for rodents, insects and other animals should be in place and documented.

Rodent Control

- Provide description of control programs and examples of the documentation [e.g., log sheets, rodent control company contracts, Best Management Practices (BMP) audits, maintenance records, etc.].

Pest Control for Rodents

Approach

- Determine management control strategy/plan
  - Integrated Pest Management (IPM)
    - Cultural
      - Sanitation, cleanliness, orderliness (e.g. feed spill clean up, feed storage, etc.)
      - Rodent proofing
    - Control methods
      - Physical – traps
      - Chemical – baits
    - Effective monitoring
      - Rodents learn and adapt
      - New methods and strategies should be evaluated and implemented
      - Visual signs
      - Rodent indexing – trapping over time

Pest Control for Rodents

Approach, cont.

- Determine associated problems
  - Environmental
    - Can fixing (cleaning up) environment solve problem?
    - What ultimately happens to the carcasses, baits, etc.?
    - Other
  - Health risks
    - To people (workers)
    - Consumer of products (i.e., accidental contamination/poisoning)
    - Animals–production, companion, wildlife, etc.
  - Public perceptions
    - “Rodent ridden facility”
  - Legal
  - Other
- Consider professional help/companies

Pest Control for Rodents—Physical Traps

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Pest Control for Rodents—Rodent Baits

Types classified by:

- Physical form
  - Blocks
  - Grain formulation
  - Pellets (pellet packets)
  - Dusts
  - Liquids
  - Soft baits
- Mechanism of action
  - Anticoagulants
  - Non-anticoagulants–nerve toxins, metabolic uncouplers, inorganic compounds
- Dose
  - Single dose (i.e., feedings)
  - Multiple dose

Pest Control for Rodents—Rodent Baits, cont.

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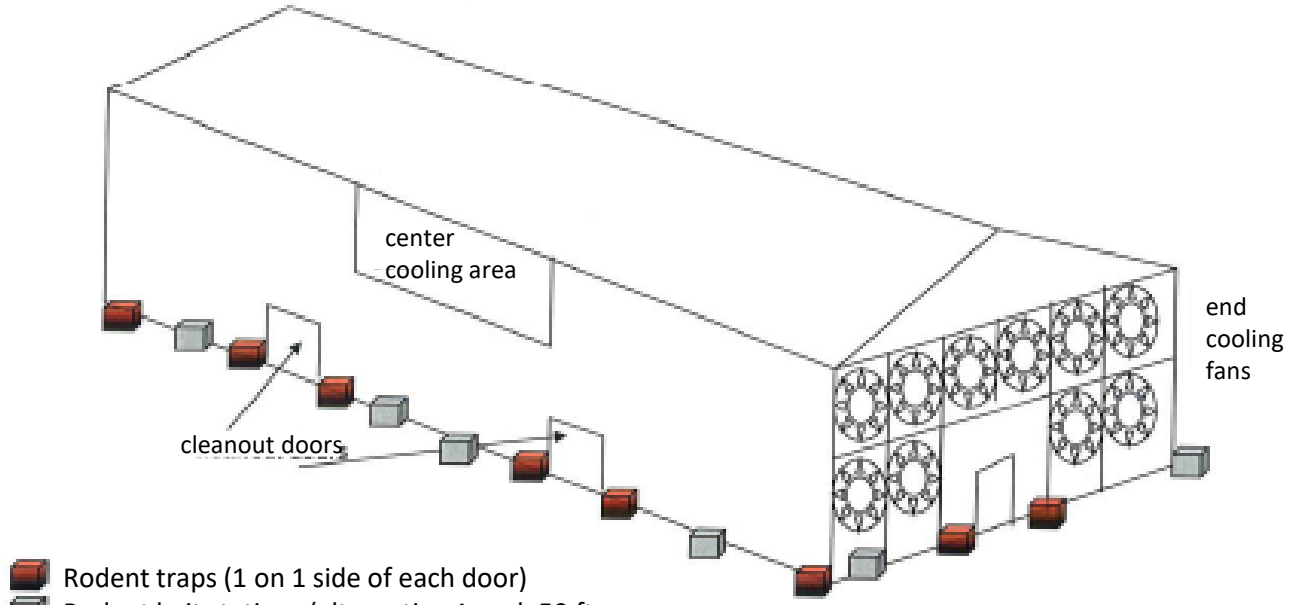
Considerations When Choosing Bait

- Is the bait approved for use in my situation?
  - Label should specify
- Are rodents consuming the bait?
- Are rodents dying after bait consumption?
- Does the active ingredient fit into IPM rotation?
- Does the bait fit IPM plan or need?
  - Long-term baiting
  - Short-term fast control

Rodent Control Devices
Typical 500 ft by 40 ft Table Egg High Rise House



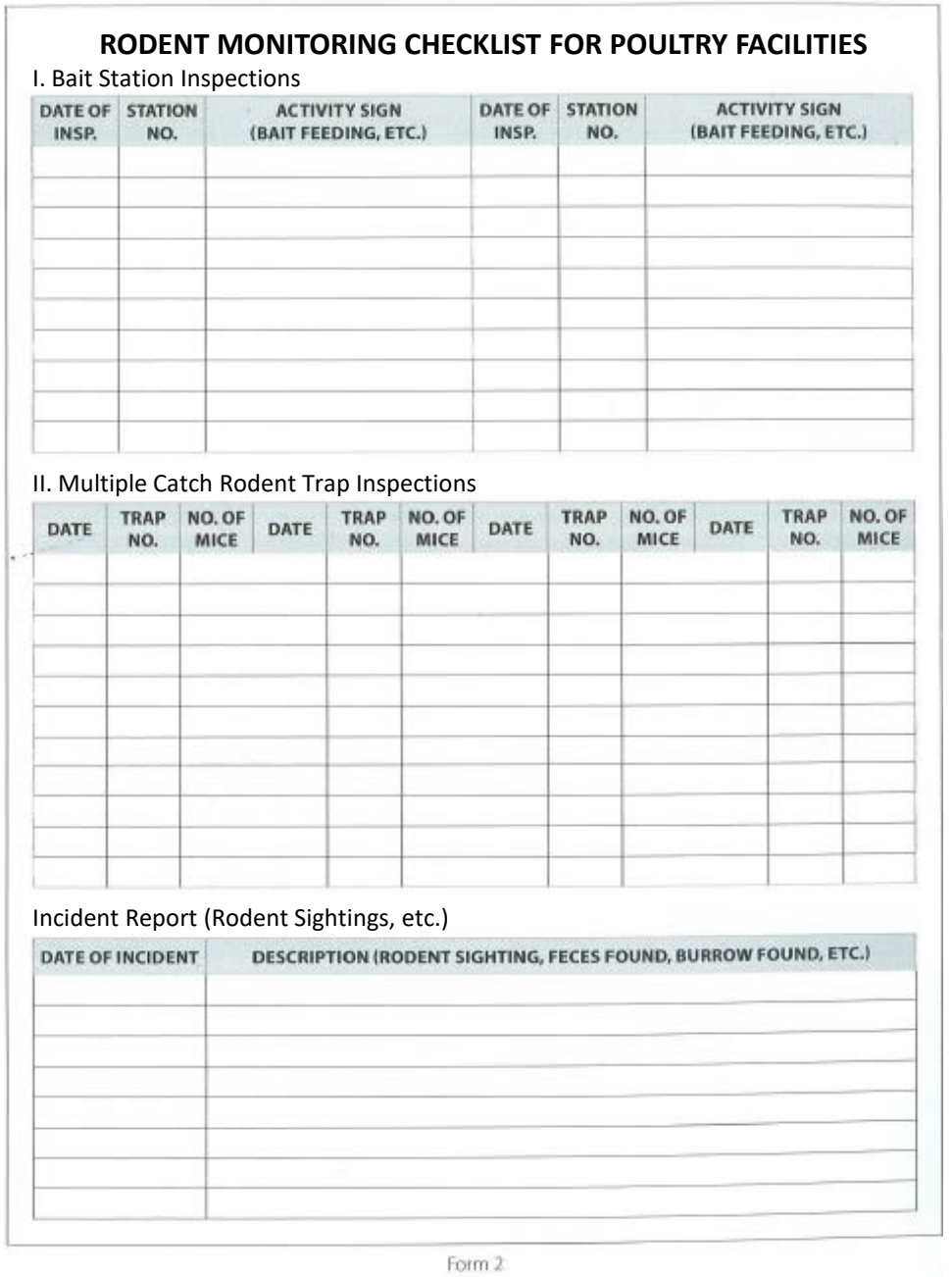
Rodent traps (1 on 1 side of each door)
Rodent bait stations (alternating 1 each 50 ft with traps on long walls)

Upstairs inside along walls, alternate 1 trap and 1 station each 50 ft. Include 1 trap and 1 station in each half section and water room as shown on the following view.

$$\text{Number of Rodents for Index} = \left(\frac{\text{Total number of mice caught in the area}}{\text{Number of functioning traps in area}} \right) \text{X } 12 \text{ X } 7 \text{ Number of Trapping Days}$$

The RI is based on the number of rodents found in 7 days per the following table:

NUMBER OF RODENTS CAUGHT IN 7 DAYS WITH 12 TRAPS	RODENT INDEX (RI)	RODENT ACTIVITY
0-10	1	Low
11-25	2	Moderate
26 or more	3	High



RODENT MONITORING CHECKLIST FOR POULTRY FACILITIES

I. Bait Station Inspections

DATE OF INSP.	STATION NO.	ACTIVITY SIGN (BAIT FEEDING, ETC.)	DATE OF INSP.	STATION NO.	ACTIVITY SIGN (BAIT FEEDING, ETC.)

II. Multiple Catch Rodent Trap Inspections

DATE	TRAP NO.	NO. OF MICE	DATE	TRAP NO.	NO. OF MICE	DATE	TRAP NO.	NO. OF MICE	DATE	TRAP NO.	NO. OF MICE

Incident Report (Rodent Sightings, etc.)

DATE OF INCIDENT	DESCRIPTION (RODENT SIGHTING, FECES FOUND, BURROW FOUND, ETC.)

Form 2

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Pest Control—Other Animals

Approach

- Determine the problem
  - Minor or major
  - Nuisance or threat
- Determine the biosecurity risk
- Determine the management control strategy/plan
- Determine associated problems
  - Environmental
  - Health risks
  - Public perceptions
  - Legal
  - Other

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Information Resources

- Local animal control
- State's Department of Natural Resources (DNR)
- Commercial pest control services
    - Commercially licensed hunters/trappers

Pest Control–Bugs

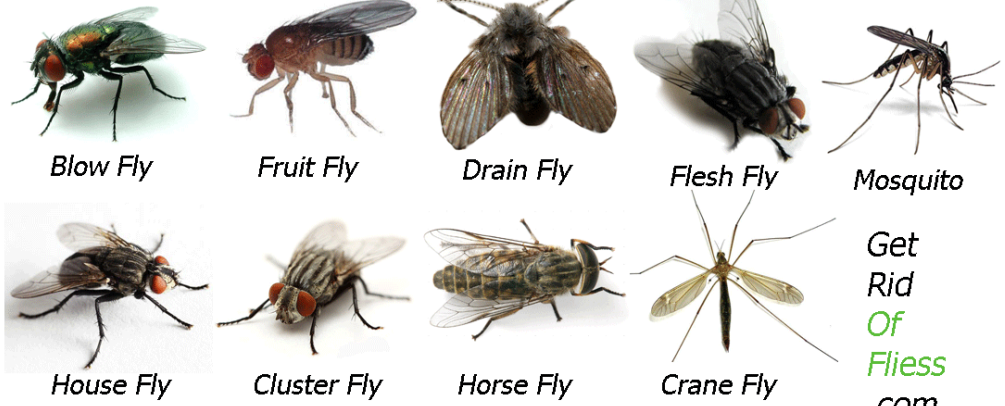
Approach

- Determine the problem / bug
  - Flies
  - Beetles, roaches
  - Mosquitoes
  - Ants
  - Other
- Determine the magnitude of problem
  - Minor or major
  - Nuisance or threat
- Determine the biosecurity risk
- Determine management control strategy/plan
- Determine associated problems
  - Environmental
  - Health risks
  - Public perceptions
  - Legal
  - Other

Pest Control—Determine Bug

Approach

- Determine the problem/bug
  - Flies
  - Beetles, roaches, crickets
  - Mosquitoes
  - Ants
  - Spiders
  - Other



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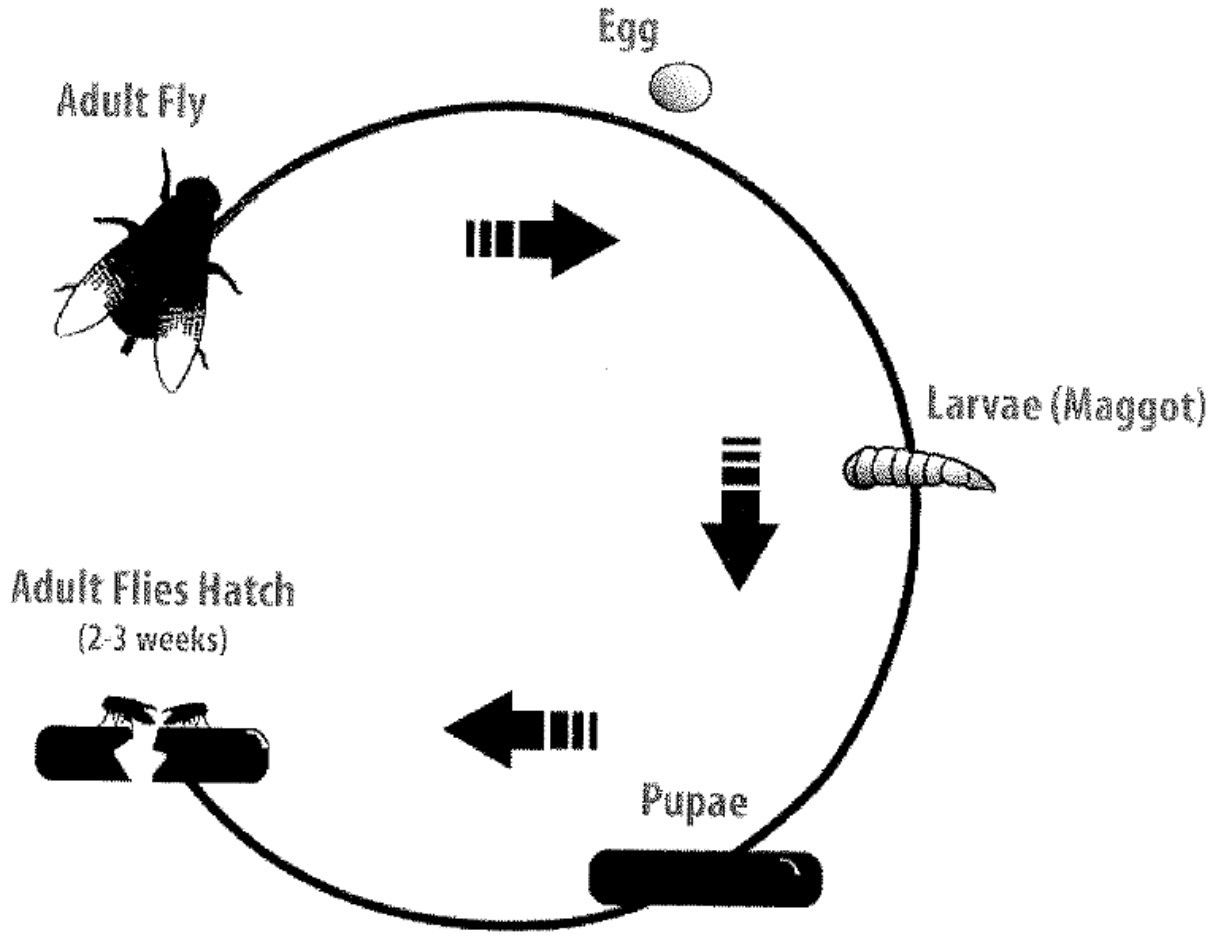
Housefly (Musca Domestica)

Caged layers, broiler/turkey breeder layers, and turkey finishing houses



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Pest Control—Bugs

Approach

- Determine the magnitude of problem
  - Minor or major
  - Nuisance or threat
- Determine the biosecurity risk
  - Disease transmission potential
    - Zoonotic
    - Public health
  - Food contamination/food safety
    - Public health
- Determine management control strategy/plan
  - Simple things/minor problems – anyone can manage
  - Complex/major problems – seek professional help
- Determine associated problems/risks
  - Health risks
  - Environmental
  - Damage to facilities
  - Public perceptions
  - Legal

Control Methods

- Chemical
  - Spray application
    - Host/animal (gels and foams)
      - Mosquito repellant
      - Sprays, gels, foams applied directly to animal
    - Facilities
    - Bedding
    - Manure
  - Mists, foggers, dusts
    - “Knock down” for immediate results
    - Personal Protective Equipment (PPE) may be needed
  - Pour-on/transdermal (e.g., flea/tick control)
  - Granules/baits
  - Feed through larvacides
- Electric bug zappers and traps
- Introduction of sterile animals (i.e. bugs) into the population
- Other

Key Points to Remember About Pest Control for Wild Birds, Rodents & Insects

Describe and Document

- Describe the control programs/procedures used
  - Who does what and how they do it
  - Document problems encountered and control/corrective measures taken
- Document the program
  - Document procedures (e.g., log sheets of when a procedure was done)
  - Document when program is reviewed
  - If commercial company, copy of their procedure and plan
- Written in biosecurity manual

Biosecurity Principle 7 — Equipment and Vehicles

The biosecurity plan should include provisions for procedures for cleaning, disinfection, or restriction of sharing of equipment where applicable. Vehicle access and traffic patterns should be defined in the site-specific biosecurity plan.

Audit Guidelines—Equipment and Vehicles

7.1. Does the biosecurity program and/or site-specific biosecurity plan include provisions for procedures for cleaning, disinfection, or restriction of sharing of equipment where applicable?

7.1.1. Supporting documentation (e.g., written instructions, signage, training videos, etc.) should be provided.

7.2. Are vehicle access and traffic patterns defined?

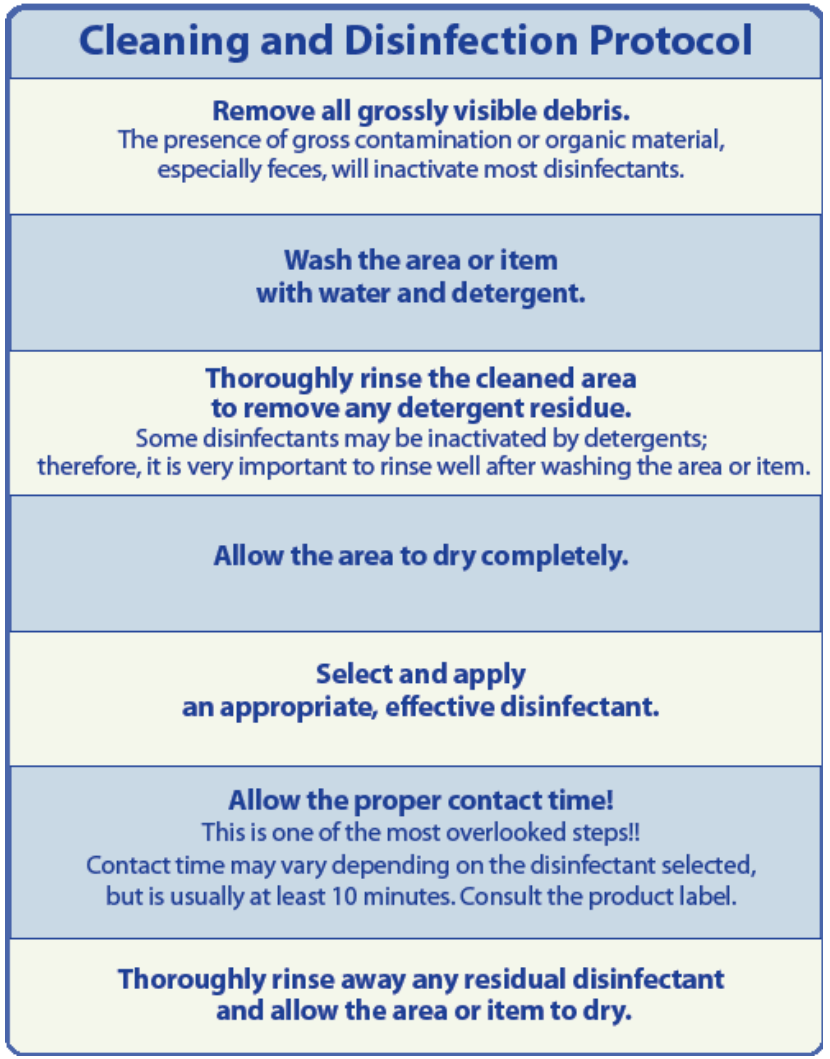
7.2.1. Provide a description of vehicle entry access and traffic patterns.

Sanitation and Disinfecting

- Cleaning is always first step
  - Remove debris, dirt, etc.
  - Organic material interferes with disinfection
- Disinfectant—chemicals used to inhibit or prevent growth of microbes on inanimate objects

Sanitize—reduces the number of harmful microbes to a safe level

Cleaning and Disinfection Protocol



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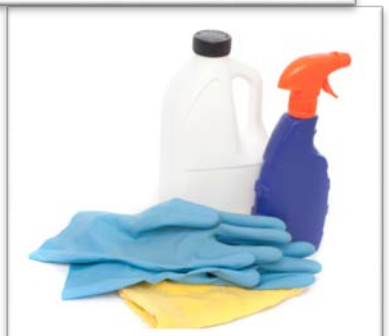
Cleaning and Disinfection



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Characteristics of Selected Disinfectants

Disinfectant Category	Alcohols	Aldehydes	Biguanides	Halogens: Hypochlorites	Halogens: Iodine Compounds	Oxidizing Agents	Phenols	Quaternary Ammonium Compounds (QAC)
Sample Trade Names	Ethyl alcohol Isopropyl alcohol	Formaldehyde Glutaraldehyde	Chlorhexidine Nolvasan® Virosan®	Bleach	Betadyne® Providone®	Hydrogen peroxide Peracetic acid Virkon S® Oxy-Sept 333®	One-Stroke Environ® Pheno-Tek II® Tek-Trol®	Roccal® DiQuat® D-256®
Mechanism of Action	•Precipitates proteins •Denatures lipids	•Denatures proteins •Alkylates nucleic acids	•Alters membrane permeability	•Denatures proteins	•Denatures proteins	•Denature proteins and lipids	• Denatures proteins • Alters cell wall permeability	• Denatures proteins • Binds phospholipids of cell membrane
Advantages	•Fast acting •Leaves no residue	•Broad spectrum	•Broad spectrum	•Broad spectrum •Short contact time •Inexpensive	•Stable in storage •Relatively safe	•Broad spectrum	• Good efficacy with organic material • Non-corrosive • Stable in storage	• Stable in storage • Non-irritating to skin • Effective at high temperatures and high pH (9-10)
Disadvantages	•Rapid evaporation •Flammable	•Carcinogenic •Mucous membranes and tissue irritation •Only use in well ventilated areas	•Only functions in limited pH range (5–7) •Toxic to fish (environmental concern)	•Inactivated by sunlight •Requires frequent application •Corrodes metals •Mucous membrane and tissue irritation	•Inactivated by QACs •Requires frequent application •Corrosive •Stains clothes and treated surfaces	•Damaging to some metals	• Can cause skin and eye irritation	
Precautions	Flammable	Carcinogenic		Never mix with acids; toxic chlorine gas will be released			May be toxic to animals, especially cats and pigs	
Vegetative Bacteria	Effective	Effective	Effective	Effective	Effective	Effective	Effective	YES—Gram Positive Limited—Gram Negative
Mycobacteria	Effective	Effective	Variable	Effective	Limited	Effective	Variable	Variable
Enveloped Viruses	Effective	Effective	Limited	Effective	Effective	Effective	Effective	Variable
Non-enveloped Viruses	Variable	Effective	Limited	Effective	Limited	Effective	Variable	Not Effective
Spores	Not Effective	Effective	Not Effective	Variable	Limited	Variable	Not Effective	Not Effective
Fungi	Effective	Effective	Limited	Effective	Effective	Variable	Variable	Variable
Efficacy with Organic Matter	Reduced	Reduced	?	Rapidly reduced	Rapidly reduced	Variable	Effective	Inactivated
Efficacy with Hard Water	?	Reduced	?	Effective	?	?	Effective	Inactivated
Efficacy with Soap/ Detergents	?	Reduced	Inactivated	Inactivated	Effective	?	Effective	Inactivated

For more information, see the "Disinfection 101" document at www.cfsph.iastate.edu

View larger image of chart at www.cfsph.iastate.edu/Disinfection/Assets/CharacteristicsSelectedDisinfectants.pdf

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? Information not found

Disclaimer: The use of trade names does not in any way signify endorsement of a particular product. For additional product names, please consult the most recent Compendium of Veterinary Products.

References: Linton AH, Hugo WB, Russel AD. Disinfection in Veterinary and Farm Practice. 1987. Blackwell Scientific Publications; Oxford, England; Quinn PJ, Markey BK. Disinfection and Disease Prevention in Veterinary Medicine, In: Block SS, ed., Disinfection, Sterilization and Preservation. 5th edition. 2001. Lippincott, Williams and Wilkins: Philadelphia.

Key Points to Remember About Equipment and Vehicles

Describe and Document

- Describe the procedures used for cleaning and sanitation
  - Who does what and how they do it
  - Where are the cleaning and disinfection procedures done
    - For vehicles show on a diagram or map entries, exits and traffic pattern
    - Signage may be helpful
- Document the program
  - Document procedures (e.g. log sheets of when a procedure was done)
  - Document when program is reviewed
  - If commercial company, copy of their procedure and plan
- Written in biosecurity manual

Biosecurity Principle 8 – Mortality Disposal

Mortality should be collected daily, stored and disposed in a manner that does not attract wild birds, rodents, insects, and other animals and minimizes the potential for cross-contamination from other facilities or between premises. It is recommended that dead bird disposal be on-site, if possible. Mortality disposal should be described in the site-specific biosecurity plan.

Audit Guidelines—Mortality Disposal

8.1. Is there a mortality disposal plan?

8.2. Does the mortality disposal plan reference the frequency of removal, storage of mortality, and pest control around mortality storage and disposal areas?

8.2.1. Provide a description of the mortality disposal plan and examples of documentation [e.g., mortality sheets, company contracts, Best Management Practices (BMP) audits, disposal records, etc.].

8.3. Does the mortality disposal plan address procedures for handling mortality disposal in a way that minimizes the potential for cross-contamination from other facilities or between premises?

8.3.1. Supporting documentation should be provided (e.g., written instructions, videos, etc.) for proper handling of mortality to minimize the potential of cross-contamination.

Mortality Disposal Plan

- Unacceptable plans:
  - “Our contractors are responsible for that–it’s in our contracts” – take a look at that portion of the contract –it should then address frequency of removal, storage and pest control.
  - Stating that contractors must comply with applicable regulations will usually not be satisfactory –most regulations target water quality and public health, not biosecurity.
- Has cross-contamination between facilities been considered? Any provisions for traffic routing or sanitation of equipment?

Disposal of Routine Mortalities

Animal tissue/mortalities

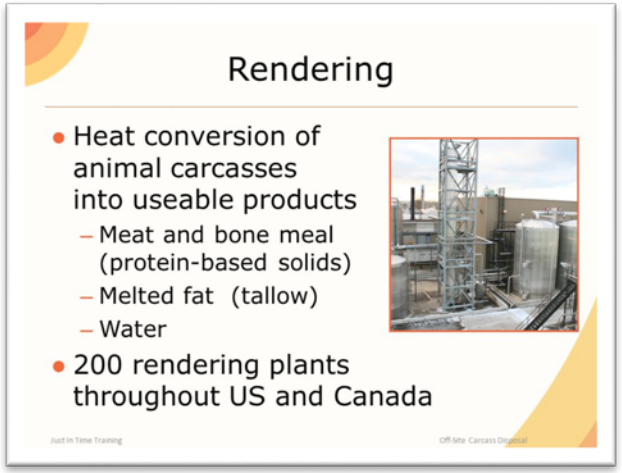
- Compost – may require a permit
  - Ample carbon source available
  - Available labor/equipment for turning and spreading compost
  - Available location
    - Location to minimize cross contamination with other production facilities
    - No risk to surface water
    - Land available for spreading finished product
  - Management key for biosecurity
    - Animals, insects, rodents must be considered and minimized as disease vectors
    - Weather conditions may contribute to challenges (e.g., snow, heavy rains, cold weather)
- Incineration – may require a permit
  - Smoke and odors should not be a nuisance/health risk to neighbors and workers
  - Frequency of operation and storage of mortalities prior to operation must be considered

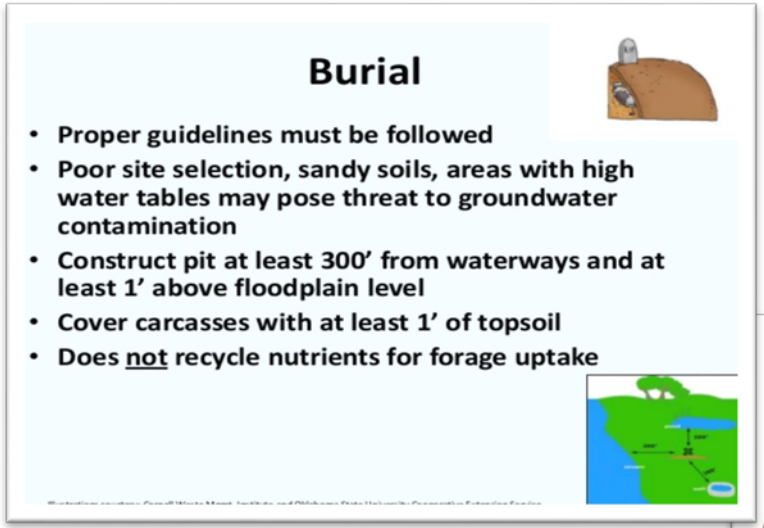
Disposal of Routine Mortalities

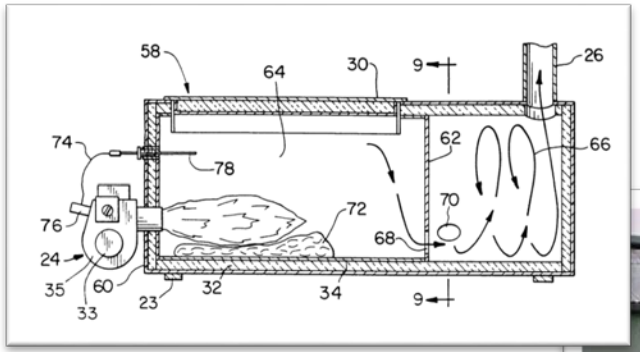
Animal tissue/mortalities

- Burial/landfill – may require a permit
  - Available labor and equipment
  - Available location
    - Location to minimize cross contamination with other production facilities
    - Deep fine textured soil works best
    - No risk to groundwater
- Rendering
  - Service is available and operates biosecurely
  - Carcass removed from facility in a biosecure way
  - Carcass storage located away from production facility (can access be achieved without entering PBA?)
  - Carcass storage is biosecure and screened from public view

Carcass Disposal Options







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Key Points to Remember About Mortality Disposal

Describe and Document

- Describe the procedures used for disposing of mortalities
  - How often are mortalities collected form barns/pens
  - Mortality charts/records
  - How often are mortalities disposed of
    - Incineration
    - Rendering pick-up
    - Compost turning and dispersion
  - Where and how are mortalities handled
    - A diagram or map indicating the disposal / storage site
    - Signage may be helpful
    - Considerations for animals, rodents, insects, etc.
- Document the program
  - Document procedures (e.g. log sheets of when a procedure was done)
  - Document when program is reviewed
  - If commercial company, copy of their procedure and plan
- Written in biosecurity manual

End of Module 4