

Plant Biocontainment

Responsible Official Workshop

May 26, 2021



Agenda

- 1. Regulation and Oversight**
- 2. Biosafety Levels**
- 3. Containment Strategies**
- 4. Management Practices**
- 5. Plan Information**
- 6. Checklist Review**



Select Agent Regulation



Regulations and Guidelines

- **APHIS Select Agent Regulations**

- 7 CFR 331.12

- **Guidelines: NIH Guidelines (BMBL)**

- Appendix P

- **A Practical Guide to Containment: Plant Biosafety in Research Greenhouses with Transgenic Plants and Microbes**

- <https://vtechworks.lib.vt.edu/handle/10919/78423>



Containment Strategies



Biological Safety

- **BSL2**

- Lab coat
- Eye protection
- Gloves

- **BSL3**

- Gowns (solid front)
- Eye protection
- Gloves



BSL-2	BSL-3
<ul style="list-style-type: none">• Protective laboratory coats, gowns, smocks, or uniforms must be worn while working with hazardous materials.• Eye and face protection (goggles, mask, face shield or other splatter guard) must be used for anticipated splashes or sprays of infectious or other hazardous materials when the microorganisms are handled outside the Biological Safety Cabinet (BSC) or physical containment device. Personnel who wear contact lenses in laboratories should also wear eye protection.• Gloves must be worn to protect hands from exposure to hazardous materials.• Eye, face and respiratory protection should be used	<ul style="list-style-type: none">• Protective laboratory clothing with a solid-front, such as tie-back or wrap-around gowns, scrub suits, or coveralls must be worn.• Eye and face protection (goggles, mask, face shield or other splash guard) must be used for anticipated splashes or sprays of infectious or other hazardous materials. [All procedures involving the manipulation of infectious materials must be conducted within a BSC, or other physical containment devices.] Personnel who wear contact lenses in laboratories must also wear eye protection.• Gloves must be worn to protect hands from exposure to hazardous materials.

Pathogen Dissemination in Containment

- **Inadvertent dissemination**

- Hitchhikers
- Breaking protocol
- Small intruders
- Wastewater
- Ventilation
- Cross contamination



Plant Lab Biocontainment

Know Your Pathogen



Physical Containment



Location



Plant Pathogen Transmission: Bacteria

- **Not airborne**
- **Moves via water**
- **Mechanically transmitted**
- **Infected seed or plant parts**
- **Soil**



Plant Pathogen Transmission: Fungi

- **Airborne**
- **Thick-Walled Spores**
- **Moves via water**
- **Mechanically transmitted**
- **Seed Borne**



Management Practices



Lab Biocontainment Practices

- **PPE**
- **HEPA**
- **Pest Management**
- **Effluent**
- **Movement from registered space**





Growth Chamber Biocontainment Practices

- Footwear
- Wastewater
- Soil
- Pest management
- Mechanical





Growth Chamber Advantages

- HEPA filtered
- Reduced foot traffic
- Equipment maintenance outside of containment area
- Interior is easy to clean
- Moveable



Greenhouse Biocontainment Practices

HEPA

PPE

Effluent

Plant Materials

Pest Management



Greenhouse Recommendations

Location

- Minimize risk to environment
 - Timing
- Consider climatic area
 - Wind Breaks
 - Sump Pumps
- Transport of agent
 - Procedures for pathogens

- Reinforced heavy frame
- Double-paneled glass
- BSL-3
 - Epoxy coating
 - Wastewater treatment
 - Security system
 - Shower



Loss of Containment

- **Weather events, equipment malfunction, human error**
 - Procedure for containment breaches
- **Ways to prevent breaches**
 - Training
 - Alarms (Glass breaks)
 - Weather Alerts



Plan Information



Decontamination Criteria



LABS



EQUIPMENT



MATERIALS



Shared Spaces

- **Prevent contamination**

- One select agent at a time
- Decontaminate work surfaces
- State of room
- Change PPE



Checklist Review



Checklist

- **Areas that have the most departures**
 - Shared space procedures
 - Drills and updating plans
 - Plants accidentally exposed to select agent
 - Location of PPE
 - Referring to other plans



www.selectagents.gov

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