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Biosafety Manual Requirements Checklist for Facilities Handling Plant Pests

Standard Operating Procedures must be facility specific and provide detailed descriptions on how all aspects of biosafety will be maintained. This checklist was developed to assist in the preparation of the Biosafety Manual for **PPC-2, PPC-2A, PPC-3 and PPC-3A** facilities.

Items to consider include:

REQ: requirement as stated in the *Containment Standards for Facilities Handling Plant Pests*;

REC: recommendations to promote good biosafety laboratory practices.

The items in this checklist are presented as a guide and are not meant to be exhaustive. Items not addressed in the checklist may be included in the Biosafety Manual of certain facilities depending on their design and program while other items may require some adaptation.

1. Executive Summary

Items to Consider	REQ	REC
Program Overview and Facility Description		
1. Program intent and goals.	√	
2. Plant pests and arthropods manipulated.	√	
3. Plant pest and arthropods stored.	√	
4. PPC lab area description and floor plan (including room numbers and door labels).	√	
5. Glossary of terms and abbreviations.		√

2. Standard Operating Procedures

Each procedure should include the following sections:

a. Purpose – short summary of the procedure objectives;
b. Glossary– list of acronyms, abbreviations and facility-specific terms with associated definition;
c. Personnel Responsibilities – overview of roles and responsibilities for personnel implicated in the procedure;
d. Safety – highlight important considerations to ensure the safety of personnel;
e. Equipment and material required;
f. Detailed Instructions – step by step instructions on protocol to follow;
g. References - list of information sources cited in the procedure.

Items to Consider	REQ	REC
Conditions of Access		
A) Training		
1. Training program must cover:		
▪ General knowledge of physical operation and design of facility.	√	
▪ General training requirements – see operational practices requirements in the *Containment Standards for Facilities Handling Plant Pests*.	√	
▪ Read SOP Manual and the *Containment Standards for Facilities Handling Plant Pests.*	√	
▪ Pest-associated hazards and the precautions necessary to prevent the release of contained pests.	√	
▪ Safe use of pesticides (if applicable).	√	
▪ Other regulatory requirements (i.e. WHMIS, TDG, etc.), if applicable.	√	
2. Training program must include:		
▪ Evidence that training is understood (includes supervision period and/or dry-runs).	√	
▪ Employee training records signed by trainer, trainee and supervisor.	√	
▪ Re-training requirements (annual frequency recommended).	√	
▪ Additional/separate training program for visitors, maintenance staff, janitorial staff commensurate with their anticipated activities in the containment zone.	√	

Items to Consider	REQ	REC
Entry and Exit		
A) Personnel		
1. Access restricted to authorized personnel only.	√	
2. Verification of systems prior to entry:		
▪ Verification of visual pressure monitoring devices (if applicable).	√	
▪ Verification of communication system.		√
3. Entry/exit logs:		
▪ Sign in/sign out.		√
▪ HVAC system gauges reading (if applicable).		√
4. Entry:		
▪ Remove jewelry and access card.	√	
▪ Remove contact lenses. The wearing of contact lenses is recommended only when other forms of corrective eyewear are not suitable.		√
▪ List dedicated lab clothing (i.e. scrubs, shoes, socks).		√
▪ Don dedicated lab clothing; or use full coverage protective clothing over street clothing.		√
▪ After entering PPC zone ensure that doors are shut properly.	√	
▪ Specific procedure must be in place when critical doors are not interlocked (i.e. lights, time lapse) to ensure that 2 doors are not opened at the same time.	√	
5. Exit:		
▪ Remove dedicated lab clothing or full coverage protective clothing.	√	
▪ Use of footbath (when working with soilborne pests)	√	
▪ Examination for hitchhiking arthropods.	√	
▪ After exiting containment zone ensure that doors are shut properly.	√	
▪ Specific procedure must be in place when doors are not interlocked (i.e. lights, time lapse) to ensure that 2 doors are not opened at the same time.	√	
B) Materials		
1. Routine items and equipment (arthropods, cages, waste).	√	
2. Movement of large equipment through containment barrier.	√	
Plant Pests and Arthropods		
1. Sanitation practices should be implemented when working with plants and plant pests, and should include the following (or a reference to the *Containment Standards for Facilities Handling Plant Pests* is acceptable) :		
▪ treating all plants and soils as if they are infected/infested		√
▪ minimizing entry of personnel into laboratory and plant growth areas		√
▪ providing adequate separation and/or physical barriers between plants infected or infested with different plant pests		√
▪ washing hands (after removing gloves) before leaving the containment zone, and at any time after handling materials known or suspected to be contaminated with plant pests, if this poses a risk of inadvertently spreading pests		√

Items to Consider	REQ	REC
▪ using decontaminated soil, soil-less potting mix or inert growing media, and cleaning up spilled soil or growing medium		√
▪ watering plants carefully, avoiding soil and water splash, and avoiding touching plants with the hose		√
▪ avoiding the use of automated watering systems where their use presents a risk of disseminating pests		√
▪ cleaning and decontaminating work surfaces as appropriate with a suitable disinfectant		√
▪ disinfecting items such as clippers, pruners and knives during and after use, as appropriate, to avoid plant-to-plant transfer of pests		√
▪ cleaning and decontaminating pots, stakes and saucers after use, or using disposables that are decontaminated and discarded after use		√
▪ surface sterilizing plant material before planting or transferring to tissue culture		√
▪ maintaining obligate parasites (e.g. viruses, nematodes) in tissue culture plantlets where possible		√
▪ eliminating unwanted pests by heat or cold therapy, surface sterilization, meristem culture or other suitable means		√
▪ inspecting for, and removing and destroying, host plants infected or infested with unwanted organisms		√
▪ using good housekeeping practices to keep the area neat, clean and free of dead plant material and unwanted plants and pests		√
▪ using dedicated cleaning equipment (e.g. brooms, mops, garbage cans) within containment zones		√
2. Storage and Inventory:		
▪ Plant pests and arthropods should be stored inside the PPC zone.		√
▪ If stored outside the PPC zone, plant pests and arthropods must be in leakproof containers and kept locked with restricted access.	√	
▪ Up-to-date inventory of all plant materials and plant pests manipulated and/or stored.	√	
▪ Regular inventory tracking.		√
Work Practices		
▪ Comply with all conditions stipulated on Permits to Import.	√	
▪ BSCs or other primary containment devices must be used for procedures that involve high concentrations or large volumes of plant pests or their propagules.	√	
▪ All arthropods must be confined in cages or other containers that prevent escape.	√	
▪ All organisms must be rendered non-viable prior to disposal.	√	
▪ Good laboratory practices must be employed to prevent the escape of pests.	√	
▪ Eating, chewing gum, drinking, smoking, storing of food and utensils, storing of personal belongings, applying cosmetics, and inserting or removing contact lenses should not occur in the containment zone.		√
▪ Long hair must be tied back or restrained so that it cannot come into contact with hands, specimens, containers or equipment in view of the potential for disseminating pests.	√	
▪ All pests and material that is infested or suspected of being infested with a pest must be moved or transported in containers that are secure, leak-proof and not easily broken, in order to prevent the accidental release or escape of a pest.	√	

Items to Consider	REQ	REC
▪ All work areas within a containment zone must be kept clean and tidy, including dedicated clerical work stations.	√	
▪ Storage of materials should be minimized, and paperwork should be done outside of containment zones if this presents a risk of disseminating pests.		√
▪ Workplace exposure to any plant pest must be kept at the lowest practical level and the generation of aerosols must be avoided when manipulating pests or inoculating plants.	√	
▪ Cultures must be stored in sealed, preferably break-resistant, containers such as screw-top vials.	√	
▪ Plants or arthropods that have been experimentally infected or infested must remain in the containment zone or be decontaminated prior to removal or disposal.	√	
▪ Contaminated materials and equipment must be properly cleaned and decontaminated before leaving the facility for servicing or disposal.	√	
▪ All unintentionally introduced pests, including those contaminating cultures, must be rendered non-viable as soon as they are detected.	√	
Documentation		
▪ Biosafety Manual to be reviewed and updated regularly.	√	
▪ Record of all activities in the containment zone must be kept for 3 years, including: - building and equipment maintenance, - shipments received, - confirmation of pest identification, - dates of import, - CFIA permits to import, - associated imported plant material, - associated organisms detected, - decontamination of packaging materials, - transfer of plant pests or organisms to other facilities, - inoculations or infestations of plant material; and - movement of plant material and plant pests into/out of containment.	√	
Decontamination		
1. List of disinfectants (effective against plant pests in use), and include:		
▪ Purpose.	√	
▪ Concentration.	√	
▪ Contact time.	√	
▪ Shelf life.	√	
2. Contaminated waste must be treated before disposal or reuse, including:		
▪ Liquid waste (i.e. cultures, etc.).	√	
▪ Solid waste (i.e. lab waste, PPE, etc.).	√	
3. Other methods of decontamination (if applicable).	√	

Items to Consider	REQ	REC
Emergency Procedures		
1. Response to soil spill (if applicable).	√	
2. Response to chemical spill.	√	
3. Response to arthropod escape.	√	
4. Response to BSC failure.	√	
5. Response to power failure.	√	
6. Response to fan (supply/exhaust) failure.	√	
7. Response to other alarms.	√	
8. Response to other situations (i.e. fire, earthquakes, floods, etc.).	√	
Incidents and Accident Reporting		
1. Must be reported to lab supervisor (or other).	√	
2. Forms/records to be completed (must be maintained on file for 3 years).	√	
3. Investigation and risk assessment.		√
4. Follow-up (communication of results to staff).		√
5. New recommendations to mitigate future risk.		√
Use and Maintenance of Equipment		
1. Autoclave (if applicable).	√	
2. BSC (if applicable).	√	
3. Spill kits.	√	
4. Pass-through (if applicable).	√	
5. Other (if applicable).		√
Housekeeping and Facility Maintenance		
1. List of tasks (daily, weekly, monthly, and annually) including:		√
▪ Regular filling of drainage traps with liquid.	√	
▪ Periodic inspections of the containment zone to check for faults and deterioration.	√	
▪ Regular inspection and cleaning of supply and exhaust filters, pre-filters and screens.	√	
▪ Regular confirmation of inward directional airflow.	√	
▪ Regular inspection of plant material and insect traps. All debris and dead plant material must be removed so that it does not act as a refuge for plant pests.	√	
2. Maintenance of safety equipment (eyewash station, spill kits, etc.)	√	
3. Bird, rodent, weed and plant pest control.	√	
4. Verification and performance testing requirements (for bi-annual re-certification)	√	