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*....Promoting a harmonized, risk-based systems approach to greenhouse and nursery certification*

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## **SANC CCP CHECKLIST and BMP Companion** **For NURSERY/GREENHOUSE INSPECTION**

The **SANC CCP Checklist** is designed to guide inspectors and growers in identifying critical control points (CCPs) to assess risk in a nursery or greenhouse production system. Used in combination with the CCP/BMP Checklist Companion, it will lead to the documenting and or development of practical means to reduce pest risk while making optimum use of resources.

The **CCP/BMP Checklist Companion** was developed jointly by industry, university researchers and regulatory representatives to offer basic, best management practices (BMPs) that can be used to address identified CCPs in a nursery or greenhouse system in order to reduce pest risk. It is not a complete list of all possible BMPs, but provides a scalable foundation for a systems approach to nursery and greenhouse production that can be implemented, documented, verified, and tailored to specific nursery situations.



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### NURSERY/GREENHOUSE INSPECTION – SANC CCP CHECKLIST

=Yes,  = Needs further attention, see companion document, *SANC CCP/BMP Checklist Companion*, for detailed considerations.

#### Plants:

- Is there a system to inspect or isolate incoming plant material?
- Are plant sources reliable/licensed?
- Are stock plants isolated from production areas?

#### Media:

- Is media managed in a sanitary manner?

#### Containers:

- Are containers managed in a sanitary manner?

#### Site:

- Is pest pressure from surrounding area addressed (soil, air, weeds, structures, pet plants)?

#### Shipping:

- Are shipping and receiving areas separate?
- Are plants inspected prior to shipment?

#### Water:

- Is water managed to minimize the spread of pests/pathogens?
- Is the water source safe?
- Are there drainage or humidity issues?

#### Production Practices:

- Are blocks of plants separated by breaks?
- Does the facility layout minimize potential for pest movement?
- Are equipment and tools properly cleaned? (Trucks, potting equipment, irrigation, knives, pruners, etc.)
- Are plants that are not in active production removed from the facility in a timely way?

#### Scouting/Pest Management:

- Is there regular scouting for pests?
- Is there follow-through when pests are detected?

#### Training:

- Is there a pest management training program for staff (pest ID, sanitation)?

#### Recordkeeping:

- Are records kept for plant inventory and pest management (scouting, treatments, disposal)?

#### Sanitation/Disposal:

- Are growing areas and work areas clear of plant debris or other contaminants?
- Are cull piles managed?

#### Facility Security:

- Is the facility minimizing risk of pest introduction by people?

Facility Name: \_\_\_\_\_

Inspector Name & Date: \_\_\_\_\_



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### SANC NURSERY/GREENHOUSE INSPECTION - CCP/BMP CHECKLIST COMPANION

Circle or highlight areas where improvements can be made.

PLANTS - INPUTS

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Imported cuttings, bareroot, tissue culture	Regulated pests and pathogens.	Introduction from offshore propagators	Follow import regulations and applicable compliance agreements. Purchase from a systems approach certified source if possible. Inspect or test for pests and pathogens.
Incoming cuttings, bareroot, tissue culture from domestic sources	Regulated pests and pathogens	Introduction on purchased stock or cuttings	Follow state regulations or compliance agreements.
Incoming cuttings, bareroot, tissue culture from domestic sources	Systemic bacterial and viral pathogens	Introduction from purchased stock or cuttings from domestic source	Purchase from state-certified sources where pre-shipment inspections have occurred. If not from a state-certified source or unknown, Grow out and inspect all deliveries prior to acceptance into inventory.
Incoming cuttings, bareroot, tissue culture from domestic sources	All pests and pathogens	Introduction on purchased stock or cuttings	Inspect all deliveries and scout for leaf and root pests, vectors and pathogens upon receipt. Send questionable samples to a diagnostic lab when necessary. Determine appropriate action for pest or pathogen found whether that is treatment, other cultural control, thorough composting <sup>1</sup> or destroying. Evaluate risk to determine options.
Incoming cuttings, bareroot, tissue culture from domestic sources	All pests and pathogens	Introduction on purchased stock or cuttings	Inspect and scout buy-ins frequently during the first two weeks of propagation. Consider crop to determine scouting intervals. Avoid co-mingling of shipments prior to inspection. Determine appropriate action for pest or pathogen found whether that is treatment, other cultural control, thorough composting <sup>1</sup> or destroying. Evaluate risk to determine options.

**PLANTS - INPUTS (cont.)**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Incoming cuttings, bareroot, tissue culture from domestic sources	all pests and pathogens	Introduction on purchased stock or cuttings	If appropriate, request scouting and pest management records from supplier.
Incoming cuttings, bareroot, tissue culture from domestic sources	All pests and pathogens	Introduction on purchased stock or cuttings	Keep loading docks clean and free of plant debris as practical.
Seed	Seedborne pathogens	Integrity of the seed	Purchase seed from reputable suppliers (those that incorporate seed testing, as available).
On site cuttings or stock	All pests and pathogens	Introduction from stock or cuttings	Propagate stock on site from healthy stock plants. If necessary, apply a broad-spectrum fungicide treatment in the field before taking cuttings. Avoid taking cuttings when wet and avoid or remove soil particles. Do not co-mingle cuttings from different stock in water. Soak cuttings in a disinfectant solution, when appropriate.

**PLANTS - PROPAGATION**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Imported cuttings, bareroot, tissue culture	all pests and pathogens, especially those regulated.	Introduction from offshore propagators	Follow import regulations and applicable compliance agreements. Purchase from a systems approach certified source if possible. Inspect or test for pests and pathogens.
Incoming cuttings, bareroot, tissue culture from domestic sources	Systemic bacterial and viral pathogens	Introduction from purchased stock or cuttings from domestic source	purchase from state-certified sources where pre-shipment inspections have occurred. If not from a state-certified source or unknown, Grow out and inspect all deliveries prior to acceptance into inventory.
Plant propagation - herbaceous cuttings in greenhouse	All pests and pathogens	Contamination from workers	Provide employee training on sanitation and define appropriate clothing for propagation area; hands cleaned or disinfested between cultivars and/or gloves changed or disinfested between cultivars, when necessary. Provide clean footwear, such as shoe coverings, dedicated footwear or foot baths before entry.
Plant propagation - all	All pests and pathogens	Contamination from cutting tools	Disinfest cutting tools and blades frequently and between varieties, blocks or lots.
Plant propagation - all	All pests and pathogens	Irrigation	Irrigate so as to minimize splashing and periods of leaf wetness. Use a water source that does not contain plant pathogens.
Plant propagation - all	All pests and pathogens	Introduction on cuttings or liners	For known pests and pathogens, schedule scouting according to predicted emergence dates and/or key life cycle events. Schedule scouting at intervals that are frequent enough to prevent or manage outbreaks.. Send questionable samples to a diagnostic lab when necessary. Determine appropriate action for pest or pathogen found whether that is treatment, other cultural control, thorough composting <sup>1</sup> or destroying. Evaluate risk to determine treatment options.
Plant propagation - seed	Seedborne pathogens	Integrity of the seed	Purchase seed from reputable suppliers (those that incorporate seed testing, as available).

**PLANTS – PROPAGATION (cont.)**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Plant propagation - herbaceous crops	Viruses such as INSV and TSWV and other insect vectored diseases	Weed and crop reservoirs of virus	Maintain a weed exclusion perimeter around propagation facilities. Regularly inspect greenhouse property for pests or pathogens or treat vegetation for pest control.
Plant propagation - all	Soilborne pathogens and pests	Introduction with soil	Keep field soil, boots, or equipment out of the propagation area. Disinfest (clean with soap and water), if necessary. Restrict entry to propagation areas to workers conducting propagation.
Plant propagation - all	Soilborne pathogens	Pots and potting media	Use new or disinfested pots and potting media.
Plant propagation - all	All pests and pathogens	Contamination from previous crops	Clean greenhouses, tools, drip lines, emitters, beds, benches, plastic or bench coverings such as capillary mats between crops. Disinfest all if pest or pathogens have been detected.
Plant propagation - all	All pests and pathogens	Entry of pests from outside the structure	Where possible, use screens and other physical barriers to prevent entry of pests into the structure. Place any light traps, pheromone or other lures away from the structure entrances by at least 15 feet.
Plant propagation- woody crops	All fungal, bacterial & oomycete pathogens	Inoculum on cuttings collected in field	Propagate stock on site from healthy stock plants. If necessary, apply a broad-spectrum fungicide treatment in the field before taking cuttings. Avoid taking cuttings when wet and avoid or remove soil particles. Do not co-mingle cuttings from different stock in water. Soak cuttings in a disinfectant solution, when appropriate.

**MEDIA AND CONTAINERS**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Pots, trays and containers	Soilborne pathogens	Used containers	<u>Disinfect</u> used containers or use on crops that are not highly susceptible to soilborne disease.
Pots, trays and containers	Soilborne pathogens and pests	New and disinfested used containers	Store containers in an area that is clean and sanitary.
Potting media	Soilborne pathogens	Media	Use growing media that is clean or disinfested
Potting media	Soilborne pathogens	Media	Store all planting media in an area that is clean and sanitary, away from production areas. Avoid standing water in storage area
Potting media	Soilborne pathogens	Media	Avoid using field equipment to mix planting media. If using field equipment clean and sanitize equipment before use.
Potting media	Soilborne pathogens and pests	Media	Ensure that soil and sand used is clean and sanitary.
Potting media	Soilborne pathogens and pests	Used media	Thoroughly compost <sup>1</sup> , sanitize or immediately dispose of used media.
Potting media	Soilborne pests and pathogens	Spread of pests and pathogens with native soil	Separate planting media from native soils, such as using concrete slabs, raised bins or other impervious material.

**SITE**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Site selection and preparation – new construction	Waterborne pathogens, fungus gnats, moth flies, shoreflies, molluscs	Splash dispersal of pathogens; damage from standing water	Facilities constructed to drain well and avoid standing water.
Site selection and preparation – new construction	Waterborne pathogens, fungus gnats, moth flies, shoreflies, molluscs	Splash dispersal of pathogens; damage from standing water	Roads and pathways should be properly graded to allow drainage and avoid standing water. Pavement, gravel or other impermeable surfaces may also help prevent standing water.
Site selection and preparation – new construction	All pests and pathogens	Spread of pests and pathogens from cull piles or compost <sup>1</sup> piles.	Locate cull piles where they will not contaminate media and container storage, production areas or nursery stock.

**SITE (cont.)**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Site maintenance	All pests and pathogens	Spread of pests and pathogens from surrounding vegetation	Maintain a weed exclusion perimeter around greenhouse production areas. Regularly inspect greenhouse property for pests or pathogens or treat vegetation for pest control.
Site maintenance	All pests and pathogens	Weeds harboring pests and pathogens	Control all weeds in and around greenhouses and production areas. Establish a vegetation-free border around the greenhouse, free of ground covers, cover crops, or landscape plants.
Site maintenance	All pests and pathogens	Spread of pests and pathogens with native soil	Avoid moving native soils between greenhouses unless sanitized.
Site maintenance	Waterborne pathogens, fungus gnats, moth flies, shoreflies, molluscs, nematodes	If standing water persists, introduction of unwanted pests increases	Address standing water by improving drainage, using gravel or impervious water barriers or raising plants off of floor.
Site Maintenance	All pests and pathogens	All	Inspect facility to determine if all cultural and physical controls are in place.
Site Maintenance	Soilborne pests and pathogens	Spread of pests and pathogens with native soil	Separate planting media from native soils, such as using concrete slabs, raised bins or other impervious material.
Site maintenance	All pests and pathogens	Spread of pests and pathogens from cull piles or compost piles.	Locate cull piles where they will not contaminate media and container storage, production areas or nursery stock.



**SHIPPING**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Shipping	All pests and pathogens	Shipping pests and pathogens	Thoroughly inspect ALL material before shipping. Only ship material that is free from regulated pests and apparently free of other pests and pathogens. Record any pests/pathogens and symptomatic plants found. If appropriate, control or treat for pests and pathogens found and record treatment. Only ship if treatment successful.
Shipping	All pests and pathogens	Shipping pests and pathogens	Maintain records (inventory number, dates, type) of all shipments. Do not ship plants with pests or diseases. Have records readily available.
Shipping	All pests and pathogens	Operation owned trucks	Do not sweep or clean trucks in or near production areas.
Shipping	All pests and pathogens	Delivery of outgoing stock	Do not allow delivery or customer trucks to be cleaned on facility property.
Shipping	All pests and pathogens	Delivery of outgoing stock	Ensure that trucks, pallets, and crates are clean before loading.
Returned product	All pests and pathogens	Introduction of pests or pathogens from other sources	If possible, do not accept product returns. If accepted, scout frequently before co-mingling with inventory.

**WATER**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Water management	Waterborne pathogens	Infected surface irrigation water	Disinfect irrigation water using effective methods.
Water management	Waterborne pathogens, fungus gnats, moth flies, shoreflies, molluscs, nematodes	Splash dispersal of pathogens; pest damage from standing water	Prevent standing water by not overwatering and correcting drainage problems, or by raising containers off the ground.
Water management	Waterborne pathogens	Recycled or recaptured water	Disinfect recycled and recaptured water using effective methods. Note; runoff from production may be regulated.

**PRODUCTION PRACTICES - Greenhouse**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Greenhouse production	All pests and pathogens	Soil used in beds	Disinfest soil/beds. Prevent direct contact of containers with the ground or unsanitized surfaces.
Greenhouse production	All pests and pathogens	Weeds	Control all weeds in and around greenhouses that may serve as alternative hosts. Establish a vegetation-free border around the greenhouse, free of ground covers, cover crops, or landscape plants.
Greenhouse production	Insects, molluscs, water molds, nematodes	Persistent standing water in soil or beds	Address standing water by improving drainage, using gravel or impervious water barriers or raising plants off of floor. Avoid overwatering.
Greenhouse production	Soilborne pathogens and pests	Used pots	Disinfest used containers or use on crops that are not susceptible to soilborne disease.
Greenhouse production	Soilborne pathogens and pests	Media	Ensure that soil and sand used from site is clean and sanitary.
Greenhouse production	Soilborne pathogens and pests	Media	Immediately dispose of used media or disinfest.
Greenhouse production	All pests and pathogens	Infested and infected plants	Immediately take appropriate management action or compost <sup>1</sup> or dispose of infested or infected plants. If infested or infected with a regulated pest or pathogen, dispose of according to regulation.
Greenhouse production	All pests and pathogens	Unsold stock	Dispose of unsold plant material no longer actively managed.
Greenhouse production	All pests and pathogens	New stock	Inspect all deliveries and scout for leaf and root pests, vectors and pathogens upon receipt. Send questionable samples to a diagnostic lab when necessary. Determine appropriate action for pest or pathogen found whether that is treatment, other cultural control, thorough composting or destroying. Evaluate risk to determine treatment options.

**PRODUCTION PRACTICES – Greenhouse (cont.)**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Greenhouse production	Regulated or high risk pests or pathogens	New stock	Segregate new, high-risk material in a separate area, inspect for leaf and root pests, vectors and pathogens upon receipt, careful. Hold to confirm plants are pest free before commingling with existing material. Send questionable samples to a diagnostic lab when necessary. Determine appropriate action for pest or pathogen found whether that is treatment, other cultural control, thorough composting <sup>1</sup> or destroying. Evaluate risk to determine treatment options.
Greenhouse production	All pests and pathogens	Infested and infected plants	When moving material to be destroyed, make sure load is securely contained so nothing escapes.
Greenhouse production	All pests and pathogens	Infested and infected plants; soil	Equipment (shovels, pruning shears, trucks, loaders, etc.) should be cleaned before moving from contaminated areas to other areas. Disinfest tools between cultivars when appropriate.
Greenhouse production	All pests and pathogens	Infested and infected plants	Separate shipments of the same plant from different suppliers, and separate seed- and cutting-grown plants of the same species, if possible, to minimize spread from a single contaminated source.

# PRODUCTION PRACTICES – Outdoor Containers

Component, site, or stage of productiona	Target pests or pathogens	Contamination Hazard	BMP
Outdoor production - containers	Soilborne pathogens and pests	Soil or beds	Prevent direct contact between containers and infested ground or disinfest if contaminated and possible.
Outdoor production - containers	All pests and pathogens	Soil or beds	Clean leafy debris from beds prior to use. When necessary, remove infected leaf debris during use.
Outdoor production - containers	All pests and pathogens	Weeds	Control all weeds in and around production areas that may serve as alternative hosts. Establish a vegetation-free border around the greenhouse, free of ground covers, cover crops, or landscape plants.
Outdoor production - containers	Insects, molluscs, water molds, nematodes	Soil or beds	Prevent standing water by not overwatering and correcting drainage problems, or by raising containers off the ground.
Outdoor production - containers	Soilborne pathogens and pests	Used pots	Disinfest used containers or use on crops that are not susceptible to soilborne disease.
Outdoor production - containers	Soilborne pathogens and pests	Media	If using soil or sand as ingredients in growing media, ensure that they have been treated so as to be free of pests and pathogens. Green waste ingredients need to be thoroughly composted <sup>1</sup> to kill pests, pathogens, and weed seeds.
Outdoor production - containers	Soilborne pathogens and pests	Media	Immediately dispose of used media or disinfest.
Outdoor production - containers	All pests and pathogens	Infested and infected plants	Immediately take appropriate management action or compost <sup>1</sup> or dispose of infested or infected plants. If infested or infected with a regulated pest or pathogen, dispose of according to regulation.
Outdoor production - containers	All pests and pathogens	Unsold stock	Dispose of unsold plant material no longer actively managed.
Outdoor production - containers	All pests and pathogens	New stock	Inspect new stock carefully and hold in separate area if pests or pathogens are found or suspected.
Outdoor production - containers	All pests and pathogens	Infested and infected plants	Scout crop frequently and take appropriate pest management action if plants are found to be infested or infected.
Outdoor production - containers	All pests and pathogens	Infested and infected plants	When moving material to be destroyed, make sure load is securely contained so nothing escapes.
Outdoor production - containers	All pests and pathogens	Infested and infected plants; soil	Before moving from contaminated areas to other area, Equipment (shovels, pruning shears, trucks, loaders, etc.) should be cleaned and disinfested, as applicable.

**PRODUCTION PRACTICES - Field**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Outdoor production - field	Soilborne pathogens and pests	Soil	Avoid planting in soil known to be infested with pests or pathogens.
Outdoor production - field	All pests and pathogens	Soil	Prevent the accumulation of leafy debris.
Outdoor production - field	All pests and pathogens	Weeds	Control all weeds. Establish a vegetation-free border around the greenhouse, free of ground covers, cover crops, or landscape plants.
Outdoor production - field	Insects, snails, water molds, nematodes	Soil or beds	Prevent standing water by correcting drainage problems and not over-watering.
Outdoor production - field	All pests and pathogens	Infested and infected plants	Immediately take appropriate management action or compost <sup>1</sup> or dispose of infested or infected plants. If infested or infected with a regulated pest or pathogen, dispose of according to regulation.
Outdoor production - field	All pests and pathogens	Unsold stock	Dispose of unsold plant material no longer actively managed.
Outdoor production - field	All pests and pathogens	New stock	Inspect new stock carefully and hold in separate area if pests or pathogens are found or suspected.
Outdoor production - field	All pests and pathogens	All stock	Scout crop frequently and take appropriate pest management action if plants are found to be infested or infected.
Outdoor production - field	All pests and pathogens	Infested and infected plants	When moving infected or infested material to be destroyed, make sure load is securely contained so nothing escapes.
Outdoor production - field	All pests and pathogens	Field equipment and tools	Before moving from contaminated areas to other area, Equipment (shovels, pruning shears, trucks, loaders, etc.) should be cleaned and disinfected, as applicable.
Outdoor production - field	All pests and pathogens	Contamination from workers	Workers should avoid moving from contaminated areas to other areas and should take necessary sanitation precautions as needed.

**PRODUCTION PRACTICES - Equipment**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Plant procurement; cuttings, bareroot, tissue culture	All pests and pathogens	Delivery of incoming stock	Inspect all delivery vehicles and clean soil and plant debris from receiving docks, as practical. Dispose of appropriately.
Plant procurement; cuttings, bareroot, tissue culture	All pests and pathogens	Delivery of incoming stock	Maintain clean trailers, carts, tools, materials and other equipment used to transport plants to and throughout the nursery. Clean equipment frequently and after transporting diseased or pest infested plants. Consider dedicated equipment for buy ins or incoming planting material.
Propagation - all (vegetative, woody, seed)	All pests and pathogens	All phases of propagation	"Do not store tools, equipment, baskets, on dirt floor (within enclosure) or native soil (outdoors)."
Propagation - all (vegetative, woody, seed)	All pests and pathogens	All phases of propagation	Clean trailers, carts and other equipment used to transport plants in and/or out of propagation areas.
Propagation - all (vegetative, woody, seed)	Regulated pests and pathogens	All phases of propagation	Disinfest trailers, carts and other equipment used to transport and dispose of infested/infected plants.
Greenhouse production	All pests and pathogens	All production equipment and tools	Clean equipment, tools and other materials as needed and when appropriate, especially after handling or transporting diseased or pest infested plants.
Greenhouse production	All pests and pathogens	Transporting equipment	Maintain clean trailers, carts and other equipment used to transport media. Disinfest if contamination occurs.
Greenhouse production	All pests and pathogens	Potting equipment	Clean potting equipment, as needed.
Greenhouse production	All pests and pathogens	Irrigation equipment	Disinfest irrigation equipment after each crop cycle or more often if contamination occurs.
Greenhouse production	All pests and pathogens	Initial processing/grading	Clean grading equipment as needed. Consider crop or stock type to determine frequency
Processing/grading	All pests and pathogens	Storage bins and racks	Clean between seasons.
Processing/grading	All pests and pathogens	Packaging	Clean packaging areas at a frequency appropriate for the crop or stock type.
Processing/grading	All pests and pathogens	Packaging	Maintain clean trailers, carts and other equipment used to transport plants for packaging.
Shipping	All pests and pathogens	Trucks and other customer equipment	Ensure that trucks, pallets, and crates are clean before loading. Do not allow delivery or customer trucks to be cleaned on facility property.

**SCOUTING**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Cuttings, bareroot, tissue culture inputs	All pests and pathogens	Introduction on purchased stock or cuttings	Inspect all deliveries and scout for leaf and root pests, vectors and pathogens upon receipt. Consider crop to determine scouting intervals. Send questionable samples to a diagnostic lab when necessary. Determine appropriate action for pest or pathogen found whether that is treatment, other cultural control, thorough composting <sup>1</sup> or destroying. Evaluate risk to determine options.
Propagation and Production cycle	All pests and pathogens	Introduction of pests or pathogens during propagation	Regularly inspect for pests and symptomatic plants. Identify pest, pathogen or abiotic problem and record. Adjust scouting frequency, according to crop type. If appropriate, control or treat for pests and pathogens found and record treatment.
Propagation and production cycle	All pests and pathogens	All	Display photographs of pests, pathogens and symptomatic plants in appropriate employee areas.
Propagation and production cycle	All pests	All	Label and date all traps. Inspect and regularly change traps.
Propagation and production cycle	All pests and pathogens	New or unknown pests or pathogens	Send unusual or unrecognized pests and diseases to a laboratory for diagnosis and identification or consult a Farm advisor or other expert for identification.
Propagation and production cycle	All pests and pathogens	All	Take appropriate corrective action and treatments if pests and diseases are found. Document the corrective action.
Propagation and production cycle	All pests and pathogens	All	For known pests and pathogens, schedule scouting according to predicted emergence dates and/or key life cycle events. Schedule scouting at intervals that are frequent enough to prevent or manage outbreaks.
Processing/grading	All pests and pathogens	Introduction of pests and pathogens during processing/grading	Regularly inspect for pests and symptomatic plants. Identify pest, pathogen or abiotic problem and record. Adjust scouting frequency according to crop type. If appropriate, control or treat for pests and pathogens found and record treatment.

**SCOUTING (cont.)**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Storage	All pests and pathogens	Introduction of pests and pathogens during storage of stock	Regularly inspect for pests and symptomatic plants. Identify pest, pathogen or abiotic problem and record. Adjust scouting frequency according to crop type. If appropriate, control or treat for pests and pathogens found and record treatment.
Shipment	All pests and pathogens	Packaging and shipping	Thoroughly inspect ALL material before shipping. Only ship material that is free from regulated pests and apparently free of other pests and pathogens. Record any pests/pathogens and symptomatic plants found. If appropriate, control or treat for pests and pathogens found and record treatment. Only ship if treatment successful.
Site Maintenance	All pests and pathogens	Spread of pests and pathogens from surrounding vegetation	Maintain a weed exclusion perimeter around greenhouse production areas. Regularly inspect greenhouse property for pests or pathogens or treat vegetation for pest control
Site Maintenance	All pests and pathogens	All	Inspect facility to determine if all cultural and physical controls are in place.

**TRAINING**

BMP
Introduce the overall systems approach and identify goals and respective duties. Train at least two staff members to cover for absences due to sickness and vacations.
Provide instruction, training and/or materials for inspection and recognizing disease symptoms or pest signs. Training must be appropriate for the responsibility of the position.
Provide instruction on procedures for recording, reporting pests/pathogens and symptomatic plants
Provide instruction on procedures for treatments, rejecting and/or disposal of symptomatic or infested plants
Provide instruction on procedures for maintaining/updating all records
Provide instruction on all sanitation procedures, including tools and equipment, and waste management procedures
Provide instruction on chain of command reporting
Provide instruction on recording treatment methods and materials
Provide instruction on material handling and storage
Provide instruction on facility security.
Develop methods to track training and compliance



**RECORDKEEPING**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Plant procurement	All pests and pathogens	Delivery of incoming stock	Maintain records (inventory number, dates, source and type) of stock delivery, scouting dates and results (pests or pathogens found), treatments, disposal or other measures. Have records readily available.
Propagation	All pests and pathogens	Propagation cycle	Maintain records throughout propagation (inventory number, dates, type, condition). Record scouting dates and results (pests or pathogens found), treatments, disposal or other measures. Have records readily available.
Production	All pests and pathogens	Production cycle	Maintain records (inventory number, dates, type) throughout production. Record scouting dates and results (pests or pathogens found), treatments, disposal or other measures. Have records readily available.
Processing/grading	All pests and pathogens	All processing/grading steps	Maintain records (inventory number, dates, type) during all stages of processing/grading. Record scouting dates and results (pests or pathogens found), treatments, disposal or other measures. Have records readily available.
Shipment	All pests and pathogens	Packaging and loading	Maintain records (inventory number, dates, type) of all shipments. Do not ship plants with pests or diseases. Have records readily available.
Storage	All pests and pathogens	Contamination by storage pests	Maintain records (inventory number, dates, type) during storage. Scout if applicable and maintain scouting records. Have records available.

**SANITATION/DISPOSAL**

Component, site, or stage of production	Target pests or pathogens	Contamination Hazard	BMP
Disposal of unsold plants	All pests and pathogens	Unsold stock	Dispose of unsold plant material no longer actively managed as appropriate.
Disposal of plants infested with pest/pathogens	All pests and pathogens-except quarantine pests/pathogens	Infested and infected plants from sourcing	Immediately dispose of infested or infected plants or compost <sup>1</sup> this material. Do not compost plants that are infested or infected with quarantine pests or pathogens. Dispose of according to quarantine regulation.
Disposal of plants infested with quarantine pests/pathogens	Quarantine pests and pathogens	Plants infected or infested with quarantine pathogens and pests	Dispose of according to quarantine regulation.
Compost <sup>1</sup> and cull piles	All pests and pathogens	Spread of pests and pathogens from cull piles or compost piles	Locate compost <sup>1</sup> and cull piles where they will not contaminate production stock or areas.
All culled plants	All pests and pathogens	Spread of pests and pathogens from cull piles or compost piles	Dispose of culled plant material as appropriate.
Container media	Soilborne pathogens and pests	Soil and other media	Dispose of used media by appropriate means or thoroughly disinfest media if reused.
Container media	Soilborne pathogens and pests	Soil and media from infested and infected plant containers	Immediately dispose of infested media or compost <sup>1</sup> this material. Do not compost plants that are infested or infected with quarantine pests or pathogens. Dispose of according to quarantine regulation.
Container media	Quarantine pests and pathogens	Soil and planting media infested with quarantine pests/pathogens	Dispose of according to quarantine regulation.
Containers	All pests and pathogens	Containers from infested/infected plants	Thoroughly disinfest all pots and containers that had infected or infested plants before reuse, or dispose of used contaminated pots.
Returned product	All pests and pathogens	Introduction of pests or pathogens from other sources	If possible, do not accept product returns. If accepted, scout frequently before co-mingling with inventory.



## REFERENCES

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<sup>1</sup> R. Ryck (ed.) 1992. On-farm composting handbook. Natural Resource, Agriculture and Engineering Service, Cooperative Extension, Cornell University, Ithaca, NY. NRAES-54. 186 p.

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