MSU Plant Science Research Greenhouse User Manual

Updated April 2025

Table of Contents

All Plant Science Research Greenhouse users are required to follow the policies and procedures contained in this guide.

Mission

The mission of the Michigan State University Plant Science Research Greenhouses (PSRG) is to provide MSU faculty, staff, and students with the greenhouse space and services that are needed to conduct world-class basic and applied research.

Overview

The PSRG consists of ~90,000 square feet of greenhouses comprised of 130 individual zones on main campus and another ~20,000 square feet on two south campus farms. Approximately 70 faculty, along with 400+ affiliated staff, post-docs, graduate students, and undergraduate students use the facility for research.

Space Allocation

Greenhouse space at the PSRG is allocated on a first-come, first-served basis. If you need greenhouse space, please complete a space request form (https://rtsf.natsci.msu.edu/research-greenhouse-complex/space_allocation.aspx). Users are encouraged to request space as far in advance as possible; last-minute space requests are accommodated when possible.

Facility Access

Access to the PSRG is via MSU ID cards. Prior to working in the greenhouse, users must complete two required trainings. (1) EPA Worker Protection Standard Training (visit https://ehs.msu.edu/occ/wps/index.html for registration information), which must be renewed annually. (2) PSRG site-specific training; email the Greenhouse Director to schedule it.

It is a violation of federal WPS law for any person to work in the greenhouses without having current/complete WPS training. This is strictly enforced.

Facility Hours

The PSRG is accessible to users at any time, including weekends and holidays. Greenhouse staff are present Monday through Friday, excluding university holidays, from 7:00 am to 4:30 pm.

Services Provided

The PSRG is comprised of greenhouse zones that have a wide range in size and climate-control capabilities. There are significant differences in quality and capability from one zone to another. Regardless, all greenhouse zones:

- Provide bench or floor space for research projects. Many zones have benches that can be lowered to accommodate tall crops.
- Control the temperature using greenhouse environmental control systems, or in a few cases, thermostats. Many zones have evaporative cooling pads to help cool the greenhouses in the summer months. There are five air-conditioned zones.
- Protect research plants and associated equipment from outdoor weather.
- Have water and electrical access points available to users.
- Restrict access to non-greenhouse users.

Security: PSRG staff check and secure all exterior doors daily. Entry doors into PSRG are locked at all times. Users should only use the keycard-access doors to enter and exit the facility, unless special permission has been granted by the Greenhouse Director. No doors should be propped open. Leaving exterior doors open compromises the security of the facility and leaving doors to individual greenhouse zones open allows pests to more easily move from one zone to another.

Maintenance: Although each greenhouse zone and its components are regularly inspected and serviced by PSRG staff, users are strongly encouraged to be observant while working and report any problems or concerns to PSRG staff. For non-emergent greenhouse work requests, please use the online ticketing system or scan the QR code posted on each greenhouse zone's door. Emergencies should be reported via phone or text to a greenhouse staff member. Maintenance of the greenhouse structure and mechanics is conducted by PSRG staff or MSU Infrastructure Planning and Facilities (IPF) as appropriate. Users are not permitted to make any repairs or alterations to the greenhouse, including environmental control components.

Cleaning: PSRG staff clean common-use areas and thoroughly clean individual greenhouse zones when possible (e.g., between users or when the house is otherwise empty).

Pest Management: The PSRG IPM Coordinator scouts plants each week looking for signs of pests and pathogens. Users are encouraged to learn to identify common greenhouse insect and mite pests, and diseases, and report issues to the IPM Coordinator. Beneficial organisms (insects and mites) and pesticides are applied to control pests that are impacting research plants. No pesticide applications are made without approval from the user. Users must obey pesticide restricted-entry intervals (REI) and not enter greenhouse zones where "danger" signs are posted. If you are a certified pesticide applicator and want to apply your own pesticides, please contact the IPM Coordinator and the Greenhouse Director.

Supplemental Lighting: High pressure sodium (HPS) or light emitting diode (LED) fixtures are supplied, as well as replacement bulbs for HPS fixtures. LED fixtures continue to be purchased to replace HPS fixtures as budget allows. There is no cost to the user for supplemental lighting.

Pots: Plastic pots in multiple sizes are provided in the potting room in the greenhouse headhouse and at the hallway potting stations. Users should recycle used pots in the appropriate location.

Potting Media (Substrate): Peat-based Suremix potting media and field soil are located in the potting room in the greenhouse headhouse and at the hallway potting stations. Diagnostic reports for the field soil are available upon request.

Fertilizer: PSRG supplies two water-soluble fertilizers (Peters Excel 15-7-25 and Peters Excel pH Low 21-7-7) and one pelletized slow-release fertilizer (Osmocote Plus 15-9-12). Please read the information supplied by PSRG staff and follow directions to ensure proper use. If you would like to fertilize at a low rate every time you water, greenhouse staff can install a siphon mixer. PSRG staff can advise users on proper fertilization practices.

Watering Supplies: Hoses, watering wands, breakers, and siphon mixers are supplied. Irrigation systems can be built by PSRG staff as time allows, with the materials and labor cost paid by the user, as outlined in the irrigation system policy. PSRG staff can advise users on proper watering practices.

Tools: PSRG supplies carts, wheelbarrows, brooms, dustpans, shop vacuums, leaf blowers, pressure washers, and shovels. PSRG-owned items are generally painted with purple to distinguish them from materials owned by individual programs. While these materials are intended for use by researchers, they must not be stored inside greenhouse zones. Hand tools (screwdrivers, drills, etc.) may be loaned at staff discretion.

Storage: Storage areas are available free of charge, but space must be reserved, and materials must be stored in a neat and orderly fashion. Combination locks (no keyed locks) may be used only if the combination is provided to the Greenhouse Director. Any items found stored in PSRG-maintained storage areas without PSRG staff knowledge will be discarded.

Specialized Services: If you would like PSRG staff to assist you with construction or maintenance of custom research-related equipment, please contact the Greenhouse Director. Assistance will be provided as time allows, and charges will be incurred for such assistance.

Plant Photography: There is a designated plant photography room in the greenhouse headhouse. Users must supply their own camera. Please contact the Greenhouse Director for additional information.

Vernalization: There is a large walk-in cooler in the greenhouse headhouse. Please contact the Greenhouse Director for additional information.

Root and Pot Washing: There is a designated room in the greenhouse headhouse to wash roots and pots. Greenhouse staff wash and sanitize pots that are supplied by PSRG. Users may wash

pots that they have purchased. Please contact the Greenhouse Director for additional information.

Personal Care: There is a wellness room with a sink and mini-fridge, and an all-gender restroom with a shower in the greenhouse headhouse. Users are welcome to use these rooms.

Greenhouse Use Standards

Greenhouse zones are to be used to grow plants for research purposes only. **No personal plants may be grown.** Once a study has ended, users should promptly dispose of or properly store all plants, potting media, and pots in a timely manner in the appropriate locations. **Food crops that are grown for research purposes must not be consumed unless the research requires it, and arrangements have been made with the Greenhouse Director and IPM Coordinator**.

Plant Care: The responsibility for use of a greenhouse zone and the care of the plants within lies with the user. Plants must be maintained in good health unless there is a research-related reason for not doing so. If plants are maintained in poor condition (e.g., insufficient or excess water, insufficient or excess fertilizer), it can lead to pest infestations that can spread to and damage other users' research plants. Additionally, it may not be possible to apply pesticides without damaging stressed plants. Users are strongly encouraged to check plants daily, even on weekends and holidays. PSRG staff can advise on proper plant care practices. A narrated slide set has information on greenhouse growing basics.

Plant Spacing: Plants may not be crowded onto greenhouse benches. Adequate space must be maintained to promote good plant health and aisles between greenhouse benches must be maintained to allow access for greenhouse staff to make repairs, scout for pest problems, and apply beneficial organisms or pesticides.

Sanitation/Cleanliness: Users are expected to maintain greenhouse zones in a neat and orderly fashion. While PSRG staff clean common areas, greenhouse zones should be cleaned (e.g., debris swept from the floors) by users. Do not wash debris down the floor drains. If floor drains need the attention of PSRG staff, please submit a work request via the ticketing system. Once a study has ended, users should promptly discard all plants, potting media, and pots in the appropriate locations. Dead plants should be routinely culled and removed from the greenhouse facility. Disposal of plants, potting media, and pots is outlined in Appendix C, Plants, Potting Media, and Pots Disposal Procedures.

Trash should be discarded in trash cans located in the greenhouse hallways.

If a greenhouse zone is not kept in a neat and orderly fashion, users will receive a notice from the Greenhouse Director to remedy the problem within a short period of time. If the problem is not addressed in a timely manner, greenhouse staff will rectify the problem and the user will be charged for the labor required, with a minimum fee of $500.

Quarantine Room: Users must inform the IPM Coordinator before bringing plants or plant cuttings (e.g., anything other than seeds) into the greenhouse to prevent introduction of unwanted pests. A quarantine room is available for plants to be held while they are being inspected, and if necessary, treated. Please do not place plants in the quarantine room before informing the IPM Coordinator.

Research with Insects and Diseases: Users must inform the Greenhouse Director and IPM Coordinator when research will involve insects and diseases so that arrangements can be made to prevent spread to other greenhouse zones.

Research with Pesticides and Other Chemicals: Users must inform the Greenhouse Director and IPM Coordinator when they will use pesticides and other chemicals (excluding fertilizers). Users must have the appropriate credentials to use pesticides and plans must be put in place to ensure safe use.

Genetically Modified Organisms: Please let the Greenhouse Director know if you are conducting research with genetically modified organisms so appropriate plans can be put into place.

Potting Areas: The potting room in the headhouse or potting stations located in the greenhouse hallways should be used; plants should not be potted in greenhouse zones. Please do not leave open bags of potting media on the table at the potting station. A lidded trash can is kept at each potting station for storage of opened bags. Carts are available to transport plants from potting stations to greenhouse zones.

Storage: Each greenhouse zone may have one small cabinet for storage of tools and supplies that are frequently used; users are discouraged from storing pots, trays, potting media, dried/dead plant materials, fertilizer, or other chemicals on greenhouse benches. **No pesticides are to be stored in the greenhouses at any time.**

Greenhouse Equipment and Electrical Hookups: Greenhouse users may not make changes to heating and cooling equipment (e.g., radiant heating fin tube, unit heaters, exhaust fans, roof vents) or to the controls that operate them. Users may also not alter electrical installations.

Attire: Greenhouse users must always wear closed-toe shoes. Sandals or other types of open-toe shoes are not permitted. Shorts are permitted.

Hallway Obstructions: All greenhouse hallways must remain free of obstructions. PSRG potting stations, potting media, and equipment (carts, wheelbarrows, etc.) are located in hallways, but cabinets, containers, tables, or other greenhouse equipment should not be stored in hallways. Aisles within greenhouse zones should not be blocked.

Pets: Pets are strictly prohibited from the greenhouse.

Bicycles: Bicycles are not permitted in the facility. Bike racks are available near most entry doors.

Policy Violations

PSRG users are expected to follow all MSU and PSRG written and posted policies, as well as applicable state and federal laws (e.g., Worker Protection Standard law). Users that violate laws or policies will be contacted by the Greenhouse Director or the Compliance and Operations Manager for MSU's AgBioResearch. Supervisors and MSU administrators will also be contacted when appropriate.

Policies may be modified with approval from the PSRG Executive Committee and changes will be communicated to all users prior to implementation. Repeated and/or flagrant violations of these policies may result in greenhouse services being suspended or a reduction in allocated space. Material damage to the PSRG facility and equipment caused by misuse, unrelated to age or preceding physical condition, will be corrected immediately at the expense of the user or their supervisor.

PSRG staff will strive to communicate in a clear, concise, and professional manner with all PSRG users and we expect the same in return. Staff and users should treat each other with mutual respect. Poor treatment of PSRG staff by users, and users by PSRG staff, is not acceptable.

Questions or comments about policies, procedures, PSRG staff conduct, or greenhouse operations should first be communicated to the Greenhouse Director. Users may also contact the co-chairs of the PSRG Executive Committee or their departmental representative(s) to the committee if the Greenhouse Director is unable to resolve concerns.

Appendix A

Plant Science Research Greenhouse Employee Directory

Website: https://rtsf.natsci.msu.edu/research-greenhouse-complex

Dr. Chrislyn Particka, Director
Office Location: 102 PSRG Headhouse
Cell Phone: 315-651-9682
Email: chrislyn@msu.edu

Trevor Hardwick, Lead Greenhouse Coordinator
Office Location: 104 PSRG Headhouse
Cell Phone: 260-704-1748
Email: hardwi31@msu.edu

Paige Kennedy, Greenhouse Coordinator and IPM Assistant Coordinator
Office Location: 106 PSRG Headhouse
Cell Phone: 269-986-3693
Email: kenne461@msu.edu

Larry Thayer, Greenhouse Engineer
Office Location: 110 PSRG Headhouse
Cell Phone: 989-413-1096
Email: thayerl1@msu.edu

Rachel Wood, Lead IPM Coordinator
Office Location: 114 PSRG Headhouse
Cell Phone: 734-771-3945
Email: woodrac6@msu.edu

Plant Science Research Greenhouse Executive Committee

Dr. Erik Runkle, Committee Co-Chair
Department of Horticulture
Email: runkleer@msu.edu

Dr. Thomas Sharkey, Committee Co-Chair
Department of Biochemistry and Molecular Biology
Email: tsharkey@msu.edu

Dr. Hannah Burrack
Department of Entomology
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Dr. Bjoern Hamberger
Department of Biochemistry and Molecular Biology
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Dr. Linda Hanson
USDA-ARS Research Plant Pathologist and Adjunct Professor, Department of Plant, Soil, and Microbial Sciences
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Dr. Jeremy Johnson
Department of Forestry
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Dr. Roberto Lopez
Department of Horticulture
Email: rglopez@msu.edu

Dr. David Lowry
Department of Plant Biology
Email: dlowry@msu.edu

Dr. Carolyn Malmstrom
Department of Plant Biology
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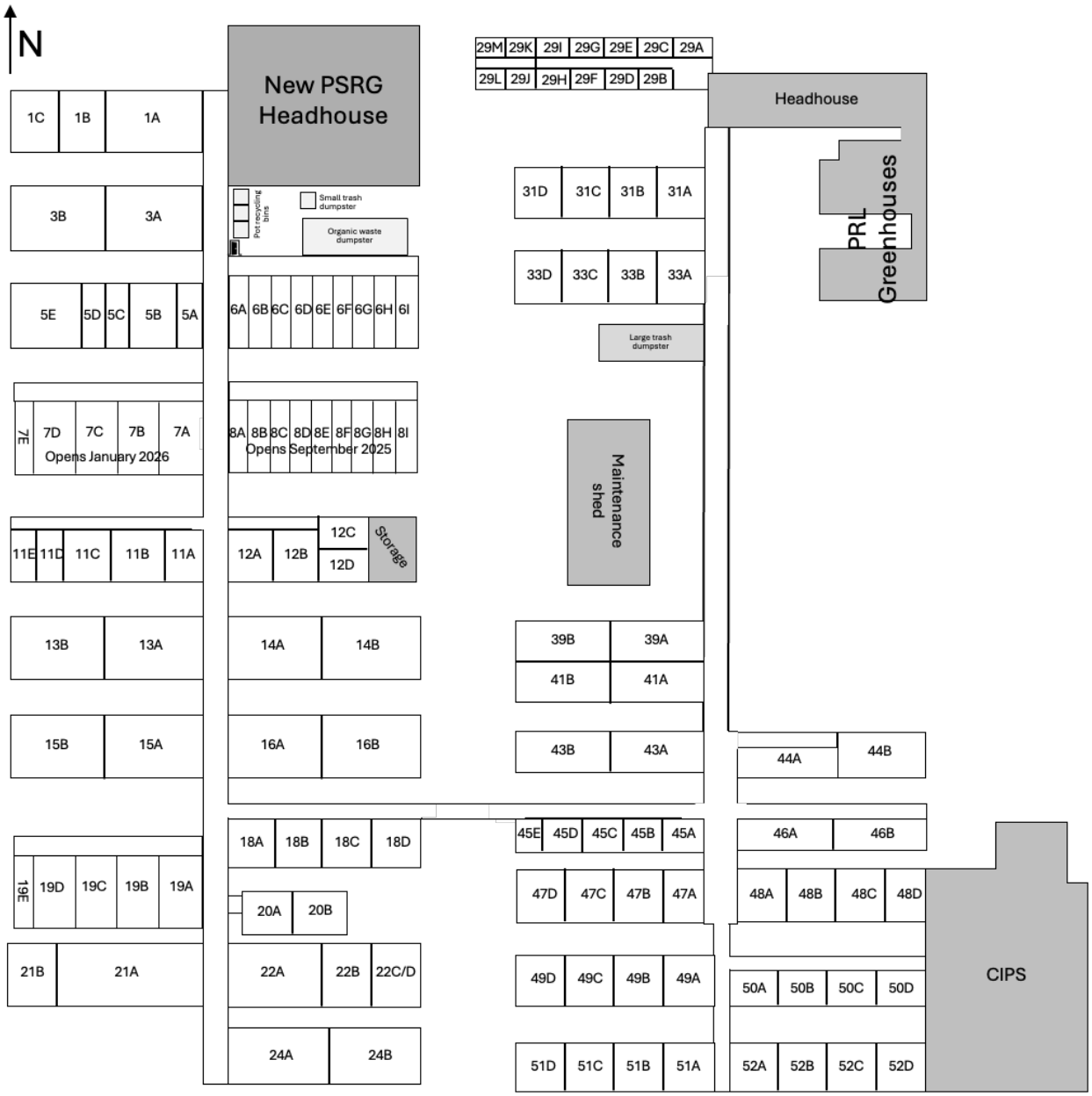
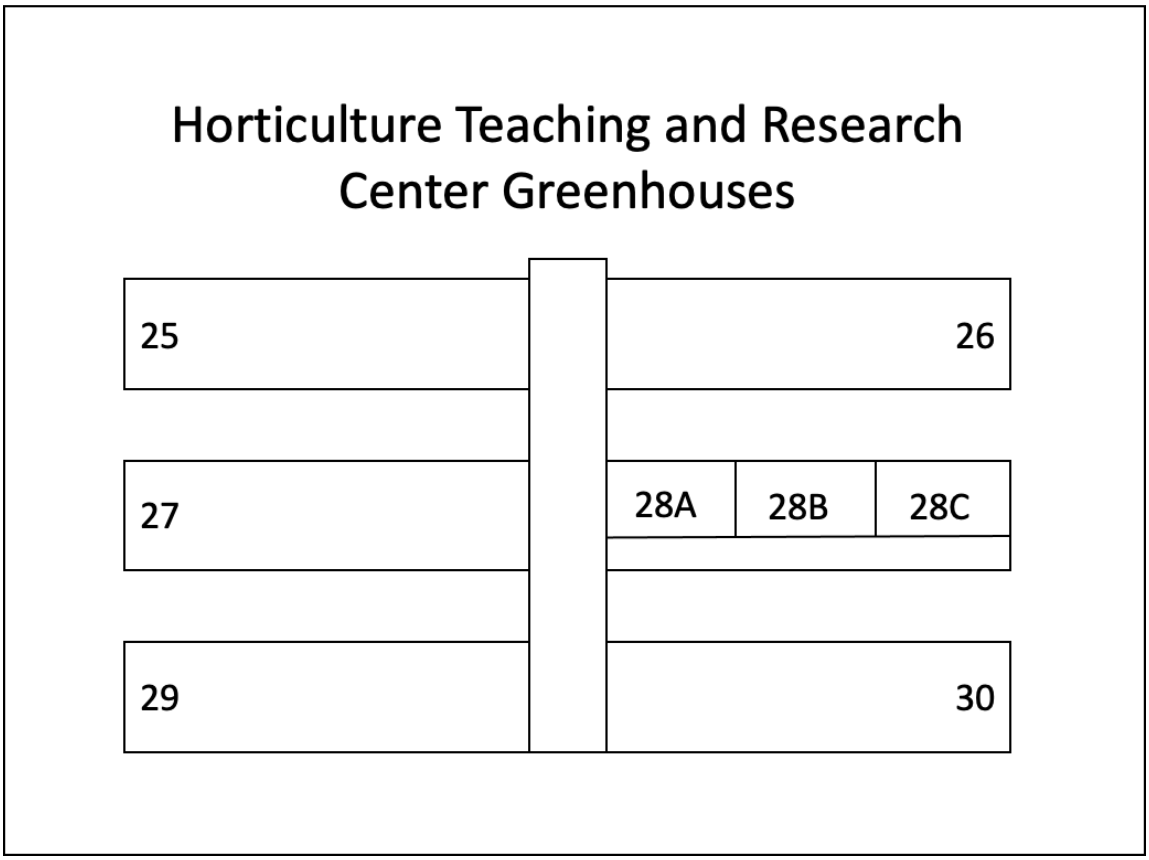
Dr. Eric Olson
Department of Plant, Soil, and Microbial Sciences
Email: eolson@msu.edu

Appendix B

Main Campus Facility Map



Horticulture Teaching and Research Center (HTRC) Facility Map



Appendix C

Plants, Pots, and Potting Media Disposal Procedures

1. Proper disposal of plants, pots, and potting media is the responsibility of the greenhouse user. Please note that there are special procedures for transgenic plants.

2. To prevent the spread of pests through the facility when discarding plants, wheeled, lidded trash cans are located throughout the greenhouse hallways; these plant disposal cans MUST be used when discarding plants. Carts, wheelbarrows, etc. may not be used.

Plant disposal cans should be taken to the greenhouse zone. Remove all pot labels, twist ties, beneficial insect sachets on plastic sticks, etc. (e.g., anything that is not compostable), then dump the plants out of the pots into the can. Do not overfill the cans as the lid must fit securely and must be on the can as it is being moved through the greenhouse hallways.

Cans of plant material, even if they are not full, must be emptied by users. In instances where plants will be discarded over a period of a few days or weeks, users may leave plant disposal cans, with the lid on, in the greenhouse zone.

If a large greenhouse zone of plants needs to be discarded, please contact a greenhouse staff member a day or two ahead of time to ensure that all of the plants will fit in the dumpster.

3. Non-transgenic plants: Users should take cans of non-transgenic plants and potting media to the steam dumpster that is in the loading area between the headhouse and greenhouse 6. There is a ramp to facilitate emptying the material in the cans into the dumpster.

Once it is full, this dumpster is covered and steamed overnight before it is taken to a compost facility. If the bin is covered for steaming or is being serviced, cans of non-transgenic plants may be parked near the dumpster and greenhouse staff will empty them later.

4. Transgenic plants: For small amounts of transgenic plants (five or fewer trash cans), users should take plant disposal cans to the maintenance shed and park them in the designated area for transgenic plants. It is on the north side and is indicated with a sign. Greenhouse staff will empty them into the steam dumpster at a later date. If the barn is locked and it is between 7 am and 4:30 pm on a non-holiday weekday, please contact a greenhouse staff member; signs with their names and contact information are posted at the keycard doors. If it outside of normal business hours, please put the plant disposal can(s) back in the greenhouse zone and email the Greenhouse Director for further instructions.

For large amounts of transgenic plants, users should contact a greenhouse staff member to arrange a time to dump material directly into the steam dumpster so it can be immediately covered and steamed once plants have been discarded.

5. Pots and plastic trays should be placed in the recycling bins, which are also in the loading area between the new headhouse and greenhouse 6. Please check the number on the pot/tray and neatly stack them into the appropriate bin.

6. Do not dispose of plants, potting media, or pots in the trash dumpsters.