



D O N A L D D A N F O R T H
P L A N T S C I E N C E C E N T E R

**PLANT GROWTH
FACILITY
USER MANUAL**

**An Orientation to Policies and
Practices**

Updated 9/8/2023

The policies and guidelines outlined in this manual have been developed by the Plant Growth Facility (PGF) Management team and PGF Oversight Committee

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Mission of the Plant Growth Facility

The Plant Growth Facility (PGF) strives to provide collaborating scientists with best-in-class resources for research, product development, and learning. We accomplish this by designing, operating, and maintaining state-of-the art controlled-environment growth facilities and through the client-focused services of our expert PGF staff.

Facility Description & Maps

The PGF houses 50 greenhouses and 100 growth chambers of various sizes that control and contain many different plant species. Greenhouses are climate-controlled and can closely replicate plants' natural growing environments by manipulating parameters such as temperature, humidity, and day length. In addition, cutting-edge growth chambers allow for even more environmental control by providing carbon dioxide addition and scrubbing capabilities and the creation of custom light spectra. The PGF's expert staff provides plant care year-round, allowing researchers to focus on the science that will advance the Center's mission to improve the human condition.

[Plant Growth Facility Website](#)

[Map of A Building, Level 0](#)

[Map of B Building, Level 0](#)

[Map of Danforth Greenhouses](#)

PGF Staff & Contact Information

PGF staff members are available on site seven days a week to address any questions or concerns users may have. General work hours for PGF staff are between 8am-5pm Monday-Friday, with weekend staff present Saturday and Sunday. The PGF Manager is on call 24/7 to address any alarms or emergencies. Feel free to contact the PGF Manager or other staff members directly. We are committed to resolving your inquiries in a timely manner.

- **PGF Director: Kevin Reilly**
kreilly@danforthcenter.org
- **PGF Operations Manager and PGF Safety Coordinator: Mary Lyon**
mlyon@danforthcenter.org
- **Greenhouse Manager, A-Range and B-Range: Aileen Kidwell**
akidwell@danforthcenter.org
- **Greenhouse Manager, C-Range and B-West: Daniel Long**
dlong@danforthcenter.org
- **Growth Chamber Facilities Manager: Kristina Haines**
khaines@danforthcenter.org



- **PGF Maintenance Manager:** Ian Lastarria
ilastarria@danforthcenter.org
- **Entire PGF Staff**
See the entire PGF staff on the [PGF website](#) at the bottom of the page.

A list of greenhouses and growth chambers can be found [here](#). Click on the individual greenhouse or growth chamber to see its user, primary contacts, and other details.

PGF Services & Supplies Offered

A number of standard services and common supplies are included in the growth space rental fee. Extended (non-standard) services & specialty supplies may be offered at an additional fee.

PGF standard services (included in growth space rental fee):

- Programming and monitoring of computer-controlled environments
- Watering 365 days a year
- Maintenance of proper soil fertility levels
- Pest scouting and control measures
- Adjusting and maintaining supplemental lighting and photoperiod control
- Greenhouse maintenance and routine sanitation
- Autoclaving/devitalization of all plant material
- Setting up automated irrigation systems when the use of the system is deemed cost effective due to the reduction in hand watering
- Advise and assist with planting and repotting crops when time permits. Users must give advance notice.
- If the estimated time to complete a requested task is great than 1 man-hour, a weeks' notice is required, and charges will be incurred (see below). Otherwise, 24-hour notice is sufficient if time is available.

Supplies provided for users' potting needs (included in rental fee):

- Potting mixes, vermiculite, perlite, sand, Turface[®]
- Various sizes of square and round standard greenhouse plastic pots, trays, plug trays, cell inserts, and nursery containers
- Clear domes
- Rooting hormone
- Carts for transport
- Small supply items such as bamboo stakes, twist ties, and pot labels
- Safety items including disposable gloves and personal protective equipment (PPE)

Extended PGF services (offered for added fee):

These services may be offered by the PGF based on time and labor availability. Users will be charged for the following services:



- Seed sowing in plugs or trays and transplanting of seedlings to pots
- Direct seed sowing in final pots
- Transferring to soil from tissue culture and potting up of rooted cuttings
- Propagation of cuttings and potting of stake cuttings
- Moving plants from potting room to a growth area, or moving plants from one area to another, unless the change of location is initiated by the staff.
- Maintenance of stock plants beyond the base care above (i.e., leaf removal, pruning, repotting, restarting new cuttings, keeping records, etc.)
- Any crop specific record keeping and labeling
- Harvesting and cleaning of seed
- Pollinating and bagging of flowers
- Tissue Sampling
- Staking and pruning of plants
- Other services that are beyond standard offerings

Facility Users' Responsibility

- Users are required to complete general safety and pesticide safety training BEFORE working in the PGF, which includes the New Employee Safety Training and WPS Safety Training. Contact DDPSC Sr. EHS Manager (Jim Cox) and PGF Operations Manager (Mary Lyon).
- Users must plan supply needs in advance. If the supplies needed are not part of our standard supplies, at least two-weeks notice is required. Contact the Operations Manager for purchasing information. For these special request items, the user will be charged. (See page 6 for growth space rate information.)
- At least 7 days in advance, all new growth areas and all multi-user growth areas must have a space request submitted. (If your lab already has a reserved greenhouse or chamber, you do not need to submit a space request for this to move plants in this growth space.) **Please click [here](#) to request greenhouse or chamber space.**
- All plants must be logged in to our Plant Transfer Record (PTR) system. Barcode tags will be printed and must be used when placing any plants in the facility. There should be a tag placed in all flats and all pots 1-gallon size or larger. *See "Creating a PTR" under the "PGF Resources" section on the PGF website for more information.*
- Plants should be spaced properly to ensure air movement and access for watering, as determined by the staff. Staff may move plants within a chamber or greenhouse if needed.
- Users should provide relevant instructions and feedback to the greenhouse team regarding their plants and what they need. Signs which can be placed in pots/flats are provided for basic care instructions and are located in the Main Potting Room.
- Growth spaces and work areas should be kept clean and organized when work is completed.
- The Greenhouse or Chamber managers should be notified when an experiment is terminated early, or your growth space is no longer needed.



- If users feel their plants are not being properly watered, they should talk with their designated horticulturist. Do not water your own plants unless you have placed a “Do Not Water” sign in the pot or flat and are taking care of watering full-time.
- All PTR tags should be removed at plant disposal and checked out of the system. Place used PTR tags in an orange receptacle.
- To help achieve our sustainability goal, the PGF runs certain planting supplies through a warewasher for reuse. Any used trays (besides plug trays), domes, pots 0.5 gallon and larger, 4.5” pots, signs, and bamboo stakes should be returned to potting room dishwashing racks for disinfection and reuse. This list can be found on the whiteboard in the Main Potting Room. Shake all extra debris off into an orange receptacle prior to stacking dirty materials on racks.
- **All plant materials and other bio-waste (including all dirty pots and trays not mentioned above) must be discarded in orange trash cans, carts, or tubs. (See page 17.)**

PGF Etiquette

Due to the large number of users in our potting rooms and greenhouses, everyone is expected to clean up after themselves and keep their growth and working areas organized. It is the user’s responsibility to clean up when finished.

After finishing work in the potting room:

- Brush off worktables with the hand brooms and dust pans. All debris must go in orange trash cans.
- If benches are wet, there are hand squeegees at the sinks for removing the water into orange trash cans.
- Brush off carts after transporting plants to growth areas. If they are still dirty, hose the carts down by the drain in A-Range, located to the right after going into the corridor. There are also drains in each potting room. **Please brush all loose debris into an orange receptacle prior to hosing down carts.**
- Rinse sinks after use. You should always be using a sink strainer when rinsing off agar or soil and empty strainer into an orange receptacle. These should not go down the drains.
- If debris is dropped in the greenhouse or corridor, sweep up and dispose of it in an orange receptacle. Brooms and dustpans are provided in the corridors and potting rooms.
- The floor in the potting room around your work area should be swept if needed.
- All extra pots and flats not used need to be returned to the supply room.
- Work only in the area that you have reserved. Do not take up multiple spaces unless you have reserved them as well.
- Working with plants in the corridors is prohibited.

The PGF firmly adheres to submitted space request dates and quantities. If you find you need more time and/or more space, please contact the manager of the space you are utilizing. You may be instructed to submit another space request form. Please keep in mind that space extensions are only granted if the space is available. They are not guaranteed.



Growth Space Rental Fees & Other Charges

Growth space rental fees are associated with the use of greenhouse and growth chambers/room. Internal growth space rental rates may be found at the [Greenhouse & Growth Chamber Rates](#) section of the PGF “Pages” tab on WorkVivo.

As specified above, common supplies are provided by the PGF for use by the researchers. The PGF may order specialty items on researchers’ behalf. However, the cost will be charged back to the requestor’s lab / company. In addition, requests for extended services that are beyond the scope of base-level services mentioned in PGF Services & Supplies Offered section (see page 3) may incur an additional fee.

Requesting Use of Growth Space

PGF Management is responsible for allocating growth space to DDPSC researchers and external clients.

Labs should coordinate within themselves regarding space allocation for reserved areas. Incoming graduate students, post docs, and visiting scientists should provide information about space needs for their experiments to their lab manager and/or PI. Space in growth chambers and growth rooms will be allocated on an “as needed” basis.

Please note: Our space request system is a request for space and not a reservation system. Space is not guaranteed to be available during the requested timeframe. Some chambers may have a longer wait time due to higher demand. Due to the limited availability of these spaces, not all requests will be immediately approved.

The following steps must be taken prior to acquiring growth chamber/room space. All new reserved locations and all multi-user locations will need to fill out a request form.

- Complete the PGF [Greenhouse & Growth Chamber Space Request Form](#). Be sure to fill out the form as completely as possible. Incomplete request forms may not go through. Request forms should be submitted at least 10 days in advance of the desired start date.
- Users will then receive an email with information on whether the request has been approved or not, which Horticulturist is their contact, and where the plants should be placed. **Do not put plants in a chamber or a greenhouse if you have not received approval.**
- **For external users potentially interested in PGF growth space or services, please fill out our New Client [Plant Growth Facility Intake Form](#).**
- If space is not available, the request will be added to the [Waitlist](#) or offered an alternative location. The requestor will be notified when a suitable growth space becomes available.



Chamber Space

- Notification of chamber request approval will be sent within two weeks and will indicate which chamber they've been assigned and for the rental dates.
- Chamber space can be requested for up to four months. Requests for a single experiment may be allowed to go up to six months with additional explanation required prior to approval.
- Chamber requests greater than 4 months in advance of requested start date will be notified of approval within one month of that date.
- Within one month of the reservation end-date, another space request can be submitted for an additional four months.
- Chambers have a one-week minimum rental. Shorter rental periods for heat/cold treatments may be accepted with additional explanation and prior approval, depending on chamber availability.
- New rentals can start on any day of the week. For consecutive renewals, rentals will begin on the Monday of the following week for scheduling purposes.
- Greenhouse staff must be notified if the chamber is to go unused for more than two weeks during the scheduled reservation. Any rented chamber left empty for more than two weeks will be considered vacated and the reservation ended.
- If space is not fully utilized when renting walk-in chambers, the user may be asked to move to a smaller chamber.
- Users not following chamber policies will be asked to vacate, or their chamber request/renewal will not be granted.
- Compatible internal projects may be consolidated into one chamber when necessary, depending on permits, environmental settings, and space requirements.
- Chambers need to be vacated by the end of their rental term. Users must notify greenhouse staff at least two weeks in advance if they need additional time. Continued usage of their current chamber is not guaranteed.
 - Unless PGF approval is granted, plants remaining in chamber after the end date will be charged twice the daily rate for up to one week. If plants still remain in the chamber at that point, they will be moved to a multi-user chamber, greenhouse, or dry-down room.

Renewing Growth Chambers

Reserved Growth Chambers must be renewed at least once a year at the Greenhouse Managers request via the [Chamber Renewal Form](#). The Chamber Manager will send instructions every 4 months, including the link to the Chamber Renewal Form, when it is time to renew.

Any users that do not renew their growth chamber will be asked to follow the termination protocol (see page 9).



Guidelines for Allocating PGF Growth Space

Greenhouse ranges have differing equipment and functionalities that are more conducive to growing certain types of crops. For example, A-range is equipped with air-conditioned compartments; therefore, cool-season crops have priority for this space.

Below are the general guidelines for each greenhouse range. Where applicable, the Managers will operate under these guidelines when allocating growth space. The PGF Oversight Committee may also be called upon to advise on space allocation prioritization when needed.

All ranges:

- Allotments that allow same/similar crops to be housed in same general area (same range) are preferred. This will increase operational efficiency as well as energy savings.
- Labs whose crops do not meet specific criteria for a certain range may still rent space if there is vacancy and no impending requests to grow plants that are better suited for growth in that range.
- Allotment of space will be as equitable as possible, in an attempt to provide each lab with the appropriate and necessary amount of space for their projects.

Chambers:

Growth conditions are highly controlled in chambers, allowing greater control of the environment for temperature, humidity, light intensity, day length, or CO₂ control. Priority will be given to those who need this tight control due to the nature of their experiment or to those who need unique environmental conditions that are not found in the greenhouses.

Multi-User Growth Space Guidelines

All users are asked to follow the following guidelines when working in a multi-user growth space:

- All researchers must fill out a space request and have it approved before placing crops within a multi-user growth space
- All containers must have a PTR tag
- All plants must be spaced appropriately as recommended in crop protocols
- Plants may not be placed directly on the floor.
- Supplies and tools may not be stored in a multi-user greenhouse or chamber

Terminating Use of a Reserved Growth Space

By User Request: During the growth space rental term, a user may wish to terminate their use of the space and stop the accrual of rental fees. This may be requested at any time by notifying the Greenhouse or Chamber Manager via e-mail.

In the “Stop Chamber/Greenhouse Use” e-mail, please provide:

- Your name,
- Lab/department or company name



- Chamber/greenhouse number
- Date you wish to move out of the growth space

Users must clean out all plant material, containers, and any other items in growth space. Rental fees will be charged until all user materials are removed and the area can be cleaned by PGF. Advanced notice of intent to stop growth space use will help expedite the process.

External users must send their notice a minimum of 30 days before the requested termination date in alignment with their contracts.

By PGF Action: In an order to maximize the use of limited growth spaces, especially growth chambers and rooms, the PGF has been authorized to remove/reassign any users from a growth space if said user is not using the space appropriately or effectively. The user may be asked to consolidate their plants into another space or to remove their plants from the facility. The Chamber Manager must be notified if a chamber is to go unused for more than two weeks during the scheduled reservation. Any rented chamber left empty for more than two weeks may be considered vacated and the reservation ended.

Updating Growth Space Settings

For greenhouses and chambers completely rented out by users, the user may update their growth space environmental settings at any time by simply notifying a PGF Manager via email. A PGF Manager will respond when the adjustments are completed.

QR Codes:

Greenhouses and chambers each have individual QR codes on them, which can be accessed with your mobile device. These allow for more information to be relayed to the user, which may include environmental setpoints, fertilization schedules, IPM updates, and Horticulturist contact information. You can also view these on any computer through the [PGF Resource section on our website](#).

Reserved Space Guidelines

All users are asked to adhere to the following guidelines when working in a reserved growth space:

- Minimum Aisle Width: 2 feet (3 feet preferred)
- All plants must be spaced appropriately as recommended in crop protocols
- Do not place plants directly on the floor
- Keep aisles clear
- All containers must have a PTR tag
- Greenhouses are not to be used as storage facilities. Please do not keep any empty containers in the greenhouse unless they are used within 7 days of placement.



Bringing in Plants/Cuttings from Outside Sources

Plants or cuttings that have been grown in the field, another growth facility, or any other external environment must be inspected for pests and disease by the PGF staff prior to entering growth spaces. Contact a Greenhouse or Chamber manager to schedule an inspection appointment if you wish to transfer outside plant material to the PGF. Proper inspection by our trained staff will ensure the safety of your crops as well as those of other researchers. If plants are clean, they may be taken to a growth space, provided that a pesticide application can be scheduled immediately. If pests are present but treatable, the plants must be temporarily taken to a designated quarantine space where they will be isolated from other plants and intensively treated for pests. In severe cases, plants will not be allowed to enter the growth facility, particularly if plants show evidence of infectious disease.

Spacing Plants

Plants should be spaced properly on the greenhouse bench or in growth chambers to allow for air movement and access by greenhouse team to water, scout, and spray. A PGF staff member will notify you if spacing needs to be modified. Do not use close spacing to make up for lack of space allocation.

Transplanting

Greenhouse users are responsible for transplanting their plants to keep them from frequently toppling over, or when plants are becoming stressed. Transplanting services are offered by PGF as time permits and are billed as an extended service (see Growth Space Rental Fees & Other Charges on page 6).

Collections, “Pet Plants”, and Other Long-Term Crops

Space in the facility is reserved for research only. Personal use and “pet plants” are not allowed. Starting personal garden plants or houseplants is not allowed. Collections should be used actively to fulfill a research mission. Plants should not be kept longer than necessary in the facility, particularly if they’ve completed their life cycle and are not actively growing. Insects and disease can become a problem in all these cases. If you will be growing long-term (perennials, etc.) research crops, please contact the PGF Manager to discuss special care procedures.

The greenhouses and growth rooms/chambers are alarmed for climate setting deviations and equipment failures. If the climate temperature is above or below the temperature alarm set points, you will hear an alarm. You do not need to take action unless the alarm continues for more than 30 minutes, in which case you may contact the PGF manager or another staff member.



PGF Managers are automatically notified about an alarm via the computer control system. The alarm appears on the manager's PC, and the system also delivers an automated notification via email, text and/or phone call. Even outside of work hours, the managers can view and acknowledge these alarms. Members of both the PGF and Facilities staff are on-call to respond to alarms and other emergencies 7 days a week.

Building Structures & Auxiliary Equipment

All structures must have their final blueprints approved by the Horticulturist in Charge of the Greenhouse, the Greenhouse Manager, the PGF Operations Manager, and the Safety Officer *before* any construction is started. Any changes during construction must be approved as soon as they are made and before any more building continues. A Horticulturist or Facilities personnel must be present during the construction process.

All structures must follow safety guidelines and must be accessible from at least 3 sides for proper plant care. Structures may not have features that require climbing to access plants.

Any equipment that is desired to be brought in to PGF that is not part of an existing greenhouse/growth chamber facility/structure must be inspected and pre-approved prior to placing or installing in PGF. Approval is to be made by an authorized PGF mechanical expert (e.g., PGF Maintenance Lead, Facilities Electrician, or Facilities Director) and Greenhouse/Chamber Manager & Safety Officer.

Guidelines for Equipment Use

The Danforth Plant Growth Facility team members use multiple types of equipment to perform various tasks. Some equipment is made available for use by Danforth and external lab personnel who work in the PGF, but prior to use, training is required, and permission must be granted by a PGF Manager or authorized Facilities member. Other equipment will be for PGF use only and is not available for common use. Please see the PGF equipment lists below.

Requires Training and Permission Before Use:

- Manual pallet jack
- Electric pallet jack
- Vertical reciprocating lift (VRC in C-Range)
- Small soil mixer
- Forklift
- Fume hood (Pesticide room in PGF-B only)

For Plant Growth Facility Staff Use Only:

- Water valves (in all greenhouses and growth chambers)
- Argus control boxes (greenhouses)
- Electrical control boxes (greenhouses or chambers)
- Conviron Control Boxes (Chambers)
- Scissor lift



- Ware-washer
- Scaffolding
- Ladders
- Large soil mixer
- Thresher (in Greenhouse G16-B)
- Autoclave (in Greenhouse G16-B)
- Fertilizer tanks or injectors in the greenhouse or chamber areas
- Pesticide sprayers/tanks

For any questions about equipment training or usage, please contact Mary Lyon (mlyon@danforthcenter.org) or Tara Oehler (toehler@danforthcenter.org) of the PGF Operations Team.

Scheduling Time in PGF Common Workspaces: QReserve

QReserve is the online reservation system we use for our potting rooms and work areas. This allows flexibility in scheduling. With a reserved work area, users know there will be room to do their work according to their schedule.

Workspaces which can be reserved include:

- Main Potting Room (5 seats plus 1 seat with microscope)
- C-Range Basement Potting Room (6 seats)
- PGF-B Potting Room (4 seats plus 1 with microscope)
- Greenhouse 11A seats (4 available plus one with microscope)
- Imaging room-basement
- Photo booth- basement
- PGF-B Pesticide Room (must have WPS handler training and get approval)
- Seed Processing Room- basement (3 seats available)

Logging on:

The link to join QReserve and create your own account can be found [here](#). Click “create your user account” and set your own password at this time, which could be the same as your Danforth information. You will then receive an e-mail asking you to activate the account. Click on “create your user account” and set your own password at this time, which could be the same as your Danforth information. An email will then be sent which will ask you to activate the account.

Menu:

- *Dashboard:* This page will show our site, Danforth Plant Science Center Plant Growth Facility. You can click on this to go to our main page. It also will list your upcoming reservations. If you would like your reservations to show up on your outlook or Google calendar, you can click the “export calendar” button. A link will appear, and you can then choose where to have it exported.
- *Sites:* This page shows our site. Click on the logo to go to our main page. Wherever needed, you can always start over on this page.



- *Search*: This lets you search for a specific location or a category. You can access the reservation calendar for a location by clicking on its name in the search results.
- *History*: This is a quick way to see your past reservations. You can go directly to that location's reservation calendar by clicking the calendar icon on the right side of that location's name.
- *My Profile*: You can fill out this page as much or little as you would like. Under "Displayed name," please enter your first and last name. This is what will show up on the reservation calendars. If you are making a reservation for someone else, you will type their name in place of yours.

Making Reservations:

Start at our site's main page, accessible from either the "Dashboard" or the "Sites" sections on the menu. On the right side of the page, you will see a list of our reservable locations. You can make reservations in several ways.

- *By Section*: Click the name of a section to see the calendar of all locations within it. For example, if you click "Potting Room- Main," you will see a calendar of all the seats in our Main Potting Room and their reservations for today. You can switch the view to day, week, or month by the tabs above the calendar. You may want to use this option if you need to make reservations for more than one location in that area.
 - To make a reservation, highlight the squares that correlate with the seat and time you want access to. A window will pop up for you to check the time and date. You can choose to be reminded of this reservation if you wish; you do not need to list a purpose. Once you click "Reserve", your name will appear on the calendar.
- *Specific location within section*: If you want to see a specific location's calendar, click on the toggle arrow next to the area if not already expanded. (Click this arrow again to collapse the list.) This will expand that area to show all the locations within it. Click on the "Reserve" button to the left of the name of that location and it will take you to a calendar for that specific location. Click on what day you want to make a reservation, enter the times, and click "Reserve." (Note that if you click on the location itself you will be taken to an information/email page instead.)

Cancellations:

If you need to cancel a reservation, go to the calendar and click your name on its reservation timeslot. Click "Delete Reservation" and then "Continue".

Mobile access:

QReserve can also be accessed on your phone at my.qreserve.com after you have set up your account. Viewing a specific location's calendar may work better than viewing a whole area's calendar.

General Reservation Rules:

- Reservations can be booked in 15-minute intervals.
- Reserve only the time and the dates you plan to be in that location. Many people are using these areas and need to know the space is not in use when they arrive.



- Potting rooms and works spaces have a 6-hour time limit and can be reserved up to 60 days in advance. Potting rooms are stocked with supplies needed for the growth locations closest to it.
- If you are loading/unloading the Phenotyper and plan to use the Main Potting Room, please reserve all seats during that time so others know they will have room to work.
- All areas can be booked up to the start time of the reservation. Make sure that you still put your time into QReserve so that we can track the number of users and so a space does not become needed by more than one person.
- Some locations may require approval before a final reservation is made, such as the PGF-B pesticide room.
- If the time of your reservation needs to be altered for any reason, a greenhouse staff will notify you.
- Any users who have not completed their yearly WPS safety training will not be allowed to make reservations.

Creating a Plant Transfer Record (PTR)

All users must create a PTR* when any plant material is placed into the facility or transferred from one area to another. This applies to both reserved and multi-user growth spaces.

PTRs may be created on any computer [here](#). To print your label, you must do it at one of the PTR computer stations. Computers are in each of our three potting rooms (Main Potting Room, C-Range Basement Potting Room, and PGF-B Potting Room). To create a PTR, users must have already received their approval email for their space request. They will need to know what activity code they are operating under and where the plants are designated to be placed.

Use these computer stations to create a PTR and print out a barcode tag. One barcode tag must be placed in each plant container greater than 4.5" and in each flat. PTRs allow the PGF staff to track the owner of each plant and to bill for space usage. Therefore, it is critical that all researchers and clients use the PTR system. **Plants which do not have a PTR record may have services withheld or may be discarded entirely.** Continued non-compliance will result in the suspension of services.

Users should check their crops at least once weekly. Forgotten plants in the PGF which are no longer needed limits space and resources. If your plants are in a growth area, they will be charged for the space regardless of if they are actively growing. You should not check out the PTR until the plants are no longer in a growth area.

*CassavaTracker barcoding system may be used in place of PTR system in reserved spaces. Multi-User houses must still have a PTR associated with the tray.

PGF Crop Plant Care Protocols

Plant Care Protocols may be found on the DDPSC website under the PGF Resources section (click on Plant Care Protocols). Please email the Horticulturists to ensure you have the latest version. If you have any questions regarding a crop protocol, please reach out to the PGF Managers via email.



Chemical & General Safety

The PGF team is responsible for operating the greenhouse in a safe manner. This includes operating under the EPA's Worker Protection Standards (WPS) and handling pesticides and other chemicals in accordance with all federal, state, and local regulations. This is a unique challenge in a facility available to its users 24 hours a day, therefore requires a great deal of communication and cooperation between staff members and users.

We are committed to making information available about the chemicals we use. A pesticide application record manual is posted in the Main Potting Room. Safety Data Sheets (SDS) and copies of labels are available in the same location.

To ensure compliance with all appropriate regulations, **all PGF users must receive permission from the EHS and PGF Managers prior to chemical applications of herbicides, fungicides, and other regulated chemicals in a chamber or greenhouse.**

All work in PGF areas should be associated with an approved IBC (Institutional Biosafety Committee). For more information regarding IBC, contact Mindy Darnell, EHS Director/Biosafety Officer.

All regulated biological material must be approved and permitted by the USDA. All permits must be submitted to Brook Schmitt (bschmitt@danforthcenter.org) in the DDPSC EHS office.

Growth Chambers and Greenhouses may exhibit signs with the terms, "Authorized Personnel Only," "USDA Regulated Materials," and/or "Doors must remain locked." All signs must be adhered to. No one is to enter these areas unless he or she has been authorized to do so. Furthermore, growth spaces with permitted material are required to have these signs unless directed otherwise and all individuals who enter this space must have authorization and training on working with regulating materials.

View fume hood document: [Fume Hood Pesticide Use](#)

View biosafety manual: [DDPSC Biological Safety Manual](#)

Faculty members are responsible for their staff's safety compliance in the Plant Growth Facility. Users are responsible for working safely and keeping the facility safe for others. This includes learning emergency procedures (e.g., fire evacuation), and location of phones, fire extinguishers, safety shower/eyewash stations, and first aid kits.

During severe storms/tornados, employees in the A building should seek shelter in the Main Auditorium (also marked as a Tornado Shelter), employees in the B building should seek in the lowest level of B Building (Growth Chamber area), and employees in the greenhouses should seek shelter in the C-Basement.



In the event of a fire, employees in either chamber area, the Main Potting Room, or greenhouse A, B, or B West ranges should report outside Main Loading Dock. Employees in Greenhouse C or C-Basement should report to the hill above the retention pond.

Eating anywhere in the PGF is strictly prohibited for safety reasons. Only drinks with secured lids are allowed in the potting rooms and corridors. Do not bring drinks inside the greenhouses or chambers. Wash your drink bottles regularly. There are designated drinking fountains, water coolers, and sinks with potable water. Do not use sinks labeled “non-potable” for drinking or washing food/drink dishes.

See the Sr. EHA Manager (Jim Cox) or the PGF Safety Officer (Mary Lyon) with any specific questions.

Pesticide Safety

PGF staff will notify users of an upcoming pesticide application (typically every Monday). This will cover all pesticide applications for that Monday through Sunday. Users are prohibited from entering any growth area that has been sprayed prior to elapsing of the Restricted Entry Interval (REI); this is typically a 4–12-hour period from the end of the application. **Users are also restricted from entering any area, such as corridors, during an active pesticide spray.** EPA-approved NO ENTRY signs will always be on doors of treated areas, indicating that the restricted access is currently in effect. Users can access ranges not being sprayed through the badge-entry doors. **Users must abide by these signs whenever posted.**



These signs will be taken down after the restricted entry interval (REI) has passed. Although the control agents used range widely in their toxicity, it is prudent for users to assume that all pesticide applications are potentially hazardous. Individual greenhouse compartments or entire ranges that have been treated with pesticides will be temporarily locked to prevent entry until the REI has expired.

Violation of entry restrictions by a user (including faculty) is strictly prohibited and may result in suspension of PGF use privileges.

Storage:

Storage in the Plant Growth Facility is very limited. Items left lying around or otherwise improperly stored pose a safety hazard and are unsightly. *Contact the Operations Manager if you need to store an item.* No items may be stored in greenhouse corridors. Do not use the ledges along the windows for storage. Items found in these areas will be removed and discarded after a determined amount of time.

Only chemicals used for greenhouses or chambers may be stored in the pesticide storage room. All containers should be labeled, including those containing only water. Pesticides for research use, either concentrated or in final solution (such as herbicides for screening), cannot be stored in the greenhouse.



Plant Bio-Waste Program (Orange Receptacles)

General Information:

- The Danforth EHS Team and PGF Operations Team work together to maintain and adhere to all assigned USDA permits and the disposal rules stated in these permits.
- To meet proper disposal regulations, DDPSC goes through Hummert International, St. Louis for plant-waste devitalization of regulated plant material. Hummert holds a USDA Compliance Agreement in order to be able to remove regulated waste.
- Hummert picks up full carts at approximately 6:30 and drops off empty carts at approximately 9:30 on Monday, Wednesday, and Friday mornings. Times are subject to change.
- If your plant material is chemically treated or pathologically treated, you must follow your lab specific IB agreement to dispose of these materials. Contact Mindy Darnell with any questions.
- **Due to safety concerns, no one is allowed in the Bio-Waste Room other than the Plant Growth Facility staff.**

Orange Cart/Tub Protocol:

- All plant waste (transgenic or not), including seeds and soil, material in greenhouses and chambers, material swept off the floor and tabletops, etc. must go into an orange receptacle.
- Stakes, pots, trays, etc. used for growing plants are either washed by the Operations Team or disposed of in orange receptacles (see page 5 or white board in the Main Potting Room for which to keep to wash).
- After emptying a bag of new soil, the empty bag can go in the general trash bins lined with black contractor bags.
- **Transporting bio-waste material outside the Danforth facility to or from a different building is strictly prohibited.**
- Carts labeled as “K-cart” are for general plant waste. Carts labeled as “Lab K-cart” are only for disposal of material from a laboratory setting.
- **Do not overfill carts or tubs.**
- Carts should only be filled three (3) inches from the top with lighter plant material. Pack down lighter material as much as possible as you discard to maximize space.
- Carts should only be filled about a quarter to halfway (sometimes even less) with compact, heavy material (Turface, wet soil, sand, etc).
- General guideline: If the cart is difficult to lift from the handle, it is too heavy.
- **The Operations Team will not move any overfilled carts due to the potential for injury** and Hummert will not accept any carts or tubs that are too heavy or too full. The lab responsible for the overfill will be notified and given the choice to correct it themselves **or be billed** for an Operations Team member to take care of it.



- Orange tubs have white mesh bags and a plastic liner. Pull these down on the outside periodically as you dispose of plant waste to ensure proper closing.
- Tubs should only be filled five (5) inches from the top with lighter plant material. **Do not discard heavy material (Turface, wet soil, etc) in tubs. Only discard heavy material in carts.**
- The operations team will check orange carts and tubs throughout the day, pick up full receptacles, and replace them with empty ones. **Remember, no one other than PGF staff is allowed in the Bio-Waste Room.**

Orange Trash Cans for Chambers and Greenhouses:

- There are orange trash cans with lids in each greenhouse and throughout the chamber areas.
- Orange trash cans are for plant waste, soil, and seeds only. Do not through non-plant waste in the orange cans.
- Empty the orange trash cans from your greenhouse(s) on a regular basis by either dumping it directly (no bag needed) into an orange cart or tub or, if concerned about pests or other things needing to be contained, by tying the liner and throwing it away and replacing the old liner with a new one. Do not overfill cans.
 - If there is an orange can in a growth space designated for waste containing regulated pathogens, this liner must be tied closed **before** leaving the workspace and the whole bag must be discarded in an orange tub or bin.
- If you are intending to use a cart and there is not a cart available, use orange trash cans. In this situation, when the can is full, securely tie the liner closed and place the full bags where the cart would normally be staged. The Operations Team will gather the bags and place them in a cart once an empty cart is available.

Note:

- **Please dry down plant material and growing media as much as possible before discarding!**
- **If a project requires special waste handling procedures that have been reviewed and approved by the IBC, then those procedures must be followed.**

Requests:

- Researchers should request special-ordered carts or tubs for large discards as soon as possible. Special orders are needed if you expect to fill more than one cart during discard. If you fail to make a request, you may have to wait to discard until there are enough orange receptacles.



- Direct all requests to Tara Oehler, copying Mary Lyon. Include the number of carts or tubs needed, date for delivery, and greenhouse/chamber location.
- Do not use anyone else's special ordered cart or tub.

Contact Information:

Mary Lyon: 314-249-7343; mlyon@danforthcenter.org

Tara Oehler: 618-541-8263; toehler@danforthcenter.org

Restricted Access/Quarantine Areas

Some areas may have restricted access due to the presence of viral diseases, intellectual property, or other factors. Only authorized personnel are allowed in these areas. Other policies/protocols for working in these zones will be posted on the doors. It is the responsibility of the user to read, learn and follow all special procedures related to restricted access areas.

Policy Violations

Users of the facility are responsible for learning and following these policies. PGF Management will communicate policies and notify users if they are in violation. Policies may be modified or updated as necessitated. Any changes will be promptly communicated to PGF users.

Repeated or deliberate violations of these policies will result in PGF services being suspended and/or a reduction in allocated space.

PGF users and staff are accountable for interacting in accordance with DDPSC values. It is everyone's responsibility to familiarize themselves with and adhere to DDPSC PGF guidelines and rules and maintain proper ethical conduct.

