

# Virginia Tech School of Plant and Environmental Sciences Greenhouse Facility

## Management and User Policy Document

### Introduction

The School of Plant and Environmental Sciences (SPES) Greenhouses located on Washington Street serve as a teaching and research facility for members of the Virginia Tech community. This document will outline current management and user policies as they are developed and will be subject to annual review and revision as needed. Policy developed for the current document will be crafted by the SPES Greenhouse Committee and presented to the Director of the School of Plant of Environmental Sciences for approval and implementation. The goal of this current document is to ensure the facility is maintained in a safe and usable manner and that users of the facility will have a clear understanding of both management policy and user policy.

### Mission

The mission of the SPES Greenhouse facility is to allow Virginia Tech to better support on-going research and teaching in plant sciences. We seek to provide safe and secure environment for faculty, staff and students to engage in and further the quest to ask and answer questions through the disciplines that they have chosen.

### Organization

- a. The SPES Greenhouse administrative responsibility is managed by the Director of the School of Plant and Environmental Sciences. The Greenhouse Manager reports to the Director of the School of Plant and Environmental Sciences (SPES) and works with the SPES Greenhouse Committee on matters of policy, planning, cost recovery, conflicts and future planning for the facility.
- b. The Greenhouse Committee is currently composed of six members; four faculty representatives, the Director of College Facilities and the Greenhouse Manager. Faculty appointees serve a 2-year term on the Greenhouse Committee. New appointees are selected by the Director of the School of Plant and Environmental Sciences.
- c. All SPES Greenhouse Committee meetings must be held with a quorum consisting of four committee members. Any agenda items that will change existing policies must be decided by a majority vote of the six committee members.

- d. The committee does not make final policy decisions. The committee recommends and if the director concurs the proposal goes to faculty meeting for review and a faculty vote.
- e. Appeals to the policies established by the SPES Greenhouse Committee should be directed to the Director of the School of Plant and Environmental Sciences.

## Greenhouse facilities space requests

- a. All individuals requiring the use of the greenhouses must complete a Space Request form available online at the SPES Greenhouses website. User request forms should be filled out completely and submitted at least 2 weeks in advance of required start date to ensure space is available and Worker Protection Standard (WPS) guidelines have been met. In most cases, the Greenhouse Manager will assign space based on information provided in the Space Request form. However, certain circumstances will necessitate review and decision from the Greenhouse Committee as to whether the user request should be fulfilled or declined.
- b. Faculty that require greenhouse resources for the purpose of maintaining existing value and preliminary data of a project in support of future extramural grant proposals but lack funding resources may fill out the Space Request form and petition the Greenhouse Committee to have any user fees waived. These types of requests would require approval from the Director of the School as the Director would assume responsibility for any greenhouse space fees incurred by the project in question.
- c. In certain situations it may be necessary for users to request an extension to an existing space request. In this case, a new Space Request document should be submitted and approval will be based on current scheduling for the space in question, again some of these cases may require full Greenhouse Committee review.
- d. All space assignments in the greenhouses will be allotted with an agreed upon time-limit. At project-end or upon reaching the time-limit (whichever is sooner), users are expected to restore the space to its original condition and relinquish the space. A final walkthrough and sign off with the Greenhouse Manager must be completed at requested end date for the project. At that time any problems left for the Greenhouse Manager to deal with will be addressed by the Greenhouse Manager and a charge will be submitted to the user. Failure to pay this charge will preclude the user from future use. Projects that exceed the time-limit without filing a new Space Request form will be reviewed by the Director of SPES.
- e. Early termination of projects may be necessary in certain circumstances. The Greenhouse Committee reserves the right to terminate a User Request based on misuse of space, non-compliance with User Guidelines as outlined in this document, mechanical problems that create unsafe conditions within a greenhouse space or new demand on a space that has been assigned but remains unused for research or teaching.

## Greenhouse facilities space assignments

- a. SPES Greenhouse facility is composed of the following greenhouse buildings:  
Quonset huts / F1, F2, F3, F4, F6, F7, F8.  
Glasshouses / G2b,c,d / G3a,b,c,d / G4a,b,c / G5a,b,c,d / G6a,b,c,d / G7a,b,c / G8a,b,c / G9a,b,c,d,e / G10a.
- b. All space assignments in the houses will be time-limited and at the end of that time users are expected to restore the assigned space to its original condition and relinquish the space. If a time extension is needed for the requested space a new Space Request form will need to be filled out and submitted for approval.
- c. Greenhouse space should be requested in increments of months; the minimum time for a User Space Request is set at one month and the maximum time is set at 1 year. For projects that will require a greenhouse space in excess of 1 year a pre-approval from the Greenhouse Director and Director of SPES will be required.
- d. Greenhouse rooms and the benches are not standardized sizes and vary by room. The smallest benches are 33 ft<sup>2</sup> and will be considered the minimum allowable space request. It may be necessary to check with the Greenhouse Manager if you are uncertain how much room your project will require. In most cases greenhouse space will be requested in square footage, keep in mind overcrowding benches to minimize space requests will lead to insect and disease issues that you will need to address. In some cases a complete greenhouse room will be needed, in that case you will input the room number.
- e. Several greenhouse rooms are not equipped with benches. Those spaces will be reserved for projects that do not require benches. The fee rate for those spaces will be based on the potential growing area within that room.
- f. Several greenhouse rooms have ground beds for growing research projects. Those spaces will require users to provide, the growing media for the beds and disposal of the growing material at the project end. Field soil will not be allowed as a media option for the ground beds unless the project has a plan to control weed and disease problems associated with the use of field soil. The Greenhouse Committee reserves the right to terminate the project if the field soil plan is not being followed.
- g. A final walkthrough and sign off with the Greenhouse Manager must be completed at the requested end date for project. At that time any issues that have been left for the greenhouse staff to address will be rectified by the greenhouse staff and a charge will be submitted to the user. Failure to pay this charge will preclude the user from future use.
- h. All project space assignments are to be used only by the space requestor for the purposes specified in the request form. Changes in project scope or PI will require the completion of a new Space Request form. Modifications to greenhouse space will need to be approved by the Greenhouse Manager before they are carried out. Any changes made to the space will need to be reversed at the conclusion of the assigned project end time. A fee will be charged to the user if modifications are left for the Greenhouse Manager to address.
- i. This paragraph is an addendum to the existing Virginia Tech School of Plant and Environmental Sciences Greenhouse Facility Management and User Policy

Document V.1.0. This agreement between the SPES Greenhouse Committee and the head of the existing small grain breeding program will ensure that the presently existing greenhouses labeled G2B, G2C, G2D will be prioritized for the use of the small grains breeding program. As such, request for this space received outside of the small grains program will require the greenhouse manager receive verbal approval from the head of the small grains breeding program prior to use. This agreement will remain in place as long as the small grain breeding program is in place and operated as a tenure-track faculty position. Additionally, the greenhouses labeled G9C, G9D, G9E which have been utilized by the CSES small grains breeding program will continue to be reserved primarily for that use.

## Greenhouse keys

- a. Greenhouse keys will be assigned to users requesting space in the greenhouse. All keys remain property of the SPES Greenhouse Facility and will need to be returned at the termination of the project. If keys are not returned at project end the space requestor will be charged for replacement cost of keys.

## Greenhouse facilities space fees

- a. Current internal rate for SPES Greenhouse is \$ 0.012 ft<sup>2</sup>/day.
- b. Current internal rate for Keck Greenhouse is \$ 0.049 ft<sup>2</sup>/day.
- c. Quarterly billing periods as follows:  
Period 1: February, March, April; invoice sent in May.  
Period 2: May, June, July; invoice sent in August.  
Period 3: August, September, October; invoices sent in November.  
Period 4: November, December, January; invoices sent in February.  
All space fees will be assessed at the end of a three-month period. Fees will begin on the start date supplied in the Space Request form and stop with the project end date and final walkthrough. The invoice will be emailed to the Principal Investigator and payments should be submitted as an ISR in Hokiemarket. The full payment will be expected in a timely manner, if the invoice remains unpaid for longer than 2 cycles the project will be removed from the greenhouse facility and the user will be asked to remit payment before the facility can be accessed.
- d. Any research faculty planning ahead should plan on including a greenhouse space fee in operating budgets or in grant proposals.

## Hours of operation

- a. The greenhouses are open between 8 A.M. and 5 P.M. Monday thru Friday, outside of those times the doors should be locked. If you have permission to work in the greenhouses outside of normal operating hours, please ensure doors are secured both after you enter the building and exit the building.

- b. Doors into and out of the Keck Greenhouse range (G5) must remain locked at all times.

## WPS training

- a. Beginning January 2, 2019, all paid students, staff and faculty who are working in the Virginia Tech Greenhouse need to schedule a training session before they are allowed to work in an environment where pesticides have been used within the last 30 days in order to recognize and avoid workplace and pesticide hazards. Training sessions can be completed by contacting the Greenhouse Manager and scheduling a time convenient to all parties.
- b. If a user holds a current Virginia Pesticide Applicator or Registered Technician license the WPS training is not required.

## Storage

- a. Plant growth media should not to be stored in greenhouse growing areas unless it is to be used within a short period of time. Concrete walkways within greenhouse compartments should remain clear of obstructions; these areas are not storage areas. Items found in these areas block access and egress, therein creating hazards and will not be allowed to remain. Temporary storage will be provided for pallets of media in the metal storage building, any individuals who wish to store quantities of growing media should contact the Greenhouse Manager for more information. Materials and equipment that are not being used in the greenhouse should be kept in an alternative storage area as high temperatures, humidity and UV radiation act to degrade most materials.
- b. Ongoing projects that require the storage of field soils or materials collected from outside areas: these items are allowed to be stored in the greenhouse they are being used in provided they are not stored in the concrete corridors between benches or along corridors between greenhouses. Stored items must not impede access to steam pipes, cooling pads, fans, electrical control panels or entry doors. It may be necessary to remove benches in order to accommodate storage of soil samples, in these cases fees will be assessed at the rate of bench being removed. Federal, State and University policies require that chemicals are not to be stored in individual greenhouse areas; if you need to use chemicals in your experiment contact the Greenhouse Manager to make storage arrangements.
- c. The greenhouse main corridor is not to be used as a storage area for media or supplies. Alternative arrangements must be made with the Greenhouse Manager.
- d. Items such as refrigerators, microwaves, coffee pots and storage cabinets are not allowed to be stored or used inside the greenhouse rooms.

## Chemical storage room

- a. If you are planning on using chemicals in your research projects, arrangements must be made with the Greenhouse Manger to store the products in the proper chemical storage area.



- b. Any chemicals brought into the chemical storage area must be in a container clearly labeled with the owner's name, date, and product information as required by EHS. Additionally, the Safety Data Sheet (SDS) for the product should be filed with the Greenhouse Manager. All products must be removed from the chemical storage area upon conclusion of the research project.
- c. Only individuals with a valid Virginia Pesticide Applicators or Registered Technicians License will be allowed to apply pesticides within the SPES Greenhouses.
- d. The chemical storage and mixing area are off limits to individuals who do not have prior approval from the Greenhouse Manager.
- e. Fertilizer injectors are not provided by the greenhouse for researchers, but greenhouse users may provide their own for projects if installed correctly. Fertilizer will need to be stored in the chemical mixing area in a sealed container with the contents clearly labeled with product information, name of P.I. and date, appropriate SDS documentation should be filed with the Greenhouse Manager.

### Pots and flats storage

- a. A storage area for used pots and flats is located off the main greenhouse hallway on the patio between G7 and G9 ranges. Before storing pots ensure all used pots are free of plant debris and media then stacked and stored according to size on the wooden shelves. Weather permitting a pot cleaning area is available for those who wish to sanitize used pots before using them.
- b. New clean pots in boxes or tied sleeves may be stored in the metal storage building after asking permission from the Greenhouse Manager, as space is available.
- c. Long term storage in the metal storage building is not permitted.

### Potting plants

- a. If you are potting plants do so in a way that does not allow loose media to fall in the gravel areas under greenhouse benches. For small potting jobs use one of the benches in the hallway or lay a sheet of plastic over a greenhouse bench and work on that surface. For large potting jobs the use of a wheelbarrow filled with media is recommended. In either case it is expected that users will clean up spilled media immediately after potting jobs.
- b. All used media is to be disposed of in the dumpster between the glass houses and Quonset huts.

### Mandatory weekly greenhouse user maintenance

- a. All senescing and dead plant material should be removed from plants, pots and benches and the floors swept weekly.
- b. All trash should be immediately removed from greenhouse rooms and not allowed to accumulate. Garbage cans in the hallway should not be used for plant and soil disposal as leaving plant materials in the greenhouse hallway garbage cans may lead to the spread of insect and disease problems. Please remove



discarded plants and soil to the dumpster in gravel area between the glass houses and Quonset huts.

- c. If your research requires you to allow plants to dry down before removing them it may be necessary to clean up more frequently. It is not permissible to store trash cans within greenhouse compartments.
- d. Weeds serve as an alternative host for insects and disease so ensure weeds are pulled and disposed of before they become larger problems inside the greenhouse. Once the seed begins to develop on the weeds the problem is much more difficult to control so remove weeds from your pots and gravel areas under benches you are using as you see them. All weeds should be disposed of in the trash dumpster located in the gravel area outside the greenhouse facility.
- e. Overcrowded projects lead to insect and disease issues. Proper spacing, pruning and staking of your plants in the greenhouse allows for a better growing environment by increasing air circulation, allowing available light to reach the crop and helping to control insect and disease within the crops. Materials for these jobs will not be provided by the greenhouse and must be supplied by the users.
- f. All hoses should be replaced on hose hangers when not in use and water supply turned off at the supply bib. Please do not allow hose sprayer ends to lie in contact with the ground. Please do not turn off hose at hose sprayer end and leave hose supply bib on.

### Transgenic research projects and disposal

- a. All transgenic research must be carried out in the G5 greenhouse range. Only those who have been granted access will be allowed access to the G5 range and the doors are to remain locked at all times.
- b. All transgenic research needs to be in compliance with the Virginia Tech Institutional Biosafety Committee Policies.
- c. If you have transgenic plant material it will need to be bagged and steamed before it is discarded in the trash. A steam operated sterilizer unit in the greenhouse hallway is available for plant material and soil/media that is required to be sterilized. Prior to operating the sterilizer new users must consult with the Greenhouse Manager to ensure the steamer is operated safely. Before placing materials in the steam box all plants should be put into a suitable disposal bag and sealed shut to prevent insect and disease problems from spreading. Users will need to supply their own bags or bins to use in the steam box.

### Introducing new plants into the SPES Greenhouse

- a. In most cases new plant material being introduced into the greenhouse from outside areas should be inspected by the Greenhouse Manager for insect or disease problems before it is brought into the facility. Do not introduce problems into the greenhouse by bringing in personal plants or plants from other areas without first filling out a space request and receiving permission.
- b. Research or projects that focus on plant pathogens or plant insects will be housed in areas where they will not impact other research or projects. These

areas or projects should be clearly labeled with the name of the P.I. and the project. The plants being used in these projects do not require inspection when they are introduced into the facility but projects will require a space request prior to beginning in the facility.

## Environmental controls and light controls

- a. Doors to individual compartments and outside areas should be kept closed in order to keep plant insect and disease from spreading and to ensure the environmental equipment operates correctly. Any adjustments to environmental or lighting controls should be addressed by the Greenhouse Manager and not attempted by users.

## Teaching Greenhouses

- a. It is the responsibility of the faculty member teaching the course to ensure a greenhouse space request is submitted for the required space at least 1 month prior to the semester in which the space will be needed.
- b. It is the responsibility of the Faculty member using the greenhouse space to ensure the SPES Greenhouse policies are adhered to and that the mandatory weekly greenhouse maintenance is followed as outlined in the Greenhouse Facility User Guidelines above.
- c. Faculty are responsible for providing the materials for the classes they will teach and providing the labor to support any plant care that may be needed; this includes daily watering, fertilizing, insect and disease scouting and plant maintenance.
- d. Faculty will not be allowed to store materials within the greenhouse unit they have been assigned to use after the User Space Request time has expired.
- e. Faculty will need to ensure the greenhouse unit they have been assigned to use is completely cleaned by the time the User Space Request time has expired.

## Safety

- a. Any pesticide applications should be done by licensed applicators or registered technicians. All applications need to be done according to the SOP for applying Pesticides in the SPES facility.
- b. The central notification area will provide information concerning pesticides applications within the previous 30 days. A complete application log is kept in the Greenhouse Manager's office.
- c. A complete listing of SDS sheets are available in the central notification area.
- d. Open toed shoes are not to be considered safe footwear when working in the greenhouse, it is suggested greenhouse users wear closed toe shoes.
- e. Food and drinks are not allowed in areas where pesticides have been applied.
- f. If you see any broken equipment or unsafe conditions, please notify the Greenhouse Manager.
- g. WPS training is mandatory before you begin a paid position in the greenhouse. A yearly refresher course must be taken thereafter if you plan to continue a position



in the greenhouse. It is up to the user to keep WPS training up to date and failure to accept that responsibility may lead to loss of greenhouse access.

- h. Without the proper training provided by EHS no person is allowed access to ladders within the greenhouse facility. Before using ladders or any other greenhouse equipment, users must ask permission from the Greenhouse Manager.

## Summary of Greenhouse facility user guidelines

In order to maintain the facility in a professional and safe manner, and to suppress the likelihood of insect and disease problems, it is the responsibility of the P.I. to ensure all users under their supervision comply with the following guidelines. It will be assumed that the users have all read and agreed to comply with these guidelines and understand that failure to comply can result in termination of the Space Request agreement.

- The Greenhouse Hazcom Plan is located in the hallway CNA (Central Notification Area) and is provided to familiarize users with current safety information for this facility.
- Fire extinguishers are located at each end of the hallway and by CNA.
- Emergency eyewash and shower station is located near CNA, additional standard shower is located in the head house bathroom.
- Emergency phone numbers are located in CNA next to the phone.
- First Aid kits are located in the Greenhouse Manager office in the head house.
- If you see a DO NOT ENTER sign posted on a greenhouse door you must not enter that compartment; follow instructions detailing the restricted entry interval (REI) and when it will be safe to re-enter. Never enter a greenhouse with this sign in place on the door.
- Do not eat or drink in areas where pesticides have been applied. It is best to restrict eating and drinking to the greenhouse hallway while you are in the greenhouse working.
- Always wash your hands after handling plants that have been treated with pesticides and when leaving the facility.
- Notice where the Material Safety Data Sheets (MSDS) are stored and where the pesticide application information is recorded. Both items can be found in the CNA which is located at the center of the greenhouse hallway.
- Alert the Greenhouse Manager to any unsafe practices or conditions you see. If you notice broken glass do not try to pick it up yourself, notify the greenhouse staff.
- Appropriate clothing should be worn to protect greenhouse users from chemical exposure; bare feet and open toed shoes are not allowed. The use of additional personal protective equipment (PPE) is a decision the principle investigator must



make, but is generally a good practice if you are handling plants that have been recently treated with pesticides.

- The greenhouses are open between 8 A.M. and 5 P.M. Monday thru Friday, outside of those times the doors should be locked. If you have permission to work in the greenhouses outside of normally open hours, please ensure doors are secured both after you enter the building and leave the building. Doors into and out of Keck Greenhouse range (G5) must be kept locked at all times.
- If you are potting plants do so in a way that does not allow loose media to fall into the gravel areas under greenhouse benches. For small potting jobs use one of the benches in the hallway or lay a sheet of plastic over a greenhouse bench and work on that surface. For large potting jobs the use of a wheelbarrow filled with media is recommended.
- Proper spacing, pruning and staking of your plants in the greenhouse allows for a better growing environment by increasing air circulation, allowing available to light reach the crop and helping to control insect and disease within the crops.
- All senescing and dead material should be removed from plants, pots and benches and floors swept weekly. All trash should be immediately removed from greenhouse rooms and not allowed to accumulate. Garbage cans in the hallway should not be used for plant and soil disposal as leaving plant materials in the greenhouse hallway garbage cans may lead to the spread of insect and disease problems to other locations. Please remove discarded plants and soil to dumpster in the gravel area between the glass houses and Quonset huts.
- Weeds serve as an alternative host for insects and disease so ensure weeds are pulled and disposed of before they become larger problems inside the greenhouse. Once the seed begins to develop on the weeds the problem is much more difficult to control so remove weeds from your pots and gravel areas under benches you are using as you see them. All weeds should be disposed of in the trash dumpster located in gravel area outside the greenhouse facility.
- If you have transgenic plant material it will need to be bagged and steamed before it is discarded in the trash. A steam operated sterilizer unit in the greenhouse hallway is available for plant material and soil/media that is required to be sterilized. Prior to operating the sterilizer new users must consult with the greenhouse manager/technician to ensure the steamer is safely operated. Before placing materials in the steam box all plants should be put into an appropriate sterilizing bag and sealed shut to prevent insect and disease problems from spreading. Users will need to supply bags.
- All plant material being brought in from outside areas or other research facilities should be inspected by the Greenhouse Manager before it is brought into the facility. Do not introduce problems into the greenhouse by bringing in personal plants or plants from other areas.

- Concrete walkways are to be kept clear of obstructions; these areas are not to be used as storage areas. Items found in these areas block access and egress, therein creating hazards and will not be allowed to remain.
- Growth media is not to be stored in greenhouse growing areas unless it will be used within a short period of time. Temporary storage will be provided for pallets of media in the metal storage building and any individuals who wish to store quantities of media should contact the Greenhouse Manager for more information. Materials and equipment that are not being used in the greenhouse should be kept in an alternate storage area as high temperatures, humidity, and UV radiation act to degrade most materials quickly. Federal, State and University policies require that chemicals are not to be stored in individual greenhouse areas; if you need to use chemicals in your experiment contact the Greenhouse Manager to make storage arrangements.
- The only pesticide applications that will be allowed in the greenhouse are those made by individuals who hold a valid Virginia State Pesticide Applicators license. All chemical applications must be done in adherence with the SPES Greenhouse pesticide application standard operating procedure.
- Doors to individual compartments and outside areas should be kept closed in order to keep insects from spreading and to ensure the mechanical equipment operates correctly.
- All hoses should be replaced on hose hangers when not in use and water supply turned off at the supply bib. Please do not allow hose sprayer ends to lie in contact with the ground.
- Wheelbarrows and greenhouse carts should be cleaned and returned to hallway after use
- Refrigerators of any kind will not be allowed to remain in the greenhouse areas unless they have been approved by VT EHS and the Greenhouse Manager.
- Storage cabinets placed into greenhouse areas will need to be pre-approved by the Greenhouse Manager and a complete inventory submitted. If a padlock is used a key will need to be supplied to the Greenhouse Manager. Cabinets must be removed from the greenhouse at project end.

### Contact Information:

Greenhouse Manager Office: 231-6883

Email: vtgreenhouse@vt.edu

SPES Greenhouse Website: <https://spes.vt.edu/greenhouses.html>

Hazardous Material Safety: 231-3600

Biological Safety: 231-5864

Police/ Fire Department: 911