

**NWQ Biological Sciences
Greenhouse Use Policy
College of Letters & Sciences
University of Wisconsin - Milwaukee**

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Approved by the Department of Biological Sciences
Executive Committee on March 25, 2019

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1.0 Introduction and Mission Statement

This document is intended to define policy for the UW-Milwaukee NWQ Biological Sciences Greenhouse, inform facility users, and serve as a guide for day to day greenhouse operations. The greenhouse maintains as service orientation with attention to the needs of all greenhouse users.

Introduction

The Department maintains a 9,200 square foot state-of-the-art greenhouse situated on the roof of the NWQ Building Complex. The glass and acrylic greenhouse maximizes research capability and provides an open, flexible environment for botanical instruction, supporting both undergraduate and graduate education and cutting-edge NSF funded research.

The facility is divided into 3 wings, with 17 separate rooms and includes an expanded head house to be utilized as both a potting area and a classroom, modern wet lab space, a vibration lab, 3 instructional houses, 2 production and propagation houses, 6 research houses, an office and student area, and greenhouse support spaces, with an additional 1,200 square feet of outdoor planting beds available for research and instruction.

The instructional plant collection for Biological Sciences at UWM comprises approximately 640 species representing over 100 plant families, showcasing a range of plant biodiversity, evolution and adaptation. Specimens range from primitive mosses and liverworts, species representing lower vascular plant evolution, to cycads, to a strong representation of flowering plants. The greenhouse maintains a collection of native plants which is supplemented by 270 tree and shrub species planted throughout the campus.

Mission

To provide the highest quality facility and plant care services in support of the University's instructional and research goals, and to support the Department of Biological Sciences Mission Statement:

“The Department of Biological Sciences at the University of Wisconsin• Milwaukee is the principal life sciences department of one of North America's premier urban research universities. The Department engages in, and seeks to support, internationally recognized research in diverse areas of biology from molecular and cell biology and microbiology to ecology and conservation biology. This commitment to research excellence is the foundation of the Department's high-quality educational programs at the bachelor's, master's, and doctoral levels. Based in its research and educational programs, the Department also provides scientific expertise that benefits the community in several ways, including health and life sciences, business, industry, education, and the public.”

2.0 Greenhouse Management Structure

- The UWM research and instructional greenhouses are located as shown in the maps located in Section 16
- The greenhouse's physical address for deliveries is:
UW-Milwaukee Greenhouse
NWQ Building C - West Loading Dock
1930 E. Hartford Avenue
Milwaukee, WI 53211
- The greenhouse's mailing address is:
UW-Milwaukee Greenhouse
Department of Biological Sciences
3209 N. Maryland Avenue S181
Milwaukee, WI 53211
- The Greenhouse Manager recommends greenhouse policy to and reviews greenhouse space requests with the Biological Sciences Greenhouse Committee
- The Biological Sciences Greenhouse Committee, consisting of faculty users, evaluates and ratifies NWQ Biological Sciences Greenhouse Policy.
- Refer to Section 3.0 for personnel contact information.

3.0 Contact Information

Greenhouse Management:

- Paul Engevold (Manager): engevold@uwm.edu, 414-229-4248 (office), or after-hours personal cell phone 414-659-4179
- Jordan Gonnering (Lapham Hall Facilities Manager and Greenhouse Backup): gonnerin@edu, 414-430-7556
- Department of Biological Sciences Office: 414-229-4214

UWM Campus Police:

- **Emergency: call x9911 from any campus phone
24-hour/day service or 414-229-9911 on a cell phone for Police, Fire, or
Medical Emergencies – Use for any situation in which there is an immediate
concern to preserve life or property**
Non-emergency: 414-229-4627. Available 24-hour/day.
Police and security-related services such as access to the facility.
- <https://uwm.edu/police/>

UWM University Safety and Assurances

- 414-229-6729 or safety-office@uwm.edu for chemical safety training, occupational safety, biological safety training and fire safety education.
- <https://uwm.edu/safety-and-assurances/>

UWM Facility Services:

- If the Greenhouse Manager is unavailable, contact the dispatch at 414-229-4742 to report urgent problems with building and infrastructure services, such as flooding or broken water lines.
- After hours contact 414-229-4752
- <https://uwm.edu/facility-services/>

4.0 Greenhouse Space Allocation

- The UW-Milwaukee NWQ Biological Sciences Greenhouse has 6 growing rooms available for use by the Department of Biological Sciences faculty and students and other UWM-affiliated programs and 5 houses dedicated to instructional courses.
- The greenhouses are available primarily for research projects. We do not allocate space to non-university projects, though when space is available, we may consider accepting projects from within other areas of the University or other educational groups and charities. We are not available for private industry or personal use.
- Formal requests to use one of the research greenhouses must be made in writing via email to the Greenhouse Manager before space can be allocated. The greenhouses are generally filled to capacity and space is extremely limited. Any requests for space should be made well in advance of need. Several months' notice is preferred. Accurate estimates of project space and time needs are important so that as many users as possible may be accommodated.
- Prospective users of the greenhouses are encouraged to contact the Greenhouse Manager (Paul Engevold engevold@uwm.edu) to discuss their needs including any special requirements prior to submitting a formal space request.
- Formal requests shall include starting and ending date, the amount of space required, environmental conditions (temperature, lighting, humidity, etc.)
- Users must provide a valid University funding account number before occupying the assigned space.
- Space will be assigned on a first-come first-served basis, consistent with the mission of the Department. Priority will be given to faculty, staff and students of Biological Sciences. Space allocation issues will be resolved by the Greenhouse Committee.
- Users may not loan or rent their greenhouse space out to anyone else. A greenhouse user engaged in this activity is subject to possible loss of their greenhouse space.
- Users working with plants that are recombinant (transgenic), exotic, and/ or grown in association with pathogenic or recombinant microbes and/ or pathogenic or recombinant small animals are required to have a biosafety protocol filed and approved by the IBC as part of university and federal policies. A couple of the approved protocol should be included with the space request. For more information, contact the UWM Biological Safety Officer or University Safety and Assurances at <https://uwm.edu/safety-health/biosafety/>

5.0 Fees & Renewals

- Greenhouse Facility Use Charges are collected to offset expenses associated with maintaining the state-of-art environmental control systems, including the humidification system. Space charges are set by the Greenhouse Manager in consultation with the Greenhouse Committee and the Biological Sciences Executive Committee.
- Greenhouse Facility Use Charges are levied on a per-room charge, whether occupied or held in reserve for future research. Charges are calculated on a monthly basis and billed in **February** and **August** of each year. The fee structure in the table below indicates the total monthly charge per house:

Monthly Facility Use Charge: *July 1, 2020 – June 30, 2021*

| | Funded, Biological Sciences & College of Letters & Science research | UWM, non-Letters & Science research |
|--|---|-------------------------------------|
| Large Research House, high limit, low-iron glass, 3 benches with 27.5 m² bench space: Rooms 4671, 4681, 4695 | \$35.00 | \$180.00 |
| Small Research House, lower light, acrylic paneled, 2 benches with 11.5 m² bench space: Rooms 4675, 4686, 4690, 4694 | \$20.00 | \$100.00 |

- These rates are current at the revision date of this document but are subject to change.
- Potting media, pots and other growing supplies are not covered by the Facility Use Charge. Users are encouraged to discuss their needs with the Greenhouse Manager. The Manager can help determine quantities and best sources for obtaining materials.
- Long-term users of a greenhouse (greater than one year) must renew their space requests annually via email to the Greenhouse Manager. Failure to renew the space request in a timely manner may result in the space being assigned to another user.
- To promote the fullest utilization of the greenhouses, unoccupied areas held in reserve at a user's request for future research will be charged for as if the space were occupied.
- An exception to this is if the space required maintenance or sanitization.

6.0 Exiting the Greenhouse and User Responsibilities

- To provide for efficient space allocation and the orderly transition of research projects, users are required to provide an exit date with their space request.
- When it becomes apparent that a project will extend beyond the exit date, the User must contact the Greenhouse Manager as soon as possible. Extension of the exit date may not be possible if a commitment has been made to provide the space to another user.
- Users with potential long-term occupancy (over one year) with an indefinite exit date should so indicate on the space request. When the completion date of a long-term project is determined the space request must be renewed with a firm exit date, at least six months before vacating the greenhouse.
- Users vacating greenhouse space before their stated exit date will continue to be charged until the stated exit date if no other user can be found to occupy the space.
- The NWQ Biological Sciences Greenhouse maintains a commitment to sustainability. Material from large experiments should be composted whenever possible. See Section 16.
- Dispose of all transgenic and quarantined plant material appropriately; all such material must be bagged and autoclaved. The user is responsible for providing proper autoclave bags for autoclaving plant material. The Greenhouse Manager will autoclave material for you once the material is properly bagged.
- Users are responsible for removing, discarding and/or returning all equipment, materials, supplies and trash from their allocated space. Floors and benches must be cleaned of plant debris.
- Cleanup time should be figured into the time requested for your research. The user will continue to be charged until the space is suitable for the next user.
- The Greenhouse Manager is responsible for the sanitization of the space once the user has vacated.

7.0 Security and Greenhouse Access

- The UWM Biological Sciences Greenhouse is at all times a locked and secured facility, 24 hours a day, 7 days a week.
- It is the responsibility of all users to ensure that the main door to the facility, Room 4600, is closed, latched and locked at all times. Greenhouse users must check the door after they exit to ensure that it is locked.
- To ensure the safety of all projects and the instructional collections, access to the greenhouse is granted only by the Greenhouse Manager.
- For access, students, staff or faculty must have a current issue UWM ID card in order to obtain entry via the electronic security system.
- Greenhouse access will not be granted until the person has completed a greenhouse orientation and has read, understood and signed the following: 1) the NWQ Biological Sciences Greenhouse Use Policy & 2) the Greenhouse Chemical Hygiene Plan and 3) Procedure for Working Alone.
- Loaning your UWM ID to allow unauthorized person(s) to enter the greenhouse will result in loss of greenhouse access. If a greenhouse user has difficulty entering the greenhouse, they should contact the Greenhouse Manager or Campus Police at 414-229-4627 to be let into the greenhouse. Campus Police will not allow access with picture identification.
- To requests keys for a specific research house or other room, inquiries should be directed to the Greenhouse Manager (Paul Engevold, engevold@uwm.edu). A record is kept of all keys issued to provide improved security and a tracking method for lost keys.
- Facility keys must NOT be copied.
- Tours of the greenhouse or the instructional collection can be arranged for visiting researchers, community members and others, with advance notice.

8.0 Services & Supplies Provided by Greenhouse Personnel

8.1 Plant Care

The NWQ Biological Sciences Greenhouse Manager is responsible for the following in each of the greenhouse rooms:

- Environmental control
- Photoperiod control where possible
- Equipment maintenance
- Routine sanitation
- Cultural and chemical pest control measures in consultation with facility users
- Routine application of fertilizer in accordance with user's request
- Occasional weekend and holiday watering (may be performed by a volunteer or student, with user permission)
- Consultation and training of user's staff and students regarding:
 - Plant propagation (seed sowing, cuttings, grafting etc.)
 - Transplanting or re-potting of material
 - Pruning or trimming
 - Staking or tying off plant material
 - Harvesting

8.2 Supplies

Contact the Greenhouse Manager for details regarding supply use and location. The following routine supplies will be provided:

- HPS grow lamps
- Dechlorinating filters
- Watering hoses, nozzles and shut off valves
- Pest monitoring cards and stakes
- General purpose cleaning supplies including bleach, soap and trash bags

9.0 Greenhouse Users' Responsibilities

The NWQ Biological Sciences Greenhouse is a shared, multi-user facility. All users share the responsibility for quality plant care with the Greenhouse Manager. Open communication regarding plant care needs will facilitate optimum plant care and reduce problems. New users of the facility are expected to schedule an orientation session prior to performing any work in the greenhouse. The session will provide an overview of the facility and available services, and an introduction to the Greenhouse Chemical Hygiene Plan, emergency response plan, and other safety issues pertinent to the greenhouse environment. In addition, the NWQ Biological Sciences Greenhouse Use Policy & the Procedure for Working Alone will be reviewed. Other topics will be addressed as needed, or upon request.

Greenhouse users are financially responsible for all aspects of project-specific greenhouse or research equipment. Permission must be obtained from the greenhouse manager prior to installing equipment as it could interfere with greenhouse controls and function, or the work of other greenhouse users.

Examples include supplemental lighting, shade and blackout curtains, lights of any sort, mist benches, tanks and trellises not included in the basic greenhouse infrastructure.

User responsibilities include:

- Complying with the Greenhouse Chemical Hygiene Plan, including use of Personal Protective Equipment, at all times.
- Food and drink is restricted to the lounge area, Room 4602.
- Potting and spacing plants properly to ensure air movement, access for watering and pest control measures (see Section 15).
- Observe good housekeeping rules by cleaning up any spilled soil in the head-house, on route to, or inside the greenhouses, on the counters, or on the carts. Floor brooms and dust pans and bench brooms and dust pans are provided for cleaning up. Sound sanitation practices are necessary in order to reduce disease and insect problems.
- Keep common use areas including head-house, potting beaches, wet lab, etc. clean, neat and sanitary and ready to be used by the next user. All general greenhouse equipment returned promptly, in a clean condition.
- Using proper pot size and pot filling technique to provide plant stability and reduce watering demands.
- Repotting, supporting and pruning of plants as needed to keep them manageable.
- Remove yellowed or dead leaf material on a regular basis to reduce breeding areas for pests and diseases.

- Plants must be spaced far enough apart to allow for: adequate airflow, watering without wetting foliage, scouting for pests, access for pest control measures.
- Promptly communicate plant care issues (e.g., pest and disease problems, fertility concerns, etc).
- Store pots and soil in applicable storage areas and not inside the growing houses.
- Users are responsible for keeping their assigned houses clean, orderly and well swept.
- Taking care to keep potting soil and debris off the floor and out of floor drains. This reduces drain backups and algal growth on the floors.
- Hoses must be kept untangled and stretched out alongside the aisles to avoid a tripping hazard. All water spigots must be turned off when not in use. Pressurized hoses can burst.
- Removing trash as it is generated. Trash bags are provided for use and all trash must be removed daily. Dumpsters are provided for near the south building entrance, near Hartford Avenue.
- Users are responsible for keeping their outdoor plantings weed-free and in an orderly condition. All biological aspects of the research, including watering, are the responsibility of the users.
- Terminating experiments and discarding plants in a timely manner.
- Providing proper bags for autoclaving plant material when necessary.
- Submitting a list of names and UWM identification numbers to the Greenhouse Manager for all authorized personnel.
- Communicating with the Greenhouse Manager BEFORE bringing any plant material into the greenhouses (Section 10).
- Receiving clearance from the Greenhouse Manager prior to installation or placement of project-specific greenhouse or research equipment.
- Promptly inform the Greenhouse Manager of:
 - alarms
 - pests on plants
 - malfunctioning equipment
 - any situation that you think may require attention
- Users should respond without delay to questions or requests from the Greenhouse Manager.
- Greenhouse space may not be used for propagating or producing plants for personal or private use.
- Be mindful of shared space and treat other user's plants and equipment with respect.
- Do not enter research houses or handle plants that do not belong to you.

10.0 Bringing Plants into the Greenhouses

- The Greenhouse Manager must be given reasonable advance notice before plants are brought into the greenhouses. This applies to plants coming from other campus environments, growth chambers, outdoor areas or off campus.
- Once in a greenhouse, plants must not be moved between greenhouses without permission; this is important for pest and pathogen control.
- Incoming plants will be inspected for pests and diseases by the Greenhouse Manager.
- Pest control measures or quarantine may be required before moving plants into the assigned greenhouse.
- In certain cases of pest infestation or disease, to protect other plants and into the facility, plants may not be allowed into the greenhouses.

11.0 Safety When Working in the Greenhouse

- Safety takes the highest priority at UWM.
- Communicate with the Greenhouse Manager when you see an unsafe condition or act.
- Cooperate with the Greenhouse Manager to ensure your own safety, as well as that of your colleagues.
- Know the location of all safety equipment, including fire extinguishers, emergency showers and eyewashes, phone, first aid kits and spill kits.
- Know the emergency evacuation procedure for your area.
- Know where to find safety information, including the Greenhouse Chemical Hygiene Plan and Safety Data Sheets.
- Before working alone in the facility, you must review the written Procedures for Working Alone, complete and sign the form. The most current version can be found in Section 5.1 of the Greenhouse Chemical Hygiene Plan.
- Closed-toed shoes must be worn at all times in the facility.
- No food or drinks are allowed in plant growth or laboratory areas.
- No loose clothing, tank tops, short pants, short skirts, bare feet, sandals, open-toed or perforated shoes permitted in the laboratory area.
- Long hair must be pulled back.
- Lab coats are recommended in BSL-1 labs and are required in BSL-2 or higher containment labs. Lab coats should be disposable and disposed of monthly in a BSL-2 lab. They should not leave the room except in a secondary container to be autoclaved, if the autoclave is outside of the laboratory. Cloth lab coats should be washed by laundry services monthly after being autoclaved. Taking lab coats home to wash is not permitted.
- Gloves are required when working with RG-2 agents/ toxins and are strongly recommended for working with RG-1 agents/ toxins. Disposable nitrile gloves are appropriate for this use.
- Eye protection is required for all BSL-2 facilities. A face shield and goggles may be necessary when handling any pathogen that may aerosolize.
- Respiratory protection- if you are handling a pathogen that has a high risk for aerosolizing, respiratory protection is necessary. A surgical mask is not respiratory protection. Training is required for safe use of respiratory protection. For more information visit: <http://uwm.edu/safety-health/respiratory/>.
- All accidents must be reported immediately to both the Greenhouse Manager and the supervising PI. The General Incident Report 300A2 must be completed and submitted to the Department.
- No smoking is allowed anywhere in the facility or on campus. UWM is a smoke-free campus.

12.0 Chemical Use in the Greenhouse

- For the safety of all individuals, no chemical may be taken into the greenhouse or associated facilities without prior consent of the Greenhouse Manager. This includes the wet lab, head-house, hallways and storage cabinets.
- Permission to use chemicals is temporary and only those that are being actively used (at least once per month) may be stored in the facility. A Safety Data Sheet must accompany the chemical at all times or provided to the Greenhouse Manager. Chemicals used less frequently must be transported to and from the greenhouse in accordance with Campus Policy.
- It is the user's responsibility to ensure that all applicable chemical labeling, signage, notification, transportation, storage, exposure, and usage laws and regulations are fully complied with. See the Greenhouse Chemical Hygiene Plan for more information.
- The Greenhouse Manager will require that University Safety & Assurances personnel be consulted before giving permission for use of potentially hazardous materials.
- Label containers with owner's name and contact information.
- Work with the Greenhouse Manager to maintain an up to date on-site inventory of all chemicals used or stored at the facility.
- State Law requires that pesticides may only be applied by a Wisconsin DATCP licensed commercial applicator with certification for Category 3.1 Greenhouse & Nursery. All pesticide applications will be done by the Greenhouse Manager.
- Worker Protection Standard training is mandatory if you will work with pesticide-treated plant materials.
- Do not enter any locked room posted with a sign "Danger: Pesticide Application"

13.0 Pest Scouting and Control

The NWQ Biological Sciences Greenhouse utilizes an Integrated Pest Management System to reduce pesticide use. This starts with a clean greenhouse. The facility is in operation 365 days per year and may be toured or inspected at any time. Users are required to assist with general clean up to maintain a safe, sanitary, and orderly work environment for fellow researchers, students and staff.

- General housekeeping requirements for users are:
 - Clean worktables and/or potting benches after potting.
 - Clean common area floors and benches.
 - Discard material from experiments as they are terminated.
 - Clean sinks after each use and limit the amount of soil going down drains.
 - Pick up dead leaves and plant material from benches and floors.
 - Do not leave unused pots with potting soil sitting in the greenhouse. Insects will live and hide in old plant refuse and potting soil.
 - Remove weeds from pots to prevent the spread of weeds and reduce the places insect can live and breed.
- Use pest, disease free soil or soil-less growing media.
- Doors are to be closed at all times to prevent the migration of pests.
- Over watering is as bad as under watering. Both conditions stress plants and promote diseases and insect (fungus gnat) problems. Doors are to be closed at all times to prevent the migration of pests.
- At end of an experiment or the beginning of a new one clean out all plant material, pots, growing medium, plant debris, algae and anything that can be removed so the greenhouse can be sanitized by the Greenhouse Manager.
- At the first sign of an insect or disease problem, promptly contact the Greenhouse Manager. The Greenhouse Manager will perform a weekly check of research plants to scout for pests and disease.
- Cultural control methods are preferred, including syringing of plants or washing with insecticidal soap. If any chemical control measures are required, they will be applied by the Greenhouse Manager in consultation with the user. A user make not make pesticide applications without prior approval.
- Infected plants should be bagged and removed from the greenhouse to avoid spreading the problem to other greenhouse rooms. If possible, discard the affected plant material directly into the dumpster outside the greenhouse.
- Wash your hands before working with plants. This is especially important when working with propagation material (seeds, seedlings, cuttings and planting media) or if you smoke or otherwise use tobacco products to avoid transmission of disease.

14.0 Biohazardous and Transgenic Plant Materials

- All research involving transgenic plants must be registered with the Institutional Biosafety Committee (IBC). For more information, visit <https://uwm.edu/safety-health/biosafety/>
- No transgenic plants are to be brought into the facility without prior approval by the Greenhouse Manager and an approved protocol on file.
- The user needs to inform the Greenhouse Manager of any special needs or precautions to be taken regarding their project so that the facility personnel and users can be kept informed.
- Transgenic plant material (BSL-1 or BSL-2) must be grown in an isolated area that is kept locked at all times.
- Certain plants must be autoclaved before disposal, including those that are: transgenic, virus-infected, legally quarantined, otherwise biologically hazardous, otherwise required to be autoclave by research protocols.
- Project users are responsible for: purchasing autoclave bags; bagging hazardous plant material in their research space; working with Greenhouse Manager to ensure the material is autoclaved, and depositing the autoclaved bags directly into dumpsters, not into building garbage cans.
- NIH Guidelines for research involving recombinant molecules can be found at: https://osp.od.nih.gov/wp-content/uploads/NIH_Guidelines.html

15.0 Commitment to Sustainability

- The 11 growing rooms that make up the NWQ Biological Sciences Greenhouse are a vital facility for research and instruction. The facility has a strong commitment to reduce waste and reuse whenever possible.
- Greenhouse plastics, consisting of mostly polypropylene pots and trays, are sterilized and reused whenever possible. Those past their prime are recycled.
- The Greenhouse partners with the Campus Garden and Composting Operations, Office of Sustainability, to compost plants whenever feasible, especially at the termination of large experiments.
- There is also a commitment to reduce energy usage. If sufficient sunlight entering the greenhouse, our control system will now automatically shut off the grow lights will.
- Heating and cooling are properly coordinated to save energy, included automated aluminized shade cloth to reflect heat outward during the middle of the day, and reflect heat into the room during the night.
- The control systems are accessible through a central computer and smartphone, providing the ability to remotely adjust set points, document greenhouse environmental conditions, and enable remote alarm capabilities.

16.0 NWQ Biological Sciences Greenhouse Site & Floor Plan



