

# POLICY AND GUIDELINES FOR THE USE OF EPO BIOLOGY GREENHOUSES



This new policy consolidates and updates all previous guidelines and policies regarding the use of EPO Biology greenhouses. This policy is approved by the Department Chairperson and the EPOB Greenhouse Committee. Although some of the information contained in this booklet may not pertain to any one user, it is important that all users be familiar with the normal operations and policies of the greenhouses.

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# GREENHOUSE POLICIES

## **EMERGENCY PROCEDURES, including Vandalism**

For any emergency requiring campus police dial 911. Aside from a medical emergency, the most likely reason to use this number would be if you witness vandalism taking place. Consider your own personal safety first. In some cases, it may be best for you to leave the premises and then call 911 to report the vandalism.

If you are the first to discover vandalism that has taken place recently at any greenhouse, please call campus police at (303) 492-6666. If safe, wait until they send an officer to take a report. They are usually prompt. Also call greenhouse manager, Tom Lemieux, (303) 492-7300 (office at 409 Ketchum).

For any emergency requiring service personnel, such as a broken water main, no water, no electricity, no heat, no coolers functioning, broken glass overhead, etc. call the service desk at (303) 492-5522 and explain the nature of the problem. Tell the service desk that it is an emergency situation and requires immediate attention. Wait or check back periodically to be sure that Facilities Management personnel are attending to the situation. Also call greenhouse manager, Tom Lemieux (number above).

## **GENERAL INFORMATION**

**Facilities:** The Department of EPO Biology at the University of Colorado maintains three greenhouse facilities for faculty, researchers and students: Two ground-level, separate greenhouses at the northeast corner of Macky Auditorium; a single-room, rooftop facility on the fourth floor of Ramaley; and a ground level, compartmentalized facility at 1380 30th Street on East Campus. This last facility is easily reached along the Boulder Creek bike path and is only a 10 minute ride from Central Campus. If you drive to the 30th Street facility, it is best to proceed north along 30th Street so that you turn right (east) into the facility parking lot. If traveling south, there is no left-turn lane.

**Parking and bike stands:** 30th Street: Several spaces of unregulated parking exist on the west side of the building. A bike stand is mounted on the concrete pad at the north end of the headhouse.

Macky: No vehicle or bicycle parking especially for greenhouse users. Use regular lots and bike stands near library or elsewhere.

Ramaley: same as Macky.

Telephones: There is a telephone at the back (3rd room) of the east Macky greenhouse (303) 492-7369. At 30th Street, there is a telephone on the desk in the headhouse [a headhouse is a work-room associated with a greenhouse] (303) 492-3387. This latter phone rolls over to voice mail after several rings. Also at 30th Street, there is a continuous ring (no voice mail) telephone in the main hallway (303) 492-5973. There is no telephone in the Ramaley greenhouse.

Restrooms: There is a restroom towards the back of the headhouse at the 30th Street facility. Neither of the other two greenhouses have a restroom.

**Teaching Collection:** The EPO Biology Plant Teaching Collection is a large assemblage of plants from around the world. It contains over 1000 species in about 200 families. Most plant science courses, as well as a few others within the Department, make use of this collection. In many cases the plants are not replaceable, as they have been acquired from collectors in foreign countries, from specialty growers who may no longer be in business, or even from scarce sources available only at an earlier date. Increasingly, our collection contains rare and endangered plants. Please help us preserve the collection by reading and observing all of the greenhouse protocols.

## **USAGE POLICY**

### **Greenhouses:**

Macky Greenhouses: Used mainly for housing part of the teaching collection, especially those plants loaned for laboratory use. Some research or undergraduate experiments may be conducted here when space is available.

Ramaley Greenhouse: Used primarily for active research purposes: plants maintained in the Ramaley greenhouse must be used at regular intervals for research (i.e. no long-term storage of collections for future use). Additionally, this greenhouse is used periodically for a Plant Physiology student experiment. Generally, plants to be used for teaching purposes must be grown in the Macky or 30th St. greenhouses.

30th St. Greenhouse: Used for research purposes as well as housing part of the teaching collection. Rooms 114 and 120 have been designated as rooms for the teaching collection, although other rooms with research priority, including the alpine room (room 127) may house a small number of plants included in the teaching collection. Rooms 114 and 120 generally do not have space for research projects (unless they occupy a very small amount of space).

Use of the greenhouse for animal studies will be considered on a case-by-case basis.

**User Type:**

Formal or large-scale users of the greenhouses: All of the policies and guidelines for the greenhouses relate to this kind of usage, with the exception of special policies pertaining to incidental usage (see below).

Incidental usage of greenhouse space: The greenhouse manager is responsible for providing space to students and faculty within EPOB for legitimate research projects. No other use is authorized. Use of space by non-EPOB personnel is arranged through the Department Chair or Greenhouse Committee at a mutually agreed fee. At times, however, it may be beneficial to the Department to provide a small amount of space to others. The benefit to the Department must be demonstrable by the greenhouse manager to the Greenhouse Committee. In all cases, incidental users of space must abide by the following protocol:

1. The designated amount and location of space must be strictly followed and the maximum amount of space for any one user is one bench (=55 ft<sup>2</sup>).
2. The amount of space, the location and the duration must be recorded on a form titled "Incidental Use of Greenhouse Space". The user must also record the benefit to EPOB that justifies use of such space. If the user exceeds the space by placing plants on the floor below the bench or elsewhere, then all plants belonging to the user must be removed.
3. The user must water his/her own plants.
4. The user's plants must be kept insect, disease and weed free at all times. Failure to comply will result in immediate removal of plants. The greenhouse staff is not

liable for infections or infestations of plants belonging to incidental users of space.

5. The user must accept the possibility that s/he will have to vacate the room and/or greenhouse on short notice.

**Expendable Materials:** The greenhouse budget, funded in part by bench fees, provides for a moderate amount of potting materials (pots, soil, amendments, labels, etc.). At present, a standard allotment of materials (equal to about forty one gallon pots) is made available per year to researchers. If additional materials are needed, researchers should complete purchase requests on their own accounts. See the greenhouse manager for supply assistance.

**Environmental Controls:** Individual users are responsible for ensuring that special treatments, such as supplemental lighting, do not interfere with other research projects. This control might require the construction of special curtains. Except by consent of the greenhouse committee, single greenhouses, such as Ramaley, are maintained under natural daylength with an established day and night temperature. Individual rooms at 30th Street offer different environments based on request from the first user, the major user or by agreement.

Please do not even attempt to modify any greenhouse controls. See the greenhouse manager or greenhouse assistant if you desire changes in the environment.

**Prohibited Activities:**

1. The greenhouses are not a suitable site for children unless they are supervised at all times. Many plants in the collection are toxic or may cause a dermatitis reaction; many are delicate and easily harmed.
2. Do not bring animals into the greenhouses, headhouses or related facilities at any time.
3. Use of any tobacco products is prohibited at all times within all greenhouse facilities because of the threat of tobacco mosaic virus (TMV). Because TMV is mainly transmitted by mechanical means, please also read "Pruning and/or harvesting plant parts" on page 11.
4. The greenhouses are a University facility and must abide by all University rules and regulations, including regulations regarding the use of alcohol.

5. No skateboards or rollerblades are permitted in the greenhouses.

**SPACE ALLOCATION**

1. New users of any greenhouses should consult first with the greenhouse manager, Tom Lemieux, through Departmental mailbox, or at (303) 492-7300, or email at thomas.lemieux@colorado.edu. Unless prior arrangements are made, an “Application for Research Space” should be approved before any plants are placed in any greenhouses. Return completed application to Tom’s mailbox in EPOB faculty mail room. Plants found in the greenhouse without the requested approval will be discarded.
2. Space utilization is coordinated through the greenhouse manager and, after research and the teaching collection, is made available on a first-come, first-served basis.

**Charges:** Researchers are charged space rental fees within the greenhouse. As stated above, they pay and provide for any additional materials beyond those provided. The fees are necessary to contribute to needed maintenance, occasional repairs of equipment and supplies such as hoses, fertilizer, insecticide, paper towels, trash bags, etc. Fees are subject to change by the Greenhouse Committee.

EPO Biology faculty, staff, students	\$ 6 / ft <sup>2</sup> /year
EPO Biology minimum	\$ 24 / year
non EPOB	\$ 30 / ft <sup>2</sup> /year
non EPOB minimum	\$ 100 / year
alpine room at 30th St greenhouse	TBA
walk-in growth chambers on 4th Floor Ramaley	\$ 100 / month

**Keys:** All faculty have access to all greenhouses through their submaster key. Students and others should obtain a key request form from the EPOB office and leave it completed with office personnel. The greenhouse manager will sign and record key requests. Office personnel will then issue a key card which should be taken by the student to Access Services in the stadium.

Please use your keys wisely. Do not lend them to anyone, unless it is a legitimate emergency. Do not leave your keys in the greenhouses or greenhouse doors. Keep them with you at all times that you are working.

**Labeling of Plants:** Label all plants, flats or groups of plants in a conspicuous manner with the name of the researcher as indicated below. Plants not identified to a researcher will be discarded.



Please refrain from pulling any labels out of pots of plants in the teaching collection. We have plants of the same species with different accession numbers which may be side-by-side on the bench. They come from different sources and probably have different collection data. Plants are rendered less useful when collection data is lost or misrepresented.

**Responsibilities of Users:** Please clean up after yourself. All clean-up, including pot washing, soil disposal and proper storage of pots and materials is the responsibility of the greenhouse user. Keep in mind that janitors do not clean any of the greenhouse facilities. Janitors will dispose of trash left in the hallway of the Ramaley greenhouse if the plastic bags are not too heavy.

1. All counters, floors and work areas should be cleaned immediately after use. Do not store items on the limited counter space or potting benches. For Ramaley greenhouse, plastic trash bags are on the shelf of the wall opposite the sink. Place full, tied bags in the hallway by drinking fountain for the janitors to collect.
2. Pots overfilled with water or soil tend to leave soil on the greenhouse floor, which clogs the floor drain. Please clean up any mess that results from such practices.
3. Any unidentified or seemingly dead or dying plants will be flagged with a hot pink flag on which the initial date is written. Plants will be discarded two weeks later unless the greenhouse manager is contacted.
4. Do not leave plants under the Ramaley mist system as an alternative for your care and attention. These plants tend to accumulate algae and weeds.

5. If a user coordinates for a substitute to water his/her research plants during a period of absence, it is the responsibility of the researcher to ensure that the substitute has carefully read all of the greenhouse policies contained here. The greenhouse manager should be notified of any such substitutes.
6. Remember to lock the doors of any facility that you use. Campus police have found our greenhouse doors unlocked at various times of night.
7. Due to vandalism, we are dependent on University Police for security checking. If you are asked by University Police to identify yourself, please cooperate fully so that we can continue to keep vandalism to a minimum.

#### **CARE OF PLANTS AND FACILITY**

The plants in the teaching collection are watered, fertilized, potted and transplanted by the greenhouse staff. Researchers or their work-study students must water, fertilize, prune and otherwise care for their own research plants. The greenhouse staff maintains pest control (for legitimate research projects), fertilizer solutions, equipment and general aspects of the facilities. Incidental users must maintain pest control on their plants.

Viruses are a constant threat to any collection of plants. If you are a tobacco user or if you have hand-to-hand contact with a tobacco user you should wash your hands thoroughly with soap BEFORE you come to the greenhouses in order to minimize the threat of transmitting Tobacco Mosaic Virus (TMV). In addition some of our plants are known to have viruses, but they are too valuable to discard. The greenhouse policy is that NO plants will be cut or harvested unless the pruning shears, knife or cutting implement is sterilized with a propane torch. Please help us keep our collection free of viruses by following this necessary protocol. If you do not know where to find or how to use the propane torch, see a greenhouse staff member.

**Accessions:** On occasion, the greenhouse manager may give away plants to employees, staff, students or the general public. It is a violation of University and EPOB policies to sell any plants that have been given away to individuals or classes. In addition, the greenhouse manager and

EPOB reserve the right to have dumped plants remain in the trash and not be scavenged by interested individuals.

**Borrowing Plants:** All plants are available for use in teaching purposes, but please obtain specific permission from the greenhouse manager so that we can maintain control over some of our special plants. These special plants are to be used only within specific guidelines due to their small biomass, rarity in the wild, requirements for particular environmental regimes, etc.

Usually borrowed plants are coordinated through the greenhouse manager, sometimes with the help of a graduate liaison. If you borrow plants for use in a course, please sign them out when you remove them and sign them in when you return them. Give a brief description of what was borrowed, including total number of potted plants, cuttings, examples. Please return them to the designated area. Greenhouse staff or the graduate liaison will return them to the correct benches.

*It is vital that the borrowed plants be well cared for while on loan.*

#### **Fertilizer Injection:**

1. All greenhouses have fertilizer injection systems with complete fertilizer, and they are available for all to use. There are, however, idiosyncrasies with each. Please see the greenhouse manager for assistance. The fertilizer in the concentrate tanks is ~ 100X. Do not use the concentrate straight from the tank! It must be diluted by passing through the injector. We occasionally have problems with people opening or closing valves associated with the injectors or back-flow prevention devices. Please do not operate any valves if you are not sure of what you are doing. Quick couplers are on hose bibs for easy transfer from fertilizer to tap water and vice versa. Ask for a demonstration if you are unfamiliar with this equipment.
2. The fertilizer used is a complete fertilizer and is mixed at approximately 100 to 200 ppm of nitrogen. This allows for daily watering of most plants without incurring fertilizer burn. It is advisable to leach accumulated salts by watering periodically with tap water alone. The most up-to-date fertilizer analysis will be posted in the various greenhouses.
3. Special fertilizer concentrates are the responsibility of the individual user.

**Insecticide Use:**

1. All plants are likely to be sprayed with a pesticide on any day. If you do not want plants treated, you must indicate which plants with a large, waterproof sign (at least 8" X 10") that reads "NO PESTICIDES," the name of the plants in question and your name, and you must inform the greenhouse manager.
2. Plants are often sprayed with an insecticidal soap or an insect growth regulator, both relatively non-toxic. No signs are posted for these operations. Occasionally, a more toxic compound is used. Each greenhouse will have a schedule of pesticides sprayed, along with the date of spraying posted in or near the headhouse. If a spray material other than a soap or insect growth regulator has been used, then do not enter the greenhouse on that day.
3. Additionally, do not touch any wet foliage unless you are certain the liquid is water.
4. Please report any pest outbreaks promptly to the greenhouse manager.

**Pruning and/or harvesting of plants:** Please be sure to read about viruses in the second paragraph under Care of Plants and Facility, page 9. The propane torch is used to sterilize cutting tools, and it is dangerous if not used properly. Take care that there are no plants, glass, people, etc. in the path of the flame before turning it on. If you do not know where to find or how to use the propane torch, see a greenhouse staff member.

**Root washing and pot washing:**

1. Macky: Avoid using sinks in Macky for any soil-related activities.
2. Ramaley: Two soil sieves are available to assist those who wash roots. The sieves will prevent the bulk of soil from being washed down the sink. However, the sink trap can still be clogged by the remaining soil. Please remove all soil from the sink before you leave the work area. Excess soil from dirty pots should also be removed before pots are washed in the sink.
3. 30th Street: Do not use the west sink (near greenhouse entrance) for any soil-related activities. Washing of roots and other soil activities (washing pots) should be done in the east sink (near bathroom). Remove any excess soil before washing pots.

4. Dirty pots can be used “as is” by researchers or they can be cleaned by researcher’s staff and used free of charge. If a researcher’s pots are not washed in a timely manner, they may be washed by the greenhouse staff. Once this happens, they become the property of the greenhouse. Use of cleaned pots beyond the regular allotment then requires an account number.

**Visitors:** In general, it is not advisable to bring visitors to the greenhouse. Occasionally, if you want to show a friend or parent around, and watering is completed, that is fine. Refer all requests for access to the greenhouses to Tom Lemieux, 492-7300.

**Watering:** The information pertaining to watering is covered under “Specific Information for Designated Users: Plant Caretakers and Staff” because most of it pertains to staff. If you will be using hoses or watering plants, please be sure to read this section.

**Mist Systems:** A few times each year someone intentionally shuts down the mist system in Ramaley greenhouse, probably thinking s/he will turn it back on shortly. Invariably, someone forgets and everyone’s plants dry out. Please do not turn off the mist system for any reason.

**Wood Shop:** The headhouse of the 30th St. greenhouse no longer has the Department power tools. See Mark Osadjan in the EPO Biology Department for access to power tools that are in general use by department members. The greenhouse has a limited amount of power tools and users should be aware that power tools are dangerous and are used at their own risk. **The greenhouse staff is neither qualified nor authorized to instruct anyone in the use of power tools. If needed, get help from a qualified instructor.**

## **SPECIFIC INFORMATION FOR DESIGNATED USERS**

### **Teaching Assistants:**

1. A collection of living organisms that does not receive adequate care is a collection that either does not thrive or does not exist for long. Every TA needs to take full responsibility for every plant s/he uses. Ideally, all TAs in a given course should be concerned about the plants borrowed, regardless of which TA has responsibility on a given week.

2. Please read carefully and be familiar with the entire booklet on Greenhouse Policy and Guidelines. Smooth operation of the greenhouses depends on users' knowledge of protocols and policies. Especially important are the following sections: responsibilities (p.8), insecticide use in greenhouses (p.11), pruning and/or harvesting plant parts (p.11), and borrowing plants (p.10).

**Plant Caretakers and Staff:**

If you are a greenhouse staff member, you should know that very few reasons are considered acceptable for not showing up to water. You must speak to another greenhouse staff member who is capable of watering in order to transfer the responsibility for a given day. Do not leave a message requesting another person to water for you. Phone numbers of all personnel are listed on the phone sheet near the telephones in both Macky and 30th St. greenhouses.

**WATERING: HOSES**

1. Before you begin watering, unwind the hose and “snake” it out on the floor in the direction you are going to water. After watering, wind the hose with wide loops (fewest number) and with most of the loops resting on the floor. The hose should be untwisted.
2. Do not step on the hose. This weakens the hose and causes it to kink more easily.
3. Keep the nozzle off the floor at all times. This is a normal sanitation procedure to prevent contaminating the nozzle and therefore the plants with soil-borne pathogens such as *Pythium*, *Rhizoctonia* and *Phytophthora*. The last loops may have to be shorter in order to keep the nozzle off the floor.

**WATERING: GENERAL STRATEGIES**

1. Watering is the most important job in the greenhouse. It must be done free of distractions (no walkmans, no radios) so that the person watering can concentrate 100% on the task. Watering always takes precedence over everything else, except an emergency.
2. Learn what you can “get away with.” There are many judgment calls when watering (e.g. “this plant doesn’t need water now, but it may need it before tomorrow morning”). What you choose to do should

depend, to a large extent, on your understanding of the plant's normal growing conditions (in the wild) and its condition in cultivation (large plant in a small pot?, porous soil mix? clay or plastic pot? recently cut back? current weather outside? expected weather for the day? etc.). Don't assume that because a plant is often wilting, that it needs to be watered more frequently. We have lost plants that wilt frequently due to overwatering!!! Learn which plants have narrow tolerances so that you can (in the words of Spike Lee) "Do The Right Thing."

3. Watering carefully takes time. If you start too late, you will be rushed and your decisions will reflect your poor planning. For those with experience, and depending on the prevailing weather conditions, watering (and checking plants) can be a three- to four-hour task.
4. Periodically, feel the temperature of the water to be sure it is not too hot or too cold. A number of factors can influence water temperature, including solar gain on copper pipes, malfunction of boilers, mixing valve adjustment, fertilizer pump switch, etc. Greenhouse staff should be familiar with all of these and should know how to make adjustments for the above situations.
5. Some plants have special requirements. Ask questions if you lack information. Your efforts in taking responsibility will be greatly appreciated, and questions or messages will be answered quickly.

### **ENVIRONMENT**

Learn to "feel" the greenhouse environment of each room so that you recognize a problem when one exists (e.g. coolers not operating, vent stuck open or closed, heat not functioning or heat on at wrong time, etc.). Please check around the greenhouses; don't merely water and go home.

### **CLEANING**

After watering, the backbone of greenhouse work is cleaning. Please take care of at least one cleaning task each time you come in to water: empty trash in greenhouses; empty trash in headhouses and bathroom (at 30th Street); sweep the floor of the greenhouse or headhouse; wash some pots; refill paper towel and toilet paper dispenser; etc.

## **EXPECTATIONS**

Find out what you can do to make this operation run smoothly. If you see something that needs to be fixed, ask about it. Be careful not to make assumptions, especially as they pertain to plants. (e.g. Crowded plants may or may not be transplanted. Others may be dumped, or divided and repotted into the same pot.). Learn what plants in our collection are valuable so you know where to concentrate your efforts when watering or giving care to the collection. Learn the kinds of work that are emergency related and learn how to deal with them so that you can act efficiently and appropriately in an emergency situation.

**GREENHOUSE STAFF ARE REQUIRED TO READ THIS  
BOOKLET REGULARLY UNTIL ALL OF THIS BECOMES  
AUTOMATIC!!**

### **Volunteers:**

We greatly appreciate volunteers who are accepted into the greenhouse as work schedules permit. Generally, one or two times are selected in order to accommodate the most volunteers. Those who cannot work those days are requested to try again for a different semester. Volunteers should be familiar with the entire booklet of Greenhouse Policies and Guidelines because they may be asked to work in any capacity.