DEPARTMENT OF BOTANY

Mission

The Department of Botany promotes research and education in basic plant biology.

Vision

The Department of Botany will continue to conduct research in fundamental plant biology, provide instruction vital to graduate and undergraduate teaching programs, maintain laboratory and field resources, and lead interdepartmental research initiatives to enhance the research climate of Oklahoma State University.

Core Values

Excellence – We seek excellence in all our endeavors, and we are committed to continuous improvement.

Integrity – We are committed to the principles of truth and honesty, and we will be equitable, ethical, and professional.

Service – We believe that serving others is a noble and worthy endeavor.

Intellectual Freedom – We believe in ethical and scholarly questioning in an environment that respects the rights of all to freely pursue knowledge.

Diversity – We respect others and value diversity of opinion, freedom of expression, and other ethnic and cultural backgrounds.

Stewardship of Resources – We are dedicated to the efficient and effective use of resources. We accept the responsibility of the public's trust and are accountable for our actions.

Goals, Critical Success Factors, Objectives, and Strategies

Goal 1: Restore Botany tenure track faculty to eleven.

Critical Success Factors:

- Salary and nationally competitive start-up funds from OSU and/or the College of Arts & Sciences for replacement of one recent vacancy (Plant Ecologist) and two long vacant positions.
- Additional laboratory space adequate for research activities of eleven faculty members.
- Successful recruitment of a high caliber Plant Ecologist (objective 1.1) and two other Botany faculty members (objective 1.2).
- Shared (rotated) teaching of core BOT/BIOL courses.
- Coverage of existing and/or development of new specialized graduate courses.

Objectives:

Objective 1.1: Fill currently vacant Plant Ecologist position.

Strategies:

- Emphasize during advertising and interviewing the diversity of ecological research across departments and colleges at OSU.
- Emphasize during advertising and interviewing the many opportunities for research collaboration across departments and colleges at OSU and nearby universities.
- Assign reduced teaching load during first 1-2 years to establish research program.

Objective 1.2: Restore two additional long vacant faculty positions.

Strategies:

- Develop departmental consensus on priority specialty areas. Possible priorities include but are not limited to:
  - Plant cell or molecular biologist
  - Molecular plant ecologist
  - Plant population ecologist
  - Plant physiologist
  - Ethnobotanist (See also objective 6.5.)
- Emphasize during advertising and interviewing the diversity of relevant research across departments and colleges at OSU.
- Emphasize during advertising and interviewing the many opportunities for research collaboration across departments and colleges at OSU and regional universities, agencies and foundations.
- Assign reduced teaching load during first 1-2 years to establish research program.

Goal 2: Improve the research environment and productivity of the Botany faculty.

Critical Success Factors:

- Secure OSU or Arts & Sciences funding to restore/maintain a minimum Botany faculty of eleven.
- Offer competitive salaries to retain productive research faculty.
- Increase total external funding (in proportion to faculty numbers) to provide F & A support for research infrastructure and flexibility in teaching assignments.
- Increase total peer-reviewed publications (in proportion to faculty numbers) in highly ranked journals to provide greater visibility for the department.
- Increase total presentations (in proportion to faculty numbers) at national and international conferences to provide greater visibility for the department.
- Increase total participation (in proportion to faculty numbers) in national funding agency grant panels and workshops to provide greater visibility for the department.
- Reduced or more flexible teaching loads to increase research productivity (publications and funding).
- Increase the number of faculty full-year sabbaticals to expand research skills and visibility.
- Increase total number (in proportion to faculty numbers) of collaborative grant proposals and publications with researchers outside of the department and OSU.

Objectives:

Objective 2.1: Improve the research infrastructure (facilities and equipment).

Strategies: (See also Objective 6.1)

- Obtain external funding from e.g. NSF, USDA, DOE, NIH to purchase major equipment and provide annual average returned F & A funds of $1,000 per tenure-track faculty member to be used in part to support research infrastructure.
- Develop schedule and F & A budget for maintenance and replacement of shared major equipment.
- Develop consensus priority needs list of new, shared facilities and major equipment.
- Submit grant proposal(s) where necessary to procure external funds for shared major facilities (e.g. herbarium) and equipment.

Objective 2.2: Increase flexibility in teaching loads and scheduling.

Strategies:

- Restore Botany tenure-track faculty to eleven members.
- Obtain external funding from e.g. NSF, USDA, DOE, NIH to provide annual average returned F & A funds of $1,000 per tenure-track faculty member to be used in part to support flexibility in teaching assignments through use of temporary faculty.

- Each tenure-track faculty member offers one graduate course every two years, to compose a rigorous curriculum relevant to the research areas of all Botany faculty members.
- Optimize teaching assignments in consultation with individual faculty members, e.g. heavier teaching one semester in exchange for lighter/no teaching another semester.
- Support adjunct faculty with office/lab space and resources, encourage them to seek external research funding, and use F&A funds to hire them for teaching assignments.

Objective 2.3 : Encourage and facilitate faculty professional development.

Strategies:

- Advise faculty members during annual appraisal and development about specific areas where they would benefit from the following activities.
- Encourage, by recognition in annual A&D, and facilitate/fund faculty attendance and research presentations at national and international conferences.
- Encourage, by recognition in annual A&D, and facilitate research collaborations between faculty members from different OSU departments and other universities or research centers.
- Encourage, by recognition in annual A&D, faculty to submit competitive proposals to fund their research.
- Encourage, by recognition in annual A&D, and facilitate faculty participation in federal grant review panels. Replacement instructors may be required for ~1-2 weeks. (See also objective 6.3.)
- Encourage and facilitate full-year faculty sabbatical leave, and use the retained half-salary to hire replacement instructors (e.g. adjunct faculty).
- Encourage faculty to obtain external funding to provide matching salary during sabbatical leave, either from the sabbatical host institution or federal grants.

Objective 2.4: Encourage and facilitate faculty research collaborations.

Strategies:

- Encourage participation in interdepartmental collaborative groups such as the Plant Sciences and Environmental Sciences graduate programs, Plant Biotechnology Network, Ecology Network.
- Encourage participation in external collaborations with organizations such as the S.R. Noble Foundation, the Flora of Oklahoma Project, the Biomedical Research Infrastructure Network, and the Ancient Cross-Timbers Consortium.
- Joint research projects, grant proposals and publications with colleagues outside of OSU Botany and at other institutions.

Goal 3: Student Development: Increase the number, quality and diversity of Botany graduate students.

Critical Success Factors:

- Maintain an average graduate enrollment of at least one student per tenure-track faculty member.
- OSU or Arts & Sciences funding to maintain a minimum Botany faculty of eleven, and to modernize teaching labs.
- External funding to provide $1,000 F & A funds per tenure-track faculty member to be used in part to support graduate recruiting and research needs.
- Adequate graduate course offerings (average of 0.5 courses/year per tenure-track faculty member) to comprise a rigorous curriculum relevant to the research areas of all Botany faculty members.
- Aggressive recruiting in Oklahoma and nationwide, with in-person visits to regional colleges, including those (e.g. Langston, Northeastern State Univ.) having large minority enrollments to encourage diversity.
- Increased graduate assistant stipends to the Big 12 biological sciences average, to be more competitive nationally.
- Ultimately, more quality students must apply before we can increase enrollment! Factors beyond our control, such as the job market and the economy, influence application rates.
- All graduate students are members of professional societies, present research results at regional or national conferences, and seek external funds to support their research and travel to conferences.

Objectives:

Objective 3.1: Develop graduate students: Increase the number of graduate students advised by Botany faculty.

Strategies:

- Target an average annual enrollment ratio of at least one graduate student per Botany faculty member.
- Annual faculty meeting focusing on strategies to recruit graduate students.
- Develop an attractive advertising flier to be taken by faculty to all research conferences (particularly Oklahoma Academy of Sciences) and distributed to regional colleges and universities.
- Develop and regularly update the Botany web page, particularly featuring individual faculty member's research programs. Prospective students increasingly use web sites to assess the vitality of departments and universities.
- Maintain the Plant Biotechnology Network web site to highlight campus-wide faculty research in plant molecular biology.
- Increase circulation of the Botany newsletter *Bluestem* to all colleges and universities in Oklahoma and neighboring states, and post it on the Department's web page.

- Include documented efforts to recruit graduate students as one important factor in annual appraisal and development.
- Appoint or elect one faculty member to serve as Director of Graduate Studies. This individual will coordinate recruiting and assist faculty and students with Graduate School protocols and degree requirements.

Objective 3.2: Develop graduate students: Improve the research experience of Botany graduate students.

Strategies:

- Designate a fraction of grant F&A and foundation funds to support graduate student field or laboratory research and presentations at regional, national and international conferences. Target average annual expenditures per graduate student of $500.
- Encourage all graduate students to become a member of relevant professional societies and to seek research and travel funding through these societies as well as granting agencies.
- Designate a fraction of grant F&A or foundation funds to support a stimulating external research seminar speaker series, and facilitate interaction of visiting speakers with graduate students. An existing Plant Bionet program already does this for plant molecular biology, and this needs to be expanded to all areas of Botany.
- Encourage establishment of a journal club and mutual research assistance between graduate students in different subdisciplines for a broader perspective.

Objective 3.3: Develop graduate students: Improve the classroom/curriculum experience of Botany graduate students.

Strategies:

- Annual review by curriculum committee to match BOT/BIOL graduate course offerings to demand/needs of students.
  - Delete courses with inadequate demand
  - Change frequency of courses based on demand
  - Recommend new courses when needed (see also Objective 6.4.)
- Modify content/emphases of individual courses to meet student needs, where appropriate.
- Add new technologies to courses as appropriate to course level and content.
- Modernize facilities and equipment for core teaching laboratories (LSE 101, 110, 011)
- Obtain (through renovation?) a modern departmental seminar room in LSE (could be dual use for lecture classes).

Goal 4: Student Development: Improve the quality of undergraduate education.

Critical Success Factors:

- Additional funds from OSU or the College of Arts & Sciences for classroom, seminar room, and laboratory modernization.
- Use A&S student technology/renovation fees for classroom/laboratory modernization.
- Additional funds from private donors for classroom and laboratory modernization.
- Participation of all faculty in mentoring and/or recruiting for undergraduate research.
- Participation of all faculty in developing curriculum and classroom technology assessment tools.
- Most Botany majors complete at least one semester or summer of research activity.
- 50% of students participating in research present their results in departmental seminars and/or regional or national scientific conferences.
- Some student-researchers are coauthors on peer-reviewed publications.
- Some student researchers become graduate students at OSU or elsewhere.
- Student satisfaction survey results (soon after research experience) indicate positive views of research experience

Objectives:

Objective 4.1: Develop undergraduate students: research experience.

Strategies:

- All faculty members will recruit undergraduate researchers through their courses, either for their own lab or other Botany faculty members.
- Recognize, in annual A&D, faculty members sponsoring undergraduate researchers.
- Develop advertising fliers to post conspicuously around campus to advertise/recruit and explain the benefits of research as an undergraduate.
- Encourage participating students to present their results in a departmental seminar.
- Increase departmental or grant support for undergraduate students to attend and present their research results at conferences.
- Obtain external funding (e.g. NSF-REU, Hughes, etc.) to support undergraduates in faculty-directed research.

Objective 4.2: Develop undergraduate students: improved classroom/curriculum experience.

Strategies:

- Annual review by curriculum committee to match BOT/BIOL undergraduate course offerings to demand/needs of students.
  - Delete courses with inadequate demand
  - Change frequency of courses based on demand

    - Recommend new courses if needed
- Modify content/emphases of individual courses to meet student needs, where appropriate.
- Add new technologies to courses as appropriate to course level and content.
- Modernize facilities and equipment for core teaching laboratories (LSE 101, 110, 011); cost estimate for replacement tables and wiring in 101 & 110 is ~$10,000.
- Seek external (e.g. NSF, HHMI, etc.) funding for course/facilities improvement

Objective 4.3: Enhance the quality of advising of undergraduate students majoring in botany and biology.

Strategies:

- Participate in proposed A&S College Center for Premedical & Life Sciences Advising
- Schedule annual review by curriculum committee to match BOT/BIOL undergraduate course offerings to demand/needs of students.
- Send advisers to conferences focusing on effective advising.
- Survey biology/botany advisers at similar institutions with respect to their philosophy, procedures, and perceptions.

Goal 5: Staff Development: Improve the training and job satisfaction of office and technical staff.

Critical Success Factors:

- Retention and expanded duties and pay scale for current office staff
- Hiring and/or retention of skilled research technicians, where appropriate

Objectives:

Objective 5.1: Clerical staff skills development.

Strategies:

- Encourage and fund (where necessary) clerical staff skills development through OSU and outside courses (e.g. Meridian Technology).
- Develop options for increasing duties, title and pay scales for office staff, e.g.:
  - Request grant funds (direct costs) for clerical staff assistance with research and facilities such as the herbarium
  - Train office staff in e.g. web page development and database management for departmental & faculty research web sites

Objective 5.2: Technical staff skills development.

Strategies:

- Encourage and fund (where necessary) technical staff skills development through OSU and outside short courses/workshops, such as those offered at professional society annual meetings.
- Encourage technician reciprocal exchanges among research projects to expand skills.

Goal 6: Formalize the promotion of the core values of OSU and the College of A & S.

Critical Success Factors:

- Eleven Botany faculty members to permit flexibility in specialty options and teaching assignments.
- Tangible rewards (e.g. salary raise recommendations) for service and stewardship activities. "Encouragement" without reward is unlikely to motivate.
- Communication to community of availability of Botany faculty for outreach programs
- Permanent financial commitment from OSU or Arts & Sciences for stewardship of two Botany-maintained resources of critical value to OSU and the State: the research herbarium and the McPherson Botanical Reserve.
    - For the herbarium:
        - A plant taxonomist faculty member serving as curator.
        - Adequate physical space and climate control to house the herbarium cabinets and bench space.
    - For the McPherson Botanical Reserve:
        - Continued active volunteer base.
        - Continued cooperation with the OSU Wildland Fire Program.
        - Continued cooperation with the OSU Physical Plant for loans of equipment.
- Advertise open faculty positions in minority-targeted publications and/or web sites, such as the "Society for Advancement of Chicanos and Native Americans in Science" (www.sacnas.org) and "The Hispanic Outlook in Higher Education" (www.HispanicOutlook.com)

Objectives:

Objective 6.1: Effective stewardship of public resources.

Strategies:

- Enhance the value of the OSU herbarium as a research, teaching and outreach resource.
    - Continue to develop, in collaboration with herbarium curators at state and regional institutions, the *Oklahoma Vascular Plants Database*.
    - Initiate a field program by trained volunteers (student and public) to systematically collect specimens from poorly collected Oklahoma counties for deposition in the herbarium.
    - Develop a "Herbarium Associates" program to attract qualified volunteers (student and public) to conduct curatorial tasks such as specimen preparation and repair, identification, bar coding, annotation, and database management.
    - Enhance the dissemination of taxonomic/ecological information and the technical assistance provided to university researchers, personnel of government agencies, and the public.

- Enhance the value of the McPherson Botanical Reserve as a research, teaching and outreach resource.
  - Vegetation management techniques such as prescribed burns, fire breaks and removal of encroaching red cedar trees.
  - Encourage field trips by OSU and K-12 classes, Boy/Girl Scouts, etc.
  - Encourage use of the preserve for research projects.

Objective 6.2: Provide <u>service</u> to OSU through quality general education courses to undergraduate students throughout OSU.

Strategies:

- Offer general education courses/sections as necessary to meet demand as permitted by faculty size and teaching loads (to avoid detracting from core courses for majors). Courses may be offered during regular semesters, summers or intersessions, and at Stillwater and/or Tulsa campuses. Current offerings include:
  - Introductory Biology (shared responsibility with Zoology and Microbiology & Molecular Genetics; also a core course for majors)
  - Plant Biology (also a core course for majors)
  - Field Botany (also a core course for majors)
  - Ethnobotany
  - Environment & Society
  - Plants & People
  - Survey of Human Diseases
  - Biological Rhythms in Humans and Other Organisms

Objective 6.3: Provide <u>outreach & service</u> to the local community, Oklahoma & the nation.

Strategies:

- Encourage faculty and student participation in periodic outreach events such as the "I Wonder Fair", the Audubon Society's Nature Day, Earth Day, ONPS meetings and outings, elder hostels, and opportunistic activities such as K-12 field trips, classroom visits, etc.
- Outreach to local K-12 public schools; guest presentations in classes and judge science fairs.
- Encourage faculty and student input to public outreach information displays at e.g. the Tallgrass Prairie Preserve, National Wildlife Refuges, Museums/Zoos/Gardens, etc.
- Encourage and facilitate faculty service on federal grant review panels. This is free to OSU, although replacement instructors may be required for ~1-2 weeks. (See also objective 2.3.)
- Encourage and facilitate faculty service as officers of professional societies and manuscript reviewers or editors of technical journals.

- Provide web-based information service on e.g. multivariate methods to the scientific and educational community.
- Continued faculty on-demand **service and outreach** to foster the public economic and ecological well-being. Common requests include:
  - Identification of nuisance or potentially toxic plants for gardeners, ranchers, lake/pond owners, etc.
  - Advice concerning vegetation management for e.g. birds and other wildlife.
  - Advice concerning elimination of aquatic plants and algae from ponds.

Objective 6.4: Formally incorporate integrity into the Botany undergraduate and graduate curriculum.

Strategies:

- Develop a new 1-credit hour undergraduate/graduate course focusing on research integrity (peer-review, confidentiality, plagiarism, data integrity, grant budgets, media influence, academic-corporate collaboration, manuscript authorship guidelines). Make the course mandatory for graduate students and recommended for undergraduates. (See also Objective 3.3.)

Objective 6.5: Incorporate diversity into the Botany undergraduate and graduate curriculum.

Strategies:

- Continue to offer the existing undergraduate course in ethnobotany (BOT 4123).
- **If** deemed a faculty position priority (objective 1.2), hire a new faculty member in the area of Ethnobotany, to address the core value of diversity. Ethnobotany concerns the uses of plants by different cultures (particularly indigenous peoples) for food, fiber, shelter and cultural rituals.
- Have the ethnobotanist (if hired) develop a new graduate course in ethnobotany research methods.

Objective 6.6: Promote intellectual freedom.

Strategies:

- We accept the principles established by the American Association of University Professors.