

Botany

Putting names and faces to botany information

by Lori Bronars and Anne Prestamo

The following annotated list of Internet sites for botany is aimed at common information needs of librarians or library users, from undergraduates to professionals.¹

Gateways and metasites

- **Internet Directory for Botany.** A searchable and browsable gateway, the Internet Directory for Botany provides more than 4,000 links to botanical information including university departments, societies, organizations, museums, checklists, threatened plants, gardening, biologists' addresses, economic botany, software, and images. Also included is an extensive, international listing of arboreta and gardens. *Access:* <http://www.botany.net/IDB/>.

- **Scott's Botanical Links.** Including more than 3,000 links, this site features both searchable and browsable gateways. Categories include: databases, multimedia experiences, illustrations, systematics, and Web resources. *Access:* <http://www.ou.edu/cas/botany-micro/bot-linx/subject/>.

- **Green Links.** A specialized gateway with browsable categories including marine biology, rainforests, tropical biology, databases, a world map of botany sites, software, and species names. *Access:* <http://www.euronet.nl/users/mbleeker/urlists/boturl-1.html>.

- **PlantFacts Search Engine.** Created and maintained by the staff of Horticulture and Crop Science in Virtual Perspective at Ohio State University, this resource includes two databases. The "Factsheet Database" contains guides for answering plant-related questions from 46 universities and government institutions across the U.S. and Canada. Links are provided to more than 20,000 pages of Extension fact sheets and bulletins that provide a concentrated source of plant-related information. The "Research and Teaching" database provides links to more than 20,000 pages from 40 American university departments related to admissions, degree requirements, career opportunities, research projects, and online courses. *Access:* <http://plantfacts.ohio-state.edu/>.

Arboreta and gardens

- **New York Botanical Garden.** A vast array of information about the garden and its activities is presented. Searchable databases include the library catalog, the "Index to American Botanical Literature" (selected years), and digital photos of vascular plant type specimens (totaling 6,500 now and 75,000 later). Go to "Herbarium Specimen Images" in the "What's New" section. The Vascular Plant Type Catalog is also searchable. *Access:* <http://www.nybg.org/>; *Access:*

About the authors

Lori Bronars is science reference librarian at Yale University, e-mail: lori.bronars@yale.edu; Anne Prestamo is coordinator of digital library services at Oklahoma State University, e-mail: prestam@okstate.edu

<http://www.nybg.org/bsci/hcol/vasc/> (Vascular Plant Type Catalog).

- **Kew Web.** The official Web site for the Royal Botanic Gardens. Kew provides information on collections, research, and publications. Includes the searchable databases "Vascular Plant Families" and "Genera and Authors of Plant Names." The site also contains a five-source compilation of data on the amounts of nuclear DNA in seed plant species. *Access:* <http://www.rbgekew.org.uk/>.

- **Missouri Botanical Garden.** Visitor information on the garden's arboretum is plentiful at this site. The library's catalog and the "w³TROPICOS" (Vascular Tropicos) database of plant names are searchable. *Access:* <http://www.mobot.org/>; *Access:* <http://www.mobot.mobot.org/Pick/Search/pick.html> ("w³TROPICOS").

- **Morton Arboretum and Sterling Morton Library.** The section on plant information and collections includes e-mail reference service. Questions are answered by a librarian. *Access:* <http://www.mortonarb.org/>.

- **U.S. National Arboretum.** Includes the latest USDA Hardiness Zone Map showing lowest recorded temperatures for the U.S., Canada, and Mexico. *Access:* <http://www.ars-grin.gov/ars/Beltsville/na/>.

Societies, organizations, and museums

- **Botany (Smithsonian Institution).** The Department of Botany, National Museum of Natural History, Smithsonian Institution provides information on its collections, research, and publications. Links to the department's searchable databases include the U.S. Wood Collection, Lichen, and Checklist of the Plants of the District of Columbia. *Access:* <http://nrmhwww.si.edu/departments/botany.html>.

- **Natural History Museum, London.** On this e-mail reference service choose "Enquiries" from the drop-down box; on the Museum Enquiries Page, scroll down to Science enquiries. Users can search the Library Catalog and the Picture Library. This site contains nearly 600 images (mostly art reproductions) of plants and flowers. *Access:* <http://www.nhm.ac.uk/>.

- **Harvard University Herbaria.** Featuring the Herbaria's 5 millionth specimen, this site also provides links to other large plant

collection sites, numerous searchable databases, descriptions of its collections, research, publications, and visitor information. The Farlow Reference Library of Cryptogamic Botany section provides e-mail reference service. The Databases section contains an extensive list of the world's most endangered mosses and liverworts. *Access:* <http://www.herbaria.harvard.edu/>.

- **Swedish Museum of Natural History.** The "Biologist-on-call" provides e-mail reference service. The Plants section contains images, searchable databases, and other descriptions of collections and information on collectors. (Some in Swedish only.) The Seed plants section contains 2,000+ images from Carl Linnaeus' herbarium. *Access:* <http://www.nrm.se/welcome.html.en>.

- **U.S. Department of Agriculture.** Providing information about USDA's many programs, services, and agencies, the National Agricultural Library also offers free searching of Agricola (1970-). In the Agencies section, choose "Forest Service" to access the *Climate Change Atlas for 80 Tree Species of the Eastern U.S.* In the Hot Topics section, choose "Biotechnology Overview" and "Research" for reports on genetically engineered crops. *Access:* <http://www.usda.gov/>; *Access:* <http://www.nal.usda.gov/ag98> (Free Agricola).

Images

- **Plant Dictionary Image Library.** The Plant Dictionary is an indexed system of multimedia teaching resources for Horticulture and Crop Science. The dictionary is organized in the following subsections: "Plants of Horticulture" is a searchable database of 3,878 high-quality images and horticultural descriptions for hundreds of unique species and cultivars; "Pests & Disease of Horticulture" is a searchable database of 1,100+ high-quality images featuring pests, diseases, and other plant problems; "Biology of Horticulture" includes pictures, questions, and labs related to biological processes and functions



of plants; "Technology of Horticulture" includes pictures, questions, and labs related to mechanisms and procedures involved in propagating horticultural plants. *Access:* <http://www.hcs.ohio-state.edu/plants.html>.

• **The Virtual Foliage Home Page.** Developed and maintained by Michael Clayton, Department of Botany, University of Wisconsin-Madison, this site provides links to thousands of plant pictures. *Access:* <http://www.wisc.edu/botany/virtual.html>.

• **Agronomy & Horticulture 100 (AgHrt 100) Plant Images.** Created and maintained by the Department of Agronomy and Horticulture, Brigham Young University, this site includes a JPEG gallery of approximately 150 economically important plants. Images may be used for noncommercial purposes. *Access:* <http://ucs.byu.edu/bioag/aghrt/aghrt100/images.htm>.

• **Smithsonian Catalog of Botanical Illustration.** More than 500 images of Bromelaciae, Cactaceae, and Melastomataceae by early to mid-20th century artists are available. The collection will eventually grow to 3,000 images. Images are copyrighted by the Smithsonian. Supported by a grant from the Atherton Seidell Endowment Fund, this resource was developed by Larry Dorr, Ellen Farr, and Alice Tangerini. *Access:* <http://nmbhwww.si.edu/botart/>.

• **The Botanic Sorting Machine.** This aesthetically pleasing gateway provides access to thousands of plant images. Plant names are in Latin, English, and Dutch. Other pages provide information and images of the Suriname Rainforest. Created by Marco Bleeker in Amsterdam (Netherlands), this site is mirrored on servers in the U.S., Japan, Canada, and Russia. *Access:* <http://www.euronet.nl/users/mbleeker/folis/bsmain-e.html>; *Access:* <http://www.euronet.nl/users/mbleeker/suriname/suri-eng.html> (Suriname Rainforest).

• **The National Plant Photographic Index.** The Australian National Botanic Gardens provides a large collection of photographic slides of identified Australian plant species. It also features environmental and conservation images. *Access:* <http://www.anbg.gov.au/anbg/photo.html>.

• **Flora of Europe—a Photographic Herbaria.** Flora of Europe is an amateur photo-herbarium, established in 1997. It con-

tains approximately 660 pictures of flowers, mostly of southern Europe. There are 284 species (63 families, 179 genera). *Access:* <http://utopia.knoware.nl/users/aart/index.html>.

Checklists and floras

• **"BABEL": a Multi-Lingual database for the Vernacular Names of European Wild Plants.** Common names of European wild plants are provided in eight languages. Andrew N. Gagg and Roger Whitehead hope to enlist other botanists to expand the glossaries, dictionaries, and databases, and to add support for additional languages. *Access:* <http://www.gagg.mcmail.com/Babel.htm>.

• **Checklist of Online Vegetation and Plant Distribution Maps.** Compiled by Claire Englander (University Herbarium, University of California, Berkeley) and Philip Hoehn (Branner Earth Sciences Library and Map Collections, Stanford University), this site is arranged by area, world or continent, and subdivided by region or country name. *Access:* <http://www-sul.stanford.edu/depts/branner/vegmaps.htm>.

• **Flora of North America.** More than 800 scientists at 30 institutions are collaborating on this project to provide information on the plants that "grow outside of cultivation" north of Mexico (21,000 species). Entries are signed and include physical descriptions, numbers of genera and species, distribution, and literature references. Online records can be searched by province, elevation, name, or other text word. This resource is related to the printed volumes of the same title, being published by Oxford University Press. *Access:* <http://hua.huh.harvard.edu/FNA/>.

• **Global Plant Checklist Project.** The International Organization for Plant Information (IOPI) has identified this project as a top priority. The Global Plant Checklist, encompassing about 300,000 vascular plant species and more than 1 million names, will serve as a taxonomic backbone to which users can append more specialized information. Eventually the Checklist will also include nonvascular plants. IOPI calls this a "work in progress," lacking the refinements envisaged for the fully relational Checklist when funds are available. *Access:* <http://iopi.csu.edu.au/iopi/iopigpc1.html>.

• **Carnivorous Plant Database.** From Rick Walker, HP Labs in Palo Alto, California, this site provides nomenclature information and images of carnivorous plants that can be retrieved via the searchable database. *Access:* http://www.hpl.hp.com/bot/cp_home.

Ethnobotany

• **Ethnobotanical Resource Directory.** Created by Michael B. Thomas, Department of Botany, University of Florida. This site's categories include publications, bibliographies, conferences/society meetings, databases, educational opportunities, research projects, Web directories, cool sites, articles, and miscellaneous sites. *Access:* <http://www.cieer.org/directory.html>.

• **Southwest School of Botanical Medicine Home Page.** This site includes a rich array of images and texts on medicinal plants and their use in alternate botanical medical systems. More than 700 photographs of medicinal plants, 136 color illustrations from *National Geographic* (1915–24), botanical drawings by Mimi Kamp, and illustrations from early 20th- and 19th-century botanical medical publi-



cations are available. Alternate botanical medical texts are available in ASCII and Adobe Acrobat formats. *Access:* <http://chili.rt66.com/hrbmoore/HOMEPAGE/HomePage.html>.

• **Dr. Duke's Phytochemical and Ethnobotanical Databases.** This project, of James A. Duke and Stephen M. Beckstrom-Sternberg, is housed at the USDA's National Germplasm Resources Laboratory. Resources include:

- EthnobotDB: 80,000 records of plant uses worldwide;
- PhytochemDB: plant chemical data, including quantity, taxonomic occurrence, and chemical activity; and
- MPNADB, Medicinal Plants of Native America: 17,634 items representing the medicinal uses of 2,147 species from 760 genera and 142 families by 123 different Native

American groups. *Access:* <http://www.ars-grin.gov/duke/>.

Economic botany

• **Plants for a Future.** A resource center for rare and unusual plants, particularly edible and medicinal plants, is featured at this site from the UK. *Access:* <http://www.scs.leeds.ac.uk/pfaf/index.html>.

• **AgNIC Home Page.** AgNIC (Agriculture Network Information Center) is a distributed network of agriculture-related information, subject area experts, and other resources. It was established by an alliance of the National Agricultural Library, land-grant universities, and other organizations committed to facilitating public access to agricultural and related information. *Access:* <http://www.agnic.org/>.

• **EnviroPlants Research.** Information on the Technical and Economical Efficiencies of Producing, Marketing, and Managing Environmental Plants is available at this site. It contains a comprehensive publication collection on economic and horticultural developments in the nursery and greenhouse industries. The site is maintained by Tim Rhodus, Ohio State University, Department of Horticulture and Crop Science. *Access:* <http://www.hcs.ohio-state.edu/s290/>.



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• **Forage Information System.** From David Hannaway, Department of Crop & Soil Science, Oregon State University, this site is a global forage information resource. It also contains a glossary of forage-related terms. *Access:* <http://forages.orst.edu/>; *Access:* <http://forages.orst.edu/main.cfm?PageID=60> (Glossary).

• **ForestWorld.** Categories at this site include news and views, databases and directories, certification and sustainability, forest industry, Internet directory, woods of the world, photo gallery, and marketplace. *Access:* <http://www.forestworld.com/>.

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Higher plants

• **Tree Guide: the Natural History of Trees.** Tree species information and range maps are available at this site developed and



maintained by Tom Kimmerer, Forestry and Natural Resources, University of Kentucky. The site is navigable via a table of contents or via the

tree database. It contains information for approximately 120 species, with 5 to 10 species added weekly. *Access:* <http://www.treeguide.com/treeguide/index.htm>.

• **Tree Conservation Information Service.** The World Conservation Monitoring Centre holds data on more than 7,000 tree species of global conservation concern. Conservation assessments (including IUCN Red List category) have been gathered from many sources. This resource is continuously updated. *Access:* <http://www.wcmc.org.uk/cgi-bin/SaCGI.cgi/trees.exe>.

• **Atlas Florae Europaeae.** Edited by Jaakko Jalas, Juha Suominen, Raino Lampinen, and Arto Kurto and published by the Committee for Mapping the Flora of Europe and Societas Biologica Fennica Vanamo. The atlas shows European distribution of species and subspecies. Ranges are mapped in grids of 50-km squares, totaling 4,419 squares for Europe. Notes list synonyms, tax-

onomy and nomenclature data, important additions and corrections (mainly complementing *Flora Europaea*), and references to maps of the total range. *Access:* <http://www.helsinki.fi/kmus/afe.html>.

• **CalFlora.** CalFlora is a comprehensive database of plant distribution for California. A joint project of USDA Forest Service, UC Berkeley Digital Library Project, USGS, UC Davis Information Center for the Environment, Santa Barbara Botanic Garden, and others, its components include:

• **Species Database.** Geographic distribution summaries, habitat, and lifeform data for the approximately 8,400 vascular plant taxa native to, or naturalized in, California.

• **Occurrence Database.** More than 600,000 observations of plants within California, uniting data from numerous public agencies, herbaria, private organizations, and individuals.

• **Nomenclature Database.** Information on relationships between plant names used by various observers, past and present. A useful tool for accessing and summarizing occurrence observations and a source of historical information on usage of plant names in California. *Access:* <http://galaxy.cs.berkeley.edu/calflora/>.

• **The Arabidopsis Information Resource (TAIR).** Funded by the National Science Foundation, this site is a resource for genomic data on *Arabidopsis thaliana*. Some information is from the former "Arabidopsis thaliana Database" (AtDB), which was maintained by Stanford University's Medical School, Department of Genetics. *Access:* <http://www.arabidopsis.org>.

• **Gray Card Index.** Maintained by K. N. Gandhi (Harvard University Herbaria), the Gray Card Index provides taxonomic information on New World vascular plants. *Access:* <http://www.herbaria.harvard.edu/Data/Gray/>.

• **Information and Education, Ohio Division of Forestry.** This site, from Bill Schultz, program administrator, provides information on Ohio forestry and includes a forestry acronym key to more than 100 acronyms. *Access:* <http://www.hcs.ohio-state.edu/ODNR/Education/Educate.htm>.

• **International Plant Names Index.** This effort is a collaboration between the Royal Botanic Gardens, Kew, Harvard University Herbaria, and Australian National Herbarium.

"Internet Resources" on the Web

Thanks to a reader's suggestion, we have made "Internet Resources" on the Web easier to use. The articles are now listed by subject instead of by date.

Subjects covered in the last two years include: African American culture, twentieth-century authors, banking, disabilities, distance education, e-commerce, El Niño, environmental engineering, fashion, foreign language, literature and culture, genealogy, geographic information systems, government information, grants, human rights, information literacy, mathematics, philosophy, physics, refugees, Russian studies, and travel.

Visit the site at <http://www.ala.org/acrl/resrces.html>.

The aim of this database is to supply, for all known flowering plants, the scientific name and literature cite to the recorded discovery. Access: <http://www.ipni.org/>.

Lower plants

• **Lichen Information System.** This resource on lichens is maintained by Roberto Zorer, Institute of Plant Physiology, University of Salzburg. Access: <http://www.sbg.ac.at/pfl/projects/lichen/news.htm>.

BRYOPHYTES

MOSES, LIVERWORTS AND HORNWORTS



• **Bryophytes.** A project of Raymond E. Stotler and Barbara J. Crandall-Stotler, Department of Plant Biology, Southern Illinois University at Carbondale, this site focuses on mosses, liverworts, and hornworts. It provides information on the classification, structural features, natural history, ecology, and evolutionary relationships of Bryophytes. Access: <http://www.science.siu.edu/bryophytes/index.html>.

• **A Cumulative Checklist for the Lichen-forming, Lichenicolous and Allied Fungi of the Continental United States and Canada.** Created by Theodore L. Esslinger, Department of Botany, North Dakota State University, this site contains cumulative updates to the most recently published North American checklist by Esslinger and Egan (1995). It corresponds to Esslinger's most current *Recent Literature on Lichens for the Bryologist*. Access: <http://www.ndsu.nodak.edu/instruct/esslinge/chcklst/chcklst7.htm>.

• **CyanoSite.** This extensive cyanobacterial bibliography is provided by Mark A. Schneegurt, Environmental and Industrial Microbiology, University of Notre Dame. It contains more than 6,700 references that can be imported into bibliographic management programs. The site also contains a gallery of 200+ images and videos of cyanobacteria. Access: <http://www.cyanosite.bio.purdue.edu/>.

• **The Harmful Algae Page.** Supported by an NSF/NOAA grant to the National Office for Marine Biotoxins and Harmful Algal Blooms at Woods Hole Oceanographic Institution, this site contains an introduction to algal blooms and "red tides," a photo gal-

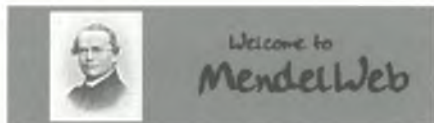
lery, a listing of species responsible for harmful algal blooms, and a distribution map. Access: <http://www.rectide.whoi.edu/hab/>.

• **Algal Journal Articles Databases.** Most issues of *Botanica Marina*, *British/European Journal of Phycology*, *Journal of Phycology*, *Phycologia*, and *Proceedings of the International Seaweed Symposia* are available here. Access: <http://seaweed.ucg.ie/search/Searchchoice.html>.

Miscellaneous

• Checklist of Software for Field Biologists.

This site provides a listing of software for biologists who do fieldwork. Short descriptive information is provided, with links to further information, and, in some cases, freely downloadable programs. Access: http://www.euro.net.nl/users/mbleeker/program/soflis_e.html.



• **MendelWeb.** The classic genetics paper by Johann Gregor Mendel (1865), in German and translated into English, is among the links on this site. This site is primarily aimed towards teachers and undergraduates. Access: <http://www.netspace.org/MendelWeb>.

• **The Botanical Collectors Database.** The database provides information on plant collectors and may be downloaded. It is a collaboration of the California Academy of Sciences, Field Museum of Natural History, Harvard University Herbaria, Missouri Botanical Garden, New York Botanical Garden, and Smithsonian Institution. Entries are provided for individual collectors as well as for collecting teams. Access: <http://herbaria.harvard.edu/Data/Collectors/>.

• **Why Leaves Change Color.** This site is provided by the USDA Forest Service, St. Paul Field office. Access: <http://willow.ncfes.umn.edu/leaves/leaves.htm>.

Note

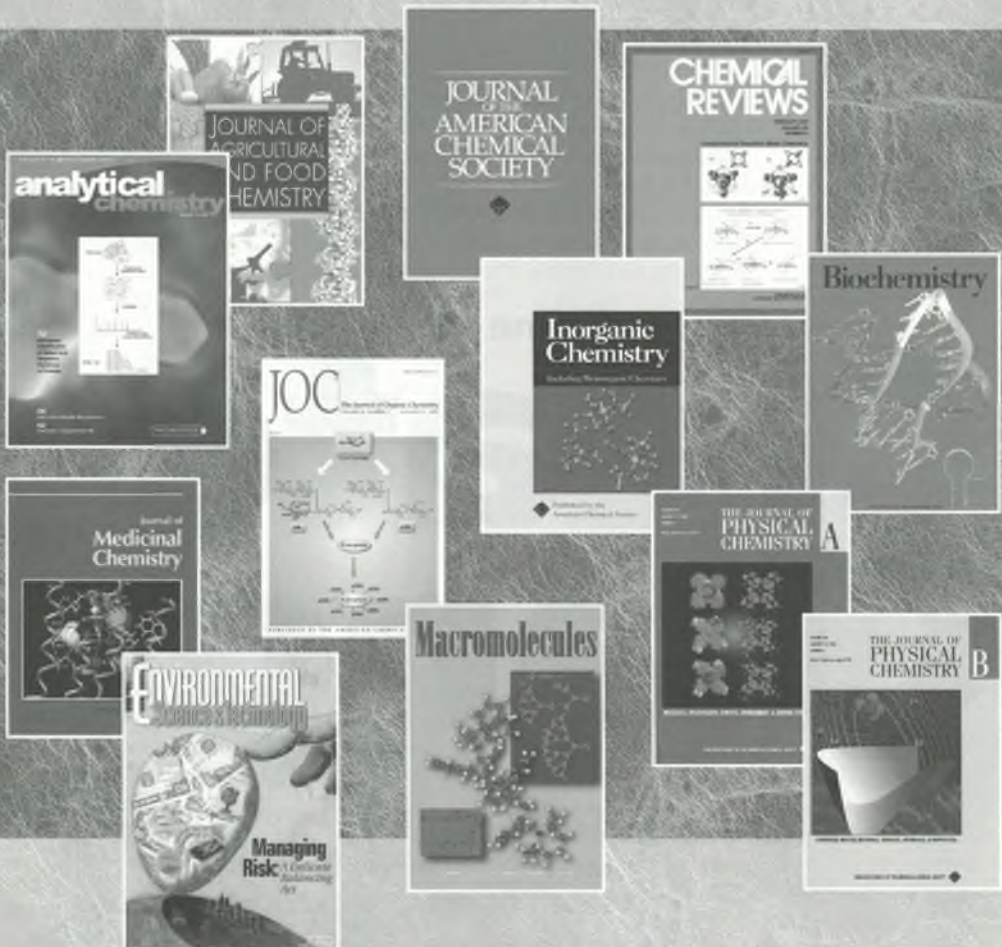
1. For a highlight on gardening sites, see Art Wolk, "Which end of the bulb goes up?" *Library Journal* (December 1999): 81-84. ■



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