

Annual Report September 1, 2005 – August 1, 2006
Ted R. Bradley Herbarium (GMUF)
George Mason University

Note from Director: This report covers my first year as director of the Ted R. Bradley Herbarium. Much of the progress I report here concerns reopening the collections following the one-year interim between Ted Bradley's retirement and my arrival.

STATISTICS

Loans Out - (4; one year term)

- MU, Willard Sherman Turrell Herbarium, Miami University, Ohio. Loans of Bahamian vascular plants to support development of a new Flora of the Bahamas:
 - 1) 123 sheets pteridophytes (September 29, 2005).
 - 2) 15 sheets Smilacaceae (January 3, 2006).
 - 3) 31 sheets of Commelinaceae and Liliaceae (April 4, 2006).
 - 4) 10 sheets Agavaceae, Smilacaceae (June 19, 2006).

Loans Returned - (1)

- MU, Willard Sherman Turrell Herbarium, Miami University, Ohio.
 - 1) 15 sheets Smilacaceae annotated (March 21, 2006).

Loans Received - (0)

Exchanges Out - (1)

- BKL, Brooklyn Botanical Garden. 300 sheets of vascular plants from Banshee Reeks Preserve, Loudoun County collected by Lisa Williams for a Master's thesis project. County records were retained by former curator, Ted Bradley. (March 21, 2006).

Exchanges In - (1)

- BKL, Brooklyn Botanical Garden. 100 sheets of vascular plants from southern New Jersey pine barrens. 200 sheets will be sent in coming years. (March 10, 2006).

Gifts - (1)

- Meadowlark Botanical Gardens, 2 sheets Arlington Co. records for club-moss species.

Specimens Mounted – (191)

Specimen Repaired – (12; backlog complete)

Herbarium Visitors: External - (25)

- From: NatureServe, NOVA, local middle-schools, and local community.

Herbarium Visitors: GMU faculty/students/staff - (15)

Publications that resulted from use of GMUF facilities - (0)

MANAGEMENT HIGHLIGHTS

Public outreach within the herbarium facility:

- A visitor's log has been installed in Krug 15 to document all users.
- I identified one plant for a local resident (*Symplocarpus foetidus*; February 14, 2006).
- I hosted two 1-hour workshops for the Sally Ride Science Festival for Girls entitled "Systematics: the science of biological diversity," attended by 10 middle-school aged girls. (May 7, 2006).

Raising external visibility of the collections:

- *Index Herbariorum* (<http://sciweb.nybg.org/science2/IndexHerbariorum.asp>) has up-to-date contact information for GMUF.
- GMUF was profiled by *The Vasculum* (2006, Vol. 1), the Society of Herbarium Curators Newsletter (<http://www.newberrynet.com/sabs/shc/Vasculum/index.htm>). I also attended the Herbarium Curator's Meeting at Botany 2005 in Austin, TX to learn about the 2020 Vision to database all US herbaria.
- GMUF has joined the collaborative network of herbaria in the southeast, SERNEC (<http://www.serneec.org>; Southeast Regional Network of Expertise and Collections).
- I represented GMUF at the Society of Herbarium Curators Symposium, "Bioinformatics Symposium/Workshop: Community Standards and Research Questions" during the 2006 meeting of the Association of Southeastern Biologists in Gatlinburg, TN (March 28-30, 2006) to network with regional herbaria and research collections management software.
- The redesigned webpage of Environmental Science and Policy Department (<http://mason.gmu.edu/~espp/research/facilities/index.html>) has a description of GMUF and contact information. The future herbarium website will be linked through this site.
- GMUF has established formal ties with Meadowlark Botanical Garden, Vienna, VA. In my role as Director, I am a board member of the MBG Deidra Turnage Trust Internship, which will fund one student annually to work in conservation biology or gardens management. (<http://www.nvrpa.org/meadowlark.html>; June 7, 2006)
- The Memorandum of Understanding between GMUF and the Virginia Department of Transportation for contract-based surveys of federal or state threatened or endangered vascular plant species on as-needed basis was renewed for July 2006 – July 2007.

Integrated pest-management of the collections: During 2005, I made the decision to discontinue widespread use of para-dichlorobenzene in favor of an integrated pest-management strategy. All para-dichlorobenzene (ca. 20 lbs) found stored in Krug 15-16 was turned in for chemical disposal. Prior to my arrival, each collection cabinet in Krug 16 was loaded with a

small dish (ca. 250 mL) filled with granular para-dichlorobenzene. By the time of my arrival, this quantity of chemical had sublimated entirely and was absorbed into the specimens. I removed the dishes and installed a HEPA-quality air-purifier in Krug 16, which is on loan from Office of Laboratory Safety, to reduce the powerful odor that permeates the collections. The odor is no longer bothersome but is dependent on constant air-filtration. I am considering purchasing a HEPA air-purifier for the herbarium. I have also set up hand-washing stations and encourage all visitors to wash their hands after handling specimens.

I installed a push broom, hand-brush, and dust-pan for each room (Krug 15, 16) to remove dust and plant litter as soon as it is evident. I purchased the Museum Monitoring Kit from Insects Limited, Inc. to begin a constant monitoring program. Currently, one sticky-trap each is placed in the prep room and collections room, and I check these monthly for herbarium beetles and silverfish. A poster containing images of these pests is posted in the prep room. Most importantly, I have instated the following rules concerning incoming specimens to prevent insect contamination. All incoming loans, exchanges or gifts are immediately frozen without being opened for 7 days at -80° C in Krug 16. Freshly dried, unmounted materials from collections made in-house can be frozen for 7 days at -80° C either before or after being mounted. Unfrozen and frozen materials are stored in separate cabinets. As usual, food and living plant materials are not permitted in the research collections (Krug 15).

Archival quality materials: Archival quality mounting materials were purchased including New York-style herbarium sheets, 25% cotton bond paper for labels, paper fragment packets, and Missouri Botanical Garden-type PVA glue. All herbarium specimens are currently sleeved in newspaper flimsies, which are not acid-free and are visibly discoloring and weakening the specimens. Either a suitable replacement will be found for the sleeves or they will be removed gradually over time.

Library: Professor Emerita Judy Skog continues to contribute recent copies of the American Fern Journal, The Fern Gazette, International Journal of Plant Sciences, American Journal of Botany, Southeastern Biology to the herbarium library. These add to the numerous uncataloged reference books and journal collections both she and Ted Bradley donated to the herbarium following their retirement prior to 2005. A copy of the Herbarium Handbook was added to the collection.

Electronic Information Infrastructure: A new Dell Pentium computer and a flat-panel monitor replaced the old Pentium III PC in Krug 16.

There is no record of the precise number of specimens housed by GMUF, although accession-stamp numbers and previous estimates by Ted Bradley indicate that they tally over 60,000. By the criteria of Prather et al. (2004: *Systematic Botany* 29: 15-28), GMUF is considered a “medium-sized” herbarium in the United States. No electronic catalog of the specimens exists, but some specimen data are maintained in an index-card file in Krug 15 that is filed by family, alphabetically. There is one card per species, and the geographic origin of each specimen (country, state or Virginia county) is amended as new specimens are added to the collection. In order to make the collections more accessible and to improve its management, I have decided to use the NSF-sponsored collections database and management software, SPECIFY, to catalog the collections and have installed this on the new computer.

A pilot databasing study was conducted to gather baseline information about the collection as a whole and to assist with grant-development efforts. The study followed the same protocol used by Prather et al. (2004), “The Decline of Plant Collecting in the United States: A Threat to the Infrastructure of Biodiversity Studies.” Specimen data from all sheets of nine exemplar genera housed in GMUF (*Amelanchier*, *Antennaria*, *Corallorhiza*, *Juniperus*, *Leersia*, *Nuphar*, *Phlox/Microsteris*, *Populus*, and *Woodsia*; 639 sheets) were recorded in spreadsheet format. None of the collections received or made in-house during the 2005-2006 report year were included. Initial analyses of the sample focused on the geographic origin and date of collection of each specimen in order to determine the overall representation of Virginian flora and the peak decade of collection. The statistics reported below are based on a small but unbiased sample of herbarium specimens and offer a preview about the collection as a whole.

Statistics about GMUF as a *state-specific collection*:

- 67% of the specimens are from Virginian plants (431 sheets). If one extrapolates to the entire collection, GMUF may contain about 40,200 Virginian specimens.
- Virginia county coverage is 78% (74 of 95 counties). The 21 missing counties are located in southern Virginia or in central counties located near other university herbaria. It is likely that the “missing” counties are present elsewhere in the collection but may be underrepresented for two reasons: 1) the great distance between GMU and the southern-most sites may have made collection there inconvenient, and 2) GMU botanists may have avoided the common collection sites of other herbaria.
- The three most prevalent counties in the collection are Fairfax (56 sheets, 13% of Virginian specimens), Fauquier (23 sheets, 5%) and Shenandoah/Page (tied with 16 sheets each, 5%), which reveal a Northern Virginian focus of the collections.

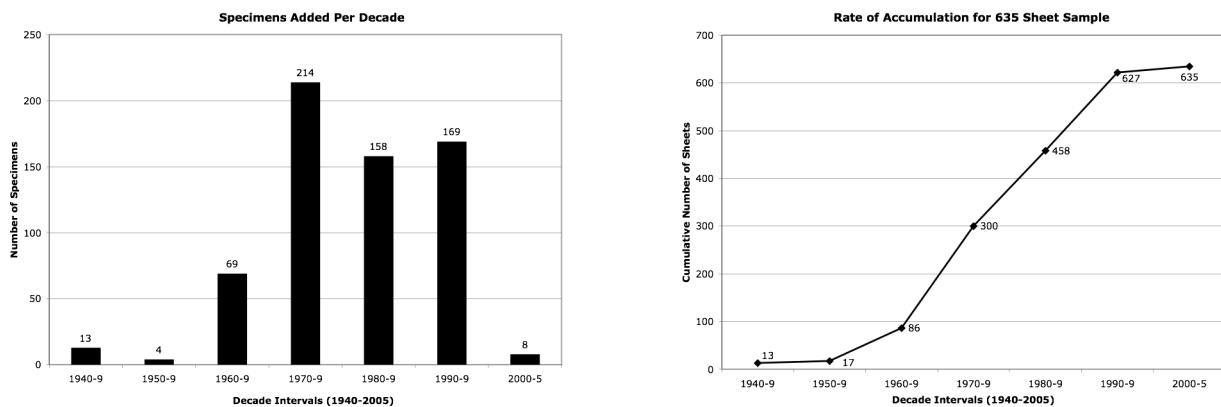


Figure 1. Sample size for historical analysis of GMUF growth (N=635) was smaller than original sample (N=639) because four specimens lacked information about the date of collection.

Data about the *historical activity of GMUF* as a natural history collection:

- The first Virginian specimen collected by Ted Bradley dates to 1967. Therefore specimens that predate this year are likely derived from external gifts and exchanges.

- The peak decade of activity within GMUF was the 1970's (214 specimens added), which was 27% more active than the second-best decade (1990's; 169 specimens) (Fig. 1). This result is consistent with Prather et al. (2004) in finding that US natural history collections are in decline. It is also identical to that found for WILLI, the herbarium of William and Mary College (ca. 70,000 specimens; Prather et al. 2004).
- The rate of growth in the sample was nearly linear from the time of Ted Bradley's first contribution until the late 1990's. After 2000, a marked decrease in the activity of the herbarium ensued, with only eight specimens being added between 2000-2005. (Fig. 1)