

T.M. Sperry Herbarium (“KSP”)

Department of Biology
Pittsburg State University

2014 Annual Report

From the Director, Dr. Neil Snow

NSF Workshop, Mt Pleasant, MI
(Central Michigan University)

The Sperry Herbarium is Going Digital

Digitization of biological specimens typically indicates one of two things. First, it can mean data basing information from the specimen's label (who collected a plant, in addition to when, where, in what habitat, on what date, including the species' identification and other information). Second, it can refer to the capture of high-resolution digital images of the specimens themselves. These data are then uploaded online for anybody to view worldwide for scientific or other uses. In the current curatorial world, digitization typically means capture of both data and images.

Databased information (on the specimen label, or the entire image itself) is typically uploaded to local, regional, national, and/or global data aggregators, which serve the data through portals. For example, some data from the Sperry Herbarium is now available through five portals: the **Great Plains Consortium of Herbaria**, the **Consortium of North American Bryophyte Herbaria**; **BISON** (Biodiversity Information In Service to the Nation, part of the U.S. Geological Survey); and **GBIF** (Global Biodiversity Information Facility, Copenhagen).

With start-up funds, the Sperry Herbarium now has the needed camera, light stand, hardware and software to data base and capture digital images. Starting in the spring semester 2015, five curatorial-related courses are now available for students, each from 1-3 credit hours. Data image capture is expected to commence early in 2015. Data basing of existing also should accelerate significantly.

In April, Snow participated in a 2-day workshop with the Department Chair, Dr. Dixie Smith, sponsored by the National Science Foundation at Central Michigan University.

Organized by an NSF-supported consortium called *IDigBio* (as in “I dig biology”), the workshop focused on smaller herbarium and museum collections. In particular, the workshop focused on “digitizing” specimens.

Snow gave an invited talk entitled “*Successfully curating small herbaria: What has and has not changed in ten years*”. In brief, existing herbarium tasks have not changed. However, data basing and digitization are sizeable additional new tasks needed to move herbaria into the 21st Century. In addition, the curatorial standards have increased significantly, as in the expectation of using acid-free, archival-quality papers and folders to house specimens.

Attending the workshop enabled Snow to visit the digitization layout (image capture) at Central Michigan University's herbarium, which helped solidify plans to purchase hardware and software for the Sperry Herbarium.

In late July, Snow attended BOTANY 2014 in Boise, and participated in a 4-hour workshop hosted by Ed Gilbert on **Symbiota**. Symbiota automatically uploads its data to the various portals mentioned previously (e.g. Great Plains, GBIF, etc.). The Sperry Herbarium thus is now “in the portal”, meaning that our specimen data will be far more widely visible and used. This adds considerable value to the collections. Symbiota

also has **OCR** (optical character recognition) capabilities that can help automatically populate fields in the database.

Does anybody actually use online data? Skeptics might wonder whether scientists ever view or use the data. The answer is unequivocally in the affirmative. For example, our colleagues at Emporia State University have digitized many specimens, and reported at the conference in Michigan that their specimen data often are viewed through the network.

With digitization and adoption of modern curatorial standards, the Sperry Herbarium is transitioning into the 21st Century. I doubt Dr. Sperry ever could have imagined that a day arrive when the specimens he collected in the early 1930s for his master's degree, and all subsequent collections, would be visible anywhere in the world with a few keystrokes and mouse clicks on a computer.

Digitization of Bryophytes

Bryophytes are photosynthetic plants that lack vascular tissues. The best known among these are the mosses, which ecologically are extremely important primary producers in arctic regions, and two other lineages commonly known as hornworts and liverworts. (*Wort* is a Middle English word for herb, modified from the Old English *wyrt*.)

KSP is part of the Consortium of North American Bryophyte Herbaria. With funding from the NSF, the Missouri Botanical Garden ("MO"), which has a highly active bryophyte research program, partnered with other institutions to create a "Thematic Collections Network" to digitize bryophytes. They received funding to digitize North American bryophytes from many regional herbaria, including KSP.

John Brinda and John Atwood from MO took KSP specimens to MO to digitize them. Barcodes for bryophyte specimens at KSP differ from those of vascular plant specimens in having the pre-

numeric prefix of "KSP-B-", rather than just "KSP-", as for vascular plants.

A total of 5758 North American bryophyte specimens have been digitized at KSP. Only 70 non North-American bryophyte packets are fully curated in the cabinets at the present time. Dr. Timme's Peruvian collections have not been fully curated. Thus at the present time we can confidently estimate approximately 6,000 bryophyte specimens at KSP.

The tasks remaining to fully digitize the KSP bryophytes include curating unprocessed specimens (of which there are hundreds); entering the specimen labels into the Symbiota database; and digitizing and databasing specimens from beyond North America.

Abandoning Accession Numbers at KSP

Previous attempts to place accession numbers on specimens at KSP were highly irregular. Many institutions now have specimens with separate accession numbers and barcodes, which complicate matters for people who wish to communicate about individual specimens. Given that barcodes are now part of the "globally unique identifiers" associated with specimens in databases, and that KSP will barcode every specimen in the next few years, KSP will no longer use accession numbers, and is now crossing them out with indelible ink.

Teaching and Education Activities at KSP

MS Thesis completion – Congratulations to Amelia Bristow on completion of her M.S. thesis entitled "*A floristic survey of Elk City State Park in Montgomery County, Kansas*", which was advised by Dr. James Dawson.

Plant Taxonomy (BIOL 548) – Students use KSP to confirm identifications of their required plant collections. Students are asked to "sign in" once on each day that they use the herbarium. The tally for fall 2014 was 45 student visits.



Students in BIOL 548, Plant Taxonomy, identifying collections. (Photo: N. Snow)

Grand River Dam Authority (GRDA) – Two undergraduate students, Sterling May and Karen Stoeher, began collecting plants along the Neosho River bottomlands west of Miami, OK. Dr. Darrell Townsend II, Director of Ecosystems Management at GRDA, is acknowledged for his cooperation in helping to initiate and facilitate this project. GRDA manages large amounts of acreage in this area as part of the Grand River drainage, and is eager to have an annotated, current, and taxonomically modern plant list to help manage these lands.



Sterling and Karen collecting plants in October near the Neosho River, OK. (Photo: N. Snow)

Sam Young's MS thesis project – Sam is a 2013 PSU graduate and began her MS project in 2014. Her project is entitled "*Floristic survey of Crawford and Cherokee counties in southeastern Kansas: An evaluation of change over five decades*". Approximately 4100 collections were made, many of them on privately owned properties, and most by Young.

Herbarium size: We have pulled about 200 specimens to exchange with other herbaria, based on our specimens having 2 or more sheets at KSP. Current estimates are of about 66,000 specimens (excluding backlog).

Current Herbarium Organization: Vascular plant families are arranged phylogenetically for following the APGIII classification. It is unknown which classification Dr. Timme used for bryophytes, but it also is phylogenetic.

Kansas and Regional Reference Collection (KRRC). Progress was slower than anticipated in making additions to the KRRC. 107 specimens were added, bringing the total to about 215.

Adding specimens to the KRRC: Adding representatives to the KRRC is more than a matter of simply pulling specimens from the main collections. Each KRRC specimen must be selected carefully among existing specimens. It should have all of the key diagnostic traits visible of the species necessary for its identification with confidence. Summary data for each specimen are included on a small piece of paper that is attached to the specimen, which is then given its own species cover. KSP is fortunate to have *Steiermark's Flora of Missouri*, a recently completed 3-volume work by Dr. George Yatskievych, which includes nearly all species occurring in southeast Kansas.

By the Numbers: 2014 accomplishments

Herbarium specimens used in teaching: Medical Botany (35); Plant Taxonomy (ca. 250); General Biology (10); Principles of Biology II (15).

Plant specimens mounted and added to the main collections or KRRC: 329.

Herbarium specimen labels made: 97

Specimens barcoded: 11,082

Specimens collected: ca. 4160; included are ca. 130 by Snow for teaching and the Kansas and

Regional Reference Collection and 4029 by Young for her MS research.

Specimens received for research: 31

Specimens received as a general gift:
98 (from K-State in August)

Specimens shipped to KSP for research:
141 (from MO for Myrtaceae of Madagascar and New Caledonia)

Specimens on loan to KSP returned: 209

Specimens re-filed from loan to MO: 5758

Specimens annotated: 4312 (mostly of Poaceae)

Families curated intensively in 2014: Poaceae

Specimens sent on loan: 0

Number of returned loans: 0

Specimens sent on exchange: 834 (Kansas State, bryophytes).

Specimens sent as gift: 77 (MO, bryophytes and vascular plants).

Specimens refrozen: 1002 (to prevent insect damage)

Specimens conserved: 2 (remounted on better paper or re-glued)

Specimens geo-referenced: 35

Estimated backlog of specimens: 13,000.

Specimens de-accessioned: 284. Some were de-accessioned for exchange, gifts, or discarded. Sterile material, mostly consisting of twigs made for woody plant identification courses in the 1960s and 1970s, was also discarded.

Other general information

Herbarium tours: In November, 8 students from Puebla, Mexico, studying intensive English at PSU for a month, were given a tour. Several insightful questions arose from the visiting students (in English!).

Do you know educational or civic groups (school children, scouts, etc.) that would enjoy a herbarium tour? If so, please contact the Director. We will work with you to tailor a presentation to your group's interests.



Verbena virginica near Neosho River, OK.
(Photo: N. Snow)

Herbarium news in broader media – Botanical collecting in 2014 by Karen and Sterling's in Oklahoma, and of Sam in southeast Kansas, was featured in a story by Andra Bryan Stephanoni in the *Joplin Globe* on November 11th: http://www.joplinglobe.com/news/local_news/student-field-work-helps-pitt-state-herbarium-grow/article_0c17889e-f88e-58d4-8a17-6201fbc42bf6.html