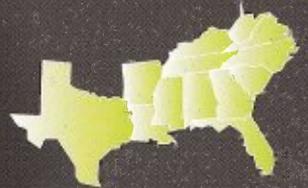


**FLORISTICS IN THE NEW  
MILLENNIUM:**

**PROCEEDINGS OF THE  
FLORA OF THE SOUTHEAST  
US SYMPOSIUM**



EDITED BY

**BARNEY L. LIPSCOMB**

**JOHN J. PIPOLY III**

**ROGER W. SANDERS**

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EDITORS

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## FOREWORD

In 1997 the Botanical Research Institute of Texas welcomed the Vanderbilt University Herbarium (VDB) to its new home at BRIT. It was a poignant move since the document that sealed this historic transaction was signed by the late Dr. Madeleine Goodman, the then Dean of the College of Arts and Science. She passed away at a much too early age of a brain tumor. It was clear to her, and her colleagues at Vanderbilt, that these wonderful collections, built primarily by Bob Kral over the years of his tenure at that University, would find an appropriate and good home in Fort Worth. To mark this historic occasion, I felt that it was appropriate to welcome the systematic botanists of the United States to a symposium celebrating the flora of the southeastern part of the country. Roger Sanders, Barney Lipscomb, John Pipoly, and other staff then made this a reality. Thus, nearly 100 botanists assembled on the 23rd, 24th, and 25th of April, 1998 for a historic gathering to focus on the flora of this part of the U.S. In so doing, we were able to announce to the world that BRIT had become the new parent, so-to-speak, of the wonderful collections that had been adopted by us, and that we took our commitment very seriously. This compilation was the result of that symposium. The proceedings serve well the memory of our evening speaker, good friend, monographer, floristician, and gentleman, Warren ("Herb") Wagner, who passed away during the intervening period.

S.H. Sohmer

Director, Botanical Research Institute of Texas

June, 2000



# A SURVEY OF THE HERBARIA OF THE SOUTHEAST UNITED STATES

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## ABSTRACT

Herbaria are critically important resources for botanical research and teaching as well as for reference and comparison for those doing plant-related applied research and biological resource management. It is a matter of national importance that we maintain and support these facilities, especially at a regional level. This study surveyed the current status, activity level, and prognosis for future health of the herbaria in the southeastern region of the U.S. The results of the survey indicate that, of the 161 herbaria still active, more than 50% of the holdings are located in only seven herbaria. Eighteen percent of the herbaria are active or very active and 47% are moderately active. However, eight herbaria holding over 700,000 specimens have closed and the specimens either been discarded (6500) or transferred to other herbaria. In addition, 40 of the herbaria, one quarter of the active ones that we surveyed, holding nearly 1,600,000 specimens, are either inactive or the person in charge fears that they will become so in the near future. We encourage herbaria in the southeast U.S. to develop state networks and to actively work with administrators and politicians to encourage the support of herbaria, and we suggest that similar surveys be under taken in other regions in the U.S.

## RESUMEN

Los herbarios son unas fuentes importantes para la investigación botánica y la enseñanza, así como para referencia y comparación para aquellos que hacen investigación aplicada relacionada con las plantas y manejo de recursos biológicos. Es un tema de importancia nacional que nosotros mantengamos y costeemos estas instalaciones especialmente a nivel regional. Este estudio analiza el estatus actual, nivel de actividad, y pronóstico de futuro de los herbarios de la región sureste de los Estados Unidos. Los resultados de este análisis indican que de los 161 herbarios todavía activos, más del 50% de los materiales están depositados en sólo siete herbarios. El dieciocho por ciento de los herbarios están activos o muy activos y el 47% están moderadamente activos. Sin embargo, ocho herbarios que conrienen más de 700,000 especímenes han cerrado y los especímenes han sido eliminados (6500) o transferidos a otros herbarios. Además, 40 de los herbarios, un cuarto de los activos que han sido analizados, que contienen cerca de 1,600,000 especímenes, están inactivos o sus directores temen que lo estén en un futuro cercano. Animamos a los herbarios del sureste de Estados Unidos a desarrollar redes estatales y a trabajar activamente con la administración y los políticos para que mantengan los herbarios, y sugerimos que se realicen análisis similares en otras regiones de los Estados Unidos

## INTRODUCTION

Herbaria are collections of preserved plant specimens. The specimens are usually pressed, dried, and mounted on stiff paper, but they are sometimes preserved in liquid or frozen. They are usually accompanied by collection data giving detailed location and habitat information, date collected, and more recently the latitude and longitude. Some plant collections are hundreds of years old and others are being collected today. Herbarium specimens provide the comparative material that is essential for correctly identifying and classifying plants, but because of the time span and the associated data, these collections also are a remarkable, irreplaceable source of information about the plants and the conditions that exist, and have existed, in the world.

**Herbarium specimens can be used for many purposes, a few are listed below:**

1. The most common use of herbarium specimens is to discover or confirm the identity of an unknown plant. Someone from the state extension service, or the local horticulture club, or the

<sup>1</sup>Present address: The Arboretum at Flagstaff, 4001 S. Woody Mountain Road, Flagstaff, AZ 86001, U.S.A.

native plant society, or the forest service, or the biology department, finds a plant and, out of curiosity or a need to manage that plant or the landscape it grows in, wants to find out what it is. Finding out what it is generally takes for granted that a huge amount of work has already been done: that the area where the plant grows has been explored and collected, that the resulting specimens have been studied and classified by a specialist, that a monograph or flora has been written in which the plant is named, described, and identifiable in keys. But for the average plant finder, the important thing is that once the plant has been provisionally identified, it is possible to go to a herbarium, compare it with the several candidate species, and determine by that comparison which species it is.

2. Specimens document which plants grew where through time. This information makes it possible to deduce what environmental conditions once existed in a particular area, including such things as climate and the presence of heavy metals, and it is possible to document what conditions a plant species required.

3. Specimens document what plants grew with what other plants. From these data, it is possible to determine what the vegetation was like, what the structure of the plant communities was like, and sometimes what animals were also likely to have been present.

4. Specimens document the morphology and anatomy of individuals of a particular species from which one can determine whether the morphology has changed through time or if it varies with different growing conditions.

5. Specimens provide temporal and spatial information. Because each collection usually has not only the location but also the date it was collected and because they are usually collected in reproductive stages, they are very useful for investigating such topics as changes in plant distribution through time, phenology, and biogeography.

6. Specimens document the concepts of the taxonomists and other biologists who have studied and commented on the specimens. This function is perhaps best illustrated by type specimens, because types are the final arbiter of the application of a scientific name. But it is also possible to read a paper by a taxonomist long dead and examine the same specimens that he or she examined and annotated in order to better understand taxonomic concepts and use of terminology.

7. From some specimens one can extract and analyze the DNA and/or analyze the chemical composition in order to understand taxonomic relationships, prove accumulation of metals or other substances, or screen for pharmaceutical effectiveness.

8. Specimens of the same species collected through the years provide the historical and current distribution of a plant and one can chart the changes in its distribution. This might elucidate the pattern of spread of a noxious weed or the encroachment on territory of a plant of conservation concern, but even in less dramatic cases it helps us understand how the world is changing.

9. Microscopic observations of herbarium specimens can provide information for many interesting studies of hairs, pollen, stomata, vasculature, and a wide range of other plant attributes.

Herbaria with large national and international collections are important for answering questions and solving problems on a global scale. However, it is important to have local and regional herbaria, not only because a local herbarium is more likely to have plants from the local area, but also someone who needs to identify a plant is unlikely to want take the plant to an out-of-area herbarium. Students learning their local flora need a herbarium close by for comparison and study, as well. In addition, any training for careers in environmental studies from preparing environmental impact studies to working with fish and wildlife projects requires a knowledge of the local flora and the ability to identify local plants.

There are more than 60 million specimens in 628 herbaria in the U.S., and 7 million specimens in 110 herbaria in Canada, according to *Index Herbariorum* (Holmgren et al. 1990). Over nine and one half million herbarium specimens are held in herbaria in the southeastern U.S., and significant collections of southeastern plants are also found in major herbaria elsewhere, particularly Missouri Botanical Garden, The New York Botanical Garden, and the U.S. National Herbarium in the National Museum of Natural History. These are a very important national and

international resource, critically needed for the study and conservation of the plants and animals of the southeastern U.S.

The purpose of this study was to conduct a survey of the herbaria of the southeast U.S. and to produce a document that would examine the activity of those herbaria and provide information to the botanical community on the availability of specimens and information. In the end we also gained useful information on the status of taxonomy and some insight into the number of herbaria that either need or are likely to need a new home.

We defined the southeast to include 13 states: Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Texas, Virginia, and West Virginia. We included West Virginia because it is located between Kentucky and Virginia. Rather than try to separate east Texas, we included all of Texas, in part because many participants in the BRIT sponsored symposium were from Texas but mainly because it was too difficult to draw boundaries regarding holdings.

Herbaria have a long history in the southeast U.S. Fourteen of the 183 southeastern herbaria were established before 1900, with the oldest, established in 1771, being in Salem College in Winston-Salem (NC) and the second in 1820 at the Charleston Museum (CHARL). Between 1900 and 1950 another 50 herbaria were opened but the real peak of growth in numbers of herbaria was between 1950 and 1975, when more than 80 herbaria were established. The vast majority of these are associated with universities or colleges, and their history and use is associated with teaching and local floristic projects. Many of the herbaria have rich local collections not duplicated elsewhere. Although some herbaria have been transferred to other homes, and some have completely disappeared, many are actively growing, loaning specimens, and undertaking research projects. Except for the largest herbaria, most are curated by faculty or staff who also have teaching responsibilities, and some are cared for entirely by volunteers, in some cases faculty from other departments. This paper discusses the geographical coverage of various herbaria and their current research projects, as well as future prospects for herbaria in the southeast.

There are several herbaria that have large southeastern holdings that were not included in this survey. The U.S. National Herbarium at the National Museum of Natural History, Smithsonian Institution, Washington, D.C. (U.S.) has extensive holdings from the southeast U.S. but they make up a small part of the total number of specimens (ca. 5 million). Statistics in this paper are for total holdings, and including U.S. would skew the analyses significantly. However, taxonomists working on the flora of the southeastern U.S. should be aware that there is a separate herbarium at US for plants of the District of Columbia and vicinity that consists of approximately 56,000 specimens. In addition, the absence of the herbaria of eastern Oklahoma and the herbarium of Southern Illinois University in Carbondale has been pointed out by several individuals from Oklahoma and Illinois. All of these herbaria have good holdings of southeastern plants and should be consulted when studying plants from the southeast.

**Our goals in this project were the following:**

1. Assess the activity and well-being of herbaria in the southeast U.S.
2. Make observations on the findings and possibly make helpful suggestions,
3. Provide a document that would be an accurate evaluation and summary,
4. Provide an electronic web site with information that would increase loans and other activity of southeast U.S. herbaria,
5. Inspire others to conduct similar surveys in other regions of the U.S., and
6. Call attention to the importance of herbaria and provide documentation that can be used when herbarium supporters are meeting with administrators.

#### METHODS

A questionnaire was developed in September 1997 and sent to all 183 southeast herbaria listed in the on-line version of Index Herbariorum (Holmgren et al. 1998). There are many small herbaria that are not listed in the Index Herbariorum, indeed several who attended this symposium.

sium asked about becoming a part of the Index Herbariorum, but we had no way of knowing about these herbaria and so they were not included. Any herbarium interested in being listed in the Index Herbariorum should contact Patricia Holmgren at the New York Botanical Garden (Bronx, NY 10458, [pholmgren@nybg.org](mailto:pholmgren@nybg.org)). It is hoped that this paper will encourage all of the unregistered herbaria to become members of this Index.

We recognized that everyone is busy and kept the survey questions to a minimum. The following five questions were included in a letter (samples of all questionnaires can be found on the web site):

1. What important collections are held in your herbarium (e.g., what regions, what taxonomic groups, and/or which collectors)?
2. How "active" is your herbarium? Are there incoming and outgoing loans? Are new specimens being added to the collections? Are the collections being actively curated?
3. Who is in charge of the herbarium (please give us name and title)? Are they full-time, part-time, or spare-time?
4. What active research and/or collecting programs are currently underway in the herbarium (if any)?
5. What do you think the future of this herbarium is—steady or rapid growth? maintaining the status quo? likely to be needing a new source of support or institutional home?

The response to the initial letter, sent to the attention of the curator of the herbarium, was about 50%. A second letter, sent to the herbaria that had not responded to the first letter was addressed to the Herbarium without specifying a person, provided responses from an additional 20% of the total. The remaining approximately 45 herbaria were reached by telephone. Some curators were easy to reach and just very busy, others were more difficult to find and were located through Department Heads or Deans. Many of the herbaria where it was difficult to obtain information were either no longer open or had been dispersed / discarded. Ultimately information was gathered for all herbaria.

As the responses were analyzed it became apparent that certain essential information had not been requested, such as the current number of collections in the herbarium and a specific question on whether or not the curator had any release time from teaching to take care of the herbarium. Some people included this information, but for others we asked by telephone or used information from Index Herbariorum or colleagues. Because the questionnaire had asked for the number of specimens added each year, we were able to adjust the IH number to reflect the approximate number of additions that would be in the collection today. The estimates were conservative and as a result the figures for some herbaria may be underestimated. After much discussion an "optimal questionnaire" has been developed (Table 1) for use as a starting point in similar surveys elsewhere.

Many curators provided detailed information as well as publications and website addresses. In addition, many curators were candid about the current status and future of their herbaria. As information accumulated the institutions were evaluated and given an informal activity code. There were seven "levels of activity," from those that had been destroyed (-1) to those that were very active in terms of acquisitions, loans, research projects, numbers of students and number of faculty (5). The criteria for each activity code value are listed in Table 2. These categories are not based on size but rather on the amount of use the collections receive and how well they are housed and curated. The survey forms and the activity codes assigned were reviewed by several people who wish to remain anonymous. In addition, a draft of this manuscript was sent to 20 of the institutions that were surveyed, at least one in every state. The authors considered all comments, but take full responsibility for the results presented in the paper.

All data from the survey were entered into an Access© database. Missing information was filled in from Index Herbariorum or by personal communications from individuals who knew the institution. This full database is available on the web site of the first author (<http://mason.gmu.edu/~ckelloff/vfunk/>) and eventually it will be listed on BRIT website ([www.brit.org](http://www.brit.org)).

TABLE 1: Optimal questionnaire recommended for future herbarium surveys.

---

(if information is from IH please indicate with \*)                      Acronym: \_\_\_\_\_  
 Who filled out this form \_\_\_\_\_ State: \_\_\_\_\_  
 Activity Code: \_\_\_\_\_  
 # of collections \_\_\_\_\_

**COLLECTIONS:**  
 What percentage of the collection do you consider to be well curated?  
 Specimens:  
 - Total number of collections in the herbarium:  
 - Approximate percentage from state:  
 - Approximate percentage from region (incl. State):  
 - Approximate percentage from outside of USA:  
 - Is there a cryptogamic or fungi collection, if so what raxa and what size:  
 People (special collections):  
 Ateas  
 - states:  
 - geographic region:  
 Taxa  
 - taxonomic groups:  
 Activity:  
 - # of Loans per year (number or qualitative answer):  
 - # of exchanges per year (number or qualitative answer):  
 - # of specimens added per year (number or qualitative answer):  
 Additional Information:  
**CURATION** (a curator is someone who touches herbarium specimens lovingly):  
 Faculty Curator (name; title; birthdate; Full-time curator, part-time, spare- time, retired) (does job as curator give you a reduced teaching load?)  
 Staff Curator (name; birthdate; full-time; part time; spare-time)  
 Other faculty or staff or associates that are interested and support the activity of the herbarium.  
 Do you have student workers (y/n):  
 Who provided the information if different from above.

**USES:**  
 Research (y/n) and what projects:  
 Teaching (y/n) and how many courses involve the herbarium:  
 Agency Use (USDA; FWS; National Park Service; state agencies; etc.):  
 Voucher collections (y/n) and what projects:  
 Training of Undergraduates (y/n) and how many on average:  
 Training of Graduate students (y/n) what level and how many on average:  
 Have you or are you computerizing any of your collections (y/n) and if so how many have been done and what are plans for future?

**SUPPORT:**  
 What are your main sources of support (University, State, Endowment, Private donations, etc.)?  
 Do you receive outside funding for the herbarium (grants or contracts), for specific research projects?

**FACILITIES:**  
 Is your space and storage capacity adequate for the next 10 years?

**COLLABORATION AND ASSOCIATION:**  
 Universities (do not include your home institution):  
 Botanical Gardens (do include one that is at your home institution):  
 Museums:  
 Agencies of Federal or State Government:  
 Garden or herb Clubs:

**FUTURE:**  
 What is the future of the herbarium: rapid growth, moderate growth, status quo, low activity or no activity, needs a new home or is likely to need a new home in the next 5 years.  
 Please answer the following question it is important: "What will happen to the herbarium when the curator retires or leaves?"

**ADDITIONAL COMMENTS:**

---

TABLE 2: Criteritia for Activity Codes used for Herbaria.

- 
- 1. Dispersed to unknown locality, known to have been thrown away, or missing (it is not there and current faculty have no idea where it is).
  - 0. Transferred

Table 2 continued

---

1. Essentially closed; no activity; not used; no students working on projects or theses; no faculty curator, no staff; no growth; losing ground; needs a new home or may need a new home in the near future.
2. Open; little or hardly any activity; maybe low level of use as reference or teaching collection; no projects or theses; maybe a spare time faculty or retired faculty; no staff; little or no growth; barely holding on to current level or sliding a bit; future of collection uncertain or may need a new home in the future.
3. Open; some moderate activity; used for some teaching and research; several theses and projects; a spare-time or part-time faculty curator and possibly a part-time or full-time staff person; gradual growth or status quo; collection secure for now; space OK or somewhat tight.
4. Open; active; used for teaching and research; theses and projects; at least a part-time faculty curator and a staff person; yearly increase of 1-several thousand collections; moving forward; collection secure for now; space OK. [possible for this to be a "one man band"]
5. Open; very active; research facility, may also be used for teaching; lots of projects and theses; faculty and staff; yearly increase of several thousand collections; leaping ahead; collections secure; institutional commitment for adequate space and support. [must have institutional support and more than one faculty interested in the herbarium, not a "one man band"]

---

Appendix A is a subset of the data matrix that includes the name of the institution, state, abbreviation, number of specimens, and activity code.

#### RESULTS AND DISCUSSION

Of the original 183 herbaria, 161 are now known to be extant (Table 3). Sixteen were transferred and six disappeared. The 161 herbaria house a total of 9,646,505 specimens (probably underestimated and does not include backlog). We recognize that some of these herbaria, most notably TEX, BRIT, DUKE, and IBE, have substantial holdings that are not from the southeastern U.S., however the majority of the specimens are from this area.

In the United States there are approximately 60,000,000 plant collections housed in 628 herbaria. About 20 million are in large herbaria that have substantial collections from outside of the U.S. which leaves 40 million specimens from the U.S. The United States covers 3,028,825 sq. miles (minus Alaska). If one divides 40 million by the sq. miles of the U.S. (minus Alaska) the result is 13.21 plant collections per square mile. There are 9,646,505 plant collections in the southeast U.S. and 813,486 square miles of territory, or 11.85 plant collections per square mile, which is not so far from the national average. Our impression is that coverage of Europe in European herbaria is higher.

The 161 herbaria in southeast U.S. are found predominately in public and private universities and colleges with approximately 105 in state supported schools and approximately 37 in private ones. Five herbaria are in free-standing Museums and eight are under federal or state government control. Three herbaria are housed in freestanding botanical gardens: Fairchild Tropical Garden, Selby Botanical Gardens, and Birmingham Botanical Gardens.

The largest herbaria in the southeast U.S. (in thousands of specimens) are TEX 1,100, BRIT 860, DUKE 700, and NCU 630. These top four herbaria have approximately one third of the specimens housed in the southeast U.S. They are followed in size by TENN 470, FLAS 400, and NLU 350. The top seven herbaria have approximately one half of the collections housed in the southeast U.S. Other herbaria that have over 100,000 specimens include IBE (253), USF (223), TABS (200), LSU (185), FSU (183), GA (180), WVA (160), LTU (122), NCSC (120), NO (108), VPI (105), LAF (104) and UARK (100). Therefore, the top 18 herbaria have a total of 6,550,000 specimens, over two thirds of the collections held in the southeast U.S.

The Activity Level can be examined in several ways. Figure 1 illustrates the number of herbaria by activity level. It represents a bell-shaped distribution in which 47% of the herbaria have activity level 3 while 26% are in category 2, 9% in category 1 and 18% are operating at a levels 4 or 5. Examining the number of specimens housed in herbaria with each activity code shows a very different picture with a linear relationship (Fig. 2) where 68% of the specimens are housed in herbaria operating at levels 4 or 5, and 10% are found in herbaria operating at levels 1 or 2. In other words, while most of the herbaria have activity level 3, most of the specimens are in institutions with level 4 or 5. Still, 9% of the total number of specimens is around 900 thousand.

TABLE 3: Total number of herbaria and the number of herbaria/number of thousands of specimens listed by state and activity code. Numbers of specimens were rounded to nearest thousand, 500's were rounded up.

State	No. Herb.	5	4	3	2	1
Alabama	8	-	1/50	4/74	2/10	1/65
Arkansas	8	-	1/16	5/111	1/5	1/100
Florida	17	4/753	1/30	8/244	2/9	2/16
Georgia	11	-	1/180	6/114	2/30	2/10
Kentucky	8	-	1/40	7/198	-	-
Louisiana	13	-	2/535	7/303	3/147	1/15
Mississippi	6	-	3/334	1/19	1/11	1/3
North Carolina	12	1/700	3/698	4/173	3/20	1/?
South Carolina	8	-	1/55	4/119	2/45	1/1
Tennessee	8	1/470	-	5/55	2/40	-
Texas	30	2/1,960	2/225	12/393	12/184	2/8
Virginia	23	-	3/203	7/194	10/93	3/36
West Virginia	8	-	1/160	5/98	2/17	-
<b>Total</b>	<b>160</b>	<b>8/ 3,883</b>	<b>20/ 2,526</b>	<b>75/ 2,095</b>	<b>42/ 611</b>	<b>15/ 254</b>

If one examines the data by state certain trends appear. In Table 3, which gives the total number of collections by state and by activity level, it is easy to see that some states have many more specimens than others. For instance, Texas has the most herbaria (30) and the most specimens (3,019,000). Florida has the largest number of herbaria (4) that have an activity code of 5. West Virginia is the smallest state but South Carolina has the fewest number of herbarium specimens. Most states have only a few herbaria in categories 1 or 2, except for Texas with 14 out of 30 (47 %) and Virginia with 13 out of 23 (61%). Table 4 gives the number of specimens per state and per square mile and shows that North Carolina is the best collected state with 33.15 collections per square mile. The least well-collected states are Alabama and Arkansas, both with around 4 specimens per square mile. Table 5 combines the number of herbaria, number of specimens and number of specimens per square mile to show that only North Carolina, Louisiana, and Florida have numbers that are significantly greater than the national average and six states are significantly below that average.

### Evaluation by State

**ALABAMA.**—Most of the herbaria in Alabama are moderately active. Two have been transferred from their original institution within state. The herbaria seem to have focused largely on collections within the state, with northern, northwestern, central, and southeast Alabama being covered. Two herbaria have general southeast U.S. collections and there is one horticultural herbarium. The largest herbarium in Alabama, Auburn University (AUA) with 65,000 collections, is currently inactive, although a newly hired faculty member, a molecular systematist, may change this. The University of Alabama herbarium (UNA), however, has new, state of the art collections facilities, and it and the Jacksonville State University herbarium (JSU) have active graduate programs.

**ARKANSAS.**—In Arkansas, the herbarium at Henderson University (HEND) is very active, and the state is fortunate to have five additional moderately active herbaria. Unfortunately, the herbarium at the University of Arkansas, Fayetteville (UARK), the largest, with 100,000 specimens, is not active and its future is uncertain. The curator has retired, the specimens are being put into storage during a renovation project, and there is no guarantee that the herbarium will be restored to an active condition. There are two herbaria in the state with bryophyte collections and three doing natural area surveys (see note on page 52 for recent information).

**FLORIDA.**—Florida is the state with the greatest floristic diversity in the southeast and it has many herbaria. Five of the Florida herbaria are hardly active, eight are moderately active, one is very active, and four are extremely active. Three of the inactive herbaria focus on algae, and there should be some concern for their future. The University of Florida (FLAS) is the largest herbarium in the state with 400,000 specimens, and FLAS and Selby Botanical Gardens (SEL)

TABLE 4: Number of herbaria, number of specimens housed in each state, and number of specimens per square mile of area within that state, ordered by number of specimens.

STATE	NO. of HERB.	NO. of SPECIMENS	SQ. MILES in STATE	SPECIMENS/ SQ. MILE
TEXAS	30	3,019,000	267,339	11.29
NORTH CAROLINA	12	1,626,955	49,067	33.15
FLORIDA	17	1,049,250	58,560	17.92
LOUISIANA	13	999,200	48,523	20.59
TENNESSEE	8	565,300	42,244	13.38
VIRGINIA	23	520,820	40,817	12.76
MISSISSIPPI	6	367,100	47,716	7.69
GEORGIA	11	333,300	58,876	5.66
WEST VIRGINIA	8	275,000	24,181	11.37
KENTUCKY	8	237,500	40,395	5.88
ARKANSAS	8	231,500	53,104	4.36
ALABAMA	8	198,600	51,609	3.85
SOUTH CAROLINA	8	220,000	31,055	7.08

TABLE 5: Number of specimens per square mile of area within each state, ordered by state.

	Specimens per Sq. Mile		Specimens per Sq. Mile
North Carolina	33.15	Mississippi	7.69
Louisiana	20.59	South Carolina	7.08
Florida	17.92	Kentucky	5.88
Tennessee	13.38	Georgia	5.66
Virginia	12.76	Arkansas	4.36
West Virginia	11.37	Alabama	3.85
Texas	10.29		

have strong support for their herbaria. FLAS has a range of special collections including bryophytes, lichens, fungi, wood, and paleobotanical specimens. It should be noted that most of the major herbaria in Florida tend to include a research and acquisition focus outside of the U.S. The curators at the herbaria of Florida Atlantic University (FAU) and Florida State University (FSU), both of which have been expanded by very active taxonomists, have indicated that the long-term future should be of concern. In addition, the Myxomycete collection at the University of Central Florida (FTU) may need a new home.

GEORGIA.—Georgia has six moderately active herbaria and four that are hardly active. The University of Georgia (GA) is the largest, with 180,000 specimens, and it is also the most active. The University of Georgia (GAM) has an Ascomycete collection of potential importance that may need more support. Also of concern is the herbarium at Valdosta State University (VSC), which has nearly 50,000 specimens, but little institutional support.

KENTUCKY.—Kentucky has good state coverage, with seven moderately active herbaria. The University of Kentucky (KY) and Eastern Kentucky University (EKY) are the largest, with 40,000 specimens; Eastern Kentucky University seems to be the most active. The curator at Berea College (BEREA) will not be replaced when he retires, and the herbarium is likely to need a new home. All but one of the herbaria in Kentucky are essentially “one man bands.”

LOUISIANA.—In Louisiana, there are seven moderately active, 4 hardly active, and 2 quite active herbaria. The largest is Northeast Louisiana University (NLU) with 350,000 specimens. Louisiana has herbaria with special collections in lichens and bryophytes; Louisiana State University (LSUS) has a Basidiomycete and Myxomycete collection. The Mycological herbarium at Tulane University (NO) is likely to need a new home. The University of Southwestern Louisiana (USLH), with 104,000 specimens and an important bryophyte collection, has an uncertain future.

MISSISSIPPI.—Mississippi has three hardly active, one moderately active, and three quite

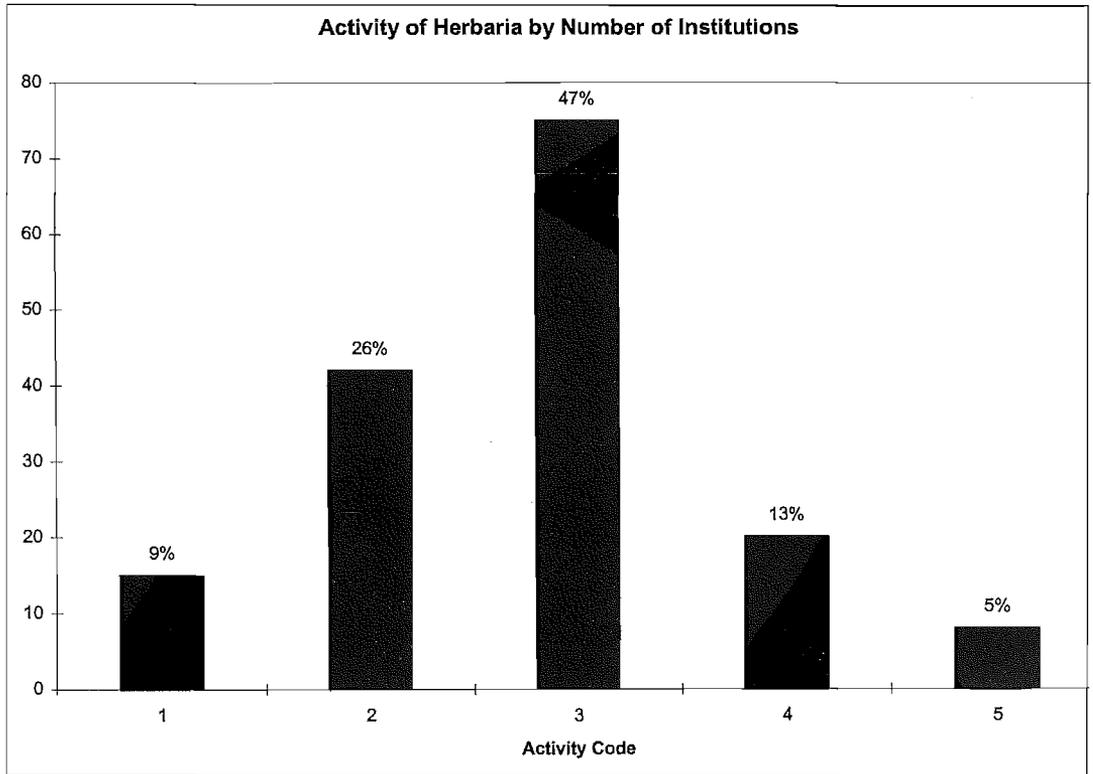


FIG. 1: The number of herbaria at each activity level.

active herbaria. The largest and most active herbarium, the Institute for Botanical Exploration (IBE), has a large South America collection. The Southern Weed Science Laboratory (SWSL), in Stoneville Mississippi has a special collection of sedges (Cyperaceae). The Gulf Coast Research Laboratory in Ocean Springs (HGCR) has collections from the coastal plain.

**NORTH CAROLINA.**—North Carolina has had three of its herbaria transferred, two within the state and one to NY and five of its herbaria are hardly active. However, there are three moderately active, three active, and one very active herbarium as well. Duke University (DUKE) is largest, with 700,000 specimens, and is the most active. With the exception of DUKE, which has a large number of collections from Costa Rica, the herbaria in North Carolina focus on local and regional flora, with several specializing in collections from National Parks. There are lichenological and bryological collections in the state with DUKE having excellent cryptogamic and fungi collections. There was some indication that the Pfeiffer University Herbarium (PFC) might need a new home but some funds have recently been allocated (pers. comm. R. Wilbur). Also, recently Appalachian State University (BOON) has hired two new taxonomists, one for vascular plants and one for fungi, and the systematic program is rapidly improving.

**SOUTH CAROLINA.**—South Carolina has three hardly active, four moderately active, and one quite active herbaria. The largest is University of South Carolina (USCH), with 80,000 specimens followed by Clemson (CLEM) with 55,000. The Charleston Museum (CHARL) has very early collections, although these are not available on loan. There are bryophyte, fungi, and algae collections in SC.

**TENNESSEE.**—The University of Tennessee (TENN) is the largest herbarium in the state, with 470,000 specimens. It is very active and is undergoing rapid growth, and it recently received an NSF facilities improvement grant. There are three hardly active and five moderately active herbaria in the state; several of them focus on park and forest inventories. The second largest herbarium in the state (VDB) was recently transferred to BRIT because the host department had little interest in maintaining organismal biology at the University.

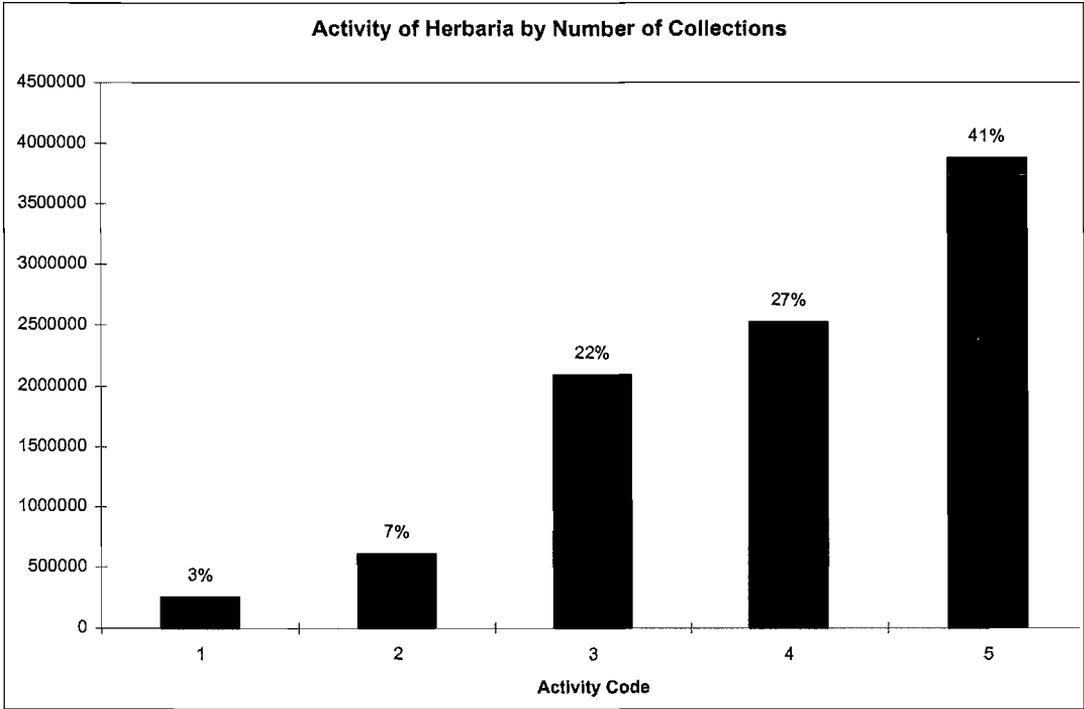


FIG. 2: The number of specimens found in the herbaria at each activity level.

**TEXAS.**—Texas covers a vast area and many habitats. The flora of central and west Texas is not strictly of the southeastern U.S., and certainly the largest herbaria found at the University of Texas (TEX) and the Botanical Research Institute of Texas (BRIT) have extensive collections from outside the state, however for the purposes of this paper it is really impossible to separate out those collections. Six herbaria have been transferred, all within the state. But in addition, there are 14 herbaria that are barely active and one might expect that many of these will need a new home soon. There are 12 herbaria that are moderately active, two that are quite active, and two that are very active. Early collections at Our Lady of the Lake University (LLC) and at the Fort Worth Museum of Science and History (FWM) may be of interest. Texas has bryological, lichenological, macroalgae, and rust fungi collections. The herbarium at South Plains College (SPLT) seems to be in danger and may be transferred elsewhere.

**VIRGINIA.**—The herbarium at Virginia Polytechnic Institute (VPI) is the largest with 98,000 specimens. There are 7 moderately and 3 quite active herbaria. The focus of most of the collections is on local floras and state parks, but there are also special horticultural, forestry, Myxomycete, and bluegreen algae collections. Virginia has an alarming figure of 13 herbaria, with a total of 129 thousand specimens, that are hardly active and may eventually need new homes. Certainly the future of the herbarium at the Virginia Military Institute (VMIL with 30,000 specimens) and the herbarium at the Virginia Department of Agriculture (VDAC with 34,000 specimens) seems to be uncertain.

**WEST VIRGINIA.**—The largest herbarium in West Virginia is the University of West Virginia, Morgantown (WVA) with 160,000 specimens, which has an active program with a lot of community interaction. In addition, there are two hardly active and five moderately active herbaria. Fairmont State College (FWVA) has a Myxomycete collection.

Only 20 herbaria mentioned specifically having cryptogamic collections. Ten of these have bryological collections, four have lichenological collections. Harbor Branch Oceanological Institute (HBFH) has an algal collection, and University of North Carolina at Moorhead (IMS) has collections of marine fungi and macro fungi. The herbaria at the Western Kentucky University

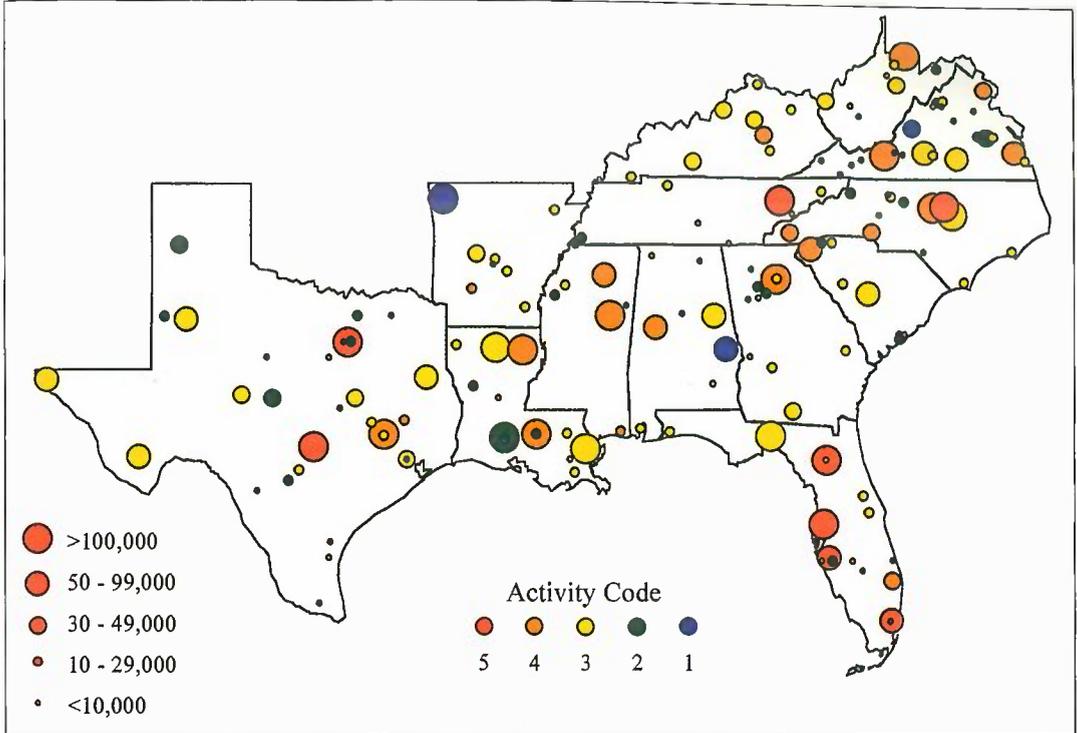


FIG. 3: A map of southeast US showing the location of the herbaria surveyed in this study. The size of the circle indicates the number of specimens and the color of the circle indicates the activity level.

(WKU) and the University of Richmond (URV) have Myxomycete collections, while the one at the University of Georgia (UGM) has an Ascomycete collection and Louisiana State University herbarium (LSUS) has a Basidiomycete collection. DUKE University has a large and diverse cryptogamic and fungi collection and graduate training program.

In general the small and medium sized herbaria that stay active do so by using students and volunteers. They have at least one (usually only one) faculty member that generates all of the interest. They produce local floras, checklists, state park surveys and other means to keep the herbarium active. Most larger herbaria are at least at a level 3 with AUA and UARK being the exceptions. AUA has just hired a molecular systematist with a taxonomic background so there is some hope that this collection will once again be active but current reports on UARK are not encouraging (see note on page 52 for recent information).

A map showing locations of herbaria in the Southeast U.S. is shown in Figure 3. The size of the circles reflects the number of specimens housed in the collection and the color indicates the activity code of that herbarium. The map shows that there are certain areas that have few or no active herbaria—in particular central and western Kentucky and Tennessee, southern Mississippi and Alabama, Arkansas, coastal South Carolina, southern West Virginia, eastern Kentucky, and west central Texas.

There are approximately 40 herbaria for which concern was expressed in the “Future” section of the form (Table 1). For these herbaria, the most frequent comment in this section was that the curator did not know what would happen to the herbarium when he/she retired. Because we did not directly ask this question in the first letter, it is likely that it is more common than the survey indicates. This question has been added to the form in Table 1 for all future surveys. However, if we look just at the 40 that expressed concern, they represent 25% of the herbaria that are still in existence in the southeast U.S. and hold approximately 1.6 million specimens. Small herbaria, and cryptogamic and fungi collections seem to be especially vulnerable. How-

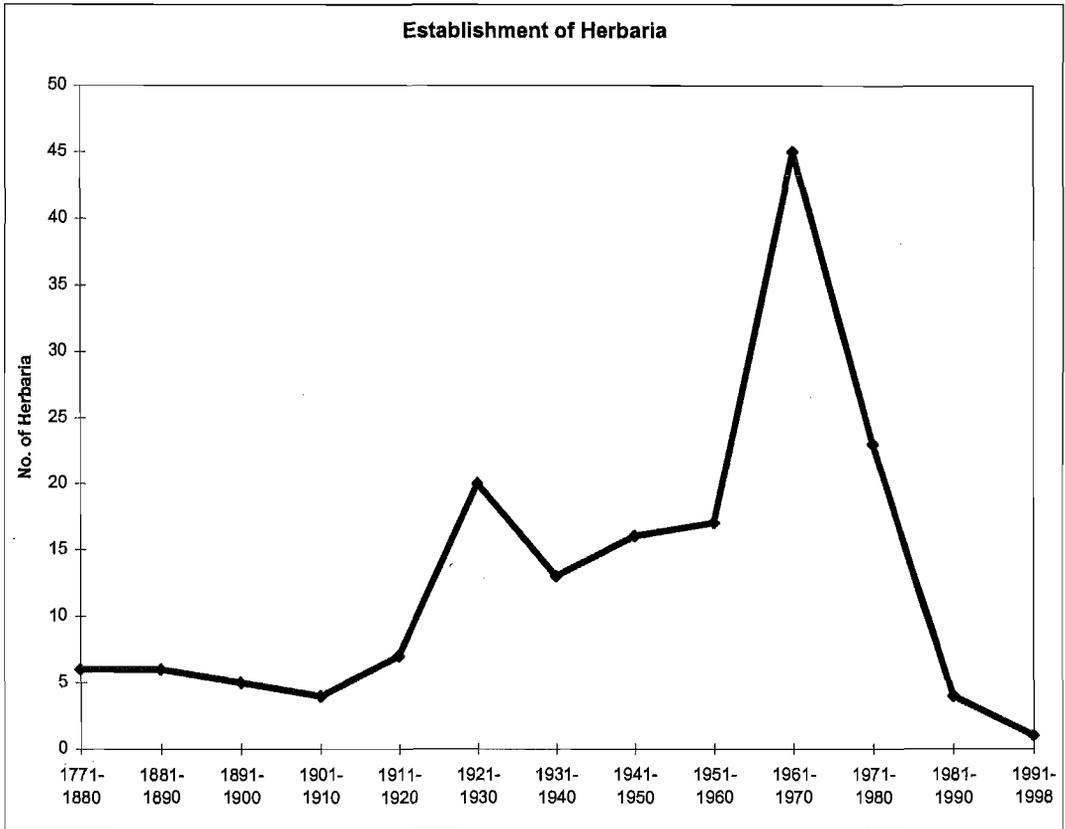


FIG. 4: The number of herbaria established in ten year increments.

ever, there are larger herbaria in this group as well, including four of the 17 with over 100,000 specimens: FSU, NLU, NO, and LAF.

By examining in 10 year intervals the number of herbaria founded (Fig. 4) it is clear that changes are taking place in the way herbaria are valued. The period between W.W.I and the great depression shows a surge, the period of the late sixties and early seventies when universities and science programs were expanding shows remarkable growth, but then a drop to nearly zero takes place, with just one new herbarium being founded since 1990 and that one is private (BRCH). The closing of herbaria reported in Index Herbariorum and this survey, and the predicted closing based on comments made in this survey (Fig. 5) show a troublesome future. There is the potential that at least 40 herbaria might close over the next few years. This is a far higher rate than any time in the past. In addition, if one examines Figure 6 it is clear that if all 40 herbaria close, the botanical community will have to find a home for at least 1,600,000 specimens, not including the backlog of unprocessed material. When one examines these trends it seems clear that unless some action is taken in the next few years, a large number of herbaria will close, requiring that their specimens be moved elsewhere and depriving students and communities of access to a valuable resource. These tables and graphs may indicate a broader problem—the general decline in plant taxonomy in Universities and Colleges throughout the southeast and as such it needs further investigation.

#### CONCLUDING REMARKS

It is hoped that this document will provide a practical guide to the collections, projects, and expertise held in the herbaria in the southeastern U.S. By consulting the database, researchers can see which herbaria have depth in their holdings of specific regions or taxa, and this should

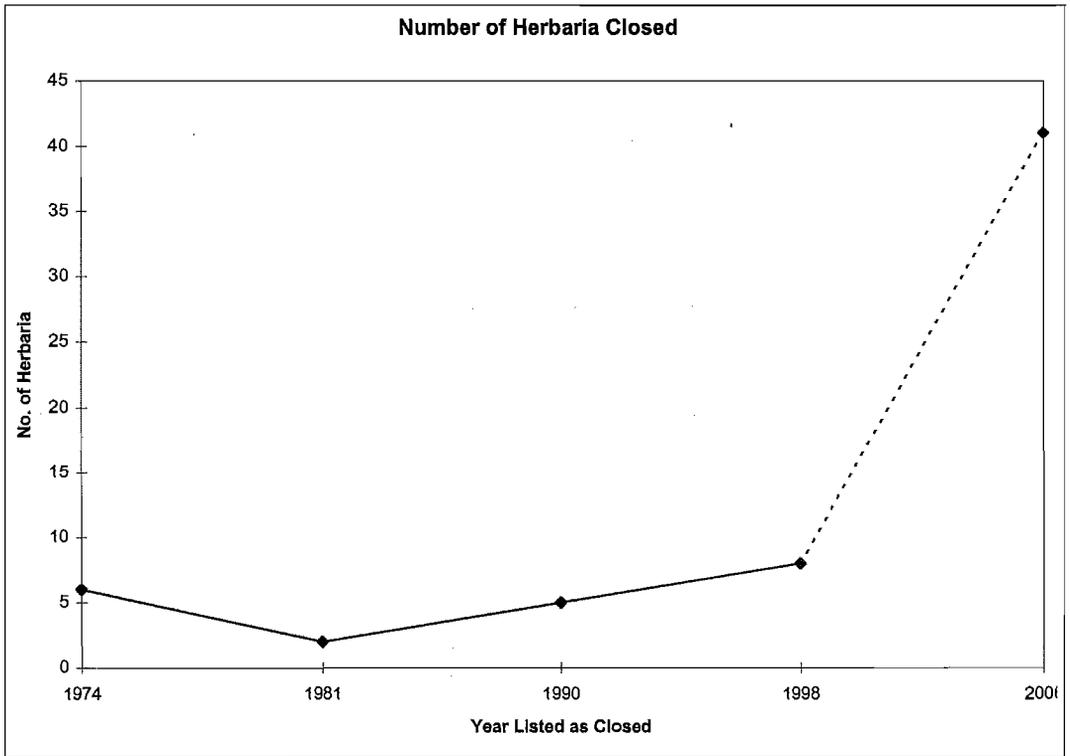


FIG. 5: Herbaria that have closed (solid line) and projected closing of herbaria (dashed line); based on information from Lanjouw & Stafleu 1964, Holmgren & Keuken 1974, Holmgren et al. 1981, Holmgren et al. 1990, Holmgren et al. 1998, and Funk & Morin, 1998 this survey.

guide them in borrowing specimens for study. The database may also facilitate development of collaborative projects.

The Convention on Biological Diversity, which endorsed a Global Taxonomy Initiative to promote capacity building in taxonomy, calls for each country to have a clearing-house mechanism to coordinate access to and distribution of taxonomic information in systematic collections. Within the U.S., Systematics Agenda 2000 confirms the importance of collections and taxonomic expertise to our understanding of biodiversity. The collections and expertise are essential for the training of taxonomists for the future as well. An international meeting of systematists in Darwin, Australia, recently declared the critical importance of evaluating the current status of collections and of specialists and of planning for their future health and growth. Systematists have an obligation to provide the information necessary for understanding global environmental processes and maintaining a national interest in documenting and studying our native flora. The results reported here clearly show that although there is much to be optimistic about, there is also reason to be concerned about the future prospects for herbaria and the capacity to do botanical research, at least in the southeast U.S.

It is hoped that this document will be useful for those who need to make compelling arguments to their deans, chairs, or funding bodies about the true local, regional, national, and international value of their collections, and the current assessment of their status. Many herbaria have been supported in part by federal or state funds and data such as these should prove useful at that level. Although in most cases ownership of a particular collection is clear, it is important for administrators to know that these collections have regional, national, and global importance and there should be a sense of community responsibility for them. In some cases they provide the only documentation for the historic makeup of the flora of an area. In other cases they may

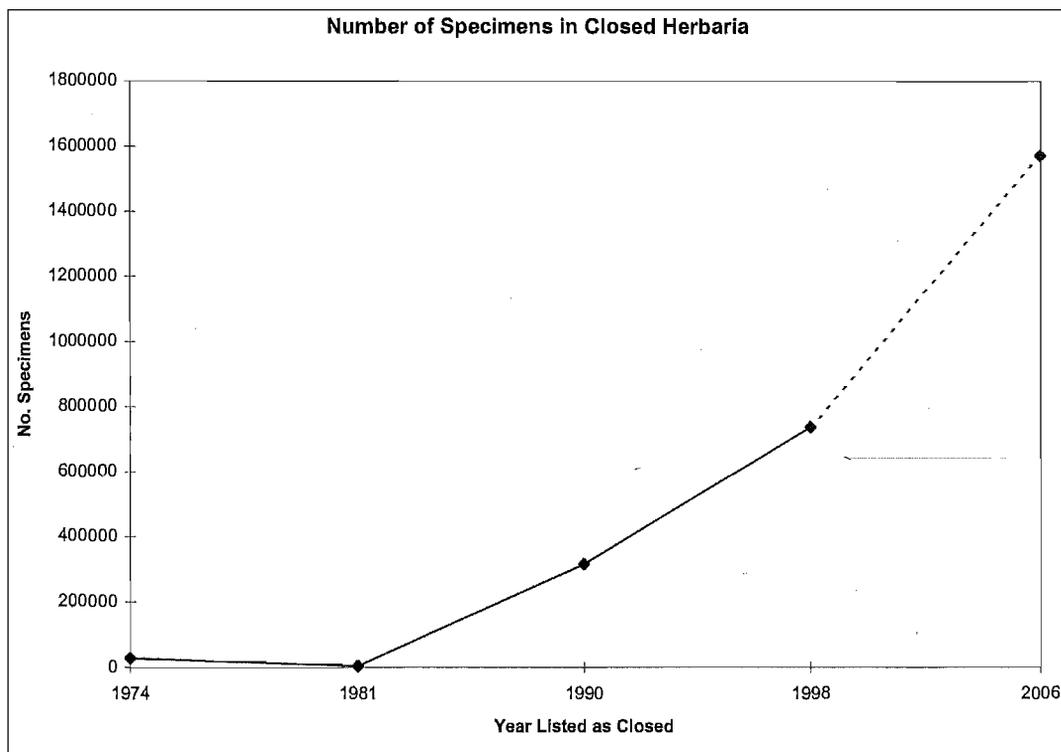


FIG. 6: The number of specimens found in herbaria that have closed (solid line) and herbaria that are projected to close (dashed line); based on information from Lanjouw & Stafleu 1964, Holmgren & Keuken 1974, Holmgren et al. 1981, Holmgren et al. 1990, Holmgren et al. 1998, and Funk & Morin, 1998, this survey.

house the only extant specimens of a rare or endangered species. Because of their regional and national importance, we think that a mechanism should be established to alert the systematics community in the event that a collection is endangered or about to be dispersed or discarded.

It would be useful for taxonomists in all states to form local networks or support groups so they can monitor the status of the herbaria within their state and so that they can call on colleagues to help convince officials at a College or University of the importance of their herbarium. It is necessary to stress the importance of local and regional collections. It is only by scientists joining forces with other herbarium users that one can hope to convince administrators that herbaria are important. In addition, it is important to convey a positive attitude about the work of the herbarium, regardless of its size or its activity level. Students and volunteers can have a great sense of pride in working with a local herbarium, and this pride can be fostered through newsletters, field trips, etc. Very small institutions can still have very useful and impressive websites. Many colleges and universities have botanical gardens or arboreta that benefit from associated herbaria. These sites are important in student training and the importance of the herbarium can be featured in public outreach programs. Garden clubs, local parks, local nature clubs and other groups can all be active partners in supporting and fighting for the herbarium. Because so many herbaria have been formed as part of a university or college, we tend to think of them entirely as academic; in fact many organizations, including departments of conservation, parks departments, non-governmental conservation organizations, and others, have a real need for a local herbarium, and sometimes they can be a source of funding as well.

We realize that one of the greatest challenges faced by institutions maintaining herbaria is funding. Because of this need, this paper will be provided to funding agencies to give them a snapshot of the current status of collections so they can see the magnitude of the problem of coverage and regional representation.

We think there would be real value in surveying the herbaria (and other kinds of systematics collections) in all regions of the U.S. in order to get a better understanding of our national capacity to document, study, and understand the organisms of our country. With this in mind, the authors are available to assist any individuals who wish to start such a survey. At least one other similar survey has been completed. It covers southern Africa (Smith & Willis 1997) and although it is a completely different area of the world it will be useful for comparison purposes.

## APPENDIX A

Appendix A: Subset of data matrix containing the University or Institution name, state in which it is located, official abbreviation, number of specimens found in the herbarium, and the activity code (see Table 2). Complete data matrix can be found on the website (<http://mason.gmu.edu/~ckelloff/vfunk>). Numbers of specimens in parentheses are not included in totals because they have disappeared or been transferred.

University	State	Herb	Size	Code
Alabama Museum of Natural History	AL	ALU	(2,500)	0
Auburn University	AL	AUA	65,000	1
Birmingham Botanical Gardens	AL	BBG	5,100	2
University of Alabama, Huntsville	AL	HALA	5,000	2
Jacksonville State University	AL	JSU	50,000	3
Saint Bernard Abbey	AL	SB	(4,500)	0
Troy State University	AL	TROY	2,500	3
University of Alabama, Tuscaloosa	AL	UNA	50,000	4
University of North Alabama	AL	UNAF	7,000	3
University of South Alabama	AL	USAM	14,000	3
Arkansas Tech University	AR	APCR	35,000	3
Henderson State University	AR	HEND	15,500	4
Hendrix College	AR	HXC	5,000	2
University of Arkansas at Little Rock	AR	LRU	16,000	3
Arkansas State University	AR	STAR	25,000	3
University of Arkansas at Monticello	AR	UAM	21,000	3
University of Arkansas, Fayetteville	AR	UARK	100,000	1
University of Central Arkansas	AR	UCAC	14,000	3
Archbold Biological Station	FL	ARCH	6,500	3
University of Miami	FL	BUS	12,000	1
Stetson University	FL	DLF	10,500	3
Florida Atlantic University	FL	FAU	30,000	4
University of Florida	FL	FLAS	400,000	5
Florida Southern College	FL	FSCL	7,500	3
Florida State University	FL	FSU	183,000	3
Fairchild Tropical Garden	FL	FTG	64,000	5
University of Central Florida	FL	FTU	10,000	3
Gesneriad Research Foundation	FL	GES	4,300	3
Harbor Branch Oceanographic Institution	FL	HBFH	6,100	2
Mote Marine Laboratory	FL	MOT	2,600	2
Division of Plant Industry	FL	PIHG	7,500	3
Selby Botanical Gardens	FL	SEL	65,000	5
University of South Florida, St. Petersburg	FL	SPMS	3,750	1
Florida Marine Research Institute	FL	STPE	(1,000)	0
University of South Florida, Tampa	FL	USF	223,500	5
University of West Florida	FL	UWFP	13,000	3
Columbus State University	GA	COLG	5,000	3
Agnes Scott College	GA	DECA	2,500	3
USDA Forest Service	GA	FSSR	11,000	2
University of Georgia, Botany	GA	GA	180,000	4
Georgia Agricultural Experiment Station	GA	GAES	-	0
University of Georgia, Plant Pathology	GA	GAM	25,000	3
Georgia Southern University	GA	GAS	20,000	3
Emory University	GA	GEO	18,800	2
Georgia Southwestern State University	GA	GSW	13,000	3

University	State	Herb	Size	Code
Shorter College	GA	SHOR	4,000	1
Valdosta State University	GA	VSC	48,000	3
State University of West Georgia	GA	WGC	6,000	1
Berea College	KY	BEREA	22,000	3
University of Louisville	KY	DHL	35,000	3
Eastern Kentucky University	KY	EKY	40,000	4
Centre College of Kentucky	KY	KBRYO		-1
Northern Kentucky University	KY	KNK	24,500	3
University of Kentucky	KY	KY	40,000	3
Morehead State University	KY	MDKY	10,000	3
Murray State University	KY	MUR	28,000	3
Western Kentucky University	KY	WKU	38,000	3
University of Southwestern Louisiana, Biology	LA	LAF	104,000	2
Louisiana State University, Baton Rouge, Plants	LA	LSU	185,100	4
Louisiana State University, Baton Rouge, Mycology	LA	LSUM	23,000	2
Louisiana State University, Shreveport	LA	LSUS	20,000	3
Louisiana Tech University	LA	LTU	122,600	3
Northwestern State University	LA	NATC	20,000	2
Northeast Louisiana University	LA	NLU	350,000	4
Tulane University	LA	NO	108,000	3
University of New Orleans	LA	NOLS	9,500	3
Southeastern Louisiana University	LA	SELU	12,000	3
Southern Forest Experiment Station	LA	SFRP	5,000	3
Nicholls State University	LA	THIB	25,000	3
University of Southwestern Louisiana, Horticulture	LA	USLH	15,000	1
Delta State University	MS	DSC	11,000	2
Gulf Coast Research Laboratory	MS	HGCRL	20,000	4
Institute for Botanical Exploration	MS	IBE	253,500	4
University of Mississippi	MS	MISS	61,000	4
Mississippi State University	MS	MISSA	(53,000)	0
Mississippi University for Women	MS	MSCW	2,600	1
Southern Weed Science Laboratory	MS	SWSL	19,000	3
Duke University	NC	ABSM	(15,000)	0
Davidson College	NC	DCH	(16,155)	0
Duke University	NC	DUKE	700,000	5
University of North Carolina, Morehead City	NC	IMS	19,000	3
North Carolina A & T State University	NC	NCATG	10,000	2
North Carolina State University	NC	NCSC	120,000	3
University of North Carolina, Chapel Hill	NC	NCU	630,000	4
Pfeiffer University	NC	PFC	?	1
St. Andrews Presbyterian College	NC	SAPCL	9,000	2
Salem College	NC	SC	1,000	2
Southeastern Forest Experiment Station	NC	SEFES	-	0
University of North Carolina, Charlotte	NC	UNCC	38,000	4
Western Carolina University	NC	WCUH	30,000	4
Wake Forest University	NC	WFU	16,000	3
University of North Carolina, Wilmington	NC	WNC	17,800	3
Charleston Museum	SC	CHARL	25,000	2
Southern Research Station	SC	CHAS	1,000	1
The Citadel	SC	CITA	7,000	3
Clemson University	SC	CLEMS	55,000	4
Furman University	SC	FUGR	20,000	2
Newberry College	SC	NBYC	12,000	3
University of South Carolina	SC	UCSC	20,000	3
University of South Carolina	SC	USCH	80,000	3
Austin Peay State University	TN	APSC	23,000	3
East Tennessee State University	TN	ETSU	12,000	3

University	State	Herb	Size	Code
Great Smoky Mountain National Park	TN	GSMNP	7,300	3
Rhodes College	TN	MEM	20,000	2
Middle Tennessee State University	TN	MTSU	6,000	3
University of Memphis	TN	SWMT	20,000	2
University of Tennessee, Knoxville	TN	TENN	470,000	5
University of Tennessee, Chattanooga	TN	UCHT	7,000	3
Vanderbilt University	TN	VDB	(300,000)	0
Stephen F. Austin State University	TX	ASTC	75,000	3
Baylor University	TX	BAYLU	30,000	3
Botanical Research Center	TX	BRCH	15,000	3
Botanical Research Institute of Texas	TX	BRIT	860,000	5
Texas A&M University, Commerce	TX	ETST	2,500	1
Texas Christian University	TX	FW	500	2
Fort Worth Museum of Science and History	TX	FWM	12,000	2
University of Mary Hardin-Baylor	TX	HABAYC	2,200	2
Howard Payne University	TX	HPC	40,000	2
Houston Museum of Natural Science	TX	HPM	5,000	1
Hardin-Simmons University	TX	HSU	3,000	2
University of Texas, Austin	TX	LL	(65,000)	0
Our Lady of the Lake University	TX	LLC	10,000	2
University of North Texas	TX	NTSC	16,000	2
University of Texas-Pan American	TX	PAUH	8,000	2
Runyon Herbarium	TX	RUNYON	-	0
Angelo State University	TX	SAT	30,000	3
Vines Environmental Science Center	TX	SBSC	30,000	3
Sam Houston State University	TX	SHST	25,000	4
Southern Methodist University	TX	SMU	(410,000)	0
South Plains College	TX	SPLT	20,000	2
Science Research Center	TX	SRCG	-	0
Sul Ross State University	TX	SRSC	60,000	3
Southwest Texas State University	TX	SWT	10,000	3
Tarleton State University	TX	TAC	1,300	3
Texas A&M University, College Station, Range Science	TX	TAES	200,000	4
Texas A&M University, Kingsville	TX	TAIC	7,000	3
Texas A&M University, College Station, Biology	TX	TAMU	29,000	3
Texas Women's University	TX	TCSW	-	-1
University of Texas, Austin	TX	TEX/LL	1,100,000	5
Blackland Experiment Station	TX	TEXA	(5,300)	0
Prairie View A & M University	TX	TPV	-	-1
Texas Tech University	TX	TTC	50,000	3
U. S. Soil Conservation Service	TX	USSC	-	-1
University of Texas, Richardson	TX	UTD	(250,000)	0
University of Texas, El Paso	TX	UTEP	56,000	3
Southwest Texas Junior College	TX	UVST	6,000	2
West Texas A&M University	TX	WTS	60,000	2
Welder Wildlife Foundation	TX	WWF	5,600	2
Bridgewater College	VA	BDWR	4,300	3
Clinch Valley College	VA	CVCW	4,000	2
Emory and Henry College	VA	EHCV	2,500	1
Longwood College	VA	FARM	75,000	3
Rappahannock Community College South Campus	VA	GLEN	(1,100)	-1
George Mason University	VA	GMUF	35,000	4
Eastern Mennonite University	VA	HAVI	4,000	2
James Madison University	VA	JMUH	16,000	2
Lord Fairfax Community College	VA	LFCC	15,000	3
Lynchburg College	VA	LYN	51,500	3
Mary Washington College	VA	MWCF	4,000	2
Old Dominion University	VA	ODU	20,000	3

University	State	Herb	Size	Code
Randolph-Macon Woman's College	VA	RMWC	13,000	3
Virginia Western Community College	VA	ROAN	1,200	2
Radford University	VA	RUHV	5,500	2
Roanoke College	VA	SARC	3,500	2
Sweet Briar College	VA	SWBR	(3,620)	0
University of Richmond	VA	URV	15,000	3
University of Virginia, Mountain Lake	VA	VA	3,000	2
Virginia Commonwealth University	VA	VCU	17,000	2
Virginia Department of Agriculture	VA	VDAC	34,000	2
Virginia Military Institute	VA	VMIL	30,000	1
Virginia Polytechnic Institute	VA	VPI	105,000	4
Virginia State University	VA	VSUH	(4,300)	-1
College of William and Mary	VA	WILLI	62800	4
Wytheville Community College	VA	WYCO	2,500	1
Fairmont State College	WV	FWVA	12,000	3
Marshall University	WV	MUHW	45,000	3
University of Charleston	WV	MVC	5,000	3
Potomac State College	WV	PSP	15,000	2
Salem College	WV	SAWV	6,000	3
West Virginia University, Morgantown	WV	WVA	160,000	4
West Virginia Institute of Technology	WV	WVIT	2,000	2
West Virginia Wesleyan College	WV	WVW	30,000	3

*Postscript.*—The following information about UARK appeared after review and revision of the present manuscript. The duties and responsibilities for collections management and curation of UARK have been transferred to the University Museum. A curator has been appointed who has floristic and monographic experience as well as herbarium management experience. The Museum's Curator of Collections and Registrar has assumed part of the collections management activities. The herbarium will move to another location on campus in June 2000.

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## FLORISTICS IN THE NEW MILLENNIUM:

PROCEEDINGS OF THE FLORA OF THE SOUTHEAST US SYMPOSIUM

*Floristics in the New Millennium* surveys our knowledge of the flora of the Southeast United States. It is a guide to the many aspects of carrying out a modern floristic work. Almost 100 botanists assembled in Fort Worth, Texas in 1998 to report, discuss and summarize our current knowledge of the flora, as well as to critically examine application of new tools for conducting modern temperate floristic work. The proceedings are a ready reference for those involved in the SE flora and elsewhere.

The book is divided into three sections: **1)** SE Flora of the US, Geological Setting, Biogeography, Overviews; **2)** Organizational and Operational Concerns in Documenting the SE Flora; **3)** Optimizing Underutilized Data. The first section contains review papers, including the geological history of the vegetation in the Southeast by David Dilcher, the aquatic vascular flora, including its endemism and origins, by Robert Haynes; and the region's medicinal plants by Ed Croom. The next section gives us the current status of Southeast flora documentation, on a regional scale as well as to compare them with efforts across the continent. The third portion of the proceedings is the largest and contains the most universally applicable information. Among the papers contained therein, almost all contain extensive appendices, where numerous World Wide Web sites are listed.

The background about the state of our knowledge, status of institutional (herbarium) resources, and current activities, will hopefully encourage more floristic work, especially in the Southeastern United States. Even more importantly, the last portion of this volume, with its many "how-to" and "how-to-find" papers, hopefully will permit the use of this volume as a textbook for, perhaps, a graduate seminar in floristic botany. The appendices—full of web site references—are meant to give this printed medium a longer, more viable lifetime.



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