



SECTION A. Grant Proposal: Round 8 Project Description

Date: 30 August 2005

Project unit (Library/Museum/Department): Harvard University Herbaria

Sponsoring unit (Library Sponsor for non-library units): HUH Botany Libraries

Project Title: Orchidaceae Type Specimen Project

Project Manager w/Name, Title and Contact Information: Gustavo Romero, Ph.D. Keeper, Oakes Ames Orchid Herbarium, HUH, 22 Divinity Avenue, romero@oeb.harvard.edu (617)495-2360

Project Associates w/Name, Title and Contact Information: Donald H. Pfister, Ph.D., Asa Gray Professor of Botany, HUH, 22 Divinity Avenue, dpfister@oeb.harvard.edu (617) 495-2368; Judith A. Warnement, Director, HUH Botany Libraries, warnemen@oeb.harvard.edu (617) 496-1025; William (Bill) Hays, Applications Developer, HUH, wlhays@fas.harvard.edu, (617) 496-6746.

Project Team w/Name, Title and Contact Information: Lisa Decesare, Head of Public Services and Archives, HUH Botany Libraries, ldecesar@oeb.harvard.edu, 495-2366; Chris Robson, Cataloger, HUH Botany Libraries, crobson@oeb.harvard.edu, 495-2366; Walter T. Kittredge, Collection Manager, kittredg@oeb.harvard.edu, (617)-495-2365; Kanchi N. Gandhi, Bibliographer, Kgandhi@oeb.harvard.edu, (617) 495-1939; Sue Kriegsman, LDI-MAP Program, Harvard University Library, Office for Information Systems, suzanne_kriegsman@harvard.edu (617) 495-3724; Project coordinator (full time, TBD); Project assistants (6, 1/4-time, TBD).

Project Summary:

The Harvard University Herbaria curatorial staff will digitize 7,050 type specimens of Orchidaceae, and the Botany Libraries staff will oversee the digitalization and metadata creation for 8900 pages of published text and illustrations that include original descriptions, or protologues, for about 2000 of the type specimens. The specimen images and direct links to the protologues, delivered via PDS, will be made available to the public from Harvard University Herbaria's web-based *Index of Botanical Specimens*. A HOLLIS record will be created for this database. Links to the protologues in PDS will also be added to corresponding monograph records in HOLLIS. All of the digitized specimens and text will be stored in the DRS. The project will work with LDI-MAP and take 15 months to complete (12 months for production and 3 months for planning, preparation, and wrap-up).

Total LDI Requested Funding: \$99,788.10¹

¹ An additional \$18,500 approved for project assistance through LDI-MAP.

Project Narrative:

The collections and literature that describe the diversity of nature play a vital role in understanding the world around us. The study of these materials increases the knowledge of vegetation and the vegetation history of areas imperiled by changes in land use and the subsequent changes in ecosystems. It is imperative to connect these vast vaults of knowledge to students and researchers who are engaged in the important work of documenting the world's flora. Biological collections are the framework for research on diversity and are a resource for systematic biologists, ecologists, conservationists, ethnobiologists, pharmacists and land planners who use the collections to identify plants and gain information on historical and current distributions. This project aims to make the raw materials of systematic and comparative research available to all those who are engaged in this important venture whether in residence at Harvard or elsewhere in the world.

The study of plant diversity depends upon verification of research materials by comparison with type specimens and original literature. The aim of this proposal is to make available, in digital form, the Harvard University Herbaria (HUH) holdings of type specimens of Orchidaceae along with a subset of their associated published original descriptions. We have selected the family Orchidaceae because of their importance to a large research and horticultural community. Harvard's herbarium and library collections in the Orchidaceae are considered second only to the Royal Botanic Gardens, Kew, in geographic coverage and detailed documentation.

Upon completion, this project will add approximately 7,050 images to the 1,300 images of Orchidaceae type specimens already available. These 8,350 type specimens represent 100% of the types of Orchidaceae and about 8% of all type specimens of vascular plants housed at the Harvard University Herbaria. The existing images and the ones created by this project can and will be viewed via the Harvard University Herbaria's web-based *Index of Botanical Specimens*:

http://brimsa.huh.harvard.edu/cms-wb/specimen_index.html

This interface allows easy access to specimen data using any combination of eleven different search criteria: genus, family/higher taxon, specific epithet, infraspecific epithet, author, rank (all, species, infraspecies), type status (searchable as "any type" or limited to one of twelve type categories), collector, collector number, location, and specimen barcode. It displays all the relevant information provided on the specimen's label (except for precise geographical location, to protect orchids from indiscriminate collectors) as well as two photographs of the specimen showing superb detail (the first occupies 157 Kb, for users with low-speed Internet connections, the second 1.0 Mb) as shown in the following example:

<http://brimsa.huh.harvard.edu/cms-wb/specimens.jsp?id=150292>

As a proof of concept, we will also make available a subset of published literature that includes about 2000 protologues associated with the types of orchids described by the following three giants of orchidology:

- Heinrich Gustav Reichenbach (1824--1889), the world's orchid expert of the late 1800s;

- Friedrich Richard Rudolf Schlechter (1872--1925), the world's orchid expert of the early 1900s;
- Oakes Ames (1874--1950), the world's orchid expert in the 1930--1940s and the founder of the Orchid Herbarium at Harvard, and his associates.

This selection is based on the following criteria:

- HUH has a large percentage of the types designated by Ames as well as an extensive and unique set of types and drawings designated by Reichenbach and Schlechter. Reichenbach's types are housed at the Natural History Museum in Vienna (Naturhistorisches Museum Wien) but do not circulate. A microfiche edition of the specimens was produced in the 1980s. Its distribution was limited by its high cost and the limited usefulness of the medium. Schlechter's types were destroyed during the bombing of Berlin in the 1940's. Hence, the HUH holdings are now the only extant documentation for many of the species he proposed. Making these particular types, the associated drawings of types, and their protologues available on the Internet will be invaluable to the botanical community at large;
- The literature associated with the types of these three authors was not widely distributed and is now rare;
- The Botany Libraries hold multiple copies of Ames' work so the most appropriate copy can be selected for scanning. Most of Schlechter's works were published on highly acidic paper, and it is certain that most of the copies in the world are in precarious condition. Reprints of a limited set of Schlechter's works are available, but they are expensive and not readily available. Again, the Botany Libraries hold multiple, well-preserved copies of his works and the most suitable copies will be selected to facilitate the scanning process;
- The literature associated with the types encompasses most of the book and journal formats we will encounter as we continue to incorporate protologues into the HUH database in the future. In most cases the copyright of the titles referred to in this document are held by Harvard University or are in the public domain. The Botany Libraries staff will request permission to copy the 5 volumes of *Repertorium Specierum Novarum Regni Vegetabilis* published after 1924.

Digital access to type specimens by graduate and undergraduate students for teaching and reference will be easy and straightforward. It will also protect and conserve the type specimens from the wear and tear of frequent handling. In a similar fashion, electronic access to the original published descriptions will reduce handling of fragile and rare books and journals. The website will offer a seamless integrated resource to Harvard researchers and plant scientists world-wide.

These materials will be important in courses on plant systematics and in related fields. As our experience presenting information to students in digital format grows, we anticipate that additional courses will benefit from the output of this project. Charles Davis, Assistant Professor in Organismic and Evolutionary Biology, joins the faculty in August of 2005. He will teach a course on plant systematics (among others) that will rely heavily on herbarium materials. He will also have at least one graduate student and a post doctoral fellow in the first year of his appointment. Donald Pfister teaches Plants and Human Affairs (OEB 104) that includes a section on taxonomy and systematics and will require projects that will employ these digital collections.

These collections will become more useful in courses as the number and variety of images increase over time.

Methodology:

Planning and preparation

The project will be completed over the course of 15 months: 12 months of production and 3 months for planning, preparation, and wrap-up. Selection of both type specimens and associated literature is complete and a detailed inventory is finalized.

Gustavo Romero will oversee all project operations with a special focus on the type specimens. The Project Coordinator will report to Gustavo and will supervise the Project Assistants, maximize the quality of the images, and run the in-house application that uploads them to the DRS. Project Assistants will transport the specimens to and from the Digital Lab and will do all the scanning/photographing thereof (see below).

Judy Warnement will oversee all operations involving the printed materials. The volumes have already been identified, the HOLLIS catalog records have been reviewed and updated, and a detailed listing of pages and illustrations has been created. Robin Wendler, Metadata Analyst, will be consulted to supply a list of standard PDS metadata fields and the HOLLIS records will be reviewed again to be sure they will robustly fill in the PDS headers. A HOLLIS record will be created for the HUH Collection Management System (HUH-CMS) *Index of Botanical Specimens* and contain a link to the database.

The Digital Imaging Group in Harvard College Library will create the page images and OCR for the protologues and deposit them in the DRS.

The library staff will check the quality control of the images created by the DIG and their structure in the PDS.

Once the protologues and type specimens have been digitized they will be linked to the HUH Collection Management System by Bill Hays.

As part of LDI-MAP, Sue Kriegsman will be responsible for systems registration, documenting the project work flow, and status reports. She will also assist with project planning and time lines.

Type Specimen images

Over the past four years, HUH has scanned and deposited in the DRS sets of images for more than 6,500 specimens. The specimens are mounted on sheets of archival paper of dimensions 16 X 11.5 inches (average size). They are selected from the compact storage unit on the third floor of HUH and taken to the Digital Lab in the basement of the same building using a herbarium cart. Each specimen is removed from its folder and placed directly on the scanner glass (if fairly flat) or on the camera stand (if "bulky", that is, if it has thick structures that would create undesirable shadows in the scanner): both systems yield 300 ppi. Some specimens may have

notes, leaves, flowers or fragments thereof in a packet or packets glued to the sheet, and photographing these objects requires extra time. We estimate that it takes a trained operator an average of 12 minutes to scan/photograph each specimen, which includes the handling and scanning of the specimen and the time it takes to do minor corrections in Photoshop and to save each image as a TIFF file. Previous experience with assistants in our Digital Lab strongly suggests that it is much more productive to hire six people working at 0.25 FTE rather than two at 1.0 and 0.5 FTE respectively (since productivity tends to fall off rapidly after two hours of scanning/photographing).

The entire process of creating deliverable jpegs, metadata creation, local storage of metadata in the HUH-CMS database, and uploading to the DRS is automated with an in-house application. Each set comprises a master TIFF, two deliverable JPEGs in different sizes, and a thumbnail. Image NRS persistent IDs are created as part of the process and after verification are available as links from the corresponding specimen records on the HUH website. No new methodology will be needed for this part of the project.

Protologue images

Print materials, including 32 volumes of journals and monographs in the Botany Libraries containing relevant botanical protologues, are imaged and structural metadata is created by the DIG and deposited in the DRS. The 29 volumes that go through the DIG's docWorks workflow will also have associated searchable OCR created. Access to these text images will be through the Page Delivery Service (PDS) with URN links in the HOLLIS record and the HUH Collection Management System available via the Internet. In the case of serials with collection level records, a single link to a group level record in PDS will be created. Each individual journal title and monographic work-in-parts will be treated as one digital object with multiple parts.

Workflow will be in batches where print volumes are flagged with a form or forms for each logical volume (to correspond with a PDS object) and delivered to DIG. Forms will contain HOLLIS number, HUH-assigned object name, and an indication of type of workflow for each logical volume. An electronic document with the same information will also be provided. Upon completion of the batch processing at DIG, reports associating generated URNs with object names are sent to HUH. HOLLIS records and HUH-CMS are updated to provide internet access. Print volumes will be picked up from the DIG by HUH staff.

The 3 fragile volumes that will not go through the docWorks workflow will have metadata supplied to DIG through the DIG Data Collection Tool for delivery through the PDS.

Storage

All digital images, and associated structural and administrative metadata, will be stored in the DRS. Bill Hays, Judy Warnement, and Gustavo Romero will receive the DRS deposit reports.

Intellectual Property and Rights:

The copyright of all but five volumes mentioned in this project either belongs to the President and Fellows of Harvard College or are in the public domain. The Botany Libraries staff will request permission to copy the 5 volumes of *Repertorium Specierum Novarum Regni Vegetabilis* published after 1924.

Long-term Commitment:

The Harvard University Herbaria have supported free electronic access to their resources since the early 1990's. The International Plant Names Index (IPNI) has been maintained on-line since 1999 and the Index of Plant Specimens debuted in 2001 and has utilized HUL-supported services including the DIG and the DRS. HUH and the HUH Botany Libraries are committed to maintaining web-based resources, links to other Harvard University digital resources, and the storage and access of digital objects, to guarantee the long-term display of the type specimens and their protologues.



SECTION B. Grant Proposal: Round 8 Work Plan

Describe project activities with associated costs, associated staff or service contract(s), projected milestones and digital products according to a monthly schedule. You may use this template or create your own schedule. Begin with "year one, month one" rather than a specific date. The start date will be agreed upon and documented in your award letter. Combine months for activities that span more than one month (e.g., Months 3 -12 may include production cataloging and digitizing with no need to break the activities into separate months). The schedule should include Status Reports and a Final Report. *Status Reports are due biannually on the first Friday of the month in February and August.* For each year summarize the annual goals including expected digital products.

Current Date: August 30, 2005

Project Title: Orchidaceae Type Specimen Project

Year One

Month 1

- Establish project funding account and request LDI funding. (G. Romero)
- Check and review PDS, DRS, DRS Web Admin., NRS, DIG Data Collection Tool systems registration (S. Kriegsman)
- Write and post job description for Project Coordinator and Project Assistants. (G. Romero, D. Pfister)
- Establish reformatting batches with DIG. (J. Warnement, S. Kriegsman)
- Make arrangements to send first batch of protologues to DIG for reformatting. (J. Warnement)
- Check PDS cataloging specifications with Robin Wendler (S. Kriegsman)

Month 2

- Hire Project Coordinator and Project Assistants. (G. Romero and D. Pfister)
- Train on the DIG Data Collection Tool with Maggie Hale (J. Warnement, L. DeCesare)
- Send first batch of protologues to DIG (J. Warnement, L. DeCesare)

Month 3

- Train Project Coordinator and Project Assistants. (G. Romero)
- Select first batch of type specimens. (G. Romero, D. Pfister)
- Begin scanning type specimens and deposit in DRS. (Project Assistants)
- Receive first completed batch of protologues and DRS report from DIG (G. Romero, J. Warnement, W. Hays)
- Quality control first reformatted protologues (J. Warnement)
- Quality control first reformatted type specimens (G. Romero, Project Assistants)

Month 4

- Link 1st batch of specimens and protologues to HUH-CMS (W. Hays)
- Link 1st batch of protologues to HOLLIS records (C. Robson)
- Continue scanning type specimens. (Project Assistants)

- Pick up 1st batch of protologue volumes from the DIG (J. Warnement, L. DeCesare)
- Bring 2nd batch of protologues to the DIG. (J. Warnement, L. DeCesare)

Months 5 - 12

- Link 2nd - 9th batches of specimens and protologues to HUH-CMS (W. Hays)
- QC 2nd - 9th batches of protologues and link them to HOLLIS records (C. Robson.)
- Continue scanning type specimens. (Project Assistants)
- Send 3rd - 10th batches of protologues to DIG. (J. Warnement, L. DeCesare)
- Create HOLLIS record for HUH-CMS. (C. Robson)
- Write LDI project status reports due February 3, 2006 and August 4, 2006. (G. Romero, J. Warnement, S. Kriegsman)

Year One Goals: Open project account and register for systems. Hire and train project staff. Reformat approximately 5600 type specimens and 7400 pages of protologue volumes. Link volumes in PDS to HOLLIS and HUH-CMS. Write two status reports.

Months 13-14

- Link 10th – 11th batches of specimens and protologues to HUH-CMS (W. Hays)
- QC and 10th – 11th batches of protologues and link them to HOLLIS records (C. Robson)
- Continue scanning type specimens. (Project Assistants)
- Send 11th – 12th batches of protologues to DIG. (J. Warnement, L. DeCesare)

Month 15

- Close project financial account (G. Romero)
- Write final report (G. Romero, J. Warnement, W. Hays, D. Pfister, S. Kriegsman)

Year Two Goals: Reformat approximately 1450 type specimens and 1500 pages of protologue volumes. Link volumes in PDS to HOLLIS and HUH-CMS. Close the financial accounts and write the final report.



SECTION C. Grant Proposal: Round 8 Budget Calculations

LDI Funding Column: List LDI contributions in column 1. LDI funding will cover temporary project staff, digital conversion services and custom programming.

Cost Share Column: List Cost Share contributions from Project unit, Sponsors and Donors in column 2: Show cost of project management and permanent staff time, local equipment dedicated to project, preparation for digital conversion (filming, conservation, etc.), and collection preservation. Include donations from other sources such as University or corporate sponsorship, which may include equipment and services.

Date: 30 August 2005

Project Title: Orchidaceae Type Specimen

	LDI Funding	Cost Share
Year One		
<u>Salaries (incl. Benefits)¹</u>		
1 Project Coordinator @ 1 FTE	\$48,500.00	\$0.00
6 student assts @ 1/4 FTE	\$18,000.00	\$0.00
1 librarian @ 1/3 FTE	\$0.00	\$20,587.06
1 curator @ 1/4 FTE	\$0.00	\$19,061.43
1 curatorial asst. @ 1/4 FTE	\$0.00	\$11,739.29
1 database developer @ .10 FTE	\$0.00	\$ 8,113.26
 <u>Travel/training</u>		
	NA	\$0.00
 <u>Equipment (incl. Hardware/Software)²</u>		
Workstation A	NA	\$ 3,912.00
Workstation B	NA	\$ 3,912.00
Adobe Photoshop licenses (2)	NA	\$ 76.00
Digital camera & lens	NA	\$ 5,403.70
Lighting for digital camera & miscellaneous	NA	\$ 2,000.00
 <u>Preservation</u>		
Assessment	\$0.00	\$0.00
Treatment	\$0.00	\$0.00
Rehousing	NA	\$0.00
 <u>Misc. Supplies</u>		
Total	NA	\$ 350.00
 <u>Contracts</u>		
DIG to scan literature	\$15,957.10	\$0.00
LDI-MAP, Sue Kriegsman (proposal & project) ³	\$18,500.00	\$0.00
 <u>Other</u>		
Fringe	\$17,331.00	[included above]
 Project Total		
	\$99,788.10 (plus LDI-MAP \$18,500) ³	\$75,154.74

¹ Costs calculated for 12 months of production.

² Cost share for new equipment purchased for this project.

³ An additional \$18,500 approved for project assistance through LDI-MAP.