
Management of University Biological Collections:

A Framework for Policy and Practice

Task Force Report

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Division of Agriculture and Natural Resources
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▣ Preface

A broad-based Task Force, chaired by Lynn Kimsey of the Department of Entomology and director of the Bohart Entomological Museum, was convened to review and assess the status of living and preserved biological collections held on the Davis campus of the University of California. The Task Force addressed three basic issues, forming subcommittees to 1) review the data gathered in a survey by the Genetic Resources Conservation Program of living and preserved collections and report its findings, 2) make recommendations for policy guidelines on a campus basis and an individual-collection basis, and 3) propose a campus-wide administrative structure to address issues of communication, documentation, and funding. Policy for administration, ownership, transfer, and disposal of collections has apparently not been previously addressed by the University of California. The Task Force's recommendations on policy and administrative issues are the subject of this report.

The Task Force uncovered a remarkable diversity and wealth of biological collections on the UC Davis campus, documented in its first report (GRCP Report No. 9). A list of these collections is presented here in the Appendix. The collections cover the taxonomic spectrum, from viruses and bacteria to plants, fungi, insects, fish, birds, and mammals. The vast majority of the collections have been founded by single individuals or research groups, without any campus-wide coordination or special sources of funding. Some of the campus collections have grown to great size as researchers have added to the ever-growing knowledge base of organismic diversity. Some collections contain large proportions of the known organismic or genetic diversity in given geographic areas.

The collections serve the many purposes of the University: its commitment to informing the sustainable development of such human endeavors as agriculture, fishery, and forestry practices; its commitment to basic research in biology, medicine, veterinary science, and food science; its commitment to the documentation and preservation of the biodiversity of California; its commitment to education and extending the knowledge derived from the research; and its commitment to serve as a repository of knowledge. The collections are not well recognized for their role in serving these purposes, their long-term value is not appreciated, and they are not always as well used as they might be, in part, because of the lack of recognition.

Recognition is necessary, but that is not enough to ensure the preservation and utility of the collections. Also required are documentation about the extent of a collection, accessibility of the collection, and support for the characterization, maintenance, and distribution of the collection. In this report, the Task Force addressed the need for administrative recognition and documentation of collections; a prerequisite to further attempts to increase support for collections. Increased financial support for these valuable resources will require

concerted, coordinated efforts by campus administration, collection managers, and collection users. Some guidelines and suggestions are included in this report.

A Biological Collections Committee which would advise the Deans and Chancellor is recommended by the Task Force. This will be a very important step toward regularizing support for biological resources, but in the longer term, a campus-wide Natural and Agricultural History Museum could provide the basis for a far-reaching education and conservation program on the Davis Campus.

I am grateful for the review and discussion of this document by several administrators, curators, and collection managers from the Davis and other UC campuses. I would especially like to acknowledge the advice from David Wake at the Museum of Vertebrate Zoology at UC Berkeley and correspondence with Philip Humphrey at the University of Kansas, they helped put the findings of the Task Force into a management framework that should be very effective if implemented. While the recommendations of this report are offered specifically for the UC Davis campus, we hope they may be useful to other University of California campuses and elsewhere. We offer these recommendations for serious consideration and expect that they will be useful in developing and adopting policies and procedures.

C.O. Qualset, Director
Genetic Resources Conservation Program

▣ Biological Resources Assessment Task Force 1991–92

Membership

Lynn S. Kimsey	Entomology, <i>Chair</i>
Hans Abplanalp	Avian Sciences
Mary T. Burke	Davis Arboretum
Roger Chetelat	Vegetable Crops
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Marilyn L. Warburton	Pomology
Grady L. Webster	Botany

Charge

Review compiled information on the campus holdings of living and preserved biological collections and make recommendations with respect to personnel, facility, and funding needs for the collections and set guidelines establishing curatorial responsibility, support, acquisition, ownership, and distribution of biological materials, preparing a report to be presented to Chancellor Hullar and the deans of the colleges and divisions which maintain collections.

▣ Introduction

The Davis Campus of the University of California houses some of the largest and most diverse assemblages of living and preserved biological materials in North America. Some of these are among the most important collections of their type in the world, and most are irreplaceable resources for teaching and research. The collections are nationally and internationally recognized resources. As such, the University and its employees have a continuing obligation to safeguard these materials for the advancement and dissemination of knowledge through education, research, and public service. Because these collections are held in trust for the benefit of society, the University has an obligation to maintain these materials appropriately.

A Biological Resources Assessment Task Force was organized to address problems of support, degradation, and loss of collections on the Davis Campus. In the past five years a number of major collections have been abandoned, transferred, or otherwise lost, including, for example, the Carnegie Primate Embryo Collection, Hildebrand's Vertebrate Skeleton Collection, and most of the Miller Isopod Collection, among others. This loss leaves gaps in research and teaching programs that can only be filled at great cost, if at all. Therefore, it is essential that the University take steps to secure the management of existing collections and to regulate their transfer or disposal by other means.

To address these issues, the UC Genetic Resources Conservation Program conducted a survey to determine the extent of Davis Campus biological collections and convened a Task Force of UC Davis researchers and curators of biological collections to assess the results of this and previous surveys. The surveys identified 85 collections of living materials and 17 collections of nonliving or preserved materials distributed among campus-administrated units. Twenty-one campus academic departments in two colleges and two schools each have at least one collection. There are also five other administrative units that maintain collections. A list of the collections is presented in the Appendix. The collections include preserved plant and animal specimens valuable for basic research in systematics and for judging environmental and other influences on biodiversity. They include genetic and breeding stocks of livestock and crops which have been widely used in California agriculture and in research. Microbial collections assembled from world-wide sources, such as the yeast collections, are extremely valuable for taxonomic research and in biotechnology. Thus, the diversity among collections is vast, but they share many common problems.

The Task Force found that almost all collections face some limitations precluding optimum maintenance, for example, no campus budgetary provision is generally made for support of these collections, the documentation, inventory, and backup status is inadequate, and there are no generally applicable policies for ownership, disposal, and legal responsibility for collections. In fact, many

campus collections may have unwritten policies established only by practice or tradition between a curator and users of the collection. Such policies, however well designed, may not survive or be communicated with the collection in a transition of management due to retirement or death of the curator, and the legal ownership of the collections may not be explicitly established. Biological collections have intellectual property value and the legal ownership or trusteeship of the University and individual scientists must be assessed and respected.

Obviously, not all elements of a collection are equal. Some have been collected at more expense than others, some are type specimens, some are voucher specimens for research projects, some are the only collected living representatives of endangered taxa, some are patented, and some are governed by restrictions imposed by a funding source external to the University. This variability makes it difficult to develop a general policy. However, absence of policy has led to loss of collections, missed funding opportunities, and a void of responsibility for some collections.

There are many notable models and precedent policy statements for collections: natural history museums, private collections, many systematics collections, botanical gardens, arboreta, zoos, and seed banks have policy statements. The national organization Association of Systematics Collections has worked to discuss and establish policies to guide museums and collections, publishing *Guidelines: The ethics and responsibilities of museums with respect to acquisition and disposition of collections materials* (1991. ASC Newsletter, 19(6):77–79). The American Association of Zoological Parks and Aquariums has produced *Disposition of wild animals from zoological parks and aquariums, A guideline of the AAZPA, 1987*. On the Davis Campus, an exception to the general lack of policy is the UC Davis Arboretum, which adopted a collections policy for itself in 1991.

While all of these statements and guidelines have applicability to some issues created by the diversity of collections on the Davis Campus, none of these policy statements studied by the Task Force serves as the general guideline needed for the campus. The Task Force has drawn on several of these policies as well as on the experiences of their colleagues at UC Davis and other UC campuses to make their recommendations. Because of the diversity of the many individual collections, each should establish its own policy to accommodate the particular needs, value, and status the collection might have. Recommendations for general guidelines for individual collection policies are offered which can be the basis for campus-wide or University-wide policies regarding ownership, transfer, or disposal of collections. Detailed suggestions for these policies and further recommendations for official campus recognition of collections, for a framework of communication among administrative units and collections personnel, for establishment of user fees, and for establishment of a campus collections database are presented.

▣ Task Force Findings

There are more than 100 campus biological collections as revealed by recent survey efforts.

Compiled summary information from the surveys and its review by the Task Force was published as Report No. 9 of the Genetic Resources Conservation Program. See Appendix for a summary of these collections.

There is no defined campus policy on several issues relevant to biological collections. These include:

- ▣ The ownership of collections when it comes to disposition and support; Disposition of individual items or components of collections; University support of collections as campuswide resources for teaching and research.

Policy should be established at two levels.

Campuswide in the administration and via the UC Policy and Procedures Manual.

- ▣ For individual collections.

Funding opportunities are lost because some funding agencies require policies for acquisition, ownership, and disposal to be in place, and because some individual collections are not of sufficient size.

The only campus-wide linkage to date among campus collections has been the campus-based Association of Biological Collections (ABC).

- ▣ The ABC consists of an informal group of curators, managers, and other personnel from a wide variety of disciplines who work with biological collections.
The ABC, numbering over 30 individuals, meets monthly to discuss collections-related problems and share information about collections management.
- ▣ Relatively few of the campus collections now documented have been represented in this group. The ABC has had no administrative role, and, while it is in position to serve a useful advisory role, there has been no clear channel from the ABC to any level of administration.
Major impetus for this Task Force and the survey of campus collections came from the ABC.

▣ **Summary of Task Force Recommendations**

A Biological Collections Committee should be established on the campus.

This committee would operate under the auspices of the Chancellor's office. It would maintain a collections database, provide formal recommendations for disposition of "orphaned" collections, and facilitate interactions among curators and users of collections and departmental and campus administration.

Collections Policy Guidelines should be composed and put in place for general administration of collections.

These guidelines would govern ethical and legal issues concerning acquisition of material, disposal of "orphaned" collections via recommendations by the Biological Collections Committee, and use of collections materials.

A "Guidelines for Disposal of Collections" section should be adopted in the UC Policy and Procedures Manual.

This section of the Policy and Procedures Manual would give specific guidelines for disposing of or deaccessioning all or significant portions of collections.

Guidelines to enable drafting of specific policy for individual collections should be prepared and made available to curators and administrators.

These guidelines would allow internal policy statements to be developed for individual collections to define their purpose and govern acquisitions of items, disposal of items, management of databases, and establishment of curation and maintenance procedures.

The Association of Biological Collections (ABC) should be formally recognized as a service entity to the campus Biological Collections Committee.

The ABC, consisting of personnel who work with biological collections, is well positioned to advise and support the Biological Collections Committee.

▣ Detailed Recommendations

- I. A Biological Collections Committee should be established on the campus.
 - A. Role for the Committee
 1. Maintain and update a campus biological collections database
 - a. The database will serve as a roster of collections for which the University of California, Davis, will accept a clear legal, financial, and ethical responsibility. The collections must meet the criteria of being used for teaching, research, or public service, and the contents of the collections should be of state, national, or international importance.
 - b. The database will consist of detailed information on holdings for campus collections and will build on the information already collected by the activity of this Task Force.
 - c. The database should be supported financially by the Chancellor's Office.
 - e. The data for the database should be collected and updated through the auspices of the Association of Biological Collections.
 2. Make recommendations on requests for disposition of collections "orphaned" by programmatic or administrative changes in departments, retirements, or lack of financial support. *It is not intended that such recommendations supersede any restrictions or legal constraints that may be imposed on a collection or components of a collection by extramural funding support sources such as endowments, private funds, or governmental agencies. In addition, it is recognized that patented components of collections are governed by a well-developed, existing policy.*
 3. Facilitate interactions among curators and users of collections and departmental and campus administration.
 4. Facilitate administrative support for collections.
 5. Assist in resolution of conflicts over administrative support and jurisdiction.
 6. Investigate the possibilities of securing funding for collections:
 - a. from the University general fund;
 - b. from patent royalty funds derived from collection materials;
 - c. from overhead assessed from grants that depend on access to collections;

- d. from endowment funds established by the private sector in support of research and collections.
 7. Recommend distribution of available funds to collections.
 8. Examine existing fee schedules and recommend others for services rendered by or materials provided from collections.
- B. Administrative Position

The Committee shall be administered and operate under the auspices of the Chancellor's Office.
- C. Composition – Five voting members and five *ex officio* members
 1. Faculty members – Two to three individuals, knowledgeable about collections.
 2. Curators or collection managers – Two to three individuals who work with campus collections.
 3. Five *ex officio* administrative representatives – one each from the College of Agricultural and Environmental Sciences, the College of Letters and Science, the Division of Biological Sciences, the School of Medicine, and the School of Veterinary Medicine.
 4. Members shall be appointed by the Chancellor with the recommendation of the Association of Biological Collections.
- D. Frequency of Meeting
 1. The Committee shall meet annually on a scheduled basis and more frequently as needed on an *ad hoc* basis.
 2. The need for the *ad hoc* meetings shall be determined and recommended by the Association of Biological Collections.
- E. Term of Service
 1. Members shall serve for a minimum of three years.
 2. Members who fail to attend more than 50% of all meetings of a term, scheduled and *ad hoc*, shall be replaced.

II. Collections Policy Guidelines should be composed and put in place for general administration of collections.

These guidelines would govern ethical and legal issues concerning acquisition of material, disposal of “orphaned” collections via recommendations by the Biological Collections Committee, and use of collections materials.

A. Acquisition

1. Priorities for acquiring material shall be determined by individual departments, researchers or collection managers, in accordance with the research goals or statement of purpose of each collection.
2. Specimens shall be acquired only when they have been collected, exported and imported in full compliance with state, national, and international laws and regulations, or confiscated by government enforcement agencies and deposited in University of California, Davis collections.
3. Specimens shall be accepted only if the donor transfers title to the University of California without encumbrance.
4. No member of the University of California shall, in an official capacity, give appraisals for the purpose of establishing the tax-deductible value of gifts offered to the University. Nor shall University employees identify or otherwise authenticate, for other individuals or agencies, materials which would encourage or benefit illegal, unethical, or irresponsible traffic in such materials.

B. Disposal

1. The Biological Collections Committee shall, as need arises, evaluate requests for disposal of collections “orphaned” by faculty or staff retirements, fiscal cutbacks, or programmatic changes. The committee shall report its recommendations for the disposition of these collections directly to the Chancellor. Request forms for disposal of collections will be included in the UC Policy and Procedures Manual.
2. When disposing of collections the University shall ensure that the manner of disposition is in the best interests of the University, the community it serves, and the public trust it represents in maintaining collections. Consideration shall be given to placing collections in another institution wherein they may best serve the purpose for which they were initially acquired.

C. Use

1. Loans and genetic resources from the University of California collections play an intrinsic part in the research, education, and public outreach missions of the University.

2. Decisions regarding loans are made by individuals in charge of collections, whether faculty or staff. Loans of materials of major monetary value or special community interest, which must be insured, must be approved by the appropriate administrative official.
3. Genetic resources may be made available free of charge for academic research or teaching purposes. However, reasonable fees should be charged, particularly for patented organisms, for for-profit use of these materials by individuals or other institutions. These fees would in turn directly support maintenance of the collection involved. *All funds derived from sale of materials shall revert to the collection from which they were removed for the support of that collection.*

III. A “Guidelines for Disposal of Collections” section should be adopted in the UC Policy and Procedures Manual.

These guidelines are for disposing of or deaccessioning whole or significant parts of biological, anthropological, or geological collections. It is not meant to take the place of individual collections policies and procedures that are in place for running the day-to-day operations of collections on campus.

A. Definitions

1. **Collection:** Any assemblage of biological, anthropological, or geological objects or items that have been acquired and maintained using state funds including salary and support to the collection. *Biological materials, living or preserved, include nucleic acids or other molecules; microbes, algae, fungi, plants, and animals; and tissue and other components of the above materials. Anthropological materials include artifacts, implements, fossils and skeletal materials, and casts thereof. Geological materials consist of fossils and fossil casts, rocks, and minerals. Vital components of many of the above-described collections are items of documentation, such as maps, photographs, and fieldbooks.*
2. **Net income:** Sales revenue remaining following payment or expenses associated with sending or transporting the collection in question to its new home.
3. **Non-university:** Organizations that are not units of or directly associated with the University of California, and individuals acting in their own behalf, regardless of affiliation.
4. **Orphaned collection:** A collection that is no longer wanted or that can no longer be maintained in such a condition that it will not degenerate.
5. **Disposal:** The disposal of a collection by sale or gift, to any other University not in the UC system or non-university unit, or by destruction of the collection.
6. **Transfer:** The disposal of a collection by transferring the collection to any other administrative unit on a campus of the University of California.
7. **Partial disposal:** The disposal of a part of a collection by sale, donation, or gift.

B. Policy

1. Responsibility
 - a. Departments in which collections are housed are responsible for determining the status of the collection and maintaining the collection in a high state of conservation.

- b. The Biological Collections Committee is responsible for reviewing and making decisions regarding the ultimate disposition of a collection once the administrative unit in which the collection is housed has determined that the collection is no longer wanted (orphaned).
 - c. The Biological Collections Committee, with approval of the Chancellor, shall direct the net income, if any, derived from disposal of part of any collection directly to the operating budget of that collection. If a collection is disposed of completely, net income shall be directed by the Committee to the operating budget of the administrative unit which ran the collection.
 - d. Disposals shall be initiated by recording a **Request for Disposal of Collection** (RDC) form. RDC forms may be obtained by calling the Accounting Office, Internal Control Division.
 - e. Any exceptions to this policy require the prior approval of the Provost.
2. Methods of Transfer or Disposal
- a. When it has been determined by the Biological Collections Committee that the collection cannot be supported or no longer serves to enhance the teaching, research, or other activities within the host unit or, more generally, on the Davis campus of the University of California, the collection may be disposed of in one of the following ways (listed in order of preference):
 - i. Transfer within the campus to another unit.
 - ii. Transfer to a unit of another campus of the University of California, with the cost of that transfer paid by the receiving campus or unit.
 - iii. Sale to private museums or other non-university organization at a price to be negotiated by the Biological Collections Committee and the Committee on Rates.
 - iv. Donations to a non-university organization, if the market value of the collection is below the cost required for handling, record keeping, storage, and other costs associated with sale.
 - v. Destruction of materials.
 - b. The basis of the market value established for collections that are being considered for disposal shall be documented and, when possible, based on published sources.

- c. Any sale of collections must be consistent with existing policy in *Sales of University Supplies and Services*, section 330-50 of the Policies and Procedures Manual.

3. **Procedures:** Disposal by Department or Unit.

<i>Responsibility</i>	<i>Action</i>
Department/ Administrative unit	<ul style="list-style-type: none"> a. Prepares and signs a Request-for-Disposal-of-Collection (RDC) form b. Retains departmental copy of RDC form; forwards form and any attachments to Dean, Biological Collections Committee, and Provost,
Dean	<ul style="list-style-type: none"> c. Reviews proposed action, if approved, forwards remainder of form set and any attachments to Biological Collections Committee and Provost
Biological Collec- tions Committee	<ul style="list-style-type: none"> d. Reviews proposed action, if approved, forwards remainder of form set and any attachments to Provost.
Provost	<ul style="list-style-type: none"> e. Reviews proposed action, forwards recommendations to department/ administrative unit for action.

IV. Guidelines to enable drafting of specific policy for individual collections should be prepared and made available to curators and administrators.

A. Introduction

This section establishes responsibility for the administration, implementation, interpretation, periodic review, and revision of the policy. The membership of a collection committee can be established where applicable, including details of its formation, meetings, responsibilities and powers.

1. Provide general statement about your goals to guide and limit what is collected and to provide proper collections management.
2. Include any obligations of supporting endowment funds or references to collections as part of the public trust.
3. Indicate who is responsible for the implementation, interpretation, periodic review, and revision of the policy.

B. Statement of Purpose

The Statement of Purpose may be drawn directly from the institution's stated purposes. It generally lists clearly stated institutional goals that describe how the collection serves the community at large. This statement should be followed by a series of objectives that specify exactly what the staff does to meet these goals.

1. List the primary purpose(s) the collection serves.
2. Write several sentences describing this (these) goal(s) more fully.
3. List a series of staff tasks/functions (objectives) that support each purpose, i.e., support research, teaching, public outreach, etc.
4. Continue until you have clearly described all the functions that your collection fulfills and have tied them to a specific institutional goal.
5. Finally, rank the importance of the purposes or goals of your collection.

C. Acquisition Policy

1. What are the criteria for selecting additions to the collection? Acquisitions should relate to the purpose of the collection. Stringent criteria for acceptance may be necessary to limit the unwarranted accumulation of specimens and the consequent drain on resources. The following criteria may be important: source of specimens, rarity or uniqueness of specimens, types of sources, documentation of source, priorities for acquisition, and ability to conserve or maintain properly the materials.
2. Who is responsible for initiating acquisitions to the collections? Who is responsible for approval?

3. What are the ethical and legal considerations to be adhered to in collecting?
 4. Under what conditions, if any, will gifts or loans be accepted?
 5. What types of items are acquired, and which are not?
 6. What essential information will be maintained for each item of the collection?
- D. Disposal Policy
1. What criteria warrant disposal of an item from the collection, e.g., death, disappearance, deterioration, lost identification, or loss of relevancy to the collections purpose?
 2. What restrictions apply to the disposal of a collection item? Questions of ownership, special legal status (endangerment, rarity), and stipulations of a bequest may be important considerations.
 3. Who must review and approve disposal recommendations?
 4. What principles govern disposal of deaccessioned items? Donation or exchange with kindred institutions may have priority over selling. Who has priority if items are sold, donated, or exchanged? How are items/specimens destroyed? How may representatives of rare, threatened, endangered, and extinct species be disposed?
- E. Collection Record System
1. Briefly describe how specimen records are maintained.
 2. Who is responsible for the administration and accuracy of the records system?
 3. Describe the institution's commitment to safeguarding collection records. Describe specifically the backup of both paper and electronic files, and where remote sets of records are kept.
- F. Care of the Collection
1. What minimum standards of care are needed to conserve properly specimens in the collection?
 2. Who has responsibility for periodic inventory of the collection?
 3. What provisions will be made for ongoing evaluation of the collection? Indicate who will be involved in this evaluation and how frequently this will be done. Recommendations for maintenance, conservation, or disposal may come from evaluation.
 4. Describe protocols for each aspect of the curatorial tasks done in the collection. How are specimens prepared or living materials housed, cultured, etc?

V. The Association of Biological Collections (ABC) should be formally recognized as a service entity to the campus Biological Collections Committee.

The ABC, a voluntary and informal organization consisting of personnel who work with biological collections, is well positioned to advise and support the Biological Collections Committee, especially with respect to the maintenance of a campus collections database.

- A. Personnel from a wider range of collections should be encouraged to participate in ABC.
- B. ABC should serve as the main channel from personnel working with collections to the Collections Committee.
- C. The database should be maintained and updated for the Biological Collections Committee by ABC.
- D. *Ad hoc* meetings of the Biological Collections Committee should be instigated by ABC as need arises.

▣ Appendix

Summary of UC Davis biological collections (by department or other administrative unit)*

Agronomy & Range Science

- Small grain cereals genetic resources (Several collections: barley, wheat, oat, rye, triticale, and wild relatives)
- Cotton germplasm
- Grain *Amaranthus* and Rose clover *Limnanthes* spp. (Meadowfoam)
- Medicago* species germplasm
- Mediterranean legume germplasm *Phaseolus* spp.
- Rice germplasm

Agronomy & Range Science

/Student Farm

- Heirloom varieties (vegetables, flowers, and herbs)

Animal Resources Service

- Research animals—Vertebrates

Animal Science

- Mouse genetic stocks
- Sheep genetic stocks and breeding lines
- White sturgeon: wild and selected lines

Anthropology

- Archaeological collections
- Biological collections
- Ethnographic collections

Arboretum

Avian Sciences

- Chicken genetic stocks
- Domesticated avian species
- Dystrophic chickens
- Parrots

Bodega Marine Laboratory

- BML museum collections
- Oyster species

Botany

- Algae collection
- Fungi teaching collection
- Conservatory plants
- Euphorbiaceae (*Dalechampia*, *Euphorbia*, *Jatropha*)
- Helianthae germplasm
- Tucker Herbarium
- Crampton herbarium collection
- Axelrod paleontological collection

California Primate Research Center

- Nonhuman primates
- Primate embryo collection

Entomology

- Ant (Formicidae) collection
- Bohart Museum of Entomology
- Collection of parasitic filarial worms and mosquito vectors
- Grape *Phylloxera*
- Honey bee stocks
- Spirochete collection
- Leiser herbarium collection
- Petunia* germplasm

Environmental Horticulture

- Alstroemeria* germplasm
- Buffalo grass germplasm
- EH Botanic gardens
- Eucalyptus* germplasm
- Gerbera* genepool
- Leiser herbarium collection
- Petunia* germplasm

Food Science & Technology

- Yeast culture collection
- Yeast genetic stocks

* Summary derived from: McGuire, P.E., M.L. Warburton, L.S. Kimsey, and S.L. Gardner (eds.) 1992. Biological collections at the University of California, Davis: Scope, status, and needs. Report No. 9. University of California Genetic Resources Conservation Program, Davis, CA.

Foundation Plant Materials Service

Variety collections of grapes,
fruit and nut trees, roses,
and strawberries

Genetics

Clarkia spp. (Onagraceae)
Drosophila genetic stocks (three
collections)

Geology

Geological/paleontological
collections

Med/Microbiology and Immunology

Pathogenic fungi

Microbiology

Anthoceros punctatus (hornwort)
and symbiotic *Nostoc* spp.
(Cyanobacteria)
Deletion mutants of yeast

**National Germplasm Repository
(USDA)**

Species of fruit, nut, and vine crops

Nematology

Insect-parasitic nematodes
Mammalian endo- and ectoparasites
Nematophagous fungi
UC Davis Nematode collection

Plant Pathology

Bacteria
Bacteria and fungi teaching
collection
Gene banks and libraries
Plant pathogenic bacteria
Plant pathogenic fungi and plant
viruses
Plant viruses
Plant viruses and mycoplasma
Plasmid vectors
Viruses of grape vines

Pomology

Actinidia breeding lines
Almond germplasm
Apricot and cherry germplasm
Castanea germplasm
Peach and almond lines
Pecan germplasm
Pistachio germplasm
Walnut collection
Wild and domesticated lines
of strawberries
Wild apricot germplasm

Vegetable Crops

Brassica germplasm
Bremia lactucae
Lettuce germplasm
Tomato Genetics Resource Center
Tomato germplasm

Viticulture and Enology

Grape germplasm
Wine yeast and bacteria
Yeast genetic stocks and
wild species

**Vet Med/Microbiology &
Immunology**

Parasite collection

Vet Med/Reproduction

Domestic horse, cattle, and
llama serum and DNA
Tritrichomonas foetus strains

Wildlife & Fisheries Biology

Museum of Wildlife and
Fisheries Biology

Zoology

Amphibians and reptiles
Zoology collection

