INTRODUCTION

Description

The *Botanical Institute of Barcelona* (IBB-CSIC-ICUB) is a joint centre of the Higher Council for Scientific Research (CSIC) and *Barcelona City Council* (AB), which is represented by the *Natural Science Museum of Barcelona* (MCNB). The IBB was established in 1934, and the first CSIC intervention occurred in 1942 when Pius Font i Quer was assigned to the institute as a tenured scientist. In 1986, the institute was incorporated as an associated centre, and a year later, the first tenured scientist of the modern era of IBB-CSIC-ICUB joined the institute. In 1998, a new deal was signed with the *Barcelona City Council* under which the institute grew to become a joint centre.

Because of its scientific importance and the volume of its collections, IBB-CSIC-ICUB is the second botanical centre of Spain. The current collections consist of approximately 800,000 herbarium specimens. These collections, as well as the specialised library, are part of the CSIC Library Network, which can be accessed via the Internet and are fully accessible to all interested researchers. IBB-CSIC-ICUB also retains the Salvador Collection, one of the few naturalist collections of the Enlightenment that has been preserved. This collection includes a variety of specimens (fossils, shells, seeds, various animal and plant products and one herbarium) and a scientific, medical and pharmaceutical library from the 16th and 18th centuries, which is one of most important of such libraries in the world.

The IBB-CSIC-ICUB is located in *Parc de Montjuic*, one of the most emblematic areas of Barcelona, both culturally and historically. The so-called "historic building," which was the first institute headquarters, is located near the *Palau Nacional*, which is home to the *National Art Museum of Catalonia*. Currently, the IBB-CSIC-ICUB is located in its new building, which was built in 2003 and is located on the high ground of the *Botanical Garden of Barcelona* (JBB), an institution with which it has a close relationship.

Mission and Objectives

Under the current agreement signed between the Higher Council for Scientific Research and Barcelona City Council on June 5, 2008, the IBB-CSIC-ICUB's mission is as follows:

"… to promote quality research in the various branches of Botany, with the following basic objectives:

- *To contribute to research advancement and technological development in all branches of botanical sciences according to the guidelines laid down in successive strategic plans of the IBB-CSIC-ICUB.*
- *To provide scientific advice to the Botanical Garden of Barcelona.*
- *To train research personnel and support postgraduate teaching.*
- *To coordinate general and instrumentation services to make better use of existing resources and those that can be achieved after the implementation of this agreement.*
- *To enhance relationships with other national and international centres.*
- *To collaborate with the government and contribute to the advancement of industry through the transfer of knowledge and research results."*

STRUCTURE AND ORGANIZATION

Currently, the IBB-CSIC-ICUB is divided into three units or departments with their respective heads:

The Scientific Board is comprised of researchers from the institute, including public officials and those employed with doctorates. In 2013, this board had the following composition:

The heads of departments along with two labour representatives for the contract employees (permanent and temporary), the director, deputy director and manager of the IBB-CSIC-ICUB form the Scientific Board of the institute. During 2013, this board was formed by the highest governing body of the institute, which is the Governing Committee; this committee consists of two representatives of the *Barcelona City Council* (appointed by the mayor of the city), two representatives of the CSIC (appointed by the president of the CSIS) and the director and manager of the IBB-CSIC-ICUB, with the manager acting as the secretary. The Governing Committee of 2013 was formed by:

PERSONNEL

In 2013, the following two associated units were created under the relevant rules of the CSIC: the *Department of Ecology* (*School of Biology*) and *Botany Unit* (*Department of Natural Products, Plant Biology and Edaphology*), *School of Pharmacy*), both from the *University of Barcelona* (UB). These associated units were approved on June 24, 2013 and are valid for three years.

Under their approval, the following researchers are now considered IBB-CSIC-ICUB Research Associates:

RESEARCH PROJECTS

Currently, the IBB-CSIC-ICUB focuses on three main lines of research:

- Biodiversity
- Palynology and Paleoecology
- History of Botany

The first two lines of research involve the two official research groups at the IBB-CSIC-ICUB, which are described in the CSIC Strategic Plan for the 2014-2017 period. The third is a specific research line of the IBB-CSIC-ICUB that is sponsored by the *Barcelona City Council*.

Biodiversity

Plant systematics, evolution, biogeography, cytogenetics and conservation

- *Systematic and molecular studies of different taxonomic groups* (mainly Compositae, Campanulaceae, Geraniaceae, Plantaginaceae, Capparidaceae, Cupressaceae and Pinaceae), development of dated phylogenetic trees dating and analysis of their diversification rates.
- *Study of the evolutionary traits* of interest in the biology of each group and adaptation and coevolution processes with their pollinators. *Biometric studies* of functional traits in plants native to extreme environments.
- *Analysis of biogeography* using methods of diversification-extinction-cladogenesis or vicariance and dispersal.
- *Identification of areas of biodiversity concentration* ("hotspots") and possible shelters and study of ecological and climatic factors that may have influenced their distribution using *niche modelling* with past, present and future climate layers.
- *Analyses of phylogeography, genotyping, neutrality tests and effective population size* to determine the recent history of each of these groups.
- *Study of the role of hybridisation* in the evolution and genesis of new species.
- Study of the origin and settlement patterns of *invasive* species.
- *Study of demographics and genetics in groups subject to various threats* (especially in species listed in the Red Books). Analysis of the genetic variability and its structure in those species. Proposal of conservation measures and criteria to preserve the genetic and

functional variability of different endangered species (prioritisation of populations, seed and germplasm banks, etc.) Development of management, conservation and recovery plans.

- *Palynology.* Study of the morphology of pollen grains by light microscopy to determine their size, scanning electron microscope to determine their ornamentation and transmission electron microscopy to determine their exine ultrastructure.
- *Cariology.* Performance of chromosome counts and establishment of basic chromosome numbers for different plant taxa.
- *Molecular cytogenetics*, which is a natural extension of classical cariology. Conduct banding techniques with fluorochromes, fluorescent *in situ* hybridisation (FISH) and staining of nucleolar organiser regions (NORs). Develop new research aimed at studying the structure and origin of ribosomal DNA and telomeric regions in different groups of plants. Update the chromosomal DNA database, and study the role of transposable elements (TEs) in the evolution of plant genome by NGS.
- *Genome size.* Quantify the nuclear DNA of the species under study.
- Update databases to reflect the amount of nuclear DNA (www.asteraceaegenomesize.com) and ribosomal DNA (www.plantrdnadatabase.com) in the Compositae family so that the data can be analysed and general patterns of evolution can be established.

Ethnobotany

Ethnobotanical study of the Catalan-speaking territories and comparison with other Iberian and Mediterranean territories, which includes the following topics of interest:

- *Study of ethnobotany*. Contribute to the inventory of a relevant aspect of the cultural and natural heritage, which constitutes one of the stages of bioprospecting or researching the methods of using and managing biodiversity.
- *Study of agroecosystems, particularly in home gardens.* Study of the ecosystems that are shaped by farming activities and constitute a reservoir of cultivated and wild diversity and management practices and knowledge.
- *Study of wild edible plants*. Study of wild edible plants and plants considered minor/local crops to determine how they are currently used and how both consumption and the perception of these plants have changed over time in the population.
- *Phytonimy.* Collection of different Catalan names of plants and study of their variety, geographical distribution, originality and ethnobotanical significance.

Palynology and Paleoecology

- Reconstructing the temporal dynamics of ecosystems and analysing the possible causes.

- Studying biotic responses to past climate change.
- Assessing the potential impact of future climate change and suggesting conservation strategies.
- Analysing the influence of human activities (deforestation, fire, agriculture, etc.) on biotic communities and landscape through history.
- Contributing to the knowledge of the origin of current biodiversity and its biogeographic patterns.
- Clarifying the processes responsible for the configuration of existing communities.
- Promoting the use of Palynology and Paleoecology in botanical and ecological studies as well as in conservation biology.
- Analysing the relationships between science and society.

The History of Botany

Survey of the historical herbaria of the IBB-CSIC-ICUB (vascular plants) from the following perspectives:

- *Taxonomic*. Search of characteristic herbarium specimens and specimens of taxonomic and/or nomenclatural interest.
- *Geographic*. Statistical study of the different regions of specimen collections.
- *Conservation.* Study of the specimens collected in locations where they are currently extinct or in decline.
- *Gardening* Study of cultivated plants in antiquity and tracking the introduction of alien species, which are still preserved in herbaria as remnants.

Publicise the value of the IBB-CSIC-ICUB historical herbaria as a control for the comparison and classification of taxa as examples of possible extinctions as a result of climate change and for dating of the introduction of alien plants in our country.

ESTABLISHED RESEARCH GROUPS

In 2013, researchers from the IBB-CSIC-ICUB joined two established research groups recognised by the *Agency for Management of University Issues and Research* (AGAUR) of the *Generalitat of Catalonia* for 2009-2013. These groups are the "*Research Group on Plant Biodiversity and Biosystematics"* (GReB) and the "*Landscape and Paleoenvironmental Research Group of the Mediterranean Mountain*."

Plant Biodiversity and Biosystematics (GReB)

Composition

The *Research Group on Plant Biodiversity and Biosystematics* (GReB) brings together researchers belonging to three institutions:

Autonomous University of Barcelona

- *Botany Unit of the Department of Animal Biology, Plant Biology and Ecology, School of Biosciences*

University of Barcelona

- *Botany Unit of the Department of Natural Products, Plant Biology/Edaphology, School of Pharmacy*
- *Botany Unit of the Department of Plant Biology, School of Biology*
- *Department of Physical Geography, School of Geography and History*
- *Department of Ecology, School of Biology*

Botanical Institute of Barcelona

Objectives

- Study the plant biodiversity of the western Mediterranean, define and catalogue plant biodiversity, and establish a scientific basis for the proper management of natural resources.
- Analyse the evolutionary mechanisms that originate the current diversity of plants by cytogenetic, biosystematic, systematic, molecular phylogeny and population biology studies.
- Study conservation biology applied to threatened, endangered, endemic or rare species in Catalonia and the western Mediterranean.

- Study the causes of current biodiversity in the Neotropics, including the origin, evolution and conservation of biodiversity.

Principal Investigators: J. Molero (*University of Barcelona*) and **J. Vallès**. IBB-CSIC-ICUB senior participants: **M. Alarcón, J.J. Aldasoro, N. Garcia Jacas**, **S. García**, **T. Garnatje**, **N. Ibáñez**, **J. Martin**, **V. Rull**, **A. Susanna**, **R. Vilatersana**, **T. Vegas**.

Landscape and Paleoenvironment of the Mediterranean Mountain

Composition

The *Landscape and Paleoenvironmental Research Group of the Mediterranean Mountain* consists of researchers from the following institutions:

University of Barcelona
- *Department of Physical Geography*
- *Service of Landscape Management*

Complutense University of Madrid
- Department of Physical Geography

University of Extremadura
- Department of Graphic Expression

University of León
- Department of Physical Geography

University of Lisbon
- *Centre of Geographical Studies*

Botanical Institute of Barcelona

Objectives

Analyse and determine the landscape evolutionary changes since the Quaternary, changes in recent times and current dynamics with an emphasis on the eastern Pyrenees, Sierra Nevada and the island of El Hierro organised around the following main lines of study:

- Geomorphology of cold environments (glaciation and periglaciation)
- Geomorphological mapping
- Paleoenvironmental landscape reconstruction
- Chronology of Quaternary and Holocene events
- Historical glaciation: Little Ice Age
- Current dynamics and morphogenic processes in cold environments
- Behaviour of current climate on natural systems
- Landscape historical evolution from natural and documentary records
- Landscape and vegetation dynamics, including biodiversity
- Asset value of the landscape

Principal Investigator: A. Gómez (*University of Barcelona*). IBB-CSIC-ICUB participant: **A. Romo**.

SERVICE UNITS

To maximise the transfer of technology to enterprises, research and teaching institutions and society in general, the IBB-CSIC-ICUB created two service units (PALAB Analytic and CERTIBB), which are designed to provide the technical knowledge and institute facilities for the immediate implementation of tasks required by those companies, institutions and people.

PALAB Analytic

The PALAB Analytic service unit was created in 2012 and began operations in 2013. This unit serves both scientific and public entities interested in the various applications of Palynology (Paleoecology, Archaeology, Biostratigraphy, Taxonomy, Melissopalynology, etc.). Initial PALAB Analytic services included analyses of honey (Melissopalynology) and are intended for any commercial sector (beekeepers, associations, cooperatives, packers, distributors, consumers, etc.) or individuals interested in the composition of honey, its botanical origin, organoleptic properties and type of recommended consumption based on these characteristics.

Types of analysis

- Basic physicochemical properties (pH, conductivity, % water, hydroxymethylfurfural (HMF), glucose-oxidase, diastase, etc.)
- Melissopalynology (normal and detailed)
- Analysis of royal jelly pollen, corbicular pollen, pollen bread, wax, propolis, bees, etc.
- Sensory advice (colour, aroma, taste, smell and consumption recommendations)
- Botanical and biogeographical advice (honey origin, location of apiaries, etc.)

In 2013, the PALAB Analytic website was built (http://www.ibb.bcn-csic.es/palabanalytic/) and advertising and outreach materials were developed. Several services have been performed for beekeepers, and informative talks on Melissopalynology and honey tasting workshops have been delivered.

Training and dissemination activities

- Five public workshops on honey tasting at the Botanic Garden of Barcelona. Instructor: **S. Garcés**

- Presentation on physicochemical analysis of honey and honey tasting. *Beekeepers Association of Barcelona and School of Agricultural Training of Manresa.* Instructor: **S. Garcés**
- Workshop on honey tasting at the *Bergabolet Fair*. Instructor: **S. Garcés**
- Introductory course in sensory analysis of honeys (30 hours) at the Agricultural Forestry Training School of Santa Coloma de Farners. Instructor: **S. Garcés**

CERTIBB

Following a proposal of the Scientific Board in 2013, the board of the institute approved the creation of the CERTIBB service unit, whose mission is to provide business enterprises and society a set of tools based on molecular techniques; this unit will offer the following services:

Identification and certification of species using DNA barcoding techniques, which allows for the detection and identification of the ingredients in a food or drug of plant origin and their proportions in different preparations as well as any sample of forestry, agriculture or environmental interest.

Analysis of species, varieties and populations by genotyping techniques, which are used to conduct studies aimed at obtaining rich lineages in compounds with applications in the health field and assessing the genetic characteristics of plant populations, races, varieties and lineages.

Consultations with regard to the evaluation, use and properties of plants for issues related to conservation and the environment (impacts of invasive species, population viability of endemic and/or threatened species, conservation strategies and environmental impact studies).

Training in the various techniques of genetic analysis with a basic research orientation (systematics, taxonomy, population biology, cytogenetics, ethnobotany, conservation, etc.) and applied research orientation (food, pharmaceutical and industrial sectors) aimed at companies and research centres.

Types of tests

- Extraction, amplification and DNA sequencing.
- Identification of amplified DNA fragments using barcoding techniques
- Search and development of molecular markers for genotyping, such as amplified fragment length polymorphism (AFLP) and simple sequence repeat (SSR)

- Creation of databases of DNA profiles

Possible applications

- Identification of plants for medicinal, food, industrial, agricultural or conservation purposes
- Characterisation of potentially productive cytotypes/genotypes (agriculture, forestry) or those that are more suitable for industrial applications
- Search for species or populations appropriate for bioprospecting related to medicine

Activities

- Proposal of a list of plants and their properties for the development of a commercial energy drink. IBB-Botany Lab CSIC-Associated Unit, UB.
- Analysis of vegetable contaminants in nasogastric tubes. IBB-Botany Lab CSIC-Associated Unit, UB.

IBB JOURNALS

Collectanea Botanica

The IBB publishes the annual scientific journal *Collectanea Botanica*, which accepts papers related to plant and fungal taxonomy and systematics and related fields, such as biogeography, bioinformatics, cytogenetics, conservation, ecophysiology, phylogeny, phylogeography, floristry, functional morphology and plant-animal nomenclature or relationships and includes synthesis and review studies. In 2013, *Collectanea Botanica* was officially included in the SCOPUS/Elsevier database.

In 2013, the editorial board of the journal consisted of the following people:

The magazine also has an international advisory council, consisting of the following people:

The contents of Volume 32 of the journal, for 2013, were as follows:

Postgraduate Courses

Paleoecology (CSIC official postgraduate course), 150 hours, 6 ECTS credits. Coordinator: **V. Rull**. Professors: **N. Cañellas Boltà**, **T. Vegas Vilarrúbia**, **Santiago Giralt** (*Institute of Earth Sciences Jaume Almera*-CSIC) and **V. Rull**. May 2013.

Other Courses

Training Techniques for Nature Guides (unofficial training course), 24 hours. *X Catalan Summer University of Natural Sciences and College of Biologists*. Professor: **A. Romo**. July 2013.

Tutorials

Gouja H. *PhD Student at Arid Regions Institute*, Tunis. Transferred for six months (March-August 2013). Tutors: **J Vallès** and **T. Garnatje**.

Parramón, C. J. Student at the *School of Pharmacy*, *University of Barcelona*. Laboratory practice (15 hours, April 2013). Tutors: **A. García-Fernández** and **T. Garnatje**.

Ren, M. X. Postdoctoral researcher of the *Wuhan Botanical Garden* (Chinese Academy of Sciences). Transferred for 16 months until completion of the following study: Molecular studies on *Centaurea* and *Staehelina*. Tutor: **R. Vilatersana**.

Roches, R. Predoctoral researcher at the *School of Biology*, University of Barcelona. Transferred for six months until completion of the following study: Using AFLP markers to study landscape genetics. Tutor: **R. Vilatersana**.

Salvia, M. Student at the *School of Pharmacy*, University of Barcelona. Tutoring Business Practice (Grade course). Tutor: **T. Garnatje**

Scotto, P. Student at the Lyceum of General and Technology Education (*LEGTA*). Toulouse-Auzeville, France. Technical work in the laboratory of Molecular Systematics of the IBB-CSIC-ICUB. Transferred for two months. Tutor: **N. Garcia Jacas**

Classes and Lectures

Class: *Local food and recovery of native plant species.* Specialisation Course: *Explore food*. *Barcelona Knowledge Campus* (*University of Barcelona* and *Polytechnic University of Catalonia*) *Universitat de Barcelona* y *Universitat Politècnica de Catalunya*. Berga, July 12, 2013, Professor: **T. Garnatje.**

Lecture: Phylogeography of *Canarina eminii,* explanation of the techniques and applications in certain crops. Master of Plant Biology and Biotechnology, *Autonomous University of Barcelona*. February 2013, Lecturer: **M. Alarcón**.

Lecture: *Conserving biological diversity*. Master of Terrestrial Ecology and Biodiversity Management, *Autonomous University of Barcelona*. October 2013, Lecturer: **M. Alarcón**.

Lecture: Evolution, Entropy and the Theory of Everything. Courses on Earth System Sciences, *School of Biology*, *University of Barcelona*. November 2013, Lecturer: **V. Rull**.

LIBRARY AND ARCHIVE

Introduction

The main event of the library during 2013 was the addition of a previously unknown part of the Salvador Collection that included more than two hundred books and numerous papers. It was incorporated in June 2013 to the Library of the Botanical Institute of Barcelona after its purchase by the Barcelona City Council.

The new collection required the implementation of a working plan, which included the establishment of a quarantine period, initial inventory of the books and cleaning and diagnosis of the books and documents. In addition, meetings were held to determine a methodology that would allow for the initiation of descriptions of the documents.

Together with the activities focused on the Salvador Collection, the library held its usual functions over the last year, including the following: selection and acquisition of new items, cataloguing, loaning, user support, etc. Regarding the technical work, microform cataloguing has restarted and the botanical drawings of Eugeni Sierra were inventoried. In addition, a review of the magazine collection was conducted to verify that the data contained in the automated CIRBIC catalogue corresponds to that of the actual collection.

In 2013, progress was made regarding the inventory and cataloguing of documents in the archive from Pius Font i Quer, which began in 2012. Another element of the work focused on the dissemination of documents from the archive that had been described and sorted; thus, two exhibitions were performed. With regard to user support, queries from the correspondence series were processed, and answers to those queries were used to create directories and scan documents at a high resolution. In the future, it is anticipated that the CIRBIC records will be linked to these digital resources.

Acquisitions

Acquisition type	Number
Purchase	73
Exchange	65
Donations	56
TOTAL	**194**

Loans and Reading Room Consultation

Type of loan	Number
Personal loans	125
Reading room consultation	1344
Interlibrary loans requested by researchers at the centre	213
Interlibrary loans sent to other centres	79
TOTAL	**1761**

New Users

During 2013, the library enrolled **8 new users**.

Technical Process

Library

- Inventorying botanical drawings by Eugeni Sierra
- Cataloguing new records incorporated with CIRBIC

Item	Number
Books	289
Microforms	178
Maps	1
Digital resources	7

TOTAL	475

Archive

- Participation in the design of the Collection Classification Table for CSIC Centres, 1940-1980
- Processing of documents

Pius Font i Quer documents, 2013	Number of document groups	Number of pages	Number of boxes
Identification, groups, classification	906	14,210	20
Inventory	310	3,229	5

Digital CSIC

One hundred and thirty-four new records corresponding to papers published by researchers from the IBB-CSIC-ICUB were included in the repository.

Reference Service and Information Search

The library and archive processed 29 external queries, some of which required specific information to be developed and documents to be scanned.

Conservation and Restoration

- Restoration of the **78 maps** composing the factitious atlas attributed to *Nicolao Visscher* from the Salvador Collection. Participants: B2 Study.
- Meeting with technicians from the Photographic Archive of Barcelona for advice on the cleaning, conservation, and management process of the collection of photographs of Pius Font i Quer.
- Relocation of the slide collection to cases and standard boxes to ensure their conservation.

Salvador Collection

- Transferral of new acquisitions of the Salvador Collection from Vilafranca del Penedès to IBB-CSIC-ICUB
- Monitoring of the quarantine period of newly acquired books and documents
- Provisional transfer of books from the Salvador Library to the Repository to facilitate air conditioning works in the Salvador Room
- Formation of the working team to plan the inventory process of documents
- Performance of an internal inventory of the new books

Dissemination

- Collaboration with teachers of the *School of Biology* of the *University of Barcelona*. Document processing and production of exhibitions "*The Work of John Cadevall in the Centenary of Flora of Catalonia" at the Institute of Catalan Studies* (June 2013) and the Athenaeum *of Terrassa* (December 2013)
- *Online* publications:

Barros, K. 2013. *The Botanical Institute of Barcelona completes the Salvador Collection.* http://bibliotecas.csic.es/historico-2013/-/contenido/19277f1b-b55b-4c90-a8a7-f0bffa450d65

Barros, K. 2013. *The Historical Archive of the Botanical Institute of Barcelona* [Presentation prepared for the meeting of heads of libraries at the CSIC in Catalonia in March 2013]. http://digital.csic.es/bitstream/10261/72128/1/Presentaci%C3%B3n_archivoIBB.pdf

Pinto, M. 2013. *Her flowers*. http://www.her-flowers.com/2013/07/08/along-the-way/

Image Digitisation

- Digitisation of botanical drawings of Suzanne Davit for the calendar of the Association of Friends of the Botanic Garden: 64
- Digitisation of 18 letters from Brother Elias to Carlos Pau
- Digitisation of 1 letter from Jose Arechavaleta and Balpardo that was addressed to Carlos Pau
- Digitisation of 1 drawing of Eugeni Sierra

Courses and Conferences

- Basic Online Access 2010 course taught online from May 13 to June 24, 2013 by the Training Cabinet of CSIC
- Adobe Illustrator CS5 taught online from September 30th. to November 4th, 2013 by the Training Cabinet of CSIC
- Participation in the "*I Meeting of technicians of collections of the Museum of Natural Sciences*" organised by the *Natural Science Museum of Barcelona* on October 15, 2013

PLANT COLLECTIONS (HERBARIA)

Introduction

The main objective for this year in the herbarium has been to continue computerising the collection of specimens with the usual program (HERBAR). A total of 11,965 records have been computerised, and this has been possible thanks to the hiring of two documentarians; one was hired by an outside company (DOC6) and another was hired with the "Technical Support Personnel" program of the Ministry of Economy and Competitiveness. The primary collections that have been processed have been the general herbarium, lichenotheca, Pius Font i Quer collection and Trèmols herbarium.

The work performed includes computerisation, assembling the specimens (if this has not already been performed), merging the specimens in the herbarium, updating and computerising the taxonomy file and high-resolution scanning of the specimens of taxonomic interest such as type species. These images are searchable from the GBIF (*Global Biodiversity Information Facility*) and AHIM (Association of Ibero-Macaronesian Herbaria) websites.

Regarding the Salvador Collection, the comprehensive inventory of the specimens has continued in addition to the application of improvements for the specimens' preventive conservation. Moreover, new material has been added to the collection this year, and they are being entered into the inventory and preserved. The documentation and restoration of this collection was presented at the Congress of the Spanish Society of Natural History.

In addition, three scientific studies are being conducted: one focuses on the Trèmols herbarium and Hieraciotheca, another focuses on the general herbarium collection, and the final study is a European project to complete a Floristic Atlas of the Pyrenees. This work has produced results that have been published in journals or presented at conferences.

Acquisitions

Origin	Acquisition type	Description	Recorded units	Elements
Amanda Ward, Agriculture and Agri-Food Canada Vascular Plant Herbarium	Donation	Vascular plants (1 lot)	107	108

Carlos Gómez	Donation	Vascular plants (2 lots)	2	2
Esteve Llop (UB)	Donation	Lichens (1 lot)	430	145***
Hilari Álvarez Vázquez	Donation	Vascular plants of Catalonia (3 lots)	14	14
Ignasi Soriano	Donation	Vascular plant (1 lot)	1	1
Ismael Sánchez-Jiménez	Donation	Vascular plants of the donor's thesis (1 lot)	117	117
Jaime Gil Gonzalez	Donation	Vascular plant (1 lot)	1	1
Cordoba Botanical Garden	Donation	2 types of vascular plants (1 lot)	2	2
Jaume Morera	Donation	Algae (1 lot)	-	3*
Joan Teruel Esmel	Donation	Collection of trunks for the Xylotheca (1 lot)	48	48
Joaquim Vives Estil·les	Donation	Vascular plants (1 lot)	2	2
Josep Nuet Badia	Donation	Vascular plants (1 lot)	175	175
Juan José Aldasoro	Donation	Vascular plants of Ethiopia (1 lot)	-	3**
Julià Molero, UB	Donation	Vascular plants (1 lot)	2	2
Lorena Uriarte, Aranzadi Science Society	Donation	Vascular plants of Navarra (1 lot)	2	2
Museum of Natural Sciences of Álava (VIT)	Exchange	Duplicates of the VIT herbarium of vascular plants (1 lot)	100	100
National Botanic Garden of Belgium	Donation	Vascular plants of the Ripoll river (1 lot)	-**	10
Noemí Montes	Donation	Vascular plants of Morocco and Menorca (1 lot)	11	11
Pedro Pablo Ferrer Gallego, Valencia Experimental Research Centre Generalitat of Valencia	Donation	Specimens of vascular plants (4 lots)	6	6
Pere Barnola	Donation	Vascular plants of Catalonia (1 lot)	7	7
Personal Herbarium BC (Diana Muñiz)	Harvest	Lichenothecas prepared in 2013 from the Herbarium BC (1 items)	25	20***

Personal Herbarium BC (Neus Nualart y Noemí Montes)	Harvest	Vascular plant collections prepared in 2013 from the Herbarium BC (2 lots)	93	93
Personal JBB (David Bertran, Miriam Aixart y Samuel Pyke)	Donation	JBB staff collections of vascular plants (9 items)	237**	243
Personal JBB (Samuel Pyke)	Donation	Seeds for the spermatheca of Umbelliferae (2 lots)	7	7
Personal JBB (Samuel Pyke)	Donation	Plants grown for the JBB collection (2 lots)	144**	193
Personal JBB (Samuel Pyke)	Donation	Mosses of Wales (1 lot)	-	5*
Teresa Garnatje Roca	Donation	Vascular plants (3 lots)	43	43
Trini Prunera	Donation	Lichens (3 lots)	6	6
Trini Prunera	Donation	Vascular plant from Serra del Cadi (1 lot)	1	1
University of Lisbon	Exchange	Exsiccata AHIM Vascular plants (1 lot)	107	107
Vienna herbarium (W)	Exchange	Duplicates of Vienna Vascular plants (1 lot)	163	163
TOTAL			**1,853**	**1,640**

* Algae and mosses have not been recorded because of lack of a protocol.
** Lots that arrived in late December have not been recorded.
*** In the case of lichens, more than one taxon can be found in the same sample, so there is more than one record.

Documentation

Group	Collection	Number of units recorded this year	Number of total units recorded	Total volume	Percentage
General	General herbarium	7,620	59,938	?	?
Historical	Bernades	-	814	814	100%
	Cadevall	-	8,242	8,242	100%
	Costa	1	1	15,000	0.00%

	F.X. Bolòs	-	-	6,000	-
	Hieraciotheca	2,009	2,091	2,091	100%
	ICHN	-	1,202	1,202	100%
	R. Bolòs	-	-	6,000	-
	Ruiz and Pavon	-	695	695	100%
	Salvador	667	4,692	4,692	100%
	SBB	-	1,211	1,211	100%
	Sennen	338	769	85,000	0.90%
	Trèmols	139	3,733	9,000	41.48%
	Vayreda	1	11	30,000	0.04%
Others	Cuatrecasas	-	415	3,900	10.64%
	Spermatheca	7	510	510	100%
	Botanical Garden	144	2,259	2,259	100%
	Xylotheca	145	145	145	100%
Cryptogamy	Algae	39	39	1,000	3.90%
	Mosses	6	6	7,000	0.09%
	Fungi	-	-	3,000	-
	Lichens - Calicials	-	199	199	100%
	Lichenotheca	845	1,796	3,000	59.87%
	Werner Lichenotheca	3	3	3,200	0.09%
TOTAL		**11,965**	**88,776**	**800,000**	**Approx. 11%**

Computerisation of the taxonomy file

Collection	**Number of records**	
	Current year	**Total**
General herbarium	1,935	31,314

Image digitisation

Collection	**Number of images**	
	Year	**Total**
General herbarium	377	2,909

Historical collection	121	1,160
Cryptogamy (lichens, mosses and fungi)	36	157
TOTAL	**534**	**4,226**

Publication of databases on the Internet

Collection	Name of the Web Portal	Number of published records
General herbarium	GBIF (http://www.gbif.org)	59,580
Historical collection (Cadevall, Cuatrecasas, ICHN, Ruiz and Pavón, Trèmols, SBB, Sennen and Vayreda)	GBIF (http://www.gbif.org)	15,675
Lichenotheca	GBIF (http://www.gbif.org)	1,998
Specimens from Africa and America (from different collections)	JSTOR (http://plants.jstor.org)	1,426
Digitised specimens (various collections)	GBIF-images (http://www.gbif.es/Imagenes.php)	2,870
TOTAL		**81,549***

*The total number includes repeated specimens because the same specimen can be available on different websites.

Specimen Preparation

Preparation type	Number of elements
Specimen preparation	3,045
TOTAL	**3,045**

Documentation Projects

Project Name	Herbarium documentation
Participants	One person hired by DOC6 for 12 months (Diana Muñiz)

Objectives	Herbarium computerisation
Results	6,166 specimens of vascular plants and 845 computerised lichens
Financing	CMCNB (€ 64,800)

Project name	Documentation of the Pius Font i Quer collection
Participants	One person hired by the CSIC for 12 months (Noemí Montes)
Objectives	Computerisation of specimens from the Pius Font i Quer collection
Results	1,707 computerised specimens/81 specimens for duplicates/82 selected specimens/1,657 checked tags/1 specimen type located
Financing	Co-financing the "Subprogram of Technical Support Personnel (PTA)" project of the Ministry of Economy and Competitiveness (€ 16,380)/CMCNB

Project name	Study of the Tremols collection and Hieraciotheca
Participants	One associate (Laura Gavioli)
Objectives	Computerisation and classification of the Tremols collection and Hieraciotheca
Results	139 computerised specimens/236 selected specimens/162 checked locations/neutral paper change in the specimens of 49 boxes
Financing	-

Project name	Preventive conservation, restoration and inventory of the Salvador Collection
Participants	Two self-employed personnel (Josep Aurell y Natalia Hervàs)
Objectives	Inventory of the Salvador Collection and conservation improvement
Results	2,924 new records/296 tags not associated with any element/2,715 taxonomy revisions/3,541 photos/implementation of improvements in preventive conservation/restoration of glass jars/cleaning of 67 herbarium specimens
Financing	CMCNB (€ 48.3500)

Scientific Use of Collections

Email consultations

	Number of consultations	Number of consulted items
Data requests	10	Data sent from 257 specimens
Requests for images	23	Images sent: 75

Scientific inquiries in person

There have been a total of 32 visits in person as detailed below:

Researcher	Centre/University	Genres viewed
Aaron Perez and Arnau Mercadé	University of Barcelona	*Juncus*
Albert Hill	-	Sennen Collection
Andrés Valverde Martínez	-	*Conyza*, *Sernera*
Andrés Valverde Valera	-	*Scrophularia*
Àngel M. Hernández	-	*Crepis*, *Sideritis*
Carme Pedrol	-	*Acacia*
Empar Carrillo and Josep M. Ninot	University of Barcelona	*Potamogeton*, *Salix*
Esteve Llop (2 visits)	-	Lichens
Eva Lopez	Higher School of Restoration	Xylotheca
Ignasi Soriano (6 visits)	University of Barcelona	Various genus
Jaime Güemes (2 visits)	Valencia Botanical Gardens	Various genus
Javier López	Autonomous University of Barcelona	*Rhaponticum*
Jesús Málvarez	Laboratory of Alpine Ecology Grenoble	Espeletia
Josep Nuet	-	*Gentiana*, *Alopecurus*,...
Josep Vigo	University of Barcelona	*Salix*, *Najas*
Llorenç Sáez (3 visits)	Autonomous University of Barcelona	Various genus
M. Lluisa González	Aragon Research Centre	*Asparagus*
Marta Fernandes	-	Collection Cadevall

Quentin	National Botanic Garden Meise, Belgium	-
Silvia Venturi	Federal University of Santa Catarina. Brasil	Various genus
Vanessa Rodríguez	University of Córdoba	*Centaurea*

Scientific exchanges

Scientists have made 12 scientific loans sending a total of 2,133 specimens. These loans are listed below:

Researcher	Centre/University	Project	Number of specimens	Departure-return dates
Anna Guttova	Collection of Cryptogams. Institute of Botany. Slovak Academy of Sciences	-	3	10/10/2013 -
Chiara Nepi	Herbarium. Museum of Natural History	-	26	04/23/2013 - 06/06/2013
COA conservative	Herbarium. Cordoba Botanical Garden. University of Cordoba	*Iberian Flora*	15	31/01/2013 -
F. J. Salgueiro	Herbarium General Service. School of Biology	*Iberian Flora*	600	03/06/2013 - 09/19/2013
F. J. Salgueiro	Herbarium General Service. School of Biology	*Iberian Flora*	605	04/24/2013 -
Fco. Javier Hernández García	Department of Plant Biology. Herbarium Service. Teaching laboratories. SALA herbarium	*Iberian Flora*	508	10/22/2013 -
Filip Verloove	National Botanic Garden of Belgium	-	5	07/25/2013 - 01/02/2014
Josefa López Martinez	Department of Plant Biology, Ecology and Earth Sciences. School of Science	*Iberian Flora*	349	11/29/2013 -
Manuel Crespo	Dept. of Environmental Sciences and Natural Resources. School of Science Phase III. Alicante University	-	15	01/31/2013 -
Marta Porillo	Department of Prehistory. School of Geography and History	-	1	06/27/2013 -

Marte Holten Jorgensen	Oslo Herbarium. Natural History Museum. University of Oslo	-	4	01/15/2013 -
Robert Rosselló	Valencia Botanical Gardens	-	2	04/17/2013 - 10/10/2013

Attendance and Participation in Conferences and Meetings

- Attendance the meeting at Bagneres de Luchon (France) on the "Floristic Atlas of the Pyrenees" (OPCC-POCTEFA) project on July 11, 2013.
- Attendance at the "*1st International Symposium-Workshop Conservation of Natural History Collections*" held in Hostalets de Pierola (Barcelona) from September 18 to 20, 2013.
- Participation in Bioprospecting Days in Alpens and Alguaire on May 22, 2013.
- Participation in Gathering Days of the Association of Ibero-Macaronesian Herbaria 2013 in Huesca and Navarra from June 11 to June 14, 2013.
- Participation in *Barcelona Bioblitz* on April19 and 20, 2013 in Horta's Labyrinth Park (Barcelona).
- Attendance at the annual meeting of l'AHIM at the Royal Botanic Gardens in Madrid on November 22, 2013.

Courses Held

- From the publication of data to the publication of scientific papers and "data papers." Course taught by the Coordination Unit of GBIF in Spain and Royal Botanic Gardens (CSIC) in Madrid; 18 hours, from March 19 to 21, 2013.
- Advanced Excel online. Online course taught by the CSIC; 40 hours, from September 23 to October 28, 2013.