

THE CDRS HERBARIUM, AN OLD NEW RESEARCH TOOL FOR GALÁPAGOS

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"Where can I find *Sisyrrinchium galapagense*?" "What is the variability of this particular species of *Scalesia*?" These are examples of common questions a herbarium curator is used to hearing. Many of the answers can be found affixed to the piles of paper stored in the shelves of this dark, strange-smelling room.

Many institutions have herbaria, but with the development of more highly technological sciences, their utility has recently been questioned. Are they necessary? Aren't they old remnants of another era of science, when Linnaeus and subsequent taxonomists were frequently describing new species?

Yes they are, and no they are not. We are again appreciating herbaria, collections and museums, realizing that our environment is changing rapidly and that these collections are often the only accurate "memories" that remain. Many fascinating studies on evolution and ecology were made measuring skulls in a museum or counting the stomatal density on centuries-old leaves taken from a herbarium (e.g., Penuelas & Matamala 1990). There is a qualification for the success of these "memories", they have to be representative, complete, kept in good condition, and easily available. Otherwise, the potential user will find more frustration than success and will join the army of detractors of collections of specimens.

The Herbarium of the Charles Darwin Research Station (CDRS) has gone through all these high and low stages and successive reports in the files of the Botany Department are witness to the difficulties of maintaining a good herbarium at the CDRS. However, since 1994 major efforts have been made to rehabilitate what is, in fact, the largest collection of specimens of Galápagos plants in the world.

In 1993, Eugene Moll remarked on the state of the herbarium in a report to the CDRS, "...it was not too good then [in 1990], and it is much worse now. In fact, it is a disgrace". We are pleased to announce that Eugene's comments were taken seriously and we wish he could return to see the results. Many of the necessary improvements made were suggestions accumulated over the years by successive visitors and users of the Herbarium. The first step was moving the collections to the new Fisher Science Building (March 1994) where they were isolated in a dehumidified room where no sunlight could enter to damage the specimens (Figure 1). Computerizing the collection records began and Iván Aldáz was hired as a permanent staff member responsible for the collections (April 1994). That was followed by acquiring two new specimen cabinets (September 1994) and a computer (June 1995), installing an air conditioner (July 1995), and re-



Figure 1. Iván Aldáz in the climatically controlled collection room of the CDRS Herbarium.

cently changing the data-base to Access, more user-friendly than dBase IV. Moving the Herbarium was also a good change for the other Museum collections, which then expanded into the space vacated by the Herbarium, and are presently undergoing general improvements. In September of 1995 we began to collaborate with the Herbario Nacional de Ecuador for identifications (mainly of introduced species) and to exchange information and samples. Our Herbarium now deserves the international recognition it had since 1975, called CDS in the *Index Herbarium* (anonymous 1975).

In 1995, the main users of the Herbarium were Drs. Conley McMullen, Yoshikazu Shimizu, Syuzo Itow and David Porter, all of whom came to Galápagos as visiting scientists. Several identifications were provided in particular to the program studying the nutrition of tortoises at the CDRS. Two students (Gioconda Villacis from the Universidad Técnica de Ambato and Sabina Estupiñán from the Universidad Estatal de Guayaquil) volunteered in the Herbarium and assisted in studies of endemic plants. Later, Ondina Landázuri of the Universidad Central de Quito and at least six students from local Galápagos schools have worked in the Herbarium for their studies.

Table 1. The main contributors to the collections of the CDRS Herbarium.

Collectors	Samples
Henning Adersen	1,464
Charles Huttel	1,083
Jonas Lawesson	888
T. Loung	573

The data-base allows us to calculate a few statistics and point out interesting features of the collection. We have catalogued over 7,200 specimens and are growing quickly. The oldest specimen was collected by Peter Kramer in January 1963 it is a *Tribulus cistoides* from Isla Darwin (Culpepper). However, it is not sample #1 of the collection. CDRS #1 is a *Tournefortia pubescens* from Isla Santa Cruz collected by David Snow in February 1963 and was the first of a series of 300 samples. Ira Wiggins first collected plants in Galápagos in January 1964.

Henning Adersen collected from March 1973 to January 1985, from a *Scalesia villosa* on Isla Floreana to an *Opuntia helleri* on Isla Genovesa, and Charles Huttel from January 1984 to July 1992, from a *Peperomia petiolata* on Isla Santiago to a *Cyperus andersonii* on an small islet near Santa Fé (Table 1). Charles Huttel was the main contributor for small islets through his participation in Howard Snell's Biological Diversity Program. A total of 84 collectors have provided samples to the Herbarium and some of these collectors include non-botanists and non-scientists.

Of course, not all the collections made in Galápagos are housed at the CDRS. Botanists began to collect in the 19th century (Porter 1822, Petit Thouars 1841, Hooker 1847) and these early collections are spread all around the world (California Academy of Sciences, Cambridge, etc.). Even more recently, some scientists have preferred to send their collections abroad. We only have twelve samples by Uno Eliasson (one of them being very important since it is our only sample of *Linum cratericola*, a nearly extinct species), and only one collected by Henk van der Werff (in 1974). Many of these collections were deposited away from Galápagos because there was no assurance that specimens would be well maintained at the CDRS.

Two genera are very highly represented. *Scalesia* has 214 specimens, and *Alternanthera* 200. Both have many taxa and attract attention. The distribution of the samples per island underlines one of our most difficult problems, the disparities of sampling effort (Table 2).

The almost scandalous dominance of samples from Isla Santa Cruz is obvious. On Isla Isabela, we can observe the same differences with 85 samples from Volcán Cerro Azul vs. 505 from Volcán Sierra Negra (and 17 from Volcán

Table 2. Number of samples per island presently in the Darwin Station Herbarium.

Island	Samples
Darwin/Culpepper	14
Wolf/Wenman	28
Marchena	40
Genovesa	43
Santa Fé	91
Española	260
Floreana	329
Fernandina	372
Pinta	467
San Cristóbal	560
Santiago	623
Isabela	1,157
Santa Cruz	1,855

Ecuador). The small islands which were included in the Biological Diversity Project were systematically sampled and the numbers of specimens better reflect the biological diversity (e. g., Isla Darwin and Isla Wolf, or even Isla Gardner near Española with more samples than Isla Marchena). On the contrary, if Isla Pinta has more than ten times as many samples as Isla Marchena, it is probably because a botanist has worked there over many years (McMullen). This highlights a suggestion by Huttel in a CDRS report that will keep us busy for years to come, which is to identify the poorly sampled areas and ... go there!

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