



**EARTHWATCH<sup>®</sup>**  
**INSTITUTE**

**2009 FIELD REPORT**

**PLANTS AND PEOPLE THROUGH THE AGES: A STUDY OF PACIFIC ISLAND  
ETHNOBOTANY**

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Washington, DC

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USA

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Unknown

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## **SECTION ONE**

### **Non-technical overview of results**

At the end of 2009, there were almost 12,000 records assembled which represented approximately 2,250 plant species. More than 65% of these records reported native language common names. Less than one-quarter reported usage information. Clearly, we had not yet accumulated enough data to be able to report any substantive trend.

As we are pulling these data together, a process that will continue for at least two more years, we are expecting to impact our understanding of cultural plant usage in the following ways.

- As previously tight-knit indigenous communities become more diffuse, certain information regarding cultural plant usage, and language issues related to that, is being lost. As oral traditions break down and disappear, the only record we may have is that which is buried in the historical collections of herbaria worldwide.
- Certain combinations of plant species and cultural usage may never have been reported in the ethnographic literature. Study of these data, and an analysis of predictive relationships to other plant species, may provide an effective means of targeting research in this area.
- A massive extinction of minor languages is predicted in the next 50 years. Efforts are underway to address this problem and the data we can extract from historical collections that tie native common names to plant species will provide critical information in support of these efforts.
- By identifying those plant species that represent an item of critical importance, sustainability plans at both the local and global levels can be developed

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## **SECTION TWO: TECHNICAL RESULTS**

### **REPORTING ON RESEARCH OBJECTIVES**

#### **Objective 1**

Target Specimen Extraction

#### **Progress report on objective 1**

Prior to the arrival of the volunteer teams, staff of the United States National Herbarium, under the direction of PIs Rusty Russell and John Kress, identified certain groups of plants known to be useful plants in Pacific Island cultures and extracted those specimens from the herbarium that reported data defining the “intersection” between plants and people. These data included information on uses, preparations, common names, languages, culture names, and informants. Specimens were prepared for data entry.

Each volunteer group was divided into two teams. One team performed the extraction and specimen management. The strategy was to stay ahead of data entry by always maintaining a queue of about 400 specimens. Certain efficiencies in specimen handling that were developed during Year 1 (2006), and modified in Years 2 & 3, resulted in an improved rate of extraction and reduced the number of “problem plant names” that were encountered.

This, the final year of the project, required that we coordinate our extraction and databasing efforts to minimize the number of “left over” specimens i.e. that were extracted but now databased, imaged and refilled.

In 2009, we continued the broad canvassing of the collection in pursuit of Pacific Island ethnobotanical specimens and data. While initial extraction efforts targeted certain species known to represent useful plants as reported in the literature, our efforts in 2009 involved a meticulous crawl through the herbarium to search through all Pacific Island collections. The intention in this more comprehensive activity was to locate specimens whose label contained “intersections” that were less common, or even unknown (unreported) to modern Western scholars. This last distinction recognizes that a long history of knowledge exists within indigenous communities of the value of plant species, as well as a great body of Eastern scholarly literature on these subjects that is still “undiscovered”.

## **Objective 2**

Target Data Entry

### **Progress report on objective 2**

During the initial three years of the project, in our attempts to integrate volunteer data capture activities, our Information Technology staff continually improved the data entry application in an effort to simplify the process and reduce the inevitable error rate. Specific areas of concern were the interpretation of plant species names and their authors, as well as the complicated physical and political geography inherent in so many of the archipelago Nations of the Pacific. By providing a more standardized gazetteer for geography and an pre-approved checklist of species names and author abbreviations, we were able to improve the data capture rate in Years 2,3 & 4.

Approximately 350 specimens remained after the departure of the last team, and a student from Georgetown University is actively engaged in finishing the databasing of these materials.

2006: 2,456 specimen records 5 teams 27 Earthwatch participants

2007: 3,821 specimen records 7 teams 33 Earthwatch participants

2008: 3,486 specimen records 7 teams 29 Earthwatch participants

2009: 2,234 specimen records 5 teams 23 Earthwatch participants

Total: 11,997

## **Objective 3**

Imaging

### **Progress report on objective 3**

In early 2000, the Department of Botany obtained seed money from the Assistant Secretary for Science, and set up a high-end digital photography studio. Only two other plant collections in the World (at that time) had such a facility. Over the past 10 years we have created more than 250,000 high resolution digital images of herbarium specimens for a wide variety of projects. In the first year of our Earthwatch project, we had decided to digitally image selected specimens as representatives of the different species which we were recording. In the second year (2007) we made the decision to digitally image every specimen which we databased. Once each specimen was entered into the computer, it went to the Digital Imaging Lab where Ingrid Lin,

the project's staff photographer, created a high resolution image. Once each specimen returned from being imaged, it was staged for reincorporation into the herbarium

2006 = 1245 imaged

2007 = 3720 imaged

2008 = 3587 imaged

2009 = 2841 imaged

A total of 11,393 plant specimens have been digitally imaged for this project.

#### **Objective 4**

Refiling of Collections

#### **Progress report on objective 4**

A critical aspect of the project from a collections management standpoint is that all the specimens which were removed from the herbarium are returned to the precise location from which they were extracted. In this way, there is synchrony between the database and the physical arrangement of specimens in the herbarium. Therefore, part of each team's responsibility has been to organize specimens that have been imaged and re-insert them in the collection. Actual counts were not maintained for the task of re-filing, but there were never more than about 400 specimens to be resolved at the end of any team. By the end of 2009, less than 50 specimens remained to be filed.

### **PROJECT DEVELOPMENT**

During the first year of the project, we targeted certain plant species by using publications that reported plant species usage. Entering 2007, we began a more comprehensive approach, and started canvassing our entire holdings from the Pacific Islands. Earthwatch participants were assigned a plant family, for example *Myristicaceae* (nutmeg family of the magnolia order), and carefully browsed all material stored in that family, extracting target specimens from the Pacific. This proved to be a more complete extraction strategy and began to turn up a higher percentage of uncommon or unreported information. In the final year, we were effectively squeezing the last bit of juice from the orange, but also turning up highly interesting "intersections" of plants and people.

Another development (improvement) in the project in 2007 was that we spent time to modify and improve the database client that was being used to enter data by Earthwatch participants. It was clear after the first year, and with feedback from volunteers, that some changes were needed to improve both throughput and consistency. Members of the Smithsonian staff developed a new MS Access client that allowed data enterers to select from lists and to populate upwards where hierarchies, such as geography, existed. During the final year of the project, we encountered the fewest number and lowest average of database problems than in any previous year.

### **CAPACITY DEVELOPMENT AND EDUCATION**

#### **Educational Opportunities**

- In 2007, our primary focus with respect to education was to involve graduate and undergraduate students in a variety of ways. Three undergraduate students, Ashlei Cooke (William & Mary), Cris Salas (Eastern Kentucky) and Carolyn Porrata (Texas), were accepted into the Intern Program and directly participated in project activities alongside Earthwatch volunteers. This dynamic proved very successful. Also during this period, graduate student Emily Gilmore (Georgetown) began the painstaking effort

to apply an international standard for coding plant uses to the data we had collected up to that point.

- In 2008, we broadened our attention to include the language data we were collecting. A graduate student from the University of Alberta, Katy Dimmer, arrived to work on this project for four months. Katy was one of five students accepted by the Smithsonian under a recently established program in which the Province of Alberta provides funding for interns to participate in SI research programs. We also added an undergraduate linguistics student from the University of Maryland, Aaron Freeman, to the summer teams.
- In 2009, we incorporated another Georgetown student into the project. Jenny Datiles continued the task of coding plant uses using the international standard developed by Frances Cook at the Royal Botanic Gardens, Kew.
- The impact and results of student participation in this project are reported in the Non-Technical Results Summary, above.

## **ANYTHING ELSE?**

### **Process and objectives**

The underlying goal of this project is to demonstrate that there is valuable information to be obtained by canvassing the extensive historical materials held in herbarium collections worldwide. More specifically, we have focussed on a specific kind of data (ethnological) and a circumscribed geographic area (Pacific Islands, including Malesia. Malesia includes the Malay Peninsula, Indonesia, the Philippines and New Guinea, and is based on a shared tropical flora derived mostly from Asia but also with numerous elements of the Antarctic flora). By assembling these data and comparing it to the existing domain of knowledge related to Pacific Island ethnobotany, we expect to reveal taxon-use combinations that have not been reported. In addition, by studying the information related to language, common name and culture, we expect to be able to enhance our knowledge of how languages have developed over time in certain island regions. The early years of this project, including the periods reported here, mostly involved the massive and rapid accumulation of data, with a modicum of data analysis and interpretation, also reported here.

The basic steps to acquire data are reported here and, to the extent that statistics were maintained, we have been able to report annual progress toward an estimated endpoint.