

ZAMORANO UNIVERSITY BOTANICAL GARDEN:  
ETHNOBOTANICAL USES AS A GUIDING FRAMEWORK FOR AN AGRICULTURAL  
UNIVERSITY'S BOTANICAL COLLECTION

by

BENJAMIN PROULX

(Under the Direction of John [Jack] Crowley)

ABSTRACT

This thesis conducts preliminary research to inform stakeholders with the necessary information to begin a collaborative master planning process for the Zamorano Botanical Garden, one of Central America's potentially most influential botanical gardens. This work includes identifying locations for botanical garden facilities and reviewing existing plant collections and their locations on Zamorano University's campus grounds located outside Tegucigalpa, Honduras. Plants' ethnobotanical uses, conservation status, and taxonomy are researched to identify potential opportunities and proposals on how to organize garden collections and which collections to add or increase. Preliminary site analysis is also conducted to identify a potential space within campus grounds for the dedicated use as a publicly accessible botanical garden. The comprehensive methodology for this work includes literature review, historic background research, case studies, site visits, interviews with project stakeholders, the collection and categorization of plants databases and the use of landscape site analysis and conceptual design strategies.

INDEX WORDS: Botanical Garden, Conservation, Ethnobotany, Master Planning

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BS, Brigham Young University, 2017

A Thesis Submitted to the Graduate Faculty of The University of Georgia in Partial Fulfillment  
of the Requirements for the Degree

MASTER OF LANDSCAPE ARCHITECTURE

ATHENS, GEORGIA

2021

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May 2021

## DEDICATION

To my wife Brittany, and my son Anderson, who are the source of my greatest joy. Also, to my mother, who helped inspire and shape my many passions, especially my love of plants and gardening.

## ACKNOWLEDGEMENTS

A special thanks to Professor Jack Crowley, who has been a great teacher, mentor and friend during my time at the University of Georgia. Thank you for the support, kind words and for providing a wide array of enriching learning opportunities both on campus and abroad.

I would also like to acknowledge and thank my undergraduate professors, Dr. Phil Allen, Dr. Greg Jolley and Dr. Mikel Stevens, whose mentorship while at Brigham Young University instilled confidence in me, inspired me to study landscape architecture and who taught me the joy of plant science.

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## CHAPTER 1

### INTRODUCTION

#### **Background**

I first learned about the Zamorano Pan-American Agricultural School (commonly called Zamorano University) from Professor Jack Crowley, who began serving on the school's Board of Trustees approximately twenty years ago. Having traveled and lived abroad in Latin America myself, I had expressed my interest to Jack to pursue academic opportunities in Central America, including the chance to support some of his ongoing work at Zamorano, located outside Tegucigalpa, Honduras.

Through this connection, I was gradually introduced to various members of the university faculty and board. I learned that in 2018, a committee of faculty, staff, and administrative stakeholders convened to address questions regarding the status, mission, and future planning of the Zamorano Botanical Garden. Although the campus grounds are referred to as a botanical garden, questions remained about what it truly means to be a "botanical garden" and what efforts are still needed to formalize this institution's status.

To understand why this question posed such a dilemma, it is necessary to know the school's original roots. In 1942, Sam Zemurray, the president of the United Fruit Company founded Zamorano University when he employed the agricultural explorer Wilson Popenoe to find the locate for, construct and be the first director for what would become one of the most successful agricultural schools in the tropics (Malo 1999, 130-145). Popenoe's prior experience running the Lancetilla Experiment Station in Northern Honduras for the United Fruit Company

prepared him for this new opportunity. While Sam Zemurray never formally wrote down his philosophy for the school, several documented conversations show that he shared a similar vision with Popenoe (Malo 1999; Rosengarten 1999). This vision was for the school to provide hands-on training with a “learning by doing” approach for Latin American students with a strong desire for self-improvement who had no means of obtaining a good agricultural education on their own (Malo 1999, 578; Rosengarten 1991, 147). In October of 1941, Popenoe detailed his vision for the institution...

*“It will be another Lancetilla on a glorified scale, for we shall build up collections of economic plants as well as a school... It will probably be the last piece of major tropical development work I will undertake, for the years are rolling by, and I believe we can make something good of it. A combined school and experiment station, I hope.”* (Malo 1999, 153)

On October 12, 1944, the school formally opened with roughly one hundred forty students (Rosengarten 1991, 137). Years later in 1999, Simón E. Malo, Zamorano alumni and University Director from 1979 to 1992 reflected on the many accomplishments since the school started, stating...

*“I am satisfied that the institution has had a deep impact on the production of food and exports of coffee, cacao, rubber, African oil palm products, tropical fruits, vegetables, and more recently flowers and shrimp. I also believe that it's significant impact on the area has been disproportionate to its size and total numbers of graduates.*

*The School has not only been a force of innovation but also an example of learning-by-doing, demonstrating the hands-on approach to agricultural efficiency and education presenting the advantages as well as the unpleasant dilemmas of practical farming in a heightened and clarified form... I believe that Sam Zemurray would be highly pleased to know that his funds and inspiration to help the small farmer in the tropics have paid such wonderful dividends. The human product of the little practical school that he started, with the assistance and dedication of Wilson Popenoe, has gone beyond their most ambitious dreams to levels that neither of these founders would have imagined in 1942."* (Malo 1999, 587).

Since it was founded, Zamorano's campus has also continued to develop and grow. By the beginning of 1971, it had grown to be able to accommodate two hundred twenty students (Malo 1999, 298). By the early 1990s this capacity had tripled to accommodate seven hundred students (Malo 199, 192). Today, Zamorano is home to over eighteen hundred students, faculty, and staff. The graduates of Zamorano have now collectively come from over thirty countries, representing most countries in the Caribbean, North, Central, and South America (Salgado et al. 2019, 37).

Campus planning and development continues under the guidance of Jack Crowley, who oversees the Board's Building and Grounds Committee, and works closely with Javier Madrid, the chief campus architect and construction manager who directs the office of campus architects. Much of their work has addressed the maintenance, upgrading, and renovating of facilities built between now and when the university first opened. Their work also includes the planning,

design, and construction of entirely new campus facilities, including some facilities of importance to the Botanical Garden as discussed in the following chapters.



*Figure 1.1: Aerial imagery of Zamorano's main campus. (Google Earth 2020)*

But the increase in buildings to the campus's current state (see Figure 1.1) and the growth in the student body were not the only developments happening on the campus. The number of plant specimens placed throughout the campus grounds had continually grown ever since the school's beginnings with some dating back to 1944 when Wilson Popenoe was the first director. The accumulation of many notable agricultural and ornamental plants throughout campus greatly contributes to the beauty and character of the campus as it is seen today. The endeavor to designate Zamorano's campus grounds as a botanical garden came out of the logical desire to

recognize what had already gradually grown into becoming one of the most highly diverse plant collections in Honduras or the larger region. These efforts began over a decade ago and since then Zamorano's Botanical Garden has been listed on Botanic Gardens Conservation International's (BGCI's) online database listing gardens around the world (BGCI 2021).

The primary stakeholders of this project include administrators, faculty, and staff of Zamorano University. Some of the stakeholders included Jeffrey Lansdale, Zamorano University President; Jack Crowley, member of the Board of Trustees and Chair of Building and Grounds; Marjorie Mayr, Zamorano graduate and spouse to Zamorano University President; Javier Madrid, Construction Manager and Director of Physical Plant and Services; Cinthya Martinez, Professor and Head of Ornamental and Propagation Unit; Francisco Javier Villamar, campus grounds maintenance supervisor as well as faculty such as Raul Soto, Associate Professor and Director of Agribusiness Management Department; Eric van den Berghe, Associate Professor; and Rina Fabiola Díaz, Instructor/Professor who were also involved in the recent development of additional greenhouses on campus. The Universities Board of Directors also oversee and approve many decisions and it is important to identify the role the students, visiting parents and alumni, other visitors, and the broader public, ranging in scale from the local neighboring community of Jicarito, to nearby residents of Tegucigalpa and beyond would have as potential visitors to the botanical garden. While not directly involved in the decision-making process regarding the project, the botanical garden would also have the potential to be serving the local community.

### **Research Question & Purpose**

The purpose of this research is to address some of the many preliminary questions that still exist regarding the botanical garden. These questions include:

- What is a botanical garden?
- How does Zamorano compare to nearby botanical gardens or other botanical gardens on the campuses of other Latin American universities?
- What and where are the plant collections and botanical garden facilities currently located on Zamorano's campus?
- What story do these plant collections tell?
- What potential organization is there to structure the plant collections?
- What areas pertain to the botanical garden?
- What publicly accessible space on campus can be devoted to future botanical garden facilities and plant collections?
- What potential opportunities are there from an increased understanding of the history and plant collection?

Answering these questions will be helpful for stakeholders to consider potential opportunities and constraints regarding questions surrounding the status, mission, and potential future of the botanical garden. It also provides some helpful information that would be necessary to understand before beginning any master planning design process for the institution. These questions and concerns were raised by stakeholders of the project including Cynthia Martinez while visiting the campus (Martinez and Villamar 2018), and Marjorie Mayr when she expressed the need for a strategic document and master plan with renderings help guide the vision and mission of the garden, as well as identify existing gardens, identify potential sites, opportunities and facilities (Mayr 2018).

These questions were on the front of stakeholders' minds as new facilities were being developed and plant collections being added to the campus grounds. These recent developments included improvements to the Simón E. Malo Arboretum and the construction of the Jorge Bueso Arias Orchidarium greenhouses to house a newly donated orchid collection. These projects were communicated by the University as improvements and additions to the Zamorano Botanical Garden but with the lack of a master plan or other strategic documents, there was little to reassure stakeholders that they were on the same page regarding what the next future developments for the botanical garden should be. The overarching mission of this work is to begin to provide some of the foundational information for stakeholders so they can continue to come together and discuss a shared vision of the potential opportunities, future growth, and design of the botanical garden.

Another concern raised by stakeholders was regarding the official status and current functionality of the botanical garden. For several years, there had been discussions on whether Zamorano's campus met the criteria for being considered a botanical garden. It was also important to consider whether Zamorano residents and campus visitors recognized the presence of the botanical garden within the context of the campus grounds. And questions remained whether visitors could easily navigate the plant collections and if that was best done via guided or self-guided tours. These concerns fit under the general questions regarding how to pull together the makings and components of a botanical garden into a formal institution recognized by those from within and outside the Zamorano community.

The overarching purpose of this work is to provide the foundational information for stakeholders to come together, consider the garden's and begin a master planning process. This

effort can not only create a shared vision for the institution but hopefully help transform it into one of the most important botanical gardens in the region.

## **Methodology**

A diverse methodological approach is used to address the broad set of previously identified research questions. A literature review was first conducted to understand the important terminology of botanical gardens, conservation, ethnobotany, and master planning. A case study method that has been adapted for landscape architecture (Francis 1999) was then used as a guide to conduct case studies for nearby and relevant botanical gardens. The criteria for which gardens were relevant to Zamorano included location proximity, similar academic campus context, and accreditation status. These case studies include information on the general background of each botanical garden, an inventory of garden facilities, plant collections, garden maps or designs, and other information found through Botanic Gardens Conservation International's database and from each institution's website.

Research was also conducted on identified plant species at Zamorano's Botanical Garden. Past student work on the plants on campus grounds was reviewed and all previous plant species lists were collected and combined to create a comprehensive database for as many identifiable plants on campus grounds. This list was then carefully reviewed and updated with the most correct and recent plant species name, authoritative author, and family using the International Plant Names Index (IPNI) and Kew Science Plant of the World Online database. Provide native origin (POWO 2021). This database was then expanded to include information on each plant's ethnobotanical uses, including edible and medicinal uses by researching several online databases of plant uses (POWO 2021; Fern 2019; Plants for a Future 2021; French, 2021).

This new database was then classified and sorted to create several plant lists including a list of all plants with known edible uses. The database was also used to propose an organizing structure for plant collections by sorting plants into shared identifying characteristics.

Information on the Zamorano Botanical Garden was also conducted through various methods. Historic research was conducted reviewing several biographical and autobiographical texts on the history of the university. This research focused on information regarding the plants present on the university's campus over the years as well as a chronological review of major events in the region that occurred before and after Zamorano's establishment.

Site visits (see Appendix A) and interviews with project stakeholders were also conducted during May of 2018 and May of 2019 (Martinez and Villamar 2018; Martinez, Sota and Leal 2019; Madrid 2019). Sketches and watercolors were created (see Appendix B), and field notes and site photos were taken while visiting the campus grounds and the plant collection locations. Interviews and communication with stakeholders including Cinthya Martinez, Francisco Javier Villamar, Marjorie Mayr, Javier Madrid, Jack Crowley, and others provided information regarding the botanical garden and ongoing campus planning efforts. This provided information on the current botanical garden facilities and plant collections and future potential facilities.

Common landscape architecture analysis and design methodologies were also used to identify a potential location and to create a concept design for the botanic garden. Preliminary site analysis was conducted not only with information gathered from site visits and interviews but by also reviewing past campus master planning documents including transportation plans, past campus guides and maps, campus master plans, and site concept designs. Current garden

and plant collection locations, security gates, site access, and site connectivity were also mapped in order to identify the most suitable location for a publicly accessible garden.

### **Challenges and Limitations**

Discussions regarding the presence and status of a botanical campus at Zamorano have been going on for over a decade, but it is important to note that few campus facilities have been developed for the sole purpose of the botanical garden. Aside from the on-campus arboretum, the newly constructed orchidarium, and new desert garden the majority of what is considered the botanical garden includes plant collections, gardens, and facilities initially established primarily for academic use. While academic study is very much compatible with the mission of the botanical gardens, certain challenges may exist when initial existing plant collections were established without consideration into their incorporation into a botanical garden. The current discussion on how to formalize the garden into a more publicly accessible institution is a challenging shift that is made more complex by its location within the gated private property of an institution often with limited access without previous communication and coordination to visit the campus. While this work takes into account the wide variety of questions and concerns regarding the future of the botanical garden it can by no means fully address all of the details of these complex considerations. This is another reason why a design concept is created to provide a potential vision for the project and allowing stakeholders the opportunity to consider what other considerations must be taken into account before a master plan is completed.

This work also addresses the identification and location of plant species throughout the campus. Accurate plant databases and records are important to botanical gardens. While plants on some areas of campus have been documented, it is important to note that many sections of the

campus have yet to be surveyed and may continue to provide additional plant species not previously accounted for in the garden's records. Not all areas of campus are planted alike. There are many areas of campus that house plants within agricultural fields, orchards to provide agricultural training or academic research. Not all of these areas or plants are easily accessible, highly permanent, and may not be conducive for inclusion into the garden's plant list. They however may provide plant material that can be located into more permanent gardens or locations. Because of the inclusion of plants from agricultural areas of campus, and the potential loss of plant species previously identified, the plant database that is produced in this work is most likely not without flaws. The database most likely includes errors including plant species that are no longer present on campus, potentially misidentified plants, inaccurate documented plant locations, undocumented plant locations, and a high potential for undocumented plants throughout many other parts of campus. Due to this, the plant database will most likely need on-site review and updating but it still has great value as a guide to the variety, general location, and potential organization of plant species on campus. This database can serve as a reference to identify what plants can be planted in newer, more accessible, and permanent garden locations from areas on campus where they are less accessible or potentially at higher risk of loss. The additional planting or relocating of plants from elsewhere around campus can also serve the purpose of bringing plants together from currently far removed and disconnected plant collections throughout campus. Consolidation of botanical garden specimens into a central location can create an area of higher plant density which can create an easier visitor experience, an increased visual impact, and potentially simplify and focus garden maintenance efforts.

Lastly, it is important to clarify that this work does not attempt to accomplish the entire master planning process for the botanical garden. More often than not, planning and design are

extensive, reiterative, and collaborative processes. This work intends to lay the groundwork for the master planning design process while sharing a potential vision for what the garden could become by creating a design concept. This work stops short of formalizing a master plan due to the need to get more stakeholder input and feedback. This work can serve as a tool to provide foundational information and identify opportunities and challenges to inform strategic decisions regarding the administration of the institution and its mission and objectives. These decisions should and can be best made by project stakeholders when provided the necessary information.

## **Chapter Overview**

Chapter 2 contains a literature review on the terminology important to this research. This includes research on the different definitions and types of botanical gardens, how these institutions were founded, the professional organizations supporting botanical gardens, and a review of the number and locations of botanical gardens around the world, throughout Central America and within Honduras. This chapter also reviews the terminology for master plans, outlining the process and detailing what value the process has for botanical gardens. The terms ethnobotany and conservation are also defined with a brief review of the basic conservation practices utilized by botanical gardens.

Chapter 3 includes several brief case studies for some of the most relevant botanical gardens to Zamorano. This includes history and information on botanical gardens of varying status and conditions near to Zamorano in the country of Honduras as well as other botanical gardens of similar characteristic relevance to Zamorano located throughout Central and South America. The chapter concludes with a brief comparison between these case studies.

Chapter 4 includes background historical research on Zamorano University. It examines the history in rough chronological order of the people and plants that have shaped Zamorano's campus into what it is today. It briefly outlines the geological formation of the Yeguaré River Valley, reviews pre-Columbian history, Spanish Colonialism, national independence to the eventual establishment and construction of Zamorano University. This information is not only important to understand the school's legacy but is helpful in providing potential ideas and inspiration that can shape the garden's eventual master planning and design process. This historic narrative may also be an important educational component to share with garden visitors through pathway signage, displays, pamphlets, and guides.

Chapter 5 includes details on the history of the Zamorano Botanical Garden, its facilities, garden and plant collections.

Chapter 6 discusses the plant databases, what previous plant identification efforts have occurred, how databases were combined and updated with additional information. It also includes a proposed plant collection structure for the garden's species.

In Chapter 7, planning and design considerations leading up to a proposed concept design are discussed. It reviews previous campus planning and design efforts, details the site visit and site analysis process used to identifying a potential space to dedicate towards future botanical garden space.

Chapter 8 summarizes the results of this work and concludes with a proposal for important additional work to address the long-term vision for the Zamorano Botanical Garden.

## CHAPTER 2

### LITERATURE REVIEW

#### **Botanical Gardens**

The most widely accepted definition for botanical gardens is an institution with “documented collections of living plants for the purpose of scientific research, conservation, display and education” (Jackson 1999). Other phrases used to describe botanical gardens include “a living laboratory”, “a museum with a living collection of plants”, “an institution that promotes the study of advancement of botany and botanic knowledge” and a place “demonstrating the medicinal, economic, cultural and environmental importance of plants to the survival and wellbeing of humankind” (Smith and Harvey-Brown 2017, 04).

Botanic Gardens Conservation International, the foremost membership organization for botanical gardens around the world, considers the first ‘true’ botanical garden to have been created in 1543 at the University of Pisa, Italy because its sole purpose for academic study set it apart from the countless gardens beforehand (BGCI, n.d.). Many botanical gardens continue to be founded by scientific institutions such as universities in close associations with herbariums, seed banks, museums or other educational facilities. After their purely academic origins, botanical gardens gradually evolved to become spaces to study and display to the public newly discovered plants from exotic expeditions, or as more recreational spaces such as civic or public parks and pleasure gardens. However, during the end of the 20<sup>th</sup> century and the beginning of the 21<sup>st</sup> century, the main purpose for establishing new botanical gardens began to increasingly center on scientific study with the specific focus on providing resources to support native plant

conservation (Jackson and Sutherland 2000). Due to the diversity of plant collections from region to region, and their broadening use and objectives, botanical gardens from around the world vary greatly from one another. And the multi-functionality of botanical gardens only continues to grow as concerns over climate change, ecological degradation, food insecurity, and other global challenges increase (Gratzfeld 2016).

While no strict criteria exist, various types of botanical gardens may best be described by some of their more general characteristics. Institutions may be categorized by their principal focus such as scientific research, recreation, public education, etc. Botanical gardens that are more focused on scientific research are often associated with universities, scientific foundations, or other public, private, or governmental research institutions. These gardens can often be located within campus grounds, and at times are maintained by the same campus grounds staff. The focus on academic research does not mean these institutions are less oriented to the general public. The most prominent botanical gardens in the world such as the Royal Botanic Gardens are both highly extremely research-oriented and heavily visited. Other botanic gardens may be more recreationally oriented. While a true botanical garden should still have some academic or research components, these types of gardens can be more park-like open spaces for passive or recreational. Examples might include public plazas, municipal parks, or other kinds of public gathering spaces. Even some heavily gardened and historic public cemeteries may fall into this category. These types of gardens are sometimes maintained by city or county government crews. Another group of gardens focused on education may be associated with private or public museums or educational institutions. These gardens, like those at a natural history museum, often comprise the landscape around the buildings and enhance the educational objectives of the organization.

Another method of categorizing botanical gardens may be by the type of facilities it is associated with. These facilities may include educational institutions as previously mentioned like schools and museums as well as herbaria, libraries, seed banks, natural reserves, conservatories, or greenhouses. Other ways to classify botanical gardens may also be on what types and how plant collections are organized. Collections may be organized by taxonomical genus, species, or orders such as cactus collections, orchid collections, or an arboretum dedicated solely to species of trees and woody shrubs. Other gardens may be organized as native or exotic plant collections often thematically designed to reflect their native region, country, or ecosystem. And plant collections can also be structured around their economic, medicinal, edible, or other uses such as many ethnobotanical gardens.

Most botanical gardens reflect a unique variety of the above-mentioned characteristics. Familiarity with the variations of these botanical garden characteristics is important to recognize their commonalities and differences as no formal classification for garden types truly exists. Additionally, many institutions are continually changing and evolving not only in their plant collections but in their purpose and objectives.

### **Botanic Garden Accreditation**

Because botanical gardens can so widely vary, BGCI has continued to address over the years in its many publications what criteria uniquely sets apart a botanical garden from other types of gardens or institutions (Jackson and Sutherland 2000; BGCI 2012; Gratzfeld 2016; Smith and Harvey-Brown 2017). These efforts culminated in the creation of a botanic garden accreditation process to help distinguish the institutions with a greater scientific focus including

documenting and promoting plant conservation (BGCI, n.d.). BGCI states that these criteria (BGCI, n.d.; Smith and Harvey-Brown 2017) include:

- A reasonable degree of permanence
- An underlying scientific basis for the collections
- Proper documentation of the collections, including wild origin
- Monitoring and long-term maintenance of plants in the collections
- Adequate labeling of plants
- Open to the public
- Communication of information to other gardens, institutions, and the public
- Promoting conservation through extension and environmental education activities
- Exchange of seed or other materials with other botanic gardens, arboreta, or research institutions
- Undertaking of scientific or technical research on plants in the collections including taxonomy, molecular biology, biochemistry, ecology, biodiversity conservation, and other disciplines
- Conserving rare and threatened plants in ex situ collections (e.g., in the garden, seed banks etc.) and, wherever possible, in their natural habitats
- Compliance with international and national regulatory frameworks (e.g., the CBD, CITES, plant health, invasive species etc.)
- Adoption and promotion of sustainable practices such as renewable energy, water conservation, and waste recycling

- Adoption and promotion of ethical standards related to knowledge, data sharing, procurement, commercialization, and employment. (BGCI, n.d.)

The accreditation assessment uses peer-reviewed applications, questionnaires, and databases to review an institution's policies and infrastructure as well as their conservation and sustainability activities to determine whether the qualifying criteria for botanical garden accreditation are met (BGCI, n.d.).

*“Accreditation can result in tangible benefits for participating gardens – such as recognition, peer comparison, creating standards for excellence, and funding – and will act as a motivator for botanic garden leadership”* (BGCI, n.d.).

Perhaps one of the largest impacts BGCI has had is helping provide a common framework for what it means to be a botanical garden while still accounting for the wide diversity and types of botanical gardens. They have helped bring institutions together from around the world, provided resources, and helped elevate the vision and standard for what these institutions can become. The emphasized importance of conservation provides botanical garden administrators with clear objectives to focus on and their accreditation empowers and highlights the institutions working towards the common goal of preserving plant diversity.

Operating within the United States and Canada, a similar public garden membership organization called the American Public Gardens Association provides a membership option to promote institutions to operate according to best practices for botanical gardens (American

Public Gardens Association, n.d.). They ask their botanical garden members to follow the generally accepted criteria for botanical gardens including:

- The garden is open to the public on at least a part-time basis.
- The garden functions as an aesthetic display, educational display and/or site research.
- The garden maintains plant records.
- The garden has at least one professional staff member (paid or unpaid).
- Garden visitors can identify plants through labels, guide maps, or other interpretive materials. (American Public Gardens Association, n.d.)

Although this association has no administrative influence over gardens elsewhere around the world, their criteria reinforces the emphasis botanical gardens should place on addressing 1) public accessibility, 2) aesthetic, educational and academic purposes, 3) organized plant documentation, 4) maintenance and upkeep of plant collections and 5) plant labeling and identification. In comparison, BGCI's criteria more specifically the needed focus on conservation efforts.

### **Botanical Gardens Around the World**

BGCI estimates on the number of botanical gardens and arboreta around the world vary greatly from low estimates of 1775 in 148 countries around the world (BGCI, n.d.) to estimates of upwards to 2951 (BGCI 2012). BGCI maintains a page called GardenSearch, an online database for botanical gardens and other plant or scientific related institutions (BGCI 2021). The ability for any organization to freely register their institution on the GardenSearch database and

classify themselves as a botanical garden and the lack of some notable institutions from this same database may contribute to this wide range of estimated gardens.

From BGCI's database, there are approximately twelve hundred botanical gardens and arboreta listed in the Americas with roughly one thousand in North America, one hundred ninety in South America, forty-five in the Caribbean, and thirty in Central America (BGCI 2021). Of these, only fourteen are BGCI Accredited Botanic Gardens including seven in the United States, four in Mexico, and one each in the Bahamas, Colombia and Argentina (BGCI, n.d.). Of the roughly thirty self-described, non-accredited botanical gardens in Central America, five are listed in Honduras. This includes Zamorano's Botanical Garden, Lancetilla Botanic Garden and Research Station in Tela, the National Autonomous University of Honduras (UNAH) Botanical Garden in Tegucigalpa, the Jardín Botánico Municipal Perez Estrada in San Pedro Sula, and the Blue Harbor Tropical Arboretum on the island of Roatan.

## **Conservation**

The term plant conservation refers generally to the wide variety of efforts aimed at preventing the loss of plant diversity by way of species extinction. A summary of the global mission of botanic gardens around the world include:

- Stem the loss of plant species and their genetic diversity worldwide.
- Focus on preventing further degradation of the world's natural environment.
- Raise public understanding of the value of plant diversity and the threats it faces.
- Implement practical action for the benefit and improvement of the world's natural environment.

- Promote and ensure the sustainable use of the world's natural resources for present and future generations. (Jackson and Sutherland 2000, 10)

The unique role botanical gardens have in promoting plant conservation was acknowledged in BGCI's publication of *Botanic Gardens Conservation Strategy* in 1989 (Heywood 1989). While conservation has been a common objective for some time, more recent publications by the BGCI have increased the emphasis of conservation efforts by botanical gardens and stating the importance of public education and community-centered efforts (Getzfeld 2016, 7; Smith and Harvey-Brown 2017, 5). The driving force for conservation to become the central focus of botanical gardens is due to the accelerating rate of plant extinction (Smith and Harvey-Brown 2017, 4).

Botanical gardens can promote conservation through a variety of efforts. The two most common approaches to conservation include the efforts to protect endangered plants within their natural habitat (*in situ*) or the relocation of plants (*ex situ*) from their native habitats to protected spaces. Because over 50% of earth's land surface has been modified by humans many native habitats may be so disturbed that a species survival may solely rely on *ex situ* conservation efforts (Getzfeld 2016, vi). One important assumption is that the ability botanical gardens from around the world have to use both *in situ* and *ex situ* techniques mean there should always be an opportunity to prevent the extinction for any plant species (Getzfeld 2016, vi). Some of the wide-ranging lists of conservation activities include seed collecting, establishing germination and propagation protocols, providing research on plant conservation threats for the IUCN's red list, species reintroduction, ecological restoration (Havens et al. 2006, Smith and Harvey-Brown 2017, 10).

## **Ethnobotany**

One of the major activities of botanical gardens as listed by Jackson and Sutherland is ethnobotanical research (2000). Ethnobotany is generally referred to as the study of the traditional use, knowledge, and customs of native plants by the local people. Ethnobotanical research often places a strong focus on the study of plant's medicinal and religious uses but the variety of all potential plant uses is broad. Simply put, any plant agriculturally grown is being produced for some intentional use whether it be for food, fiber, construction material, etc. While a plant with no known human use has intrinsic ecological value on its own, the knowledge of plant's uses can be a powerful tool for people to connect with plants and nature and to learn about the importance of conservation efforts. Plant use is an important component of a plant database and a sample plant collection data form published by the BGCI categorized the variety of plant uses into the following list:

- Food
- Food Additive
- Animal Food
- Bee Plant
- Invertebrate Food
- Materials
- Fuel
- Social Use
- Vertebrate Poison
- Non-Vertebrate Poison

- Medicine
- Environmental Use
- Gene Source (Gratzfeld 2016, 57)

As human and plant relationships change over time, there is also value in preserving historic information about the variety of plant uses. Botanical gardens with an emphasis on ethnobotanical plants often refer to themselves as ‘ethnobotanical gardens’ and prioritize educating their guests on the various uses of their native or non-native plant collection. At its basic, this is accomplished by adding information about uses to plant labels along with its scientific and common names. One example of an ethnobotanical garden is the Latin American Ethnobotanical Garden located on the campus of the University of Georgia in Athens, GA. UGA’s garden also maintains a relationship with several ‘sister gardens’ throughout Latin America with whom they collaborate on research and design, participate in faculty and student, and the exchange of plant specimens. These gardens identified on the website for UGA’s Latin American Ethnobotanical Garden are located in Chiapas, México; Guácimo, Costa Rica; Córdoba, Argentina; Baeza, Napo, Ecuador; Isla Navarino, Chile; Santa Marta, Colombia; and Pisac Valley, Cusco, Peru (Walker 1999).

## **Master Planning**

Master planning is a common tool used by planners, architects, landscape architects, and designers in shaping the built environment. The American Society of Landscape Architecture describes master plans as a series of ideas and drawings brought together into one rendering for a client or stakeholders to approve and to inform future construction documents (ASLA, n.d.). For

most projects conducting site visits, research, and historical analysis, receiving stakeholder input, and creating concepts are some of the preliminary steps before a master plan can be created (ASLA, n.d.). In *BGCI's Manual on Planning, Developing and Managing Botanic Gardens*, a master plan is defined as:

*“An essential document of any botanic garden development that identifies activities, opportunities and facilities that need to be considered to deliver the vision and mission of the organization. It can be used to translate the requirements defined in the scope of work and design brief into a concept design solution. It may comprise to-scale plan drawings, illustrations and sketches, as well as cost estimates of the construction work”* (Gratzfeld 2016, 3).

The BGCI lists key components of a master plan (see Table 2.1) and elaborates on the important role it provides, stating:

*“The goal of the master plan is to provide a comprehensive document that presents a possible solution to the intended project outcome and guides all subsequent design phases leading to project realization. The master plan is not just a drawing – it is a strategic document that includes sketches and illustrations as a key feature besides explanatory specifications and cost estimates”* (Gratzfeld 2016, 14).

Key Components of a Master Plan Document
• Vision, mission and goals of the project
• Summary of background research
• Relevant examples of precedent projects – photos and illustrations
• Spacing of components and activities
• Site analyses – biophysical, operational, contextual
• Diagram and sketches to illustrate the conceptual options
• Potential garden operations
• Design options and relationship diagrams
• Analysis of design options – strengths, weaknesses, opportunities, challenges
• To-scale plan drawings, illustrations, sketches
• Cost estimates

*Table 2.1: Components of a Master Plan Document (Gratzfeld 2016, 14)*

## CHAPTER 3

### CASE STUDIES

Case studies were used to research and compare the most relevant botanical gardens to Zamorano. The first criteria for selection included identifying botanical gardens within Honduras (see Figure 3.1) including the Lancetilla Botanic Garden and Research Station, the UNAH Botanical Garden, the Blue Harbor Tropical Arboretum, and the Jardín Botánico Municipal Perez Estrada in San Pedro Sula. Although listed on BGCI's database, this last garden was not used as a case study because little contemporary information could be found. Although it was established in the early 20<sup>th</sup> century and had a notable connection to Wilson Popenoe it has since been severely neglected.

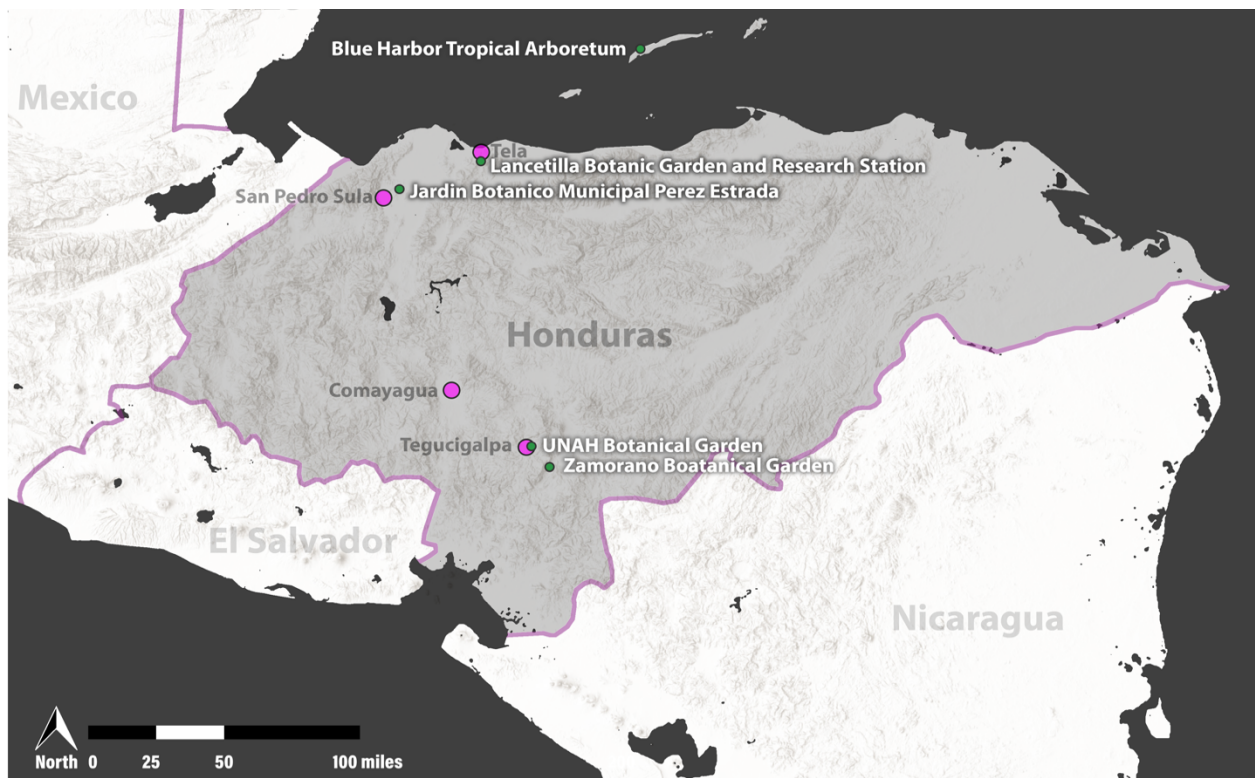


Figure 3.1: Honduran Botanical Gardens and Arboreta (Proulx 2021)

Another criteria for selecting botanical garden case studies was by identifying BGCI accredited botanical gardens with similar characteristics to Zamorano that were also located in Latin America. This was accomplished by identifying a list of botanical gardens located on university campuses throughout Central or South America. This list was narrowed down to several botanical gardens that had the most information and were accredited by BGCI or had the appearance of being the most successfully established. The following case studies provide a reference of varying botanical gardens while still sharing some level of relevance to Zamorano by either location or similar location on a university campus.

### **Lancetilla Botanical Garden and Research Station**

Of the handful of botanical gardens, Lancetilla Botanical Garden and Research Station (see Figure 3.2) is the largest and most visited in Honduras. It was also established by Wilson Popenoe while working under the United Fruit Company. Lancetilla provides an important reference point when considering what potential there is for the Zamorano Botanical Garden. While located within different temperate climates, many of the plants grown at Lancetilla have the potential to also be grown at Zamorano. Lancetilla also reflects what a more formalized botanical garden experience could look like.

Originally named Lancetilla Agricultural Experiment Station, it was established in 1925 for the United Fruit Company by Wilson Popenoe before he started Zamorano University. Wilson selected the 1000-acre site outside the city of Tela on the Northern Caribbean coast of Honduras on an old farm growing coconuts, *Cocos nucifera*. The site was located in a valley home to a small and indigenous palm called *Astrocaryum standleyanum* whose lance-shaped spines became the namesake for Lancetilla (Rosengarten 1991, 99). Popenoe's role was to

develop a station to test plant introductions from around the world for potential production in Central America. The institution quickly became an invaluable educational resource, with its primary role studying introduced plants of economic value to the region. Plants were brought from around the world to become established at the station and by the Lancetilla had become what was then considered “the best arboretum of tropical fruits and forest trees in the Western Hemisphere” (Rosengarten 1991, 100). Over the years, Lancetilla became the testing grounds and initial nursing grounds for thousands of fruit trees that were eventually distributed to other countries in the region (Malo 1999, 153; Rosengarten 1991, 101). The station's legacy included the introduction of several banana varieties such as *Musa acuminata* ‘Valery’; abaca or Manila hemp, *Musa textilis*, whose fibers were important for making cordage; new varieties of citrus plants including the Ponderosa lemon, *Citrus limon* × *Citrus medica*; and selected varieties of African oil palm, *Elaeis guineensis*, which remain an important agricultural crop in the region today (Rosengarten 1991, 99-103). It would become home to the largest collection of Asiatic plants in the Neotropics fruit trees such as durian, litchi, rambutan, pulasan, mangosteen, langsat, and mango as well plants from Africa like the akee, *Blighia sapida* several species of coffee such as *Coffea arabica*, *C. canephora* (formerly known as *C. robusta*), *C. liberica*, and *C. stenophylla* (Rosengarten 1991, 99-105). The station also was important to the further development and research of plants native to the western hemisphere such as pineapple, avocado, jaboticaba, and others (Rosengarten 1991, 99). A variety of native and introduced tropical timbers used for timber or fiber such as Central American teak, *Tectona grandis*; Mexican cypress, *Cupressus lusitanica*; Spanish cedar, *Cedrela odorata*; white mahogany, *Roseodendron donnell-smithii*; Burmese rosewood, *Dalbergia bariensis*; sandalwood, *Santalum* spp.; rainbow eucalyptus, *Eucalyptus deglupta* and tropical pines were also planted at the station (Rosengarten

1991, 103). Other collections included introduced Asiatic timber bamboos such as *Gigantochloa asper* and *G. verticillate* which were introduced from Java in the 1920s by Popenoe's former boss and mentor David Fairchild and associate F. A. McClure and were later introduced to the Zamorano campus (Malo 1999, 426). Medicinal plants also included species from the genera of *Dioscorea* (Mexican yam - source of cortisone), *Derris* and *Lonchocarpus* (source of rotenone insecticide), *Erythroxylum* (coca plant), *Rauwolfia* and *Aloe* (Rosengarten 1991, 103). Other species planted at Lancetilla included cacao, *Theobroma cacao*; chicle, *Manilkara spp.*; tung oil, *Aleurites fordii*; sugar cane, *Saccharum officinarum*; lemon grass, *Cymbopogon citratus*; citronella, *Cymbopogon nardusand*; vetiver, *Chrysopogon zizanioides*; lablab-bean, *Dolichos lablab*; and ylang-ylang, *Cananga odorata* as well as various forage grasses, spices and edible nuts (Rosengarten 1991, 103).

Popenoe eventually left Lancetilla to go and establish Zamorano and in time the value of the experiment station to the United Fruit Company began to wane. Popenoe, however, would continue to advocate for Lancetilla for many years to come.

*"I believe also that Lancetilla is just about the best collection of tropical economical plants available today for the study of botanists and horticulturalists... It is among the very few in tropical America which have survived the past 25 years... This is the moment to give the future of the Garden serious consideration. I believe you must feel the same way about it. - Wilson Popenoe in 1959 writing to the United Fruit Company director of research, Norwood C. Thornton, regarding the lack of funding and fate of Lancetilla (Malo 1999, 155).*

In 1964, the United Fruit Company no longer needed the experiment station and first offered Zamorano the opportunity to sublease the station for \$1 a year (Malo 1999, 155). Wilson Popenoe was delighted at this opportunity but then director Albert S. Muller questioned the financial cost for maintenance and relevance to student training. Despite of Popenoe's urging, Muller passed up the opportunity, and the United Fruit Company tired of waiting and donated the facility to the Honduran government (Malo 1999, 156).

By 1974 the experiment station had been given a new name, the "Dr. Wilson Popenoe Botanical Garden" (Rosengarten 1991, 110) and in the 1980s then-director Simón E. Malo attempted to acquire the botanical garden but the National School of Forestry in Siguatepeque would not let it go (Malo 1999, 156). In 1999, Malo would reflect on the missed opportunity for the University to attain the garden stating *"Thus, our twenty-year effort to try to conserve the Garden as an educational and research center and part of Zamorano, another creation of Popenoe, came to nothing"* (Malo 1999, 156). Today, the Lancetilla Botanical Garden continues to be administered by the government through the National School of Forest Sciences along with approximately three thousand additional adjacent acres of national reserve. The garden is accessible to the public today and includes approximately fifteen hundred species in its collections of fruit trees, tropical timbers, bananas, orchids, bamboos, palms, and other plants (BGCI 2021; Jardín Botánico Lancetilla, n.d.).

## LANCETILLA BOTANICAL GARDEN



Author unknown, n.d., <https://hondurastraveling.hn/paquetes/lancetilla-garden/#!>

<b>LOCATION</b>	Tela, Honduras	<b>WEBSITE</b>	<a href="http://www.jblancetilla.org">www.jblancetilla.org</a>
<b>TOTAL AREA</b>	4,150 Acres	<b>ESTABLISHED</b>	1925
<b>BGCI MEMBER</b>	No	<b>ACCREDITED</b>	No
<b>OPEN TO PUBLIC</b>	Yes	<b>YEARLY VISITORS</b>	50,000

### PARENT INSTITUTION

The National School of Forest Sciences (ESNACIFOR)

### FACILITIES

Herbarium, Seed Bank, Arboretum, 3,115 Acre Biological Reserve, 890 Acre Timber Plantation, Orchidarium

### ESTIMATED SPECIES

1,500

### PLANT COLLECTION DESCRIPTION

Timber Trees, Exotic Species, Economic Species, Fruit Trees, Asian Fruit Species, Orchids, Bamboo, Mangosteen Collection, Mango Collection, Citrus Collection, Edible Nut, Coffee Collection, Medicinal Plants, Spices, Palm Collection, Heliconia Collection.

Figure 3.2: *Lancetilla Case Study* (BGCI 2021; Jardín Botánico Lancetilla n.d.)

## **UNAH Botanical Garden**

The Botanical Garden at the National Autonomous University of Honduras (see Figure 3.3), also referred to as UNAH, is located on its main campus in the city of Tegucigalpa, Honduras (UNAH Jardín Botánico. n.d.). The 8.6-acre botanical garden was created in 2005 after the land adjacent to the biology department building was saved from being developed into an additional campus parking lot (UTV 2014). The majority of the garden includes rustic trails and hillside gardens and is used by the biology department for research and to teach plant taxonomy.

Facilities at the garden include a butterfly house, orchidarium as well as natural history and entomology museum. Similar to Zamorano, visits to the botanical garden by non-UNAH faculty and students are only possible by scheduling private tours in advance with the biology department. Plants are organized into 8 collections of primarily native plants to the dry forest region. These collections include medicinal plants, aquatic plants, cactus, cycads, palms, bromeliads and ferns (UTV 2014).

## UNAH BOTANICAL GARDEN



Author unknown, 2014, <https://presencia.unah.edu.hn/noticias/jardin-botanico-de-la-unah-un-contacto-directo-con-la-naturaleza/>

<b>LOCATION</b>	Tegucigalpa, Honduras	<b>WEBSITE</b>	<a href="http://www.biologia.unah.edu.hn/home/sendero-jardin-botanico-unah">www.biologia.unah.edu.hn/home/sendero-jardin-botanico-unah</a>
<b>TOTAL AREA</b>	8.6 Acres	<b>ESTABLISHED</b>	2005
<b>BGCI MEMBER</b>	No	<b>ACCREDITED</b>	No
<b>OPEN TO PUBLIC</b>	Yes	<b>YEARLY VISITORS</b>	N/A

### PARENT INSTITUTION

The National Autonomous University of Honduras (UNAH)

### FACILITIES

Botanical Garden and Trails, Orchidarium, Butterfly House, Herbarium, Entomology Museum, Natural History Museum.

### ESTIMATED SPECIES

700

### PLANT COLLECTION DESCRIPTION

Medicinal Collection, Aquatic Plant Collection, Cactus Collection, Cycad Collection, Orchid Collection, Fern Collection, Palm Collection, Bromeliad Collection.

Figure 3.3: UNAH Botanical Garden Case Study (UNAH Jardín Botánico. n.d.; UTV 2014)

## **Blue Harbor Tropical Arboretum**

Blue Harbor Tropical Arboretum (see Figure 3.4) is located on the northwestern coast of the Island of Roatan, Honduras. The island is located roughly 35 miles off the Caribbean coast of Honduras. Although formally called an arboretum, it is listed as a botanical garden on BGCI's database (BGCI 2020). Limited information is provided on this database, but the arboretum's webpage provides details on its history and current facilities. Blue Harbor Plantation was first established in 1998 as an orchard and hydroponic farm providing fresh lettuce and herbs to restaurants, resorts, and markets throughout the island of Roatan (Blue Harbor Tropical Arboretum 2020).

The farm changed ownership in 2009 and was rebranded as the Blue Harbor Tropical Arboretum. The commercial hydroponic farm continued while outdoor gardens, a conservatory, an orchid house, and walking trails were developed on the property. With an increasing focus on eco-tourism, the arboretum began serving as an event venue and providing tours for cruise ship tourists from the nearby ports (Blue Harbor Tropical Arboretum 2020). The orchid house displays mostly Central American orchids along with some Indonesian species. The arboretum's vision is to *"be the environmental, recreational and cultural resource for the region"* with the mission to *"promote the art, enjoyment, and knowledge of horticulture, while providing opportunities for education and research"* (Blue Harbor Tropical Arboretum 2020). Compared to the other botanical gardens, Blue Harbor Tropical Arboretum has a greater focus on agricultural production and recreational tourism.

## BLUE HARBOR TROPICAL ARBORETUM



Rhoatan Travel Network, 2014, <https://www.youtube.com/watch?v=Anrg8ajc9qE>

<b>LOCATION</b>	Roatan, Honduras	<b>WEBSITE</b>	<a href="http://www.blueharbortropicalarboretum.com">www.blueharbortropicalarboretum.com</a>
<b>TOTAL AREA</b>	160 Acres	<b>ESTABLISHED</b>	2009
<b>BGCI MEMBER</b>	Yes	<b>ACCREDITED</b>	No
<b>OPEN TO PUBLIC</b>	Yes	<b>YEARLY VISITORS</b>	N/A

### PARENT INSTITUTION

Blue Harbor Plantation

### FACILITIES

Arboretum, Conservatory, Orchid House, Nature Trails, Lagoon, Orchards, Hydroponics Greenhouses, Vegetable Farm, Butterfly House.

### ESTIMATED SPECIES

250

### PLANT COLLECTION DESCRIPTION

Tropical Fruit Trees, Orchids, Citrus Collection, Ginger Collection, Heliconia Collection.

*Figure 3.4: Blue Harbor Tropical Arboretum Case Study (BGCI 2021, Blue Harbor Tropical Arboretum 2020)*

## CARTAGENA BOTANICAL GARDEN



unknown author, 2020, [https://www.tripadvisor.ch/Attraction\\_Review-g2546946-d7198937-Reviews-Jardin\\_Botanico\\_de\\_Cartagena\\_Guillermo\\_Piñeres-Turbaco\\_Bolivar\\_Department.html](https://www.tripadvisor.ch/Attraction_Review-g2546946-d7198937-Reviews-Jardin_Botanico_de_Cartagena_Guillermo_Piñeres-Turbaco_Bolivar_Department.html)

<b>LOCATION</b>	Turbaco, Colombia	<b>WEBSITE</b>	www.jbgp.org.co
<b>TOTAL AREA</b>	22 Acres	<b>ESTABLISHED</b>	1978
<b>BGCI MEMBER</b>	Yes	<b>ACCREDITED</b>	Yes
<b>OPEN TO PUBLIC</b>	Yes	<b>YEARLY VISITORS</b>	N/A
<b>PARENT INSTITUTION</b>			
Botanical Garden of Cartagena “Guillermo Piñeres”			
<b>FACILITIES</b>			
Herbarium, Nursery, Arboretum, Orchard, Evolutionary Garden, Seed Bank, Plant Shop, Café.			
<b>ESTIMATED SPECIES</b>			
300			
<b>PLANT COLLECTION DESCRIPTION</b>			
Native and Exotic Trees, Fruit Trees, Palm Collection, Medicinal and Fragrant Plants, Evolutionary Plant Garden, Xerophytic Plants.			

*Figure 3.5: Cartagena Botanical Garden Case Study (BGCI 2021, Christenhusz and Madriñán 2017)*

## CADEYTERA REGIONAL BOTANICAL GARDEN



Rivera Gerarda, 2018, [www.google.com](http://www.google.com)

<b>LOCATION</b>	Cadereyta de Montes, Mexico	<b>WEBSITE</b>	<a href="http://www.concyteq.edu.mx/JB/inicio.html">www.concyteq.edu.mx/JB/inicio.html</a>
<b>TOTAL AREA</b>	30 Acres	<b>ESTABLISHED</b>	1990
<b>BGCI MEMBER</b>	Yes	<b>ACCREDITED</b>	Yes
<b>OPEN TO PUBLIC</b>	Yes	<b>YEARLY VISITORS</b>	2,000

### PARENT INSTITUTION

Querétaro State Council of Science and Technology

### FACILITIES

Herbarium, Nursery, Arboretum, Orchard, Evolutionary Garden, Seed Bank, Plant Shop, Café.

### ESTIMATED SPECIES

118

### PLANT COLLECTION DESCRIPTION

Cactus Collection, Agave Collection, Native Plant Collection, Mammillaria Cactus Collection, Semi-Desert Plant Collection

Figure 3.6: Cadereyta Regional Botanical Garden Case Study (BGCI 2021, CONCYTEQ n.d.)

## UNIVERSITY OF PUEBLA BOTANICAL GARDEN



Jose Cabrera, 2014, [www.google.com](http://www.google.com)

<b>LOCATION</b>	Puebla, Mexico	<b>WEBSITE</b>	<a href="http://www.jardinbotanico.buap.mx">www.jardinbotanico.buap.mx</a>
<b>TOTAL AREA</b>	25 Acres	<b>ESTABLISHED</b>	1987
<b>BGCI MEMBER</b>	Yes	<b>ACCREDITED</b>	Yes
<b>OPEN TO PUBLIC</b>	Yes	<b>YEARLY VISITORS</b>	2,000

### PARENT INSTITUTION

Meritorious Autonomous University of Puebla

### FACILITIES

Arboretum, Herbarium, Seed Bank, Retail / Plant Store.

### ESTIMATED SPECIES

N/A

### PLANT COLLECTION DESCRIPTION

Pine Collection, Oak Collection, Dogwood Collection, Jatropha Collection, Medicinal Plants, Herbal Plants.

*Figure 3.7: University of Puebla Botanical Garden Case Study (BGCI 2021, BUAP 2021)*

## CHAPTER 4

### HISTORY OF ZAMORANO

The land that now makes up Zamorano University can be seen historically through both temporal and spatial lenses. Looking at it in chronological order takes us from the prehistoric and geological formation of the Yeguaré River Valley millions of years ago, through the following periods of pre-Columbian, Spanish Colonial, to the more modern history of national Honduran independence and the eventual construction and establishment of Zamorano University.

#### **Location & Early Geological Formation**

Zamorano University is located in Southern Honduras at roughly fourteen degrees north and eighty-seven degrees west, roughly twenty-five miles east of modern-day Tegucigalpa, Honduras. Of the University's approximately fifteen hundred acres of land, a small portion includes surrounding mountain and forest reserves, while the campus and the remaining majority of the property lies along the floor of the Yeguaré River Valley (Malo 1999, 164). The mountains surrounding the Yeguaré Valley were originally formed by a ring of volcanoes (Malo 1999, 44). Roughly eighty percent of modern-day Honduras is made up of this mountainous terrain, with the Yeguaré Valley being located within the "newer" interior or central highlands formed some twelve million years ago (Malo 1999, 30). The latest volcanic eruptions in Honduras are believed to have occurred more than several thousand years ago. To this day, large stones can still be found throughout the chaparral landscape of the valley floor, remnants and reminders left behind by the previous volcanic eruptions (Malo 1999, 500). The tallest mountain

peak, “Uyuca”, a name from a Mayan language, lies on the western side of the valley with its peak just over 6,500 ft or 2,000 meters (Malo 1999, 44). Below it, the valley floor lies at the approximate altitude of 2,500 feet and was formed after soft tuff stone made of volcanic ash, eroded and allowed a lake to drain from the valley (Malo 1999, 44).

### **The Pre-Columbian Maya (c. 2000 B.C. – A.D. 900)**

It is important to note that the Maya were some of the first peoples that substantially populated the Mesoamerican region, which includes modern day Honduras. Of all the Pre-Columbian civilizations, the Maya are regarded as the most culturally advanced and their proximity to Zamorano University has left long term influences on the land and institution today.

The height of Maya civilization (see Figure 4.2), classified as the Maya Classic Period, spanned from roughly A.D. 250 to 900 and spanned from what is now modern-day southern Mexico through Guatemala and Belize and into the western regions of El Salvador and Guatemala (Malo 1999, 30; Hammond 1977, 116). While the region where Zamorano is located today did not lie at the heart of Maya civilization, they continued to have substantial influence over the wider Mesoamerican region. It was widely believed for some time that the Maya civilization was destroyed or vanished when their abandoned overgrown cities were later ‘discovered’ by the Spanish, but time has shown that the people and culture did not disappear after A.D. 900, but that for various reasons they Maya people left their urban centers and peopled the surrounding region.

It is during this Classic Period that the greatest developments occurred in areas such as writing, mathematics, architecture, astronomy, arts and agriculture (Drew 1999; Hammond 1977, 127). Central to its many advancements was the most fully developed writing system of the New

World in a hieroglyphic script of over eight hundred characters (Malo 1999, 30) and the creation of a 365-day sun calendar that consisted of eighteen months of twenty-day lengths and one shorter month of only five days (Malo 1999, 31). Much of Maya culture and knowledge continue today through those of indigenous Maya descent. Many of today's indigenous groups throughout Mesoamerica are of Maya descent and continue to carry on many traditional practices, even speaking a variety of approximately thirty Mayan languages (Malo 1999, 32). The Yeguaré River Valley eventually became the home and hunting grounds of some of these descendants, the Xicague and Lenca people (Malo 1999, 44).



Figure 4.1: Maya Civilization Map (Pyne and Feisel, 2020, <https://www.archaeology.org/issues/386-2007/features/8757-maya-clothing-jewelry-body-modification>)

The Maya's contribution to agriculture at Zamorano is substantial. Knowledge of historic agricultural practices is an important reference and at times a reminder amidst the continual shift of modern-day best practices. Many Maya agricultural developments and techniques continue to be relevant to the world today. The domestication of the staple food crops of maize, beans, and squash trace back as far as 7,000 B.C. in south-central Mexico (Malo 1999, 31). The Maya planted these crops in an agricultural method called milpa, where the maize, beans, squash as well as chiles were planted together in a sustainable intercropping system (Isakson 2009). This practice continues to be important to many traditional and permaculture farmers and gardeners. Other important crops to the modern world that were shaped by the Maya include the avocado, cassava, cocoa, cotton, guava, papaya, peanuts, peppers, pineapple, potatoes, cinchona, rubber, sisal, sunflower, tobacco, tomatoes, and vanilla (Malo 1999, 31). While the broader list of Maya plants is extensive and includes many species of obscurity, these few crops previously listed here have become some of the most important and cultivated crops around the world.

The Maya were also knowledgeable in the medicinal uses for dozens of plants and considered many plants and flowers to be of spiritual and sacred importance such as the ceiba or silk cotton tree, *Ceiba pentandra*, a large tree with thorny trunk and cotton like fiber exploding out of its fruit pods (Rosengarten 1991, 42). Zamorano University's scientific journal is named Ceiba, in reference to this important tree. The selection and planting of seeds over thousands of years eventually shaped the genetics of these plants and fruits into what we are familiar with today. This is the case for maize/corn, *Zea mays* subsp. *mays*, which is believed to have developed from a tall and small grained fodder grass called teosinte, *Zea mays* subsp. *Mexicana*. Teosinte most likely originated in the highlands of Guatemala and continues to grow on the

surrounding mountainsides of the Yeguaré River Valley (Malo 1999, 431; Rosengarten 1991, 164).

During the Maya Classic period, the city of Copán, located in modern day western Honduras, became the capital of one of the Maya city states and was the center for politics, culture and trade (Malo 1999, 32). Research at the city uncovered a complex system of irrigation for food production shedding further light on the complex development of Maya agriculture (Fash 1991; Malo 1999, 32). Maya agricultural practices continue to be used by many Mesoamerican subsistence farmers, including the milpa technique as well as the slash and burn practice of land clearing and crop rotation that eventually allows fallow land to regenerate soils and vegetation. The balance of productive yet sustainable farming techniques for not just large scale but subsistence farming continues to be important to Zamorano's mission. The lessons that can be learned from the Maya, as well as other pre-Columbian civilizations such as the Aztec and Inca, should be a foundational starting point in the story of Latin American agriculture.

### **Maya Scholars Among Early Zamorano**

Because the influence of the Maya can be easily overlooked in reference to today's agricultural narrative, it is worthwhile to mention the importance Maya research had on many of Zamorano's founders and early scholars. The study of Maya society was a notable interest to many at Zamorano including Samuel Zemurray himself, the President of the United Fruit Company who funded and directed the creation of the University; Doris Zemurray Stone, Mesoamerican archaeologist and ethnographer, daughter of Samuel Zemurray and longtime school administrator; and Wilson Popenoe, agricultural explorer, tropical fruit specialist, and the first director of Zamorano University who oversaw its construction and whose first wife Dorothy

Popenoe was also a botanist and Mayan archeologist. Dorothy became passionately engaged in researching Maya sites shortly after moving to Central America with Wilson. In 1932, she tragically died at the young age of thirty-three, believed by some the result of eating the edible but highly toxic fruit when unripe, overripe or uncooked, of the ackee tree, *Blighia sapida*, native to west Africa (Malo 1999, 160). Her work, some of which published posthumously, details her work at several archeological sites including Lancetilla, Tenampua, Cerro Palenque and Playa de los Muertos (Joyce and Claassen 1994).

It is key to note the importance that Maya research played in the life of those that built Zamorano. Ultimately, the agricultural developments, plant knowledge and culture of the Maya should continue to be an important chapter in the garden's narrative and may provide ideas for future garden design and development.

### **Spanish Colonialism**

1492 brought the colliding of two worlds in such a way that controversy continues today on the best way to discuss its narrative. The interchange of people and plants are just one component to the larger story of what would become known as the era of Spanish Colonialism. Amid this brutal story of the Spanish conquest exist the stories of some of the world's most important agricultural introductions and exchanges between the 'New' and 'Old' Worlds. One of the first introductions was the banana, *Musa* spp. Tomás de Berlanga, the Fourth Bishop of Panama, brought the first banana rhizomes, from the Spanish controlled Canary Islands off the coast of Northwestern Africa to Santo Domingo in 1516 (Malo 1999, 30). The introduction of this plant would have such a profound impact that it would be described nearly three hundred years later by José Cecilio del Valle in 1821:

*"Let us take the banana... that abounds in our provinces. This plant by itself, if there weren't any others, would be enough to give value to the land that sustains it. Its singularity, its beauty, its low cost of growing, the short time it takes to fruit, its nutritious value, the flour that's made from it when immature, the delicacies you can make with it when ripe, and more, give value to this unique plant, glory of America, wealth of our people and beauty of our land"* (Malo 1999, 524).

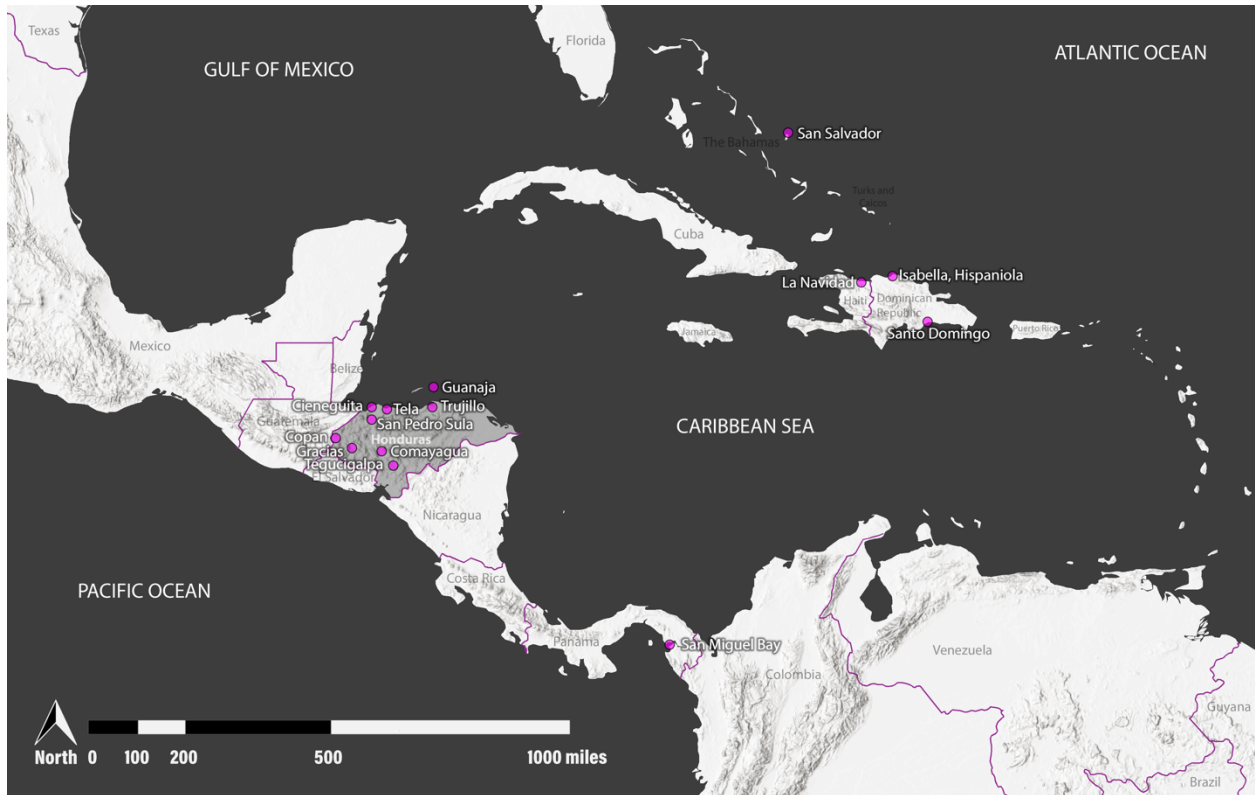
So important was the introduction of European plants to the New World that in a letter to Emperor Carlos I in 1524, Spanish conquistador Hernán Cortés wrote the following:

*"I have already made known to your Imperial Majesty the necessity of bringing to these lands plants of all kinds... and I repeat the request, hoping that orders can be given to the Casa de Contratación in Sevilla to the effect that every ship must bring plants, and that no ship shall be allowed to depart without them"* (Rosengarten 1991, 157).

Other early plants brought from the Old World by the Spanish (see Appendix C) included the olive, *Olea europaea*, and the grape, *Vitis* spp., which did not do well in Central America but would eventually establish new roots in California and Chile (Rosengarten 1991, 157).

Introductions by Mercedarian friars, a religious order within the Catholic Church, included wheat, *Triticum* spp., and barley, *Hordeum vulgare*, and the broad bean, *Vicia fava* (Malo 1999, 37). Then came peaches, *Prunus persica*, and apples, *Malus domestica*, as well as pears, *Pyrus* spp., and plums, *Prunus* subg. *Prunus* (Rosengarten 1991, 157). These Mercedarians would become some of the first teachers on agricultural practices and the cultivation of these new crops

they introduced to the indigenous communities they sought to convert and modernize (Malo 1999, 36). The Comayagua valley, roughly fifty miles northwest of modern-day Tegucigalpa would become the seat of these efforts in what would become modern day Honduras.



*Figure 4.2: Map of Spanish Contact and Early Honduran Settlements (Proulx 2021)*

In 1524, what we know as Honduras today was being explored by Gíl González Dávila. By 1536 Pedro de Alvarado had established the cities of Gracias a Dios known as modern day Gracias and San Pedro de Puerto Caballos known today as San Pedro Sula (Malo 1999, 34). Other early settlements were established (see Figure 4.2) including Trujillo and Comayagua. By this time the Spanish had begun ‘discovering’ countless new plants and fruit in the Americas with whom they were entirely unfamiliar. In 1525, Gonzalo Fernández de Oviedo y Valdés, the

first European naturalist to describe this awe-inspiring scene of the New World explained his experience in the forests of Panama:

*"I say to you, in general, that the trees of these Indies are things that cannot be explained, for their multitude... one could say that this is a great and unknown sea, because though part is seen, much more is not, since their names and properties are unknown.... Others of innumerable and diverse forms of wild fruits that only the little catlike monkeys understand and know which are for their purpose.... Some have fruit and others flowers and others burst into growth and each kind enjoys the season in its own way and one may see every stage of development at a given time and during any part of the year" (Malo 1999, 448).*

In time, the Spanish would not only bring their plants to the New World but bring newly discovered plants back to Europe (see Appendix D). Maize, *Zea mays* subsp. *mays*, as well as sweet potatoes, *Ipomoea batatas*, and chile peppers, *Capsicum* spp., were some of the first plants brought back to Spain by the end of the 1560's (Malo 1999, 36). The Spanish later introduced the potato, *Solanum tuberosum* ssp. *andigena* back to Europe in about 1580 (Rosengarten 1991, 86). This Andean indigenous plant grown on mountain and hillside terraces since about 6,000 B.C. had been domesticated alongside the tomato, *Solanum lycopersicum*, and peanut, *Arachis hypogaea* (Rosengarten 1991, 85). Francisco Hernández de Toledo, a Spanish physician and naturalist ordered in 1570 to conduct a scientific survey of medicinal and edible plants, would eventually have his work entitled 'Four Books on the Nature and Virtues of Plants and Animals

for Medicinal Purposes in New Spain' be published years later in 1615 in Mexico (Malo 1999, 389).

### **Land Ownership in the Yeguaré Valley**

The discovery of gold and silver around 1558 led to the establishment of the mountain town of Tegucigalpa (Malo 1999, 42). This discovery attracted Catholic friars of the Mercedarian who eventually found that the San Francisco area of the Yeguaré Valley was the most promising for cultivation being both fertile and easily irrigated (Malo 1999, 46). In the early 1600's, the Spanish Captain Diego de Cárcamo initially received a land grant containing parts of the Yeguaré Valley and the surrounding mountains. As his interest was in mining, the land in the valley was sold to the brothers Bernardo, Cosme and Juan Francisco de Valle (Malo 1999, 46). A farm was established that was eventually named by one of the brothers as 'El Zamorano' after their native homeland of Zamora, Spain (Malo 1999, 48). The farm El Zamorano was referenced in the writings of a Franciscan friar named Fernando Espino in 1674 where he mentioned El Zamorano was settled as by 1630 (Malo 1999, 48).

There are missing details on the succession of land ownership between the late 1600's and the early 1800's (Malo 1999, 48) but during this time however, the region had gained its independence from Spain in 1821 and from Mexico in 1823. Honduras had joined the formation of the United Provinces of Central America and the local politician from Tegucigalpa, Francisco Morazán, had become president in 1830. In the midst of conflict over power and independence in 1823, Francisco Morazán reflected on the true riches of the Mesoamerican region stating:

*"It is not silver or any other precious metal that is the wealth of our country: it is agriculture. The first is no more than the price of everything but it is also the cause of all our destructive dissensions. The second is the source of all our abundance and of all our virtues"* (Malo 1999, 423).

In a matter of several years the federation would soon collapse, and Honduras declared itself an independent nation in 1838 with a population of two hundred thousand inhabitants (Malo 1999, 58). By the mid 1800's the property in the Yeguaré Valley was now operating as a ranch for a cattle export business and was in the hands of the Midence family (Malo 1999, 48). In 1854, the farm was sold from the late Cornelio Midence's estate to another family member, Migeul Midence Zelaya (Malo 1999, 50). Miguel and his family had the farm for about forty years and his granddaughter, Carmen Rodezno de Lazo-Arriaga, would later describe her memory of looking at the expansive fields of sugar cane, *Saccharum officinarum*, and cattle pasture (Malo 1999, 50). At the time the farm was operating as a ranch in the early 1800's, an American archaeologist and writer Ephraim George Squier described the valley, saying "It is celebrated even in Honduras for its surpassing beauty and exhaustless resources" and describing the neighboring towns of indigenous peoples as being distinguished "for their industry, bravery and republican spirit" due to their involvement in previous military campaigns (Squier 1858).

Shortly before 1900, the property was sold to Daniel Fortín Sr. and his brother Cornelio Fortín (Malo 1999, 50). During this time, the entirety of the Yeguaré Valley was under ownership by the Fortín family (Malo 1999, 48) and sugar cane plantings were expanded on the farm. The children inherited different portions of the land with Daniel Fortín Jr. taking over the

original farm El Zamorano (Malo 1999, 172) who eventually lost the farm El Zamorano to the government for a debt in 1937 (Malo 1999, 52).

In 1941, the President of the United Fruit Company, Samuel Zemurray, had gotten a commitment from the company's board of directors to fund the development of a school of agriculture in Latin America (Malo 1999, 80). Company employees, including the future first director, Wilson Popenoe, along with others, had begun looking for land to locate the school and W. L. Taillon had recommended a possible property in the Yeguaré Valley where he had gone hunting in 1939 (Malo 1999, 168-170). Because the goal was to attract students from throughout Latin America, the proposed site had to have conditions favorable for a diverse array of agricultural crops grown throughout various regions. This included being warm enough for bananas and mangoes but with nightly temperatures cool enough for vegetable crops (Malo 1999, 168). Before purchasing the land, another United Fruit Company employee, F. Forster, conducted a soil and water availability study of the Yeguaré Valley in November of 1941 that found the location suitable for the school's plans (Malo 1999, 171). The Hacienda El Zamorano, then owned by the government, met all of the important criteria for the school's ideal location; 1) being close to yet not too close to a large city, 2) having a climate accommodating both warm and cool season crops without extreme temperatures and rainfall, 3) providing a reliable source of water for drinking, livestock, irrigation and power production, 4) having good soil – neither too fertile nor too poor - with good drainage and 5) being sited in a location that would be attractive to retaining faculty and personnel (Malo 1999, 180).

The remaining challenge was to acquire the property from the government of Honduras. At the time, it was being used by the president's wife, Doña Elena Castillo, for her own cattle business (Malo 1999, 176). President Carías was so pleased at the potential of gaining an

agricultural school so close to the capital that he offered to donate the government-owned farm to the project (Malo 1999, 168-175). Wilson Popenoe, however, carefully explained that the property must be fairly bought to avoid future intervention and interference from subsequent governments and the price of 67,500 lempiras (US \$33,750) was established for 3,650 acres of land in three separate parcels, more than half of which was located along the mountain slopes (Malo 1999, 180). Popenoe would later write describing the location:

*“Here was an ample tract of land, at an elevation suitable for all tropical crops yet not uncomfortably hot, and with water available for irrigation as well as domestic use... At one end of the farm was an abundant supply of volcanic ruff, which is excellent building material, and clay for making bricks and roofing tiles. Back in the mountains within sight of campus were forests of white pine”* (Malo 1999, 180).

### **The Construction of an Agricultural School**

In March of 1942, ground was broken for the construction of the new school (Malo 1999, 114). Some of the farm was in a state of semi abandoned pastures and the abundant vegetation of “carbon” or native mesquite, *Mimosa tenuiflora*, covered much of the land (Malo 1999, 184). In one section of land, a one hundred twenty-acre grove of native coyol palms, *Acrocomia aculeata*, called the “Coyolar” had been growing and was selected as the center of campus development (Malo 1999, 184). The spine covered palm which thrives in dry soil had been brought to the site as seeds in the stomachs of cattle purchased from neighboring Olancho Department (Malo 1999, 184). Unfortunately, the remaining coyol palms were mostly wiped out after the introduction of a plant disease to the campus in the 1960’s (Malo 1999, 443).

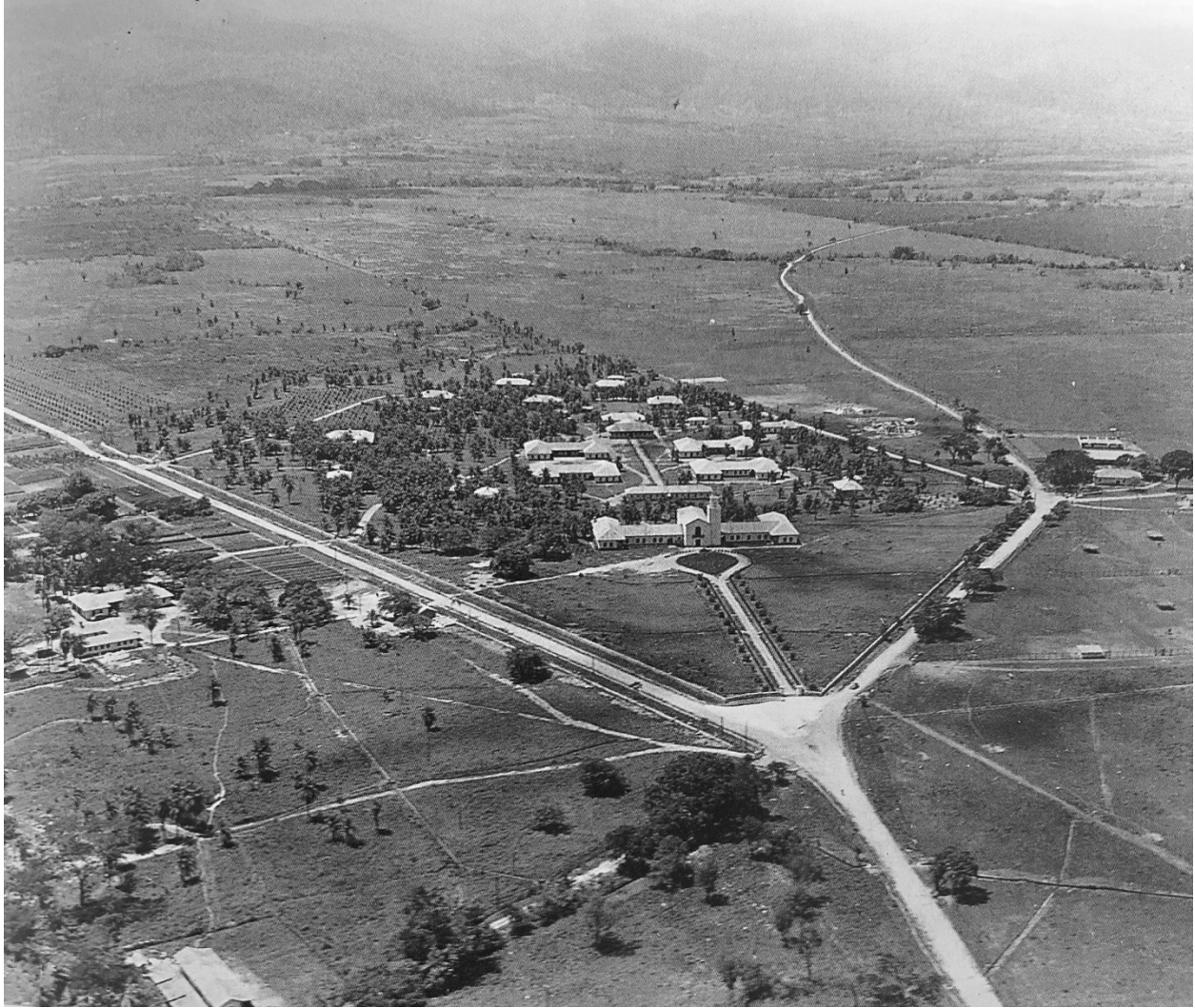
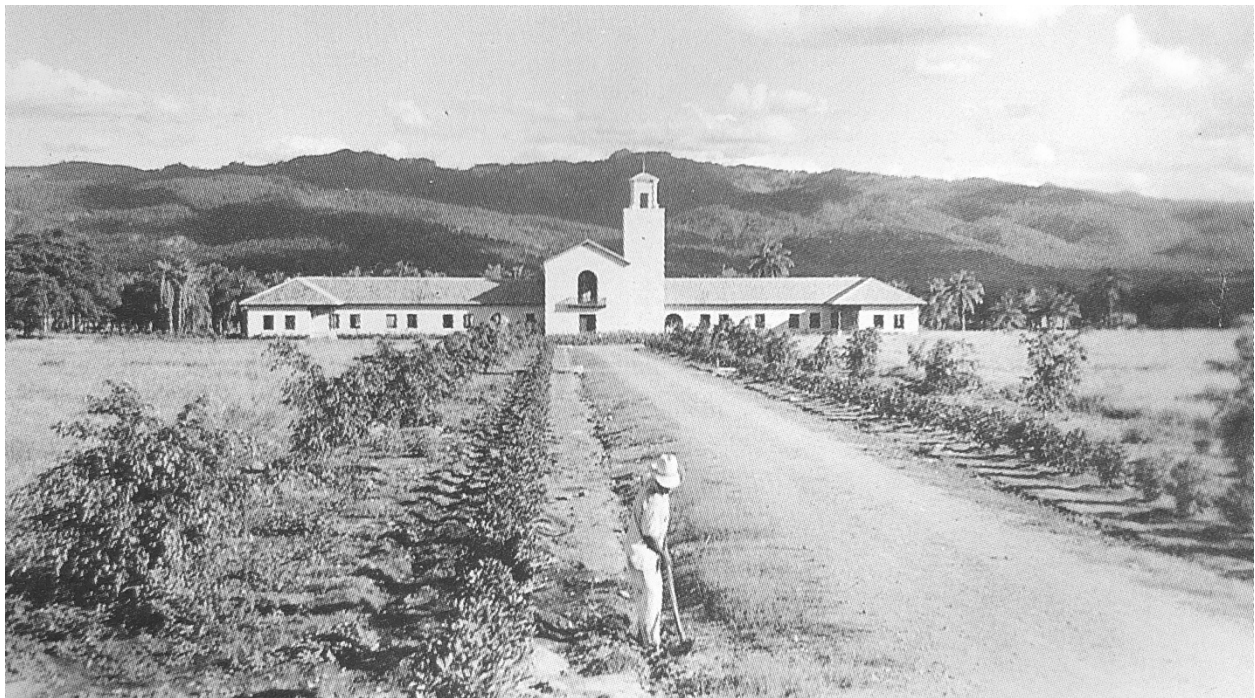


Figure 4.3: Circa 1944 aerial of the newly constructed campus (Malo 1999, 199)

During campus construction, the small neighboring community Jicarito, named from the small calabash fruit with scientific name *Crescentia cujete*, began to bustle with extra activity due the influx of hundreds of workers (Malo 1999, 193). The campus was constructed from mostly local materials in a Spanish colonial architectural style (Malo 1999, 190; Rosengarten 1991, 145). An east to west central axis ran through the center length of the campus with about 850 feet between the large administrative building on the west end and the mess hall on the east (Malo 1999, 193). At the western entrance to the campus a 600 feet long avenue was planted

with weeping fig trees (see Figure 4.4), *Ficus benjamina*, in 1944 which reached 40 feet in height by 1951 and under whose shade graduations began to be conducted in 1959 (Malo 1999, 126-127). Caparrosa Creek, also referred to as El Gallo Creek, ran along the northern edge of campus and was where Wilson Popenoe would eventually plant large varieties of timber bamboo including *Gigantochloa asper* and *Gigantochloa verticillata* which could grow upwards to twelve inches in diameter at its base (Malo 1999, 426). Native to Java, these had first been introduced to the Americas in the 1920's by Wilson Popenoe's mentor David Fairchild, US chief plant explorer who ran the USDA Plant Introduction Office and had most likely made its way to Zamorano after being planted along with other Asiatic at the United Fruit Company's Lancetilla Agricultural Experiment outside Caribbean port of Tela (Malo 1999, 426; Rosengarten 1991, 103). The bamboos are present along the El Gallo creek to this day and are known for having concealed students' mischievous behavior over the years (Malo 1999, 426).



*Figure 4.4: Planting of Ficus benjamina on the western entrance to campus. Circa 1944. (Malo 1999, 127)*

Construction continued as students arrived and on October 12, 1944 the school was inaugurated with a total of 140 students (Malo 1999, 208). The natural and built beauty of the campus was so immediate that one of Zamorano's first professors, the environmental conservationist Archie F. Carr Jr., described his first impression visiting the campus in the "beautiful high valley of the Yeguaré River" stating:

*"Pop had just finished building Escuela Agrícola Panamericana for the United Fruit Company and a crop of graduates were about to leave; the budded mangoes were about to bear and the sun flooded the valley through the most exciting air I had ever breathed. I walked about the palm-grove campus and the school buildings, all built in graceful solid colonial style with hand-cut rhyolite. I talked with students from thirteen different countries. The frangipanis were blooming, roses were everywhere and the roadside African tulips were just coming into flame."* (Malo 1999, 433)

Zamorano's beauty has arguably only increased since the school was built. Plants and tree canopies have matured, and many recent buildings have been built in keeping with Popenoe's original architectural style. Today, the lush vegetation and striking architecture create an immersive experience with a tangible uniqueness striking sense of place that hints at the rich past. The plants that continue to grow on its grounds, from both near and far, connect Zamorano's story to that of the larger region and world.

## CHAPTER 5

### CURRENT FACILITIES AND GARDEN COLLECTIONS

This chapter reviews the various on-campus facilities and plant collections pertaining to the Zamorano Botanical Garden. The majority of this information was collected during site visits during the spring of 2018 and 2019 and discussions with Zamorano administrators, faculty and staff regarding the botanical garden and updates to the campus master plan. (Martinez and Villamar 2018; Martinez, Sota and Leal 2019; Madrid 2019).

#### Sendero Geco

Located within central campus, the Sendero Geco includes some of the older plant collections with specimens dating back to the original campus. Some of the plants within this area are identified on a map on the campus guide (see Appendix E, Appendix F and Figure 5.1).



Figure 5.1: Sendero Geco Plant Map

## **The Jorge Bueso Arias Orchidarium**

In the beginning of 2018, the Zamorano Botanical Garden received a donated collection of native Honduran orchids. The donation was the personal collection from Dr. Dora Elisa Pérez, a professor of ecology from the National Autonomous University of Honduras located in Tegucigalpa (Zamorano 2019). Pérez had author a two-volume set of work entitled *Orquídeas Nativas de Honduras* or *Native Orchids of Honduras* (Perez 2015a; Perez 2015b). The donated collection included 637 orchids from 112 genera and 232 different species (see Appendix G). This donation substantially increased the university's existing orchid collection and provided a unique opportunity in researching ornamental plants and for public outreach and education on the importance of conservation for native and endangered orchid species. Due to limited space, discussions soon arose on the need to build a new facility called an orchidarium, specifically house the University's entire orchid collection. At the time, only two other orchidaria existed in Honduras that were open to the public: one at the Lancetilla Botanic Garden and Research Center outside Tela and the other at The National Autonomous University of Honduras in Tegucigalpa.

The orchidarium would need to provide the appropriate environmental conditions to accommodate plants from dry forest, rainforest and cloud forest ecosystems. This led to the design of several smaller and separate greenhouse structures.

The primary goal in building an orchidarium was to house the newly donated specimens along with the University's existing collection of orchids. Due to space constraints, the existing orchids were already being housed in separate facilities spread throughout campus. This new facility would consolidate the entire collection into one location with enough space to accommodate upwards of twenty-five hundred specimens.

One of the questions identified by the team was how to make the collection more accessible to visitors and guests. The western portion of campus is the most publicly accessible and the majority of the orchid collection has been housed at one of the furthest located facilities in the far northeastern corner of campus. With this in mind, the northwest corner of the Simón E. Malo Arboretum was identified by Jack Crowley as the best potential site for the new facility. This location was not only fitting because it located the orchid collection next to the plant collection in the arboretum but places it in close proximity to other campus facilities that cater to daily visitors and overnight campus guests. These facilities include the W. K. Kellogg Center where conference rooms, guest lodging and the new Kellogg Café are located; the Espresso Americano Café; Zamorano's grocery, gift and plant shop; two community banks as well as CEDA, the student center which hosts large events from weddings to student graduation ceremonies.

Because the orchidarium would serve as a facility for the Zamorano Botanical Garden, an additional building was proposed to serve as a welcome center for educational information. The objective was that this building could serve as a gateway to the arboretum and botanical garden. It could also house educational and outreach information especially regarding the University's conservation efforts for endangered and threatened native species.

### *Construction & Inauguration*

Construction on the orchidarium began during the summer of 2019. An initial phase of the project was completed by the fall of the same year and on September 15, 2019 the facility was inaugurated (see Figure 5.2) and given the name Jorge Bueso Arias Orchidarium. After the inauguration, additional greenhouse structures and facilities



*Figure 5.2: 2019 Jorge Bueso Arias Orchidarium inauguration (Zamorano 2019b)*

**The Simón E. Malo Arboretum**

The campus arboretum is located on approximately four acres directly southwest of the administration building. It has been established for many years now, but recent efforts have focused on its continued preservation and development including the installation of a commemorative sculpture (see Figure 5.3) in honor of the alumnus and former director Simón E. Malo. On February 23, 2019 Zamorano held a commemorative ceremony to unveil a sculpture in honor of his contributions to the University (Zamorano 2019a).



*Figure 5.3: Simón E. Malo Arboretum commemorative sculpture (Zamorano 2019a)*

The arboretum contains approximately one hundred species of trees and woody plants (see Appendix H). Directly to the south new student housing has been developed and several outdoor pavilions with gathering space and cooking grills for student use have been built along the stone wall that serves as the boundary to the arboretum. The recently built orchidarium facility is situated within the walls of the arboretum but there is concern that future development

and campus infill will threaten the already limited space designated for the arboretum (Martinez and Villamar 2018).

### **Fruit Collection**

The largest of the plant collections is the Fruit Collection also located on the northeast corner of campus. Over one hundred species of fruit trees and other plants are located on a roughly two-and-a-half-acre site (see Appendix I). The diversity of the trees planted here is quite impressive but its location at the edge of campus makes the collection hard to access. Its setting is also such that without being made aware of its location, it would likely go unnoticed by most visitors and perhaps the unaware student. Many of the plants have been labelled in the past, but many of them are currently missing or broken, making it difficult to identify what trees are located within the collection.

### **Avocado and Mango Collection**

Some of the first plants planted by Wilson Popenoe for student training were avocado and mango varieties. These trees are planted in orchards on the eastern side of central campus. Approximately 26 mango varieties and 11 avocado varieties were identified on campus (see Appendix J and Appendix K).

### **Medicinal & Culinary**

The Medicinal and Culinary Garden has a documented list of species but dates back to the early to mid 2000's (see Appendix L). It is also located in northeast campus and consists of plants that include a variety of annuals and perennials. Due to the fact that many of these plants

have a short life, it is likely that previously documented species may no longer be cultivated or present at this site. The inclusion of gardens used for educational purposes into the botanical garden collection showcases the challenge of semi-permanent plant locations. It highlights the need to delineate between plants used for educational instruction and for inclusion into the botanical garden. This example shows how the desire to include every part of campus or plant on campus into the botanical garden can be confusing in trying to understand what plants are a part of the botanical garden. However, the inclusion of agricultural crops into the garden should be promoted as it is an agricultural institution. Having a botanical garden on an agricultural university campus should set the institution apart from others and be a defining characteristic compared to many other institutions that are seen or appreciated more for their ornamental value. Perhaps the development of an additional medicinal and culinary garden for the botanical garden itself can be a solution to the previously mentioned challenges.

### **Desert Garden**

Another campus garden location that includes documented plant species is the Desert or the Xerophytic Plants Collection (see Figure 5.4). This was planted directly above central campus to the east of the auditorium. The species list for this garden collection is included in the plant database.

Of the many plant collections located outside of central campus, the closest and most recently developed is this collection comprising of cactus and succulent plants.



*Figure 5.4: Desert Garden (EAP Zamorano: Conservación Integral de la Biodiversidad en Honduras 2019)*

### **Native Garden**

Another recently developed plant collection includes species native to the region. After the recent construction of the Environmental Science and Development building in the far northeastern edge of campus, a native tropical dry forest garden was installed within the open courtyard. This garden emphasizes local plants and draws attention to the need to promote conservation efforts for threatened and endangered species. None of the obtained species list for on campus plants appear to mention this garden location so it can be assumed that this collection may not be identified and is possibly missing from the botanical collection species list.

## **The Paul C. Standley Herbarium**

An herbarium is an important resource for the study and understanding of plant diversity. They are a library of collected, pressed and dried plant specimens. Each preserved specimen is annotated by its proper name and scientific taxonomy and contributes to the collected knowledge of plant diversity and distribution. Most herbaria are associated with a botanical garden, natural history museum, university or research institute. Even as collections get digitized throughout the world, on site herbaria remain indispensable resources for teaching and researching plant science. This collection of recorded plant specimens in an herbarium is usually more comprehensive than and can complement the live specimens in botanical gardens collections and will continue to be the starting point for deep research into economic plant use and conservation efforts. Herbaria remain more important than ever today, especially in the tropics, where high plant diversity and abundance continues to lead to the discovery of thousands of new unique species every year. More importantly, they also provide a valuable physical record of plants in the tragic and unfortunate occurrence of plant extinction.

Zamorano's herbarium was initially established in 1943 by Professor Juvenal Valerio Rodríguez in order to teach botany and taxonomy to the school's first students. By 1946, Rodríguez had accumulated five thousand plant specimens for the herbarium. That same year, Director Wilson F. Popenoe attracted Louis O. Williams, one of the world's leading authorities on orchid and neotropical plants, to the campus to develop the school's herbarium and library. A year later in 1947, Wilson successfully attracted the notable systematic botanist of the neotropics, Paul C. Standley, to the school to aid in these efforts. Standley's previous experience publishing works on Mexican trees and shrubs, visiting the Lancetilla Agricultural Experiment

Station in Northern Honduras, and conducting a study of the flora of the Panama Canal Zone for the USDA made the opportunity at Zamorano an appealing option after having “retired”.

Standley’s primary responsibility was to assist Louis O. Williams in organizing the school’s herbarium. Bringing his previous experience working for the U.S. National Herbarium at the Smithsonian Institution’s National Museum of Natural History and Chicago’s Field Museum of Natural History, Standley and Williams began collecting, documenting and inherently building the foundational understanding of the flora of Honduras, El Salvador and Nicaragua. With Standley’s help, the herbarium grew into one of the largest collections in Central America. By 1952 the herbarium had sixty thousand specimens and remains the largest herbarium in the country (Malo, 1999). Today, the herbarium contains approximately two hundred forty thousand plant samples, all collected from southern Mexico, Central America and northern South America (EAP website). Thirty thousand of which were added by Standley himself over his course of time at Zamorano (Malo, 1999). Wilson spoke admirably of Standley’s commitment and contributions to his study saying...

*"He took almost no part in the social activities of the scientific set in Washington to which by right he belonged. He much preferred to come down to the tropics on a collecting trip, get out in the field, drop in to the thatched hut of Juan García, have a cup of coffee and ask Juan the common name of a plant he had just pulled up in the forest, and what was it good for? This ability to get close to the common people of the country and fill his Floras with authentic plant lore, was one of Paul's greatest assets. In this respect, few botanists have been his equal."*

Popenoe remembering Paul C. Standley in 1964 (Malo, 1999).

A year after his death in 1963, the herbarium took on Standley's name, in honor of his lifelong legacy of work, having substantially contributed to the knowledge of Central American flora. In botanical nomenclature, the author abbreviation for the botanist first publishing the name of a newly described plant follows directly after its scientific name. The standard author abbreviation Standl. accompanies roughly sixty-five hundred scientific plant names, the majority of which originate from Central America. For context, Carl Linnaeus, the father of Taxonomy himself, published just under eleven thousand botanical names and Standley's sixty-five hundred plants account for .5% of the roughly 1,192,000 global plant names in the Plants of the World Online database published by the Royal Botanic Gardens, Kew. Of the little over one million scientific names, an estimated 369,000 are unique plant species with the majority being plants repeat descriptions and names for the same plant, otherwise known as a synonym (Kew Report 2016).

Williams left behind a legacy of his own. During his time in Central America, he served as the project manager, botanist and plant collector for a project with the 'Central American Nutrition Foundation' (CANF). During this project he collected and identified as many useful plants as possible and sent them to MIT for nutritional analysis. His detailed records about plant use, as well as social, ethnobotanical and ecological significance. While at Zamorano he created *Ceiba*, the school's scientific journal and authored many books on Latin American flora. Williams, along with Standley, published many important pieces on the flora of the region (see Table 5.1). After having returned home, Louis and his wife Terua Williams continued to support botanical research and would later provide substantial funding to establish the Williams Conservatory at his Alma Mater, the University of Wyoming (Malo 1999).

Interviews with faculty and directors at Zamorano in May of 2019, provided information that the herbarium was lacking in space, and its current location on the northwest corner of campus made it hard to access for visitors and guests. In these interviews, preference for an updated facility with increased space located in closer proximity to the W. K. Kellogg Center on the western entrance to campus could make the herbarium more accessible to visiting scholars as well as place it closer to the more publicly accessible heart of the campus arboretum and botanical garden. A new herbarium in close proximity to the Botanical Garden could also support the institutes' objectives to educate and promote biological conservation efforts for regionally native plant species that are threatened and endangered. The herbarium can also provide an invaluable resource in researching regionally native plant species to add to the Botanical Garden, especially those plants whose own history are intertwined with that story of Zamorano and its influential contributors.

### **Potential Facilities**

Discussions with stakeholders revealed the interest in potentially developing new or relocating existing facilities. One example is the expressed interest by one of the department directors to establish a butterfly house on campus (Madrid 2019). Other discussions included the desire to renovate and increase the space for the entomology collection and to relocate it closer to the west end of campus where it is more easily accessible by visitors and guests.

Other facilities with potential connection to the Botanical Garden include a visitors center, a store or shop where plants and other merchandise or food is purchased, a natural history museum, and cafes and restaurants. Of these potential facilities, several already exist albeit without a current relationship with the Zamorano Botanical Garden.

PUBLICATIONS BY PAUL STANDLEY & LOUIS WILLIAMS		
PUBLICATION TITLE	AUTHOR(S)	PUBLISHING DATE
Trees and Shrubs of Mexico	Paul C. Standley	1920-1926
Lista Preliminar de las Plantas de El Salvador.	Paul C. Standley & Salvador Calderón	1925
The Flora of Barro Colorado Island, Panama	Paul C. Standley	1927
Flora of the Panama Canal Zone	Paul C. Standley	1928
Flora of Yucatan	Paul C. Standley	1930
Flora of the Lancetilla Valley, Honduras	Paul C. Standley	1931
The Forests and Flora of British Honduras	Paul C. Standley & Samuel J. Record	1936
Flora of Costa Rica: Part I	Paul C. Standley	1937
Flora of Costa Rica: Part II	Paul C. Standley	1937
Flora of Costa Rica: Part III	Paul C. Standley	1938
Flora of Costa Rica: Part IV	Paul C. Standley	1938
Flora of Guatemala (13 volumes)	J. A. Steyermark, Paul C. Standley, Louis O. Williams & Terua Williams	1938-1977
Edible and Poisonous Plants of the Caribbean Region	B. E. Dahlgren & Paul C. Standley	1944
The Orchidaceae of Mexico	Louis O. Williams & Abdul Bari Awan	1950-1986
Tropical American Plants (17 volumes)	Louis O. Williams	1961-1975
The Useful Plants of Central America (2 volumes)	Louis O. Williams	1981

*Table 5.1: Important publications on tropical or Central American plants by Paul C. Standley and Louis O. Williams*

## CHAPTER 6

### Plant Database

#### **Prior Research**

On BGCI's website, the Zamorano Botanical Garden is listed as containing approximately three hundred identified plant species. These list of plant collections include "Fruit Plant Collection", "Mango Collection", "Avocado Collection", "Orchid Collection", "Tropical Dry Forest Plants", and "Medicinal & Herb Plant Collection" (Griffith and Rodríguez 2014). This number is outdated and recent plantings of plant specimens on campus have increased the Botanical Garden's collection. However, no comprehensive updated plant database of all of these specimens exists. This creation of plant databases began by the past efforts of faculty and students over the past two decades to locate, identify and document botanical specimens throughout Zamorano's campus (Cajilema 2002; Ponce 2004; Griffith and Rodríguez 2014). The majority of these past efforts focused on the documentation of plant species and their locations with some student work proposing development for the Botanical Garden's design.

Jaime Rodrigo Cajilema Vinueza (2002) completed his seminal work entitled *Caracterización de Especies en el Campus de "El Zamorano"* or *Botanical Characterization of Species on the Campus of "El Zamorano"*. Zamorano student Mateo Ponce Izurieta (2004) conducted his culminating project entitled *Diseño Técnico de un Jardín Botánico del Bosque Seco Tropical en Zamorano* or *Technical Design of a Tropical Dry Forest Botanical Garden at Zamorano*. Yared Steven Griffith Picado and Orlando Francisco Rodríguez Izabá's (2014) graduation work was entitled *Elaboración de Base de Datos de las Especies Pertenecientes al*

*Jardín Botánico Zamorano* or *Development of a Database of Species Belonging to the Zamorano Botanical Garden*. All three pieces of student work included lists of plant species found on campus. Unfortunately, even with these previous efforts, considerable information in identifying and accurately locating plants was missing, incorrect or in need of updating. As such, all of the scientific names had to be reviewed and updated. However, as plant taxonomy continually gets updated a plant species may get renamed.

### **Compiling Existing Plant Databases**

Plant lists were combined into a single database, duplicates removed, and as much incorrect information was fixed as possible. Previously identified species were updated with their most appropriate scientific name. There are two resources to verify and update the correct use of a scientific name for a plant species by either referencing the author who published it or the journal in which it was published (Mori 2013). The Royal Botanic Gardens, Kew maintains an International Plant Name Index (IPNI 2021). The collected list of plant species was verified with Kew Science's Plants of the World Online database for the accepted scientific name (POWO 2021).

Many of the obtained plant lists included UTM coordinates identifying plant locations. Although these coordinates were provided, many locations appeared to be incorrect or repeated countless times after having been mapped in Google Earth. The inconsistencies and errors in these locations made identifying the exact locations for many of the species on campus nearly impossible. Notes on the general locations had to be used instead and several locations continue to be unidentified. What little information available was used to create an existing plant collection distribution map to show the approximate locations of previously documented plant

species throughout campus (see Figure 6.1). This map also shows the general location for most of the plant collections or gardens mentioned in previous chapters. As can be seen, these areas are dispersed throughout campus and do not lend themselves to a cohesive botanical garden visitor experience.

Although past students at Zamorano have worked towards documenting and databasing the plant species found on campus, it can be assumed that this effort is incomplete as there are vast portions of campus that have not been fully documented and ongoing campus development and maintenance may continually add or remove plant specimens from the grounds leaving any formal database in constant need of updating. The potential misidentification of plant species and the loss of plant specimens due to disease or removal since they were documented also contribute to potential errors in any plant database. Due to these factors, the 2002, 2004 and 2014 and 2021 species lists (Cajilema 2002; Ponce 2004; Griffith and Rodríguez 2014; Martínez 2021) of campus plants can be used as references to the kind and diversity of plants present on campus and as a starting point for organizing future botanical collections on campus. These lists provide the information on what types of botanical collections may be present on campus grounds and where there might be opportunities to add to missing plant collections.



Figure 6.1: Botanical Garden Existing Conditions and Plant Collection Locations Map (Proulx 2021)

During this process, a comprehensive excel spreadsheet was created for approximately six hundred unique plant species previously identified on campus (see Appendix M) as well as a more detailed table for edible plants (see Appendix N). These plants were classified into a sortable document with columns listing each plant's scientific name, English common name, Spanish common name, scientific authoritative author, family taxon, native regional origin, whether it is native to Honduran, it's endangered species status, plant habit/form, evergreen/deciduous, edible uses, edible plant parts, medicinal uses, fiber/timber uses as well as other ethnobotanical uses. In order to further understand the opportunities of reorganizing potential botanical collections the plants were also classified into various classifications such as: groundcovers, orchids, fruit trees, nut trees, conifers, palms & cycads, bamboos, cactus, yuccas & succulents. While an abbreviated copy of this database can be seen in Appendix M, the information is most importantly accessed and navigated in its original format where plants can be filtered and searched by various factors. This original file is being shared with stakeholders at the Botanical Garden as a tool and so that it can be continued to be updated as the plant collection grows.

### **Researching Ethnobotanical Characteristics**

This new database was then expanded to include information on each plant's ethnobotanical uses, including edible and medicinal uses by researching several online databases of plant uses (POWO 2021; Fern 2019; Plants for a Future 2021; French, 2021). This new database was then classified and sorted to create several plant lists including a list of all plants

with known edible uses. The database was also used to propose an organizing structure for plant collections by sorting plants into shared identifying characteristics.

### **Proposed Plant Collections**

After reviewing the list of plants collections while conducting a literature review and inventorying the plants collections previously identified on campus, the classification of several potential plant collections was created (see Table 6.1). This list of plant collections serves as an opportunity to organize plants not only in printed lists and in descriptive information about the botanical garden but to aid the design of plantings within the botanical garden. Much of the current present species are loosely organized and grouped together making it hard to locate, learn about and compare individual plants within the context of other botanical specimens. For example, it can be easier to admire and evaluate a specific palm tree's characteristic, when it is closely located within the context of other palm trees. The grouping of species within collections may also be helpful for those interested in studying specific qualities or traits or types of plants. And the grouping of plants into collections aids the overall organization of the botanical garden from how to create garden guides and maps, to guests deciding on where to visit and what to see.

PROPOSED PLANT COLLECTIONS		
COLLECTION NAME	EXISTING SPECIES	PROPOSED ACTIONS
Honduran Native	Approximately 300 species.	Create new planting collection within newly defined botanical garden area. Increase collection identifying species from the Herbarium and past work done by Paul C. Standley and Louis O. Williams.
Threatened & Endangered	Approximately 15 species identified as 'endangered' or 'critically endangered' and 15 species identified as 'vulnerable' or 'near threatened' by the IUCN Red List.	Create new planting collection within newly define botanical garden area. Identify more at-risk species native to the region to add to collection.
Mayan and Indigenous	Approximately 100 species.	Create new planting collection within newly define botanical garden area. Continue research, including research on Mayan plant names, their uses and cultural importance.
Spanish & Introduced Plants	Approximately 130 species.	Create new planting collection within newly defined botanical garden area.
Medicinal Plants	Approximately 270 species.	Create new planting collection within newly defined botanical garden area in close proximity to the Edible Plant Collection. Identify and highlight some of the more significant medicinal plants.
Edible Plants	Approximately 300 species.	Create new planting collection within newly defined botanical garden area. Consider planting collection centered around a small farmers cabaña to show plants being grown in the context of a small-scale home garden.
Fruit Trees	Approximately 150 species.	Create new grove/orchard within newly defined botanical garden area. Plant multiple varieties of the mangos and avocados grown on campus in the new location.
Palms & Cycads	Approximately 30 species.	Create new planting collection within newly defined botanical garden area.
Cactus & Succulents	Approximately 50 species.	Create new planting collection within newly defined botanical garden area.
Bamboo & Grasses	Approximately 10 species.	Create new planting collection within newly defined botanical garden area. Identify and add additional species of importance or significance to Zamorano to the collection.
Timber Trees	Approximately 50 species.	Plant specimens of all timber tree species that are currently absent from the Arboretum.
Orchids	Approximately 225 species.	Continue to identify the genus and species of orchids within existing collection.

*Table 6.1: Proposed plant collection structure and proposed actions.*

Organizing plants into collections can also help highlight the various uses of a species. Being an agricultural school, Zamorano's Botanical Garden staff would most likely want to emphasize the various agricultural or ethnobotanical uses of its plants. Because plants may have several uses or characteristics, specimens may be included in several or as many collections as is appropriate. Because some plants may fall into several plant collections, they may be planted multiple times or once but should be identified as also being part of the other plant collections. The proposed organization of these new collections not only increases visitor's ability to

navigate and find plants within the gardens but also provides the opportunity for creating a narrative and sharing stories about the plants, the University and the history of the region and past agricultural contributions as described in the literature review.

## CHAPTER 7

### Site Identification

#### **Previous Planning & Design**

Many existing documents were reviewed in order to create a site analysis for identifying a potentially on campus area devoted specifically to the botanical garden. The first document reviewed was the 2011 campus master plan (see Appendix O) was completed by Jack Crowley and Daniel E. Sniff, then a Doctor of Education candidate and graduate of the University of Georgia's programs in landscape architecture and historic preservation. Being a long-term vision for potential campus development, much of the master plan has yet to be implemented although several elements have been completed. Another major proposal yet to be fully implemented is the adjustment of some internal roads that intersect campus and the rerouting of the Pan-American Highway which divides the campus in half to a bypass around the Northern edge of campus (see Appendix P). The relocating of the highway and the smaller vehicular circulation changes like closing off of the southeastern portion of Jicarito Road away from the W. K. Kellogg Center would remove unnecessary traffic and improve the walkability of the main campus. It would also drastically reduce the number of security gates at the campus' perimeter and concentrate the public access to the university at the western entrance.

This also included various Zamorano Master Plan Concepts produced by Jack Crowley (see Appendix Q) as well as the conceptual master plan for the Orchidarium that was produced in 2018 (see Appendix R). These designs provided the most detail about future plans and building

locations in the area that would soon be identified for the publicly accessible Zamorano Botanical Garden.

### **Site Analysis & Proposed Concept**

A site analysis (see Figure 7.1) was created showing the locations of current security gates at the campus. This helped influence the proposed design concept (see Figure 7.2) as well as referencing previous planning and design efforts for the campus. Undeveloped space within close proximity to the western edge campus and the Simón e Malo Arboretum primarily included the open space in front of the administration building. The plan to area also extends northward to include the space potentially gained from the proposed closure of the Pan-American Highway. With this closure, a greenbelt could be created allowing the northern and southern halves of campus to be reconnected.

The proposed concept ultimately defined the publicly accessible Botanical Garden area to include the Arboretum, the adjacent undeveloped campus areas in front of the administration building and the reclaimed land from the potential rerouting of the Pan-American Highway (See Figure 9). This concept includes much of the proposed building infill and circulation patterns from the 2010's campus master plan (Sniff and Crowley 2010) and the master plan concepts (Crowley n.d.). The inclusion of the potential infill shows that the proposed concept for the Zamorano Botanical Garden could still be in keeping with the long-term vision from past campus planning efforts. This proposed concept also shows how relocating the University's public friendly facilities can create a more publicly accessible zone on the western perimeter entrance. Relocating some of the campus institutions like the herbarium and insect collection would not only make these facilities more accessible to campus guests but strengthen their connection to

the Botanical Garden. The consolidation of more public facilities together also strengthens each of the respective units. For example, a guest may eat at the Kellogg Café, then visit the Botanical Garden, Arboretum, Orchidarium, herbarium and insect collection all before attending an evening event or private reception hosted at the CEDA. All of these activities could be reached by a guest without ever having to cross parts of campus devoted to student housing or academic instruction.

Developing the Botanical Garden as an anchor that connects together other more public oriented facilities on campus can provide a great opportunity to connect with local, regional and larger community. Past videos of Zamorano's Botanical Garden posted to social media for example have been met with a range of responses the majority of which asking how to visit while others even included sharp remarks on whether or not the garden was actually accessible to the general public of humble means.



Figure 7.1: Vehicular Circulation and Security Analysis Map (Proulx 2021)



Figure 7.2: Proposed Concept Design Zamorano Botanical Garden (Proulx 2021)

## CHAPTER 8

### CONCLUSION

#### **Results**

As Zamorano University continues to grow, gradual investments and improvements in both additional plant specimens and infrastructure can help develop the Botanical Garden into an increasingly important institution for both guests and residents of campus. The Botanical Garden has the potential to better connect the campus to the surrounding community and larger public by providing a more accessible campus space to learn about the University's mission and history, learn about agriculture and the important need for conserving biodiversity.

Because a botanical garden is much like a library, with plants instead of books, it is important to continually update and organize its plant database. These databases are important not only to those managing the institution but can be used to provide guests and visitors with information about the plants within the garden. The information produced by this classification is also instrumental in understanding what plants the institution has to share with its guests. Each of these plants have different roles, different uses, and tell different stories. Important decisions regarding the mission, master planning and design of the botanical garden are greatly aided by deeply understanding these plants and the stories they can tell. And many of these stories are important in telling the unique history of the University's geographical location, of the important use of plants and even reveal stories of the people that contributed in shaping the University into the important institution it is today. Just as a great library is not merely a random collection of books, the creation of a successful botanical garden will require careful efforts of selecting, cataloguing and arranging its collection for use by its guests. Curated plant collections should should also reflect the school's mission to provide a hands-on, learning-by-doing education with

practical agricultural training as well as its growing focus to promote biodiversity conservation. In order to achieve this, research on the University is conducted, including the history of the university property, the plants that have been involved in the story of the school as well as some of the societies and individuals that helped shape the and impact the development of the University. Through this interdisciplinary study of the historical, botanical, biographical and cultural research and with campus and institutional planning techniques a master plan for the Zamorano Botanical Garden can more successfully align with the mission of the University and begin to tell its story to all that visit the campus grounds.

Knowledge about the plants, their conservation importance and their various ethnobotanical uses is important to the success of the Botanical Garden as an institution. The research, documentation and analysis of the existing plant specimens not only helps to categorize the plants into collections but can help provide a narrative to visitors. The goal of this research was not only to provide information for project stakeholders during the ongoing strategic planning and design efforts for the institution but to also identify information that can be shared with visitors potentially through print or digital formats to improve both guided and self-guided visits to the Zamorano Botanical Garden. The efforts to identify campus facilities important to the institution and relocate them together allows for these various facilities to better support one another and become more accessible to the same visitors. Locating these facilities together and concentrating future botanical garden collections into a more defined location along the western campus gateway will ultimately help develop a garden that is more accessible and has a more educational and impactful botanical garden experience.

## **Future Work**

This research ultimately plays a small but crucial role in the larger ongoing work of developing the Zamorano Botanical Garden into a formal institution. In order to accomplish this,

further research on plant species that can be added to existing or proposed plant collections is still needed. Now that a comprehensive database has been created, there still remains the need to verify plant species and their locations on campus. It is likely that many of these plants have been misidentified or are no longer present at their previously mentioned locations due to a variety of reasons.

Continued work is also needed to address the design and planning components to the Botanical Garden itself. Further efforts will be needed to address the physical needs of developing the institution and stakeholders will continue to address strategic planning efforts. Planning should continue towards creating a more detailed vision of what the Botanical Garden could become. This may best be accomplished through an intensive collaborative design session, called a design charrette, with project stakeholders. The work and research here have hopefully laid the important groundwork for envisioning what potential this important institution can have not only for the students, but for the local community and all those that visit Zamorano University.

## REFERENCES

- American Public Gardens Association. n.d. “Acquiring Botanical Garden Status.” Accessed April 6, 2021. <https://www.publicgardens.org/acquiring-botanical-garden-status>.
- ASLA. n.d. “What is Landscape Architecture?”. The American Society of Landscape Architects. Accessed April 6, 2021. <https://www.asla.org/yourpath/docs/WhatISLA.pdf>.
- BGCI. 2012. *International Agenda for Botanic Gardens in Conservation: 2<sup>nd</sup> Edition*. Richmond, U.K: Botanic Gardens Conservation International  
[https://www.bgci.org/files/All/Key\\_Publications/interagendaeng2580.pdf](https://www.bgci.org/files/All/Key_Publications/interagendaeng2580.pdf).
- BGCI. 2021. “GardenSearch Online Database.” Botanic Gardens Conservation International. Richmond, U.K. [https://tools.bgci.org/garden\\_search.php](https://tools.bgci.org/garden_search.php).
- BGCI. n.d. Botanic Gardens Conservation International. Richmond, U.K. Accessed April 2, 2021. <https://www.bgci.org>.
- Blue Harbor Tropical Arboretum. 2020. <http://blueharbortropicalarboretum.com/>.
- BUAP. 2021. Jardín Botánico Universitario. Benemérita Universidad Autónoma de Puebla. <https://jardinbotanico.buap.mx>.
- Cajilema Vinueza, Jaime Rodrigo. 2002. “Caracterización de Especies en el Campus de “El Zamorano”.” Bachelor’s thesis. Zamorano University.
- Christenhusz, Maarten and Santiago Madriñán. 2017. Botanical Garden of Cartagena “Guillermo Piñeres”. Accessed April 2, 2021. <http://www.jbgp.org.co>.
- CONYECTEQ. n.d. Jardín Botánico Regional de Cadereyta. Accessed March 29, 2021. <http://www.concyteq.edu.mx/JB/inicio.html>.

- Crowley, John F and Manasi Parkhi. 2017. *Proposed CA-6 Realignment in the Area of Escuela Agrícola Panamericana (EAP) Zamorano University*
- Crowley, John F. 2018. *Orchidarium Conceptual Design*.
- Crowley, John F. n.d. *2015 Transportation Plant*.
- Crowley, John F. n.d. *Master Plan Concepts*.
- Drew, David. 1999. *The Lost Chronicles of the Maya Kings*. Berkeley, California: University of California Press.
- Fash, William L. 1991. *Scribes, Warriors and Kings: The City of Copán and the Ancient Maya*. London: Thames and Hudson.
- Francis, Mark. 1999. "A Case Study Method for Landscape Architecture." Washington, D.C.: Landscape Architecture Foundation.
- French, Bruce. 2021. "Edible Plants of the World Database." Food Plants International. Accessed March 29, 2021. <https://foodplantsinternational.com/plants/>.
- Gratzfeld, Joachim, ed., 2016. *From Idea to Realisation – BGCI's Manual on Planning, Developing and Managing Botanic Gardens*. Richmond, United Kingdom: Botanic Gardens Conservation International.
- Griffith Picado, Yared Steven and Orlando Francisco Rodríguez Izabá. 2014. "Elaboración de Base de Datos de las Especies Pertencientes al Jardín Botánico Zamorano." Bachelor's thesis. Zamorano University.
- Hammond, Norman. 1977. "The Earliest Maya." *Scientific American* 236, no. 3: 116-133.
- Havens et al. 2006. "Ex situ plant conservation and beyond." *BioScience* 56, 525-531.
- Heywood, Vernon. 1989. *Botanic Gardens Conservation Strategy*. Gland, Switzerland: IUCN Botanic Gardens Conservation Secretariat, Kew and WWF and IUCN.

- IPNI. 2021. "International Plant Names Index." The Royal Botanic Gardens, Kew, Harvard University Herbaria & Libraries and Australian National Botanic Gardens. Accessed March 29, 2021. <http://www.ipni.org>.
- Isakson, S. Ryan. 2009. "No Hay Ganancia en la Milpa: The Agrarian Question, Food Sovereignty, and the On-Farm Conservation of Agrobiodiversity in the Guatemalan Highlands." *The Journal of Peasant Studies* 36, no. 4: 725-759.  
<https://doi:10.1080/03066150903353876>.
- Izurieta, Mateo Ponce. 2004. "Diseño Técnico de un Jardín Botánico del Bosque Seco Tropical en Zamorano." Bachelor's thesis. Zamorano University.
- Jardín Botánico Lancetilla. n.d. Last updated August 2006.  
[http://jblancetilla.org/welcome\\_ingles.htm](http://jblancetilla.org/welcome_ingles.htm).
- Joyce, Rosemary A. and Cheryl Claassen. 1994. *Women in Archaeology*. Philadelphia: University of Pennsylvania Press.
- Lalonde, Roberto Eduardo Rivera. 2015. "Entre Armas y Dádivas: The Xicaque Before Spanish Rule in Leán y Mulia, Honduras 1676-1821." PhD. diss., Tulane University.
- Madrid, Javier. 2019. (Zamorano Campus Architect), in discussion with the author. May.
- Malo, Simón E. 1999. *El Zamorano: Meeting the Challenge of Tropical America*. Manhattan, Kansas: Simbad Books.
- Martinez, Cinthya, and Francisco Javier Villamar. 2018. (Zamorano campus grounds), in discussion with the author. May.
- Martinez, Cinthya, Raúl Soto, and Martin Leal. 2019. (Zamorano faculty), in discussion with the author. May 17.
- Mori, Scott A. 2013. "The Shifting Science of Botanical Nomenclature – I." New York Botanical Garden. <https://www.nybg.org/blogs/plant-talk/2013/06/science/the-shifting-science-of-botanical-nomenclature-i>.

- Pérez, Dora Elisa. 2015a. *Orquídeas Nativas de Honduras*. Tegucigalpa, Honduras: n.p.
- Pérez, Dora Elisa. 2015b. *Orquídeas Nativas de Honduras: Volume 2*. Tegucigalpa, Honduras: n.p.
- POWO. 2021. "Plants of the World Online." The Royal Botanic Gardens, Kew. Accessed March 29, 2021. <http://www.plantsoftheworldonline.org>.
- Pyne, Lydia and Ken Feisel. 2020. "From Head to Toe in the Ancient World." Archaeological Institute of America. <https://www.archaeology.org/issues/386-2007/features/8757-maya-clothing-jewelry-body-modification>.
- Rosengarten, Frederic. 1991. *Wilson Popenoe: Agricultural Explorer, Educator, and Friend of Latin America*. Lawai, Kauai, Hawaii: National Tropical Botanical Garden.
- Salgado, Sheila, Manlio Ceroni, Abelino Pitty, Isaac Ferrera and Jeffrey Lansdale. 2019. *Annual Report 2019*. Francisco Morazán, Honduras: Zamorano University.
- Smith, Paul and Yvette Harvey-Brown. 2017. *BGCI Technical Review: Defining the botanical garden, and how to measure performance and success*. Richmond, United Kingdom: Botanic Gardens Conservation International.
- Sniff, Daniel and Jack Crowley. 2010. *Zamorano Campus Master Plan*.
- Squier, Ephraim George. 1858. *The States of Central America*. New York: Harper & Brothers.
- UNAH Jardín Botánico. n.d. Universidad Nacional Autónoma de Honduras. Accessed March 29, 2021. <https://biologia.unah.edu.hn/galeria/jardin-botanico>.
- Zamorano. 2019. "Orquideario para conservar la biodiversidad e impulsar la investigación." University of Zamorano. Accessed March 29, 2021. <https://www.zamorano.edu/2019/12/04/orquideario-para-conservar-la-biodiversidad-e-impulsar-la-investigacion>.
- UTV: Reportaje: Jardín Botánico De La UNAH. YouTube. 2014. <https://www.youtube.com/watch?app=desktop&v=j8T6huw8Bk4>.

Walker, Jeff. 1999. "Sister Gardens." UGA Latin American Ethnobotanical Garden. Accessed March 29, 2021. <http://ethnobot.uga.edu/home.html>.

Zamorano. 2019a. "Escultura en honor al primer rector latinoamericano Simón Malo." University of Zamorano. Accessed March 29, 2021. <https://www.zamorano.edu/2019/03/06/escultura-en-honor-al-primer-rector-latinoamericano-simon-malo>.

Zamorano. 2019b. "Orquideario para conservar la biodiversidad e impulsar la investigación." University of Zamorano. Accessed March 29, 2021. <https://www.zamorano.edu/2019/12/04/orquideario-para-conservar-la-biodiversidad-e-impulsar-la-investigacion>.

Zamorano. n.d. *Campus Guide*. Francisco Morazán, Honduras: Zamorano University.

**APPENDIX A**

<b>12:05pm</b>	Arrival Delta # 849	Toncontín Airport	Zamorano driver
<b>1:30 pm</b>	Arrival at Zamorano And light lunch	Casa de Huéspedes No. 1	Gloria Rojas
<b>3:30 pm</b>	Meeting with Javier Madrid	Casa de Huéspedes No. 1	Javier Madrid
<b>6:00 pm</b>	Dinner	Doris Stone Student Dinning Hall	TBD

**Tuesday, May 14, 2019**

<b>Hour</b>	<b>Activity</b>	<b>Place</b>	<b>Details</b>
<b>7:00 am</b>	Breakfast	Doris Stone Student Dinning Hall	TBD
<b>8:30 – 11:00</b>	Farm off campus visit	Finca Agroecológica	Josué León / Karen Bárceñas
<b>12:00 m</b>	Lunch	Doris Stone Student Dinning Hall	TBD
<b>1:30 – 2:20 pm</b>	Ideas to share with Chef Eduardo and Ligia concerning menus and strategy at new cafeteria at Kellogg	W. K. Kellogg Cafeteria	Ligia Contreras Eduardo Mora Carlos Santos
<b>4:00 pm</b>	Meeting with Claudia de Trabanino and early dinner at their place	Trabanino's Residence	Rogelio Trabanino / Claudia

**Wednesday, May 15, 2019**

Hour	Activity	Place	Details
7:00 am	breakfast	Doris Stone Student Dinning Hall	TBD
9:00 am	Visit site for the orchidiarium	CEDA	Javier Madrid
10:30 – 11:30 am	Meeting with Raúl Soto (Review and up date Master plan)	AGN Department	Raúl Soto / Javier Madrid
12:00 – 1:00 pm	lunch	Doris Stone Student Dinning Hall	TBD
2:00-3:00	Meeting with Isaac Ferrera regarding green houses	Isaac Ferrera's office	Isaac Ferrera
3:40 4:20 pm	Meeting with Mayra Márquez (Review and up date Master plan)	AGI Department	Mayra Márquez / Javier Madrid
6:00 pm	Dinner	Doris Stone Student Dinning Hall	TBD

**Thursday, May 16, 2019**

Hour	Activity	Place	Details
7:00 am	Breakfast	Doris Stone Student Dinning Hall	TBD
9:00 -10:20 am	Meeting with Erika Tenorio (Review and up date Master plan)	E&D department	Erika Tenorio/ Javier Madrid
10:30 – 11:30 am	Meeting with Rogel Castillo (Review and up date Master plan)	Agronomy Department	Rogel Castillo / Javier Madrid
12:00 – 1:00 pm	lunch	Doris Stone Student Dinning Hall	TBD
2:00 pm	Possible project for design of new clinic	Javier's office	Javier Madrid/ Carlos Santos
3:15 pm	Possible project for design and construction of new clinic outside campus	Javier's Office	Javier Madrid
7:00-8:30 pm	Dinner	Casa Cabot	Jeff Lansdale

**Friday, May 17, 2019**

Hour	Activity	Place	Details
7:00- 8:00 am	breakfast	Doris Stone Student Dinning Hall	TBD
8:45 am	Leave for Tegucigalpa		Zamorano driver
10:00 am	Meeting with Gabriela Galvez (Fullbright scholarships)	US Embassy Tegucigalpa	Zamorano driver
1:00 pm	lunch	El Tigrito	TBD
2:00 – 2:45 pm	Meeting with Olvin Rodríguez (New Coffee Center)	TBD	Olvin Rodriguez/ Javier Madrid
3:00- 4:00 pm	Review business plan for the orchid center	AGN Department	Cintha Martinez, Raúl Soto, Martin Leal

**Saturday, May 18, 2019**

Hour	Activity	Place	Details
7:00 -8:00 am	Breakfast	Doris Stone Student Dinning Hall	TBD
8:30 – 9:30 am	New Honey Processing Center Site	AGI Department	Javier Madrid

**Sunday, May 19, 2019**

Hour	Activity	Place	Details
7:00 am	Breakfast	Doris Stone Student Dinning Hall	TBD
FREE	FREE	FREE	FREE

**Monday, May 20, 2019**

Hour	Activity	Place	Details
7:00 am	Breakfast	Doris Stone Student Dinning Hall	TBD
10:00 am	Leave for airport		Zamorano driver

APPENDIX B



Benjamin Proulx, The Smith Falck Center and Royal palms, *Roystonea regia*, in full fruit, 2019, watercolor & ink, University of Zamorano



Benjamin Proulx, Royal palms, *Roystonea regia*, along the central campus axis, 2019, watercolor & ink, University of Zamorano

## APPENDIX C

IMPORTANT OLD WORLD CROPS			
SCIENTIFIC NAME	ENGLISH COMMON NAME	SPANISH COMMON NAME	NOTE
<i>Saccharum officinarum</i>	sugar cane	caña de azúcar	Introduced from the Canary Islands to Hispaniola in 1493. Grown on the Zamorano property since at least the mid 1800's or longer.
<i>Vitis vinifera</i>	European grape	uva europea	Introduced to Hispaniola in 1493 by Christopher Columbus. First planted on the east coast of North America in 1621.
<i>Olea europaea</i>	olive	aceituna	Introduced by Christopher Columbus during his voyage in 1492.
<i>Musa spp.</i>	banana	banana/plátano	Banana rhizomes brought to Santo Domingo from the Canary Islands of Spain in 1516.
<i>Triticum spp.</i>	wheat	trigo	Spanish bring wheat to New World in 1520. Cultivation in Virginia begins in 1618.
<i>Hordeum vulgare</i>	barley	cebada	Introduced during the 1600's to North America.
<i>Vicia faba</i>	broad bean	haba (fava)	Most likely brought to the "New World" by Mercedarian friars
<i>Prunus persica</i>	peaches	melocotón	Brought to New World approximately 1560's.
<i>Malus domestica</i>	apples	manzana	First apple orchard planted in North America in 1625.
<i>Pyrus communis</i>	pear	pera	First brought by British and French to North America in 1630.
<i>Prunus domestica</i>	European plum	ciruela europea	European plums sold in New York as early as 1737.
<i>Prunus salicina</i>	Japanese plum	ciruela japonesa	Japanese plum introduced to North America in 1870.
<i>Citrus sinensis</i>	orange	naranja	Oranges are introduced to Florida by Juan Ponce de Leon in 1513.
<i>Citrus limon</i>	lemon	limón	Lemons are introduced to Florida by Juan Ponce de Leon in 1513.
<i>Cannabis sativa</i>	hemp	cañamo	Spanish introduce hemp to the New World in 1545.
<i>Avena sativa</i>	oat	avena	Oat first introduced to North America in 1602.
<i>Oryza sativa</i>	rice	arroz	Rice gets introduced to modern day Charleston, South Carolina in 1685.
<i>Coffea arabica</i>	coffee	café	Coffee first introduced to New World in 1720.
<i>Phoenix dactylifera</i>	date	dátiles	Date introduced to California in 1765.
<i>Ficus carica</i>	fig	higo	Fig varieties were sent to the West Indies in 1520. Introduced to Mexico by Hernan Cortez in 1560.
<i>Prunus armeniaca</i>	apricot	albaricoque	Apricot introduced to California in 1770.
<i>Artocarpus altillis</i>	breadfruit	panapen	Breadfruit seedlings brought to St. Vincent in 1793.
<i>Beta vulgaris</i>	sugar beet	remolacha azucarera	Sugar beets are grown in North America in 1836 to produce sugar.
<i>Citrus paradisi</i>	grapefruit	pomelo	Grapefruit trees introduced from Spain to Florida in 1840.
<i>Prunus dulcis</i>	almond	almendra	Almonds introduced to California in 1843.
<i>Sorghum bicolor</i>	sorghum	sorgo	Sorghum introduced from Africa to North America in 1850.
<i>Myristica fragrans</i>	nutmeg	nuez moscada	Planted on Grenada in 1858.
<i>Actinidia deliciosa</i>	kiwi	kiwi	Kiwi first exported to United States in 1904, then later introduced for growing in California in 1934 and then reintroduced with greater success in 1958.

## APPENDIX D

IMPORTANT NEW WORLD CROPS			
SCIENTIFIC NAME	ENGLISH COMMON NAME	SPANISH COMMON NAME	NOTE
<i>Ananas comosus</i>	pineapple	piña	Introduced to Europe in 1514. Introduced to Hawaii in 1790.
<i>Capsicum spp.</i>	chili pepper	chile	Portuguese bring chili peppers to India in 1525.
<i>Cinchona spp.</i>	quinine	cinchona	Quinine powder introduced to Spain and Rome in 1632. Plants and seeds sent from Ecuador to London in 1860.
<i>Citrus sinensis</i>	navel orange	naranja de oblige	After its introduction to the New World, a new mutation called the navel orange was discovered in Brazil in 1869.
<i>Erythroxylum coca</i>	coca	coca	Amerigo Vespucci records observed use of coca in 1499.
<i>Helianthus spp.</i>	sunflower	girasol	Spanish introduced sunflowers to Europe as an oil crop in 1510.
<i>Hevea brasiliensis</i>	Para rubber	árbol de caucho	Domesticated in South America in 1872.
<i>Indigofera spp.</i>	indigo	índigo	Species of indigo from the "New World" introduced to Europe in 1516.
<i>Ipomoea batatas</i>	Sweet potato	batata	Sweet potato introduced to England in 1564.
<i>Nicotiana tabacum</i>	tobacco	tabaco	First observed in 1493 by Columbus being used medicinally by Native Americans. Tobacco cultivation in Europe begins in 1556. British begin cultivation in Virginia in 1612.
<i>Persea americana</i>	avocado	aguacate	Introduced to Florida in 1833.
<i>Rubus x loganobaccus</i>	loganberry	frambuesa de logan	Loganberry hybrid first developed in North America in 1881.
<i>Rubus ursinus x Rubus idaeus</i>	boysenberry	boysenberry	Developed in North America by crossing blackberry, raspberry and loganberry in 1920.
<i>Solanum lycopersicum</i>	tomato	tomate	The first written description of tomato published in Italy in 1534. First introduced to England in 1590.
<i>Solanum tuberosum ssp. andigena</i>	potato	patata	Potatoes from South America are introduced to Germany and North America for the first time in 1621. By 1765 it has become Europe's most widely used food.
<i>Theobroma cacao</i>	cocoa	cacao	Hernan Cortes introduces chocolate back to Europe in 1520. Chocolate paste gets introduced to Europe in 1615.
<i>Zea mays</i>	corn	maíz	Maize first planted in China in 1516.

APPENDIX E



**EDIFICIO ZEMURRAY (ADMINISTRACIÓN GENERAL) / ZEMURRAY HALL (GENERAL ADMINISTRATION), 5-D**

**Rectoría / President's Office**  
**Oficina de Avance Institucional / Institutional Development Office**  
**Decanato Académico / Academic Dean's Office**  
**Contabilidad y Proyectos / Accounting and Projects**  
**Tesorería y Presupuesto / Treasury and Budget**

**OTRAS OFICINAS ADMINISTRATIVAS / OTHER ADMINISTRATIVE OFFICES**

**Admisión y Beca / Admissions and Financial Aid, 5-D**  
**Biblioteca Wilson Popocatepec / Wilson Popocatepec Library, 5-F**  
**Gerencia de Comunicación / Communications Office, 5-F**  
**Compras y Bodega Principal / Purchasing and Main Warehouse, 6-E**  
**Construcción y Asistencia / Construction and Auditing, 6-E**  
**Correo / Campus Post Office, 5-D**  
**Recursos Humanos / Human Resources Office, 6-E**  
**Gerencia de Planta Física / Physical Plant Office, 7-E**  
**Programas Internacionales y Colocación / International Programs and Placement, 5-D**  
**Registro / Registrar's Office, 5-D**  
**Reproducción / Photocopy Center, 5-D**  
**Servicios Estudiantiles / Student Services, 5-D**  
**Vigilancia / Security, 7-E**

**PROGRAMAS ACADÉMICOS / ACADEMIC PROGRAMS**

**Agricultura Alimentaria / Agroindustry, 4-D**  
**Ingeniería Agrícola / Agricultural Science and Production, 7-1**  
**Desarrollo Socioeconómico y Ambiental / Socioeconomic Development and Environment, 5-A**  
**Agropecuarias / Agribusiness Management, 6-E**

**EMPRESAS UNIVERSITARIAS / UNIVERSITY ENTERPRISES**

**Ganado Lechero / Dairy Cattle, 3-J**  
**Ganado de Carne / Beef Cattle, 4-B**  
**Casas Productas / Swine, 1-I**  
**Riego y Maquinaria Agrícola / Irrigation and Machinery, 7-E**  
**Planta de Procesamiento de Productos Hortofrutícolas / Vegetable and Fruit Processing Plant, 6-I**  
**Planta de Concentrados Animales y Semillas / Feed and Seed Processing Plant, 7-I**  
**Planta de Procesamiento de Carne / Meat Processing Plant, 3-D**  
**Planta de procesamiento de leche / Milk Processing Plant, 3-D**  
**Planta de Procesamiento de Maderas / Wood Processing Plant, 3-C**

**AULAS Y AUDITORIOS / CLASSROOMS AND AUDITORIUMS**

**Curso General / General Curriculum, 6-F**  
**Aulas / Classrooms, 7-E**

**RESIDENCIAS Y DORMITORIOS ESTUDIANTILES / STUDENT RESIDENCES AND DORMITORIES**

**Arboreto y II C-1 Los Libertadores P-0**  
**-Sucre, 5-E**  
**-Bolivar, 5-E**  
**-San Martín, 5-E**  
**Maya, 7-I**  
**Rubén Darío, 4-F**  
**Washington, 4-E**  
**Caballero, 5-F**  
**Delgado, 5-E**  
**Barrios, 5-E**  
**Mora, 5-E**  
**Morazán, 5-F**  
**Las Américas, 5-E**

**FACILIDADES DEPORTIVAS / SPORTS FACILITIES**

**Canchas Deportivas / Athletic Fields, 3-G**  
**Gimnasio / Gym, 4-G**  
**Piscina / Swimming Pool, 4-E**  
**Canchas de Tenis Pútema / Pútema Tennis Courts, 3-H**  
**Club Equestre / Equestrian Club, 3-I**

**SERVICIOS ESTUDIANTILES / STUDENT SERVICES**

**Barbería / Barber Shop, 4-F**  
**Clinica Médica / Clinic, 4-F**  
**Centro Estudiantil / Student Center, 5-B**  
**Cafetería / Cafeteria**  
**-Cooperativa de Ahorro y Crédito / Savings and Loan Cooperative**  
**-Farmacia / Pharmacy**  
**-Librería Zamorano / Zamorano Bookstore**  
**-Tienda Varías / Various Shops**  
**Comedor Estudiantil Doris Zamorano Stone / Doris Zamorano Stone Student Dining Hall, 5-F**  
**Lavandería estudiantil / Student's Laundry, 7-D**

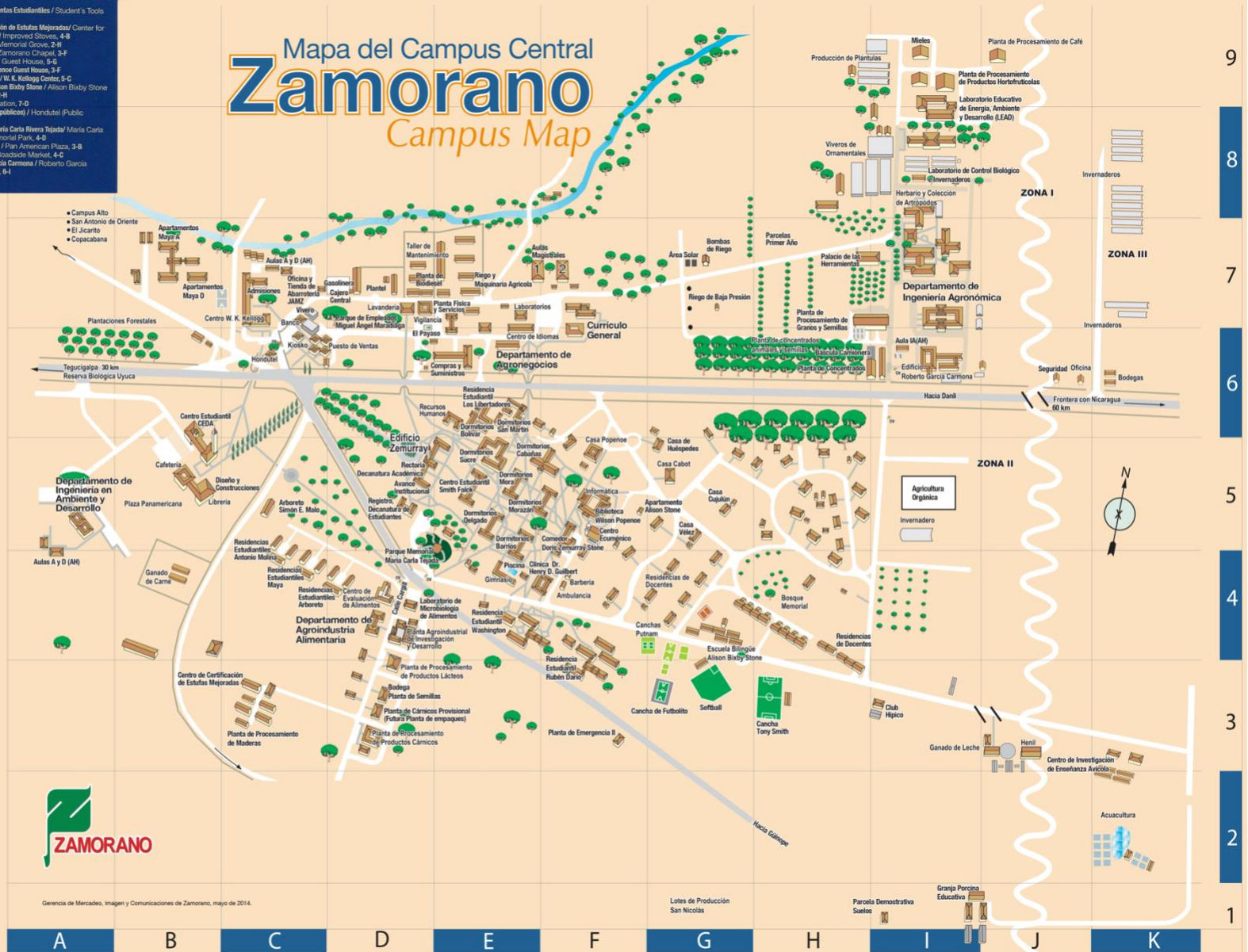
**OTROS / OTHER**

**Arboreto Simón E. Mala / Simón E. Mala Arboretum, 3-D**  
**Agricultura Orgánica / Organic Agriculture, 5-I**  
**Banco / Bank, 5-C**

**Bodega de Herramientas Estudiantiles / Student's Tools Warehouse, 5-H**  
**Centro de Certificación de Estudios Mejorados / Center for the Certification of Improved Studies, 4-A**  
**Boque Memorial / Memorial Grove, 2-H**  
**Capilla Zamorano / Zamorano Chapel, 3-F**  
**Casa Cabot / Cabot Guest House, 5-C**  
**Casa Popocatepec / Popocatepec Guest House, 3-F**  
**Centro W. K. Kellogg / W. K. Kellogg Center, 5-C**  
**Escuela Bilingüe Alison Dixy Stone / Alison Dixy Stone Bilingual School, 2-H**  
**Gasolinera / Gas Station, 7-D**  
**Honduras / Honduras (Public Telephone), 4-C**  
**Parque Memorial María Carla Rivera Tejeda / María Carla Rivera Tejeda Memorial Park, 4-D**  
**Plaza Panamericana / Pan American Plaza, 3-B**  
**Puesto de Ventas / Roadside Market, 4-C**  
**Edificio Roberto García Carmona / Roberto García Carmona Building, 6-I**

# Mapa del Campus Central Zamorano

## Campus Map



Gerencia de Mercado, Imagen y Comunicaciones de Zamorano, mayo de 2014.

# Sendero GECO

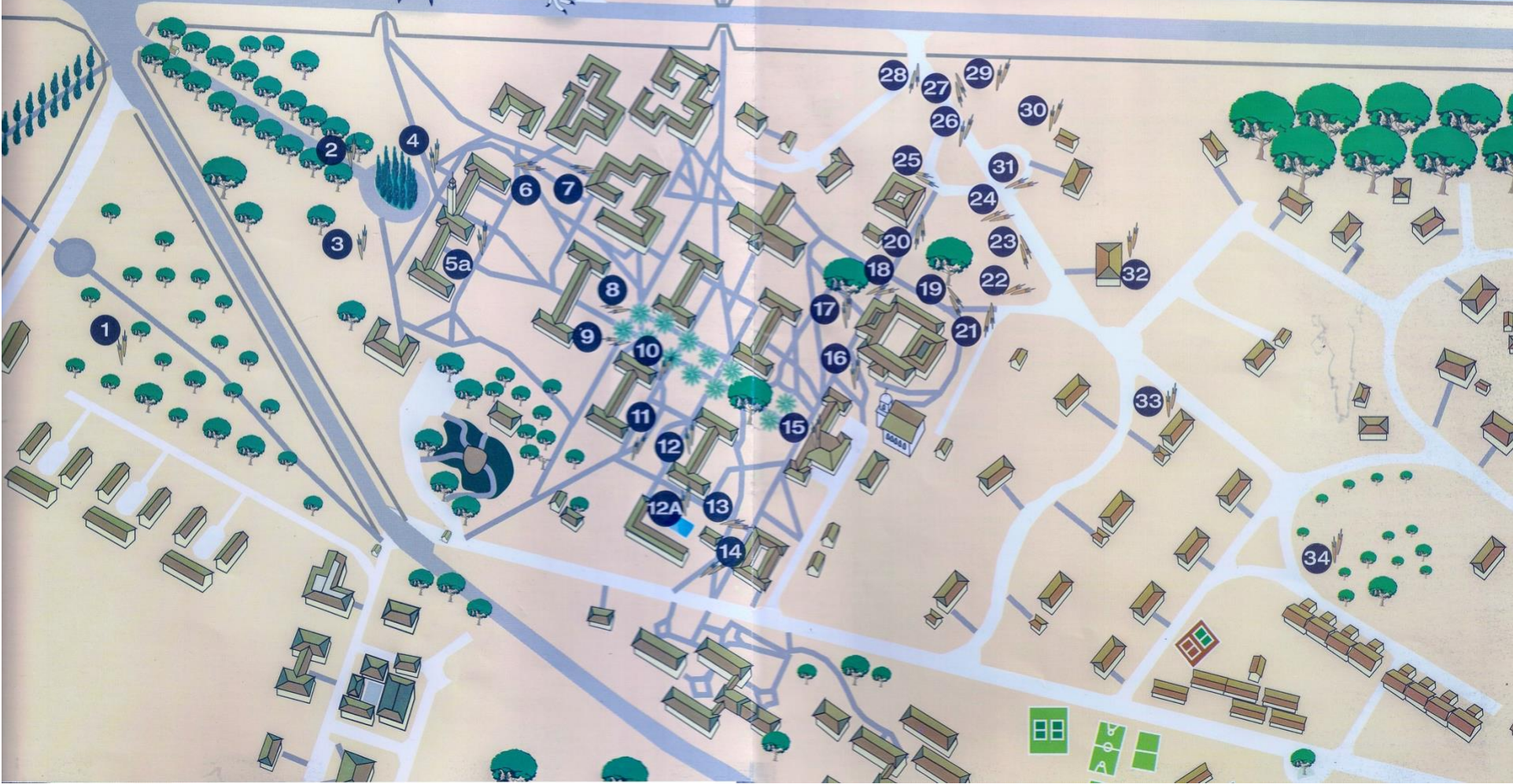


## ESPECIES BOTÁNICAS Y PUNTOS DE INTERÉS EN ZAMORANO

Esta guía fue elaborada con el apoyo del Grupo de Ecocaminantes-Geco, constituido por estudiantes y docentes dedicados a ayudar a la comunidad zamorana a entender y apreciar mejor nuestro ambiente.  
La guía fue actualizada en mayo 2011 por Nelson Agudelo, Ramón Muñoz y Samantha Perard.

## BOTANICAL SPECIES AND POINTS OF INTEREST AT ZAMORANO

This guide was developed with the support of Ecocaminantes -Geco Group, made up of students and professors dedicated to helping the Zamorano community to better understand and appreciate our environment.  
The guide was updated in May 2011 by Nelson Agudelo, Ramón Muñoz and Samantha Perard.



1. **Arboreto Simón E. Malo.** Este lote demostrativo contiene 63 especies distribuidas en 31 familias. La mayoría de las especies proceden del Jardín Botánico Lancaštila. El jardín está enclavado en las tierras bajas (0-1000 m) de la zona de vida o ecotono bosque muy húmedo subtropical, con aproximadamente 3,600 mm de precipitación promedio total anual.

El **Arboreto Simón Malo** debe su nombre al Dr. Simón Eduardo Malo, quien fuera Director de Zamorano durante el periodo 1979-1992 y quien también consiguió los fondos para su establecimiento por medio de la Fundación Wallace.

2. **Ficus benjamina L. Moraceae.** Laurel de la India. Especie originaria de la India y de la Península Malaya. Presenta un crecimiento denso característico, con ramas y hojas péndulas. Fue traído del Jardín Botánico Lancaštila por el Dr. Wilson Popenoe, uno de los fundadores de Zamorano y Director (1942-57). Es el tipo grande original, distinto de las variedades comerciales corrientes que han sido seleccionadas por entrenudos cortos.

3. **Polyalthia longifolia** Benth. et Hook. **Annonaceae.** Árbol de los reyes, Ashoka. Árbol de hasta 10 m de altura, usado como ornamental. Se introdujo de Tailandia a Zamorano en 1978 por el Dr. Simón Malo (Clase '54). La fuente de agua fue diseñada en 1947 por el famoso arquitecto e historiador americano Verle L. Annis, quien escribió la historia arquitectónica de Antigua Guatemala.

4. **Myrciaria cauliflora** Berg. **Myrtaceae.** Jaboticaba o cereza de Brasil. Arbusto originario del sur de Brasil, considerado por muchos como el más bello del género. Las flores nacen del tronco, fenómeno conocido como "cauliflora". En Brasil, el fruto es usado para elaborar refresco y vino.

5. **Ficus pumila L. Moraceae.** Falsa hiedra en Honduras y Costa Rica. Planta trepadora originaria de China y Japón. Se adhiere a las paredes a través de sus raíces. Plantada por el Dr. W. Popenoe.

5a. **Edificio Zeturmary** (Administración General). Este edificio servía, desde 1944 hasta la década de los 70, como salón de clases, laboratorios y oficinas. El salón principal se utilizó como auditorio y sala de cine. Fue bautizado como "Samuel Zeturmary Jr. Hall" en honor al hijo de uno de los fundadores de Zamorano, Samuel Zeturmary.

6. **Elaeis guineensis** Jacq. **Arecaceae.** Palma africana o aceituna. Especie originaria de África tropical. Es una planta monóxica que tiene inflorescencias masculinas y femeninas. El aceite de la palma es extraído de la pulpa de los frutos a través de un proceso industrial y se usa para cocinar. Traída de Lancaštila por Wilson Popenoe.

7. **La Campana Vieja.** El Dr. William C. Paddock, el segundo director de Zamorano (1958-63), colocó esta campana como una balsa, nombrada en honor a Thomas Jefferson Coolidge, uno de los fundadores principales de Zamorano. La Campana, que señalaba el principio y el fin de la jornada, está ubicada entre los dormitorios Sucre, Bolívar y el Edificio Zeturmary. El **Staff House** fue construido en 1943 con el propósito de hospedar a los profesores solteros. Este sitio alberga el Centro Estudiantil Smith-Falk.

8. **Cupressus sempervirens L. var. stricta** Aiton. **Cupressaceae.** Ciprés italiano. Árbol que alcanza hasta 60 m de altura. Es originario de Grecia y Chipre. Sus ramas le dan una apariencia piramidal. Es cultivado en jardines de Europa donde se caracteriza por su longevidad. Ejemplares de esta especie se llaman estar plantadas a orillas del camino entre el Staff House y el comedor, pero el Dr. William C. Paddock decidió reemplazarlos por palma real en la década de los 60 porque consideraba que daban la apariencia de un cementerio.

9. **Syagrus macrocarpa** Rodrig. **Arecaceae.** Palma del Orinoco. Es una palma nativa de Brasil y Venezuela, que alcanza hasta 20 m de altura. Tiene hojas delgadas que se ponen rígidas cuando están viejas. Produce numerosos frutos que son usados para engordar cerdos. También es empleada como especie de ornato.

10. **Roystonea regia** (Kunth) Cook. **Arecaceae.** Palma real por su excepcional belleza. Es originaria del Caribe y es el árbol nacional de Cuba. Se usa para decorar alamedas, parques y jardines. Alcanza entre 25 y 30 m de altura.

11. **Tabebuia rosea** (Bertol) DC. **Bignoniaceae.** Macaulezlo, robe de sabana, apamate o macaiguallun. Árbol nacional de El Salvador. En la estación seca se llena de flores vistosas de color rosado o morado.

12. **Cela panatandra** (L.) Gaertn. **Bombacaceae.** Ceiba. Es el árbol nacional de Guatemala. Alcanza a medir hasta 33 m

1. **The Simon E. Malo Arboretum.** This demonstration lot currently contains 63 species from the north families, most of which proceed from the Lancaštila Garden. The garden is located near the town of Telsa on the north coast of Honduras in the country's lowlands (0-1000 m) in a subtropical humid forest ecosystem with an average of approximately 3,600 mm of annual rainfall.

The **Simon Malo arboretum** is named after Dr. Simón Eduardo Malo, who was Zamorano's Director from 1979 to 1992 and who obtained the funds for the arboretum's establishment through a generous contribution from the Wallace Foundation.

2. **Ficus benjamina L. Moraceae.** Indian Laurel. A species native to India and the Malay Peninsula which is characteristic for its dense growth and pendulous branches and leaves. It was brought from the Lancaštila Botanical Garden by Dr. Wilson Popenoe, one of Zamorano's founders and its Director from 1942 to 1957. This is the original large type different from current commercial varieties that have shorter internodes.

3. **Polyalthia longifolia** Benth. & Hook. **Annonaceae.** Indian Mast Tree or False Ashoka. An ornamental tree with a height of up to 10 m that Dr. Simón Malo, Class of '54, introduced in 1978 from Thailand. The water fountain was designed in 1947 by the famous American architect and historian Verle L. Annis, who also wrote the architectural history of Antigua Guatemala.

4. **Myrciaria cauliflora** Berg. **Myrtaceae.** Jaboticaba or Brazilian cherry is a shrub native to southern Brazil and is considered by many as the most beautiful of the genus. The flowers bloom from the trunk, a phenomenon known as cauliflora. In Brazil the fruit is used to make soft drinks and wine.

5. **Ficus pumila L. Moraceae.** False Ivy in Honduras and Costa Rica. Is a climbing plant native to China and Japan that adheres to walls with its roots. It was planted by Dr. W. Popenoe.

5a. **The Zeturmary Building - General Administration.** This building served as classrooms, laboratory and offices from 1944 until the 70s. The main hall was used as an auditorium and movie theater. It was named Samuel Zeturmary, Jr. Hall after the son of one of Zamorano's founders, Samuel Zeturmary.

6. **Elaeis guineensis** Jacq. **Arecaceae.** African oil palm. This species is a native to tropical Africa. It is a monoecious plant which has male and female inflorescences. Palm oil is extracted from the fruit pulp in an industrial process and is used for cooking and cosmetic production, among other uses. It was brought from Lancaštila by Dr. Wilson Popenoe.

7. **The Old Bell.** Dr. William C. Paddock, Zamorano's second director from 1958 to 1963, placed this bell beside a bench, in honor of Thomas Jefferson Coolidge, one of Zamorano's main founders. The bell is rung to mark the beginning and end of the day and is located between the Sucre and Bolívar dormitories and the Zeturmary building.

The **Staff House** was built in 1943 to house single professors and is the site of the Smith Falk Student Center.

8. **Cupressus sempervirens L. var. stricta** Aiton. **Cupressaceae.** Italian cypress is a tree native to Greece and Cyprus that reaches up to 60 m in height. Its branches give it a pyramidal look. It is grown in gardens in Europe and is characterized by its longevity. For many years specimens of this species were planted next to the path between the Staff House and the dining hall, but Dr. William Paddock decided to replace them with royal palm trees in the 60s because he thought the cypresses gave the campus the appearance of a cemetery.

9. **Syagrus macrocarpa** Rodrig. **Arecaceae.** Orinoco Palm. It is a palm native to Brazil and Venezuela, which reaches up to 20 m in height. It has narrow leaves that turn gray when they are old. It produces fruits that are used for fattening pigs. It is also an ornamental species.

10. **Roystonea regia** (Kunth) Cook. **Arecaceae.** The Royal Palm, famous for its outstanding beauty, is native to the Caribbean and is Cuba's national tree. It is used to decorate avenues, parks and gardens and can reach heights of between 25 and 30 m.

11. **Tabebuia rosea** (Bertol) DC. **Bignoniaceae.** The Macaulezlo also known as Mayflower, Pink Trumpet Tree or Spanish oak is El Salvador's national tree. During dry season it blossoms with colorful pink and purple flowers.

12. **Cela panatandra** (L.) Gaertn. **Bombacaceae.** Ceiba. Es el árbol nacional de Guatemala. Alcanza a medir hasta 33 m

de altura y obtiene diámetros de más de 2.2 m. Fue considerado por los Mayas como árbol sagrado. Sus raíces representan el inframundo, la tierra y su hijo el cielo. Tiene propiedades medicinales.

12. **A. La Piscina** fue construida en 1950 por iniciativa de los estudiantes, quienes tomaron herramientas y empezaron su construcción. Una vez concluida de la entrega de los estudiantes, la Administración terminó la obra.

13. **Acacia mangium** Willd. **Mimosaceae.** Mokuca, mangium. Esta especie fue introducida por Nelson Agudelo desde Canberra, Australia, en la década del 80. Es originaria de las Islas Molucas. Se usa como ornamental, para producción de madera y en algunos sitios como barrera rompe vientos. Puede alcanzar una altura de 10 m y posee flores aromáticas de color blanco.

14. **Chrysalidocarpus lutescens** Wendland. **Arecaceae.** Palma area. Es originaria de Madagascar. Es usada como cultivo en grandes extensiones o como ornamental en maceteros. De la base de la planta nacen varios troncos enmarcados.

15. **Comedor Doris Zeturmary Stone.** Los pasillos funcionan como aulas durante la construcción del Edificio Principal. Fue bautizado con el nombre de la primera madrina de Zamorano, quien fue fundamental en la fundación de la institución y el remodelado de los primeros alumnos. Doña Doris fungió como miembro de la Junta Directiva de Fiduciarios desde 1942 hasta su muerte en 1994. Durante el periodo 1958 - 63 actuó como presidenta de la junta.

16. **Callistemon lanceolatus** Sweet. **Myrtaceae.** Escobilla, falso sauce. Es una especie nativa de Australia, es de la misma familia de la guayaba y los eucaliptos. Sus ramas péndulas le confieren el aspecto característico de tristezza, por lo que en algunas partes se le denomina falso sauce, aunque con el sauce no tiene ningún parentesco.

17. **Ficus morazanica** W. Burger. **Moraceae.** Amate o higuierón. Es un árbol de 25 m de altura. Crece en forma silvestre desde el suroeste de México hasta el área central de Costa Rica. Es utilizado para dar sombra en las grandes fincas por su espeso follaje y su gran cobertura.

18. **Litchi chinensis** Radlk. **Sapindaceae.** Lichi. Es una especie nativa del sudeste Asiático. Su fruto, de un color rojo brillante, tiene un sabor agri dulce. Tiene un valor ornamental por su frondosa copa.

19. **Dietes iridioides** (L.) Sweet ex Klatt. **Iridaceae.** Flor de mosco o corona del sur de África y tiene flores blancas con manchas amarillas. Es usado en jardinería como adorno al pie de árboles grandes.

20. **Yucca guatemalensis** Baker. **Liliaceae.** Flor de Izote. Esta especie es la flor nacional de El Salvador. Es nativa de la zona de Chiapas, México. Es comestible cubierto con queso o amate. Además su flor es comestible y se prepara en ensalada o frita con huevo. Tiene un tallo hasta de 10 m de altura. Sus hojas machacadas producen espuma, que puede ser usada para lavar ropa.

La **Casa Wilson Popenoe** fue diseñada por Wilson Popenoe y construida en 1944. Es el único edificio en Zamorano que tiene paredes de doble grosor. En 1979, el Dr. Simón E. Malo la convirtió en museo, y a la fecha es utilizada para hospedar visitantes distinguidos.

21. **Acrocomia mexicana** Karw. **Arecaceae.** Palma coyol. Planta originaria del sudeste de México, Guatemala, El Salvador y Honduras que llega a medir hasta 15 m de altura. Su estipeite café está totalmente cubierto de espigas de hasta 6 cm de largo, que antiguamente eran usadas como aguijas. Sus hojas pinnadas son hasta de 4 m de largo. Los frutos son cocidos en almibar en algunas zonas, principalmente en la época de Semana Santa. En Zamorano se cree que esta especie está afectada por una enfermedad conocida como amarillamiento letal.

22. **Phyllocarpus septentrionalis** D. Sm. **Caesalpinaceae.** Corallillo. Árbol nativo de Guatemala y Honduras, que alcanza una altura entre 15 y 35 m. Entre enero y marzo pierde sus hojas y sus flores son de color rojo brillante. Estas flores son apreciadas por los loritos verdes que rondan en el valle. Fue traída por Wilson Popenoe de Guatemala. Popenoe decía que San Pedro, no lo dejaría entrar al cielo si no distribuía este árbol por todo el mundo.

23. **Plumeria lutea** (Ruiz & Pavón) Woodson. **Apocynaceae.** Flor de mayo. Flor nacional de Guatemala. Sus flores son usadas en el Día de la Cruz como adorno en casas e iglesias. La savia se emplea en remedios caseros y produce un tipo de caucho. De la flor se obtiene un perfume llamado Frangipani.

12. **Cela panatandra** (L.) Gaertn. **Bombacaceae.** White silk tree. It is Guatemala's national tree and can reach up to 33 m in height with diameters of more than 2.2 m. It was considered a sacred tree by the Mayans with its roots representing hell, its trunk, the earth and its leaves, the sky. It also has medicinal properties.

12. **A. The swimming pool** was built in 1950 as an initiative of the students, who borrowed tools and began construction. Once convinced of the students' commitment, the Zamorano Administration completed the project.

13. **Acacia mangium** Willd. **Mimosaceae.** Mangium, Brown Salwood. This species from Canberra, Australia was introduced by Professor Nelson Agudelo in the 80s. It is native to the Maluku Islands and is used for as an ornamental, for timber production and in some places as a windbreaker. It can reach a height of 10m and has white fragrant flowers.

14. **Chrysalidocarpus lutescens** Wendland. **Arecaceae.** Area Palm. This palm is native to Madagascar and is used as a crop on large plantations or as an ornamental in pots. Small shoots form at its base which can be used for propagation by root division.

15. **The Doris Zeturmary Stone Dining Hall.** The corridors served as classrooms during the construction of the Main Building. It was named after Zamorano's first Godmother, Samuel Zeturmary's daughter, who was essential in the founding of the institution and the recruitment of the first students. Mrs. Zeturmary Stone was a member of the Board of Trustees from 1942 until her death in 1994. From 1958 to 1963 she was the Chairwoman of the Board.

16. **Callistemon lanceolatus** Sweet. **Myrtaceae.** Bottlebrush Plant. It is native to Australia and of the same family as guava and eucalyptus. Its pendulous branches give it a look characteristic of sadness, so in some parts is called false willow, although they are not related.

17. **Ficus morazanica** W. Burger. **Moraceae.** Common fig. A 25 m high tree that grows from southeastern Mexico to the central area of Costa Rica and is used to provide shade on large farms because of its thick foliage and large coverage area.

18. **Litchi chinensis** Radlk. **Sapindaceae.** Litchi. It is native to Southeastern Asia and its fruit has a bright red color and bitterness taste. It has ornamental value because of its leafy canopy.

19. **Dietes iridioides** (L.) Sweet ex Klatt. **Iridaceae.** African iris and escobilla. Native to southern Africa, this plant has white flowers with yellow markings. It is used in gardens as an ornament at the foot of large trees.

20. **Yucca guatemalensis** Baker. **Liliaceae.** Bluestem yucca. This species is El Salvador's national flower. It is native to the area of Chiapas, Mexico and is commonly grown for ornamental purposes. In addition, its flower is edible and can be used in salads or fried with chili. It has a stalk of up to 10 m high and its crushed leaves produce foam, which can be used for washing clothes.

The **Wilson Popenoe House** was designed by Wilson Popenoe and built in 1944. It is the only building at Zamorano that has double thick walls. In 1979, Dr. Simón E. Malo turned it into a museum, and it is also used to house distinguished visitors.

21. **Acrocomia mexicana** Karw. **Arecaceae.** Cru-gro Palm, Quacaw Palm. This plant is native to southern Mexico, Guatemala, El Salvador and Honduras and can measure up to 15 m in height. Its tips is fully covered with brown spines up to 3 inches long, which were formerly used as awl needles. Its pinnate leaves are up to 4 m long. The fruits are cooked in sugar syrup in some areas, mainly during Easter week. At Zamorano this species is believed to be affected by a disease known as lethal yellowing.

22. **Phyllocarpus septentrionalis** D. Sm. **Caesalpinaceae.** Corallillo. This tree is native to Guatemala and Honduras and reaches a height of between 15 and 35 m. Between January and March it loses its leaves and produces bright red flowers that are craved by the green parrots which live in the Zamorano valley. It was brought by Wilson Popenoe from Guatemala. Popenoe liked to say that St. Peter would not let him enter heaven if he did not distribute this tree all over the world.

23. **Plumeria lutea** (Ruiz & Pavón) Woodson. **Apocynaceae.** Saccuajoyote or Frangipani is Nicaragua's national flower. Its

24. **Araucaria heterophylla** (Salisb.) Franco. **Araucariaceae.** Araucaria. Especie siempre verde nativa de la Isla de Norfolk, Nueva Zelanda, que llega a medir hasta 60 m de altura. Se usa mucho como ornamental en los climas mediterráneos, y es importante para la producción de madera en Sudáfrica y otros países subtropicales.

25. **Cananga odorata** (Lam.) Hook. et Thoms. **Annonaceae.** Ilán Ilán. Es nativa de Java y Burma. El árbol es apreciado por su fragancia intensa de sus flores, especialmente en las noches, cuando puede ser detectado desde largas distancias. El aceite de sus flores es usado en perfumería.

26. **Dendrocalamus sikkimensis** Gamble. **Poaceae.** Bambú. Es una especie nativa de la India. Crece hasta 15 m de altura, con 10 cm de diámetro. Se utiliza para construcción y producción de estacas o toreros.

27. **Lagerstroemia speciosa** (L.) Persoon. **Lythraceae.** Júpiter de la reina. Especie que alcanza 20 m de altura en su lugar de origen, India tropical. Tiene flores moradas muy vistosas.

28. **Pterocarpus indicus** Willd. **Fabaceae.** Palo verde, nara. Es una especie nativa de la India. Alcanza una altura entre 15 y 20 m. Es un árbol maderable y es usado también como ornamental por su profusa floración amarilla.

29. **Spondias mombin L. Anacardiaceae.** Jocote de montaña. Especie nativa de México, cuya distribución se extiende desde Perú y Brasil. Posee frutos comestibles, pero de inferior calidad a otros jocos cultivados. Es utilizan también como cerco vivo o sombra para caletas.

30. **Entolobium cycarpum** (Jacq.) Griseb. **Mimosaceae.** Guanacaste o conacaste. El Guanacaste es un nombre de origen Nahuatl, que significa árbol de orejas, en alusión a la forma de las vainas. Es el árbol nacional de Costa Rica y puede alcanzar hasta 38 m de altura, con un diámetro de 1.7 m. Son árboles de crecimiento rápido, utilizados como sombra en pastizales y poblaciones. La resina es sustituta de la goma arábiga. Uno de ellos fue plantado por el Dr. Simón Malo en 1952, cuando era estudiante, en la esquina del dormitorio Morazán.

31. **Eucalyptus deglupta** Blume. **Myrtaceae.** Eucalipto o guayabo. Especie originaria de la zona de Guinea y las Islas Filipinas. Su madera es usada en construcciones, enmarcados, encofrados y acabados de interiores. Fue traída a Zamorano por Robert P. Armour (Director de Zamorano 1969-72). Estos árboles tienen más de 40 años de edad.

32. **Casa Cabot.** Nombrada en honor a Thomas D. Cabot, uno de los fundadores de Zamorano. Su generosidad hizo posible la adquisición y protección de fuentes de agua y recursos forestales que son necesarios para la estabilidad de la institución a largo plazo. Es la casa donde habita el Rector y su familia.

33. **Calliandra molinae** Standl. **Mimosaceae.** Palo de corcho. Es una especie ornamental nativa del valle del Yeguate. Son arbustos de mediano tamaño, ramas flexibles y resistentes y flores con estambres blancos y rosados. Florece dos a tres veces durante la misma temporada. La corteza se usa como flotadores para anzuelos y redes de pescar. El Dr. Paul C. Standley nombró esta especie en honor al profesor Antonio Molina R. (Clase '46).

34. **Guaicum sanctum L. Zygophyllaceae.** Guayacán real, lignum vitae (madera de la vida). Especie que se distribuye naturalmente desde el extremo sur de Florida hasta Colombia y Venezuela. Se encuentra también en la costa atlántica de México y en los países de América Central, en Bahamas, Puerto Rico, Belice, Cuba, República Dominicana y Haití. El guayacán se localiza en tierras bajas, a elevaciones menores de 1,000 m, en sitios desde áridos a subhúmedos. Árbol siempre verde y lúcido, aún en condiciones de extrema sequía, con copa perfectamente simétrica en estado maduro. Las flores son extremadamente bellas, de color violeta. La madera es extremadamente dura y pesada y tan fuerte como el hierro. Esta especie fue introducida a Zamorano desde el Valle de Comayagua, Honduras, por Nelson Agudelo en la década del 90.

**Árboles de Mesoamérica en peligro de extinción.** Este bloque de árboles contiene especies procedentes principalmente de ecosistemas secos de Mesoamérica, aunque contiene también individuos de zonas húmedas y algunas especies exóticas. Este bosque memorial constituye un reconocimiento a la generosidad de los amigos y colaboradores de Zamorano. A futuro, esta colección se continuará enriqueciendo con la introducción de nuevas especies y procedencias.

23. **Plumeria lutea** (Ruiz & Pavón) Woodson. **Apocynaceae.** Saccuajoyote or Frangipani is Nicaragua's national flower. Its

flowers are used on the Day of the Cross as a decoration in homes and churches. The sap is used for its medicinal properties in home remedies and also produces a type of rubber. A perfume called Frangipani is obtained from its flowers.

24. **Araucaria heterophylla** (Salisb.) Franco. **Araucariaceae.** Norfolk Island pine. This is an evergreen species native to Norfolk Island, New Zealand, which can reach up to 60 m in height. It is widely used, as an ornamental tree in Mediterranean climates and is important for timber production in South Africa and subtropical countries.

25. **Cananga odorata** (Lam.) Hook. et Thoms. **Annonaceae.** Yang Yang. This tree is native to Java and Burma where it is cherished for the intense fragrance of its flowers, especially at night, when its scent can be detected from long distances. The oil from its flowers is used in perfumes.

26. **Dendrocalamus sikkimensis** Gamble. **Poaceae.** This is a species native to India, which grows 15 m high with a diameter of 10cm. Its wood is used for construction and as plant tutors or stakes.

27. **Lagerstroemia speciosa** (L.) Persoon. **Lythraceae.** Banaba tree. This tree is native to tropical India, can reach up to 20 m in height and has very colorful purple flowers.

28. **Pterocarpus indicus** Willd. **Fabaceae.** Rosewood. It is native to India and reaches a height of between 15 and 20 m. It is a timber tree and is also used as an ornamental because of its profuse yellow flowers.

29. **Spondias mombin L. Anacardiaceae.** Hog Plum. This species is native to Mexico and has reached Peru and Brazil. It produces edible fruits, but they are of lower quality than other cultivated plants. It is also used as hedges or for shade in coffee plantations.

30. **Entolobium cycarpum** (Jacq.) Griseb. **Mimosaceae.** Ear pod tree, Guanacaste or conacaste. Guanacaste is a name of Nahuatl origin, meaning ear tree, in reference to the shape of its fruit. It is the Costa Rican national tree and can reach up to 38 m in height with a diameter of 1.7 m. It is a fast growing tree and is used for shade in pastures and towns. The resin can be used as a substitute for acacia gum. One tree was planted by Dr. Simón Malo in 1952 when he was a student, at the corner of the Morazán dormitory.

31. **Eucalyptus deglupta** Blume. **Myrtaceae.** Eucalyptus or guava. This species is native to the area of Guinea and the Philippine Islands. Its wood is used in construction, framing, formwork and interior finishing. It was brought to Zamorano by Robert P. Armour, Zamorano Director from 1969 to 1972. These trees are over 40 years old.

32. **Cabot House.** It was named in honor of Thomas D. Cabot, a Zamorano founder. His generous contributions made it possible for Zamorano to acquire and protect the water and forest resources that are vital for to the institution's long term survival. Zamorano's President and his family live here.

33. **Calliandra molinae** Standl. **Mimosaceae.** Palo corcho is an ornamental species native to the Yeguate Valley. They are medium size shrubs with flexible and resilient branches and flowers with pink and white stamens. It flowers two to three times per season. The bark is used as floats for fishing nets and hooks. Dr. Paul C. Standley named this species on honor of professor Antonio Molina R. (Clase '46).

34. **Guaicum sanctum L. Zygophyllaceae.** Lignum-vitae tree, lignum vitae (wood of life). This species is found naturally from the southern tip of Florida to Colombia and Venezuela. It is also found on the Atlantic coast of Mexico and in all the countries of Central America, the Bahamas, Puerto Rico, Belize, Cuba, Dominican Republic and Haiti. Lignum vitae trees are located in lowland areas at elevations below 1,000m in arid to sub-humid areas. It is a lush evergreen tree even in conditions of extreme drought with a perfectly symmetrical canopy when it reaches maturity. It has extremely beautiful violet flowers and extremely hard and heavy wood. This species was introduced to Zamorano in the 90s from the Comayagua valley, Honduras by Nelson Agudelo.

**Mesoamerican trees in danger of extinction.** This block contains species of trees mainly from dry ecosystems of Mesoamerica, but there are also species from humid areas and some exotic species. The memorial forest is a tribute to the generosity of Zamorano friends and collaborators. In the future, we will continue to enrich this collection by introducing new species.

# Zamorano en un vistazo

## Zamorano at a Glance

### MISIÓN INSTITUCIONAL

Zamorano desarrolla líderes con base en programas rigurosos, excelencia académica, Aprender-Haciendo, desarrollo de valores y carácter; y contribuye al progreso socioeconómico.

### EL CAMPUS

La propiedad total tiene más de siete mil hectáreas, entre bosque nublado que incluye dos micro cuencas, grandes áreas productivas, muchos sitios de esparcimiento y edificaciones diversas. Áreas verdes, senderos y lagunas sostienen una gran cantidad de especies silvestres que encuentran en el campus de Zamorano un refugio natural. Muchas de ellas son aves migratorias que viven en nuestros espacios durante ciertas épocas del año.

Amplios y modernos salones de clase multiusos están equipados con tecnología digital para facilitar el aprendizaje. La red de informática cubre los sitios accesibles del campus, con servicio de Internet las 24 horas del día. Los laboratorios especializados permiten el aprendizaje interactivo, incluyendo un moderno laboratorio de inglés. Sus plantas de procesamiento agroindustrial son sin duda el recurso más completo que existe para el aprendizaje en el ámbito universitario en la región, y más allá. El Herbario Paul C. Standley, conserva cerca de 300,000 especímenes clasificados de Mesoamérica. Además, su colección de insectos plagas y benéficos ronda los 200,000 ejemplares.

Zamorano también cuenta con un pequeño centro comercial, central telefónica y agencia bancaria disponible a la comunidad. El Centro de Capacitación W. K. Kellogg cuenta con aulas, salas de conferencia, instalaciones para hospedar hasta 114 personas y un auditorio con capacidad para 350 participantes.

### ESTUDIANTES Y DOCENTES

En los programas académicos de Zamorano participan 1,100 estudiantes provenientes de 18 países. Estos jóvenes son seleccionados cuidadosamente entre miles de aplicantes de toda América Latina y el Caribe. Las mujeres representan aproximadamente el 33% del total de alumnos. El cuerpo docente experimentado y bien capacitado de Zamorano incluye especialistas de más de 20 países que viven en el campus.

### PROGRAMAS EDUCATIVOS

Zamorano ofrece un programa académico universitario de cuatro años con carreras en: Ingeniería Agronómica, Administración de Agronegocios, Ingeniería Agroambiental y Agroindustria Alimentaria.

### PROGRAMAS DE PROYECCIÓN

Zamorano realiza, en conjunto con sus programas de educación formal, actividades de proyección que incluyen: Educación y capacitación continua, extensión e investigación aplicada. Estos programas, que se imparten tanto en línea, en campus, como en otros sitios de Latinoamérica, benefician a decenas de miles de personas cada año. También tiene un Programa de Verano que recibe a estudiantes norteamericanos, quienes participan de las experiencias prácticas de Aprender Haciendo de acuerdo a sus intereses y áreas de estudio.

### INSTITUTIONAL MISSION

Zamorano develops leaders based on rigorous programs, academic excellence, learning-by-doing, values and character development; and contributes to socio economic progress.

### THE CAMPUS

The total property is more than seven thousand acres, including a cloud forest with two micro watersheds, large production areas, recreational areas and many different buildings. Green areas, paths and lagoons attract a large number of wildlife species on campus that find a natural refuge at Zamorano. Many of them are migratory birds that pass through the region during certain times of year.

Large and modern multi-purpose classrooms are equipped with digital technology to facilitate learning. The computer network provides the campus with internet service 24 hours a day. Specialized laboratories like the modern English as a Second Language laboratory allow interactive learning. Zamorano's agroindustrial processing plants are undoubtedly the most comprehensive learning resource that exists in universities in the region and beyond. The Paul C. Standley Herbarium has close to 300,000 classified Mesoamerican specimens. In addition, its collection of beneficial insects and pests has around 200,000 specimens.

Zamorano also has a small shopping center, a telephone plant and a bank branch available to the community. The W.K. Kellogg Training Center has classrooms, conference rooms, facilities to accommodate up to 114 people and an auditorium with a capacity for 350 people.

### STUDENTS AND PROFESSORS

1,100 students from 18 countries participate in Zamorano's academic programs. These young people are carefully selected from thousands of applicants from Latin America and the Caribbean. Women represent about 33% of the student body. The experienced and well trained Zamorano faculty is made up of specialists from more than 20 countries that live on campus.

### EDUCATIONAL PROGRAMS

Zamorano offers a four-year university program with the following careers: Agricultural Engineering, Agribusiness Management, Agro-Environmental Engineering and Food Agroindustry.

### OUTREACH PROGRAMS

Along with its formal education programs Zamorano carries out outreach activities including: continuing education and training, extension and applied research. These programs are delivered both online and on campus, as well as in other places in Latin America, and benefit tens of thousands of people every year. It also has a summer program for American students who participate in the practical experience of Learning by Doing in accord with their interests and areas of study.

### Horarios Importantes / Important Schedules

	Ext.	
Oficinas Administrativas Administrative Offices		Lunes a Viernes (Monday-Friday) 7:00 - 11:00 a.m. 12:00 - 4:00 p.m. Sábado (Saturday) 7:00 - 11:00 a.m.
Biblioteca Wilson Popenoe Wilson Popenoe Library	2126 - 2121	Lunes, Martes y Jueves (Monday-Tuesday-Thursday) 7:00 a.m. - 9:30 p.m., Miércoles-Viernes (Wednesday-Friday) 7:00 a.m. - 4:00 p.m., Sábado (Saturday) 12:00 - 4:00 p.m.; Domingo (Sunday) 5:00 p.m. - 9:00 p.m.
Librería Bookstore	2433 - 2439	Lunes a Viernes (Monday-Friday) 8:00 a.m. - 4:00 p.m.; Sábado (Saturday) 8:00 a.m. - 3:30 p.m.; Domingo (Sunday) 9:00 am - 3:00 pm
Farmacia Pharmacy	2621	Lunes a viernes (Monday-Friday) 9:30 a.m. - 4:30 p.m.
Puesto de Ventas Roadside Market	2030 - 2031	Lunes a sábado (Monday-Saturday) 7:30 a.m. - 5:40 p.m. Domingo (Sunday) 8:00 a.m. - 5:40 p.m.
Cafetería del Centro Estudiantil Student Center Cafeteria	2436 - 2437	Lunes a domingo (Monday-Sunday) 6:00 a.m. - 8:00 p.m.
Recepción del Centro W. K. Kellogg Reception Desk at the W. K. Kellogg Center	2408 - 2417 2409 - 2416	Lunes a domingo (Monday-Sunday) 6:30 a.m. - 10:00 p.m.
Comedor Estudiantil	2045 - 2046	Lunes a sábado (Monday-Saturday) 5:00 a.m. - 6:30 p.m.

### Mayor Información / More Information

Individuos, empresas u organizaciones que deseen conocer más sobre Zamorano y cómo participar o contribuir con nuestros programas, pueden obtener información adicional en cualquiera de las siguientes direcciones:

**En Honduras**  
Apartado Postal 93  
Tegucigalpa, Honduras, Centroamérica  
Tel: (504) 2287-2000  
Fax: (504) 2776-6240  
E-mail: zamorano@zamorano.edu

Individuals, businesses or organizations interested in learning more about Zamorano and how to participate in or support our programs can obtain additional information from either of the following addresses:

**In the United States**  
Office of Institutional Advancement, USA  
1701 Pennsylvania Ave., NW,  
Suite 300  
Washington, DC 20006  
Tel: (202) 461-2242  
Fax: (202) 580-6559  
E-mail: wdc@zamorano.edu

APPENDIX F

Central Campus and Sendero Geco (Griffith and Rodríguez 2014)					
Family	Genus & Species	Common Name (Spanish)	X Coordinate	Y Coordinate	BRAHMS
Agavaceae	<i>Yucca guatemalensis</i>	Flor de izote	499088	1548808	129427
Anacardiaceae	<i>Spondias mombin</i>	Jocote de montaña	499106	1548927	129431
Annonaceae	<i>Cananga odorata</i>	Ilán ilán	499066	1548864	129432
Annonaceae	<i>Polyalthia longifolia</i>	Polialta	498690	1548865	129436
Apocynaceae	<i>Plumeria lutea</i>	Flor de mayo	499097	1548831	129437
Araucariaceae	<i>Araucaria heterophylla</i>	Araucaria	499097	1548855	129441
Arecaceae	<i>Elaeis guineensis</i>	Palma africana	498813	1548850	129442
Arecaceae	<i>Roystonea regia</i>	Palma real	498857	1548798	129443
Arecaceae	<i>Chrysalidocarpus lutescens</i>	Areca	498911	1548625	129439
Arecaceae	<i>Acrocomia mexicana</i>	Palma coyol	499068	1548805	129440
Arecaceae	<i>Syagrus macrocarpa</i>	Palmera reina	498863	1548752	129444
Bignoniaceae	<i>Tabebuia rosea</i>	Amapa rosa	498878	1548724	129445
Cupressaceae	<i>Cupressus sempervirens</i>	Ciprés	498850	1548797	129446
Fabaceae	<i>Phyllocarpus septentrionalis</i>	Coralillo	499057	1548804	129447
Fabaceae	<i>Pterocarpus indicus</i>	Palo verde	499031	1548905	129448
Fabaceae	<i>Enterolobium cyclocarpum</i>	Guanacaste	499100	1548883	129449
Fabaceae	<i>Calliandra molinas</i>	Palo de corcho	499201	1548745	129450
Iridaceae	<i>Dietes iridioides</i>	Flor de mosco	499037	1548808	129451
Lythraceae	<i>Lagerstroemia speciosa</i>	Júpiter de la reina	499055	1548916	129452
Malvaceae	<i>Ceiba pentandra</i>	Ceiba	498896	1548718	129453
Moraceae	<i>Ficus benjamina</i>	Laurel de la india	498720	1548881	129454
Moraceae	<i>Ficus morazanica</i>	Caucho	499010	1548796	129455
Myrtaceae	<i>Callistemon lanceolatus</i>	Escobillón rojo	498993	1548752	129456
Myrtaceae	<i>Eucalyptus deglupta</i>	Eucalipto	499124	1548847	129457
Myrtaceae	<i>Myrciaria cauliflora</i>	Jaboticaba	498746	1548893	129458
Poaceae	<i>Dendrocalamus sikkimensis</i>	Bambú	499049	1548882	129459
Sapindaceae	<i>Litchi chinensis</i>	Lichi	499035	1548810	129460
Zygophyllaceae	<i>Guaiacum sanctum</i>	Guayacán real	499307	1548656	129461

APPENDIX G

<b>Orchid Collection</b> (Griffith and Rodríguez 2014)					
<b>Family</b>	<b>Genus &amp; Species</b>	<b>Flower Color (Spanish)</b>	<b>X Coordinate</b>	<b>Y Coordinate</b>	<b>BRAHMS</b>
Orchidaceae	<i>Brassavola cucullata</i>	Blanca y amarilla			129499
Orchidaceae	<i>Brassavola nodosa</i>	Blanca y amarilla			129500
Orchidaceae	<i>Brassia sp.</i>	Verde claro			129501
Orchidaceae	<i>Catasetum integerrimum</i>	Verde			129502
Orchidaceae	<i>Catasetum saccatum</i>	Morada			129503
Orchidaceae	<i>Catasetum sp.</i>	Morada			129504
Orchidaceae	<i>Coelia sp.</i>	Anaranjada			129505
Orchidaceae	<i>Cymbidium sp.</i>	Verde y morada			129506
Orchidaceae	<i>Dendrobium sp.</i>	Rosada			129507
Orchidaceae	<i>Elleanthus graminifolius</i>	Verde			129509
Orchidaceae	<i>Encyclia adenocarpa</i>	Verde y blanca			129510
Orchidaceae	<i>Encyclia bractescens</i>	Rosada			129511
Orchidaceae	<i>Encyclia diota</i>	Anaranjada			129512
Orchidaceae	<i>Encyclia nematocaulon</i>	Blanca			129513
Orchidaceae	<i>Encyclia sp.</i>	Blanca			129515
Orchidaceae	<i>Epidendrum ciliare</i>	Blanca			129516
Orchidaceae	<i>Epidendrum eximiun</i>	Verde y morada			129517
Orchidaceae	<i>Epidendrum nocturnum</i>	Blanca			129518
Orchidaceae	<i>Epidendrum oerstedii</i>	Blanca			129519
Orchidaceae	<i>Epidendrum sp.</i>	Rosada			129520
Orchidaceae	<i>Epidendrum stamfordianum</i>	Lila			129521
Orchidaceae	<i>Epidendrum umbelliferum</i>	Verde			129522
Orchidaceae	<i>Guarianthe aurantiaca</i>	Anaranjada			129523
Orchidaceae	<i>Guarianthe bowringiana</i>	Lila			129524
Orchidaceae	<i>Guarianthe skinneri</i>	Lila			129525
Orchidaceae	<i>Helleriella nicaraguensis</i>	Blanca y anaranjada			129526
Orchidaceae	<i>Jacquiiniella gigantea</i>	Amarilla y café			129527

Orchidaceae	<i>Laelia rubescens</i>	Lila			129528
Orchidaceae	<i>Laelia sp.</i>	Lila			129529
Orchidaceae	<i>Ludisia discolor</i>	Blanca y amarilla			129530
Orchidaceae	<i>Lycaste aromatica</i>	Amarilla			129531
Orchidaceae	<i>Lycaste skinneri</i>	Blanca y lila			129532
Orchidaceae	<i>Lycaste sp.</i>	Amarilla			129533
Orchidaceae	<i>Manfreda sp.</i>	Verde y rosada			129534
Orchidaceae	<i>Maxillaria cucullata</i>	Amarilla y roja			129535
Orchidaceae	<i>Maxillaria praestans</i>	Amarilla y morada			129536
Orchidaceae	<i>Maxillaria tenuifolia</i>	Roja			129537
Orchidaceae	<i>Maxillaria uncata</i>	Blanca y café			129538
Orchidaceae	<i>Myrmecophila tibicinis</i>	Blanca y lila			129539
Orchidaceae	<i>Myrmecophila wendlandii</i>	Anaranjada y amarilla			129540
Orchidaceae	<i>Oeceoclades maculata</i>	Blanca y rosada			129542
Orchidaceae	<i>Oncidium ampliatum</i>	Amarilla			129543
Orchidaceae	<i>Oncidium flexuosum</i>	Amarilla			129545
Orchidaceae	<i>Oncidium leucochilum</i>	Blanca y lila			129546
Orchidaceae	<i>Oncidium sphacelatum</i>	Amarilla y café			129547
Orchidaceae	<i>Pelexia sp.</i>	Verde			129548
Orchidaceae	<i>Pleurothallis dolichopus</i>	Verde			129549
Orchidaceae	<i>Pleurothallis pantasmi</i>	Roja y morada			129550
Orchidaceae	<i>Pleurothallis sp.</i>	Blanca y lila			129551
Orchidaceae	<i>Pleurothallis tribuloides</i>	Roja			129552
Orchidaceae	<i>Prosthechea chacaoensis</i>	Verde y blanca			129554
Orchidaceae	<i>Prosthechea radiata</i>	Verde y blanca			129555
Orchidaceae	<i>Rhyncholaelia digbyana</i>	Verde y blanca			129556
Orchidaceae	<i>Rhyncholaelia glauca</i>	Verde y blanca			129557
Orchidaceae	<i>Scaphyglottis fasciculata</i>	Verde			129558
Orchidaceae	<i>Scaphyglottis lindeniana</i>	Verde y blanca			129559
Orchidaceae	<i>Scaphyglottis sp.</i>	Amarilla y verde			129560
Orchidaceae	<i>Sobralia fragrans</i>	Blanca y amarilla			129561
Orchidaceae	<i>Sobralia macrantha</i>	Lila			129562
Orchidaceae	<i>Spathoglottis plicata</i>	Lila			129563
Orchidaceae	<i>Trichocentrum ascendens</i>	Amarilla y café			129564

Orchidaceae	<i>Trichocentrum carthagenense</i>	Blanca y lila			129565
Orchidaceae	<i>Trichocentrum cebolleta</i>	Amarilla y café			129566
Orchidaceae	<i>Trigonidium egertonianum</i>	Amarilla y café			129567
Orchidaceae	<i>Vanda gigantea</i>	Amarilla y morada			129568
Orchidaceae	<i>Vanda teres</i>	Blanca y lila			129569
Orchidaceae	<i>Vanilla pompona</i>	Amarilla y verde			129570

APPENDIX H

“Simón E. Malo” Arboretum Species (Griffith and Rodríguez 2014)					
Family	Genus & Species	Common Name (Spanish)	X Coordinate	Y Coordinate	BRAHMS
Anacardiaceae	<i>Mangifera indica</i>	Mango	498670	1548781	129248
Annonaceae	<i>Annona glabra</i>	Anona de manglar	498584	1548808	129227
Annonaceae	<i>Annona muricata</i>	Guanábana	498614	1548749	129234
Annonaceae	<i>Annona reticulata</i>	Anona corazón	498649	1548763	129240
Apocynaceae	<i>Plumeria rubra</i>	Flor de mayo	498656	1548771	129252
Arecaceae	<i>Elaeis guineensis</i>	Palma africana	498656	1548740	129254
Arecaceae	<i>Syagrus macrocarpa</i>	Palmera reina	498644	1548732	129253
Arecaceae	<i>Veitchia merillii</i>	Palmera miami	498653	1548785	129255
Bignoniaceae	<i>Parmentiera edulis</i>	Cuajilote	498605	1548749	129233
Bignoniaceae	<i>Tabebuia ochracea</i>	Corteza amarilla	498585	1548865	129256
Boraginaceae	<i>Cordia megalantha</i>	Clavel negro	498597	1548754	129257
Combretaceae	<i>Terminalia catappa</i>	Almendro	498574	1548775	129232
Euphorbiaceae	<i>Hevea brasiliensis</i>	Caucho	498616	1548827	129258
Euphorbiaceae	<i>Jatropha curcas</i>	Piñón	498602	1548818	129231
Fabaceae	<i>Brownea macrophylla</i>	Rosa de montaña	498661	1548723	129237
Fabaceae	<i>Cojoba arborea</i>	Barba de jolote	498624	1548839	129262
Fabaceae	<i>Enterolobium cyclocarpum</i>	Guanacaste	498552	1548866	129220
Fabaceae	<i>Myroxylon balsamum</i>	Bálsamo	498608	1548812	129260
Fabaceae	<i>Pithecellobium dulce</i>	Guamúchil	498614	1548762	129235
Fabaceae	<i>Pterocarpus officinalis</i>	Sangre drago	498566	1548851	129224
Lauraceae	<i>Cinnamomum zeylanicum</i>	Canela	498578	1548798	129226
Lecythidaceae	<i>Couroupita guianensis</i>	Bala de cañón	498591	1548904	129245
Meliaceae	<i>Guarea grandifoliola</i>	Marapolán	498627	1548802	129266
Meliaceae	<i>Swietenia macrophylla</i>	Caoba	498616	1548804	129267
Moraceae	<i>Ficus benjamina</i>	Ficus	498642	1548735	129236
Myrtaceae	<i>Myrciaria cauliflora</i>	Jaboticaba	498578	1548827	129244
Myrtaceae	<i>Syzygium cumini</i>	Jambul	498570	1548801	129270

Myrtaceae	<i>Syzygium jambos</i>	Pomarrosa	498637	1548793	129269
Pinaceae	<i>Pinus oocarpa</i>	Pino	498636	1548798	129272
Rubiaceae	<i>Morinda citrifolia</i>	Noni	498600	1548815	129229
Rubiaceae	<i>Psychotria cooperi</i>	Flor azul	498675	1548722	129239
Sapindaceae	<i>Melicoccus bijugatus</i>	Mamón	498571	1548836	129225
Sapotaceae	<i>Pouteria caimito</i>	Caimito	498594	1548809	129228
Sapotaceae	<i>Pouteria campechiana</i>	Sapote amarillo	498551	1548835	129223
Sapotaceae	<i>Synsepalum dulcificum</i>	Mata sabor	498565	1548829	129246
Strelitziaceae	<i>Ravenala madagascariensis</i>	Palma del viajero	498602	1548865	129279
Strelitziaceae	<i>Strelitzia nicolai</i>	Ave de paraíso	498622	1548807	129241
Zamiaceae	<i>Dioon mejiae</i>	Teocinte	498569	1548874	129247

APPENDIX I

<b>Fruit Tree Collection (Griffith and Rodríguez 2014)</b>					
<b>Family</b>	<b>Genus &amp; Species</b>	<b>Common Name (Spanish)</b>	<b>X Coordinate</b>	<b>Y Coordinate</b>	<b>BRAHMS</b>
Anacardiaceae	Anacardium occidentale	Marañón	499607	1549371	129312
Anacardiaceae	Bouea gandaria	Gandaria	499603	1549340	129319
Anacardiaceae	Mangifera indica	Mango	499645	1549344	129370
Anacardiaceae	Mangifera odorata	Kuwini	499643	1549345	129371
Anacardiaceae	Spondias dulcis	Ambarela	499645	1549345	129413
Anacardiaceae	Spondias purpurea	Jocote	499645	1549344	129414
Anacardiaceae	Spondias tuberosa	Imbu	499643	1549345	129415
Annonaceae	Annona cherimola	Atemoya	499608	1549376	129309
Annonaceae	Annona diversifolia	Ilama	499606	1549369	129316
Annonaceae	Annona muricata	Guanábana	499603	1549367	129317
Annonaceae	Annona purpurea	Soncuya	499607	1549361	129313
Annonaceae	Annona squamosa	Anon	499613	1549346	129307
Annonaceae	Cananga odorata	Ilang-ilang	499628	1549362	129293
Annonaceae	Rollinia mucosa	Rollinia	499603	1549330	129406
Annonaceae	Stelechocarpus burahol	Burahol	499639	1549340	129416
Apocynaceae	Carissa grandiflora	Carisa	499631	1549351	129291
Arecaceae	Monstera deliciosa	Cerimán	499634	1549326	129375
Arecaceae	Bactris gasipaes	Pijibaye	499608	1549320	129310
Arecaceae	Cocos nucifera	Cocotero	499645	1549344	129282
Arecaceae	Elaeis guineensis	Palma aceitera	499626	1549354	129338
Arecaceae	Mauritia fleuxuosa	Aguaje	499638	1549366	129373
Arecaceae	Phoenix dactylifera	Palma datilera	499617	1549405	129389
Arecaceae	Salacca zalacca	Salaca	499603	1549340	129407
Averrhoaceae	Averrhoa bilimbi	Bilimbi	499597	1549337	129323
Averrhoaceae	Averrhoa carambola	Carambola	499601	1549314	129321
Bignoniaceae	Crescentia sp	Jícaro	499643	1549345	129327
Bignoniaceae	Parmentiera edulis	Cuajilote	499622	1549342	129384

Bixaceae	<i>Bixa orellana</i>	Achiote	499611	1549316	129308
Bombacaceae	<i>Durio zibethinus</i>	Durian	499631	1549351	129335
Bombacaceae	<i>Pachira macrocarpa</i>	Sapotón	499622	1549326	129383
Bombacaceae	<i>Quararibea cordata</i>	Sapote	499606	1549368	129403
Bromeliaceae	<i>Ananas comusus</i>	Piña	499606	1549368	129315
Burseraceae	<i>Canarium ovatum</i>	Nuez Pili	499638	1549366	129285
Cactaceae	<i>Hylocereus triangularis</i>	Pitaya amarilla	499607	1549371	129356
Cactaceae	<i>Hylocereus undatus</i>	Pitaya morada	499607	1549361	129357
Cactaceae	<i>Opuntia ficusindica</i>	Tuna	499626	1549354	129382
Cactaceae	<i>Pereskia aculeata</i>	Grosella dátil	499620	1549330	129386
Caricaceae	<i>Carica papaya</i>	Papaya	499626	1549354	129294
Caricaceae	<i>Carica x heilbornii</i>	Babaco	499631	1549348	129290
Chrysobalanaceae	<i>Chrysobalanus icaco</i>	Icaco	499639	1549340	129328
Chrysobalanaceae	<i>Coupeia polyandra</i>	Olosapo	499645	1549345	129325
Chrysobalanaceae	<i>Licania platypus</i>	Sunsapote	499603	1549340	129363
Combretaceae	<i>Terminalia catappa</i>	Almendro tropical	499631	1549348	129422
Dilleniaceae	<i>Dillenia indica</i>	Dillenia	499638	1549344	129330
Ebenaceae	<i>Diospyros digyna</i>	Sapote negro	499632	1549360	129332
Ebenaceae	<i>Diospyros philippensis</i>	Mobolo	499632	1549313	129333
Elaeagnaceae	<i>Elaeagnus philippensis</i>	Lingaro	499628	1549362	129337
Elaeocarpaceae	<i>Elaeocarpus serratus</i>	Olivo de ceylan	499622	1549326	129339
Erithroxilaceae	<i>Erythroxylum coca</i>	Coca	499620	1549330	129342
Euphorbiaceae	<i>Phyllanthus acidus</i>	Grosella tropical	499617	1549363	129390
Fabaceae	<i>Caesalpinia tinctoria</i>	Tara	499628	1549355	129292
Fabaceae	<i>Ceratonia siliqua</i>	Algarrobo europeo	499622	1549326	129295
Fabaceae	<i>Dypterix odorata</i>	Tonka bean	499628	1549355	129336
Fabaceae	<i>Inga sp.</i>	Pacea	499607	1549337	129358
Fabaceae	<i>Prosopis sp.</i>	Algarrobo desértico	499608	1549376	129397
Fabaceae	<i>Tamarindus indica</i>	Tamarindo	499632	1549313	129421
Flacourtiaceae	<i>Dovyalis hebecarpa</i>	Ketembilla	499631	1549348	129334
Flacourtiaceae	<i>Flacourtia indica</i>	Ciruela del gobernador	499614	1549324	129349
Flacourtiaceae	<i>Flacourtia inermis</i>	Lovi lovi	499614	1549361	129350
Flacourtiaceae	<i>Xylosma hemsleyana</i>	Pepenance	499628	1549362	129425
Guttiferaceae	<i>Garcinia mangostana</i>	Mangostán	499611	1549316	129352
Guttiferaceae	<i>Garcinia sp.</i>	Mangostán ácido	499608	1549376	129353

Guttiferaceae	<i>Garcinia tinctoria</i>	Garcinia	499608	1549320	129354
Guttiferaceae	<i>Mammea americana</i>	Mamey	499645	1549345	129369
Guttiferaceae	<i>Rheedia lateriflora</i>	Achachairú	499603	1549367	129405
Lauraceae	<i>Cinnamomum cassia</i>	Cinnamón chino	499615	1549334	129304
Lauraceae	<i>Cinnamomum zeylanicum</i>	Canela	499620	1549330	129298
Lauraceae	<i>Laurus nobilis</i>	Laurel real	499606	1549369	129360
Lauraceae	<i>Persea americana</i>	Aguacate	499619	1549357	129387
Lauraceae	<i>Persea schiedeana</i>	Chucte	499618	1549323	129388
Lecythidaceae	<i>Couropita guianensis</i>	Bala de cañón	499645	1549344	129326
Lecythidaceae	<i>Lecythis elliptica</i>	Olla del mono	499603	1549367	129361
Lecythidaceae	<i>Lecythis zabucajo</i>	Zapucaia	499603	1549330	129362
Malpighiaceae	<i>Bunchosia armeniaca</i>	Cansaboca	499603	1549340	129320
Malpighiaceae	<i>Byrsonima crassifolia</i>	Nance	499608	1549348	129311
Malpighiaceae	<i>Malpighia emarginata</i>	Acerola	499597	1549337	129367
Meliaceae	<i>Lansium domesticum</i>	Lanson	499606	1549368	129359
Meliaceae	<i>Sandoricum koetjape</i>	Santol	499603	1549340	129408
Moraceae	<i>Artocarpus altilis</i>	Árbol del pan	499607	1549337	129314
Moraceae	<i>Artocarpus heterophyllus</i>	Jaca	499603	1549330	129318
Moraceae	<i>Artocarpus integer</i>	Champedak	499599	1549323	129322
Moraceae	<i>Ficus carica</i>	Higuera	499615	1549334	129348
Moraceae	<i>Morus sp.</i>	Morera	499632	1549360	129376
Musaceae	<i>Musa paradisiaca</i>	Banano	499632	1549313	129377
Myristicaceae	<i>Myristica fragrans</i>	Nuez moscada	499628	1549355	129380
Myrtaceae	<i>Eugenia atropunctata</i>	Uva de jamaica	499619	1549357	129343
Myrtaceae	<i>Eugenia dombeyi</i>	Grumichana	499618	1549323	129344
Myrtaceae	<i>Eugenia jambos</i>	Pamarosa	499617	1549405	129345
Myrtaceae	<i>Eugenia stipitata</i>	Arazá	499617	1549363	129346
Myrtaceae	<i>Eugenia uniflora</i>	Cerezo de surinam	499617	1549371	129347
Myrtaceae	<i>Myrciaria cauliflora</i>	Jaboticaba	499631	1549348	129378
Myrtaceae	<i>Myrciaria dubia</i>	Camu-camu	499631	1549351	129379
Myrtaceae	<i>Pimenta recemosa</i>	Bay Rum	499617	1549371	129391
Myrtaceae	<i>Psidium cattleianum</i>	Guayaba japonesa	499608	1549348	129399
Myrtaceae	<i>Psidium friedrichstahlianum</i>	Cas	499607	1549371	129400
Myrtaceae	<i>Psidium guajaba</i>	Guayabo	499607	1549361	129401
Myrtaceae	<i>Syzygium cumini</i>	Jambolán	499638	1549344	129418

Myrtaceae	<i>Syzygium jambos</i>	Pamarosa	499634	1549326	129419
Myrtaceae	<i>Syzygium malaccense</i>	Pamarosa maleya	499632	1549360	129420
Passifloraceae	<i>Passiflora edulis</i>	Maracuyá amarillo	499622	1549332	129385
Piperraceae	<i>Piper nigrum</i>	Pimienta	499615	1549334	129392
Polygonaceae	<i>Coccoloba uvifera</i>	Uva de playa	499645	1549345	129281
Proteaceae	<i>Macadamia integrifolia</i>	Macadamia	499601	1549314	129365
Proteaceae	<i>Macadamia tetraphylla</i>	Macadamia falsa	499599	1549323	129366
Punicaceae	<i>Punica granatum</i>	Granado	499607	1549337	129402
Rhamnaceae	<i>Ziziphus mauritiana</i>	Yuyuga	499626	1549354	129426
Rosaceae	<i>Eriobotrya japonica</i>	Níspero japonés	499622	1549332	129341
Rosaceae	<i>Prunus serotina</i>	Capulí	499608	1549320	129398
Rubiaceae	<i>Borojoa pattinoi</i>	Borojó	499614	1549324	129305
Rubiaceae	<i>Coffea arabica</i>	Café	499651	1549341	129280
Rubiaceae	<i>Coffea robusta</i>	Café robusta	499617	1549371	129303
Rubiaceae	<i>Genipa americana</i>	Jagua	499608	1549348	129355
Rubiaceae	<i>Randia formosa</i>	Estrella de malabar	499606	1549369	129404
Rubiaceae	<i>Vangueria edulis</i>	Tamarindo africano	499628	1549355	129424
Rutaceae	<i>C. paradisi</i> x <i>C. reticulata</i>	Tangüelo	499619	1549357	129299
Rutaceae	<i>C. paradisi</i> x <i>P. trifoliata</i>	Citrumelo	499617	1549405	129301
Rutaceae	<i>C. sinensis</i> x <i>P. trifoliata</i>	Citrango	499617	1549363	129302
Rutaceae	<i>Casimiroa edulis</i>	Sapote blanco	499632	1549360	129288
Rutaceae	<i>Citrus aurantifolia</i>	Limas ácidas	499622	1549332	129297
Rutaceae	<i>Citrus aurantium</i>	Naranja agrio	499622	1549342	129296
Rutaceae	<i>Citrus paradisi</i>	Toronja	499638	1549344	129286
Rutaceae	<i>Citrus reticulata</i>	Mandarina	499639	1549340	129284
Rutaceae	<i>Citrus sinensis</i>	Naranja dulce	499634	1549326	129287
Rutaceae	<i>Clausenia lansium</i>	Wampi	499643	1549345	129283
Rutaceae	<i>Fortunella</i> sp.	Kumquat	499613	1549346	129351
Sapindaceae	<i>Bilighia sapida</i>	Akee	499618	1549323	129300
Sapindaceae	<i>Dimocarpus longan</i>	Longán	499634	1549326	129331
Sapindaceae	<i>Litchi chinensis</i>	Litchi	499603	1549340	129364
Sapindaceae	<i>Melicoccus bijugatus</i>	Limoncillo	499638	1549344	129374
Sapindaceae	<i>Nephelium lappaceum</i>	Rambután	499628	1549362	129381
Sapotaceae	<i>Chrysophyllum cainito</i>	Caimito	499638	1549366	129329
Sapotaceae	<i>Colocarpum viride</i>	Sapote verde	499651	1549341	129324

Sapotaceae	Manilkara zapota	Níspero	499639	1549340	129372
Sapotaceae	Pouteria caimito	Caimo	499614	1549324	129393
Sapotaceae	Pouteria campechiana	Sapote amarillo	499614	1549361	129394
Sapotaceae	Pouteria obovata	Lúcuma	499613	1549346	129395
Sapotaceae	Pouteria sapota	Sapote	499611	1549316	129396
Sapotaceae	Synsepalum dulcificum	Mata sabor	499638	1549366	129417
Simarubaceae	Simarouba glauca	Aceituno	499601	1549314	129409
Solanaceae	Solanum betaceum	Tomate de Árbol	499599	1549323	129410
Solanaceae	Solanum quitoense	Naranjilla	499597	1549337	129411
Solanaceae	Solanum sessiliflorum	Cocona	499651	1549341	129412
Sterculiaceae	Cola nitida	Cola	499632	1549313	129289
Sterculiaceae	Theobroma cacao	Cacao	499631	1549351	129423
Theaceae	Camellia sinensis	Té	499614	1549361	129306
Zingiberaceae	Elettaria cardamomum	Cardamomo	499622	1549342	129340

APPENDIX J

Mango ( <i>Mangifera indica</i> ) Collection (Griffith and Rodríguez 2014)					
Genus & Species	Variety	Origin	X Coordinate	Y Coordinate	BRAHMS
<i>Mangifera indica</i>	Adams	Hawaii			
	Aeromanis	Tailandia			
	Amini	India			
	Carabao	México			
	Carrier	Florida			
	Criollo	México			
	Fairchild	Panamá			
	Fascels	Florida			
	Florigon	Florida			
	Golek	Indonesia			
	Haden	Florida			
	Irwin	Florida			
	Julie	Jamaica			
	Keitt	Florida			
	Kent	Florida			
	Lippens	Florida			
	Mulgoba	India			
	Nandocmay	Florida			
	Palmer	Florida			
	Saigon	Florida			
	Sensation	Florida			
	Smith	Florida			
Springfels	Florida				
Tommy Atkins	Florida				
Torbert	Florida				
Zill	Florida				

APPENDIX K

Avocado ( <i>Persea americana</i> ) Collection (Griffith and Rodríguez 2014)					
Genus & Species	Variety	Origin	X Coordinate	Y Coordinate	BRAHMS
<i>Persea americana</i>	Booth 7	Guatemala			
	Booth 8	Guatemala			
	Catalina	Cuba			
	Chequette	Guatemala			
	Hall	Guatemala			
	Lula	Mexico			
	Murashigue	Mexico			
	Pollock	Antilles			
	Wilson Popenoe	Antilles			
	Simonds	Antilles			
Waldin	Antilles				

APPENDIX L

Medicinal and Culinary Garden (Griffith and Rodríguez 2014)					
Family	Genus & Species	Common Name (Spanish)	X Coordinate	Y Coordinate	BRAHMS
Amaranthaceae	<i>Chenopodium ambrosioides</i>	Apazote			129571
Amarylidaceae	<i>Allium cepa</i>	Cebolla			129572
Amarylidaceae	<i>Allium sativum</i>	Ajo blanco			129573
Amarylidaceae	<i>Allium schoenoprasum</i>	Chive			129574
Apiaceae	<i>Anethum graveolens</i>	Eneldo			129575
Apiaceae	<i>Coriandrum santivum</i>	Culantro de castilla			129577
Apiaceae	<i>Eryngium foetidum</i>	Culantro			129578
Apiaceae	<i>Myrrhis odorata</i>	Mirra			129582
Apocynoidae	<i>Fernaldia pandurata</i>	Loroco			129584
Araceae	<i>Monstera deliciosa</i>	Cerimán			129585
Asteraceae	<i>Ambrosia cumanensis</i>	Altamisa			129587
Asteraceae	<i>Helianthus annuus</i>	Girasol			129588
Asteraceae	<i>Stevia rebaudiana</i>	Estevia			129589
Asteraceae	<i>Tagetes patula</i>	Marigold			129591
Bixaceae	<i>Bixa Orellana</i>	Achiote			129592
Boraginaceae	<i>Symphytum officinale</i>	Suelda con suelda			129593
Eritroxilaceae	<i>Erythroxylum coca</i>	Coca			129594
Euphorbiaceae	<i>Jatropha curcas</i>	Piñón			129595
Euphorbiaceae	<i>Ricinus communis</i>	Higuerilla			129596
Fabaceae	<i>Indigofera tinctoria</i>	Añil			129597
Lamiaceae	<i>Hyptis suaveolens</i>	Chan			129599
Lamiaceae	<i>Mentha piperita</i>	Menta			129600
Lamiaceae	<i>Mentha spicata</i>	Yerbabuena			129603
Lamiaceae	<i>Ocimum basilicum</i>	Albahaca			129606
Lamiaceae	<i>Plectranthus amboinicus</i>	Orégano			129607
Lamiaceae	<i>Rosmarinus officinalis</i>	Romero			129615
Lamiaceae	<i>Salvia hispanica</i>	Chía			129616
Lamiaceae	<i>Salvia magellanica</i>	Menta arbustiva			129618

Lamiaceae	<i>Thymus vulgaris</i>	Tomillo		129620
Lauraceae	<i>Cinnamomum verum</i>	Canela		129621
Linaceae	<i>Linum usitatissimum</i>	Linaza		129622
Malvaceae	<i>Hibiscus sabdariffa</i>	Rosa de jamaica		129625
Meliaceae	<i>Melia azedarach</i>	Paraíso		129626
Moringaceae	<i>Moringa oleifera</i>	Moringa		129627
Myrtaceae	<i>Eucalyptus cinerea</i>	Eucalipto		129628
Myrtaceae	<i>Pimenta dioica</i>	Pimienta		129629
Myrtaceae	<i>Pimenta dioica</i>	Pimienta de jamaica		129630
Nyctaginaceae	<i>Mirabilis jalapa</i>	Chabelita		129631
Plantaginaceae	<i>Plantago major</i>	Llantén		129632
Poaceae	<i>Cymbopogon citratus</i>	Zacate de limón		129633
Poaceae	<i>Saccharum officinarum</i>	Caña de azúcar		129635
Poaceae	<i>Vetiveria zizanioides</i>	Valeriana		129636
Poaceae	<i>Zea perennis</i>	Maiz teocinte		129637
Rubiaceae	<i>Cinchona officinalis</i>	Quina		129639
Rubiaceae	<i>Coffea arabica</i>	Café		129640
Rubiaceae	<i>Morinda citrifolia</i>	Noni		129641
Rubiaceae	<i>Uncaria tomentosa</i>	Uña de gato		129644
Rutaceae	<i>Ruta graveolens</i>	Ruda		129645
Solanaceae	<i>Capsicum frutescens</i>	Chile		129646
Solanaceae	<i>Datura stramonium</i>	Estramonio		129648
Solanaceae	<i>Nicotiana tabacum</i>	Tabaco		129650
Urticaceae	<i>Boehmeria nivea</i>	Ramio		129651
Xanthorrhoeaceae	<i>Aloe vera</i>	Sábila		129652
Zingiberaceae	<i>Elettaria cardamomun</i>	Cardamomo		129654
Zingiberaceae	<i>Zingiber officinale</i>	Jengibre		129656

## APPENDIX M

ZAMORANO BOTANICAL GARDEN EXISTING PLANT SPECIES LIST															
TAXONOMY			COMMON NAME		CONSERVATION	NATIVE ORIGIN		USES			CAMPUS LOCATION				
SCIENTIFIC NAME	AUTHORITY	FAMILY	ENGLISH	SPANISH	IUCN RED LIST STATUS	REGION	HONDURAS	MEDICINAL	EDIBLE	ARBORETUM	CACTUS GARDEN	CENTRAL CAMPUS	MEDICINAL & CULINARY GARDENS	FRUIT COLLECTION	ORQUIDARIUM
<i>Acacia mangium</i>	Willd.	Fabaceae	black wattle	acacia de las molucas	Least Concern	Southeast Asia & Australia		✓	✓			✓			
<i>Acanthocereus tetragonus</i>	(L.) Hummelinck	Cactaceae	triangle cactus	nopal de cruz	Least Concern	North Central & South America	✓		✓		✓				
<i>Acianthera angustifolia</i>	(Lindl.) Luer	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Acianthera angustisepala</i>	(Ames & Correll) Pridgeon & M.W.Chase	Orchidaceae			Not Evaluated	Mesoamerica									✓
<i>Acianthera circumplexa</i>	(Lindl.) Pridgeon & M.W.Chase	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Acianthera johnsonii</i>	(Ames) Pridgeon & M.W.Chase	Orchidaceae			Not Evaluated	Central America	✓								✓
<i>Acianthera pantasmi</i>	(Rchb.f.) Pridgeon & M.W.Chase	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Acianthera sp.</i>	Scheidw.	Orchidaceae			N/A	Caribbean, Central & South America	✓								✓
<i>Acoelorrhaphe wrightii</i>	(Griseb. & H.Wendl.) H.Wendl. ex Becc.	Arecaceae	everglades palm	palma de suyate	Not Evaluated	Caribbean, Central & South America	✓	✓		✓					
<i>Acrocomia aculeata</i>	(Jacq.) Lodd. ex R.Keith	Arecaceae	coyol palm	palma coyol	Not Evaluated	Caribbean, Central & South America	✓	✓	✓			✓			
<i>Adenium obesum</i>	(Forssk.) Roem. & Schult.	Apocynaceae	desert rose	rosa del desierto	Least Concern	Africa		✓			✓				
<i>Adonidia merrillii</i>	(Becc.) Becc.	Arecaceae	Christmas palm	palma de navidad	Vulnerable	Southeast Asia			✓	✓					
<i>Aechmea fasciata</i>	(Lindl.) Baker	Bromeliaceae	silver base plant	bromelia fasciada	Not Evaluated	South America					✓				
<i>Agathis robusta</i>	(C.Moore ex F.Muell.) F.M.Bailey	Araucariaceae	Queensland kauri	kauri de Queensland	Least Concern	Southeast Asia & Australia						✓			
<i>Agave americana</i>	L.	Asparagaceae	century plant	pita americana azul	Least Concern	North & Central America		✓	✓		✓				
<i>Agave americana 'Variegata'</i>	L.	Asparagaceae	variegated century plant	agave amarillo	Least Concern	North & Central America		✓	✓		✓				
<i>Agave angustifolia</i>	Haw.	Asparagaceae	Caribbean agave	maguey espadín	Least Concern	Central America	✓	✓	✓		✓				

<i>Agave attenuata</i>	Salm-Dyck	Asparagaceae	foxtail agave	agave cuello de cisne	Least Concern	Central America			✓		✓				
<i>Agave seemanniana</i>	Jacobi	Asparagaceae	seemann's century plant	agave tobalá	Least Concern	Mesoamerica	✓		✓		✓				
<i>Agave sisalana</i>	Perrine	Asparagaceae	sisal	sisal	Not Evaluated	Mesoamerica		✓	✓		✓				
<i>Alibertia patinoi</i>	(Cuatrec.) Delprete & C.H.Perss.	Rubiaceae	borojo	borojó	Least Concern	South America		✓	✓			✓		✓	
<i>Allamanda cathartica</i>	L.	Apocynaceae	golden trumpet	trompeta amarilla	Not Evaluated	Central & South America	✓	✓				✓			
<i>Allium cepa</i>	L.	Amaryllidaceae	onion	cebolla	Not Evaluated	Central Asia		✓	✓				✓		
<i>Allium sativum</i>	L.	Amaryllidaceae	garlic	ajo blanco	Not Evaluated	Middle East & Central Asia		✓	✓				✓		
<i>Allium schoenoprasum</i>	L.	Amaryllidaceae	chives	cebollino	Least Concern	North America, Europe, Middle East, Asia		✓	✓				✓		
<i>Aloe vera</i>	(L.) Burm.f.	Asphodelaceae	true aloe	sábila	Not Evaluated	Middle East		✓	✓		✓		✓		
<i>Ambrosia cumanensis</i>	Kunth	Asteraceae	Peruvian ragweed	altamisa	Not Evaluated	Caribbean, Central & South America	✓	✓	✓				✓		
<i>Anacardium occidentale</i>	L.	Anacardiaceae	cashew	marañón	Not Evaluated	South America		✓	✓					✓	
<i>Ananas comosus</i>	(L.) Merr.	Bromeliaceae	pineapple	piña	Not Evaluated	Central & South America		✓	✓					✓	
<i>Ananas comosus var. bracteatus</i>	(Lindl.) Coppens & F.Leal	Bromeliaceae	red pineapple	piña roja ornamental	Not Evaluated	South America		✓	✓		✓				
<i>Anathallis barbulata</i>	(Lindl.) Pridgeon & M.W.Chase	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Anethum graveolens</i>	L.	Apiaceae	dill	eneldo	Not Evaluated	Africa & Middle East		✓	✓				✓		
<i>Annona × atemoya</i>	Mabb.	Annonaceae	atemoya	atemoya	Not Evaluated	American Tropics	✓		✓					✓	
<i>Annona cherimola</i>	L.	Annonaceae	cherimoya	chirimoyo	Least Concern	South America		✓	✓					✓	
<i>Annona glabra</i>	L.	Annonaceae	pond apple	anona de manglar	Least Concern	Africa & Tropical America	✓	✓	✓	✓					
<i>Annona macrophyllata</i>	Donn.Sm.	Annonaceae	ilama	ilama	Least Concern	Central America	✓		✓					✓	
<i>Annona mucosa</i>	Jacq.	Annonaceae	wild sweetsop	anon amazonico	Least Concern	Central & South America	✓	✓	✓	✓				✓	
<i>Annona muricata</i>	L.	Annonaceae	soursop	guanábana	Least Concern	American Tropics	✓	✓	✓	✓				✓	
<i>Annona purpurea</i>	Sessé. & Moc. ex Dunal	Annonaceae	soncoya	soncuya	Least Concern	Southern Mexico to Panama	✓	✓	✓					✓	
<i>Annona squamosa</i>	L.	Annonaceae	sugar apple	anón	Least Concern	American Tropics & Caribbean	✓	✓	✓					✓	
<i>Antigonon leptopus</i>	Hook. & Arn.	Polygonaceae	coral vine	corona de reina	Not Evaluated	Mesoamerica	✓		✓			✓			
<i>Araucaria heterophylla</i>	(Salisb.) Franco	Araucariaceae	Norfolk Island pine	araucária de Norfolk	Vulnerable	Australia			✓		✓				

<i>Ardisia escallonioides</i>	Schtdl. & Cham.	Myrsinaceae	marlberry	guitumbillo	Least Concern	Caribbean & Mesoamerica	✓		✓		✓			
<i>Artocarpus altilis</i>	(Parkinson) Fosberg	Moraceae	breadfruit	árbol del pan	Not Evaluated	Southeast Asia		✓	✓				✓	
<i>Artocarpus heterophyllus</i>	Lam.	Moraceae	jack fruit	jaca	Not Evaluated	Southeast Asia		✓	✓				✓	
<i>Artocarpus integer</i>	(Thunb.) Merr.	Moraceae	chempedak	champedak	Not Evaluated	Southeast Asia			✓				✓	
<i>Asparagus densiflorus</i>	(Kunth) Jessop	Liliaceae	asparagus fern	esparraguera	Not Evaluated	Southeastern Africa					✓			
<i>Asparagus scandens</i>	Thunb.	Liliaceae	climbing asparagus	helecho espárrago trepador	Not Evaluated	Southern Africa					✓			
<i>Astronium graveolens</i>	Jacq.	Anacardiaceae	glassywood	ron-ron	Not Evaluated	Southern Mexico to South America	✓			✓				
<i>Averrhoa bilimbi</i>	L.	Averrhoaceae	bilimbi	bilimbi	Not Evaluated	Southeast Asia		✓	✓				✓	
<i>Averrhoa carambola</i>	L.	Averrhoaceae	star fruit	carambola	Not Evaluated	Southeast Asia		✓	✓				✓	
<i>Azadirachta indica</i>	A. Juss.	Meliaceae	neem	neem	Least Concern	Southern Asia		✓	✓		✓			
<i>Bactris gasipaes</i>	Kunth	Arecaceae	peach palm	pejibaye	Not Evaluated	American Tropics	✓	✓	✓				✓	
<i>Bambusa vulgaris</i>	Schrad. ex J.C.Wendl.	Gramineae	common bamboo	bambú común	Not Evaluated	South Asia		✓	✓		✓			
<i>Barkeria obovata</i>	(C.Presl) Christenson	Orchidaceae			Not Evaluated	Central America	✓							✓
<i>Barkeria spectabilis</i>	Bateman ex Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Barnebydendron riedelii</i>	(Tul.) J.H.Kirkbr.	Fabaceae	Fairchild's folly	guacamayo	Not Evaluated	Central America	✓				✓			
<i>Bauhinia monandra</i>	Kurz	Fabaceae	Napoleon's plume	penacho de Napoleón	Not Evaluated	Madagascar		✓	✓		✓			
<i>Bauhinia purpurea</i>	L.	Fabaceae	purple bauhinia	árbol de orquídea púrpura	Least Concern	South Asia		✓	✓		✓			
<i>Beaucarnea sp.</i>	Lem.	Asparagaceae	ponytail palm	pata de elefante	N/A	Mesoamerica	✓			✓				
<i>Bertholletia excelsa</i>	Bonpl.	Lecythidaceae	Brazil nut	nuez de Brasil	Vulnerable	South American Amazon		✓	✓	✓				
<i>Bixa orellana</i>	L.	Bixaceae	annatto	achiote	Least Concern	Mexico, Central & South America	✓	✓	✓			✓	✓	
<i>Bletia purpurea</i>	(Lam.) A.DC.	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓							✓
<i>Blighia sapida</i>	K.D.Koenig	Sapindaceae	ackee	akee	Least Concern	Western Africa		✓	✓				✓	
<i>Boehmeria nivea</i>	(L.) Gaudich.	Urticaceae	nettle	ramio	Not Evaluated	South & East Asia		✓	✓			✓		
<i>Bouea macrophylla</i>	Griff.	Anacardiaceae	plum mango	gandaria	Not Evaluated	Southeast Asia			✓				✓	
<i>Bougainvillea glabra</i>	Choisy	Nyctaginaceae	lesser bouganvillea	buganvillea menor	Least Concern	South America		✓			✓			
<i>Bourreria macrophylla</i>	P.Browne	Boraginaceae	strongbark	corteza fuerte	Not Evaluated	North to South America	✓	✓		✓				

<i>Brachypterum microphyllum</i>	Miq.	Fabaceae	vetch tree	derris	Not Evaluated	Southeast Asia		✓				✓		
<i>Brassavola cucullata</i>	(L.) R.Br.	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓							✓
<i>Brassavola subulifolia</i>	Lindl.	Orchidaceae			Not Evaluated	Caribbean								✓
<i>Brassia maculata</i>	R.Br.	Orchidaceae	spotted spider orchid		Least Concern	Caribbean & Mesoamerica	✓							✓
<i>Brassia verrucosa</i>	Bateman ex Lindl.	Orchidaceae			Least Concern	Central & South America	✓							✓
<i>Brosimum alicastrum</i>	Sw.	Moraceae	breadnut	masica	Not Evaluated	American Tropics		✓	✓	✓				
<i>Brownea macrophylla</i>	Linden ex Mast.	Fabaceae	rose of Venezuela	rosa de Venezuela	Not Evaluated	American Tropics	✓	✓		✓				
<i>Bunchosia armeniaca</i>	(Cav.) DC.	Malpighiaceae	monk's plum	ciruela del fraile	Not Evaluated	South America		✓	✓					✓
<i>Bursera simaruba</i>	(L.) Sarg.	Burseraceae	gumbo-limbo	jiñocuabo	Least Concern	Mexico, Caribbean, Central & South America	✓	✓	✓	✓		✓		
<i>Byrsonima crassifolia</i>	(L.) Kunth	Malpighiaceae	golden spoon	nance	Least Concern	American Tropics	✓	✓	✓					✓
<i>Calliandra haematocephala</i>	Hassk.	Fabaceae	red powder puff	carbonero	Not Evaluated	South America		✓		✓				
<i>Calliandra molinae</i>	Standl.	Fabaceae	calliandra	palo corcho	Not Evaluated	Central America	✓					✓		
<i>Calliandra tergemina</i> var. <i>emarginata</i>	(Humb. & Bonpl. ex Willd.) Barneby	Fabaceae	pink powder puff	Calliandra	Least Concern	American Tropics	✓	✓				✓		
<i>Camellia sinensis</i>	(L.) Kuntze	Theaceae	tea plant	té	Not Evaluated	China		✓	✓					✓
<i>Campylocentrum fasciola</i>	(Lindl.) Cogn.	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓							✓
<i>Cananga odorata</i>	(Lam.) Hook.f. & Thomson	Annonaceae	cananga tree	ylang-ylang	Least Concern	Southeast Asia		✓	✓			✓		✓
<i>Canarium ovatum</i>	Engl.	Burseraceae	pili nut	nuez pili	Least Concern	Southeast Asia		✓	✓					✓
<i>Capsicum frutescens</i>	L.	Solanaceae	chilli pepper	ají picante	Least Concern	South America		✓	✓			✓		
<i>Carica papaya</i>	L.	Caricaceae	papaya	papaya	Not Evaluated	American Tropics	✓	✓	✓					✓
<i>Carissa macrocarpa</i>	(Eckl.) A.DC.	Apocynaceae	natal plum	ciruela de natal	Least Concern	Southern Africa		✓	✓					✓
<i>Casimiroa edulis</i>	La Llave	Rutaceae	white sapote	zapote blanco	Least Concern	Central America	✓	✓	✓					✓
<i>Cassia grandis</i>	L.f.	Fabaceae	pink shower tree	carao	Least Concern	American Tropics	✓	✓	✓	✓				
<i>Casuarina equisetifolia</i>	L.	Casuarinaceae	Australian pine	pino australiano	Least Concern	Australia		✓				✓		
<i>Catasetum integerrimum</i>	Hook.	Orchidaceae			Not Evaluated	Caribbean & Mesoamerica	✓							✓
<i>Catasetum saccatum</i>	Lindl.	Orchidaceae	the sack-shaped catasetum	catasetum sacco	Not Evaluated	South America								✓
<i>Catasetum</i> sp.	Rich. ex Kunth	Orchidaceae			N/A	Caribbean, Central & South America	✓							✓

<i>Cecropia pachystachya</i>	Trécul	Urticaceae	trumpet tree	guarumo	Least Concern	South America		✓	✓						
<i>Ceiba pentandra</i>	(L.) Gaertn.	Malvaceae	silk-cotton tree	ceiba	Least Concern	American Tropics, West Africa & Southeast Asia	✓	✓	✓	✓		✓		✓	
<i>Central Campus</i>	(Scheidw.) Linden	Orchidaceae			Not Evaluated	Mefsite visitsoamerica	✓								✓
<i>Ceratonia siliqua</i>	L.	Fabaceae	carob	algarrobo europeo	Least Concern	South America, Mediterranean & Middle East		✓	✓					✓	
<i>Cereus hexagonus</i>	(L.) Mill.	Cactaceae	lady of the night cactus	cactus vela	Least Concern	South America			✓		✓				
<i>Cereus peruvianus var. monstrosus</i>	K.Schum.	Cactaceae	Peruvian apple cactus	cactus de cerco	Not Evaluated	South America		✓	✓		✓				
<i>Chrysobalanus icaco</i>	L.	Chrysobalanaceae	coco plum	icaco	Not Evaluated	Africa, Central & South America	✓	✓	✓					✓	
<i>Chrysophyllum cainito</i>	L.	Sapotaceae	star apple	caimito	Not Evaluated	Central America		✓	✓					✓	
<i>Chrysopogon zizanioides</i>	(L.) Roberty	Poaceae	vetiver	valeriana	Not Evaluated	Southeast Asia		✓	✓			✓			
<i>Chysis sp.</i>	Lindl.	Orchidaceae			N/A	Central & South America	✓								✓
<i>Chysis tricolorata</i>	Schltr.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Cinchona officinalis</i>	L.	Rubiaceae	quinine	quina	Not Evaluated	Ecuador		✓	✓			✓			
<i>Cinnamomum verum</i>	J.Presl	Lauraceae	cinnamon	canela	Not Evaluated	South Asia		✓	✓	✓		✓	✓		
<i>Citrus japonica</i>	Thunb.	Rutaceae	kumquat	naranjo chino	Not Evaluated	Japan		✓	✓					✓	
<i>Citrus paradisi x C. reticulata</i>	J.W.Ingram & H.E.Moore	Rutaceae	tangelo	tangelo	Not Evaluated	United States		✓	✓					✓	
<i>Citrus paradisi x Poncirus trifoliata</i>	J.W.Ingram & H.E.Moore	Rutaceae	citrumelo	citrumelo	Not Evaluated	United States			✓					✓	
<i>Citrus sinensis x Poncirus trifoliata</i>	J.W.Ingram & H.E.Moore	Rutaceae	citrange	citrange	Not Evaluated	United States			✓					✓	
<i>Citrus x aurantiifolia</i>	(Christm.) Swingle	Rutaceae	key lime	lima ácida	Not Evaluated	Southeast Asia		✓	✓					✓	
<i>Citrus x aurantium</i>	L.	Rutaceae	bitter orange	naranjo agrio	Not Evaluated	Southeast Asia		✓	✓					✓	
<i>Citrus x paradisi</i>	Macfad.	Rutaceae	grapefruit	pomelo	Not Evaluated	Caribbean		✓	✓					✓	
<i>Citrus x reticulata</i>	Blanco	Rutaceae	mandarin orange	mandarina	Not Evaluated	Southeast Asia		✓	✓					✓	
<i>Citrus x sinensis</i>	(L.) Osbeck	Rutaceae	sweet orange	naranjo dulce	Not Evaluated	Southeast Asia		✓	✓					✓	
<i>Clausena lansium</i>	(Lour.) Skeels	Rutaceae	wampee	wampi	Not Evaluated	South China		✓	✓					✓	
<i>Clowesia russelliana</i>	(Hook.) Dodson	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Cnidioscolus aconitifolius</i>	(Mill.) I.M.Johnst.	Euphorbiaceae	tree spinach	chayo	Least Concern	Mesoamerica	✓	✓	✓		✓				

<i>Coccoloba uvifera</i>	(L.) L.	Polygonaceae	sea grape	uva de playa	Least Concern	Tropical America	✓	✓	✓					✓	
<i>Cochleanthes flabelliformis</i>	(Sw.) R.E.Schult. & Garay	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓								✓
<i>Cocos nucifera</i>	L.	Arecaceae	coconut	cocotero	Not Evaluated	Southeast Asia		✓	✓					✓	
<i>Codiaeum variegatum</i>	(L.) Rumph. ex A.Juss.	Euphorbiaceae	croton	croto	Least Concern	Southeast Asia & Australia		✓	✓		✓				
<i>Coelia bella</i>	(Lem.) Rchb.f.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Coelia densiflora</i>	Rolfe	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Coelogyne flaccida</i>	Lindl.	Orchidaceae			Not Evaluated	South Asia									✓
<i>Coffea arabica</i>	L.	Rubiaceae	arabian coffee	cafeto arábigo	Endangered	Ethiopia		✓	✓			✓	✓		
<i>Coffea canephora</i>	Pierre ex A.Froehner	Rubiaceae	robusta coffee	café robusta	Least Concern	Sub-Saharan Africa		✓	✓				✓		
<i>Cojoba arborea</i>	(L.) Britton & Rose	Fabaceae	coral snake tree	barba de jolote	Least Concern	Tropical America	✓			✓					
<i>Cola acuminata</i>	(P.Beauv.) Schott & Endl.	Malvaceae	true cola	nuez de cola	Least Concern	Africa		✓	✓						
<i>Cola nitida</i>	(Vent.) Schott & Endl.	Sterculiaceae	kola nut	nuez de cola	Least Concern	West Africa		✓	✓					✓	
<i>Coleus amboinicus</i>	Lour.	Lamiaceae	Cuban oregano	orégano cubano	Not Evaluated	Africa, Middle East & South Asia		✓	✓		✓	✓			
<i>Comparettia falcata</i>	Poepp. & Endl.	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓								✓
<i>Cordia megalantha</i>	S.F.Blake	Boraginaceae	black laurel	laurel negro	Least Concern	Tropical America	✓			✓					
<i>Cordylone fruticosa</i>	(L.) A.Chev.	Liliaceae	ti plant	palmita roja	Least Concern	Southeast Asia		✓	✓		✓				
<i>Coriandrum sativum</i>	L.	Apiaceae	cilantro	culantro de castilla	Not Evaluated	Middle East & South Asia		✓	✓			✓			
<i>Couepia polyandra</i>	(Kunth) Rose	Chrysobalanaceae	olosapo	olozapo	Not Evaluated	Mexico & Central America	✓		✓					✓	
<i>Couroupita guianensis</i>	Aubl.	Lecythidaceae	cannonball tree	bala de cañón	Least Concern	South America		✓	✓	✓				✓	
<i>Crescentia sp.</i>	L.	Bignoniaceae	calabash tree	jicaro	N/A	Mexico, Caribbean Central & South America	✓	✓	✓					✓	
<i>Cuitlauzina egertonii</i>	(Lindl.) Dressler & N.H.Williams	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Cupressus sempervirens</i>	L.	Cupressaceae	Italian cypress	cipres italiano	Least Concern	Mediterranean		✓			✓				
<i>Cycnoches egertonianum</i>	Bateman	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Cymbidium sp.</i>	Sw.	Orchidaceae	boat orchid	orquídea barco	N/A	East, South & Southeast Asia & Australia									✓
<i>Cymbopogon citratus</i>	(DC.) Stapf	Poaceae	lemongrass	zacate de limón	Not Evaluated	South Asia		✓	✓			✓			
<i>Cyrtochilum flexuosum</i>	Kunth	Orchidaceae			Not Evaluated	South America									✓



<i>Dipteryx odorata</i>	(Aubl.) Forsyth f.	Fabaceae	tonka bean	cumaru	Not Evaluated	South America		✓	✓					✓	
<i>Dombeya wallichii</i>	(Lindl.) K.Schum.	Sterculiaceae	pink ball tree	árbol de las hortensias	Not Evaluated	Madagascar & Eastern Africa						✓			
<i>Domingoa purpurea</i>	(Lindl.) Van den Berg & Soto Arenas	Orchidaceae			Not Evaluated	Central America	✓								✓
<i>Dovyalis hebecarpa</i>	(Gardner) Warb.	Salicaceae	ceylon gooseberry	grosella de ceilán	Not Evaluated	Southeast Asia			✓					✓	
<i>Dracaena fragrans</i>	(L.) Ker Gawl.	Liliaceae	corn plant	dracaena	Least Concern	Africa						✓			
<i>Dracaena fragrans 'Janet Craig'</i>	(L.) Ker Gawl.	Asparagaceae	Janet Craig compacta	dracaena compacta	Least Concern	Africa					✓				
<i>Dracaena hyacinthoides</i>	(L.) Mabb.	Liliaceae	mother-in-law's toungue	lengua de suegra	Not Evaluated	South Africa		✓				✓			
<i>Dracaena masoniana</i>	(Chahin.) Byng & Christenh.	Asparagaceae	whale fin snake plant	sansiveria aleta de ballena	Not Evaluated	Africa					✓				
<i>Dracaena sanderiana</i>	Mast.	Asparagaceae	lucky bamboo	bambú de la suerte	Not Evaluated	Africa		✓			✓				
<i>Dracaena trifasciata</i>	(Prain) Mabb.	Asparagaceae	mother-in-law's tongue	lengua de suegra	Not Evaluated	Africa					✓				
<i>Dracaena trifasciata 'Hahnii'</i>	(Prain) Mabb.	Asparagaceae	bird's nest snake plant	lengua de suegra enana	Not Evaluated	Africa		✓			✓				
<i>Dryadella linearifolia</i>	(Ames) Luer	Orchidaceae			Not Evaluated	Central America	✓								✓
<i>Duranta erecta</i>	L.	Verbenaceae	golden dewdrop	duranta	Least Concern	Tropical America	✓	✓				✓			
<i>Durio zibethinus</i>	L.	Malvaceae	durian	durián	Not Evaluated	Southeast Asia		✓	✓					✓	
<i>Dyopsis lutescens</i>	(H.Wendl.) Beentje & J.Dransf.	Arecaceae	areca palm	palma areca	Near Threatened	Madagascar						✓			
<i>Dysphania ambrosioides</i>	(L.) Mosyakin & Clemants	Amaranthaceae	Mexican tea	apazote	Not Evaluated	North, Central & South America	✓	✓	✓				✓		
<i>Echites panduratus</i>	A.DC.	Apocynaceae	loroco	loroco	Not Evaluated	Mesoamerica	✓		✓				✓		
<i>Elaeagnus triflora</i>	Roxb.	Elaeagnaceae	lingaro berry	lingaro	Not Evaluated	Southeast Asia		✓	✓					✓	
<i>Elaeis guineensis</i>	Jacq.	Arecaceae	African oil palm	palma aceitera	Least Concern	Tropical Africa		✓	✓	✓		✓		✓	
<i>Elaeocarpus serratus</i>	L.	Elaeocarpaceae	Ceylon olive	oiwo de Ceylan	Not Evaluated	Southeast Asia		✓	✓					✓	
<i>Elettaria cardamomum</i>	(L.) Maton	Zingiberaceae	true cardamom	cardamomo	Not Evaluated	South Asia		✓	✓				✓	✓	
<i>Elleanthus caricoides</i>	Nash	Orchidaceae			Not Evaluated	Central America	✓								✓
<i>Elleanthus graminifolius</i>	(Barb.Rodr.) Løjtnant	Orchidaceae	the grass-like leafed elleanthus		Not Evaluated	Central & South America	✓								✓
<i>Encyclia adenocarpus</i>	(Lex.) Schltr.	Orchidaceae			Not Evaluated	Mexico									✓
<i>Encyclia alata</i>	(Bateman) Schltr.	Orchidaceae			Not Evaluated	Central America	✓								✓

<i>Encyclia bractescens</i>	(Lindl.) Hoehne	Orchidaceae			Not Evaluated	Central America	✓													✓
<i>Encyclia chloroleuca</i>	(Hook.) Neumann	Orchidaceae			Not Evaluated	Central & South America														✓
<i>Encyclia cordigera</i>	(Kunth) Dressler	Orchidaceae			Not Evaluated	Central & South America	✓													✓
<i>Encyclia diota</i>	(Lindl.) Schltr.	Orchidaceae			Not Evaluated	Central America	✓													✓
<i>Encyclia gravida</i>	(Lindl.) Schltr.	Orchidaceae			Not Evaluated	Caribbean & Central America	✓													✓
<i>Encyclia hanburyi</i>	(Lindl.) Schltr.	Orchidaceae			Not Evaluated	Central America	✓													✓
<i>Encyclia incumbens</i>	(Lindl.) Mabb.	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Encyclia nematocaulon</i>	(A.Rich.) Acuña	Orchidaceae			Not Evaluated	Caribbean														✓
<i>Encyclia papillosa</i>	(Bateman ex Lindl.) Aguirre-Olav.	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Encyclia</i> sp.	Hook.	Orchidaceae			N/A	Caribbean, Central & South America	✓													✓
<i>Encyclia trachychila</i>	(Lindl.) Schltr.	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Enterolobium cyclocarpum</i>	(Jacq.) Griseb.	Fabaceae	monkey ear tree	guanacaste	Least Concern	Southern Mexico to South America	✓	✓	✓	✓	✓									
<i>Epidendrum anceps</i>	Jacq.	Orchidaceae			Not Evaluated	Caribbean														✓
<i>Epidendrum baumannianum</i> X <i>flexuosum</i>	Schltr.	Orchidaceae			Not Evaluated	Central & South America	✓													✓
<i>Epidendrum carpophorum</i>	Barb.Rodr.	Orchidaceae			Not Evaluated	South America														✓
<i>Epidendrum centropetalum</i>	Rchb.f.	Orchidaceae			Not Evaluated	Central America	✓													✓
<i>Epidendrum ciliare</i>	L.	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓													✓
<i>Epidendrum cristatum</i>	Ruiz & Pav.	Orchidaceae			Not Evaluated	Central & South America	✓													✓
<i>Epidendrum difforme</i>	Jacq.	Orchidaceae			Not Evaluated	Caribbean	✓													✓
<i>Epidendrum eximium</i>	L.O.Williams	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Epidendrum hondurensense</i>	Ames	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Epidendrum isthmi</i>	Schltr.	Orchidaceae			Not Evaluated	Central America	✓													✓
<i>Epidendrum melistagum</i>	Hågsater	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Epidendrum myrianthum</i>	Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Epidendrum nocturnum</i>	Jacq.	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓													✓



<i>Eulophia alta</i>	(L.) Fawc. & Rendle	Orchidaceae			Not Evaluated	North, Central & South America, Caribbean & Africa	✓											✓
<i>Euphorbia tirucalli</i>	L.	Euphorbiaceae	pencil cactus	coral verde	Least Concern	Africa		✓	✓				✓					
<i>Euphorbia trigona</i>	Mill.	Euphorbiaceae	African milk tree	árbol africano de leche	Not Evaluated	Africa		✓	✓			✓						
<i>Ficus benjamina</i>	L.	Moraceae	weeping fig	figs de hoja pequeña	Least Concern	Southeast Asia			✓	✓			✓					
<i>Ficus carica</i>	L.	Moraceae	common fig	higuera	Least Concern	Middle East			✓	✓								✓
<i>Ficus crocata</i>	(Miq.) Mart. ex Miq.	Moraceae	sandpaper fig	saiba prieta	Least Concern	Mesoamerica, Caribbean & South America	✓	✓	✓				✓					
<i>Ficus elastica</i>	Roxb. ex Hornem.	Moraceae	rubber plant	palo de hule	Not Evaluated	Southeast Asia			✓	✓			✓					
<i>Ficus lyrata</i>	Warb.	Moraceae	fiddle leaf fig	figs lira	Not Evaluated	Tropical Africa			✓	✓	✓							
<i>Ficus microcarpa</i>	L.f.	Moraceae	Indian laurel	laurel de Indias	Least Concern	Southeast Asia			✓	✓	✓			✓				
<i>Ficus pumila</i>	L.	Moraceae	climbing fig	figs trepador	Not Evaluated	Japan & China			✓	✓				✓				
<i>Flacourtia indica</i>	(Burm.f.) Merr.	Salicaceae	governor's plum	cerezo del gobernador	Least Concern	Africa & Asia			✓	✓								✓
<i>Flacourtia inermis</i>	Roxb.	Salicaceae	lovi-lovi	lovi-lovi	Not Evaluated	Southeast Asia			✓	✓								✓
<i>Fraxinus uhdei</i>	(Wenz.) Lingelsh.	Oleaceae	tropical ash	fresno	Least Concern	Mesoamerica	✓	✓					✓					
<i>Fridericia chica</i>	(Bonpl.) L.G.Lohmann	Bignoniaceae	cricket-vine	puca panga	Not Evaluated	North to South America	✓	✓					✓					
<i>Galeandra batemanii</i>	Rolfe	Orchidaceae			Not Evaluated	Central America	✓											✓
<i>Garcinia humilis</i>	(Vahl) C.D.Adams	Clusiaceae	achacha	achachairú	Not Evaluated	South America & Caribbean			✓	✓								✓
<i>Garcinia mangostana</i>	L.	Clusiaceae	mangosteen	mangostán	Not Evaluated	Southeast Asia			✓	✓								✓
<i>Garcinia xanthochymus</i>	Hook.f. ex T.Anderson	Clusiaceae	false mangosteen	falso mangostán	Least Concern	Southeast Asia				✓	✓							✓
<i>Genipa americana</i>	L.	Rubiaceae	genipa	jagua	Not Evaluated	Tropical America	✓	✓	✓									✓
<i>Gmelina arborea</i>	Roxb. ex Sm.	Lamiaceae	gamhar	melina	Least Concern	South & Southeast Asia			✓	✓								
<i>Gongora sp.</i>	Ruiz & Pav.	Orchidaceae			N/A	Central & South America	✓											✓
<i>Gongora truncata</i>	Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓											✓
<i>Gongora unicolor</i>	Schltr.	Orchidaceae			Not Evaluated	Central America	✓											✓
<i>Guaiacum sanctum</i>	L.	Zygophyllaceae	hollywood	guayacán real	Near Threatened	Central America & Caribbean	✓	✓	✓				✓					
<i>Guarea kunthiana</i>	A.Juss.	Meliaceae	marapolan	marapolán	Not Evaluated	Central & South America			✓	✓	✓							

<i>Guarianthe × laelioides</i>	(Lem.) Van den Berg	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Guarianthe aurantiaca</i>	(Bateman ex Lindl.) Dressler & W.E.Higgins	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Guarianthe bowringiana</i>	(O'Brien) Dressler & W.E.Higgins	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Guarianthe skinneri</i>	(Bateman) Dressler & W.E.Higgins	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Guarianthe sp.</i>	Dressler & W.E.Higgins	Orchidaceae			N/A	Central & South America	✓													✓
<i>Guazuma ulmifolia</i>	Lam.	Sterculiaceae	West Indian elm	guácimo	Least Concern	Tropical America	✓	✓	✓				✓							
<i>Handroanthus chrysanthus</i>	(Jacq.) S.O.Grose	Bignoniaceae	yellow ipê	guayacán	Not Evaluated	Central & South America	✓				✓									
<i>Handroanthus ochraceus</i> subsp. <i>neochrysanthus</i>	(A.H.Gentry) S.O.Grose	Bignoniaceae	cortez	cortez amarillia	Not Evaluated	Central & South America	✓				✓									
<i>Hauya elegans</i> subsp. <i>cornuta</i>	(Hemsl.) P.H.Raven & Breedlove	Onagraceae	white snake	culebro blanco	Least Concern	Mesoamerica	✓						✓							
<i>Helianthus annuus</i>	L.	Asteraceae	sunflower	girasol	Least Concern	South Asia, North & Central America			✓	✓								✓		
<i>Heliconia latispatha</i>	Benth.	Heliconiaceae	expanded lobsterclaw	pico de gorrión	Not Evaluated	Central America	✓			✓			✓							
<i>Heliconia psittacorum</i>	L.f.	Heliconiaceae	parrot heliconia	pico de loro	Not Evaluated	South America			✓	✓			✓							
<i>Helleriella nicaraguensis</i>	A.D.Hawkes	Orchidaceae			Not Evaluated	Central America	✓													✓
<i>Hesperocyparis lusitanica</i>	(Mill.) Bartel	Cupressaceae	Mexican cypress	cipres mexicano	Least Concern	Mesoamerica	✓	✓					✓							
<i>Hevea brasiliensis</i>	(Willd. ex A.Juss.) Müll.Arg.	Euphorbiaceae	Para rubber tree	árbol de caucho	Least Concern	South America				✓	✓									
<i>Hibiscus rosa-sinensis</i>	L.	Malvaceae	Chinese hibiscus	rosa de China	Not Evaluated	Asia			✓	✓			✓							
<i>Hibiscus sabdariffa</i>	L.	Malvaceae	roselle	rosa de Jamaica	Not Evaluated	Africa			✓	✓								✓		
<i>Hippeastrum vittatum</i>	(L'Hér.) Herb.	Amaryllidaceae	amaryllis	amarilis	Not Evaluated	South America							✓							
<i>Holmskioldia sanguinea</i>	Retz.	Verbenaceae	Chinese hat plant	sombrero chino	Not Evaluated	Himalayas							✓							
<i>Hylocereus costaricensis</i>	(F.A.C.Weber) Britton & Rose	Cactaceae	Costa Rican pitahaya	pitahaya de Costa Rica	Not Evaluated	Central & South America				✓			✓							
<i>Hymenaea courbaril</i>	L.	Fabaceae	stinking toe	guapinol	Least Concern	Caribbean, Central & South America	✓	✓	✓				✓							
<i>Indigofera tinctoria</i>	L.	Fabaceae	true indigo	añil	Not Evaluated	Central & South America, Africa, Middle East & South Asia			✓	✓								✓		
<i>Inga edulis</i>	Mart.	Fabaceae	guama	guaba	Least Concern	South America			✓	✓										
<i>Inga inicuil</i>	Schltld. & Cham. ex G.Don	Fabaceae	ice cream bean	cuajiniquil	Least Concern	Mexico, Central America & South America	✓			✓			✓							
<i>Inga paterno</i>	Harms	Fabaceae	paterno	paterna	Least Concern	Mesoamerica	✓			✓	✓									

<i>Inga sp.</i>	Mill.	Fabaceae	shimbillo	pacae	N/A	South America		✓	✓				✓	
<i>Ionopsis utricularioides</i>	(Sw.) Lindl.	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓							✓
<i>Iresine latifolia</i>	(M.Martens & Galeotti) Benth. & Hook.f.	Amaranthaceae	bloodleaf	amargosillo	Not Evaluated	South America		✓				✓		
<i>Isochilus linearis</i>	(Jacq.) R.Br.	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓							✓
<i>Isochilus major</i>	Schtdl. & Cham.	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Ixora salicifolia</i>	(Blume) DC.	Rubiaceae	West Indian jasmine	cruz de Malta	Not Evaluated	India						✓		
<i>Jacaranda mimosifolia</i>	D.Don	Bignoniaceae	blue jacaranda	jacarandá	Vulnerable	South America		✓				✓		
<i>Jacquinella equitantifolia</i>	(Ames) Dressler	Orchidaceae			Not Evaluated	Central America	✓							✓
<i>Jacquinella gigantea</i>	Dressler, Salazar & Garcia-Cruz	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Jatropha curcas</i>	L.	Euphorbiaceae	purging nut	piñón	Least Concern	Caribbean, Central & South America	✓	✓	✓	✓			✓	
<i>Jatropha multifida</i>	L.	Euphorbiaceae	coral bush	planta coral	Not Evaluated	Central America & Caribbean		✓	✓	✓				
<i>Jatropha podagrica</i>	Hook.	Euphorbiaceae	gout stalk	jatropha	Not Evaluated	Central America	✓	✓		✓	✓			
<i>Juglans pyriformis</i>	Liebm.	Juglandaceae	Olancho walnut	nogal olanchano	Endangered	Central America	✓		✓	✓				
<i>Khaya senegalensis</i>	(Desv.) A.Juss.	Meliaceae	African maogany	caoba africana	Vulnerable	Tropical Africa		✓	✓	✓				
<i>Lacaena bicolor</i>	Lindl.	Orchidaceae			Not Evaluated	Central & South America	✓							✓
<i>Laelia anceps</i>	Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Laelia rubescens</i>	Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Laelia rubescens var. alba</i>	Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Laelia sp.</i>	Lindl.	Orchidaceae		Lila	N/A	Caribbean, Central & South America	✓							✓
<i>Laelia superbiens</i>	Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Lagerstroemia indica</i>	L.	Lythraceae	crape myrtle	árbol de Júpiter	Least Concern	Southeast Asia		✓	✓			✓		
<i>Lagerstroemia speciosa</i>	(L.) Pers.	Lythraceae	pride of India	reina de las flores	Not Evaluated	Southeast Asia		✓	✓			✓		
<i>Lansium domesticum</i>	Corrêa	Meliaceae	langsat	lanzón	Not Evaluated	Southeast Asia		✓	✓					✓
<i>Laurus nobilis</i>	L.	Lauraceae	bay laurel	laurel	Least Concern	Mediterranean		✓	✓					✓
<i>Lecythis minor</i>	Jacq.	Lecythidaceae	monkey pot	olla del mono	Least Concern	South America			✓	✓				✓
<i>Lecythis zabuajo</i>	Aubl.	Lecythidaceae	sapucaia nut	nuez sapucaia	Least Concern	South America		✓	✓					✓

<i>Leochilus labiatus</i>	(Sw.) Kuntze	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓													✓
<i>Lepanthes guatemalensis</i>	Schltr.	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Lepanthes sp.</i>	Sw.	Orchidaceae			N/A	Caribbean, Central & South America	✓													✓
<i>Lepanthes yunckeri</i>	Ames	Orchidaceae			Not Evaluated	Central & South America	✓													✓
<i>Linum usitatissimum</i>	L.	Linaceae	flax	linaza	Not Evaluated	Middle East		✓	✓						✓					
<i>Liquidambar styraciflua</i>	L.	Hamamelidaceae	red gum	árbol del ambar	Least Concern	North and Central America	✓	✓		✓										
<i>Liriope spicata</i>	Lour.	Liliaceae	creeping liriopae	espigosa	Not Evaluated	Japan & China		✓	✓					✓						
<i>Litchi chinensis</i>	Sonn.	Sapindaceae	lychee	litchi	Not Evaluated	China		✓	✓	✓				✓					✓	
<i>Litchi chinensis</i> subsp. <i>philippinensis</i>	(Radlk.) Leenh.	Sapindaceae	kamingi	kamingi	Not Evaluated	Southeast Asia			✓					✓						
<i>Ludisia discolor</i>	(Ker Gawl.) Blume	Orchidaceae			Not Evaluated	South & Southeast Asia														✓
<i>Lycaste aromatica</i>	(Graham) Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Lycaste cruenta</i>	(Lindl.) Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Lycaste deppei</i>	(G.Lodd. ex Lindl.) Lindl.	Orchidaceae			Not Evaluated	Central & South America	✓													✓
<i>Lycaste lasioglossa</i> var. <i>flava</i>	Rchb.f.	Orchidaceae			Not Evaluated	Mesoamerica	✓													✓
<i>Lycaste sp.</i>	Lindl.	Orchidaceae			N/A	Central & South America	✓													✓
<i>Macadamia integrifolia</i>	Maiden & Betche	Proteaceae	smooth-shelled macadamia	nuez de macadamia	Vulnerable	Australia				✓									✓	
<i>Macadamia tetraphylla</i>	L.A.S.Johnson	Proteaceae	rough-shelled macadamia	nuez de macadamia	Endangered	Australia				✓									✓	
<i>Magnolia champaca</i>	(L.) Baill. ex Pierre	Magnoliaceae	champaca magnolia	champaca	Least Concern	India & Southeast Asia		✓	✓					✓						
<i>Malpighia emarginata</i>	DC.	Malpighiaceae	acerola cherry	acerola	Not Evaluated	Tropical America	✓		✓										✓	
<i>Malpighia glabra</i>	L.	Malpighiaceae	Barbados cherry	cerezo de Barbados	Least Concern	Tropical America	✓	✓	✓											
<i>Mammea americana</i>	L.	Calophyllaceae	mamey apple	mamey	Not Evaluated	Central America & Caribbean		✓	✓										✓	
<i>Mangifera indica</i>	L.	Anacardiaceae	mango	mango	Not Evaluated	South Asia		✓	✓	✓									✓	
<i>Mangifera odorata</i>	Griff.	Anacardiaceae	kwini mango	kuwini	Not Evaluated	Southeast Asia		✓	✓										✓	
<i>Manilkara zapota</i>	(L.) P.Royen	Sapotaceae	sapodilla	chicozapote	Not Evaluated	Central America	✓	✓	✓										✓	
<i>Matisia cordata</i>	Bonpl.	Malvaceae	South American sapote	chupa chupa	Least Concern	South America			✓										✓	

<i>Mauritia flexuosa</i>	L.f.	Areaceae	moriche palm	aguaje	Not Evaluated	South America		✓	✓					✓	
<i>Maxillaria anceps</i>	Ames & C.Schweinf.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Maxillaria cucullata</i>	Lindl.	Orchidaceae			Not Evaluated	Central America	✓								✓
<i>Maxillaria densa</i>	Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Maxillaria egertoniana</i>	(Bateman ex Lindl.) Molinari	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Maxillaria elatior</i>	(Rchb.f.) Rchb.f.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Maxillaria hagsateriana</i>	Soto Arenas	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Maxillaria hedwigiae</i>	Hamer & Dodson	Orchidaceae			Least Concern	Central & South America	✓								✓
<i>Maxillaria lineolata</i>	Lindeley Schltr	Orchidaceae			Not Evaluated	Central America	✓								✓
<i>Maxillaria maleolens</i>	Schltr.	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Maxillaria praestans</i>	Rchb.f.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Maxillaria pulchra</i>	(Schltr.) L.O.Williams ex Correll	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Maxillaria ringens</i>	Rchb.f.	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Maxillaria sp.</i>	Ruiz & Pav.	Orchidaceae			N/A	Caribbean, Central & South America	✓								✓
<i>Maxillaria tenuifolia</i>	Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Maxillaria uncata</i>	Lindl.	Orchidaceae			Not Evaluated	South America									✓
<i>Maxillaria valenzuelana</i>	(A.Rich.) Nash	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓								✓
<i>Maxillaria variabilis</i>	Bateman ex Lindl.	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Melaleuca citrina</i>	(Curtis) Dum.Cours.	Myrtaceae	crimson bottlebrush	escobillón rojo	Not Evaluated	Australia			✓			✓			
<i>Melaleuca leucadendra</i>	(L.) L.	Myrtaceae	cajeput tree	cajeput	Not Evaluated	Southeast Asia & Australia		✓	✓			✓			
<i>Melia azedarach</i>	L.	Meliaceae	chinaberry tree	árbol de paraíso	Least Concern	South Asia, Southeast Asia & Australia		✓	✓				✓		
<i>Melicoccus bijugatus</i>	Jacq.	Sapindaceae	Spanish lime	limoncillo	Least Concern	South America		✓	✓	✓				✓	
<i>Mentha spicata</i>	L.	Lamiaceae	spearmint	yerbabuena	Least Concern	Europe, Middle East, Central & South Asia		✓	✓					✓	
<i>Mentha x piperita</i>	L.	Lamiaceae	peppermint	menta	Not Evaluated	Europe, Middle East & Central Asia		✓	✓					✓	
<i>Mesosphaerum suaveolens</i>	(L.) Kuntze	Lamiaceae	pignut	chan	Not Evaluated	Caribbean, Central & South America	✓	✓	✓					✓	

<i>Mirabilis jalapa</i>	L.	Nyctaginaceae	four o'clock plant	Don Diego de nueche	Not Evaluated	Mesoamerica	✓	✓	✓			✓		
<i>Monoon longifolium</i>	(Sonn.) B.Xue & R.M.K.Saunders	Annonaceae	false ashoka	polialta	Not Evaluated	Southeast Asia						✓		
<i>Monstera deliciosa</i>	Liebm.	Araceae	swiss cheese plant	carimán	Not Evaluated	Mesoamerica	✓		✓			✓	✓	
<i>Moquilea platypus</i>	Hemsl.	Chrysobalanaceae	sansapote	sonzapote	Least Concern	Mexico, Central and South America	✓		✓				✓	
<i>Morinda citrifolia</i>	L.	Rubiaceae	noni	noni	Not Evaluated	South Asia, Southeast Asia & Australia		✓	✓	✓		✓		
<i>Moringa oleifera</i>	Lam.	Moringaceae	drumstick tree	moringa	Least Concern	South Asia		✓	✓			✓		
<i>Mormodes aromatica</i>	Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Mormodes ephippilabia</i>	Fowlie	Orchidaceae			Not Evaluated	Honduras	✓							✓
<i>Mormodes lineata</i>	Bateman ex Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Mormodes sp.</i>	Lindl.	Orchidaceae			N/A	Central & South America	✓							✓
<i>Morus spp.</i>	L.	Moraceae	mulberry	morera	Not Evaluated	China		✓	✓				✓	
<i>Murraya paniculata</i>	(L.) Jack	Rutaceae	orange jasmine	limonaria	Not Evaluated	Southeast Asia		✓	✓			✓		
<i>Musa acuminata (AAA Group)</i>	Colla	Musaceae	banana	banano	Least Concern	Southeast Asia		✓	✓				✓	
<i>Musa x paradisiaca</i>	L.	Musaceae	plantain	plátano	Least Concern	Southeast Asia		✓	✓				✓	
<i>Myoxanthus congestus</i>	(A.Rich. & Galeotti) Soto Arenas	Orchidaceae			Not Evaluated	Central & South America	✓							✓
<i>Myrciaria dubia</i>	(Kunth) McVaugh	Myrtaceae	camu-camu	camu camu	Least Concern	South America			✓				✓	
<i>Myristica fragrans</i>	Houtt.	Myristicaceae	nutmeg	nuez moscada	Not Evaluated	Southeast Asia		✓	✓				✓	
<i>Myrmecophila brysiانا</i>	(Lem.) G.C.Kenn.	Orchidaceae			Not Evaluated	Central America	✓							✓
<i>Myrmecophila sp.</i>	Rolfe	Orchidaceae			N/A	Caribbean, Central & South America	✓							✓
<i>Myrmecophila tibicinis</i>	(Bateman ex Lindl.) Rolfe	Orchidaceae			Not Evaluated	Central & South America	✓							✓
<i>Myrmecophila wendlandii</i>	(Rchb.f.) G.C.Kenn.	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Myroxylon balsamum</i>	(L.) Harms	Fabaceae	Peru balsam	bálsamo de Perú	Not Evaluated	Mexico, Central & South America	✓	✓	✓	✓				
<i>Myrrhis odorata</i>	(L.) Scop.	Apiaceae	sweet cicely	mirra	Not Evaluated	Europe		✓	✓			✓		
<i>Nemaconia striata</i>	(Lindl.) Van den Berg, Salazar & Soto Arenas	Orchidaceae			Not Evaluated	Central & South America	✓							✓
<i>Neolitsea cassia</i>	(L.) Kosterm.	Lauraceae	Chinese cinnamon	cinnamón chino	Not Evaluated	Southeast China		✓	✓				✓	

<i>Nephelium lappaceum</i>	L.	Sapindaceae	rambutan	rambután	Least Concern	Southeast Asia		✓	✓				✓	
<i>Nephrolepis exaltata</i>	(L.) Schott	Pteridophyta	Boston fern	helecho de Boston	Not Evaluated	Caribbean, Central & South America	✓				✓			
<i>Nicotiana tabacum</i>	L.	Solanaceae	tobacco	tabaco	Not Evaluated	South America		✓	✓			✓		
<i>Nidema boothii</i>	(Lindl.) Schltr.	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓							✓
<i>Noronhia emarginata</i>	(Lam.) Poir.	Oleaceae	Madagascar olive	olivo de Madagascar	Least Concern	Madagascar			✓	✓				
<i>Ochroma pyramidale</i>	(Cav. ex Lam.) Urb.	Malvaceae	balsa tree	balso	Least Concern	Caribbean, Central & South America	✓	✓	✓	✓				
<i>Ocimum basilicum</i>	L.	Lamiaceae	sweet basil	albahaca	Not Evaluated	Australia, Central, South & Southeast Asia		✓	✓			✓		
<i>Oeceoclades maculata</i>	(Lindl.) Lindl.	Orchidaceae			Least Concern	Africa								✓
<i>Oestlundia luteorosea</i>	(A.Rich. & Galeotti) W.E.Higgins	Orchidaceae			Not Evaluated	Central America	✓							✓
<i>Oncidium leucochilum</i>	Bateman ex Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Oncidium oliganthum</i>	(Rchb.f.) L.O.Williams ex Correll	Orchidaceae			Not Evaluated	Mesoamerica								✓
<i>Oncidium sp.</i>	Sw.	Orchidaceae			N/A	Caribbean, Central & South America	✓							✓
<i>Oncidium sphacelatum</i>	Lindl.	Orchidaceae			Not Evaluated	Central & South America	✓							✓
<i>Ophiopogon jaburan</i>	(Siebold) G.Lodd.	Liliaceae	giant lilyturf	césped mondo	Not Evaluated	Japan					✓			
<i>Opuntia cochenillifera</i>	(L.) Mill.	Cactaceae	cochineal cactus	nopal de la cochinilla	Data Deficient	Mesoamerica		✓	✓		✓			
<i>Opuntia decumbens</i>	Salm-Dyck	Cactaceae	decumbens cactus	nopal de culebra	Least Concern	Central America	✓				✓			
<i>Opuntia ficus-indica</i>	(L.) Mill.	Cactaceae	prickly pear	nopal	Not Evaluated	Mexico		✓	✓				✓	
<i>Opuntia hondurensis</i>	Standl.	Cactaceae	Honduran prickly pear cactus	nopal hondureño	Not Evaluated	Honduras	✓	✓	✓		✓			
<i>Opuntia lutea</i>	(Rose) D.R.Hunt	Cactaceae	prickly pear	nopal dorado	Data Deficient	Mesoamerica	✓	✓	✓		✓			
<i>Omithocephalus numenius</i>	Toscano & Dressler	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Pachira aquatica</i>	Aubl.	Malvaceae	Guiana chestnut	castaño de Guayana	Least Concern	Tropical America	✓	✓	✓				✓	
<i>Pachypodium lamerei</i>	Drake	Apocynaceae	Madagascar palm	falsa palmera de Madagascar	Least Concern	Madagascar					✓			
<i>Palicourea pseudaxillaris</i>	C.M.Taylor	Rubiaceae	bitter little bird	cascajero	Least Concern	Central & South America				✓				
<i>Papilionanthe teres</i>	(Roxb.) Schltr.	Orchidaceae			Not Evaluated	South Asia								✓
<i>Parmentiera aculeata</i>	(Kunth) Seem.	Bignoniaceae	cuachilote	cuajilote	Least Concern	Mesoamerica	✓	✓	✓	✓			✓	

<i>Passiflora edulis</i>	Sims	Passifloraceae	passion fruit	maracuyá	Not Evaluated	Australia		✓	✓				✓	
<i>Pelexia</i> sp.	Poit. ex Lindl.	Orchidaceae			N/A	Caribbean, Central & South America	✓							✓
<i>Pereskia aculeata</i>	Mill.	Cactaceae	Barbados gooseberries	grosellero americano	Least Concern	South America		✓	✓				✓	
<i>Persea americana</i>	Mill.	Lauraceae	avocado	aguacate	Least Concern	Mesoamerica	✓	✓	✓				✓	
<i>Persea schiedeana</i>	Nees	Lauraceae	coyo	sucte	Endangered	Mesoamerica	✓	✓					✓	
<i>Phalaenopsis</i> sp.	Blume	Orchidaceae			N/A	South Asia, Southeast Asia & Australia								✓
<i>Philodendron hederaceum</i> var. <i>hederaceum</i>	(Jacq.) Schott	Araceae	heartleaf philodendron	filodendro trepador	Not Evaluated	Mexico, Caribbean, Central & South America	✓				✓			
<i>Philodendron radiatum</i>	Schott	Araceae	split-leaf philodendron	filodendro mano de tigre	Not Evaluated	Mexico, Central & South America	✓	✓			✓			
<i>Phlebodium areolatum</i>	(Willd.) J.Sm.	Pteridophyta	Virginia blue fern	calaguala	Not Evaluated	Tropical & Subtropical America	✓				✓			
<i>Phoenix canariensis</i>	H.Wildpret	Arecaceae	Canary Island date palm	palma fénix	Least Concern	Africa			✓		✓			
<i>Phoenix dactylifera</i>	L.	Arecaceae	date palm	palma datilera	Least Concern	Africa, Middle East & Southwest Asia		✓	✓				✓	
<i>Phoenix roebelenii</i>	O'Brien	Arecaceae	pygmy date palm	palmera enana	Not Evaluated	South Asia					✓			
<i>Phyllanthus acidus</i>	(L.) Skeels	Euphorbiaceae	star gooseberry	grosella estrellada	Not Evaluated	India		✓	✓				✓	
<i>Pimenta dioica</i>	(L.) Merr.	Myrtaceae	allspice	pimienta de Jamaica	Least Concern	Caribbean & Central America	✓	✓	✓		✓			
<i>Pimenta racemosa</i> var. <i>racemosa</i>	(Mill.) J.W.Moore	Myrtaceae	bay rum tree	bay-rum	Not Evaluated	Caribbean & South America			✓	✓			✓	
<i>Pinus oocarpa</i>	Schiede ex Schltld.	Pinaceae	oocarpa pine	ocote	Least Concern	Mesoamerica	✓	✓	✓	✓				
<i>Piper nigrum</i>	L.	Piperaceae	black pepper	pimienta	Not Evaluated	China, India & Southeast Asia		✓	✓				✓	
<i>Pithecellobium dulce</i>	(Roxb.) Benth.	Fabaceae	Manila tamarind	guamúchil	Least Concern	Mexico, Central & South America	✓	✓	✓	✓				
<i>Plantago major</i>	L.	Plantaginaceae	broadleaf plantain	llantén	Least Concern	Europe, Asia, Africa, Middle East		✓	✓		✓			
<i>Platystele stenostachya</i>	(Rchb.f.) Garay	Orchidaceae			Not Evaluated	Central & South America	✓							✓
<i>Pleurothallis cardiothallis</i>	Rchb.f.	Orchidaceae			Not Evaluated	Central & South America	✓							✓
<i>Pleurothallis quadrifida</i>	(Lex.) Lindl.	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓							✓
<i>Pleurothallis</i> sp.	R.Br.	Orchidaceae			N/A	Caribbean, Central & South America	✓							✓
<i>Pleurothallis titan</i>	Luer	Orchidaceae			Not Evaluated	South America								✓

<i>Plinia cauliflora</i>	(Mart.) Kausel	Myrtaceae	Brazilian grape tree	jaboticaba	Least Concern	Brazil			✓	✓		✓		✓	
<i>Plumeria rubra</i>	L.	Apocynaceae	frangipani	franchipán	Least Concern	Tropical America	✓	✓	✓	✓		✓			
<i>Podocarpus macrophyllus</i>	(Thunb.) Sweet	Podocarpaceae	yew plum pine	tejo podocarpus	Least Concern	China & Japan		✓	✓			✓			
<i>Polyscias guilfoylei</i>	(W.Bull) L.H.Bailey	Araliaceae	geranium aralia	millonaria	Not Evaluated	Southeast Asia			✓			✓			
<i>Polyscias paniculata</i>	(DC.) Baker	Araliaceae	parsley leaf aralia	aralia	Critically Endangered	Southeast Asia						✓			
<i>Polystachya foliosa</i>	(Hook.) Rchb.f.	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓								✓
<i>Pouteria caimito</i>	(Ruiz & Pav.) Radlk.	Sapotaceae	yellow star apple	abiu	Least Concern	Central & South America			✓	✓				✓	
<i>Pouteria campechiana</i>	(Kunth) Baehni	Sapotaceae	canistel	canistel	Least Concern	Central America	✓	✓	✓	✓				✓	
<i>Pouteria lucuma</i>	(Ruiz & Pav.) Kuntze	Sapotaceae	lucuma	lucuma	Least Concern	Andean South America			✓					✓	
<i>Pouteria sapota</i>	(Jacq.) H.E.Moore & Stearn	Sapotaceae	mamey sapote	zapote mamey	Not Evaluated	Central America	✓	✓	✓					✓	
<i>Pouteria viridis</i>	(Pittier) Cronquist	Sapotaceae	green sapote	zapote verde	Least Concern	Central America	✓		✓					✓	
<i>Prosopis juliflora</i>	(Sw.) DC.	Fabaceae	mesquite	mezquite	Not Evaluated	Caribbean, Central & South America	✓	✓	✓						
<i>Prosopis</i> spp.	L.	Fabaceae	mesquite	algarrobo desértico	Not Evaluated	North, Central & South America, Africa, Middle East & Asia		✓	✓					✓	
<i>Prosthechea baculus</i>	(Rchb.f.) W.E.Higgins	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Prosthechea chacaoensis</i>	(Rchb.f.) W.E.Higgins	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Prosthechea cochleata</i>	(L.) W.E.Higgins	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓								✓
<i>Prosthechea fragrans</i>	(Sw.) W.E.Higgins	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓								✓
<i>Prosthechea glauca</i>	Knowles & Westc.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Prosthechea livida</i>	(Lindl.) W.E.Higgins	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Prosthechea neuropa</i>	(Ames) W.E.Higgins	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Prosthechea radiata</i>	(Lindl.) W.E.Higgins	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Prosthechea rhynchophora</i>	(A.Rich. & Galeotti) W.E.Higgins	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Prosthechea</i> sp.	Knowles & Westc.	Orchidaceae			N/A	Caribbean, Central & South America	✓								✓
<i>Prunus serotina</i> var. <i>salicifolia</i>	(Kunth) Koehne	Rosaceae	capulin cherry	capulí	Least Concern	Central America	✓	✓	✓					✓	
<i>Pseudobombax ellipticum</i>	(Kunth) Dugand	Malvaceae	shaving brush tree	coquito	Least Concern	Caribbean & Mesoamerica	✓	✓	✓	✓					

<i>Pseudosamanea guachapele</i>	(Kunth) Harms	Fabaceae	cadeno	frijolillo	Least Concern	Mexico, Central & South America	✓			✓						
<i>Psidium cattleianum</i>	Sabine	Myrtaceae	strawberry guava	guayaba fresa	Not Evaluated	Brazil		✓	✓						✓	
<i>Psidium friedrichsthalianum</i>	(O.Berg) Nied.	Myrtaceae	Costa Rican guava	cas	Least Concern	Central & South America	✓		✓						✓	
<i>Psidium guajava</i>	L.	Myrtaceae	guava	guayabo	Least Concern	Tropical America		✓	✓						✓	
<i>Psidium guineense</i>	Sw.	Myrtaceae	Brazilian guava	guayaba de sabana	Least Concern	Central & South America	✓	✓	✓			✓				
<i>Pterocarpus acapulcensis</i>	Rose	Fabaceae	padauk	sangregado	Vulnerable	Caribbean, Central & South America	✓			✓						
<i>Pterocarpus indicus</i>	Willd.	Fabaceae	Burmese rosewood	amboyna	Endangered	Southeast Asia		✓	✓			✓				
<i>Pterocarpus officinalis</i>	Jacq.	Fabaceae	dragonsblood tree	sangre drago	Near Threatened	Caribbean, Central & South America	✓	✓		✓						
<i>Punica granatum</i>	L.	Punicaceae	pomegranate	granado	Least Concern	Middle East		✓	✓						✓	
<i>Quercus peduncularis</i>	Née	Fagaceae	black oak	encino zopilote negro	Least Concern	Mesoamerica	✓			✓						
<i>Ravenala madagascariensis</i>	Sonn.	Strelitziaceae	travelers palm	palma del viajero	Not Evaluated	Madagascar		✓	✓	✓						
<i>Renanthera sp.</i>	Lour.	Orchidaceae			N/A	South Asia & Southeast Asia										✓
<i>Restrepia muscifera</i>	(Lindl.) Rchb.f. ex Lindl.	Orchidaceae			Not Evaluated	Central & South America	✓									✓
<i>Restrepia ophioccephala</i>	(Lindl.) Garay & Dunst.	Orchidaceae			Not Evaluated	Florida, Central & South America	✓									✓
<i>Rhapis excelsa</i>	(Thunb.) A.Henry	Arecaceae	lady palm	palmera de China	Not Evaluated	Southern China		✓		✓		✓				
<i>Rhynchoalaelia digbyana</i>	(Lindl.) Schltr.	Orchidaceae			Not Evaluated	Mesoamerica	✓									✓
<i>Rhynchoalaelia glauca</i>	(Lindl.) Schltr.	Orchidaceae			Not Evaluated	Mesoamerica	✓									✓
<i>Rhynchoalaelia sp.</i>	Schltr.	Orchidaceae			N/A	Mesoamerica	✓									✓
<i>Ricinus communis</i>	L.	Euphorbiaceae	castorbean	higuerilla	Not Evaluated	Africa		✓	✓				✓			
<i>Rosenbergiodendron formosum</i>	(Jacq.) Fagerl.	Rubiaceae	blackberry jam fruit	fruta de mermelada de zarzamora	Least Concern	Central & South America			✓						✓	
<i>Rossioglossum ampliatum</i>	(Lindl.) M.W.Chase & N.H.Williams	Orchidaceae			Not Evaluated	Central & South America	✓									✓
<i>Rossioglossum williamsianum</i>	(Rchb.f.) Garay & G.C.Kenn.	Orchidaceae			Not Evaluated	Mesoamerica	✓									✓
<i>Roystonea regia</i>	(Kunth) O.F.Cook	Arecaceae	Cuban royal palm	palma real	Critically Endangered	Caribbean & Central America	✓		✓			✓				
<i>Ruta graveolens</i>	L.	Rutaceae	common rue	ruda	Least Concern	Europe		✓	✓				✓			
<i>Saccharum officinarum</i>	L.	Poaceae	sugarcane	caña de azúcar	Not Evaluated	Southeast Asia		✓	✓					✓		

<i>Salacca zalacca</i>	(Gaertn.) Voss	Areaceae	salak palm	salaca	Not Evaluated	Southeast Asia			✓					✓	
<i>Salvia hispanica</i>	L.	Lamiaceae	chia	chia	Not Evaluated	Central & South America	✓	✓	✓				✓		
<i>Salvia rosmarinus</i>	Spenn.	Lamiaceae	rosemary	romero	Not Evaluated	Europe, Middle East & Africa		✓	✓				✓		
<i>Sandoricum koetjape</i>	(Burm.f.) Merr.	Meliaceae	cotton fruit	santol	Least Concern	Southeast Asia		✓	✓					✓	
<i>Sarcoglottis sceptrodes</i>	(Rchb.f.) Schitr.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Scaphyglottis fasciculata</i>	Hook.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Scaphyglottis hondurensis</i>	(Ames) L.O.Williams	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Scaphyglottis lindeniana</i>	(A.Rich. & Galeotti) L.O.Williams	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Scaphyglottis longicaulis</i>	S.Watson	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Scaphyglottis micrantha</i>	(Lindl.) Ames & Correll	Orchidaceae			Not Evaluated	Central America	✓								✓
<i>Scaphyglottis sp.</i>	Poepp. & Endl.	Orchidaceae			N/A	Caribbean, Central & South America	✓								✓
<i>Scaphyglottis subulata</i>	Schltr.	Orchidaceae			Not Evaluated	Central America									✓
<i>Schiedeella trilineata</i>	(Lindl.) Burns-Bal.	Orchidaceae			Not Evaluated	Central America	✓								✓
<i>Schinus terebinthifolia</i>	Raddi	Anacardiaceae	Brazilian peppertree	pimentero brasileño	Not Evaluated	South America		✓	✓			✓			
<i>Sciadaphyllum systylum</i>	Donn.Sm.	Araliaceae	schefflera	cheflera	Least Concern	Southeast Asia						✓			
<i>Selenicereus triangularis</i>	(L.) D.R.Hunt	Cactaceae	queen of the night	pitaya amarilla	Not Evaluated	Caribbean			✓					✓	
<i>Selenicereus undatus</i>	(Haw.) D.R.Hunt	Cactaceae	dragon fruit	pitaya morada	Not Evaluated	Mesoamerica	✓		✓		✓			✓	
<i>Senna siamea</i>	(Lam.) H.S.Irwin & Barneby	Fabaceae	kassod tree	cassia	Least Concern	South & Southeast Asia		✓	✓			✓			
<i>Simarouba glauca</i>	DC.	Simarubaceae	paradise tree	aceituno negro	Least Concern	Caribbean & Central America	✓	✓	✓					✓	
<i>Sobralia decora</i>	Bateman	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Sobralia fenziiana</i>	Rchb.f.	Orchidaceae			Not Evaluated	Central & South America									✓
<i>Sobralia fragrans</i>	Lindl.	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Sobralia macra var. alba</i>	Schltr.	Orchidaceae			Not Evaluated	Central America									✓
<i>Sobralia macrantha</i>	Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Sobralia sp.</i>	Ruiz & Pav.	Orchidaceae			N/A	Central & South America	✓								✓
<i>Sobralia xantholeuca</i>	B.S.Williams	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓

<i>Solanum betaceum</i>	Cav.	Solanaceae	tree tomato	tomate de arbol	Not Evaluated	South America		✓	✓					✓	
<i>Solanum quitense</i>	Lam.	Solanaceae	naranja	naranja	Not Evaluated	Andean South America			✓					✓	
<i>Solanum sessiliflorum</i>	Dunal	Solanaceae	cocona	cocona	Not Evaluated	Central & South America		✓	✓					✓	
<i>Spathodea campanulata</i>	P.Beauv.	Bignoniaceae	African tulip tree	tulipán africano	Least Concern	Tropical Africa		✓	✓			✓			
<i>Spathoglottis plicata</i>	Blume	Orchidaceae			Not Evaluated	South Asia, Southeast Asia & Australia									✓
<i>Specklinia endotrachys</i>	(Rchb.f.) Pridgeon & M.W.Chase	Orchidaceae			Not Evaluated	Central America									✓
<i>Specklinia grobyi</i>	(Bateman ex Lindl.) F.Barros	Orchidaceae			Not Evaluated	Central & South America	✓								✓
<i>Specklinia tribuloides</i>	(Sw.) Pridgeon & M.W.Chase	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓								✓
<i>Spondias dulcis</i>	Parkinson	Anacardiaceae	golden apple	ambarela	Not Evaluated	Southeast Asia		✓	✓					✓	
<i>Spondias mombin</i>	L.	Anacardiaceae	hog plum	jobo amarillo	Least Concern	Tropical America	✓	✓	✓			✓			
<i>Spondias purpurea</i>	L.	Anacardiaceae	purple mombin	jocote	Least Concern	Tropical America	✓	✓	✓					✓	
<i>Spondias radlkoferi</i>	Donn.Sm.	Anacardiaceae	jobo	pahara	Not Evaluated	Tropical America	✓		✓			✓			
<i>Spondias tuberosa</i>	Arruda	Anacardiaceae	Brazil plum	umbu	Least Concern	Brazil			✓					✓	
<i>Stanhopea dodsoniana</i>	Salazar & Soto	Orchidaceae			Not Evaluated	Central America									✓
<i>Stanhopea graveolens</i>	Lindl.	Orchidaceae			Not Evaluated	South America									✓
<i>Stanhopea nicaraguensis</i>	G.Gerlach	Orchidaceae			Not Evaluated	Central America									✓
<i>Stanhopea oculata</i>	(Lodd.) Lindl.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Stanhopea ruckeri</i>	Lindl.	Orchidaceae			Not Evaluated	Central America									✓
<i>Stanhopea sp.</i>	J.Frost ex Hook.	Orchidaceae			N/A	Caribbean, Central & South America	✓								✓
<i>Stelechocarpus burahol</i>	(Blume) Hook.f. & Thomson	Annonaceae	kepel	burahol	Not Evaluated	Southeast Asia		✓	✓					✓	
<i>Stelis gargantua</i>	Pridgeon & M.W.Chase	Orchidaceae			Not Evaluated	South America									✓
<i>Stelis gelida</i>	(Lindl.) Pridgeon & M.W.Chase	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓								✓
<i>Stelis megachlamys</i>	(Schltr.) Pupulin	Orchidaceae			Not Evaluated	Central America	✓								✓
<i>Stelis poasensis</i>	(Ames) Chinchilla & Karremans	Orchidaceae			Not Evaluated	Central America	✓								✓
<i>Stenocereus pruinosus</i>	(Otto ex Pfeiff.) Buxb.	Cactaceae	gray ghost organ pipe cactus	pitayo de mayo	Least Concern	Mesoamerica	✓		✓			✓			
<i>Stenotyla lendyana</i>	(Rchb.f.) Dressler	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓

<i>Stevia rebaudiana</i>	(Bertoni) Bertoni	Asteraceae	sweetleaf	estevia	Not Evaluated	South America		✓	✓				✓	
<i>Strelitzia nicolai</i>	Regel & Körn.	Strelitziaceae	giant white bird of paradise	ave del paraiso gigante	Not Evaluated	Southern Africa			✓	✓				
<i>Swietenia humilis</i>	Zucc.	Meliaceae	Pacific Coast mahogany	caoba del Pacifico	Endangered	Central America	✓	✓				✓		
<i>Swietenia macrophylla</i>	King	Meliaceae	Honduras mahogany	caoba	Vulnerable	Central & South America	✓	✓	✓	✓				
<i>Syagrus macrocarpa</i>	Barb.Rodr.	Arecaceae	Maria Rosa palm	palma del Orinoco	Endangered	Brazil			✓	✓		✓		
<i>Syagrus orinocensis</i>	(Spruce) Burret	Arecaceae	churrubay	churúbai	Not Evaluated	South America				✓				
<i>Syagrus romanzoffiana</i>	(Cham.) Glassman	Arecaceae	queen palm	palmera reina	Not Evaluated	South America		✓	✓	✓				
<i>Symphytum officinale</i>	L.	Boraginaceae	comfrey	consuelda	Least Concern	Europe, Middle East & Asia		✓	✓				✓	
<i>Synsepalum dulcificum</i>	(Schumach. & Thonn.) Daniell	Sapotaceae	miracle fruit	fruta milagrosa	Least Concern	West Africa			✓	✓				✓
<i>Syzygium cumini</i>	(L.) Skeels	Myrtaceae	java plum	jambolán	Least Concern	India & Southeast Asia		✓	✓	✓				✓
<i>Syzygium grande</i>	(Wight) Walp.	Myrtaceae	sea apple	manzana de mar	Not Evaluated	Southeast Asia & Australia			✓			✓		
<i>Syzygium jambos</i>	(L.) Alston	Myrtaceae	rose apple	pomarrosa	Least Concern	Southeast Asia		✓	✓	✓				✓
<i>Syzygium malaccense</i>	(L.) Merr. & L.M.Perry	Myrtaceae	Malay apple	manzana malaya	Least Concern	Southeast Asia		✓	✓	✓				✓
<i>Syzygium polyanthum</i>	(Wight) Walp.	Myrtaceae	Indian bayleaf	uva de jamaica	Not Evaluated	Southeast Asia		✓	✓					✓
<i>Tabebuia rosea</i>	(Bertol.) Bertero ex A.DC.	Bignoniaceae	pink poui	macuelizo	Least Concern	Mexico, Central America & South America	✓					✓		
<i>Tagetes erecta</i>	L.	Asteraceae	marigold	clavel de moro	Not Evaluated	Mesoamerica	✓	✓	✓				✓	
<i>Tamarindus indica</i>	L.	Fabaceae	tamarind	tamarindo	Least Concern	Tropical Africa			✓	✓				✓
<i>Tara spinosa</i>	(Molina) Britton & Rose	Fabaceae	spiny holdback	tara	Not Evaluated	Caribbean & South America		✓	✓					✓
<i>Tectona grandis</i>	L.f.	Verbenaceae	teak	teca	Not Evaluated	South & Southeast Asia		✓	✓			✓		
<i>Terminalia amazonia</i>	(J.F.Gmel.) Exell	Combretaceae	white olive	roble coral	Least Concern	Tropical America				✓				
<i>Terminalia catappa</i>	L.	Combretaceae	tropical almond	almendro tropical	Least Concern	Southeast Asia		✓	✓	✓				✓
<i>Terminalia ivorensis</i>	A.Chev.	Combretaceae	Ivory Coast almond	almendro de Costa de Marfil	Vulnerable	Africa		✓		✓				
<i>Terminalia mantaly</i>	H.Perrier	Combretaceae	Madagascar almond	almendro de Madagascar	Least Concern	Madagascar		✓		✓				
<i>Thaumatococcus bipinnatifidum</i>	(Schott ex Endl.) Sakur., Calazans & Mayo	Araceae	tree philodendron	filodendro mano de leon	Not Evaluated	South America		✓				✓		
<i>Theobroma bicolor</i>	Bonpl.	Sterculiaceae	mocambo tree	pataxte	Least Concern	South America		✓	✓	✓				

<i>Theobroma cacao</i>	L.	Sterculiaceae	cocoa	cacao	Not Evaluated	South America		✓	✓				✓	
<i>Thymus vulgaris</i>	L.	Lamiaceae	garden thyme	tomillo	Least Concern	Europe		✓	✓			✓		
<i>Tradescantia fluminensis</i>	Vell.	Commelinaceae	small-leaf spiderwort	amor de hombre	Not Evaluated	South America		✓	✓		✓			
<i>Tradescantia pallida</i>	(Rose) D.R.Hunt	Commelinaceae	purple secretia	amor de hombre	Not Evaluated	Mexico		✓			✓			
<i>Tradescantia spathacea</i>	Sw.	Commelinaceae	Moses-in-a-cradle	roheo	Not Evaluated	Mesoamerica		✓			✓			
<i>Trichillia havanensis</i>	Jacq.	Meliaceae	limoncillo	limoncillo	Least Concern	Caribbean, Central & South America	✓	✓	✓		✓			
<i>Trichocentrum ascendens</i>	(Lindl.) M.W.Chase & N.H.Williams	Orchidaceae			Not Evaluated	Central America	✓							✓
<i>Trichocentrum aurisasinorum</i>	(Standl. & L.O.Williams) M.W.Chase & N.H.Williams	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Trichocentrum carthagense</i>	(Jacq.) M.W.Chase & N.H.Williams	Orchidaceae			Not Evaluated	Caribbean, Central & South America	✓							✓
<i>Trichocentrum cebolleta</i>	(Jacq.) M.W.Chase & N.H.Williams	Orchidaceae			Not Evaluated	South America								✓
<i>Trichocentrum lindenii</i>	(Brongn.) M.W.Chase & N.H.Williams	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Trichocentrum luridum</i>	(Lindl.) M.W.Chase & N.H.Williams	Orchidaceae			Not Evaluated	Central & South America	✓							✓
<i>Trichocentrum microchilum</i>	(Bateman ex Lindl.) M.W.Chase & N.H.Williams	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Trichocentrum sp.</i>	Poepp. & Endl.	Orchidaceae			N/A	Caribbean, Central & South America	✓							✓
<i>Trichocentrum splendidum</i>	(A.Rich. ex Duch.) M.W.Chase & N.H.Williams	Orchidaceae			Not Evaluated	Mesoamerica	✓							✓
<i>Trichopilia tortilis</i>	Lindl.	Orchidaceae			Not Evaluated	Central America	✓							✓
<i>Uncaria tomentosa</i>	(Willd. ex Schult.) DC.	Rubiaceae	cat's claw	uña de gato	Not Evaluated	Central & South America	✓	✓	✓			✓		
<i>Vanda sp.</i>	R.Br.	Orchidaceae			N/A	South Asia, Southeast Asia & Australia								✓
<i>Vandopsis gigantea</i>	(Lindl.) Pfitzer	Orchidaceae	the giant vandopsis		Not Evaluated	South Asia & Southeast Asia								✓
<i>Vangueria madagascariensis</i>	J.F.Gmel.	Rubiaceae	Spanish tamarind	tamarindo Africano	Not Evaluated	Tropical Africa		✓	✓				✓	
<i>Vanilla pompona</i>	Schiede	Orchidaceae	West Indian vanilla	vainilla	Endangered	Central & South America	✓	✓	✓					✓
<i>Vanilla sp.</i>	Plum. ex Mill.	Orchidaceae	vanilla	vainilla	N/A	Caribbean, Central & South America, Africa, South Asia & Southeast Asia	✓	✓	✓					✓
<i>Vasconcellea × pentagona</i>	(Heilborn) Mabb.	Caricaceae	babaco	babaco	Not Evaluated	South America			✓				✓	

<i>Vitex cooperi</i>	Standl.	Lamiaceae	aceituno	aceituno	Endangered	Central & South America	✓		✓	✓					
<i>Xylobium elongatum</i>	(Lindl. & Paxton) Hemsl.	Orchidaceae			Not Evaluated	Central & South America									✓
<i>Xylobium sulfurinum</i>	(Lem.) Schltr.	Orchidaceae			Not Evaluated	Mesoamerica	✓								✓
<i>Xylosma panamensis</i>	Turcz.	Salicaceae	pepenance	pepenance	Least Concern	Southern Mexico & Central America	✓	✓	✓					✓	
<i>Yucca gigantea</i>	Lem.	Asparagaceae	spineless yucca	izote	Not Evaluated	Mesoamerica	✓		✓		✓	✓			
<i>Zea perennis</i>	(Hitchc.) Reeves & Mangelsd.	Poaceae	perennial teocinte	maiz teocinte	Critically Endangered	Central America			✓				✓		
<i>Zingiber officinale</i>	Roscoe	Zingiberaceae	ginger	jengibre	Data Deficient	South Asia		✓	✓				✓		
<i>Ziziphus mauritiana</i>	Lam.	Rhamnaceae	jujube	jujube	Least Concern	South Asia		✓	✓					✓	

## APPENDIX N

ZAMORANO BOTANICAL GARDEN EDIBLE PLANT SPECIES LIST													
TAXONOMY			COMMON NAME		WARNING	EDIBLE USES							
SCIENTIFIC NAME	AUTHORITY	FAMILY	ENGLISH	SPANISH	TOXIC / POISONOUS	EDIBLE	FRUIT	FOLIAGE	FLOWERS	SAP / OIL / RESIN / RESIN	SEED / NUT	BUD / SHOOTS / PALM HEART / BARK	ROOTS
<i>Acacia mangium</i>	Willd.	Fabaceae	black wattle	acacia de las molucas		✓					✓ Seed	✓	✓
<i>Acanthocereus tetragonus</i>	(L.) Hummelinck	Cactaceae	triangle cactus	nopal de cruz		✓	✓					✓	
<i>Acrocomia aculeata</i>	(Jacq.) Lodd. ex R.Keith	Arecaceae	coyol palm	palma coyol		✓	✓	✓		✓ Oil	✓ Seed	✓	
<i>Adonidia merrillii</i>	(Becc.) Becc.	Arecaceae	Christmas palm	palma de navidad		✓					✓ Seed		
<i>Agave americana</i>	L.	Asparagaceae	century plant	pita americana azul		✓			✓	✓ Sap	✓ Seed	✓	
<i>Agave americana 'Variegata'</i>	L.	Asparagaceae	variegated century plant	agave amarillo		✓			✓	✓ Sap	✓ Seed	✓	
<i>Agave angustifolia</i>	Haw.	Asparagaceae	Caribbean agave	maguey espadín		✓	✓		✓	✓ Sap		✓	
<i>Agave attenuata</i>	Salm-Dyck	Asparagaceae	foxtail agave	agave cuello de cisne		✓						✓	
<i>Agave seemanniana</i>	Jacobi	Asparagaceae	seemann's century plant	agave tobalá		✓						✓	
<i>Agave sisalana</i>	Perrine	Asparagaceae	sisal	sisal		✓				✓ Sap		✓	
<i>Alibertia patinoi</i>	(Cuatrec.) Delprete & C.H.Perss.	Rubiaceae	borojo	borojó		✓	✓						
<i>Allium cepa</i>	L.	Amaryllidaceae	onion	cebolla		✓		✓	✓		✓ Seed		✓
<i>Allium sativum</i>	L.	Amaryllidaceae	garlic	ajo blanco		✓		✓	✓		✓ Seed		✓
<i>Allium schoenoprasum</i>	L.	Amaryllidaceae	chives	cebollino		✓		✓	✓				✓
<i>Aloe vera</i>	(L.) Burm.f.	Asphodelaceae	true aloe	sábila		✓		✓	✓	✓ Gum	✓ Seed		
<i>Ambrosia cumanensis</i>	Kunth	Asteraceae	Peruvian ragweed	altamisa		✓				✓ Oil	✓ Seed		
<i>Anacardium occidentale</i>	L.	Anacardiaceae	cashew	marañón		✓	✓	✓		✓ Oil	✓ Nut	✓	
<i>Ananas comosus</i>	(L.) Merr.	Bromeliaceae	pineapple	piña		✓	✓	✓				✓	
<i>Ananas comosus var. bracteatus</i>	(Lindl.) Coppens & F.Leal	Bromeliaceae	red pineapple	piña roja ornamental		✓	✓	✓				✓	

<i>Anethum graveolens</i>	L.	Apiaceae	dill	eneldo		✓		✓			✓ Seed		
<i>Annona × atemoya</i>	Mabb.	Annonaceae	atemoya	atemoya		✓	✓						
<i>Annona cherimola</i>	L.	Annonaceae	cherimoya	chirimoyo		✓	✓						
<i>Annona glabra</i>	L.	Annonaceae	pond apple	anona de manglar		✓	✓						
<i>Annona macrophyllata</i>	Donn.Sm.	Annonaceae	ilama	ilama		✓	✓						
<i>Annona mucosa</i>	Jacq.	Annonaceae	wild sweetsop	anon amazonico		✓	✓						
<i>Annona muricata</i>	L.	Annonaceae	soursop	guanábana		✓	✓	✓				✓ Young Shoots	
<i>Annona purpurea</i>	Sessé. & Moc. ex Dunal	Annonaceae	soncoya	soncuya		✓	✓						
<i>Annona squamosa</i>	L.	Annonaceae	sugar apple	anón		✓	✓						
<i>Antigonon leptopus</i>	Hook. & Arn.	Polygonaceae	coral vine	corona de reina		✓		✓	✓				✓
<i>Araucaria heterophylla</i>	(Salisb.) Franco	Araucariaceae	Norfolk Island pine	araucária de Norfolk		✓					✓ Seed		
<i>Ardisia escallonioides</i>	Schltl. & Cham.	Myrsinaceae	marlberry	guitumbillo		✓	✓						
<i>Artocarpus altilis</i>	(Parkinson) Fosberg	Moraceae	breadfruit	árbol del pan		✓	✓	✓	✓		✓ Seed		
<i>Artocarpus heterophyllus</i>	Lam.	Moraceae	jack fruit	jaca		✓	✓	✓	✓		✓ Seed		
<i>Artocarpus integer</i>	(Thunb.) Merr.	Moraceae	chempedak	champedak		✓	✓	✓			✓ Seed		
<i>Averrhoa bilimbi</i>	L.	Averrhoaceae	bilimbi	bilimbi		✓	✓	✓					
<i>Averrhoa carambola</i>	L.	Averrhoaceae	star fruit	carambola		✓	✓	✓	✓				
<i>Azadirachta indica</i>	A.Juss.	Meliaceae	neem	neem		✓	✓	✓	✓	✓ Oil & Sap	✓ Seed		
<i>Bactris gasipaes</i>	Kunth	Arecaceae	peach palm	pejibaye		✓	✓		✓	✓ Oil	✓ Seed	✓	
<i>Bambusa vulgaris</i>	Schrad. ex J.C.Wendl.	Gramineae	common bamboo	bambú común		✓						✓ Young Shoots	
<i>Bauhinia monandra</i>	Kurz	Fabaceae	Napoleon's plume	penacho de Napoleón		✓		✓	✓				
<i>Bauhinia purpurea</i>	L.	Fabaceae	purple bauhinia	árbol de orquídea púrpura		✓	✓	✓	✓	✓ Gum	✓ Seed		
<i>Bertholletia excelsa</i>	Bonpl.	Lecythidaceae	Brazil nut	nuez de Brasil		✓				✓ Oil	✓ Nut		
<i>Bixa orellana</i>	L.	Bixaceae	annatto	achiote		✓					✓ Seed		
<i>Blighia sapida</i>	K.D.Koenig	Sapindaceae	ackee	akee		✓	✓						
<i>Boehmeria nivea</i>	(L.) Gaudich.	Urticaceae	nettle	ramio		✓		✓	✓	✓ Oil	✓ Seed		✓
<i>Bouea macrophylla</i>	Griff.	Anacardiaceae	plum mango	gandaria		✓	✓	✓					

<i>Brosimum alicastrum</i>	Sw.	Moraceae	breadnut	masica		✓	✓			✓ Sap	✓ Seed		
<i>Bunchosia armeniaca</i>	(Cav.) DC.	Malpighiaceae	monk's plum	ciruela del fraile		✓	✓						
<i>Bursera simaruba</i>	(L.) Sarg.	Burseraceae	gumbo-limbo	jiñocuabo		✓		✓					
<i>Byrsonima crassifolia</i>	(L.) Kunth	Malpighiaceae	golden spoon	nance		✓	✓			✓ Oil			
<i>Camellia sinensis</i>	(L.) Kuntze	Theaceae	tea plant	té		✓		✓	✓	✓ Oil	✓ Seed		
<i>Cananga odorata</i>	(Lam.) Hook.f. & Thomson	Annonaceae	cananga tree	ylang-ylang		✓	✓		✓	✓ Oil			
<i>Canarium ovatum</i>	Engl.	Burseraceae	pili nut	nuez pili		✓	✓			✓ Oil	✓ Nut	✓	
<i>Capsicum frutescens</i>	L.	Solanaceae	chilli pepper	ají picante		✓	✓	✓					
<i>Carica papaya</i>	L.	Caricaceae	papaya	papaya		✓	✓	✓	✓		✓ Seed		
<i>Carissa macrocarpa</i>	(Eckl.) A.DC.	Apocynaceae	natal plum	ciruela de natal		✓	✓						
<i>Casimiroa edulis</i>	La Llave	Rutaceae	white sapote	zapote blanco		✓	✓				✓ Seed		
<i>Cassia grandis</i>	L.f.	Fabaceae	pink shower tree	carao		✓	✓						
<i>Cecropia pachystachya</i>	Trécul	Urticaceae	trumpet tree	guarumo		✓	✓						
<i>Ceiba pentandra</i>	(L.) Gaertn.	Malvaceae	silk-cotton tree	ceiba		✓	✓	✓	✓	✓ Oil & Resin	✓ Seed		
<i>Ceratonia siliqua</i>	L.	Fabaceae	carob	algarrobo europeo		✓	✓	✓		✓ Gum	✓ Seed		
<i>Cereus hexagonus</i>	(L.) Mill.	Cactaceae	lady of the night cactus	cactus vela		✓	✓					✓	
<i>Cereus peruvianus var. monstruoso</i>	K.Schum.	Cactaceae	Peruvian apple cactus	cactus de cerco		✓	✓					✓	
<i>Chrysobalanus icaco</i>	L.	Chrysobalanaceae	coco plum	icaco		✓	✓			✓ Oil	✓ Seed		
<i>Chrysophyllum cainito</i>	L.	Sapotaceae	star apple	caimito		✓	✓				✓ Seed		
<i>Chrysopogon zizanioides</i>	(L.) Roberty	Poaceae	vetiver	valeriana		✓				✓ Oil			✓
<i>Cinchona officinalis</i>	L.	Rubiaceae	quinine	quina		✓						✓ Bark	
<i>Cinnamomum verum</i>	J.Presl	Lauraceae	cinnamon	canela		✓		✓		✓ Oil		✓ Bark	
<i>Citrus japonica</i>	Thunb.	Rutaceae	kumquat	naranja chino		✓	✓						
<i>Citrus paradisi x C. reticulata</i>	J.W.Ingram & H.E.Moore	Rutaceae	tangelo	tangelo		✓	✓						
<i>Citrus paradisi x Poncirus trifoliata</i>	J.W.Ingram & H.E.Moore	Rutaceae	citrumelo	citrumelo		✓	✓						
<i>Citrus sinensis x Poncirus trifoliata</i>	J.W.Ingram & H.E.Moore	Rutaceae	citrange	citrange		✓	✓						
<i>Citrus x aurantiifolia</i>	(Christm.) Swingle	Rutaceae	key lime	lima ácida		✓	✓	✓					

<i>Citrus x aurantium</i>	L.	Rutaceae	bitter orange	naranja agrio		✓	✓	✓	✓	✓ Oil	✓ Seed		
<i>Citrus x paradisi</i>	Macfad.	Rutaceae	grapefruit	pomelo		✓	✓			✓ Oil	✓ Seed		
<i>Citrus x reticulata</i>	Blanco	Rutaceae	mandarin orange	mandarina		✓	✓			✓ Oil & Pectin			
<i>Citrus x sinensis</i>	(L.) Osbeck	Rutaceae	sweet orange	naranja dulce		✓	✓	✓	✓	✓ Oil			
<i>Clausena lansium</i>	(Lour.) Skeels	Rutaceae	wampee	wampi		✓	✓	✓					
<i>Cnidioscolus aconitifolius</i>	(Mill.) I.M.Johnst.	Euphorbiaceae	tree spinach	chayo	✓	✓		✓					
<i>Coccoloba uvifera</i>	(L.) L.	Polygonaceae	sea grape	uva de playa		✓	✓						
<i>Cocos nucifera</i>	L.	Arecaceae	coconut	cocotero		✓	✓		✓	✓ Oil & Sap	✓ Seed	✓ Palm Heart	✓
<i>Codiaeum variegatum</i>	(L.) Rumph. ex A.Juss.	Euphorbiaceae	croton	croto	✓	✓		✓					
<i>Coffea arabica</i>	L.	Rubiaceae	arabian coffee	cafeto arábigo		✓		✓	✓		✓ Seed		
<i>Coffea canephora</i>	Pierre ex A.Froehner	Rubiaceae	robusta coffee	café robusta		✓	✓				✓ Seed		
<i>Cola acuminata</i>	(P.Beauv.) Schott & Endl.	Malvaceae	true cola	nuez de cola		✓	✓	✓			✓ Seed		
<i>Cola nitida</i>	(Vent.) Schott & Endl.	Sterculiaceae	kola nut	nuez de cola		✓					✓ Nut		
<i>Coleus amboinicus</i>	Lour.	Lamiaceae	Cuban oregano	orégano cubano		✓		✓					
<i>Cordyline fruticosa</i>	(L.) A.Chev.	Liliaceae	ti plant	palmita roja		✓	✓	✓				✓ Young Shoots	✓
<i>Coriandrum sativum</i>	L.	Apiaceae	cilantro	culantro de castilla		✓	✓	✓			✓ Seed		✓
<i>Couepia polyandra</i>	(Kunth) Rose	Chrysobalanaceae	olosapo	olozapo		✓	✓						
<i>Couropita guianensis</i>	Aubl.	Lecythidaceae	cannonball tree	bala de cañón		✓	✓						
<i>Crescentia sp.</i>	L.	Bignoniaceae	calabash tree	jicaro	✓	✓	✓	✓		✓ Oil	✓ Seed		
<i>Cymbopogon citratus</i>	(DC.) Stapf	Poaceae	lemongrass	zacate de limón		✓		✓				✓ Stem	
<i>Cyrtostachys renda</i>	Blume	Arecaceae	sealing wax palm	palma roja		✓						✓ Palm Heart	
<i>Delonix regia</i>	(Bojer ex Hook.) Raf.	Fabaceae	royal poinciana	flamboyant		✓	✓	✓	✓	✓ Gum	✓ Seed		
<i>Dendrocalamus sikkimensis</i>	Gamble ex Oliv.	Gramineae	Bhutan bamboo	bambú		✓						✓	
<i>Dillenia indica</i>	L.	Dilleniaceae	elephant apple	manzana de elefante		✓	✓	✓					
<i>Dillenia suffruticosa</i>	(Griff.) Martelli	Dilleniaceae	shrubby simpoh	simpoh		✓	✓	✓					
<i>Dimocarpus longan</i>	Lour.	Sapindaceae	longan	longán		✓	✓	✓			✓ Seed		
<i>Dioon pectinatum</i>	Mast.	Zamiaceae	cycad	palma teosinte		✓					✓ Seed		

<i>Diospyros discolor</i>	Willd.	Ebenaceae	velvet apple	mabolo		✓	✓							
<i>Diospyros ebenum</i>	J.Koenig ex Retz.	Ebenaceae	ceylon ebony	ébano		✓	✓							
<i>Diospyros nigra</i>	(J.F.Gmel.) Perr.	Ebenaceae	black sapote	zapote negro		✓	✓							
<i>Dipteryx odorata</i>	(Aubl.) Forsyth f.	Fabaceae	tonka bean	cumaru	✓	✓	✓					✓ Seed		
<i>Dovyalis hebecarpa</i>	(Gardner) Warb.	Salicaceae	ceylon gooseberry	grosella de ceilán		✓	✓							
<i>Durio zibethinus</i>	L.	Malvaceae	durian	durián		✓	✓	✓	✓			✓ Seed	✓ Young Shoots	
<i>Dysphania ambrosioides</i>	(L.) Mosyakin & Clemants	Amaranthaceae	Mexican tea	apazote	✓	✓		✓				✓ Seed		
<i>Echites panduratus</i>	A.DC.	Apocynaceae	loroco	loroco		✓		✓	✓				✓	
<i>Elaeagnus triflora</i>	Roxb.	Elaeagnaceae	lingaro berry	lingaro		✓	✓					✓ Seed		
<i>Elaeis guineensis</i>	Jacq.	Arecaceae	African oil palm	palma aceitera		✓	✓				✓ Oil & Sap	✓ Seed	✓ Palm Heart	
<i>Elaeocarpus serratus</i>	L.	Elaeocarpaceae	Ceylon olive	olivo de Ceylan		✓	✓							
<i>Elettaria cardamomum</i>	(L.) Maton	Zingiberaceae	true cardamom	cardamomo		✓	✓	✓				✓ Seed		
<i>Enterolobium cyclocarpum</i>	(Jacq.) Griseb.	Fabaceae	monkey ear tree	guanacaste		✓	✓					✓ Seed		
<i>Epiphyllum hookeri</i>	Haw.	Cactaceae	hooker's orchid cactus	cactus orquídea		✓			✓					
<i>Eriobotrya japonica</i>	(Thunb.) Lindl.	Rosaceae	loquat	níspero Japonés		✓	✓					✓ Seed		
<i>Eryngium foetidum</i>	L.	Apiaceae	Mexican coriander	culantro		✓		✓				✓ Seed		✓
<i>Erythroxylum coca</i>	Lam.	Erithroxilaceae	coca	coca		✓		✓						
<i>Eugenia brasiliensis</i>	Lam.	Myrtaceae	Brazilian plum	grumichana		✓	✓							
<i>Eugenia florida</i>	DC.	Myrtaceae	guamirim cherry	guamirim		✓	✓							
<i>Eugenia stipitata</i>	McVaugh	Myrtaceae	araza	arazá		✓	✓							
<i>Eugenia uniflora</i>	L.	Myrtaceae	Surinam cherry	pitanga		✓	✓	✓						
<i>Euphorbia tirucalli</i>	L.	Euphorbiaceae	pencil cactus	coral verde	✓	✓		✓						
<i>Euphorbia trigona</i>	Mill.	Euphorbiaceae	African milk tree	árbol africano de leche	✓	✓		✓						
<i>Ficus benjamina</i>	L.	Moraceae	weeping fig	ficus de hoja pequeña		✓	✓	✓						
<i>Ficus carica</i>	L.	Moraceae	common fig	higuera		✓	✓	✓	✓		✓ Sap			
<i>Ficus crocata</i>	(Miq.) Mart. ex Miq.	Moraceae	sandpaper fig	saiba prieta		✓	✓							
<i>Ficus elastica</i>	Roxb. ex Hornem.	Moraceae	rubber plant	palo de hule		✓	✓	✓						

<i>Ficus lyrata</i>	Warb.	Moraceae	fiddle leaf fig	figus lira		✓	✓							
<i>Ficus microcarpa</i>	L.f.	Moraceae	Indian laurel	laurel de Indias		✓	✓							✓
<i>Ficus pumila</i>	L.	Moraceae	climbing fig	figus trepador		✓	✓							
<i>Flacourtia indica</i>	(Burm.f.) Merr.	Salicaceae	governor's plum	cerezo del gobernador		✓	✓						✓ Young Shoots	
<i>Flacourtia inermis</i>	Roxb.	Salicaceae	lovi-lovi	lovi-lovi		✓	✓							
<i>Garcinia humilis</i>	(Vahl) C.D.Adams	Clusiaceae	achacha	achachairú		✓	✓							
<i>Garcinia mangostana</i>	L.	Clusiaceae	mangosteen	mangostán		✓	✓					✓ Seed		
<i>Garcinia xanthochymus</i>	Hook.f. ex T.Anderson	Clusiaceae	false mangosteen	falso mangostán		✓	✓							
<i>Genipa americana</i>	L.	Rubiaceae	genipa	jagua		✓	✓							
<i>Gmelina arborea</i>	Roxb. ex Sm.	Lamiaceae	gamhar	melina		✓	✓	✓	✓			✓ Seed		
<i>Guaiacum sanctum</i>	L.	Zygophyllaceae	hollywood	guayacán real		✓				✓ Resin				
<i>Guarea kunthiana</i>	A.Juss.	Meliaceae	marapolan	marapolán		✓						✓ Seed		
<i>Guazuma ulmifolia</i>	Lam.	Sterculiaceae	West Indian elm	guácimo		✓	✓		✓	✓ Sap	✓ Seed	✓ Bark		
<i>Helianthus annuus</i>	L.	Asteraceae	sunflower	girasol		✓			✓	✓ Oil	✓ Seed			✓
<i>Heliconia latispatha</i>	Benth.	Heliconiaceae	expanded lobsterclaw	pico de gorrión		✓	✓	✓					✓	
<i>Heliconia psittacorum</i>	L.f.	Heliconiaceae	parrot heliconia	pico de loro		✓							✓	✓
<i>Hevea brasiliensis</i>	(Willd. ex A.Juss.) Müll.Arg.	Euphorbiaceae	Para rubber tree	árbol de caucho	✓	✓		✓				✓ Seed		
<i>Hibiscus rosa-sinensis</i>	L.	Malvaceae	Chinese hibiscus	rosa de China		✓		✓	✓					✓
<i>Hibiscus sabdariffa</i>	L.	Malvaceae	roselle	rosa de Jamaica		✓		✓	✓	✓ Oil	✓ Seed			
<i>Hylocereus costaricensis</i>	(F.A.C.Weber) Britton & Rose	Cactaceae	Costa Rican pitahaya	pitahaya de Costa Rica		✓	✓		✓					
<i>Hymenaea courbaril</i>	L.	Fabaceae	stinking toe	guapinol		✓	✓						✓ Bark	
<i>Indigofera tinctoria</i>	L.	Fabaceae	true indigo	añil		✓		✓						
<i>Inga edulis</i>	Mart.	Fabaceae	guama	guaba		✓	✓							
<i>Inga iniquil</i>	Schtdl. & Cham. ex G.Don	Fabaceae	ice cream bean	cuajiniquil		✓	✓					✓ Seed		
<i>Inga paterno</i>	Harms	Fabaceae	paterno	paterna		✓	✓					✓ Seed		
<i>Inga sp.</i>	Mill.	Fabaceae	shimbillo	pacae		✓	✓							
<i>Jatropha curcas</i>	L.	Euphorbiaceae	purging nut	piñón	✓	✓		✓				✓ Seed		

<i>Jatropha multifida</i>	L.	Euphorbiaceae	coral bush	planta coral	✓	✓	✓	✓		✓ Oil			✓
<i>Juglans pyriformis</i>	Lieb.	Juglandaceae	Olancho walnut	nogal olanchano		✓					✓ Nut		
<i>Khaya senegalensis</i>	(Desv.) A.Juss.	Meliaceae	African maogany	caoba africana		✓				✓ Oil	✓ Seed	✓	✓
<i>Lagerstroemia indica</i>	L.	Lythraceae	crape myrtle	árbol de Júpiter		✓			✓				
<i>Lagerstroemia speciosa</i>	(L.) Pers.	Lythraceae	pride of India	reina de las flores		✓		✓					
<i>Lansium domesticum</i>	Corrêa	Meliaceae	langsat	lanzón		✓	✓						
<i>Laurus nobilis</i>	L.	Lauraceae	bay laurel	laurel		✓		✓		✓ Oil			
<i>Lecythis minor</i>	Jacq.	Lecythidaceae	monkey pot	olla del mono		✓					✓ Nut		
<i>Lecythis zabucajo</i>	Aubl.	Lecythidaceae	sapucaia nut	nuez sapucaia		✓					✓ Nut		
<i>Linum usitatissimum</i>	L.	Linaceae	flax	linaza		✓		✓		✓ Oil	✓ Seed		
<i>Liriope spicata</i>	Lour.	Liliaceae	creeping liriope	espigosa		✓							✓
<i>Litchi chinensis</i>	Sonn.	Sapindaceae	lychee	litchi		✓	✓						
<i>Litchi chinensis</i> subsp. <i>philippinensis</i>	(Radlk.) Leenh.	Sapindaceae	kamingi	kamingi		✓	✓						
<i>Macadamia integrifolia</i>	Maiden & Betche	Proteaceae	smooth-shelled macadamia	nuez de macadamia		✓				✓ Oil	✓ Nut		
<i>Macadamia tetraphylla</i>	L.A.S.Johnson	Proteaceae	rough-shelled macadamia	nuez de macadamia		✓				✓ Oil	✓ Nut		
<i>Magnolia champaca</i>	(L.) Baill. ex Pierre	Magnoliaceae	champaca magnolia	champaca		✓	✓		✓		✓ Seed	✓ Bark	
<i>Malpighia emarginata</i>	DC.	Malpighiaceae	acerola cherry	acerola		✓	✓						
<i>Malpighia glabra</i>	L.	Malpighiaceae	Barbados cherry	cerezo de Barbados		✓	✓						
<i>Mammea americana</i>	L.	Calophyllaceae	mamey apple	mamey		✓	✓		✓	✓ Sap			
<i>Mangifera indica</i>	L.	Anacardiaceae	mango	mango		✓	✓	✓	✓		✓ Seed		
<i>Mangifera odorata</i>	Griff.	Anacardiaceae	kwini mango	kuwini		✓	✓				✓ Seed		
<i>Manilkara zapota</i>	(L.) P.Royen	Sapotaceae	sapodilla	chicozapote	✓	✓	✓	✓		✓ Sap & Gum		✓	
<i>Matisia cordata</i>	Bonpl.	Malvaceae	South American sapote	chupa chupa		✓	✓						
<i>Mauritia flexuosa</i>	L.f.	Arecaceae	moriche palm	aguaje		✓	✓			✓ Oil & Sap		✓ Palm Heart	
<i>Melaleuca citrina</i>	(Curtis) Dum.Cours.	Myrtaceae	crimsosn bottlebrush	escobillón rojo		✓		✓					
<i>Melaleuca leucadendra</i>	(L.) L.	Myrtaceae	cajeput tree	cajeput		✓	✓	✓	✓ Nectar	✓ Oil			
<i>Melia azedarach</i>	L.	Meliaceae	chinaberry tree	árbol de paraíso	✓	✓		✓	✓	✓ Gum			

<i>Melicoccus bijugatus</i>	Jacq.	Sapindaceae	Spanish lime	limoncillo		✓	✓				✓ Seed		
<i>Mentha spicata</i>	L.	Lamiaceae	spearmint	yerbabuena		✓		✓		✓ Oil			
<i>Mentha x piperita</i>	L.	Lamiaceae	peppermint	menta		✓		✓		✓ Oil			
<i>Mesosphaerum suaveolens</i>	(L.) Kuntze	Lamiaceae	pignut	chan		✓		✓			✓ Seed	✓	
<i>Mirabilis jalapa</i>	L.	Nyctaginaceae	four o'clock plant	Don Diego de nueche		✓		✓	✓		✓ Seed		✓
<i>Monstera deliciosa</i>	Liebm.	Araceae	swiss cheese plant	cerimán		✓	✓						
<i>Moquilea platypus</i>	Hemsl.	Chrysobalanaceae	sansapote	sonzapote		✓	✓						
<i>Morinda citrifolia</i>	L.	Rubiaceae	noni	noni		✓	✓	✓			✓ Seed		
<i>Moringa oleifera</i>	Lam.	Moringaceae	drumstick tree	moringa		✓	✓	✓	✓	✓ Oil & Gum	✓ Seed	✓ Bark	✓
<i>Morus</i> spp.	L.	Moraceae	mulberry	morera		✓	✓	✓					
<i>Murraya paniculata</i>	(L.) Jack	Rutaceae	orange jasmine	limonaria		✓	✓	✓	✓				
<i>Musa acuminata</i> (AAA Group)	Colla	Musaceae	banana	banano		✓	✓		✓			✓ Young Shoots	
<i>Musa x paradisiaca</i>	L.	Musaceae	plantain	plátano		✓	✓	✓	✓			✓	✓
<i>Myrciaria dubia</i>	(Kunth) McVaugh	Myrtaceae	camu-camu	camu camu		✓	✓						
<i>Myristica fragrans</i>	Houtt.	Myristicaceae	nutmeg	nuez moscada		✓					✓ Seed		
<i>Myroxylon balsamum</i>	(L.) Harms	Fabaceae	Peru balsam	bálsamo de Perú		✓				✓ Oil & Sap		✓ Bark	
<i>Myrrhis odorata</i>	(L.) Scop.	Apiaceae	sweet cicely	mirra		✓		✓			✓ Seed		✓
<i>Neolitsea cassia</i>	(L.) Kosterm.	Lauraceae	Chinese cinnamon	cinnamón chino		✓	✓			✓ Oil		✓ Bark	
<i>Nephelium lappaceum</i>	L.	Sapindaceae	rambutan	rambután		✓	✓			✓ Oil	✓ Seed		
<i>Nicotiana tabacum</i>	L.	Solanaceae	tobacco	tabaco	✓	✓		✓					
<i>Noronhia emarginata</i>	(Lam.) Poir.	Oleaceae	Madagascar olive	olivo de Madagscar		✓	✓						
<i>Ochroma pyramidale</i>	(Cav. ex Lam.) Urb.	Malvaceae	balsa tree	balso		✓	✓			✓ Oil	✓ Seed		
<i>Ocimum basilicum</i>	L.	Lamiaceae	sweet basil	albahaca		✓		✓	✓	✓ Oil	✓ Seed		
<i>Opuntia cochenillifera</i>	(L.) Mill.	Cactaceae	cochineal cactus	nopal de la cochinilla		✓	✓	✓					
<i>Opuntia ficus-indica</i>	(L.) Mill.	Cactaceae	prickly pear	nopal		✓	✓	✓	✓	✓ Gum	✓ Seed		
<i>Opuntia hondurensis</i>	Standl.	Cactaceae	Honduran prickly pear cactus	nopal hondureño		✓	✓	✓	✓	✓ Gum	✓ Seed		
<i>Opuntia lutea</i>	(Rose) D.R.Hunt	Cactaceae	prickly pear	nopal dorado		✓	✓	✓	✓	✓ Gum	✓ Seed		

<i>Pachira aquatica</i>	Aubl.	Malvaceae	Guiana chestnut	castaño de Guayana		✓		✓	✓		✓ Seed		
<i>Parmentiera aculeata</i>	(Kunth) Seem.	Bignoniaceae	cuachilote	cuajilote		✓	✓						
<i>Passiflora edulis</i>	Sims	Passifloraceae	passion fruit	maracuyá		✓	✓			✓ Oil	✓ Seed	✓	
<i>Pereskia aculeata</i>	Mill.	Cactaceae	Barbados gooseberries	grosellero americano		✓	✓	✓				✓ Young Shoots	
<i>Persea americana</i>	Mill.	Lauraceae	avocado	aguacate	✓	✓	✓	✓		✓ Oil			
<i>Phoenix canariensis</i>	H.Wildpret	Arecaceae	Canary Island date palm	palma fénix		✓	✓			✓ Sap			
<i>Phoenix dactylifera</i>	L.	Arecaceae	date palm	palma datilera		✓	✓	✓		✓ Sap	✓ Seed	✓ Palm Heart	
<i>Phyllanthus acidus</i>	(L.) Skeels	Euphorbiaceae	star gooseberry	grosella estrellada		✓	✓	✓					
<i>Pimenta dioica</i>	(L.) Merr.	Myrtaceae	allspice	pimienta de Jamaica		✓	✓	✓			✓ Seed		
<i>Pimenta racemosa</i> var. <i>racemosa</i>	(Mill.) J.W.Moore	Myrtaceae	bay rum tree	bay-rum	✓	✓	✓	✓		✓ Oil		✓ Bark	
<i>Pinus oocarpa</i>	Schiede ex Schtdl.	Pinaceae	oocarpa pine	ocote		✓					✓ Seed		
<i>Piper nigrum</i>	L.	Piperaceae	black pepper	pimienta		✓	✓				✓ Seed		
<i>Pithecellobium dulce</i>	(Roxb.) Benth.	Fabaceae	Manila tamarind	guamúchil		✓	✓			✓ Oil	✓ Seed		
<i>Plantago major</i>	L.	Plantaginaceae	broadleaf plantain	llantén		✓		✓		✓ Oil	✓ Seed		✓
<i>Plinia cauliflora</i>	(Mart.) Kausel	Myrtaceae	Brazilian grape tree	jaboticaba		✓	✓						
<i>Plumeria rubra</i>	L.	Apocynaceae	frangipani	franchipán		✓	✓		✓		✓ Seed		
<i>Podocarpus macrophyllus</i>	(Thunb.) Sweet	Podocarpaceae	yew plum pine	tejo podocarpus		✓	✓						
<i>Polyscias guilfoylei</i>	(W.Bull) L.H.Bailey	Araliaceae	geranium aralia	millonaria		✓		✓					
<i>Pouteria caimito</i>	(Ruiz & Pav.) Radlk.	Sapotaceae	yellow star apple	abiu		✓	✓				✓ Seed		
<i>Pouteria campechiana</i>	(Kunth) Baehni	Sapotaceae	canistel	canistel		✓	✓				✓ Seed		
<i>Pouteria lucuma</i>	(Ruiz & Pav.) Kuntze	Sapotaceae	lucuma	lucuma		✓	✓						
<i>Pouteria sapota</i>	(Jacq.) H.E.Moore & Stearn	Sapotaceae	mamey sapote	zapote mamey		✓	✓				✓ Seed		
<i>Pouteria viridis</i>	(Pittier) Cronquist	Sapotaceae	green sapote	zapote verde		✓	✓			✓ Sap & Gum	✓ Seed		
<i>Prosopis juliflora</i>	(Sw.) DC.	Fabaceae	mesquite	mezquite		✓	✓	✓	✓	✓ Gum	✓ Seed		
<i>Prosopis</i> spp.	L.	Fabaceae	mesquite	algarrobo desértico		✓	✓				✓ Seed		
<i>Prunus serotina</i> var. <i>salicifolia</i>	(Kunth) Koehne	Rosaceae	capulin cherry	capulí	✓	✓	✓				✓ Seed		
<i>Pseudobombax ellipticum</i>	(Kunth) Dugand	Malvaceae	shaving brush tree	coquito		✓					✓ Seed		

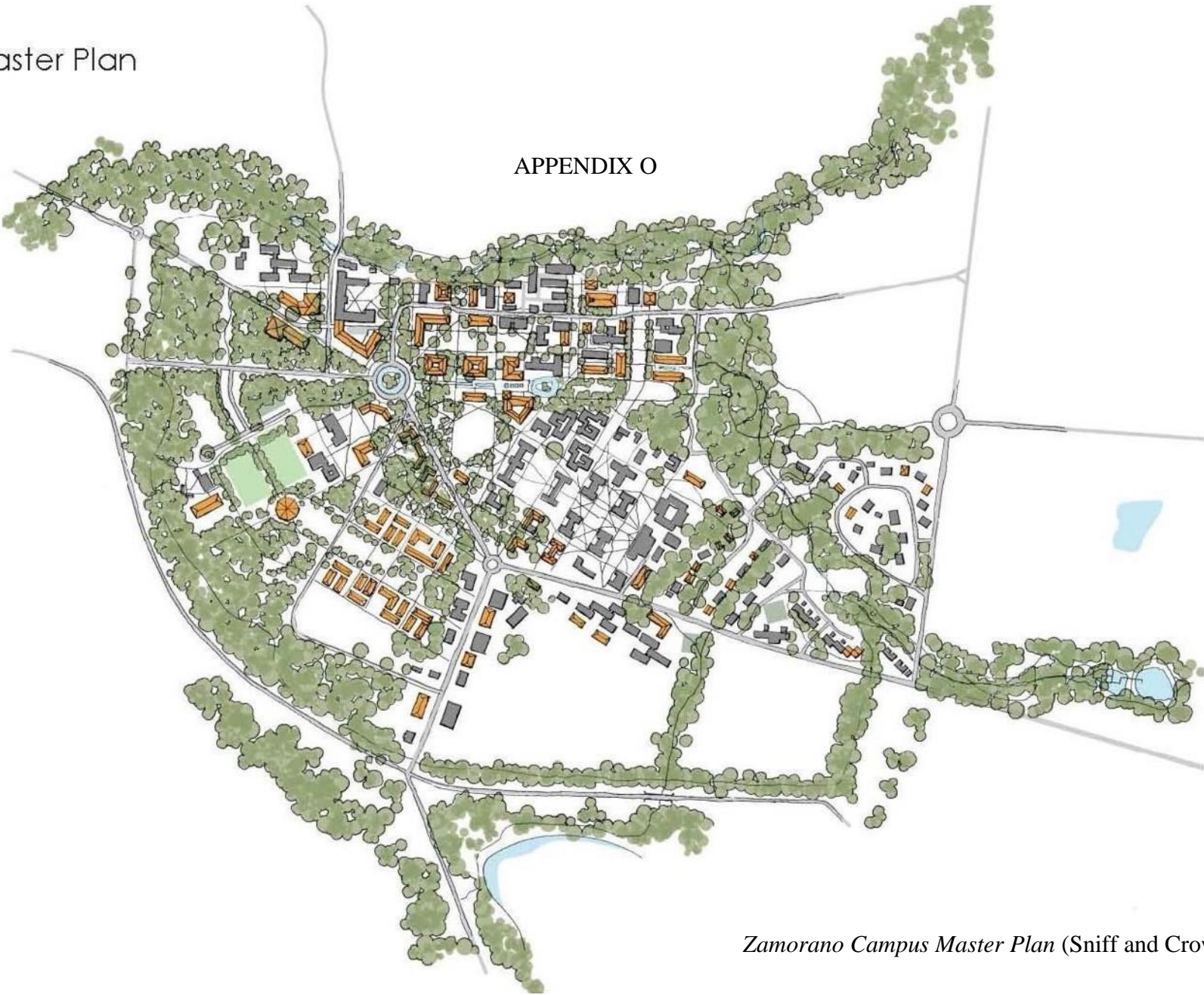
<i>Psidium cattleianum</i>	Sabine	Myrtaceae	strawberry guava	guayaba fresa		✓	✓		✓				
<i>Psidium friedrichsthalianum</i>	(O.Berg) Nied.	Myrtaceae	Costa Rican guava	cas		✓	✓						
<i>Psidium guajava</i>	L.	Myrtaceae	guava	guayabo		✓	✓	✓	✓	✓ Oil	✓ Seed		✓
<i>Psidium guineense</i>	Sw.	Myrtaceae	Brazilian guava	guayaba de sabana		✓	✓						
<i>Pterocarpus indicus</i>	Willd.	Fabaceae	Burmese rosewood	amboyna		✓		✓	✓				
<i>Punica granatum</i>	L.	Punicaceae	pomegranate	granado		✓	✓	✓	✓		✓ Seed		
<i>Ravenala madagascariensis</i>	Sonn.	Strelitziaceae	travelers palm	palma del viajero		✓	✓				✓ Seed		
<i>Ricinus communis</i>	L.	Euphorbiaceae	castorbean	higuerilla	✓	✓		✓		✓ Oil	✓ Seed		✓
<i>Rosenbergiodendron formosum</i>	(Jacq.) Fagerl.	Rubiaceae	blackberry jam fruit	fruta de mermelada de zarzamora		✓	✓						
<i>Roystonea regia</i>	(Kunth) O.F.Cook	Arecaceae	Cuban royal palm	palma real		✓						✓ Palm Heart	
<i>Ruta graveolens</i>	L.	Rutaceae	common rue	ruda	✓	✓		✓			✓ Seed		
<i>Saccharum officinarum</i>	L.	Poaceae	sugarcane	caña de azúcar		✓			✓	✓ Sap		✓ Stem	
<i>Salacca zalacca</i>	(Gaertn.) Voss	Arecaceae	salak palm	salaca		✓	✓				✓ Seed		
<i>Salvia hispanica</i>	L.	Lamiaceae	chia	chía		✓		✓		✓ Oil	✓ Seed		
<i>Salvia rosmarinus</i>	Spenn.	Lamiaceae	rosemary	romero		✓		✓					
<i>Sandoricum koetjape</i>	(Burm.f.) Merr.	Meliaceae	cotton fruit	santol		✓	✓	✓					
<i>Schinus terebinthifolia</i>	Raddi	Anacardiaceae	Brazilian peppertree	pimentero brasileño		✓					✓ Seed		
<i>Selenicereus triangularis</i>	(L.) D.R.Hunt	Cactaceae	queen of the night	pitaya amarilla		✓	✓						
<i>Selenicereus undatus</i>	(Haw.) D.R.Hunt	Cactaceae	dragon fruit	pitaya morada		✓	✓		✓		✓ Seed		
<i>Senna siamea</i>	(Lam.) H.S.Irwin & Barneby	Fabaceae	kassod tree	cassia	✓	✓	✓	✓	✓				
<i>Simarouba glauca</i>	DC.	Simarubaceae	paradise tree	aceituno negrito		✓	✓			✓ Oil	✓ Seed		
<i>Solanum betaceum</i>	Cav.	Solanaceae	tree tomato	tomate de arbol		✓	✓						
<i>Solanum quitoense</i>	Lam.	Solanaceae	naranjilla	naranjilla		✓	✓						
<i>Solanum sessiliflorum</i>	Dunal	Solanaceae	cocona	cocona		✓	✓						
<i>Spathodea campanulata</i>	P.Beauv.	Bignoniaceae	African tulip tree	tulipán africano	✓	✓			✓		✓ Seed		
<i>Spondias dulcis</i>	Parkinson	Anacardiaceae	golden apple	ambarela		✓	✓	✓					
<i>Spondias mombin</i>	L.	Anacardiaceae	hog plum	jobo amarillo		✓	✓	✓		✓ Sap	✓ Seed		✓

<i>Spondias purpurea</i>	L.	Anacardiaceae	purple mombin	jocote	✓	✓	✓	✓			✓	✓	✓
<i>Spondias radlkoferi</i>	Donn.Sm.	Anacardiaceae	jobo	pahara		✓	✓						
<i>Spondias tuberosa</i>	Arruda	Anacardiaceae	Brazil plum	umbu		✓	✓						✓
<i>Stelechocarpus burahol</i>	(Blume) Hook.f. & Thomson	Annonaceae	kepel	burahol		✓	✓						
<i>Stenocereus pruinosus</i>	(Otto ex Pfeiff.) Buxb.	Cactaceae	gray ghost organ pipe cactus	pitayo de mayo		✓	✓						
<i>Stevia rebaudiana</i>	(Bertoni) Bertoni	Asteraceae	sweetleaf	estevia		✓		✓					
<i>Strelitzia nicolai</i>	Regel & Körn.	Strelitziaceae	giant white bird of paradise	ave del paraiso gigante		✓					✓ Seed		
<i>Swietenia macrophylla</i>	King	Meliaceae	Honduras mahogany	caoba		✓	✓						
<i>Syagrus macrocarpa</i>	Barb.Rodr.	Arecaceae	Maria Rosa palm	palma del Orinoco		✓	✓				✓ Seed		
<i>Syagrus romanzoffiana</i>	(Cham.) Glassman	Arecaceae	queen palm	palmera reina		✓	✓			✓ Oil		✓	
<i>Symphytum officinale</i>	L.	Boraginaceae	comfrey	consuelda		✓		✓	✓			✓	✓
<i>Synsepalum dulcificum</i>	(Schumach. & Thonn.) Daniell	Sapotaceae	miracle fruit	fruta milagrosa		✓	✓						
<i>Syzygium cumini</i>	(L.) Skeels	Myrtaceae	java plum	jambolán		✓	✓	✓					
<i>Syzygium grande</i>	(Wight) Walp.	Myrtaceae	sea apple	manzana de mar		✓	✓						
<i>Syzygium jambos</i>	(L.) Alston	Myrtaceae	rose apple	pomarrosa	✓	✓	✓		✓				
<i>Syzygium malaccense</i>	(L.) Merr. & L.M.Perry	Myrtaceae	Malay apple	manzana malaya		✓	✓	✓	✓				
<i>Syzygium polyanthum</i>	(Wight) Walp.	Myrtaceae	Indian bayleaf	uva de jamaica		✓	✓	✓					
<i>Tagetes erecta</i>	L.	Asteraceae	marigold	clavel de moro		✓		✓	✓				
<i>Tamarindus indica</i>	L.	Fabaceae	tamarind	tamarindo		✓	✓	✓	✓		✓ Seed	✓ Young Shoots	
<i>Tara spinosa</i>	(Molina) Britton & Rose	Fabaceae	spiny holdback	tara		✓		✓			✓ Seed		
<i>Tectona grandis</i>	L.f.	Verbenaceae	teak	teca		✓	✓						
<i>Terminalia catappa</i>	L.	Combretaceae	tropical almond	almendro tropical		✓	✓			✓ Oil	✓ Nut		
<i>Theobroma bicolor</i>	Bonpl.	Sterculiaceae	mocambo tree	pataxte		✓	✓				✓ Seed		
<i>Theobroma cacao</i>	L.	Sterculiaceae	cocoa	cacao		✓	✓				✓ Seed		
<i>Thymus vulgaris</i>	L.	Lamiaceae	garden thyme	tomillo		✓		✓	✓			✓	
<i>Tradescantia fluminensis</i>	Vell.	Commelinaceae	small-leaf spiderwort	amor de hombre	✓	✓		✓					
<i>Trichillia havanensis</i>	Jacq.	Meliaceae	limoncillo	limoncillo		✓				✓ Oil	✓ Seed		

<i>Uncaria tomentosa</i>	(Willd. ex Schult.) DC.	Rubiaceae	cat's claw	uña de gato		✓				✓ Sap			
<i>Vangueria madagascariensis</i>	J.F.Gmel.	Rubiaceae	Spanish tamarind	tamarindo Africano		✓	✓						
<i>Vanilla pompona</i>	Schiede	Orchidaceae	West Indian vanilla	vainilla		✓	✓				✓ Seed		
<i>Vanilla sp.</i>	Plum. ex Mill.	Orchidaceae	vanilla	vainilla		✓	✓				✓ Seed		
<i>Vasconcellea × pentagona</i>	(Heilborn) Mabb.	Caricaceae	babaco	babaco		✓	✓						
<i>Vitex cooperi</i>	Standl.	Lamiaceae	aceituno	aceituno		✓	✓						
<i>Xylosma panamensis</i>	Turcz.	Salicaceae	pepenance	pepenance		✓	✓						
<i>Yucca gigantea</i>	Lem.	Asparagaceae	spineless yucca	izote		✓		✓	✓				
<i>Zea perennis</i>	(Hitchc.) Reeves & Mangelsd.	Poaceae	perennial teocinte	maiz teocinte		✓					✓ Seed		
<i>Zingiber officinale</i>	Roscoe	Zingiberaceae	ginger	jengibre		✓		✓	✓	✓ Oil		✓	✓
<i>Ziziphus mauritiana</i>	Lam.	Rhamnaceae	jujube	juyube		✓	✓	✓			✓ Seed		

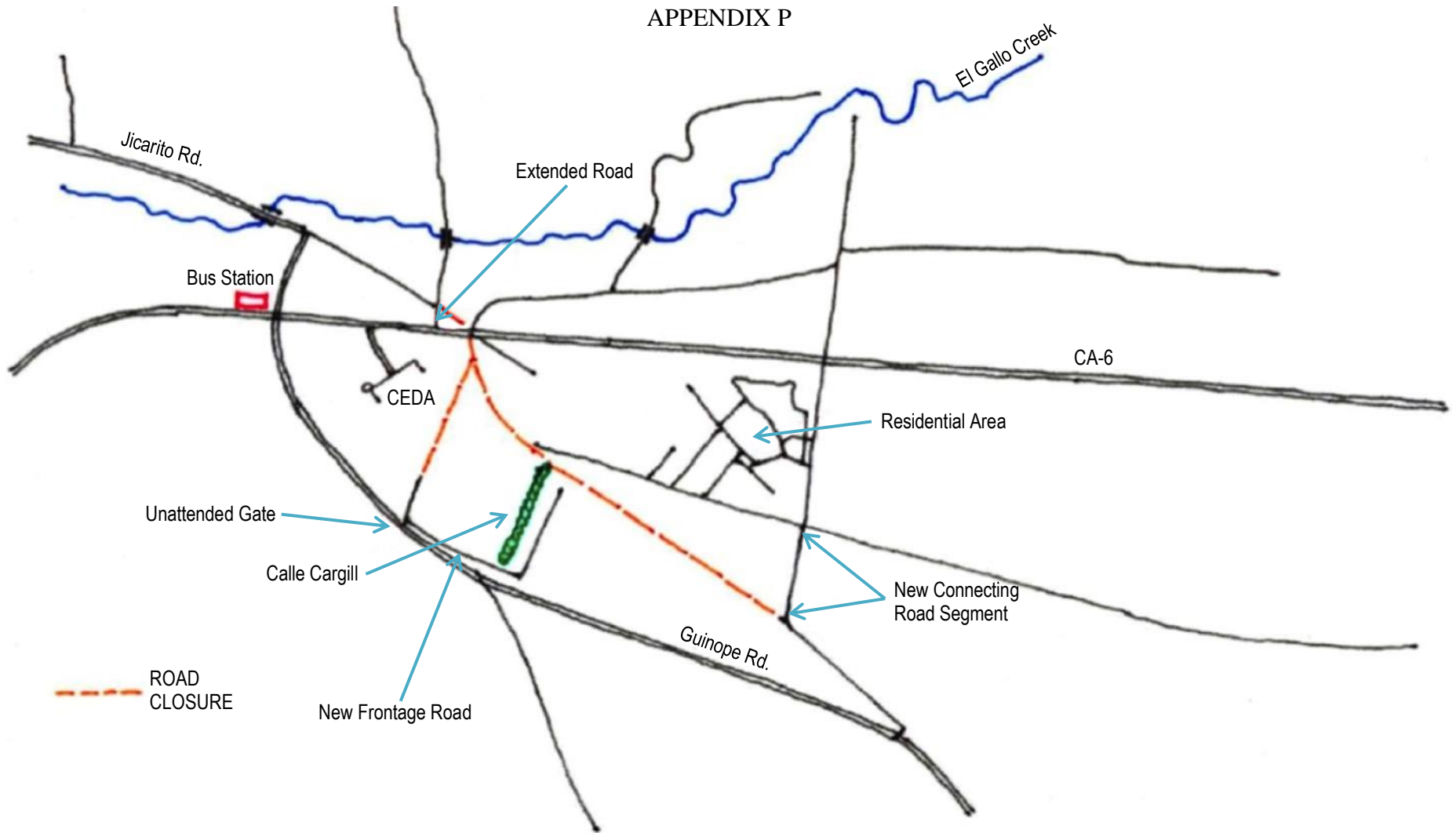
Master Plan

APPENDIX O



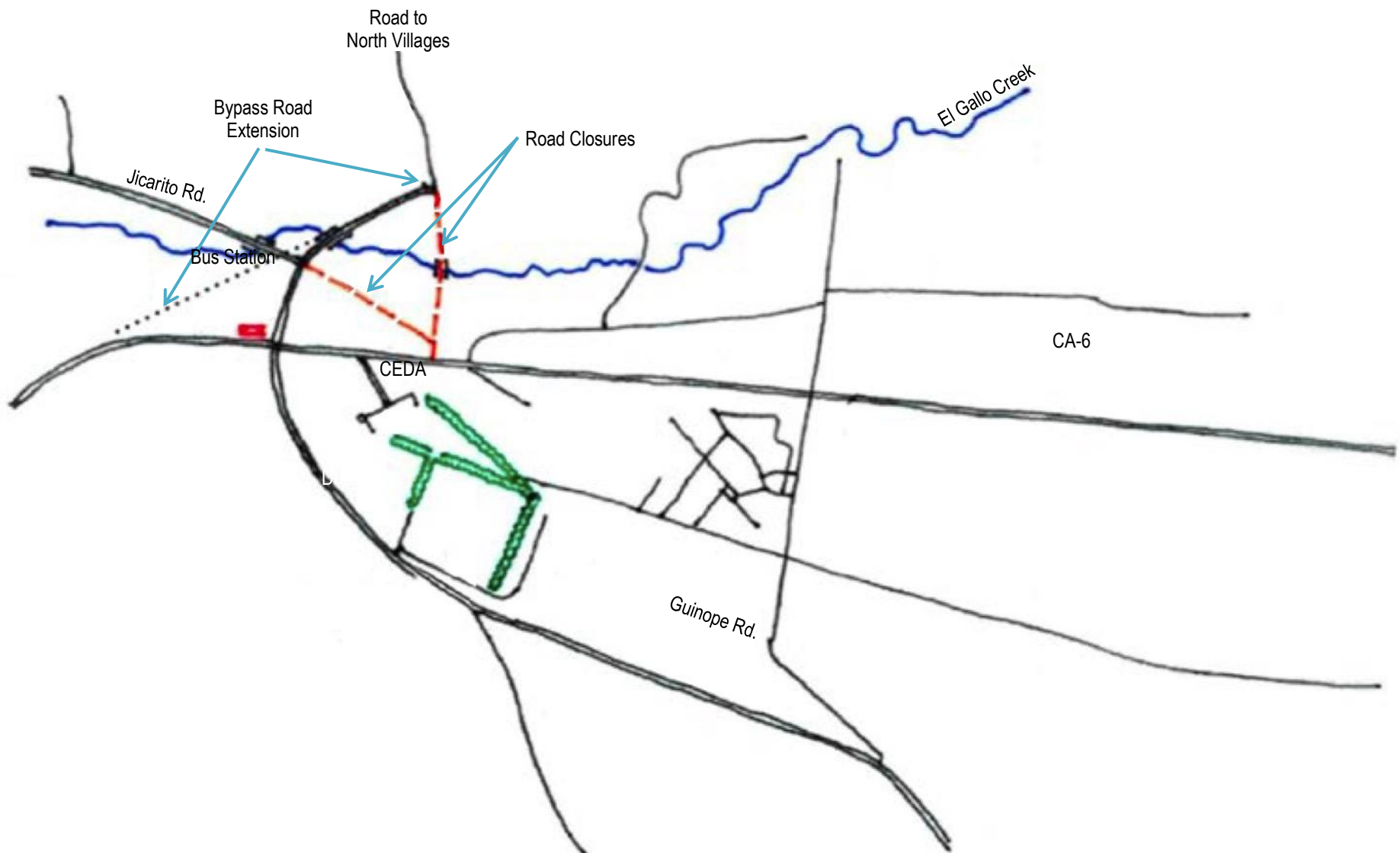
*Zamorano Campus Master Plan (Sniff and Crowley 2010)*

APPENDIX P



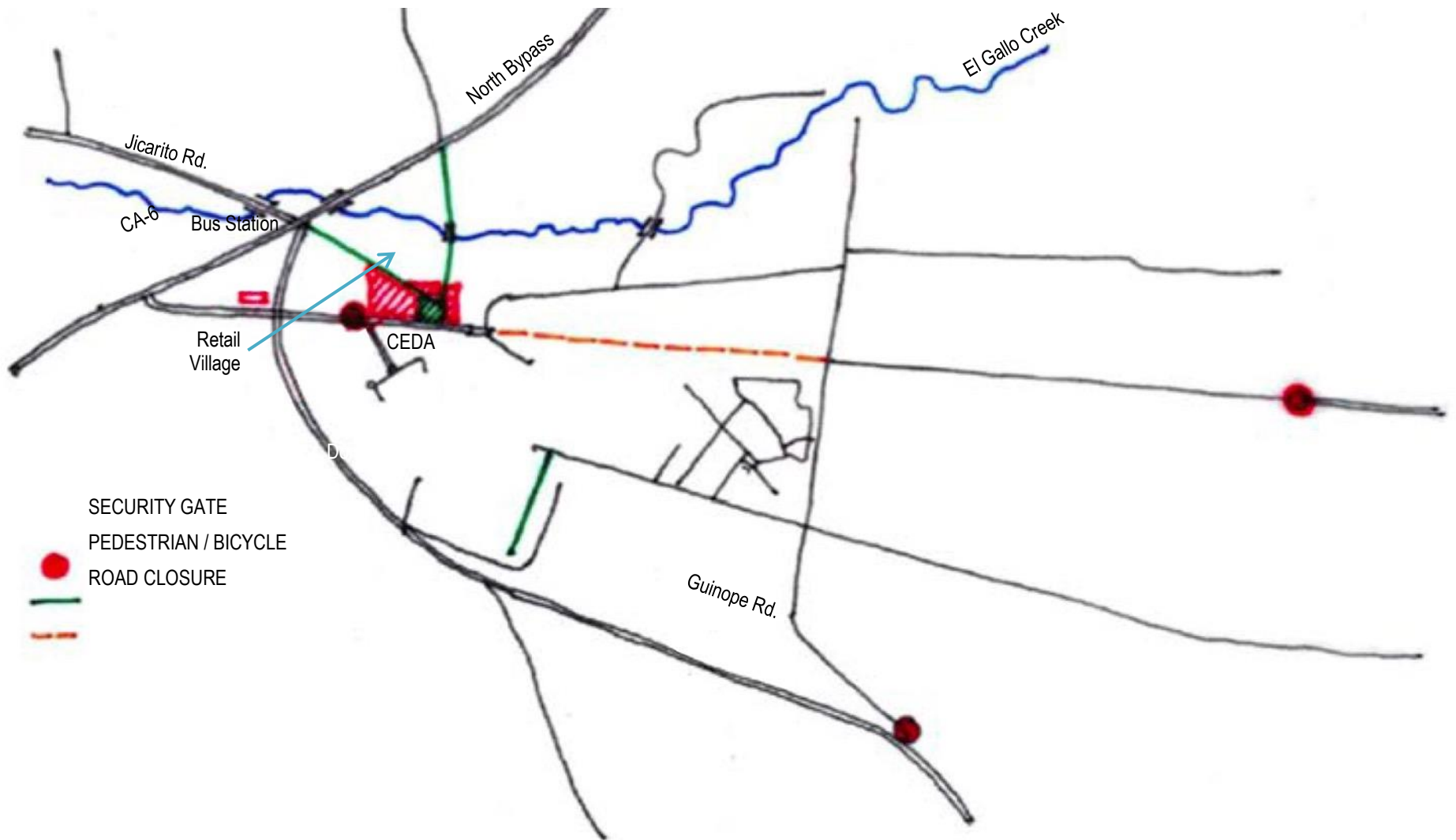
2015 TRANSPORTATION PLAN

Phase I



**2015 TRANSPORTATION PLAN**

Phase II



**2015 TRANSPORTATION PLAN**

Phase III

APPENDIX Q

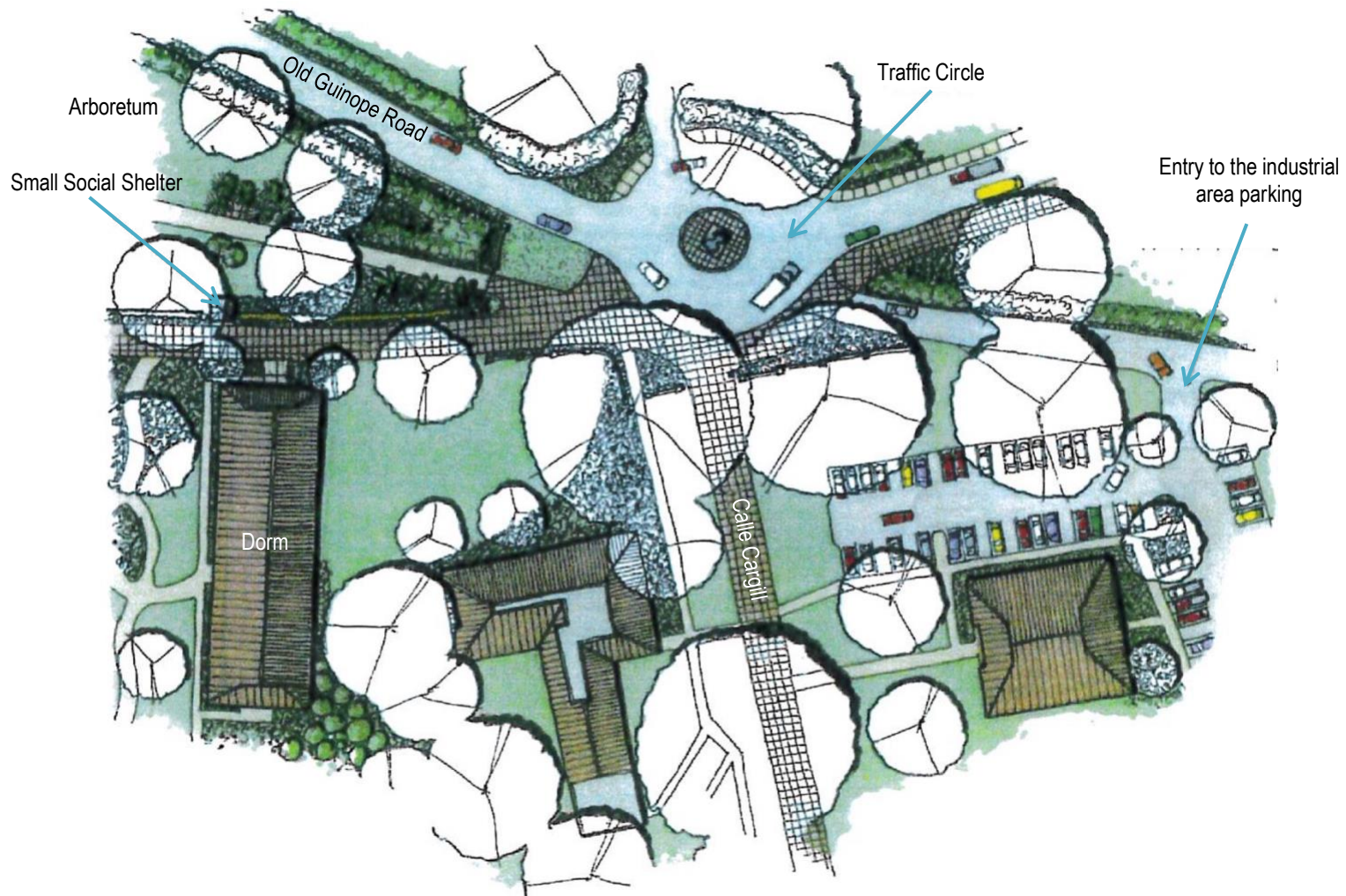


**ZAMORANO MASTER PLAN**  
Concepts for the Village CEDA, Arboretum



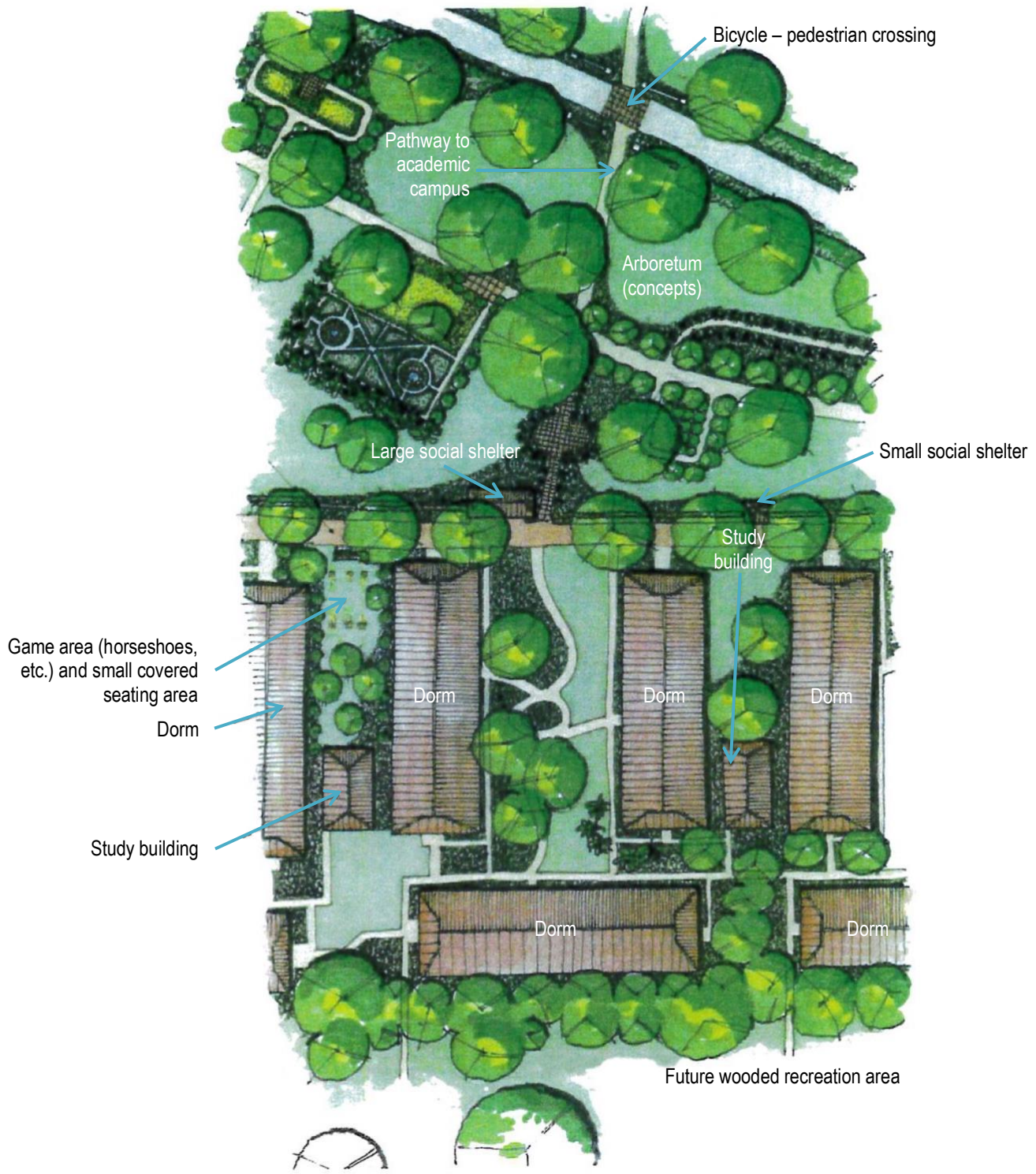
# PARQUE DE GRADUADOS

Overall Plan Area

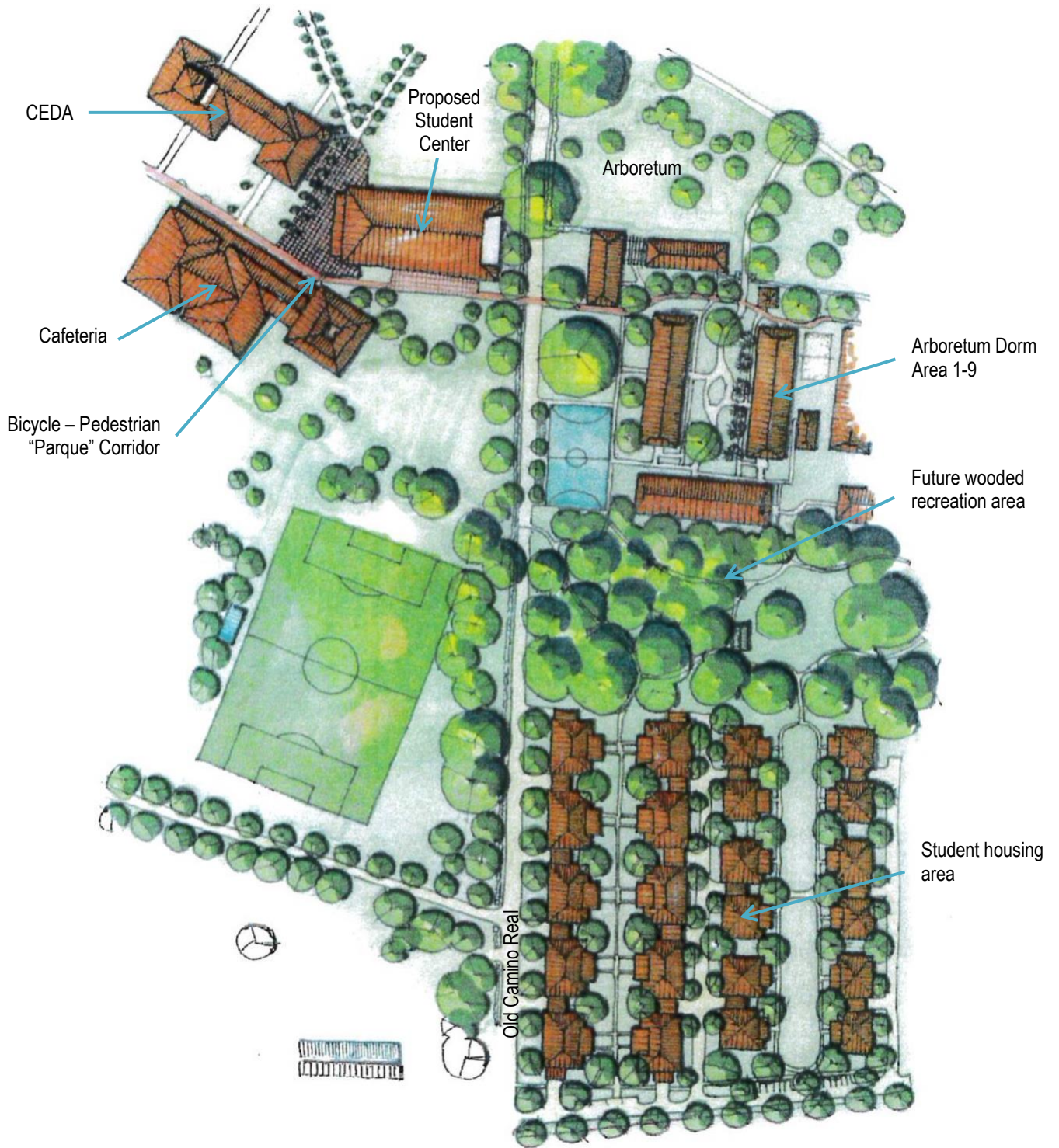


## PARQUE DE GRADUADOS

East End



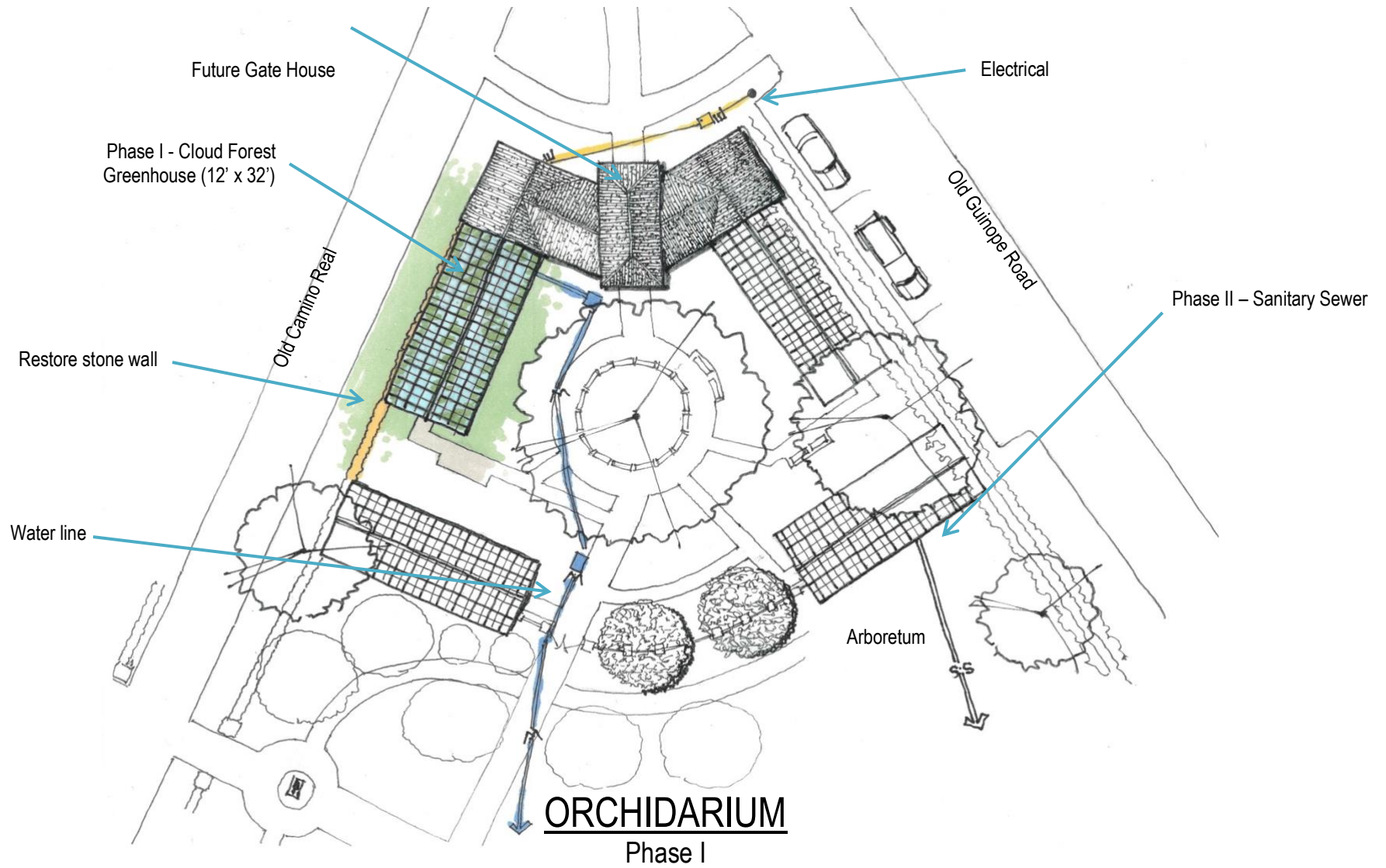
**PARQUE DE GRADUADOS**  
Middle Section



# PARQUE DE GRADUADOS

West Section

APPENDIX R



Future Gate House

Electrical

Phase I - Cloud Forest Greenhouse (12' x 32')

Old Guinope Road

Phase II - Sanitary Sewer

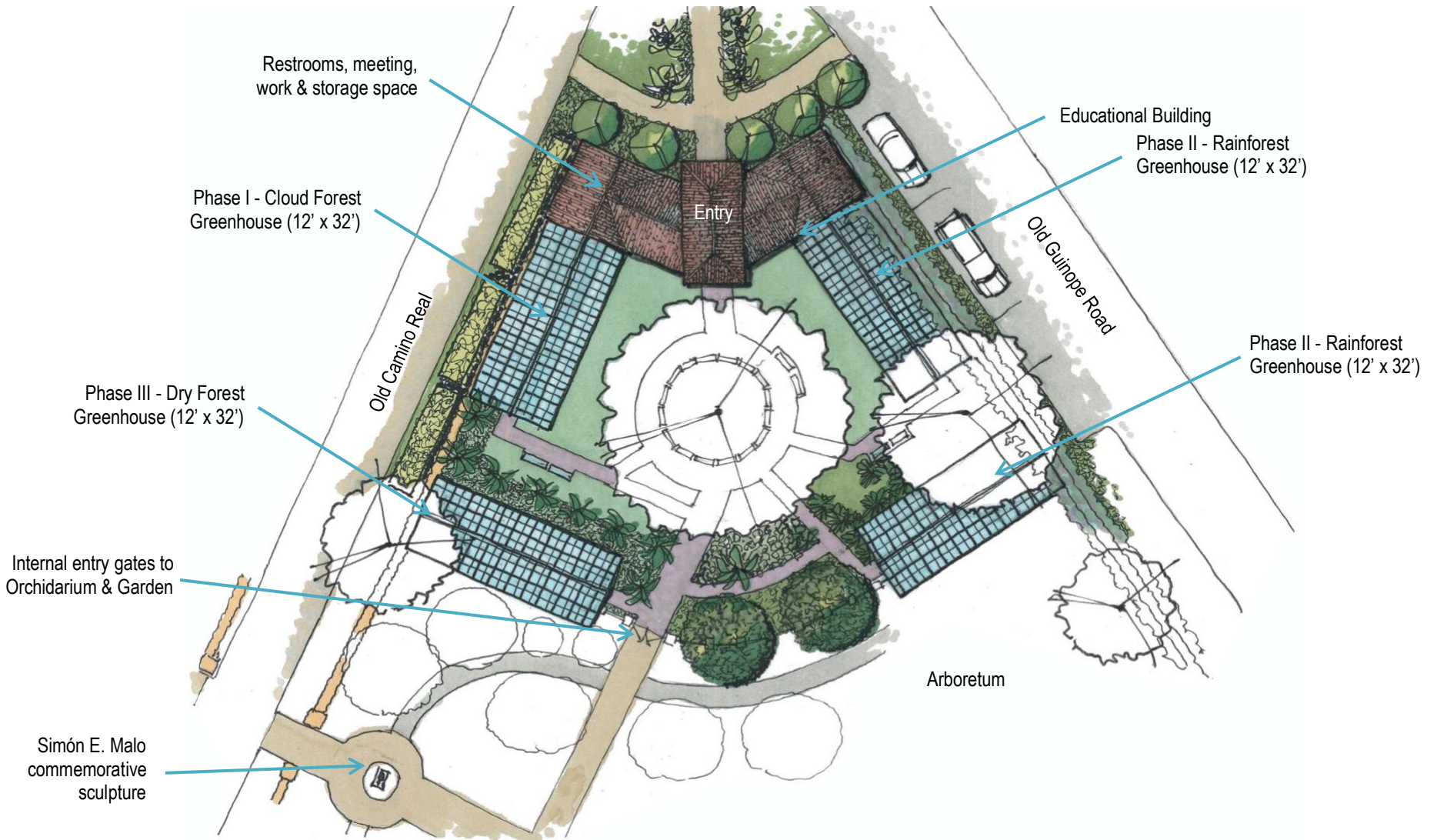
Restore stone wall

Old Camino Real

Water line

Arboretum

**ORCHIDARIUM**  
Phase I



# ORCHIDARIUM

Phases II & III