

## Ynez Mexia

### Citation:

Haley-Oliphant, A.E. (1997). "Ynez Mexia, Botanist, 1870-1938," in Matyas, M.L. & Haley-Oliphant, A.E. (Editors). (1997). *Women Life Scientists: Past, Present, and Future – Connecting Role Models to the Classroom Curriculum*. Bethesda, MD: American Physiological Society, p. 203-216.

Copyright © 1997 The American Physiological Society

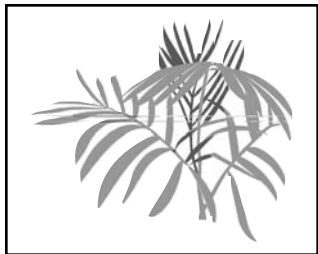
Permission to reproduce the information in this publication is granted for classroom, home, or workshop use only. For all other purposes, request permission in writing from the Education Office at The American Physiological Society at [education@the-aps.org](mailto:education@the-aps.org).

This publication was supported by a grant from the National Science Foundation (HRD-9353760). Any interpretations and conclusions in this publication are those of the authors and/or the role models and do not necessarily represent the views of the National Science Foundation or The American Physiological Society.

Copies of the activities from *Women Life Scientists: Past, Present, and Future* can be found at <http://www.the-aps.org/education/k12curric/index.asp>. To purchase bound copies, visit the APS store at [http://www.the-aps.org/cgi-bin/ecom/productcatalog/Product\\_catalog.htm](http://www.the-aps.org/cgi-bin/ecom/productcatalog/Product_catalog.htm).

**Visit the APS Education Online Website for more resources:**

**<http://www.the-aps.org/education/>**



**Ynez Mexia**  
**Botanist**  
**1870-1938**



*Unit developed by*  
*Ann E. Haley-Oliphant*  
*Miami University, Oxford, Ohio*

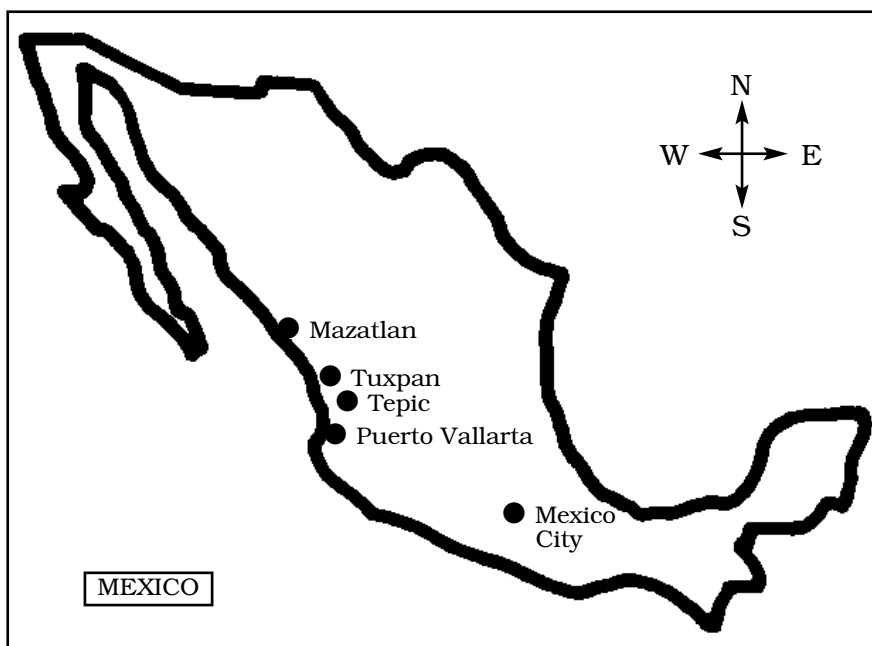
---



## Who was Ynez Mexia?

Ynez Enriquetta Julietta Mexia was a Mexican American born on May 24, 1870, in Washington, DC. Very little is known about her early life. She married Reygadas Mex in 1907 and he died shortly after. Dr. Mexia was a botanist renowned for her plant collecting trips in remote regions of Mexico, Alaska, and South America. During these trips, she collected over 100,000 plant specimens, many of which were named in her honor. One year, Dr. Mexia celebrated Christmas by setting up a palm tree under her shelter and trimming it with red peppers and poinsettias.

## What happened during her first plant collecting trip to Mexico?



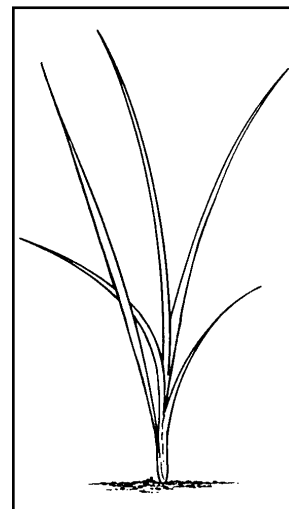
With support from the Department of Botany of the University of California, Dr. Mexia embarked on her first major collecting expedition at the age of 56. She left San Francisco in September 1926 for the western coast of Mexico on a Pacific mail steamer ship. She arrived four days later at Mazatlan, the port of the State of Sinaloa, and was met by her friend, J. Gonzales Ortega, a civil engineer who was interested in the study of plants. His knowledge of the west coast of Mexico was invaluable as he directed her to the best plant-collecting locations.

Dr. Mexia traveled to Tepic, a mountain valley town, for her first trip out of Mazatlan. There, a gentleman with whom she had corresponded provided her with a *mozo*, or guide, and a few horses to aid in her plant collecting. Dr. Mexia said, "As I had never been in this region before, I found the luxuriance of the vegetation actually embarrassing. It was hard to know where to begin to collect and still harder to know when to stop." She and Mauro, her *mozo*, would stop and eat the rich fruit of the guava trees that grew wild. She was able to collect specimens from a variety of ferns, shrubs, and trees.

On a trip into the Cordillera, Dr. Mexia and her *mozo* found all types of mountain plants. She found a leafy plant that turned out to be a new species, *Verbesina pantopectera* blace, (type no. 1317608 U.S. National Herbarium). She also collected many kinds of wild *hibiscus*, a type of tropical flower.

## Journeys in plant collecting

Dr. Mexia returned to Mazatlan with her collection, then traveled to Tuxpan, in the State of Nayarit. This city lies on the Rio San Pedro, one



of the largest rivers draining into the Pacific Ocean. In 1925, Tuxpan and its surrounding territory flooded. The river deposited rich *alluvial* (clay, silt, and rocks) as a result of the flood. The alluvial deposits increased the fertility of the land. "Crops and weeds grow almost overnight," said Ynez. It was here that she found great *Palapares*, the forests of the oil-nut palm.

From Tuxpan, Dr. Mexia traveled by dug-out canoe to Mexcaltitlan, a village of shrimp fisheries. Because there were numerous lagoons, Ynez collected most of her samples by traveling along the shore by boat. She encountered large mosquitoes and biting gnats known as *jejenes*. When her collection for this particular region was complete, she said, "I was glad to escape from the mosquitoes and the odoriferous shrimp and return to Tuxpan or Mazatlan."



Dr. Mexia traveled to Puerto Vallarta in the State of Jalisco by steamboat to collect more plant specimens for a month. One of the plants she and her mozo collected was *Rhus-Comocladia engleriana loesener*, a type of tree or shrub found in warm climates that produces substances that cause skin irritation. Unfortunately, the plant caused her mozo's face and hands to become red and swollen. Dr. Mexia did not have an allergic reaction to the plant.

Later Dr. Mexia traveled by canoe about twenty or thirty miles down the coast to a cove called Quimixto. Seven very poor families lived there. She stayed with them for five days. Up in the hills where the woods were thick, Dr. Mexia found a new type of *Eugenia* (tropical tree) plant, called *Eugenia pleurocarpa standl*. She also found this same plant up in the Sierra Madre mountains about 2,000 meters above sea level; however, it could be found nowhere in great quantities. Dr. Mexia found a new plant from the *Piper* (pepper) family and named it *Piper quimixtense*, after the seven families of the little cove. "I fear they will never know of the honor done their hamlet," she said.

### **What is one of her major achievements?**

On December 1, 1926, Ynez and her mozo, Reyes, collected plants along a stream called the El Arroyo del Chorillo. Here, Dr. Mexia collected a specimen that represented a new type, or *genus*, of plant. Ynez sent the specimen to the Gray Herbarium at Harvard University to be analyzed. Dr. B. L. Robinson wrote back and, in his letter, said, "You will be pleased, I think, to notice that there was a new genus among these, namely no. 1202, which is a very interesting plant....I have been pleased to name it in your honor and have called it *Mexianthus mexicanus*, in the hope that its cheerfully alliterative appellation will be easily remembered and will keep in mind your noteworthy service in exploration."

### **Plant life near the volcanoes of Puerto Vallarta**

Dr. Mexia returned to Puerto Vallarta where she stayed with a woodcutter and slept on a cot in his banana patch. Tobacco was mostly grown on the hot coast while coffee was grown in the hills high above sea level. Sugar cane and banana fields were as common in this region as potato and cornfields are in the midwestern United States.

The volcanic mountains in the region made her travels rather exhausting and strenuous. Dr.

Mexia was told of a tall plant with small, pale-green leaves and little greenish flowers that grew in the area. The natives revered this plant, which they called *hierba de arlomo*, because they said it was the remedy for the poisonous bite of an insect called the *arlomo*. They said the part of the body that was bitten would become swollen, red, and painful and sometimes the person died from the bite. The insect resembled a glow worm to Dr. Mexia, so she bottled it and brought it home to the United States. Dr. E. C. Van Dykean, an entomologist, declared the insect to be a female glow worm, which is harmless. Dr. Van Dykean concluded that the natives must be referring to the bite of a black widow spider when referring to the *arlomo*. Ynez cataloged the curative herb, which was formerly an unknown species. It was named *Euphorbia mexiae standl* in her honor.

### **How successful was Dr. Mexia's first major expedition?**

Dr. Mexia continued to travel the western coast of Mexico, collecting plant specimens wherever she went. In April 1927 her collecting trip came to an end. She packed her things and took a three-day pack mule trip over treacherous terrain to arrive at the railroad. In all, she collected about 1,600 plants, including lichens, mosses, ferns, grasses, herbs, shrubs, and trees on her first expedition. She discovered one new genus as well as fifty new species.

### **Her contribution to the botanical world**

In 1928, Dr. Mexia traveled to Alaska's Mt. McKinley where she collected over 6,000 specimens in a summer. From October 1929 to March 1932, she traveled all over South America and collected plant specimens from all regions of the continent. On this trip, Dr. Mexia collected over 60,000 plant specimens.

Dr. Mexia was never deterred from her work by harrowing weather, travel, or living conditions. She continued her plant-collecting travels and, as a result of her findings, the vast biological diversity in the plant world was unearthed. The photographs she took during her expeditions have proven



invaluable to the botanical world. Parts of her collections are now preserved by museums and universities in the United States and Latin America. Ynez Mexia died July 12, 1938, in Berkeley, California, at the age of 68, but her work continues to contribute to our understanding of the diversity of organisms throughout the world.

## SUGGESTIONS FOR TEACHERS

### ACTIVITY #1: Take a Walk on the Wild Side!

#### Purpose

To provide students with the opportunity to collect, preserve, identify, and classify plants in a similar fashion as actual field botanists, such as Ynez Mexia.

#### Objectives

- 1) To practice cooperation skills by working in teams of four to complete each task.
- 2) To describe techniques used to collect plants from a natural area.
- 3) To demonstrate appropriate herbaria techniques.
- 4) To develop a classification scheme for the group's plant collection.
- 5) To name each plant and justify the choice of the name.

#### Materials

*For each team of four students*

- shovel or trowel
- pruning shears
- paper or plastic bags
- newspapers
- hand lenses
- metric measuring tools
- string
- thin-line permanent markers
- stiff white paper
- white glue
- transparent tape
- stick-it notes

#### Before You Begin

- 1) Determine if your area has any regulations that prohibit collecting certain species, e.g. wildflowers, by contacting the department of natural resources.
- 2) Organize the class into teams of four members. Teachers can assign roles within the teams or students may choose roles themselves.
- 3) Find sample classification charts or dichotomous keys for the students to use as references.
- 4) Remind students about thorough observation practices.
- 5) Describe basic plant-sampling techniques:

demonstrate how to prune a small branch from a larger plant; demonstrate how to remove a smaller plant from the ground, including the roots.

- 6) Describe classification charts and how they are made based on specific characteristics. Be sure students are able to create their own classification charts.
- 7) Give students a copy of the plant profile sheet, but have them organize the profile on stiff paper or cardboard.

#### Safety Considerations

- Students need to be able to identify poison ivy, poison oak, and stinging plants while collecting plants outdoors.
- Students should wash hands upon returning to the classroom.

#### Questions to Ask

- How are plants classified?
- What procedures are involved in plant collecting?
- What is an herbarium?
- What procedures are used to identify and recognize new plant species?
- Plant species around the world are becoming extinct due to habitat loss such as destruction of the rain forest. Experts are now finding that some of the plants being lost have medicinal possibilities. Should an effort be made to save plants? Why? Why not?

#### Where to Go From Here

- Create a poster highlighting the life of Ynez Mexia.
- Develop a travel brochure for a plant collecting trip.
- Create individual plant portfolios.
- Research and write a biography of a plant from a historical, medicinal, nutritional, or social perspective.
- Conduct a radio or television interview with a botanist.
- Research a plant growing near the school and document all changes over a period of time.

- Create a “pretend” plant out of arts and crafts materials and provide a scientific name for it.

### Ideas for Assessment

- Evaluate the level of cooperation between team members.
- Evaluate whether one team can successfully use another team’s classification chart.
- Assess the plant profiles and classification chart of each team.

### References and Resources

Barnhart, J. H. (1965). *The New York Botanical Garden: Biographical Notes About Botanists*. Boston, MA: G. K. Hall and Co., Vol. 2, p. 482.

Blaney, C. (December 1995). Paya plants prove potent. *BioScience*, 45, p. 744.

Daisey, P. (October 1996). Promoting interest in plant biology with biographies of plant hunters. *The American Biology Teacher*, 58, p. 396-406.

Mexia, Y. (September 27, 1929). Botanical trails in old Mexico — the lure of the unknown. *Madrono — Journal of the California Botanical Society*, 1, p. 227-240.

Miller, J. A. (December 1995). Drug in a haystack. *BioScience*, 45, p. 743-4.

National Gardening Association. (Fall 1995). *Gardens for all*. Vol. 4, p. 1-4.

Wright, E. L. (May 1992). Plants on parade. *Science and Children*, p. 12-14.

#### ✓ On gardening materials for the classroom:

The National Gardening Association, 180 Flynn Avenue, Burlington, VT 05401, (802) 863-1308.

#### ✓ Photo credit:

Photos on page 203 and 207 courtesy of Hunt Institute for Botanical Documentation, Carnegie Mellon University, Pittsburgh, PA.



ACTIVITY #1: Take a Walk on the Wild Side!

**You are about to embark on a plant-collecting expedition.**

You will be observing plants in their natural area and carefully collecting five samples during your expedition.

Upon returning to your research station, you will catalog and classify your findings.

Roles to Play

**Head Plant Collector**

It is the responsibility of the head plant collector to see that five different plants are collected. Try to find “new and unusual species.” You are also to aid in creating plant profiles and a classification chart.

**Mozo**

Your job is to assist the head plant collector in searching for new and unusual plant species. It is your responsibility to provide/collect the materials needed for the plant-collecting expedition and the herbarium procedures. You must also return the materials to the original owners (teacher) and villages (material table). You are also to aid in profiling the plants and creating the plant classification chart.

**Preserver**

Your job as preserver is to see that the collected plants will be around for many years for all people to admire. Your job as preserver is to create plant profiles for each of the five plants collected. You will be helped by the head plant collector, the mozo, and the head of the herbarium. Remember, your work will be seen by millions of people visiting the herbarium.

**Head of the Herbarium**

Your job is to record the classification chart created by your team. You are also to help the team create the plant profiles. As head of the herbarium, you should encourage your team members to meet project deadlines.

**Your Team Mission**

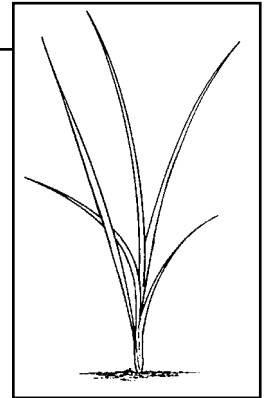
Your task is to work as a team to create plant profiles and a classification chart for five plants collected on a plant-collecting expedition. Your team must follow the procedure on the following page.



## Plant-Collecting Procedures

### 1. Go on a plant-collecting expedition!

As a **team**, go outdoors and collect five different kinds of plants. If you collect a sample from a large plant, carefully remove a small branch with numerous leaves from the parent plant. If you select a smaller plant, you may carefully dig it up, paying special attention to the roots. Search for unique plants that other teams may not collect. The **Mozo** is to collect materials needed for the adventure. The **Head Plant Collector** should encourage the **team** to find new and unusual plant species. Place each plant sample in between pieces of newspaper. Be sure that all the leaves are laying flat prior to folding the newspaper over the sample. The **Team Preserver** and the **Head of the Herbarium** need to record information about the location of the plant in its natural surroundings.



### 2. Bring your plants to the herbarium.

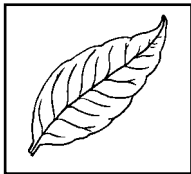
The **Team Preserver** makes sure that a plant profile is created for each plant. For each plant the **team** should:

1. Observe the plant and note any identifying characteristics — a minimum of five characteristics is required for the profile. Use hand lenses to examine your plant.
2. Measure leaf length and width; make other measurements as needed.
3. Tape the plant sample on the profile sheet. Be sure some of the leaves are taped so the underside of the leaf is face up. Tape roots as well if applicable.
4. Invent a new scientific name for the plant. You need to record the name on a separate piece of paper. You will record the name of your plant on the profile sheet after another team accurately identifies it based on the classification chart you create.

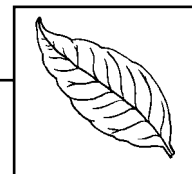
Each **team member** must contribute to the profiles. One grade for each **team** will be given based on the plant profiles.

REMEMBER: These profiles will be displayed for other teams to see and admire!





**Plant-Collecting Procedures (continued)**



**3. Create a plant classification chart.**

Your **team** needs to create ONE identification key for the five plants. Start at the top of a blank sheet of paper and copy the following:

<b>Plants</b>	
<b>1a</b> _____	<b>1b</b> _____

Examine your collection of plants. As a **team**, divide the plants into two groups based on a specific characteristic. Name these two groups on your chart based on this characteristic.

**Example: Needle-Like Leaves and Broad Leaves**

<b>Plants</b>	
<b>1a</b> _____	<b>1b</b> _____
<b>Needle-Like Leaves</b>	<b>Broad Leaves</b>

Divide each of the first two groups into two more groups. Record the characteristics in the chart. When naming the plant, use your creative scientific name, not the common name.

**Example: Sunburstia flores**

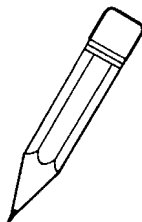
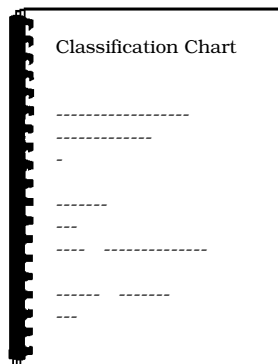
<b>Plants</b>	
<b>1a</b> _____	<b>1b</b> _____
<b>Needle-Like Leaves</b>	<b>Broad Leaves</b>
	<b>3a</b> _____
	<b>Sunburstia flores</b>

Note: For this example, the five plants were divided into **Broad Leaves** plants and **Needle-Like Leaves** plants. The only plant collected with **Broad Leaves** was **Sunburstia flores**; all the other plants had **Needle-Like Leaves**.

Continue dividing the groups until each plant has been separated from the others.



## Plant-Collecting Procedures (continued)



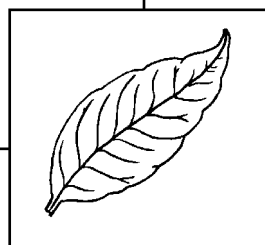
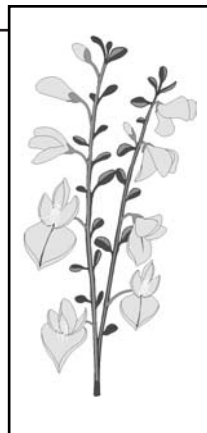
### 4. Exchange classification charts with another group.

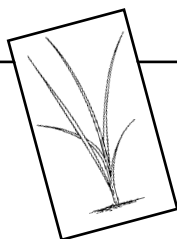
Your teacher will give your classification chart and plant profiles to another team. They will use your chart to find the creative scientific name of your plants.

Your **team** will be given a plant profile and classification chart from another team and you will figure out the names of their plants. When you figure out the name of a plant, write the name on a stick-it note and place it on the plant profile.

### PLEASE NOTE:

For this plant-collecting expedition to be successful, cooperation is essential. You are expected to perform your assigned role, help others, and participate. Anyone (e.g., your teacher) visiting the herbarium should hear encouragement, praise, and group cooperation!





## HERBARIUM OF:

---

**Scientific name** \_\_\_\_\_

**Common name** \_\_\_\_\_

**Family** \_\_\_\_\_

**Locality** \_\_\_\_\_

**Date** \_\_\_\_\_

**Altitude** \_\_\_\_\_

**Habitat** \_\_\_\_\_

**Collected by** \_\_\_\_\_

**Identified by** \_\_\_\_\_





## PLANT PROFILE:



(mount plant sample here)

### PLANT MEASUREMENTS:

Plant height (in natural conditions): \_\_\_\_\_

Leaf length: \_\_\_\_\_

Leaf width: \_\_\_\_\_

### PLANT CHARACTERISTICS:

- 1.
- 2.
- 3.
- 4.
- 5.

### OTHER INFORMATION AND OBSERVATIONS:



