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EXPLORING FOR PERSEA IN LATIN AMERICA

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Exploring the *Persea* in the American tropics and sub-tropics takes more than a lifetime. This is evident when we consider the collections of Popenoe and Zentmyer. Popenoe started explorations in regard to horticultural genetic material in 1916-17 and reported about wild avocados in 1935 (2). Zentmyer started his collections in 1952, traveling through Latin America in the search for resistance to avocado root rot (11, 12, 13). He traveled from Mexico to Chile, Argentina and Brazil.

Only the explorations made since 1971 are presented in this paper. Our findings are extensive so only a summary can be presented in this Short Course. We explored in Mexico (Chiapas), Guatemala, El Salvador, Nicaragua, Costa Rica and Ecuador. Some information on these explorations has already been published in the California Avocado Society Yearbooks (3, 4, 5, 6, 7, 8, 9).

Zentmyer studied herbarium specimens in Latin America, the United States and England before we started collecting in 1971, to serve as a guide for collection of the species. We also used Kopp's monograph as a guideline (1).

Fruit and budwood collected in the field and selected fruit was obtained from local markets. A total of 1,097 collections were made in Latin America from 1971 to 1976. We will discuss some of these collections in 3 groups: species explored, Guatemalan *criollo* relatives and unusual collections.

Species Explored

Persea steyermarkii *Allen*

We found this important wild *Persea* in 3 distinct centers in Guatemala (Fig. 1). We observed flowers and fruits in the field for the first time on a total of 12 trees in the 3 centers. This wild avocado was found only in Guatemala, growing in its natural habitat at over 2,500 m. We believe that it plays an important role in the origin of the Guatemalan *criollos* (Guatemalan Race).

Persea nubigena *L*. *Williams*

Dense stands of *P. nubigena* were located in several countries in Central America during our explorations (Fig. 2).

It was detected in Chiapas, Mexico, for the first time, also. Certain variants were found within this species as in the previous species listed, *P. steyermarkii.* It also grows above 2,500 m. This species is easy to identify in the field because of its coarse, oak-like leaves and its oblate fruit.

P. nubigena was first found by Popenoe (2) and later described by Williams (10). Kopp (1) classifies it as *P*. *americma* var. *nubigena.*

Persea *drymifolia Schlecht. and Cham.*

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A very extensive collection of this species was made from trees and from markets in Guatemala, Ecuador and Chiapas, Mexico (Fig. 3). It is of interest that trees were found in Guatemala without anise scent, normally an important characteristic for this species. This species was also found in its wild habitat in Guatemala. Many variants were found, as well as several apparent hybrids with Guatemalan *criollos.*

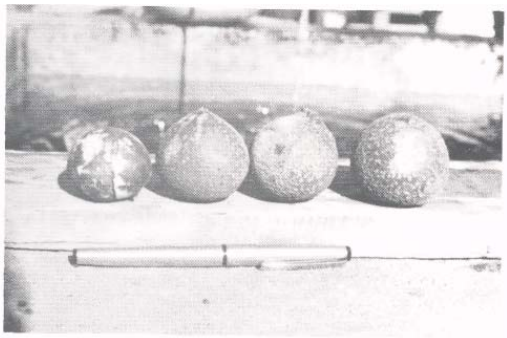

Fig. 1. Specimens of *P. steyermarkii* as collected in Guatemala.

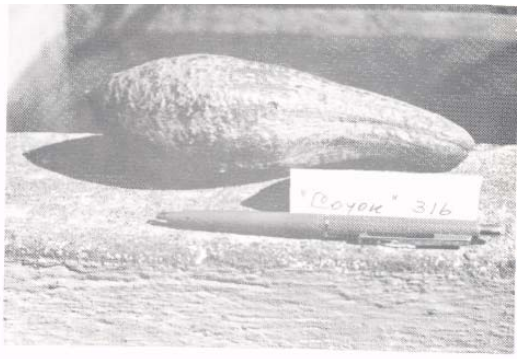

Fig. 4. Specimen fruit of 'Coyou 316' (*P. schiedeana*).

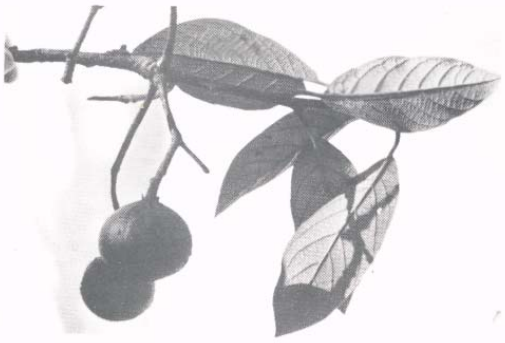

Fig. 2. Fruit and foliage of *P. nubigena.*

Fig. 5. Fruit and foliage of *guaslipe*, a new species of *Persea.*

Fig. 3. Fruit and foliage of *P. drymifolia.*

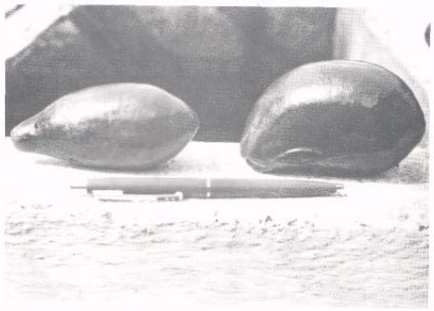

Fig. 6. Fruit of *anay*, a *Beilschmedia* spp. which resembles wild *Persea.*

This species grows above 1,700 m in cooler climates from Mexico to western Guatemala and in the highlands of Ecuador, although it is not an indigenous species in

Ecuador. Kopp classifies this as *P. americana* var. *drymifolia.*

Persea schiedeana *Nees*

Collections were made from trees in Guatemala and Costa Rica and from markets in El Salvador. Some collections were made also in Chiapas, Mexico.

This species characteristically grows in the warmer regions of Middle-America. Many different variants were found in regard to fruit shape, from almost round to pyriform and very long. It is known by several names, including *chucte, coyou* and *jas,* depending on the country and region (Fig. 4).

Guaslipe

This interesting new species of *Persea* grows in the Matagalpa region of Santa Maria de Ostuma in Nicaragua (Fig. 5). A botanist found it also in Costa Rica several years ago.

We made a brief description of this species in 1976 (8). Flowers and fruit were photographed in the field for the first time. The fruit resembles a miniature, primitive *P. drymifolia.*

Anay (Beilschmedia spp.)

Three different types of *Beilschmedia* were found growing in warm regions of Guatemala, El Salvador and Costa Rica. It is not a true *Persea,* but its fruit resembles a wild avocado (Fig. 6). Popenoe found the first trees *(Beilschmedia anay)* in the Pacific coast of Guatemala and had a great interest in this collection. Another species, *Beilschmedia ovalis,* grows on the slopes of a volcano in Costa Rica.

Persea donnell-smithii *Mez*

This species of *Persea* with its pea-sized fruits is found in northern Guatemala and in Honduras (Fig. 7). There are heavy stands in Aha and Baja Verapaz in Guatemala. It is of interest that 100 years ago it was described from northern Guatemala. Its characteristic broad leaves with brown pubescence, as well as the size of its black-purple fruit, make this species very distinct.

Persea vesticula *Standl. and Steyermark*

We have only seen this rare species in western Guatemala (Tajumulco Volcano) and in the Cordillera de Talamanca in Costa Rica (Fig. 8). We have examined the fruit in herbaria in Costa Rica; it has not been found yet in the field.

Guatemalan *Criollo* Relatives

The Guatemalan *criollos* constitute a very large group. Belonging to the Guatemalan race, they are found in large centers or scattered in the *campesinos* or small farmer's land from Chiapas, Mexico, through the highlands of Guatemala and some parts of western El Salvador.

We have made many collections from trees and markets in recent years, selecting the most primitive types in the markets. Among the close relatives of this important group are the *aguacate de mico* (Figs. 9, 10, 11), the *aguacate* from Volcano Turrialba (Fig. 11), the *aguacate* from San Pedro-San Marcos and the wild avocado from San Lucas Toliman.

Fig. 7. Foliage and flowers of *P. donnell-smithii*.

Fig. 9. Representative fruit of *aguacate de mico*, a possible ancestor of Guatemalan *criollos*.

Fig. 8. Foliage of *P. vesticula*, a rare species seen only in western Guatemala and Costa Rica.

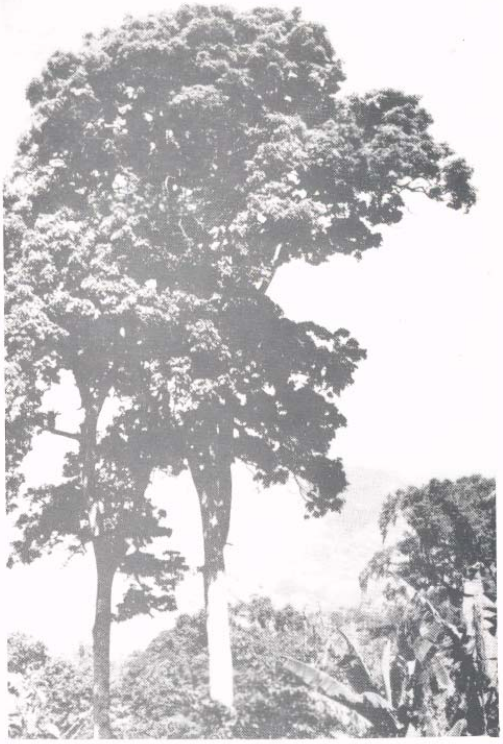

Fig. 10. A large tree of *aguacate de mico*, a possible ancestor of Guatemalan *criollos*.

The *aguacate de mico* is an interesting wild avocado which grows on the slopes of

certain volcanos in El Salvador. We found it also in the Cordillera Dariense in Nicaragua and in western Guatemala. There are many variants within this hard-shelled wild avocado. It is strange that this group has been overlooked in previous botanical explorations.

Unusual Collections

Among other unusual collections, the *antillano de Azalea* is a primitive type of the West Indian race (Fig. 12). It is found in El Salvador. Zentmyer found a primitive type similar to this one in Costa Rica several years ago.

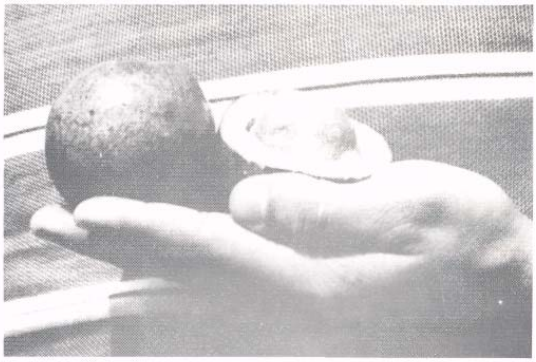

Fig. 11. Fruit of some possible ancestors of the Guatemalan *crillos*: A) *P. nubigena*, B) *aguacate de mico* and C) *aguacate* from Volcano Turrialba.

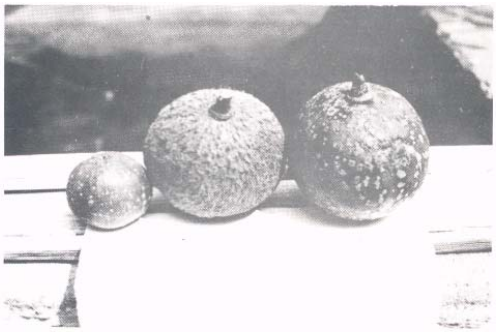

Fig. 12. Fruit of the *antillano de Azalco*, which is a primitive type of the West Indian race, found in El Salvador.

Summary

In the last 5 years of exploring for *Persea* in Central America, Mexico and Ecuador, we have made the following collections from trees and markets:

Guatemala	875 collections
El Salvador	63
Nicaragua	27
Costa Rica	32
Ecuador	26
Mexico (Chiapas)	74

The species we have collected are, in addition to *P. americana. P. donnell-smithii, P. drymifolia, P. nubigena, P. schiedeana, P. steyermarkii* and *P. vesticula.* Also we have collected a new species of *Persea (Guaslipe)* from Nicaragua and *Beilschmedia* spp., related to *Persea.*

The origin of the Guatemalan race is complicated by the fact that we have encountered several trees of *P. steyermarkii, P. nubigena* and *aguacate de mico.* We believe that all of these may be involved in the ancestry of the Guatemalan *criollos.*

P. drymifolia, found in its natural habitat in Mexico and western Guatemala, is the ancestor of the Mexican race.

It is of importance to study the primitive West Indian types as found in Costa Rica and the one collection found in F.I Salvador.

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