

The Journal of the Department of Agriculture OF PORTO RICO

Published Quarterly; January, April, July and October of each year.

VOL. IX

APRIL 1925

No. 2

INTRODUCTION

Probably no other Tropical American country possesses so many distinct botanical species and subspecies of cultivated food plants as Porto Rico; in fact, few countries, even in the Old World, have so many—not counting forms and varieties of cereals, rosaceous fruits and potatoes.

Five hundred years ago this Island was perhaps the richest locality, except the Central Andean region, in the Western Hemisphere in the way of crop varieties; five thousand years before the conquest of the West Indies the aborigines of this country had undoubtedly partially domesticated a considerable number of food-producing plants and subsisted mainly by their cultivation.

Very likely many varieties of cassava (*Manihot* spp.), yautía (*Xanthosoma* spp.), yam (*Dioscorea* spp.) and sweet potato-like roots (*Ipomœa* spp.), utilized by the Arawaks and their forebears, had become extinct before the arrival of the Spaniards.

The U. S. Department of Agriculture, especially in 1915, made investigations to determine where the food plants of the Western Hemisphere originated, and, so far as possible, which species were domesticated by the prehistoric races. Briefly, it was found that the Central Andean region was for many centuries the center of a very artful though not strictly scientific agriculture; there the practice of terracing and irrigating small fields under very intensive cultivation and, presumably, rotation of crops over very long periods was *successfully worked out; and there more than 60 and probably over 80 distinct species of wild plants were domesticated and used* (nearly all of them, at least) *for food.*

From this old center the trend of plant dispersion was northward along the mountain ranges; some of the plants went up through Central America and were probably modified there more or less as time went on; in this class should probably be included the avocados, the squashes, some of the annonas and Capsicums, cacao, tobacco and perhaps some of the beans. Another dispersal route was eastward along the north shore of South America, thence along

the chain of islands beginning with Trinidad and ending with Cuba; such plants as the pineapple, the edible canna, the Arracacha, the yuquilla, the jícamas, and probably some of the yams and yautías came here rather by this route than through Central America.

Porto Rico, situated approximately in the middle of the great chain of islands extending from Yucatán to Venezuela, might have received such plant introductions *via* either or both of these routes.

Not only Porto Rico but very probably Hispaniola, Cuba and Jamaica were large enough *per se* to have domesticated a few of their own wild plants and to have greatly modified some of those arriving from South America. According to archeological evidence the aborigines of Porto Rico had developed a fair degree of basic culture and were cultivating quite a number of crop plants contemporaneously with the Incas of Peru and other Andean races; and it may even be questioned whether the aborigines of Borinquen were not as successful in domesticating some of their wild plants as were the races of the Central Andean valleys.

The Arawaks and their ancestors, however, were not sufficiently insulated, as it were: they were continually exposed to the devastating attacks of their enemies from the South American shores, the Caribs and their forerunners. As Cook and Payne point out, permanency of location and fixed modes of living are indispensable to agricultural development and social progress. The Andean peoples, through their centuries of undisturbed, but very gradual domestication of plants *in situ* naturally excelled the inhabitants of more exposed regions.

The Carib races, the first recorded cannibals in history, presumably emigrating from some center in northern South America, played the part of marauders among the Antilles; possibly they brought a few crop plants to the islands but it appears more logical to accredit such good work to some earlier peoples.

As soon as the first Spanish colonists began to arrive, Governors made great efforts to introduce promptly those crops which they believed would be profitable to grow in Porto Rico, such as Sugar Cane, Ginger, Coffee, Tobacco, etc. The Coconut and the Bananas and Plantains also were brought in at an early date. Many vegetables and fruits came *via* the Canary Islands, and soon such crops as Cacao and the Avocado came over from the Central American mainland.

During the seventeenth and eighteenth centuries there was probably comparatively little progress in plant introduction work here,

but early in the nineteenth considerable efforts were made to establish those industries which might produce better revenues for the colonists, and in this it seems that Porto Rico shared about equally with Cuba and Hispaniola.

In 1890 there were established by Royal Decree of 1888 two Agricultural Experiment Stations; one occupied the present site of the Federal Experiment Station and was abandoned after several years of desultory operations; the other was started on a tract between Bayamón and Río Piedras; these Spanish Stations did some good work with the major crops, but their funds were entirely inadequate for complete success.

In September 1901 the U. S. Department of Agriculture established an Experiment Station in Río Piedras but the area was much too small for permanent location and in the spring of 1902 a tract was selected near the town of Mayagüez. During several years following 1902 a very large number of economic plants was introduced, mostly from the U. S. Department of Agriculture, and numerous exchanges were instituted with botanic gardens and experiment stations throughout the Tropics; in that way some 300 varieties of fruits, root crops, and vegetables were brought in and planted out. In 1903 a Coffee Sub-Station (La Carmelita) was established in the hills above Ponce, and there a great collection of coffees was amassed; but about 1910 the work was centralized at Mayagüez.

In 1910 the cane planters of the Island organized and established an Experiment Station at Río Piedras; this was taken over in 1914 by the Board of Commissioners of Agriculture; with the creation (by the Jones Act) of the Department of Agriculture and Labor of the Insular Government of Porto Rico, in 1917, the Experiment Station is now known as the Insular Experiment Station; it has been of considerable importance in plant introduction work, especially as regards sugar cane, avocados, grapes and bush berries.

In October, 1923 the Plant Propagation Station at Trujillo began operations and by the end of 1924 a considerable quantity of economic plants had begun to go out to the Model Farms and to the Agricultural Agents and farmers throughout the Island. During 1924 (calendar year) seven Model Farms were established; the foundations for breeding work have been laid and in the near future these Farms can be expected to become centers for food-plant distributions.

The purpose of this Bulletin is twofold:

First, to show the present economic status of every species of

any considerable importance either as forage or food. Second, to give the origin of each species—both its original habitat and the country from which it was received into Porto Rico—and so far as possible, the approximate date of its arrival.

Soon after the American occupation a survey of the economic plants of the Island was made by O. F. Cook and G. N. Collins with the assistance of several other federal officers, and a bulletin* was issued which included all the known varieties of timber and forest trees as well as the edible fruits and the forage plants of the Island.

“The Botany of Porto Rico and the Virgin Islands”, by Britton and Wilson, published by the New York Academy of Sciences as a part of that institution’s “Scientific Survey of Porto Rico and the Virgin Islands”, has been used as the basis of this list and its nomenclature has been closely followed with only one or two exceptions. The approximate percentage of indigenous species, as evidenced by the said “Botany of Porto Rico and the Virgin Islands”, appears to be about 20 per cent. This is in line with the theory that Porto Rico has long been one of the most striking examples of a highly cultivated agricultural country into which economic plants have been brought from many other countries.

Obviously this is not a report upon Porto Rico’s food-plant flora but merely a record of what is here and, so far as data are available from whence and when each species came. Of some horticultural groups, such as the beans, the cottons and the seasoning herbs there is a deplorable dearth of data; but such crops as the avocados, mangos, yams, yautías and coffees have been given special attention and it is hoped that the list of these crop varieties may serve as a standard for future reference.

Two special words to meet the exigency of this record have been brought in: *cormel*, the specialized horizontal rhizome attached to the central rootstock of yautías, dasheens, etc., *i. e.*, small corm, and *fecula*, the starchy substance which fills roots, tubers, etc.—on a par with the *pulp* of fruits: since there is no word for this in English, the Spanish word (which applies particularly to the dried substance of roots and starchy fruits) has been appropriated.

At present 496 species of food plants are in evidence in the Island. Of these, nearly, 225 fruits appear, of which 60 may be considered as first class. The true vegetables are rather few, only

* “Economic Plants of Porto Rico”, by O. F. Cook and G. N. Collins; 1904; pub. by the Smithsonian Institution, U. S. Nat. Mus. as contribution from the U. S. Nat. Herbarium, Vol. 8, No. 2.

30 species; but the root crops are rather numerous (38); of seed crops there are 23 species and sub-species; and of salad plants there are 21. Forage plants, not including pasture grasses, amount to 43 species. The Island is well supplied with seasoning herbs—to the extent of 45 species. And there are at least 75 plants which do not correctly fall into any of the aforesaid groups.

While it must be admitted that this is a very respectable quota for a country no larger (only 3,435 square miles) than Porto Rico, it really is only *about one-half of what it easily might be*. For instance, there are today available in the Philippine Islands 175 species of fruits, which, so far as we are aware have never reached these shores. Besides these species there are *varieties* which in pomology and olericulture are just as distinct as the botanical *species*: another 200 or 300 *varieties* of citrus fruits, mangos, bananas, plantains, etc., which could and should be introduced at once. Our quota of mangos and avocados is a matter of great credit, but in the line of citrus fruits the Island is far behind its due quota.

No attempt has been made to give detailed suggestions regarding the propagation or uses of the 700 or more varieties listed in the following pages; however, effort has been made to awaken interest in certain food plants which most certainly deserve better attention, and to make the text readable for the layman.

Unfortunately no good photographs are available to illustrate the most interesting indigenous, not to say endemic, food plants of the Island.

In all works of this kind errors are bound to creep in. Moreover, the omission of certain species which, to some individuals perhaps, will appear ill-advised has been allowed, while certain other plants which, from some points of view, should hardly appear in a work of this kind, are included.

Assistance in revising parts of the text and the nomenclature has very kindly been given by Dr. N. L. Britton, Director of the New York Botanical Gardens, and the prime mover in the "Scientific Survey of Porto Rico and the Virgin Islands". Mr. C. A. Figueroa, Assistant Agricultural Advisor of the Department of Agriculture and Labor, has furnished data on Sugar Cane and the dates for some of the early introductions. Mr. T. B. McClelland, Horticulturist of the U. S. Experiment Station, has also rendered assistance.

THE FOOD PLANTS OF PORTO RICO

ACEITUNA; Olive; *Olea europea* L.

This very important European fruit was introduced by the Spaniards in the early days of the Colony but did not succeed. At present only a few specimens are in evidence at the U. S. Experiment Station. Whereas this species might be grown with some success on the higher and drier districts, it is of course useless to consider it as a food crop of the Island. Probably some of the largest specimens of the species (1.5 m. or more in diameter) are still in evidence in Central Mexico and while it has been fruited at sea level in the tropics (in the Jamaica Botanic Gardens) it always has been an extra-tropical species.

ACELGA; Chard, or Leaf-Beet; *Beta vulgaris* var. *Cicla* (L.) Moq.

This first-class European salad vegetable succeeds well; two or three varieties are becoming fairly common.

ACHICORIA; Chicory, Succory; *Cichorium Intybus* L.

A rather rare old European kitchen vegetable occasionally planted in the interior of the Island; apparently not adaptable to the warmer regions of the coast.

ACHIOTE, Achote; Annatto; *Bixa Orellana* L.

This very important shrub or small tree, native to Tropical America, is now naturalized and cultivated throughout the Tropics of both Hemispheres; while usually it begins to bear at the height of 2 m., it occasionally reaches 9 m. It is one of the commonest of the so-called minor crops in Porto Rico. The following 5 varieties are recognized, and their coloring-material percentages are as follows:

Pelón ----	6.80% to 8.73%
Colorado--	7.96%
Amarillo--	6.69%
Blanco ---	5.80%
Negro	

The last is of too little value to pay for collection although it is sometimes used to adulterate the better varieties. At the Trujillo Plant Propagation Station hundreds of plants of the better varieties have been propagated for general distribution, and in many instances the Agricultural Agents have obtained large quantities of selected seed from certain districts famous for their excellent prod-

uct; in the near future the results of these plantings will be apparent. Fortunately, during the past two years the price of Achiote has been very high in the mainland, due to interstate laws which prohibit the sale or transportation of certain dairy products if colored with chemical dyes, thus obliging certain producers to use vegetable coloring materials instead of cheaper chemicals.

The total production of Porto Rico today is probably in the neighborhood of 150 tons per annum. Weekly shipments in season (January to April) may amount to over 41,000 pounds.

Selective breeding experiments have been started at the Trujillo Plant Propagation Station and the Model Farms with the purpose of eventually securing extra-high-grade varieties, which will bring an extra price on the mainland market. At present, there is no export of the paste which is made by boiling the seeds and drying the separated powdery aril in sheets or cakes.

Really enormous quantities of Achiote are consumed locally; almost every plate of rice (say, 1,000,000 per day) and many other dishes such as beans, stews, soups, etc., eaten in the Island are colored with Achiote.

ACTINIDIA; Yang-Tao; *Actinidia arguta* Miq.

An interesting fruit vine recently introduced from the mainland; habitat, eastern Asia. The fruits are about 3 mm. in diameter, roundish, greenish yellow and very sweet, with a peculiar perfume.

ADLAY; *Coix Lachryma-Jobi* L. var. *Mayuen* Stapf.

Six varieties of this common Philippine crop were introduced in 1923 through the Plant Propagation Station at Trujillo Alto. Four of these forms made a phenomenal growth; in some instances one seed produced a "*cepa*" of some 50 or more suckers, most of which attained a height of 1.5-2 m. with many culms bearing heavy "heads" of large seeds with only a moderately hard "shell". These seeds are good poultry feed, better if cracked. Bread can be made from Adlay flour with one-third to one-half wheat flour added. The yield of grain, under good conditions, is heavy; and according to P. J. Wester, Agricultural Advisor of the Philippine Bureau of Agriculture, it is a promising grain for the Tropics; he records yields of 1,634 to 3,625 kilos of grain per hectare.

AGUACATE. See Coyo.

AGUACATE DE CARACAS; Caracas Avocado; *Persea* sp.

Perhaps the rarest of all the known Avocados. Four seeds were obtained in Caracas, Venezuela, in November, 1924, and planted at the Trujillo Plant Propagation Station.

The fruit, of medium size, flavor, and apparent value is very distinct as to shape; the distal end, rounded in all other species, is prolonged into a tapering short beak; the "neck", too, is different in that it is rather strongly curved and its basal portion is larger (in diameter) than the middle part.

This has been described, according to Dr. H. Pittier, of the Museo Comercial of Caracas, as a new species.

AGUACATE DE GUATEMALA; Guatemalan Avocado; * *Persea Persea* (L.) Cockerell.

This race is practically a sub-species and is distinguished from the West Indian race by the thick rind of the fruits, and while the foliage lacks the anise-like odor of the Mexican species the young leaves are usually deeper colored (reddish) than those of the West Indian type. The fruits, with their firm thick peels, will undoubtedly stand long shipment better than the ordinary West Indian varieties; their color ranges from light green to purplish black; the surface is often rough, which is a disadvantage in the retail trade.

The following varieties have been introduced, partly at the U. S. Experiment Station at Mayagüez and partly at the Insular Experiment Station at Río Piedras:

Blakeman. Originated at Hollywood, California, in 1912; skin thick and woody, granular. Dark green with numerous yellowish or reddish brown dots. Pulp rich and pleasant and of high quality.

Dickinson. Originated at Los Angeles, California, in 1912. Skin very thick and brittle but separating readily from the flesh; dark purple with irregular maroon dots. Pulp buttery, of pleasant flavor.

Lyon. Originated at Hollywood, California, in 1911; pear-shaped, sometimes with a short "neck"; weight 400-600 grams; skin rough or undulating, green with yellowish or brownish dots, moderately thick, granular; flesh smooth, firm, light colored, fiberless, unusually rich.

Sharpless. Originated near Santa Ana, California, first propagated in 1913; shape pyriform, sometimes with quite a long "neck"; size large to very large (450-700 grams); skin slightly roughened or pitted, glossy greenish purple to deep purple, with numerous yellow dots; skin thick, frequently granular, or even woody; pulp smooth, firm, fiberless, of excellent quality.

Solano. Originated at Hollywood, California, first propagated in 1912; shape oval or obovate, size medium to large; skin nearly smooth, glossy, bright green with numerous yellow-

* The correct name for this fruit is O (in the Quekchi language), On (Maya dialects), or Oj (pronounced Okh) in Guatemala.

- ish dots; skin moderately thick; pulp smooth, yellowish green, fiberless. Quality not so good as most of the other Guatemalans but the tree is quite productive and the season—March to May—in California, and October to November in Florida—which means that it will probably be a winter bearer in Porto Rico.
- Spinks.* Originated at Duarte, California, in 1915; shape regular; size extremely large (500–1,000 grams); skin thick and woody, dark purple; pulp firm, smooth, rich, yellow, fiberless and of excellent flavor.
- Taft.* Originated at Orange, California, in 1912; shape regular, with short “neck”; skin thick but not brittle, deep green with yellowish dots; flesh firm, light yellow, fiberless, unusually rich and pleasant.
- Taylor.* Originated at Miami, Florida, in 1914; shape pyriform to obovate; skin moderately thick, granular, dull green with yellowish dots; pulp firm, fiberless, of good quality.
- Akbal.* Elongated to slender pyriform, sometimes curved, size medium; surface quite smooth, bright green; skin very thin, firm; flavor nutty, good.
- Benik.* Obovoid or broad pyriform, very large; skin pebbled, deep purplish maroon, thin, pliable; pulp of excellent flavor.
- Cabnal.* Quite round, medium-sized; surface pebbled, dull green; skin thick, woody; nutty flavor, fairly dry.
- Cantel.* Oblate, medium-sized; deep yellow green with yellowish dots; skin medium; seed very small.
- Coban.* Pyriform or obovoid, above medium size; skin nearly smooth, deep green with few small yellowish dots; excellent, rich flavor.
- Collins.* Small, rough fruit, pyriform, dark green; of Floridan origin.
- Chabil.* Round, smallish; surface smooth, deep dull purple, with few large yellowish dots; skin thick, unusually woody; pulp slightly fibrous, flavor nutty.
- Challenge.* Nearly round, good size; rough surface, skin granular, dark purple; seed large, tight in cavity; originated in Hollywood, California.
- Chisoy.* Roundish, large; skin pebbled, yellowish or dark green, dotted yellow; very oily, pleasant flavor.
- Grande.* Oblong, large; skin thick, leathery, dark purple. From Puebla, Mexico, via California.
- Ishim.*—Pyriform or oblate, below medium in size; surface smooth or pitted, dark maroon-purple; skin thin, tender.
- Ishkal.* Small, nearly round; skin rough; thick, purple with few large yellowish dots.
- Itzama.* Pear-shaped; surface pebbled, skin glossy green; very late.

- Kanan.* Round, large; surface pebbled, bright green with few large yellowish dots; skin medium, brittle; quality good.
- Kanola.* Roundish, small, deep purple with small yellowish spots; flavor oily; skin 3 mm. thick.
- Kashlan.* Oval, very large (0.6 kilo or more); skin deep green with numerous large yellow dots.
- Kayab.* Obliquely spherical, medium to very large; surface pebbled, deep or yellowish green; skin thick, hard and woody.
- Kekchi.* Pyriform or obovoid, small; surface rough, deep dull purple maroon with few small brownish dots; skin thick, woody, few fibers.
- Knight.* Round, of good size; skin rough, green, woody; flesh with a nutty flavor, carrying 20 to 25 per cent of oil.
- Lamat.* Oval, medium to large, deep green with a few yellowish green dots; rich flavor.
- Linda.* Round, large; skin rough, purple, woody; pulp rather dry with only 13 to 16 per cent of oil, fiberless.
- Manik.* Oval to elliptic-pyriform, about medium in size; surface bright green; skin medium, hard; flesh, rich, unusually dry.
- Mayapan.* Round, medium-sized; surface decidedly rough, greenish purple to dull purple with many large yellowish dots; skin very thick (5 mm. near the base) and granular; quality excellent.
- McDonald.* Medium-sized, round, dark mahogany color; originated in Hawaii.
- Nabal.* Round, below medium in size; skin pebbled, rough, dull green.
- Nimlioh.* Broadly oval, one of the largest (1-2 kilos); skin pebbled, deep green with many large irregular yellowish dots; excellent flavor.
- Panchoy.* Round or obovoid, medium to large; surface heavily pebbled, green with yellowish dots; one of the very best sorts.
- Pankay.* Pear-shaped, long, medium-sized; skin smooth, light green.
- Queen.* Oblong-pyriform, good size; skin rough, deep purple, thick; flesh excellent, not very oily.
- Schmidt.* Pear-shaped, large; skin fairly smooth, green; late.
- Tertoh.* Oblong to slender pyriform, extremely large (1 kilo or more); length up to 20 cm.; surface smooth, deep dull purple with russet dots and patches; skin medium, woody; seed very small.

AGUACATE HIBRIDO; Hybrid Avocado; *Persea drymifolia* X *Persea Persea*.

Thus far the principal hybrid in cultivation is known as the *Fuerte* and this bids fair to be one of the most popular varieties of

Avocado in the Island; one plantation near Villalba has already many Fuerte trees in bearing and many are being propagated in nurseries.

The fruit is pyriform, with no "neck", or oblong; size medium to large (300-500 grams); surface decidedly rough, sometimes wrinkled, dull green with numerous small dots, about 1 mm. thick, separating from the flesh, and leathery. This fruit is probably one of the richest fruits in the world in fat content; some fruits analyze as high as 30 per cent, yet the flavor is not seriously affected by this exceedingly high percentage of oil.

Winslowson. This is a seedling from the Winslow "which appears to have been hybridized with a West Indian variety, as it more resembles Trapp than it does Winslow." Fruit immense (1 k. or more), round, dark green, very shiny. Season November-December. Said to be prolific and a precocious bearer.

AGUACATE DE LAS INDIAS OCCIDENTALES; West Indian Avocado;
Persea Persea (L.) Cockerell.

The varieties of the so-called "native" Avocados of Porto Rico are descendants almost entirely of the trees brought to the Antilles from Central America or Mexico. They resemble the Guatemalan race, but the young leaves usually are not reddish and the rind of the fruit is leathery and thin instead of thick and woody.

While it must be considered as one of the most important food fruits of the Island it is very rarely planted in orchards. The 1920 census indicated that approximately 161,000 "native" trees are in evidence here; only 95,000 of these were "in bearing". Several nurseries for the propagation of budded varieties have been established in or near the Bayamón district, the actual number of Avocado trees here now is probably not less than 200,000 and may exceed 250,000. Thousands of seedlings have been raised for stocks, mostly at the Trujillo Plant Propagation Station, but also at the Model Farms and the Río Piedras Experiment Station; in well-cared-for rows a good seed will produce a 3- to 5-meter stock in about 12 months.

Practically all the "native" varieties here have a green skin and more or less "neck"; the pulp is nearly or quite fiberless; the seed is variable. The oil content is moderate—from 10 to 20 per cent. Oil made at the By-Products Plant in Mayagüez, by first dehydrating the nearly "mellow" ripe pulp and then pressing, has a very strong, dry (*sic*) taste; and the "cake" (after expressing the oil) at the said Plant appears to be exceedingly nutritious.

A fertilizer, also made at the said Plant from the sliced, dried, and ground seeds has been used with good results at the Model Farms and Trujillo Plant Propagation Station; this could probably be used as a goat feed.

Over 150 barrels of seeds for nurseries in Florida were exported in 1924. Practically no fruits have been exported thus far; the thin peel of the "native" fruit is too easily damaged en route. Orchards containing West Indian, Mexican, Guatemalan, and Hybrid type trees are in evidence at Villalba, Garrochales, Trujillo, and Bayamón.

Hayman. One of the few "native" sorts which seem worthy of a name; fruit large, roundish; from a Mayagüez tree.

Pollock. An extremely large fruit (weight commonly 0.75-1 kilo, but occasionally attaining 1.5 k.), smooth-skinned, light yellowish or green, fiberless; flavor rich, very pleasant, rather dry; originated at Miami, Florida, and first propagated in 1901.

Trapp. This very interesting and quite distinct variety originated at Coconut Grove, Florida, in 1901; of very unusual shape (roundish oblate); size large to very large (400-600 grams; surface nearly smooth, pale yellow green with numerous yellowish dots; one of the latest-bearing avocados known—fruits frequently remaining on the tree until February or even March. Should, perhaps, be separated as a sub-species.

Waldin. A new Avocado originating at Homestead, Florida, in 1915; size large to very large (weight 400-700 grams); shape oblong to nearly pear-shaped; skin smooth, tough, without markings; flavor rich, with very little fiber; season October to January.

AGUACATE DE MEXICO; Mexican Avocado; *Persea drymifolia* Cham. and Schlecht.

This species is readily distinguished from the West Indian and Guatemalan types by the peculiar odor of its leaves which remind one of anise when they are bruised; the skin, moreover, is comparatively very thin, in some races being almost papery and never exceeds 1.5 mm.; there are also peculiarities in the flowering and fruiting habits of this species.

Their cultivation here, which was begun several years ago, will probably result in the extension of the fruit shipping season; this species therefore, in connection with the Guatemalan race of the common West Indian species, and the hybrids between these two or three groups should theoretically carry the crop season over nine if not eleven months of the year.

The following varieties have been introduced at the Río Piedras Experiment Station and the Trujillo Plant Propagation Station:

Gottfried. One of the largest of this type; pear-shaped, purplish black; skin peels readily; pulp nearly fiberless, of good flavor.

Northrop. Originated near Santa Ana, California, in 1911; shape regular, sometimes "necked", very small (150-250 grams); skin smooth, very glossy, deep purple, membrane adhering close to the flesh; pulp buttery, fiberless, of good quality.

Puebla. Originated at Atlixco, Mexico, propagated in 1911 in California; shape regular, size rather small 250-300 grams; skin smooth, glossy, dark maroon purple with numerous reddish dots, fairly thin but removable from the flesh; pulp yellow, buttery, of a distinctly nutty flavor and high quality.

AJI CABALLERO; Devil Pepper; *Capsicum annum* L.

Very common, semi-cultivated variety producing over a long period, extremely pungent, minute fruits from 5-8 mm. in diameter, conical or roundish. Plant 1-1.5 m. Ripe fruits dark red; used generally while green.

AJI DULCE; Sweet Pepper; *Capsicum annum* vars.

An undetermined race having wrinkled, nearly globular, sweet, mildly aromatic fruits about 1.5-2 cm. in diameter, is common in some districts; 3 forms of this were brought from St. Thomas in March, 1924. This appears to be the best sort for pickling, and could be exported fresh or dried if a market were opened. A rare long-conical form with a white or flesh-colored skin is in evidence at Trujillo Plant Propagation Station; origin unknown.

AJI GRANDE; Red Pepper, Chilli, Long Cayenne; *Capsicum annum* L. var *acuminatum* Fingh.

A very common old race of Peppers, widely cultivated throughout the Island. The true type of this botanical variety has long red fruits curved at the tip and very "hot". A similar variety, *longum* Sendt., has large leaves and fruits (of several colors); another, *fasiculatum* Irish, bears the red fruits in clusters.

Most forms of these races succeed well here. Their culinary uses are more restricted here than in Mexico and Central America.

AJI PEQUEÑO; Tabasco, or Short Cayenne Pepper; *Capsicum annum* L. var. *conoides* Irish.

The smaller varieties of these Cayennes are semi-cultivated on a very small scale, but are widely known. The intensely hot red fruits are erect, 1.5-2.5 cm. long, and nearly cylindrical.

A similar variety, *cerasiforme* Irish, has very small (3-4 mm.) roundish fruits.

Both these races are used in making "pepper sauces" with vinegar and in seasoning soups, meats, etc.

AJO; Garlic; *Allium sativum* L.

A fairly common vegetable, 20-30 cm. The domestic bulbs are from one-fourth to one-half the size of the imported (*ex* S. Europe) article, but command a fair price in the local markets.

Native of Southern Europe.

AJONJOLI; Sesame, Bene; *Sesamum orientale* L.

This fairly common crop, native to the Old World Tropics, is cultivated in various areas of the interior but always on a small scale and the grain is only used for local consumption. Only one variety is in evidence; 1-1.25 m. The seed is used in various dulces, horchatas, and even raw.

AKEE; *Blighia sapida* Koen.

Several mature trees of this African species are in evidence here and seedlings are being propagated as rapidly as possible. The fruits appear to be as large or larger here than in Jamaica or any of the other West Indian countries. The fruit is quite unknown to the agriculturists thus far. Introduced about 1904.

ALBAHACA DE LIMON; Basil; *Ocimum Basilicum* L.

This old culinary herb of uncertain origin endures ordinary situations well; 20-40 cm. Not commonly cultivated as an aromatic condiment but it deserves a place in every garden.

ALCACHOFA; French Artichoke; *Cynara Scolymus* L.

This old European vegetable of uncertain origin has been occasionally cultivated in several gardens here but it is not on the market. Since two years are required for the full development of the plants, there is a small chance for the successful cultivation of this excellent vegetable here.

ALCACHOFA; Jerusalem Artichoke, Girasole; *Helianthus tuberosus* L.

This very interesting and potentially important root crop was long cultivated by the Indian races of Canada and the Central United States. Whether there were distinct varieties of this species in pre-Columbian days is not quite certain but there is no doubt that two or three similar species (especially *H. giganteus* L.) were used for food by the aborigines of the said region probably for centuries before the arrival of the European colonists. There are

today four or five distinct varieties and probably several other forms and races of this species. In Egypt it has long been grown as a major crop in some sections under the name of Topinambour. It was introduced through the U. S. Experiment Station at Mayagüez in 1904 but does not seem to have become thoroughly acclimated at that time. In 1923 it was again introduced at the Trujillo Plant Propagation Station; the first crop, without being thoroughly rested, was immediately planted in the same plats, and the second crop gave splendid plants from 2-3 m. in height some of the "hills" yielding as much as 8 kilos of tubers. The average yield per hill is perhaps less than 2 kilos.

Orders are coming in from farmers who have seen this crop growing on the Model Farms and it is hoped that in the near future this will be one of the commonest crops on the small farms.

The small stems, leaves and flowers are excellent forage for domesticated animals while the very sweet tubers are excellent for pigs and cattle. Recently sugar has been made from the tubers which contain about 18 per cent of inulin and sugars, instead of starch; this inulin is easily changed into levulose and by a new process with lime compounds a calcium levulate is formed which can be reduced to levulose *crystals*. Therefore, if a crop of 1,000 bushels per acre (which seems to be quite possible) can be produced, the amount of sugar obtainable from one acre of Girasole may compare very favorably with the amount obtainable from sugar cane.

ALCACHOFA DEL JAPON; Chorogi, Chinese- or Japanese-Artichoke; *Stachys Sieboldi* Miq.

Recently introduced through the Trujillo Plant Propagation Station from Japan *via* France. Tubers about one-fourth to one-sixth the size of the "Jerusalem" Artichoke. Presumably adapted to loose soils at moderate elevations.

ALCARAVEA; Caraway; *Carum carui* L.

This European herb is adapted to the higher districts; it seeds at Trujillo but does not endure well the droughts. The Wholesomeness of its leaves, roots, and seeds, as aromatic condiments, entitles it to a place in every kitchen garden.

ALFALFA; *Medicago sativa* L.

This strictly temperate European forage plant does not endure this climate well. In limey soil it sometimes reaches a height of 1 m. and flowers but does not form thick stools. Its culture should be abandoned here.

ALGALIA; Musk-seed; *Abelmoschus Abelmoschus* (L.) Cook & Collins.

A rather rare vegetable, sometimes cultivated for the seeds which have a strong odor of musk.

ALGARROBO; West Indies Locust; *Hymenaea Courbaril*, L.

Native tree, 10-20 m. Never cultivated, but common. Floury aril surrounding the large seeds is malodorous but edible and apparently quite wholesome. Very common in markets.

ALGODON; Cotton.

The cottons of Porto Rico require careful study. Their multiple origin and the three or four centuries of inter-breeding have tended to "blend out" many of the original specific characters.

The Arawaks had Cotton, probably in several varieties, under at least partial cultivation. Spain not only gave her own varieties and those of the Canary Islands but brought hither the Mexican and probably the Peruvian and other Central American, South American, and Antillean varieties; the slave ships brought over varieties from West Africa; and finally some of the United States varieties arrived. Large lots of seed from St. Kitts and Antigua have recently been imported for the long-staple "Sea Island" planters.

ALGODON DE BARBADOS; Sea Island Cotton; *Gossypium Barbadense* L.

This probably indigencous shrub is rapidly becoming one of the principal crops of the Island; the present production is about 1,500 to 2,000 tons of seed cotton; some considerable percentage is damaged by contact (hybridizing) with short-staple "native" cottons. The principal districts are the northwest, the southwest coastal plain and scattered areas over the north central and southern districts. There are few large fields, one or two acres probably being the average.

One cottonseed oil-factory was started in 1923 and this plant has consumed practically every pound of seed since its opening, whereas previously the Porto Rican cottonseed was exported to British West India Islands and to European countries.

The oil is not used here for human consumption; the meal produced at the seed plant is sold both as a cattle feed and fertilizer but in the future it is expected that most of the meal will be turned into dairy feeds. Several hundred tons of meal are brought from Venezuela and about the same quantity from the United States.

ALGODON DEL PERU; Peruvian Cotton; *Gossypium Peruvianum* Cav.

A small rare cotton formerly cultivated and now "escaped".

ALGODON DE PUERTO RICO; Porto Rican Cotton, Bourbon Cotton; *Gossypium purpurascens* Poir.

This very rare species is never cultivated as a food plant but it has some points which might make its extensive culture of advantage: it attains a height of 6 meters. Absolutely perennial and produces a heavy crop of large smooth seeds.

ALGODON DE RIÑON; Kidney Cotton; *Gossypium brasiliense* Macfad.

A small rare short-staple variety of cotton; according to Britton & Wilson, "spontaneous after cultivation". The seeds are easily separated from the bright white fiber.

ALGODON SILVESTRE; Wild Cotton; *Gossypium hirsutum* L.

A shrub or small tree 2-4 m.; seed very "fuzzy". According to Britton & Wilson, "spontaneous after cultivation".

ALMENDRILLO; Wild Plum; *Laurocerasus occidentalis* (Swartz.) Roem.

Wild tree, 10-18 m., in moist forests; fruits 2-2.5 cm. long. Valued for its excellent timber.

ALMENDRO; Tropical Almond; *Terminalia catappa* L.

One of the commonest shade trees in Porto Rico; 6-20 m. This species is almost deciduous though some trees remain leafless but 2 or 3 weeks. The nut is of very little value, though frequently eaten by children. The pulp of the thoroughly ripe fruit, although very astringent, is also eaten by children. The fibrous cover of the kernel militates against the use of the nut commonly. Practically no variation occurs here; some fruits are much redder than others but this is undoubtedly a non-specific character.

ALLSPICE. See Pimienta.

ALOCASIA. See Panamá.

AMATUNGULU, Tungulu; Natal Plum; *Arduina grandiflora* E. Meyer.

A first-class fruit shrub, 2-6 m.; introduced some 25 years ago; from South Africa. The elliptic or ovoid, pointed, dark red fruit, 3-5 cm. long, with white or red-streaked pulp is used like strawberries, fresh or cooked. Distributing by the Department. Probably exportable.

AMATUNGULU, Tungulu; Natal Plum; *Arduina bispinosa* (L.) Desf.

Very similar to the larger *Arduina grandiflora*, but distinguished by its small flowers and small roundish fruits; introduced about 1903 from South Africa, via U. S. Department of Agriculture.

ANIGLI; *Annona senegalensis* Pers.

Recently introduced third-class West African fruit tree, 3-10 m. At Experiment Station at Río Piedras.

ANIS; Anise; *Pimpinella Anisum* L.

This old Levantine culinary herb is rarely grown though it endures the climate very well. The name is applied also to several other aromatic herbs.

ANISE. See Anís.

ANNATTO. See Achiote.

ANON; Sugarapple; Sweetsop; *Annona squamosa* L.

First-class fruit tree, 3-6 m.; cultivated in all districts but not so common as in other West Indian countries; main crop, September to May. Slight individual tree variation, but no distinct varieties recognized by name. Used only as fresh, dessert fruit; unsuited for export. Probably native; aboriginal name, Hanon.

ANONANG; Philippine Plum; *Cordia blancoi*.

Recently introduced second-class fruit tree from the Philippines at the U. S. Experiment Station.

APIO; Celery; *Apium graveolens* L.

A difficult vegetable for tropical olericulturists; it grows fairly well here in the wet season, especially in the higher districts, but blanching is seldom successful.

APIO. See Arracacha.

APIO-NABO; Celeriac; *Apium graveolens* DC. var. *rapaceum* DC.

Like celery, this plant does best in cool, moist regions; if rapidly grown the root has little or no fiber and no bitter taste. Should be grown more extensively.

APPLE. See Manzana.

APRICOT, Santo Domingan. See Mamey.

ARRACACHA; Apio; *Arracacia xanthorrhiza*, Baner.

A first-class vegetable fairly common on the north side of the Island. Probably introduced in pre-Columbian times from Venezuela. It succeeds best in the moist rich limey soil of the hills. Probably never flowers here; propagated with offsets from the old root-cluster. Especially good in stews and soups; served alone, boiled or fried, its strong flavor (resembling that of celery, parsnip, carrot, and squash) is rather too rich for most palates; odor rather unpleasant. Old roots may be left in the ground for years, portions being broken off as required at any season of the year—an advantage possessed by extremely few vegetables. Worthy of much more extended cultivation; unfortunately, few people seem to be acquainted with its use, and is less common now than formerly.

ARROWROOT. See Yuquilla.

ARTICHOKE. See Alcachofa.

ARROZ; Rice; *Oryza sativa* L.

This very old East Indian cereal was introduced in the early days of the Spanish colonists. Three or four varieties are cultivated, mostly in the hilly districts; according to report over 11,000 acres are planted here and the outturn is estimated at some 2,500 or 3,000 tons—a small percentage of the total amount of this grain consumed here: 80,000 to 90,000 tons is about the average annual import.

Irrigation and the flooding method commonly practiced in Oriental countries are almost unknown here. Tests of many standard varieties from the Mainland and the Orient have given negative results in practically every instance.

ASPARAGUS. See Espárrago.

ATEMOYA; *Annona squamosa* X *A. Cherimolia*.

Seedlings of this very interesting hybrid fruit are being propagated at the Trujillo Plant Propagation Station; seeds presented by Mr. P. J. Wester, Agricultural Advisor of the Philippine Government. The Atemoya has fruited for 10 years in the Philippine Islands and is one of the best of several *Annona* hybrids created at the Lamao Plant Breeding Station by Mr. Wester.* Seedlings vary somewhat.

AUSU. See Malagueta.

AUSUBO; *Sideroxylon fœtidissimum* Jacq.

Indigenous tree common in all the old forests of the Island in both the wet and dry districts; 20–30 m.; fruit a yellow berry, roundish or oval, 2–2.5 cm. long, containing one or two large seeds and a small amount of acid or sweetish yellow pulp.

AVENA; Oats; *Avena sativa* L.

Rarely cultivated. Native of Old World. Leaves and inflorescence commonly attacked by rusts.

AVOCADO. See Aguacate.

AVOCADO. See Coyo.

BACULO. See Gallito.

BALM. See Melisa.

* At Lamao, Bataan Province, across the Bay from Manila is assembled the world's largest collection of tropical fruits—some 500 varieties.

BALSAM APPLE. See *Cundeamor*.

BANANA. See *Guineo*.

BARBASCO. See *Canela de Costa*.

BARLEY. See *Cebada*.

BASIL. See *Albahaca de Limón*.

BATATA,* *Camote*; *Sweet Potato*; *Ipomœa Batatas* (L.) Lam.

This, the principal root-crop of Porto Rico (as well perhaps, as of all other tropical countries) was probably in cultivation by the very early aborigines; an illuminant fact is the presence of the wild species (*Ipomœa tiliacea* Choisy) from which this tremendously important cultigen is descended. Cultivated much more widely and extensively than any yam, yautía or yuca. Not all the types are in evidence here to day; the *Bush* (non-repent) form and the very long-rooted form, with a beautiful purple fecula, from Eastern Mexico appear to be absent.

In June 1924, some 240 varieties of named seedlings were presented by the Agricultural Experiment Station at Christiansted, St. Croix, A. V. I.; and these have been tested at Vega Baja Farm and San Sebastián Model Farm and the Río Piedras Experiment Station. About 150 of these varieties were discarded in 1925 as unworthy of further test. These seedlings, produced by Mr. J. B. Thompson, in charge of the said Station, were raised from several mainland and several West Indian standard varieties; in most cases only the female parent was known (— some may have been self-fertilized). The forms exhibit all gradations from white, through yellow, to dark-rose-colored feculas, while some show rays and clouds of purple on a white background; the leaves are of many types. In dry situations some plants produce seed here, but propagation is always by vine cuttings—except when a rare root may be used for sprouts.

Seeds were also received during 1924 from the said Station, and these were grown at the Trujillo Plant Propagation Station, the seedlings being distributed mostly to the Vega Baja Farm; some fifty varieties were raised and are now under test; seedling work

* Just where the wild species was domesticated is probably impossible to determine; however, the Quichua dialect, which was spoken by the Incas in 1500, contains several words which apply only to *Ipomœa Batatas*: the word *Cumara* was given to the sweet potatoes of the dry, or starchy, type, and *Apichu* was the general term for the varieties having a sweet, or moist, fecula. Presumably, distinct varieties had their own names. It must be admitted as an important horticultural fact that the Incas recognized *two classes*, or sections, of this crop—something which has scarcely been done since.

both at Río Piedras and U. S. Experiment Station has not given to date very good results.

Some forty varieties of sweet potatoes of the Mainland have been introduced at the United States Experiment Station; of these the following are, in order of importance, the best for local conditions:

Key West, locally known of late and now planted as "Cayo Hueso"; prolific and early.

Madeira, of unknown origin; a splendid sort.

Porto Rico, of uncertain origin; very popular in the mainland.

Southern Queen.

Golden Beauty.

Creola.

Other Mainland varieties recently presented by the United States Department of Agriculture and now under test by this Department are, in order of importance:

Nancy Hall.

Pumpkin.

Yellow Jersey.

Triumph.

Dooley.

Big Stem.

The vines are not used here (as in the Philippine Islands) as a spinach substitute; they are often fed to pigs, however.

An excellent feed is made from the small (cheaper) entire roots, and a rich flour for human consumption from the fécula.

The following old native varieties deserve brief mention:

Ahoga-Perro. A rare variety, common near the east end of the Island. The roots are so dry that, it is said, "even dogs choke in eating them."

Almacenada. The white fécula has purplish veins. The skin may be red (*Almacena colorada*) or white (*Almacena Blanca*).

Anita. An early prolific variety having a yellow fécula shaded with pale pink. Flavor excellent.

Blanca. At least twelve forms are planted under this type name. Both skin and fécula are light-colored.

Burra. The largest and perhaps the coarsest type; a white and a red form exist. They are quick growers. Roots weigh up to several kilos. Probably identical with *India*.

Candela. Large purple-skinned roots with whitish inside.

Capitaleña. Root with a dark brown or even blackish skin, globose, fine flavor. Prolific.

Carbonera. Similar to *Rosita*, but has fewer and larger roots.

Colorada. The common red-skinned forms with a yellowish fecula are all grown under this name.

Cuarentina. A rare form, said to mature roots in forty days.

Mameya. Several distinct forms are known under this type name. Their feculas are yellowish and usually sweeter than in most other types.

Morada. An excellent variety with beautiful streaks of purple in the fecula.

Melendres. One of the best sorts grown here. The small, white roots cook quickly, and are granular and remarkably sweet.

Negra. One of the most striking plants in the whole realm of agronomy; the stems and leaves are of a rich dark maroon purple, becoming almost indigo black with age. The roots are, strange to state, unusually white, slender and of very poor quality. Plants at Vega Baja Model Farm succumbed twice to insect attacks. Very rare.

Rosita. Has rose-colored roots.

Yoya. A regular variety having white roots; leaves are strongly lobed; vines entirely green; prolific.

Other varieties possibly identical with some of the above are: Cangrejera, Gurabeña, Mayagüezana, Ranina.

BAY. See Malagueta.

BAY BEAN. See Mato de Playa.

BAY Lavender. See Nigua.

BEAN. See Habichuela.

BEAN, Civet. See Haba de Sieva.

BEAN, Jack. See Canavali.

BEAN, Lima. See Haba.

BEAN, Red Jack. See Canavali Colorado.

BEAN, Wild Yam. See Habilla.

BEET. See Remolacha.

BEGGARWEED. See Junquillo.

BEJUCO DE CONCHITAS; *Clitoria ternatea* L.

An Old-World vine thoroughly naturalized here. Does not seem to be appreciated as a pasture forage here as it is in St. Croix, U. S. V. I. Three forms in evidence.

BEJUCO DE COSTA; *Ipomœa stolonifera* (Cyrill) Poir.

Common along the coasts of Porto Rico and neighboring islands; stem is sometimes partially buried in sand; 3-10 m. Leaves and vines commonly used as pig feed.

BEJUCO DE PUERCO; *Ipomœa rubra* (Vahl.) Millsp.

Very common in wet or moist soil in the northern districts of the Island; 1-3 m.; the young branches hairy. Leaves and vines used for pig feed.

BEJUCO DE PUERCO; *Ipomœa tiliacea* (Wild.) Choisy.

An extremely common vine in waste grounds everywhere; 2-5 m.; roots sometimes bearing small tubers. Leaves and stems gathered from waste grounds—never cultivated—and used for pig and rabbit feed. Indigenous and possibly the original ancestor of *I. Batatas* (L.) Lam.

BELL APPLE. See Parcha.

BENE. See Ajonjoli.

BERENJENA; Eggplant; *Solanum Melongena* L.

One of the commonest and most satisfactory of the "temperate" vegetables; marketed over a season of some 9 months. Both the place of origin and the wild form are quite unknown. The cultivated plant may easily be and often is grafted on a wild species, Berenjena Cimarrona (*S. torvum* Sw.), with good results; fruiting period may last a year. Three or four varieties are popular; the black-fruited seem hardier than the white ones.

BERROS; Water-Cress; *Sisymbrium Nasturtium-aquaticum* L.

Semi-cultivated, fairly common salad plant. Grows in shallow streams. Native of Europe and Asia. Sometimes in markets in large quantities.

BERZA; Kale, Collards; *Brassica oleracea* L. var. *acephala* DC.

This "temperate" vegetable succeeds fairly well here, but is severely attacked by insects. Worthy of extra efforts. Several varieties. Excellent for "greens" and soups.

BERZA DE GANADO; Cattle Kale; Thousand-headed Kale; *Brassica oleracea* L. var. *ramosa* Alef.

This common European forage plant is unfortunately rare here; has succeeded at Vega Baja Farm and Trujillo Station. Injured by drought.

BINUKAO; *Garcinia binucao* Cy.

A medium-sized second-class fruit tree, 10-15 m., or more, introduced via United States Department of Agriculture from the Philippine Department of Agriculture. Fruiting at Mr. H. I. Sewall's place at Naguabo. Fruit shaped like a mandarin orange, yellowish green when ripe, 3-5 cm. or more in diameter, pulp almost too acid to use without sugar.

BIRIBA; *Rollinia* sp.

A splendid specimen of this excellent Brazilian first-class fruit tree is in evidence near Río Piedras, 5-10 m.

The fruit resembles the Corazón in shape but is larger, much more juicy and aromatic as to pulp, and somewhat like the Anón as to color and surface.

BIRIJI; *Eugenia monticola* (Sw.) DC.

A fairly common shrub or small tree, 6-10 m., in the waste lands of the Interior. Fruits roundish, black, about 5mm. in diameter.

BLACKBERRY. See Zarzamora.**BONAVIST BEAN.** See Chicharos.**BREADFRUIT.** See Pana.**BREADNUT.** See Nuez de Pan.**BROCCOLI.** See Coliflor.**BRUSSELS SPROUTS.** See Col de Bruselas.**BUCARE;** *Erythrina Pæppigiana* (Walp.) O. F. Cook.

A common coffee-shade and roadside tree, 15-25 m.; introduced from Peru. Leaves are a nutritious forage.

BUCARE; *Erythrina Berteroana* Urban.

A common Tropical American tree, 5-8 m. The leaves and small branches may be used as forage for rabbits and cattle. Leaves dried may be ground and used like Alfalfa meal. Frequently planted along roadsides.

BULALA, Pulasan; *Nephelium mutabile* Bl.

This excellent Oriental fruit tree has just been introduced at the Trujillo Plant Propagation Station; 10-15 m.; fruit reddish brown or greenish, somewhat resembling the Rambután, with a delicious sweet or sub-acid transparent pulp surrounding a large seed. This should rank with the Limón and the Rambután as much better fruits than the Quenepa.

BUNAG; *Garcinia Benthani* Pierre.

This interesting species from Cochin China and Philippines is in evidence (7 m.) in the collection of Garcinias belonging to Mr. Sewall at Naguabo. The fruit is similar to the Mangosteen but smaller, redder and more acid.

CABBAGE. See Col.

CACAO; Cacao; *Theobroma cacao* L.

A small tree introduced in 1636 from continental Tropical America, 4-9 m. Cultivated sparingly in the Maricao and Las Mariás districts, and found in at least 3 of the 12 or more distinct forms; the Forastero occurring much more commonly (in both the red and yellow sub-forms). The Criollo is extremely rare and the Calabacillo is seldom seen. Most of the dried (mixed) seeds are bought by the chocolate factory in Mayagüez. A considerable quantity of the dried "beans" is used locally by the producers. In 1903 14 forms of cacao were brought in (as fruits) from Trinidad, B. W. I., to the U. S. Experiment Station in Mayagüez and planted out on the Station's grounds.

CACAO DE NICARAGUA; Nicaraguan Cacao; *Theobroma pentagona* Bernoulli.

This was introduced about 1903 at the Federal Experiment Station at Mayagüez. Although a very delicate species it has succeeded fairly well here.

CACAO WARIBA; Patashte; *Theobroma bicolor* H. & B.

An interesting Central America tree, 5-10 m. The large cacao-like seeds in the large (0.7-1 kilo) hard-shelled fruit are used in various confections. Introduced from Trinidad in 1903; growing vigorously from seeds at Trujillo Plant Propagation Station.

CACTUS. See Tuna.**CACHIMAN; *Rollinia mucosa* (Jacq.) Baill.**

Small forest tree, bearing roundish fruits 7 cm. or more in diameter; "pulp white, mucilaginous, sweet, edible", according to Britton & Wilson. Wild in western districts. Cultivation intended, experimentally. Closely related to the excellent Biribá (*R. deliciosa Safford*), of Brazil.

CAFE DE ABEOCUTA; *Coffea abeokuta* Cr.

This species was obtained from the island of St. Lucia in 1904 and tried first at La Carmelita Sub-station. It is still under test at the U. S. Experiment Station in Mayagüez. It resembles in foliage, fruit, and habit the typical *C. liberica*.

CAFE DE ARABIA. See Café Común.**CAFE CANEFORA; *Coffea canephora* Pre.**

This interesting coffee was received from the French Government in 1908 by the U. S. Experiment Station. It is a late-bearing coffee and the bean is of medium size. It is closely related to *C. robusta*.

CAFE COMUN, Café de Arabia; Arabian Coffee; *Coffea arabica* L.*

This species, which today furnishes some 90 per cent or more of the world's coffee, was introduced into Porto Rico from Haiti in 1736; the Haitian plants were probably brought from Martinique about 1735, the first plants reaching the latter island from Java about 1720. Practically no variation is in evidence here after nearly 200 years; however, a morphological "freak" has occurred near Barros, in which the seeds are reversed (back-to-back) in the fruit, and a multi-seeded form came to light through La Carmelita Sub-Station about 1909. As cultivated, 3-5 m.

The seed of the Porto Rican coffee ranks in commerce as one of the three to four best varieties; it is uniform in size, rather large, of a good "bold" appearance, varying from a pale grayish blue to a dark greenish blue. It is not very rich in caffeine (probably about 1 per cent, as against 1.5 per cent for certain Central American and South American types) and is not so "rich in the cup" as some varieties, but it is an excellent "blender". It is more popular in Europe and Cuba than in the mainland.

The acreage at present is about 160,000. The average yield per acre is about 300 pounds of marketable "beans". The average export is around 15,000 tons.

The crop season is August to December. The shrub flowers (January to April) about five times, the berries ripening in six and one-half or seven months; all the plants in a district bloom at the same time. The "Caracolillo", or Peaberry, seeds are merely the seeds from 1- instead of 2-seed fruits borne at the tips of the branches; the percentage of these 1-seeded berries in Porto Rican coffee is 6 to 8 per cent. In size the common variety here weighs about 139 to 147 grams per 1,000 seeds, as against 242 grams for Liberian seeds and 78 for "Mocha".

The skin and pulp (which contains considerable sugar) removed at the plantation are allowed to decay in heaps and this material is usually (after several months) used as a manure; the parchment is used at the coffee mills, or "tahonas", for fuel; the "silver skin" membrane adhering to the seed, collected from the "tahona", has been successfully used in several feeds (principally "Melca", a mixture of molasses and coffee middlings and "Caftor", a cattle feed made by mixing equal weights of the "dust" and grapefruit juice or pulp) and fertilizers made up at the By-products Plant in

* "Coffee Varieties in Porto Rico", by T. B. McClelland, Horticulturist, U. S. Agricultural Experiment Station, Mayagüez, P. R.; Bulletin No. 30; issued June, 1924.

This Bulletin treats some 20 species and varieties of coffee in a semi-technical way.

Mayagüez; it has also been used as a carrier for tobacco extract in making up various "nicotine" insecticides. Its analysis is: Protein, 10.67 per cent; fiber, 36 per cent; carbohydrates, 35.2 per cent; ether extract, 3.2 per cent.

Other introduced varieties of Arabian coffee in Porto Rico (in evidence at the U. S. Experiment Station and at some few points—whither distributed almost entirely by the Federal Station) are:

Bourbon, introduced from Salvador.

Pointed Bourbon, a long-seeded variety, discovered in Reunion, of distinct habit of growth as well as of seed.

San Ramón, a splendid dwarf type from Salvador, having a bearing season of six months (August to January).

Columnaris, a tall-growing form discovered in Java.

Erecta, a Java variety having ascending lateral branches.

Maragogipe, a Brazilian variety, coarse in growth, strong in flavor, and poor in yield, introduced about 1904.

Mocha, a small-seeded form from Java, which perhaps may be considered a distinct sub-species (*C. "mokka"*).

Murta, a dwarf, late-bearing form from Brazil.

Preanger, a mediocre variety from Java; introduced in 1904.

Menado, a mediocre variety from Celebes introduced in 1904.

Philippine, a mediocre variety from Philippines introduced in 1904.

Guadeloupe, a variety from Guadeloupe, F. W. I.

Surinam, a variety from Dutch Guiana, S. A.

Haitian, a variety from Haiti.

Alta Verapaz, a variety from Guatemala, introduced in 1904.

Harrar, a variety from Abyssinia, introduced in 1904.

Kona, a variety from Hawaii, introduced in 1904.

CAFE DE CONGO; *Coffea congensis* (Fro.) De Wild.

This species belongs to the Robusta group and hybrids of it with other species may become very popular in the future. One variety of this species, "Chalotii", has large leaves and is quite productive.

CAFE DEL CONGO; *Coffea Laurentii* De Wild.

This variety was received from the U. S. Department of Agriculture at the U. S. Experiment Station. It is commonly cultivated in the Congo Free State. One tree at the U. S. Experiment Station in Mayagüez has continued for years giving a very heavy crop; according to Mr. T. B. McClelland, Horticulturist of the said Station, the yield in one season was 19.4 liters and it has often produced half an almod.

CAFE DE DEWEVRE; *Coffea Dewevrei* De Wild.

An interesting species, indigenous in the African Congo, introduced by the U. S. Experiment Station in 1911. A late-fruiting

species giving its principal crop in December, January and February. Smaller crops may be obtained in October and November, and also in March, April and May. In fruiting habit this species resembles the Liberian but has thinner pulp and more clustered fruits; the size of the fruits ranks as about third in the list of the varieties thus far tested at the U. S. Experiment Station. Budding has been successfully accomplished with this species.

CAFE DE DYBOWSKI; *Coffea Dybowskii* Pierre.

This species was introduced in 1905 through the U. S. Experiment Station at Mayagüez.

CAFE ESTENOFILA; Bush Coffee; *Coffea stenophylla* G. Don.

Though this excellent species was introduced at the U. S. Experiment Station some time ago it did not succeed well and was unfortunately ignored in the recent excellent coffee development work of that Station. In 1924-25 quantities of fresh seeds have been presented to this Department by the Botanic Gardens of Dominica and several thousand seedlings are now propagating at the Forestry Station, Experiment Station, and Trujillo Plant Propagation Station for immediate distribution to the Model Farms (San Sebastián and Villalba) and to coffee collaborators in the interior. It is claimed that this small-seeded coffee yields two or three times as much weight of product per given area as does the regular Arabian.

CAFE EXCELSA; Excelsa Coffee; *Coffea excelsa* Chev.

This species, according to Bulletin No. 30 of the U. S. Experiment Station, was discovered in 1905 by M. Chevalier in West Africa near Lake Tchad.

Received from the French Government at the U. S. Experiment Station in 1905. These trees have succeeded fairly well in the U. S. Experiment Station test plats and this species is today considered one of the most promising Coffees for further experimental planting. Its fruiting season is perhaps the latest of all known Coffees, March and April being the two heaviest bearing months, with May and June not much less; this late-fruiting habit may have considerable advantage in some districts of the Island.

CAFE HIBRIDO; "*Coffea ugandæ*".

Seed of this hybrid cultigen was introduced by the U. S. Experiment Station in 1918 from the Java Experiment Station. It belongs to the Robusta type and appears to have a variable fruit,—both as to size, shape and color.

CAFE DE LIBERIA; Liberian Coffee; *Coffea liberica* Hiern.

The largest of the commercial coffees, introduced at La Carmelita Coffee Sub-station of the U. S. Experiment Station in 1904. A specimen of this species near Adjuntas is about 12 m. or rather more than the average height of the cultivated trees in the Republic of Liberia; occasionally specimens reach 16 m. This species is not cultivated as a crop in Porto Rico; it appears to fruit fairly well but the size of the berries is quite variable; the fruits are, on an average, about 65 per cent heavier than those of the common Porto Rican coffees. No hybrids appear to be under cultivation here at present, although at least one has been produced (with *C. arabica*).

CAFE QUILLOU; *Coffea quillou*.

This was imported *via* the Dutch East Indies from the French Congo into the U. S. Experiment Station in 1914. This variety of the Robusta type appears to be one of the most productive of the so-called "new" coffees. Its bearing season is from November to March, with January showing the heaviest crop.

CAFE ROBUSTA; *Coffea robusta* L.

This excellent coffee has been grown in Porto Rico since 1904 when it was introduced at La Carmelita Coffee Sub-station. Recently rather extensive plantings have been made at the U. S. Experiment Station at Mayagüez and considerable seed has been distributed. The season is decidedly late, the principal crop coming in January instead of September and October as with the common Coffee.

CAIMITILLO; Lechesillo; *Chrysophyllum bicolor* Poir.

An indigenous species from the north side of Porto Rico; 10-15 m.; fruit smooth, oblong or roundish, 2-3 cm. long, 1- or rarely 2-seeded.

CAIMITILLO, Teta de Burra; *Chrysophyllum oliviforme* L.

An indigenous tree, common in all forests of the Island; 8-15 m. Fruit oval, 1-2 cm. long, purple or blackish, usually 1-seeded, the pulp extremely sweet, purplish.

CAIMITILLO, Murta, Guasávara; *Mouriri domingensis* (Tuss.) Spach.

A tree 8-10 m. indigenous in many parts of Porto Rico and Vieques; fruit roundish, yellow, about 15 mm. in diameter.

CAIMITILLO VERDE; *Chrysophyllum argenteum* Jacq.

A rather rare indigenous species from the old forests in the moister districts of the Island; 10-12 m. Fruits small, roundish or oblong, 8-14 mm.

CAIMITO; Star-Apple; *Chrysophyllum Cainito* L.

Probably indigenous first-class fruit tree, common throughout Tropical America; 10-20 m. Two forms of the fruit are found here, the green and purple. Practically no difference exists in the flavor, size or other characters of the fruit,—the purple or nearly black color, although it extends into the outer pulp of the fruit does not give a flavor different from that of the green form. Very seldom planted and never on a large scale; the fruits, however, bring a fair price on the market and are popular everywhere.

CAIMITO DE PERRO. See Caimitillo.

CAJUIL. See Pajuil.

**CALABAZAS; Squashes; *Pepo (Cucurbita) Pepo* L.,
Pepo (Cucurbita) moschata (Duch.) Britton.
Pepo (Cucurbita) maxima (Duch.) Britton.**

An unknown number species, sub-species, varieties, and hybrids of same are grown here widely but not to any great extent.

Certain varieties, presumably of the true "Field Pumpkin" type, are to be found in the markets throughout the year. In the drier regions of the Island many tons of these old garden fruits are produced each season and they hold a rather important place in the diet of the urban as well as the country people. Even several varieties of the "Summer Squashes" are occasionally found in the large groceries of San Juan. On account of the readiness with which most of the Cucurbits hybridize it is practically impossible to be certain that any varieties of these fruits found here are absolutely pure. No special care is taken to prevent cross breeding; the plants are largely left to find their own supports (trees, fences, etc.).

From the investigations made in Eastern and Central Peru in 1915 by Dr. O. F. Cook, of the U. S. Department of Agriculture, (an eminent authority on plant origins), it appears certain that the aborigines in the Central Andean region had domesticated at least three distinct types of squashes: one with hairy seeds which may be extinct at present; one with small white seeds; one with large black seeds. Very likely some of these primitive squash-like plants were the ancestors of our present-day varieties, and they were probably introduced into Porto Rico via one or both of the routes suggested in the preface.

CALAMBREÑA; *Coccolobis venosa* L.

An indigenous tree of the waste lands in both dry and moist districts of Porto Rico and neighboring islands; 8-12 m. Fruits

white when ripe, 3-angled, about 6 mm. long; the pulp white, quite edible, very juicy.

CALAMONDIN; *Citrus mitis* Blanco.

This very interesting Philippine fruit was introduced some time ago (about 1911), but has not been extensively planted. Some 50 trees, 3-8 m., are in evidence in the Guanajibo district of Mayagüez; the crop of "scarlet limes" is regular and heavy, and the beautiful fruits hang on the branches for months after ripening. This fruit is unquestionably of most value as an "ade" fruit (for drinks, sherbets, etc.); its loose peel is an advantage therefor.

It has been used as a parent in the seven following hybrids:

Citraldin, (with *Poncirus trifoliata*).

Sopomaldin, (with *C. grandis*).

Calarin, (with *C. nobilis deliciosa*).

Calashu, (with *C. nobilis unshiu*).

Faustrimedín, (with *Microcitus australasica*).

Bigaraldin, (with *C. aurantium*).

Citragedin, (with the *citrange*).

CALLALOU. See **Yautia**.

CAMANCHILE; *Pithecellobium dulce* (Roxb.) Benth.

A Central American shrub or small tree, 5-10 m. Has been planted near the Director's residence at the Mayagüez Experiment Station and elsewhere. Apparently variable; one Mexican variety has pods 20-30 cm. long. The sweet, whitish, fleshy pulp is very wholesome.

CAMANDULAS; **Job's Tears;** *Coix Lachryma-Jobi* L.

Scarcely cultivated, but common. The luxuriant foliage is of some feeding value, but the grain envelopes of the old ordinary form are too hard to be safely used as feed (even when ground) for animals. The only forms worthy of cultivation are the newly introduced Adlays from the Philippine Islands. Native of Tropical Asia.

CAMOMILA; **Chamomile;** *Anthemis nobilis* L.

A first-class seasoning herb with a very pleasant aroma; native to Europe. Introduced from France in 1924. Testing at the Plant Propagation Station.

CANAVALI; **Sword Bean, Jack Bean;** *Canavali ensiformis* (L.) DC.

An old East Indian Bean, 1-2 m., cultivated in fruit orchards, of little importance as a food plant. The large white seeds may be eaten with little danger provided they are soaked several hours

in warm water and then "hulled" by rubbing off the loosened coarse skins; the "first water" in which they are cooked should be thrown away.

CANAVALI COLORADO; Red Jack Bean, Horse Bean; *Canavali gladiata*, DC.

This rare plant is growing luxuriantly at the Plant Propagation Station. It may be of value as a forage and cover crop, but the very succulent foliage might require (partial, at least) drying before feeding to cattle. The crimson seed is larger than the white Canavali, and very different from the wild mato colorado (*C. rusiosperma* Urban) of the forests in the western end of the Island; plant much larger, 3-10 m.

CANDLE-NUT. See Nuez de la India.

CANDLE-TREE. See Palo de Vela.

CANE. See Caña.

CANELA; Cinnamon; *Cinnamomum zeylanicum* Nees.

A fine specimen of this famous species is in evidence in Mayagüez; about 6 m.; probably introduced about 1895. Native of South Asia.

CANELA DE CHINA; Cinnamon; *Cinnamomum Cassia* Blume.

A rare tree occurring in various scattered localities, never actually cultivated; introduced in 1903, a tree in the Federal Experiment Station orchard had reached a height of 3.7 m. in 1905. The bark appears to be utilizable but has never been put on the market here. Native of China.

CANELA DE COSTA, Barbasco; Winter Bark, Pepper Cinnamon; Canella Winterana (L.) Gaertn.

This indigenous shrub or small tree, 5-15 m., occurs in many localities, especially along the coastal area of Porto Rico and the neighboring islands. The highly aromatic and fragrant bark yields not only an excellent condiment but also a medicinal tonic.

CANISTEL, Ti-es; Egg-fruit; Lucuma nervosa A. DC.

A very interesting Cuban fruit introduced in 1903 at the U. S. Experiment Station; 5-10 m. This tree fruited in 1908 at the said Station but has never been distributed about the Island as it should have been. The fruit is one of the richest of all the sapotes; the sweet dry yellow pulp may be eaten raw, or made into pies or jam. Testing at the Trujillo Plant Propagation Station.

CANNA, Edible. See Maraca.

CAÑA, Caña de Azúcar; Cane, Sugar Cane; *Saccharum officinarum* L.

The precise habitat wherein this luxuriant grass was first reclaimed as a tame crop may never be known; in fact, there may have been several points of origin: A. de Candolle appears to consider its primitive range (as a domesticated plant) between Bengal in India and Cochin-China; but, if the Uba cane be regarded as of this species, South China was probably the mother country of one or more types of cane; and recent explorations have revealed the fact that in central New Guinea there are today large districts wherein savage tribes plant cane (probably of several varieties) from *the seed*, like sorghum or maize,—which might well indicate that there it has not lost by any means so much of its pristine seed vigor as elsewhere.

Certain it is, however, that Don Enrique, Infante de Portugal, took it about 1420 from Cyprus or Sicily to the Madeira Islands; the Arabs had brought the "honey-bearing reed" presumably from South India to Egypt, then to Sicily and Spain, rather early in the Middle Ages. From Madeira it was taken to the Canary Islands in 1503 and thence, a few years later (probably about 1505–1506) to Hispaniola. According to one account Columbus took it to Hispaniola in 1493. It was probably one of the first very important introductions (from the Island of Haiti) into the world's first agricultural Experiment Station on the Toa River, near Toa Baja; evidence indicates that it was established there *before 1520*.

The variety grown in Porto Rico, from say, 1515 to about 1800 was the soft-rinded, weak growing *Criolla*. During the 19th century scores of varieties were introduced here from the other West Indies Islands and from Brazil, but not till about 1905 did the multitude of seedling varieties begin to appear in cultivation.

Mr. Arthur H. Rosenfeld, Special Cane Technologist of the Insular Experiment Station at Río Piedras, Porto Rico, has kindly prepared the following summary in regard to present-day cane varieties.

Some 500 distinct varieties of sugar cane have been tried out at the Insular Experiment Station and the Federal Experiment Station, as well as on the plantations, around one-fifth of that number being cultivated to some extent on the plantations today. The following, however, represent the most generally cultivated and promising varieties on the Island today, in the order of their actual importance and distribution:¹

¹ For full descriptions and discussions of most of these varieties, see: *Rosenfeld, Arthur H.*—"The Java P. O. J. Canes in Tucumán and Porto Rico" and "The BH 10(12)

Barbados Hybrid 10(12) and *St. Croix 12/4*. By a remarkable coincidence, since these are easily the two most promising varieties on the Island, both of these canes were produced by the Hon. Jno. R. Bovell, Director of Agriculture in Barbados, from the same parent, *B 6835*, the *S. C. 12/4* having been taken by Mr. Bovell to St. Croix when on a visit to that Island when it was yet but a tiny unnamed seedling cane and when nothing, naturally, was known of its characteristics. Both are canes of good tonnage and high sugar qualities and they are rapidly replacing the old standard *Cristalina* and other varieties in the better soils of the Island of Porto Rico. For example, Mercedita de Ponce at present has practically 100 per cent of her entire acreage in these two canes, while around 50 per cent of the entire South Coast cane area is now devoted to these canes. The indications are that this percentage will rapidly increase in the better cane areas all over the Island in the coming few years.

Cristalina. Known in Hawaii as *Rose Bamboo* and in the British West Indies as *White Transparent*. "The grand old cane" of the sugar industry of the world, having probably produced more sugar than any other variety during the generations that it has been cultivated. Is one of the *Cherribón* canes which for years formed the basis of the cane plantations of well-known sugar countries such as Java and Cuba, in the latter of which it still constitutes approximately 99 per cent of all the cane cultivated. On the South Coast of Porto Rico this was for years almost the only cane planted, with the exception of the now almost extinct *Otaheite*, but, as indicated above in the discussion of the *B. H. 10(12)* and *S. C. 12/4* varieties, it is now rapidly being replaced by them.

Rayada. Also known as *Louisiana Ribbon* or *Striped Cherribón*. Like its sister cane, the *Louisiana Purple*, it is nothing more nor less than a color mutant of *Cristalina* and until recently was as important a factor in North, East and West Coast production in Porto Rico as was *Cristalina* on the South Coast. Like its sister, it is rapidly being replaced by the *B. H. 10(12)* and *S. C. 12/4* varieties and its practical disappearance from the Island in a few more years can confidently be predicted.

Demerara 433. Known all over the Island as *Ceniza* or *Fajardo* cane, this variety represents an interesting case of a variety of rather undesirable characteristics in general developing special adaptation for a particular zone, which in this case is the Northeast corner of Porto Rico, where the

and *SC 12/4 Canes*", in Jour. of P. R. Dept. of Agr., VIII and IX, Nos. 3 and López Domínguez, F.—"The Sugar Yield of the Uba Cane in Porto Rico", in Bull. 28 of Insular Experiment Station of Porto Rico.

Experiment Station of the Fajardo Central, through the competent efforts of Messrs. McConnie and Veve, has brought up its former production to around 100 per cent increase. Fajardo has of late developed some seedlings of this cane which bid fair to gradually replace the parent, notably *F. C. 140, 214* and *306*, their order of importance at present being in the reverse of their enumeration here.

Uba. One of the groups of North Indian canes which Dr. C. A. Barber considers as belonging to the *Pansahi* group. Generally classified as a distinct species from the "noble" canes usually grown, which come under the *Saccharum officinarum* species, while Brandes considers that the *Uba* group belongs to the *sinensis* lot.¹ The variety generally cultivated in Porto Rico is what is known in Argentina and Brazil as *Kavangire*, this name probably being due to a mixing of varietal labels, but at any rate our commonly cultivated Chinese cane seems distinct from the genuine *Uba de Natal* in behavior if not in readily discernible botanical characteristics. This cane was sent in 1917 from the Tucumán Sugar Experiment Station in Argentina to Mr. D. W. May, Director of the Federal Experiment Station in Mayagüez, P. R., and, after its complete immunity to Mosaic Disease had been proven several years later by Mr. F. S. Earle, then Cane Technologist of the Porto Rican Insular Experiment Station, a large shipment was brought up from the Tucumán Station and it has since been widely cultivated on the West Coast of Porto Rico, where the ravages of Mosaic Disease were particularly severe and roguing most impracticable. It is a rustic type of cane, with a very thin stalk and closely adhering leaf sheath which makes preparation for the mill difficult and expensive, but on poor, hilly lands, where other types of cane give almost nothing, it will produce quite satisfactory yields at a ridiculously low cost of cultivation—particularly as ratoons. Its sugar content is variable, however, and likely to be low in cropping seasons of high precipitation, and it is not venturesome to predict that in a few years it will commence to be replaced quite quickly by some of the *P. O. J.* (*Proefstation Oost Java*) crosses produced by Kobus in Java, one of the most promising of which is mentioned below.

P. O. J. 36. This is a controlled cross of *Chunnee*, of the North Indian type, with *Striped Preanger* of Java. As both parents are susceptible to Mosaic Disease—Kobus was breeding for resistance to Sereh—this variety, like others of the group, is not immune, but becomes infected with great facility. The deleterious effect of Mosaic, however, is not great on account of the tolerance of *Chunnee*, which appears

¹ Breeding of Disease-Resisting Sugar Plants for America. Ref. Book of Sugar Ind. of the World. La. Planter; July, 1925.

to have been transmitted in high degree to this seedling. It is a comparatively slender variety, but a most prolific stooler and ratooner and, while under ordinary favorable conditions this cane will probably not outyield the "noble" canes, under conditions approaching disease saturation, their striking superiority is nothing less than phenomenal. Considerable of this variety is now being cultivated on the West Coast, in the vicinity of Añasco and Rincón, and Central "Los Caños", near Arecibo, under the very progressive administration of Mr. Antonio Fraticelli, has a large area of it which has been giving most excellent results. The Insular Experiment Station is now multiplying Mosaic-free seed of this variety for extensive distribution in districts where *Kavangire* is being largely grown, the results from which were rather unsatisfactory in the past crop. Beginning with disease-free seed, it should be entirely practicable to rogue plantations of these resistant canes and maintain them free of Mosaic Disease, enabling this section to grow a better type cane than the *Kavangire* without recommending cultivation of cane 100 per cent infected with Mosaic. This cane gives quite good sugar yields, will grow on lands as poor as that which will still produce the Japanese type and is as easy to strip as *Cristalina* or *B. H. 10(12)*.

Demerara 1135. This is a variety which, while of no promise whatsoever in the place of its production, has given most promising results under unfavorable conditions in Tucumán, Queensland and Hawaii. It is somewhat similar in size and characteristics to the *P. O. J. 36*, susceptible to attack of but to some degree resistant to the effects of Mosaic Disease, although not to such a marked extent as the *P. O. J. 36*, drought-resistant, easy to strip for mill and a remarkable germinater, stooler and ratooner. The Insular Experiment Station at Río Piedras is pushing this variety as advisable for the unfavorable conditions of the North and West Coast and for the very dry Island of Vieques. Several centrals will have substantial quantities of this variety for cropping in 1926-27, when its adaptation to Porto Rican conditions can be more adequately determined.

Two of the new Barbados seedlings are giving such excellent results on a small scale that it is practically certain that they will replace some of the above-mentioned seedlings in the near future; they are B. 6032 and B. 11569.

At the U. S. Experiment Station, the Río Piedras Experiment Station, the Fajardo Sugar Co., Guánica Central, and elsewhere in

* "The Java *P. O. J.* Canes in Tucumán and Porto Rico", by A. H. Rosenfeld, "Journal of the Department of Agriculture and Labor of Porto Rico", Vol. VIII, No. 3, July 1924.

CEBADA; Barley; *Hordeum vulgare* L.

This polymorphous old cultigen, or cultivated hybrid, of very obscure origin was introduced at the Toa Grange about 1515 and was repeatedly planted here; but it has disappeared except as an occasional "curiosity exhibit".

The spent grain from the brewery in Santurce has been successfully used as a local dairy feed.

CEBOLLA; Onion; *Allium Cepa* L.

Commonly cultivated, especially in the northwestern portion of the Island; no large fields, but the total acreage may run into hundreds. Yield usually fair, but considerable trouble is experienced in curing the bulbs to prevent decay between field and counter. Several varieties are common, the white, so-called "Bermuda" or "Canarias" type, usually being preferred to the red or yellow types. Native to Western Asia. Both the rare multiplier, or potato, onion (*A. Cepa* var. *solanum* Alef.) and the top onion (*A. C. viviparum* Metz) are also being tested by the Department.

CEBOLLA DE GALES; Welsh Onion; *Allium fistulosum* L.

This Siberian chive-like vegetable is being tested at the Trujillo Plant Propagation Station.

CEBOLLIN; Chive; *Allium Schænoprasum* L.

An obscure but not very rare vegetable, successfully cultivated in the higher and well drained districts; commonly marketed in small quantities; used in flavoring soups and stews—both the long (5-10 cm.) slender bulbous bases and the savory leaves. Native in Europe and Asia.

CELERIAC. See Apio-Nabo.**CELERY. See Apio.****CERAFOLIO; Chervil; *Cerfolium Cerfolium* (L.) Britton.**

A rather rare old seasoning herb from West Asia and S. E. Europe. Merits wider cultivation here.

CERAFOLIO BULBOSO, Perifollo de Bulbo; Tuberous-rooted Chervil; *Chærophyllum bulbosum* L.

This old European vegetable is being tested at the Trujillo Plant Propagation Station; it will probably succeed in the higher elevations.

CEREUS. See Pitajaya.

CEREZA COLORADA; West Indian Cherry; *Malpighia puniceifolia* L.

A fairly common second-class fruit tree, 4-6 m.; probably indigenous. Apparently slightly variable but in no types do the fruits exceed 2 cm. in diameter. The very acid, red fruits are sometimes eaten fresh but usually made into a sauce, jam or preserve with plenty of sugar.

CEREZA ESPAÑOLA; Spanish Cherry; *Mimusops Elengi* L.

A recently introduced East Indian tree, 8-10 m. or more; fruit egg-shaped, yellow, 2 cm. long, 1-seeded, with a dry sweet pulp.

CEREZA DE SURINAM; Surinam Cherry; *Eugenia uniflora* L.

Introduced through the U. S. Experiment Station at Mayagüez, in 1903. Still very rare. The red cherry-like fruits should be a valuable addition to our pomology.

CICELY. See Mirra.

CIDRA; Citron; *Citrus medica* L.

Introduced (as seeds) repeatedly from Europe (and probably America); the Adjuntas and Mayagüez district plants are descendant from Corsican *seeds* brought in by persons who had confidence in the future of the export industry here. A few *grafted* plants were sent hither (by the U. S. Department of Agriculture) from the genuine Corsican trees, and it is believed that a few sprouts are still in evidence.

Three or four small orchards, one coming into full bearing, have recently been set out near Adjuntas; a gross income at the rate of over \$1,000 per acre was reported last season from one of these groves. All trees are grown from short stake cuttings; but at the Trujillo Plant Propagation Station experiments are being made in budding onto Sour Orange and Grapefruit stocks and in one plantation near San Juan excellent results are showing from using strong old Grapefruit stocks; fruit is expected within 2 years by this method. At present the export price of fresh fruits (packed in barrels) is considered good, and this should increase somewhat, considering the fact (1) that consumption in the Middle States will probably increase, (2) that the cost of importing fruit in brine from the Mediterranean countries is high and conditions precarious, (3) that neither California nor Florida can, with commercial safety, expect to produce large and "steady" crops of this very sensitive (to frosts, etc.) fruit, and (4) that the current retail price for candied fruit (largely sugar) leaves a very wide margin for profit.

Test plats of Citron varieties are being established on the Model

Farms, and from these and the Plant Propagation Station propagating material will soon be distributed to planters who are being encouraged to grow at least a few of these exceedingly promising trees.

Dulces and confections have long been made from the common seedling fruits here (without brining); experimental work has been done in "brining" and "crystalizing" citron at the Mayagüez By-Products Plant, results indicating that the local humidity and the hygroscopic tendency of the sugared product militate against the establishment of the peel industry here. Cithon peel dries well but slowly in the said Plant's special dehydrator, and quite possibly this method may be used as an important factor in cheaply putting the raw material on the mainland market.

Three or four fairly distinct races, based on fruit characters, are already recognized; one, the "Boba" is large but lacks flavor.

The principal variety for export has been named *Preferida*; this is a very large oblong fruit with a fairly smooth surface; it appears to have two distinct habits; one called the *Erecta* grows fairly erect whereas the ordinary plant has the bad habit of allowing its branches (unless propped) to fall onto the ground, especially if carrying any fruit. Another variety known as the *Rugosa* is a medium-sized fruit of first quality but the rind is considerably wrinkled and the shape may be somewhat irregular. Still another form which has made its appearance in the Adjuntas plantations is called the *Híbrida*; it would appear that this is a cross with the Limón de Cabro as indicated by its inferior size, shape, and flavor and by its more juicy and acid pulp; this fruit is being studied.

Two trees of distinct habit and fruit on a plantation west of Adjuntas seem to be hybrids between the citron and some kind of "Lemon".

CIDRA DULCE; *Citrus sp.*

One or two trees, near Maricao and one near Añasco are known of this fruit. Foliage resembling that of Cidra but *spineless* or nearly so; fruit with thin peel, rich sweet "orange-like" pulp and some Grapefruit characters. Two trees are reported from Santo Domingo. Probably a valuable new fruit, at least for local use. Propagating at Trujillo Plant Propagation Station.

CILANTRO; Coriander; *Coriandrum sativum* L.

This European culinary herb ranks with Anise here. For dulces and pastry the seeds are excellent.

CINNAMON. See Canela.

CINNAMON, Wild. See Malagueta.

CIRUELA AMARILLA. See Jobillo.

CIRUELA; Spanish Plum, Red Mombin; *Spondias purpurea* L.

Second-class fruit tree, 4-8 m.; semi-cultivated throughout the Island, usually in fence-rows (where it grows from stake cuttings).

CIRUELA AMARILLA. See Jobillo.

CIRUELA DE LA CHINA; Chinese Plum; *Flacourtia cataphracta* Roxb.

This oriental species is sometimes cultivated for its round fruit which is about 1.5 cm. in diameter. The tree is smaller and more spiny than the sister species *F. Ramontchi*.

CIRUELA DE GUAYANA; Guiana Plum; *Drypetes lateriflora* (Sw.) Krug & Urban.

A small tree native to the hills near Bayamón, 5-15 m. Fruit reddish, 6-11 mm. in diameter, dark brownish, hairy.

CIRUELA DE MADAGASCAR; Madagascar Plum, Governor's Plum; *Flacourtia Ramontchi* L'Her.

This Madagascan fruit shrub is occasionally grown here; 5-10 m. or higher. Fruit round, black, about 12 mm. in diameter.

CIRUELA DE MALAYA; *Gmelina arborea* Roxb.

A rare Malayan second-class fruit tree presented by the Dominica Botanic Gardens, and distributing from the Trujillo Plant Propagation Station; 5-15 m. Fruit plum-like, very juicy.

CIRUELA DEL MONTE; Mountain Plum; *Rheedia edulis* Planch & Triana.

This small-growing fruit tree is related to the Mangosteen; introduced by the U. S. Experiment Station at Mayagüez in 1903.

CIRUELA DE SANTO DOMINGO, Ciruelas; Santo Domingo Cherry; *Ananomis umbellifera* (H. B. K.) Britton.

A second-class fruit tree, native of Hispaniola. Fruit 1-1.5 cm. in diameter. Cultivated here.

CITRON. See Cidra.

CLAVO DE ESPECIA; Clove; *Caryophyllus aromaticus* L.

An extremely rare Oriental tree; does not succeed here. Several specimens have been introduced; one at Trujillo Plant Propagation Station now.

CLOVE. See Clavo de Especia.

CLOVER. See Trébol.

COCO, Cocotero; Coconut; *Cocos nucifera* L.

Although practically all closely related palms are indigenous in Tropical America, and while evidence points to Colombia as the locus where it *should have originated*, the 25 to 40 varieties of Coconut* have been grown since prehistoric times in Southern Asia, the East Indies, and Polynesia; and whether it came around the Cape of Good Hope with the early Portuguese navigators or was carried along the north coast of Africa into the East Atlantic archipelagoes by the Phœnicians or their successors, the fact seems quite and remarkably clear that neither Porto Rico nor any other part of Tropical America visited by the Spanish discoverers around 1500 had ever known the species as a food plant. (If ever found in the wild state it will probably be in some of the recesses of the Panaman or Colombian [Darien] wildernesses).

There is little doubt that Father Diego Lorenzo brought the first nuts from Cape Verde to Porto Rico sometime before 1525; presumably he had a considerable number of sprouting nuts and therefore both the Green and the Yellow forms of the species (which comprise at least 95 per cent of the 400,000,000 to 500,000,000 trees under some sort of cultivation in the world today) were undoubtedly introduced then. The few and very rare following varieties have been brought hither from time to time by unknown parties from unknown sources:

Golden; a beautiful nut, considerably below medium size, the surface of the roundish pericarp showing at all times a peculiar bronze yellow or golden brown color; the tree is rather small, 5-10 m.

Macapunó, the famous "solid-meat" variety from the Philippine Islands is said to have become established here long ago but the author has not seen a specimen; in this connection it should be remembered that not all the nuts on the Philippine tree have the "water cavity" filled with the "meat", the few (?) quasi-normal nuts being the means whereby the "freak" variety is propagated.

Chocó, this very large, thick-husked nut from the south coast of East Panamá has probably been established here.

San Blas, this famous variety from the north side of East Panamá (and the 365 islands of the San Blas chain) is or soon should be here; the rather elongate husk is thin and the shell is more easily removed from the "meat" than that of any other variety.

It appears that none of the six or seven distinct varieties of

* "The Philippine Coconut Industry", by O. W. Barrett; Bull. 25, Bur. of Agr., Govt. of Philippine Ids.; 1912.

dwarf coconuts have yet been introduced here; they should all be tested out in the shallow soils. The Ginaring, or Ivory Husk, and the Edible Husk varieties are to be introduced as soon as opportunity offers.

The Green and Yellow ordinary varieties reach, in good situations, 25 to 30 m., being at this height presumably over 75 years old.

Only a few tons per annum of copra are in evidence—made mostly in hot-air driers in Loíza and Humacao Playa; the steam-pipe hot-air dryers in evidence at the By-Products Plant in Mayagüez were devised in 1912 by the author to provide a cheap simple means for reducing the moisture content to the point (around 9 per cent) where moulds do not attack the copra (with the certain and deplorable loss of oil). Instead of making into copra here the sprouted, broken, rotting (from "eye" injury) and very small nuts are usually fed to pigs and poultry.

The annual export crop ranges from 20 to 25 million nuts; of these probably about 25 per cent are sold as culls at about half price. Neither wine nor sugar has ever been produced here from the (immature peduncle) sap. Probably not over 1,000 immature nuts are harvested daily for the "water" which is a popular beverage in the towns.

Both at Mayagüez and Humacao Playa coir factories produced a few thousand tons of fiber about 1914-15.

One of the closest wild relatives of the Coconut is the very interesting palm, *Calypptogyne occidentalis* (Sw.) Maza, which is found about San Sebastián; since it appears that less than 500 specimens of this tree exist it must be considered (like some of the nearly extinct species of the Seychelles Islands) one of the rarest palms in the world: (established at the Model Farm near San Sebastián).

Comparatively little increase in coconut cultivation has occurred here since 1900; the acreage is supposed to be around 10,000.

COCOA-PLUM. See *Icaco*.

COCONUT. See *Coco*.

COFFEE. See *Café*.

COFFEE-SENNA. See *Hedionda*.

COITRE.

Six species of three genera of very similar plants are included under this common name here as follows:

Campelia Zanonia (L.) H. B. K.
Tradescantia geniculata Jacq.
Tradescantia elongata G. F. W. Meyer.
Commelina longicaulis Jacq.
Commelina elegans H. B. K.
Athyrocarpus persicariaefolius (D C.) Hems.

The very watery herbage of these plants is frequently harvested from waste ground, roadside banks and even cultivated fields and fed to pigs, rabbits and poultry partly as a roughage and partly for the popular belief that the cool sap (*sic*) is beneficial to the animals. Although never cultivated, in some districts these weeds are of considerable importance to the small farmer.

COL; Cabbage; *Brassica oleracea* L. var. *capitata* L.

One of the commonest and most appreciated "temperate" vegetables; succeeds better perhaps in the hilly moist regions, but Vega Baja produces excellent specimens in wholesale quantities. Many varieties of the three or four types are grown. Frequently badly attacked by a Tineid moth. Of West European origin. Imported from the mainland in enormous quantities in the August-October season.

COL DE BRUSELAS; Brussels Sprouts; *Brassica oleracea* L. var. *gemmifera* DC.

A very difficult vegetable to produce at sea-level in the Tropics, but can be grown at 1,000 m. Not popular.

COLA; Kola; *Cola vera* K. Schum.

This African tree is being distributed from Trujillo Plant Propagation Station; the seedlings seem to start off well. In Liberia, the Canal Zone and Dominica, the average tree at full maturity is hardly more than 5-8 m., although specimens probably attain a height of 10 m. or more. The pulp is edible, but the seed itself, containing two or three times as much caffeine as coffee, is of great value as a stimulant and will eventually, it is believed, become a very popular beverage for the whole world.

COLIFLOR; Cauliflower and Broccoli; *Brassica oleracea* L. var. *botrytis* L.

Neither form of this vegetable succeeds well here. Popular.

COLINABO; Kohlrabi; *Brassica caulorapa* Pasq.

Occasionally cultivated, second-class vegetable. If grown rapidly in a cool moist soil the "stem tuber" is tender and usually devoid of bitterness.

COLLARDS. See **Berza.**

CONDOL; Chinese, Preserving Melon; *Benincasa hispida* Cogn.

This Oriental cucurbit has never succeeded here. The excellent flavor of the preserved rind is a good reason for further tests. Seeds brought in from Caracas, Venezuela, have not succeeded at Trujillo.

CONGO PEA. See Gandul.

CORAZON; Custard Apple; *Annona reticulata* L.

A third-class fruit tree, 4-8 m.; semi-cultivated in all and common in western districts, preferring well-drained soils. Fruits commoner during dry season. Variable from nearly inedible forms 7 cm. to delicious forms 15-20 cm. in diameter; the better sorts have pinkish or rosy pulp and a slightly acid, instead of sweetish, taste. Superior varieties have been introduced from Dominica and the American Virgin Islands. Fairly common in markets. Superior sorts probably exportable. Believed to be indigenous.

CORAZON CIMARRON, CAYUR; Pond Apple, Monkey Apple; *Annona glabra* L.

Inferior fruit tree, 3-10 m.; swamps and wet lands, never cultivated. Pulp insipid or slightly aromatic, resembling that of an inferior Corazón.

CORIANDER. See Cilantro.

CORN, INDIAN. See Maíz.

COROZO. See Palma de Corozo.

COTTON. See Algodón.

COWPEA. See Frijol.

COWPEA, PHILIPPINE. See Silani.

COYO, Aguacate de Guatemala; Guatemalan Avocado; *Persea Schiedeana* Nees.

This rare Guatemalan species is, of course, quite similar to the Avocado, but it can readily be distinguished by its pubescent branchlets and leaves and by the brownish white to pale brown pulp which contains a milky juice and has a coconut-like flavor.

This excellent fruit was introduced at the Río Piedras Experiment Station about two years ago; thus far it has not succeeded well. It may prove superior to the Avocado as an export and market fruit.

There are in Guatemala several varieties, the fruits of which vary from green to bronze brown, and may be either long- or short-necked; the skin is thicker than the regular West Indian sort but is not brittle or woody like the true Guatemalan Avocado.

CRESON; Garden Cress; *Lepidium sativum* L.

This rare West Asiatic vegetable is sometimes grown here; being tested at the Trujillo Plant Propagation Station.

CRESS, GARDEN. See Cresón.

CRESTA DE GALLO BLANCO; *Teramnus uncinatus* (L.) Sw.

A slender vine, 0.5–1 m. or more long, indigenous to the Island, and Tropical America in general.

Used as a forage plant in St. Thomas, whence seeds (presented by Mr. A. Holst, the Danish Consul) were received in January, 1925, for trial at the Trujillo Plant Propagation Station. In this respect it resembles the Bejuco de Conchitas (*Clitoria ternatea* L.) and the high percentage of proteids in the fodder is undoubtedly about the same in both plants.

CUCUMBER. See Pepino.

CULANTRO DEL MONTE; *Eryngium foetidum* L.

A very common seasoning herb occurring in fields and roadsides, 0.5 to 1 m. The leaves, preferably used fresh, give a flavor much relished by many to stews, soups and even pastries.

CULCAS; Egyptian Taro; *Caladium Colocasia* (L.) W. F. Wight.

Recently introduced from the U. S. Department of Agriculture and now growing at the Trujillo Plant Propagation Station. This relative of the common Malanga and Dasheen is one of the common crops of Egypt though it was probably brought there from the Orient in prehistoric times.

CUNDEAMOR; Balsam Apple; *Momordica Balsamina* L.

The young fruits of this and of the much rarer species *M. Charantia* L. are occasionally boiled and eaten with meats and rice; ripe fruits eaten by children. The leaves are reputed to have medicinal properties.

CURUBA. See Parcha.

CUTTIRIBA; *Lucuma macrocarpa* Huber.

A very rare recently introduced (from Brazil) fruit tree at the U. S. Experiment Station. Like most of the Lucumas the fruit is large and has a rich edible pulp.

CUSTARD APPLE. See Corazón.

CHARD. See Acelga.

CHAYOTE, Tayote; Christophine; *Sechium edule*, (Jacq.) Swartz.

One of the commonest and best native Porto Rican vegetables. Boiled, baked, stewed with roots or meats, or (especially) "stuffed", it fills a place which no other plant can occupy. It succeeds best in the cooler, moister districts; a trellis or tree support is almost necessary; many fruits do not germinate and the young vine frequently lacks vigor; 3-10 m.

There are fruit forms ranging in size from 8 to 20 cm. in length; from smooth to exceedingly prickly; and from creamy white to green in color; these forms, however, are not named and it is probable that none of these ten or twelve "varieties" is absolutely stable. The root, if not too old (and woody) is quite edible, resembling a poor Water Yam when boiled. Exportable.

CHESTNUT, MORETON BAY. See *Castaño de Australia*.

CHERIMOYA; Cherimoyer; *Annona cherimolia* Mill.

Recently introduced and extremely rare Central American first-class fruit tree. Will probably succeed in high valleys of the interior.

CHERIMOYER. See *Cherimoya*.

CHERRY. See *Cereza*.

CHERVIL. See *Cerafolio*.

CHICHAROS; Bonavist Bean; *Dolichos Lablab* L.

Commonly cultivated in nearly all parts of the Island. Not marketed here in large quantities, but could be exported in wholesale lots since the demand is strong in New York for this first-class old bean; probably from Tropical Africa. Five varieties were brought in from St. Thomas in March, 1924; and about three kinds were in evidence theretofore. The plant usually produces a fairly steady crop for 6 to 10 months or more; generally trellised or allowed to run on fences or trees. All things considered, this is one of the best, if not the best species of bean for the garden. The flavor of some varieties is exquisite.

CHICKORY. See *Achicoria*.

CHICKPEA. See *Garbanzos*.

CHILLI. See *Ají Grande*.

CHINA, Naranja Dulce; Orange; *Citrus sinensis* (L.) Osbeck.

Whereas the exact place of origin of this very old fruit will probably never be known, it appears certain that the Portuguese

spice traders first brought it from some port on the South China Coast to Europe at the beginning of the 15th century—400 years after the Arabs had taken the Sour Orange to Sicily. The Spaniards began cultivating the sweet orange probably about the middle of the 16th century, and they distributed it to Florida and their West Indian Colonies at that time.

Today the species is practically naturalized here in the mountainous coffee region. Several races may be distinguished which come true to seed, and in fact, very nearly all the trees of the so-called "wild orange" are "volunteer" seedlings. While there are but very few orchards of these semi-cultivated wild sweets, or "Chinas", the number of scattered trees in and around the coffee plantations is tremendous; in the 1922-23 season over 300,000 boxes of this "wild" fruit were exported from the west end (and Ponce) of the Island, yet probably not 65 per cent of the total crop was shipped. In this connection it should be remembered that these "wild" trees are never pruned or sprayed, and many of the trees are so old (50 years, presumably) and their fruits are so small and so difficult to pick that they are abandoned. Many small packing sheds have been established along the roadways; mules and horses carry the bulk fruit down from the "fincas" to these sheds, and trucks then take the packed crates down to the coast; for many years the fruit went down to the ports (Mayagüez and Aguadilla, mostly) in ox-carts and on pack animals, the spoilage, of course, being excessively great; yet, because of the extremely low price of these excellent oranges the shippers could compete with the grafted orange growers.

The common China, produced very largely in the 150 square miles of territory in the western end of the Island, is a medium-sized, well colored fruit with a moderate amount of "rag", a good tough peel, and a sprightly, pleasant flavor.

A "native" Navel variety (or perhaps *several*) was discovered east of Mayagüez in 1903.

Several practically seedless sorts have been found.

The annual production of the seedling China trees is from 250,000 to 500,000 boxes; heavy and light crops usually alternate.

The crop of grafted oranges, mostly from the Bayamón and Manatí-Vega Baja sections, runs from 1,000,000 to 1,500,000 cases. The acreage in 1920 was about 1,300; number of trees, about 100,000. The grafted (named) varieties were practically unknown during the Spanish régime; in 1900 a large (500-acre) tract near Palo Seco

was cleared and planted with the standard Florida varieties; Mr. William Allan was the pioneer in this industry which soon (1904-1910) spread along the north coast, but never reached the famous fruit district of the western end. Little extension of the groves has been evidenced since about 1910. Many of the first orange groves were uprooted and replanted about 1908 to 1912 with grapefruit.

The following varieties are established here:

Jaffa, reputed to have been brought from Jaffa, Palestine; round, deep colored; juice abundant; seeds many, large.

Joppa, a seedling (at San Gabriel, Calif.) from a Palestine orange was the parent (1877); oblong, slightly shouldered; skin thin, pebbled; sweet, fine flavor.

Lue Gim Gong; the most popular of several varieties of oranges which hold their fruits for several months after ripening; color deep orange; very juicy with no "rag", flavor sub-acid, quite sweet when fully ripe; nearly seedless.

Mediterranean Sweet, and old (1870) California favorite; fruit round or oblate, small to medium-sized; tree semi-dwarf.

Norris, a rare old (1880) variety from Glenwood, Fla., round, early ripening; very smooth skin, yellow tinged with deep red, nearly seedless; very juicy, "melting" pulp.

Parson Brown, introduced about 1878 at Lake Weir, Fla.; size medium to large, quality fair; very popular here.

Pineapple, originated near Citra, Fla.; color deep red; flavor and odor suggest pineapple; one of the commonest here.

Ruby, Ruby Blood; an old Mediterranean variety, fairly popular here; color or rind very good, but the pulp seldom becomes red here.

St. Michael, Paper Rind; an old variety from St. Michael; small, very thin-skinned, juice abundant, but not well colored here.

Valencia, Hart's Late, Tardiff; An old favorite from the Azores Islands; introduced to the mainland in 1870, but probably not in evidence here till 1900; shape somewhat irregular; seeds very few, inclined to sourness; one of the best shippers and prolific, the most popular variety in the grafted groves.

Washington Navel, Bahía, Riverside Navel (wrongly called "Nebo" and even "Neighbor"); this "King of Oranges" was introduced in 1870 from Bahía, Brazil to Washington, D. C. It is inclined to pithiness and coarseness here. The sub-races are:

Australian, (with a thick skin, often closed navel; probably from Australia).

Buckeye, (with ridges of deeper color; from San Dimas, California).

Navelencia, (thin-skinned, large; from Duarte, California).

Nugget, (with a crack in the skin; from San Dimas, California).

Thompson, (early, of excellent appearance; introduced at Duarte, California, in 1891).

CHINITA, Limoncito; Sweet Lime, Lime-berry; *Triphasia trifolia* (Bourm. f.) P. Wilson.

This widely naturalized East Indian shrub (1-2 m.) is often planted in gardens and sometimes escapes. The sweet mucilaginous pulp and the very aromatic oily peel of the small (1-1.5 cm.) red berry are edible and may be made into jam, marmalade, etc. Deserves a place in every collection.

CHIVE. See Cebollín.

CHRISTOPHINE. See Chayote.

DAHLIA DE AZUCAR; Sugar Dahlia; *Dahlia pinnata* Cav. (?).

Three varieties of a sweet-rooted dahlia were presented by the New York Botanical Gardens in 1924; these have succeeded fairly well at Cayey and Vega Baja Model Farms. The roots contain inulin, like these of the Girasole (*Helianthus tuberosus* L.); apparently they cannot compete with the Girasole.

DASHEEN DE AZUFRE; Sulphur Dasheen; *Caladium* sp.

Introduced from Dominica in 1924; of very uncertain origin; has long been cultivated in the little-known interior of that island, but is now rapidly being superseded by the far more prolific Trinidad Dasheen. Planted along banks of streams. Forms large stools, 10-20 side-shoots sending up leaves beside the old corm. The fecula of the mature corm is distinctly yellowish, somewhat resembling that of the (Hawaiian) Manaa Taro. The petioles show considerable reddish and bronze color below but are, on the whole, paler than those of most Colocasias.

DASHEEN DE TRINIDAD; *Caladium Colocasia* var. *esculenta* sub-var. *globulifera* Engl. & Kr.

This extremely productive root-crop was brought in 1903 by the writer from Trinidad, B. W. I., to the U. S. Experiment Station at Mayagüez; it was sent from that Station in 1905 to the U. S. Department of Agriculture whence it has been distributed throughout the Southern States as one of the principal introductions of the Office of Foreign Seed and Plant Introduction.

Since many similar varieties and sub-species occur only in the Orient and few if any are proved to be endemic in Tropical America,

it most probably was introduced in Trinidad, in some mysterious manner, from the Far East in the early days of that Island's colonization.

Unlike the common Malanga, this Dasheen bears numerous (20 to 100) side cormels, or globose tuberous rhizomes, close to the mother rootstock; both corm and cormel contain a fine-grained fecula like that of the best Taros. No better root-crop for moist lands in the Tropics exists.

Although this important economic plant was introduced 22 years ago, it is only just beginning to enter into the list of crops grown by the Island's farmers. A new lot of cormels was sent (from the U. S. Department of Agriculture) early in 1924 and a re-introduction was made from Trinidad in November, 1924; four of the Model Farms are now propagating it for general distribution.

The yield per hectare should be about twice as heavy as for the best Yautías.

One of the greatest advantages of the Trinidad dasheen is its remarkably short season—6 to 8 months, instead of 9 to 12. Its adaptability to a great variety of soils is another strong point. The cormels and corms keep very well after harvesting.

DATE. See *Palma de Dátil*.

DATIL. See *Palma de Dátil*.

DIENTE DE LEON; Dandelion; *Leontodon Taraxacum* L.

A very common European spinach vegetable. This is behaving well at Trujillo Plant Propagation Station.

DILL. See *Eneldo*.

DURIAN; *Durio zibethinus* L.

This Philippine (and Malayan) tree, in the author's opinion, deserves to rank practically on a par with the mangosteen as the world's best fruit; 10–20 m. Introduced in 1920 at the U. S. Experiment Station (several specimens in evidence), and in 1924 at the Trujillo Plant Propagation Station. While only one (?) tree has succeeded well in the Western Hemisphere (Dominica Botanic Gardens) to date it is probable that this excellent fruit will give satisfactory results in this Island.

The fact that its odor is strongly disliked by many people is only a negative factor as against its exquisite taste and its very high degree of nutritiousness. The pulp of the fruit, somewhat resembling in texture that of the Avocado, has three distinct flavors: first, the highly aromatic, almost resinous flavor; second, the rich

cheeselike, satisfying taste; and third, the indescribable quality which makes Durian pulp more avidly relished than that of perhaps any other fruit. The fruits weigh from 1-3 kilos.*

EGG-FRUIT. See *Canistel*.

EGGPLANT. See *Berenjena*.

ENDIVE. See *Escarola*.

ЕНEA; Cat-Tail; *Typha angustifolia* L.

This old cosmopolitan aquatic is common in fresh-water bogs and wet soil along streams, especially near the east coast. The long fleshy roots contain about 8 per cent of starch and according to tests made at the By-Products Plant in Mayagüez a fair cattle and pig feed can be made (as in Europe) from them; the cost of labor here now for digging the rootstocks is prohibitive.

ENELDO, Hinojo; Dill; *Anethum graveolens* L.

This European culinary herb is not very common but should be grown everywhere. Both seeds and foliage are excellent for "seasoning".

ESCAROLA; Endive; *Cichorium Endivia* L.

This Indian salad vegetable is very rarely cultivated here.

ESCHALOTA; Shallot; *Allium ascalonicum* L.

A rare, onion-like vegetable, sometimes cultivated though seldom seen in the markets. Closely related to Chive but milder in flavor; the angular, oblong bulbs distinct but clustered. Probably Asian in origin.

This rare root crop from Central and Southern Europe is in evidence at Cayey Model Farm where it appears to succeed fairly well.

ESPARRAGO; Asparagus; *Asparagus officinalis* L.

This excellent vegetable (originally wild in Europe, with similar species in East Africa) is rarely planted here; the roots usually weaken after two or three years. The flavor of the young shoots here is strong.

ESPINACA; Spinach; *Spinacia oleracea* L.

This rather recently introduced salad does fairly well even in full sun when proper soil conditions are met.

* The 4 or 5 (or more) other species of *Durio* which occur in Brunei, Sarawak, and presumably Dutch and British North Borneo should most certainly be introduced as soon as possible. The fruits of these (not yet cultivated) fruit trees have little or none of the objectionable odor of the common Durian.

ESPINACA SIN AROMA; Herb Patience, Spinach-Dock; *Rumex Patientia* L.

A rare European salad plant being introduced through the Plant Propagation Station.

ESPINACA SIN AROMA; Herb Patience, Spinach-Dock; *Rumex Patientia* L.
pansa Murr.

A splendid spinach becoming popular in limited areas here. The plants readily reach a good size and furnish over a long harvest period good crops of the tender branches which find a ready sale to steamers and occasionally to large grocery stores; 0.5-1 m. Native of New Zealand.

ESPONJA; Luffa, Vegetable Sponge; *Luffa cylindrica* (L.) Roem.

The young fruits of this and of the much rarer species *Luffa acutangula* (L.) Roxb, are rarely eaten in stews and mixed with rice.

FEIJOA; *Feijoa Sellowiana* Berg.

A rare South American fruit shrub; introduced about 1904 at the U. S. Experiment Station in Mayagüez, but has never succeeded well anywhere to date. This, being so closely related to the guavas, should be thoroughly tested both for its edible flowers and highly fragrant fruits.

FENNEL. See Hinojo.

FIG. See Higo.

FIG, INDIAN. See Tuna Mansa.

FRAMBUESA AKALA; Akala Berry; *Rubus Macreii*.

Received in January, 1925, from the U. S. Department of Agriculture, and planted out on a private plantation near Bayamón. Also plants of apparently two varieties of this fruit have been received (January, 1925) at the Experiment Station at Río Piedras. This excellent Hawaiian species should prove of great value in our *Rubus* work.

FRAMBUESA AMARILLA; Himalayan, or Golden Evergreen, Raspberry; *Rubus ellipticus* Smith.

Introduced recently by the Río Piedras Experiment Station from Jamaica; of Asiatic origin. Plant erect, 3-5 m.; fruit yellow, small; plant usually large and very vigorous,—of probable advantage in our hybridizing work.

FRAMBUESA AMERICANA; Red Raspberry; *Rubus idæus* L.

Recently introduced from the mainland. Does not endure the climate well at the Río Piedras Experiment Station, but may succeed at the Cayey, Utuado, and San Sebastián Model Farms.

FRAMBUESA DE AUSTRALIA; Australian Raspberry; *Rubus* sp.

Introduced by the U. S. Experiment Station about 1911; fruited well in 1912. Promises well.

FRAMBUESA COMUN, Zarza, "Fresa"; Mountain Raspberry; *Rubus rosafolius* Smith.

Very common on moist mountain slopes, especially at east end of the Island; occasionally cultivated (Bayamón). From southeastern Asia; date of introduction very uncertain. Crop almost continuous; at Aibonito baskets of fresh, brilliant red berries are offered for sale at the roadside every day in the year. Berries frequently marketed.

Being tested for variability and "sports"; may be used in *Rubus* hybridizing work of Department. Color excellent; size fair but variable; flavor distinctive though not liked by some.

The so-called "Balloon Berry" is an "improved" form with large, odd-shaped fruits. Some forms at the Cayey Model Farm have fruits 3-4 cm. in diameter.

FRAMBUESAS MISCELANEAS; Various Raspberries.

The following 12 *Rubi* have recently been planted out at the Río Piedras Experiment Station.

Rubus Thunbergii; from China.

Rubus moluccanus L. var. *Fairholmianus*.

Rubus moluccanus L. var. *macrocarpus*.

Rubus trivialis. Mich. The Dewberry of the Mainland.

Rubus hybridus. A hybrid between *R. trivialis* and a black-berry, grown in Florida.

Rubus fruticosus; Bot. Gardens, Ceylon.

Rubus glomeratus; Bot. Gardens, Ceylon.

Rubus innominatus S. Morre. }

Rubus lasiostylus Focke. }

Rubus adenophorus Rolfe. }

Rubus coreanus Miq. }

Rubus melonasius. }

From U. S. Department of
Agriculture.

FRAMBUESA NEGRA; Blackcap Raspberry; *Rubus occidentalis* L.

Recently introduced. Will probably not endure the lowland temperatures well.

FRAMBUESA DE NIEVE; Snow Berry, *Rubus niveus* Thunb.

One of the very interesting *Rubi* from China, of recent introduction (at the Río Piedras Experiment Station).

Fruits red, orange, or bluish black.

FRAMBUESA DE QUEENSLAND; Queensland Raspberry; *Rubus probus* Bailey.

Introduced by the U. S. Experiment Station. Resembles the common "fresas" berry, but larger. Promises well.

FRAMBUESA DE LOS ANDES; Purple Raspberry, Andean Berry; *Rubus glaucus* Benth.

This splendid species, recently introduced by the Insular Experiment Station, from northern South America, bids fair to become one of the best *Rubi* under cultivation here. The beautiful fruit is comparatively large (1.5-2 cm.) and the plants are very vigorous. Fruit black or purple.

FRAMBUESA DE HAWAII; Akala Berry; *Rubus hawaiiensis*.

Perhaps some forms of this (and the closely related species, *R. Macrei*), are the largest of all the many *Rubi*—even larger than the enormous Colombian wild raspberry (*R. glaucus* Benth.); some fruits, according to Mr. J. P. Rock, the famous explorer and plant collector in Southern Asia, reach a diameter of 5 cm. There are several forms, some with yellow fruits some with fruits of a beautiful purple shade; and some varieties grow to enormous size,—5-7m. in length.

FRESA; Strawberry; *Fragaria chilöensis* Duchesne.

Date of original introduction not known; but a variety apparently adaptable to tropical conditions was planted out in 1923 at Río Piedras Experiment Station, the Trujillo Plant Propagation Station, and elsewhere. The plants grow well and at times bear fairly good crops of medium-size berries. Numerous seedlings of this variety are being tested by the Plant Breeder, Mr. J. P. Griffith, at the Río Piedras Experiment Station; some of these are expected to show complete tolerance of our climate. Other varieties might adapt themselves more readily.

FRESA. See **Frambuesa Común.**

FRIJOL; Cowpea; *Vigna unguiculata* (L.) Wolf.

Probably of recent introduction, native of Tropical Africa. As a forage and food-plant it seems to be slowly gaining in favor. Numerous varieties have been tested, by the U. S. Agricultural Experiment Station, the Río Piedras Experiment Station, and the Trujillo Plant Propagation Station; the varieties which appear best adapted to Porto Rican conditions are: New Era, Iron and Groit.

Several of these varieties mature in 60 to 70 days.

GALLITO, Báculo; *Agati grandiflora* (L.) Desv.

This peculiar (monotypic) tree, 4-10 m., from Tropical Asia, is extremely common along roadsides and around gardens. The edible (boiled) fleshy, large flowers, and the half-ripe pods are seldom used here as they are in other countries.

The red-flowered form is very rare here.

GANDUL; Pigeon Pea, Congo Pea; *Cajan Cajan* (L.) Millsp.

Potentially the most important food and forage plant of the Island. Country of origin unknown, and date of introduction (if any) uncertain.

While in Hawaii this is strictly a forage crop, it is here grown almost entirely for its seed (used either green or ripe); there the acreage is over 10,000, here probably under 8,000. Near Ponce the first Gandul pasture in the Island is succeeding well; the plants endure drought well and recover promptly from heavy browsing.

The most striking introductions at Trujillo Plant Propagation Station have been: "New Era" and "New Era, Strain D", from Hawaii Agricultural Experiment Station; "Florida" and "India" from the U. S. Department of Agriculture at Washington, D. C.—the latter being the tallest (4-5 m.) variety known.

The following varieties have been tested at the Trujillo Plant Propagation Station and the Model Farms:

Amarillo; a common variety from the Lares district of medium-size, very prolific, rather late in bearing. The pods are long, pale purple, and the ripe seeds are a yellowish brown color. The leaves are very dark green.

Americano; a variety from the Río Piedras district, with pods having cross stripes of violet and brown; seed is large, white, with orange-colored spots.

Blanco; this is probably the commonest of our "native" Gandules and is even exported in considerable quantities to the mainland. The pods are long with brownish sutures and stripes. Seeds gray with a dark hilum; plant very resistant to rust and good yielder. Two or three forms recognized.

Blanco Chiquito; one of the famous Yauco-district varieties, with a comparatively small pod striped with brownish marks; the seed is gray like the regular Blanco, the principal difference between these varieties being in the size of the pods.

Chágaros; a large plant of good branching habit from the south side of the Island; flowers yellow striped with dark red; pods dull green covered with spots. Seeds large, grayish white with orange stains. Very susceptible to rust.

Chino; this common variety from the Yauco district is of good size and has reddish flowers, very dark colored pods

and seeds of an orange or grayish color with a distinct large spot near the hilum. It fruits in six months and may be planted at any time of the year.

- Colmeno*; a common (Yauco district) variety with very large grayish seeds.
- Dominica*; one of the varieties brought from Dominica Botanic Gardens has given excellent results. The seeds are shining orange color, round, and of good size; the pods are green, blunt and of good size.
- India*; this variety was received in 1923 from the U. S. Department of Agriculture. It is apparently the largest of all known gandules, plants at the Trujillo Plant Propagation Station reaching a height of 5 m. by the end of 1924. The pods are very small, the seeds are unusually small, with a yellowish color when dry. Flowers reddish.
- Largueño*; a variety from the north side of the Island having slender light green pods and medium-sized white seeds.
- Manchado*; a first-class variety having the pods spotted with brown and yellowish colors; the seed is of a beautiful bright orange color.
- Miami*, or *Florida*; this plant was received from the U. S. Department of Agriculture in 1923. Flower reddish; pod spotted; seed small, dark orange in color. This plant is rather slow in bearing and only moderately susceptible to the rust blight.
- Morado*; a variety from the Lares district, with very large pods and reddish purple seeds with a white hilum. Usually a dwarf plant.
- New Era*; from the Hawaii Experiment Station; this variety was received there from the U. S. Experiment Station in Mayagüez in 1903 and was bred up between 1910 and 1915 into a very prolific strain which was received back into Porto Rico in 1923 where it has given splendid results at the Trujillo Plant Station. This variety is comparatively wide-spreading, and the slender long branches, when in good crop, bend down to the ground. The seed is roundish and dark, while the pods are green. This variety is very susceptible to the leaf rust or "blight".
- New Era*, "*Strain D*"; very similar to the regular *New Era* but is supposed to be about three weeks earlier.
- Parranetos*; a distinct variety having short broad pods like those of the Lima bean, of a pure green color changing to yellowish when ripe; the seeds are of good size and of light orange color.
- Pinto Moro*; the pods are brownish with yellowish markings and the seeds are small and white.
- St. Kitts*; among the several introduced from St. Kitts and the neighboring islands in 1924, one variety has given excellent results and is being distributed. The flowers are

small and pale yellow, while the pods are pale green, of good size; and the seeds are white, somewhat flattened, but rather large.

Todo Tiempo; a comparatively small erect plant with brownish-yellow flowers; small, flattened, tan seed; pods half green, half black, rather resistant to rust. The striking feature of this variety is its very early fruiting habit and its frequently repeated light crops of seeds.

Viequero; a variety from Vieques and the east end of the Island; pods very short and small; seed small, roundish, brown, with a short white hilum.

Among the other varieties under test at the Trujillo Plant Propagation Station are: Gigante, Cangrejero, Sanjuanero, Patebuey, Poncño, Multicolor, Colorado, St. Thomas, and about six or eight other unnamed sorts of doubtful position in our agronomy. The total number of distinct gandul varieties at present under general cultivation here is probably between 20 and 25.

At the By-Products Plant in Mayagüez the half ripe seeds have been successfully dehydrated *with the skin intact*; when soaked in water a few hours these seeds regain their size and without loss of the "fresh taste" may be cooked as easily as fresh seeds. The leaves and young branches when dehydrated and ground make a cattle feed about equal to alfalfa meal; the analysis shows a protein content of 29.8 per cent; of crude fiber, 17.5 per cent, and of carbohydrates, 31.3 per cent.

Experiments at the Farms and Trujillo Plant Propagation Station indicate that the Gandul may be "topped back" several times without injuring the vigor of the plant. In Hawaii it is reported that as a pasture forage it may be "fed off" (by cattle or horses) for five to seven years without replanting. The normal life of the plant here is 1 to 2 years. Both the ripe seeds and the entire nearly ripe pods (like "string beans") are exported in considerable quantity to New York; the latter article is a recent venture, thus far in the hands of only two or three exporters.

GARBANZOS; Chick-Pea; *Cicer arietinum* L.

Very rare, practically always a failure in cultivation here. Probably native to Mediterranean region. Heavy imports from Spain; selected seed imported by Spain from Mexico (Guadalajara district).

GARCINIA; *Garcinia tinctoria* (DC.) Dawn.

This handsome species was sent out about 1908 from the U. S. Department of Agriculture; a fine specimen is in evidence in the old Dr. Leonhart collection near Bayamón—now known as Villa

León and another is in Mr. H. I. Sewall's ground at Naguabo; 6-9 m. The fruits are 5-10 cm. in diameter, bright yellow and smooth skinned; the yellow pulp is very juicy, strongly acid, but of a very pleasing taste; one or two seeds. The fruit keeps very well; perhaps exportable.

GARCINIA ESPINOSA; *Garcinia spicata* Hook. f.

This Malaysian species was experimentally planted at the Insular Experiment Station in 1924.

GARLIC. See Ajo.

GENIPAP. See Jagua.

GHERKIN. See Pepinillo.

GINGER. See Jengibre.

GIRASOL; Sunflower; *Helianthus annuus* L.

This old Composite originated in Central United States is now spread throughout not only the Temperate Zone but is invading the Tropics; 1-3 m.; two forms under cultivation here but not planted to any extent. The seeds are frequently used for feeding poultry but the forage is seldom used here. No oil is made from the seed.

GOOSEBERRY. See Grosella.

GOOSEBERRY. See Hortensia de Bajuco.

GOURD. See Güiro.

GRAMA; Bermuda Grass; *Capriola dactylon* (L.) Kuntze.

Cosmopolitan; probably the widest-spread grass in the world today. Propagated by cuttings. Spreads rapidly on dry ground. Does not endure heavy pasturing.

GRAMA BLANCA; St. Augustine Grass, Running Crab Grass; *Stenotaphrum secundatum* (Walt.) Kuntze.

This cosmopolitan pasture and lawn grass is one of the commonest species in the Island. The flattened, thick, sweetish, creeping stems attain a length of 3-5 m. in good, moist soil. A white-variegated race is cultivated as an ornamental.

GRANADA; Pomegranate; *Punica Granatum* L.

Very common third-class South Asiatic fruit-shrub, 2-4 m.; cultivated everywhere, but never in orchards. Several varieties, some having white, some red, flowers, are in evidence. The juice of the pulp cells is used for coloring and flavoring drinks. Occasionally eaten "out of hand".

GRANADILLA; Grenadilla; *Passiflora quadrangularis* L.

A very large vine from Central America, frequently cultivated in all parts of the Island; fruit by far the largest in the genus, more or less square with rounded angles, 10-25 cm. long by 8-15 cm. in diameter: the walls of the fruit are spongy or nearly firm, practically tasteless, but sometimes used in the preparation of dulces; the comparatively small cavity is partially filled with a mass of flat seeds enclosed (each) in a watery, sweet, aromatic pulp, the juice of which is used in preparing sherbets and drinks, or eaten raw.

GRAPE. See Parra.

GRAPE. See Uva.

GRAPES, CHIGGERY. See Nigua de Monte.

GRAPEFRUIT. See Toronja.

GRASS. See Grama.

GRASS. See Malojillo.

GRASS. See Yerba.

GRENADILLA. See Granadilla.

GROSELLA; Otaheite Gooseberry; *Cicca disticha* L.

Probably introduced long ago from the Orient; very common tree semi-cultivated throughout the Island, 4-8 m. The fruit, borne during the dry season, may be eaten raw, notwithstanding its intense acidity, and is especially good cooked up into jelly or conserve with sugar. When cooked with sugar this yellowish fruit becomes dark red in color. The decoction of the fruit is used in a popular drink, sweetened and iced, the fruit being discarded after a short period of boiling.

GRUMICHAMA; *Eugenia Dombeyana* Skeels.

Recently introduced (through the U. S. Department of Agriculture) second-class fruit tree, 5-8 m. Distributing from Plant Propagation Station. Probably a valuable addition to our collection of Eugenia fruit trees.

GUAMA; *Inga laurina* (Sw.) Wild.

This very common (probably indigenous) coffee-shade tree (8-15 m.) produces greenish, leathery pods containing a white sweet watery pulp surrounding the large green seeds. These pods are commonly marketed in the coffee districts. Apparently not variable.

GUANABANA; Soursop; *Annona muricata* L.

First-class fruit tree, 3-6 m.; commonly cultivated throughout the Island. Fruits ranging from 0.5-1.5 kilos, extremely common in markets nearly the entire year. Eaten fresh, as dessert fruit, or the pulp used in drinks and sherbets. Soft rind and great weight prevent long-distance transportation; if picked green may be kept a week or more. Very slightly variable. Fruit frequently attacked by insects. Worthy of intensive cultivation and hybridization. Probably native.

GUANABANA CIMARRONA; Mountain, or Wild, Soursop; *Annona montana* Macf.

As a wild fruit practically valueless, but an excellent fruit, believed to be of this species, has been introduced by the Department from St. Thomas, A. V. I., where it is cultivated at Botany Bay.

GUANGO. See Samán.**GUAR; *Cyamopsis psoralioides* DC.**

This very old Indian crop resembles the gandul in some points, but its growth is slower and the plants in the Department's testing plats reach only 1-1.5 m. The seeds (especially unripe, like the Gandul) and the young pods (like "string beans") are boiled for human food; the foliage is a rich fodder.

GUASAVARA; *Eugenia æruginia* DC.

This indigenous tree of the waste lands in central Porto Rico has a height of 20 m., and bears an oval or roundish, purple fruit, 10-15 mm. in diameter.

GUASAVARA. See Caimitillo.**GUAVA.** See Guayaba.**GUAVA-BERRY.** See Murta.**GUAYABA; Guava; *Psidium Guajava* L.**

Several varieties of this native species are common throughout the Island and in point of numbers this vies with the Jobo as the commonest semi-cultivated fruit tree in the Island; 3-10 m. At least six distinct varieties are in evidence in private and government institutions here; the small sweet, the small sour, the large round, the large pear-haped (rare) and other minor sub-varieties are in evidence. On account of a peculiar fungous disease ("mummy disease") the wild trees are frequently not very prolific, some producing practically no edible fruits at all. The fruit is used largely raw but is also cooked in the form of dulces, preserves, and especially

made up into a paste, a "crystal" or jelly, and a jam which to some extent are exported to the mainland. Also common in *helados*.

GUAYABA DE FRESA; Strawberry Guava; *Psidium cattleianum* Sabine.

This first-class little fruit tree (native to Brazil) was introduced about 1900 from Florida by one of the largest fruit growers here; it has never been popular and only a very few specimens are in evidence. The fruit, although not very prolific, is one of the best-colored fruits in the world and the flavor is well above the average. Should be in every collection.

GUAYABA SILVESTRE; Wild Guava; *Eugenia pseudopsidium* Jacq.

A shrub or small tree, 8-12 m., in waste lands in the interior districts of Porto Rico and Vieques; fruit roundish, red, smooth, 10-15 mm. in diameter.

GUAYABOTA-NISPERO; *Maba Sintenisii* Krug. & Urban.

A fairly common tree from the mountain forests, endemic to the west central district. Fruit roundish, brown, about 3 cm. in diameter, with several seeds.

GUAYAVITA. See Malagueta.

GUINEA-CORN. See Millo.

GUINEO, Banano; Banana; *Musa sapientum* * L.

While wild species of *Musa*, for the most part nearly or quite inedible, are in evidence throughout most of the frostless regions of Africa, southern and southeastern Asia, the East Indies, and Polynesia, it appears fairly certain that the edible bananas and plantains which the Spaniards brought to Porto Rico in the 16th century came (westward) from northern and western Africa and the Canary Islands rather than (eastward) from the Orient. Just how they came and which varieties arrived first will probably never be known; if records of those important events were ever made it seems that all have been lost. The first reliable reference to these fruits in Tropical America is given by one of the Spanish narrators (*Las Casas*?) early in the 16th century; he mentions, very casually, indeed, the dispatch of some boats, manned by the crew from a vessel

* The local name, Guineo, would seem to indicate that the early colonists simply applied to the strange new fruit the name of the region—Gulf of Guinea—whence they were beginning to obtain several new commercial items, including slaves,—just as the *Dashen*, or *De la Chine*, or *Des Indes*, was named for the supposed region of its origin. Quite possibly it was in the first slave ships that there arrived here not only the "Fruta de Guinea", but also the *Ñame de Guinea*, and the *Yerba Guinea*.

In the French West Indies, the local name *Figue* is applied to most types of Bananas, apparently with no very good reason, since dried bananas (*banana "figs"*) were undoubtedly unknown at the time the misnomer originated.

just arrived at Trinidad, up a river (evidently the Orinoco) for the purpose of securing a supply of fruits for the said vessel. How such large supplies were readily available *up a river* and not at the coast of Trinidad itself is a very perplexing problem.

There is little doubt, however, that the only plant closely related to the banana and plantain in evidence here (or elsewhere in Tropical America) in pre-Columbian times was the Bihai, or Wild Plantain (*Bihai Bihai* [L.] Griggs); and this was of questionable importance as an emergency-ration root-crop.

After the plantains, the bananas (as a class) follow second in importance as food fruits; unlike the mango and avocado they are on the market every day of the year.

The young leaves are eaten by cattle and goats. The inside portion of the pseudo-stem is sometimes chopped up and fed raw to pigs. The bulb-like base of the "stem", cut up in pieces, can be used like the stem middle; but at the By-Products Plant in Mayagüez a fairly good swine and cattle feed was prepared by slicing, drying and grinding the "ñames" of several sorts of bananas; about 5 kilos of raw root are required to yield 1 kilo of dry flour.

The heart of the flower-bud, or *pámpana*, is not used (boiled) as a table vegetable here—as it is (of some varieties) in the Philippine Islands.

Accurate data regarding the source and date of introduction of the 12 or more old (*sic*) varieties of these exceedingly important food plants of Porto Rico would be of great importance.

Since 1901, the date of the establishment of the Federal Agricultural Experiment Station here—first in Río Piedras (in October) then in Mayagüez (in April 1902)—some 15 or 20 varieties have been received, mostly from the Jamaica Department of Agriculture and the U. S. Experiment Station at Honolulu, H. T.; a few suckers of several of these Indian (*via* Jamaica) and Polynesian fruits were distributed from the U. S. Experiment Station and may still exist in the Island, but it appears that nearly all of the said varieties were unfortunately lost. Among those lots were the famous Hua Moa, or Egg Banana, of Hawaii, with excellent fruits about the size and shape of a turkey's egg; the Rajah, a choice Indian variety similar to our Rosa; and the Martaban.

In the fiscal year 1904-5 the following very interesting varieties were presented by the Agricultural Experiment Station at Honolulu, H. T.: Hai, Kapua, Maole, Lele, Ae-ae, Popoulu, Brazilian, Apple, Striped.

Presumably several if not all of these were distributed from the Federal Experiment Station at Mayagüez; only the Hai, however, appears to be in evidence now at that Station (and at Vega Baja Farm and Trujillo Plant Propagation Station).

At the end of the said fiscal year there were no less than 68 varietal names of bananas and plantains in the collection at the Mayagüez Station.

The estimated annual crop is about two million bunches.

Deplorable confusion of varietal names has long existed, not only here, but in the Orient as well; the synonymy work (to determine just which varieties were really distinct), begun at the U. S. Experiment Station in 1903, was not completed.* Actually, only four types of true Bananas are in general cultivation here now. The varieties now in evidence here are:

Colorado; one of the commonest and cheapest of our bananas; also the largest,—attaining 8 m. or more in rich moist soils in mountain ravines. The reddish or brownish-purple coloring of the “stem”, midrib, and fruit is deeper, perhaps, than in any other Banana, though many have as highly colored fruits and some have darker leaf-bases.

The quality of the sub-cylindrical, blunt-ended fruit is very poor and is not considered as safe, even when quite ripe, for eating raw; baked in its skin and served hot with butter and spices it is not a bad table fruit. Excellent cattle feed was made at the Mayagüez By-Products Plant from the nearly ripe fruits—by running the entire bunch through a forage-cutter, dehydrating, and grinding; at 15 to 25 cents per hundred fruits the cost of this highly nutritious meal was around 7 cents per kilo.

This variety requires 12 to 15 months to mature. It is highly resistant to disease.

Colorado Blanco; this is merely the green form of the Colo-

* During the period of 1911 to 1914 the author built up for the Bureau of Agriculture of the Philippine Government, the largest collection of *Musa* varieties ever assembled with the object of determining their synonymy by noting what differences, if any, existed among the various members of the many groups or types, all grown in one field under identical conditions. Success could not attend such a task except under very favorable circumstances; yet the need for such a work was and still is urgent. Nearly complete collections of the Bananas and Plantains of Papua, Siam, Indo-China and the Philippine Islands (the countries richest in musaceous floræ) were received (*gratis*)—some 50 or more varieties from each country; and most of the other tropical countries likely to furnish valuable material donated their quota. Over 730 names were indexed, after discarding a large number of obvious synonyms; some 15 countries were represented; several new types of these fruits were brought to light; and many botanically new species, sub-species, and varieties were (some time afterward) described; probably not less than 300, and perhaps around 400, distinct forms of these plants were in evidence. Possibly 100 others, in out-of-the-way corners of the Old World Tropics, still await the courageous pomologist.

rado. No part (except the "pámpana") has any of the purple color. The ripe fruit has the same pasty or slimy pulp as the Colorado. The odor of the well-ripened fruit is better than that of most other West Indian bananas, though not to be compared with some of the fragrant Oriental varieties.

Less common than the Colorado, or at least much less conspicuous. Grown in the coffee plantations.

Dátil, Guineíto, Niño, de Rosa; Lady's Finger, Fig Banana; whether 1, 2, or 3 really distinct forms are included under these names, is at present debatable; only a prolonged test, growing several "cepas" of each reputed sort side-by-side with all the others in the same soil, can solve this question.*

The plant is of medium size (3.5-5 m.) but rather slender and weak. Fruits in 11 to 13 months. Resists fairly well the fungus diseases.

The extreme sweetness and delicate flavor of the pulp, its thin peel, delightful perfume (when thoroughly ripe) and dainty appearance have won for this excellent fruit the first place among all table bananas here; yet the bulk of the bananas marketed are, of course, of the Guarán variety. Dátiles are especially good fried in oil or butter—one of the few items on our menus which we never tire of.

Peeled and dried whole these splendid little fruits are an excellent dessert confection; they are sometimes sold as "banana figs"; at the By-Products Plant in Mayagüez some difficulty was experienced in determining the right stage of ripeness at which to dry, the correct temperature (to hold the fresh fruit flavor), and the degree of dehydration (to avoid fermentation on one hand and over-hardness and darkness of color on the other).

A teratological "freak" variety, known as the Tirabuzón, or Corkscrew, has the hands arranged in a continuous *spiral* on the rachis.

The magnificent Rajah (from India) and the several rosy or purplish-fruited races should be in evidence here; the Rajah fruited here first in 1904; the one (?) Purple Date plant was destroyed about 1902.

Guarán, Gigante; the very common large-fruited variety which for thirty years has been the *piece de résistance* in the banana export trade. Rather small (6- to 9-hand) bunches are shipped during the past few years to New York in the "off season", but no plantations are maintained here for the export trade. Most of the 100 to 200 bunches consumed daily in San Juan and Santurce come down by

* Allowing for the variations naturally attributable to the effects of soils, droughts, degree of vigor, etc., there are, in the author's opinion, two forms: one short, very sweet, and inclined to show small spots of color on the ripe peel; and a longer, larger, less sweet variety. Any or all the names, however, may be applied to either variety here.

truck from small *fincas* in the interior districts. This variety is seldom cooked here.

Gigante Enano; the preposterous name (dwarf giant) of this rather rare but widely known variety requires changing: Guarán Enano would be preferable, but would still leave some confusion with the true *Enano* (*M. Cavendishii*).

A flour has been made at the By-Products Plant, the fruits being dried just before ripening; the taste of Guarán flour, however, is not pleasant to most people and efforts to thus utilize the vast quantities of wasted fruits in other Tropical American countries has practically always resulted in failures—even during the World War, when millions of bunches rotted either on the plantations or on the dump-heads at the shipping ports, while only a few desultory attempts at drying the pulp for export as flour were made. The fecula of this variety, however, is rather gummy and unless dehydrated (as in the drying apparatus at the By-Products Plant) thoroughly is liable to mould.

Manzana, or *Apple*; a very common, second-class old variety grown both for market and home use by the farmers of all districts. Non-variable; some bunches, however, have fruits most of which contain hard lumps of ill-flavored pulp. The very thin delicate peel frequently splits if the bunch is allowed to ripen *in situ*.

Monte Cristy; a very large form of the common Guarán, or *Gigante*. The fruit is greener and of enormous size. "Johnson" may be another name for this variety; bunches of 20 hands or more are sometimes reported.

GUINEO ENANO, Chinese, or Dwarf, or Canary Banana; *Musa Cavendishii* Lamb.

This very interesting species (of uncertain, but probably South Asian origin) is becoming one of the commonest bananas in Porto Rico. Two advantages it has over the other *Musas*: it resists the banana disease very well, and it is not so badly damaged by the wind. Its short, rigid leaves on very short petioles, and its sturdy, blackish, very short "stem" are distinctive features; the flower-bud, or *pámpana*, is close to the terminal hand, *i. e.*, there is no bare space on the rachis; the bunch is comparatively heavy, and sometimes tips over the plant unless propped up well. The medium-sized fruit never becomes yellow; the thinnish green peel sometimes splits; the bouquet of the ripe fruits is exquisite. Because of its tendency to separate from the rachis, even before full ripeness, this Banana is not a "good shipper".*

* In the Australasian countries the hands are cut off, wrapped separately, and packed in crates, thus avoiding the tear in the skin at the base—and immediate inception of decay.

As grown here the enano seldom reaches 2.5 m. in height of pseudo-stem. Nearly twice as many plants may be set on a given area as in the case of the Guarán.

A variety (Doble, or Double) exists in which the "stem" divides into 2 or 4; and each of these may produce a double rachis: thus, theoretically (but never in evidence), one bulb might bear any number of bunches up to eight.

GUINEP. See *Quenepa*.

GUINGAMBO, Quimbobó; Okra; *Abelmoschus esculentus* (L.) Moench.

One of the commonest garden vegetables throughout the Island. Three varieties are recognized, only two of which are common. The unripe fruits are used in soups and stews, salads, and with rice; usually sold in small bunches in the markets, practically throughout the year. "Home-grown" seed succeeds well.

GUIRO; Gourd; *Cucurbita lagenaria* L.

Only the half-ripe fruits of this common Cucurbit are (very rarely) used for food. The local variety is much inferior as a food plant to the Upo of the Philippine Islands, whose fruits reach 80-150 cm. in length.

HABA; Lima Bean; *Phaseolus lunatus* L. var. *macrocarpus* Benth.

An old favorite; possibly indigenous; widely cultivated. Several varieties grown for the local markets; a medium-sized white-seeded form the commonest. Bush Limas are being tested. Not so "resistant" as the Bonavist, but more popular.

The Philippine "Patani" variety (of a distinct type) succeeds very well here.

HABA DE SIEVA; Civet or Sieva Bean; *Phaseolus lunatus* L.

This smaller-seeded Lima with pods having a long sharp beak is grown with and confused with the true Limas.

HABICHUELA; Kidney Bean; *Phaseolus vulgaris* L.

One of the commonest major food crops of the Island. Exact place of origin uncertain, but according to Las Casas and Oviedo, the Arawaks and other Indian tribes of the Antilles used one or more bean-like seeds as food.

About 6 varieties are widely cultivated and marketed, some 20 others are in evidence at Government institutions and on private estates. Some sorts appear largely dependent on their special root-nodule bacteria and will not grow well in new fields; others seem to be so well "acclimated" that they grow off well almost anywhere.

The dwarf (var, *nanus* Aschers) or bush, forms are grown on a larger scale (sometimes in fields of several acres extent) than the pole beans.

Several varieties imported in enormous quantities.

HABICHUELA ATERCIOPELADA; Velvet Bean; *Stizilobium Deeringianum*
Bort.

Rather recently introduced from United States and grown partly as a cover, partly as a forage crop. Seeds not eaten here. One of the most rapid-growing forage plants. Seldom made into hay. Attains 20 m.

An "improved" "bush" form is being tried out; 1 m.

HABICHUELA GALANA; Scarlet Runner Bean; *Phaseolus multiflorus* Willd.

This old species, native to Tropical America, is cultivated both as an ornamental and as a food plant. The very large beautiful seeds are not so delicate in flavor as the Lima, and should be used before fully ripening.

HABICHUELA SOYA; Soy Bean; *Soja Max* (L.) Piper.

About 15 varieties of this Oriental grain and forage crop have been distributed by the Federal Experiment Station, Insular Experiment Station, Model Farms and Trujillo Plant Propagation Station; 1-1.5 m. Some varieties are badly attacked by leaf fungi and some yield very poorly. Not yet under cultivation in the citrus plantations.

HABILLA; Wild Yam Bean; *Cacara erosa* (L.) Kuntze.

Fairly common in a semi-wild state. The seeds are not used here.

HAUM; *Amaranthus tricolor* L.

A recently introduced salad plant from the Philippine Islands; 1 m. It is really only a variety of the common species which has been developed into a nearly fiberless spinach-like vegetable.

HERB PATIENCE. See *Espinaca Sin Aroma*.

HEDIONDA; Coffee Senna; *Ditremexa occidentalis* (L.) Britton & Rose.

A cosmopolitan weed, 1-1.5 m. The small (4 mm.) brown seeds are occasionally used like coffee in preparing a hot beverage.

HEDIONDILLA; Wild Tamarind; *Leucaena glauca* (L.) Benth.

Probably indigenous, extremely common shrub in drier districts, 2-6 m. Foliage, much relished by goats, has a mysterious but pronounced depilatory action on horses and swine.

HEVI. See *Jobo de la India*.

HIERBA GATERA; Catnip; *Nepeta Cataria* L.

This temperate tea and seasoning herb does not endure the heat well here, but at Trujillo has grown to 30 cm.

HIGO; Fig; *Ficus Carica* L.

First-class fruit shrub, 2-5 m.; probably introduced long ago, but nowhere successfully cultivated as a crop. Nematode worms presumably weaken the root-system so much that little or no fruit is produced in most cases.

The "Lemon" Fig type may give fair results at Villalba and Sabana Grande Model Farms. A small tree bears well at the Río Piedras Experiment Station.

HINOJO; Fennel; *Foeniculum Foeniculum* (L.) Karsten.

This old European seasoning herb is cultivated for its strong-flavored seeds.

The Florence, or Sweet, Fennel, (var. *dulcis* Alef.) has succeeded very well indeed at both Vega Baja Farm and Trujillo Plant Propagation Station; at both places these plants quickly reach a height of about 1 m. and produce magnificent umbels fully 10 cm. in diameter; the highly aromatic and fragrant leaf-bases are not relished here.

HISOPO; Hyssop; *Hyssopus officinalis* L.

A first-class seasoning herb from Europe and Temperate Asia; growing well at the Trujillo Plant Propagation Station.

HOG PLUM. See Jobo.**HONDAPARA; *Dillenia indica* L.**

A magnificent large Asiatic tree introduced about 1903 at the U. S. Experiment Station. This tree has fruited heavily for many years but it has few descendants in the Island. The fruits attain a diameter of 10-15 cm.

HORSE RADISH. See Rábino Picante.**HORTENSIA; *Pereskia grandiflora* Haw.**

A shrub or small Brazilian tree, 4-6 m., armed with very long strong spines. Fruit pear-shaped, reddish. Cultivated; a fine specimen at Villa León, near Bayamón.

HORTENSIA DE BEJUCO; Barbados Gooseberry; *Pereskia Pereskia* (L.) Karst.

Cultivated occasionally; a slender woody vine, practically spineless, up to 10 m.; fruit reddish-yellow or reddish, 1-2 cm. in diameter; pulp acid. Indigenous.

ICACO; Cocoa-plum; *Chrysobalanus Icaco* L.

A third-class fruit-shrub, 1-5 m.; probably indigenous; very common near the coast in waste ground; never cultivated, and seldom marketed. Fruits variable in color, white or pale pinkish, or purplish black. Petals cuneate. Pulp dry, sweet.

Another species (*C. pellocarpus* G. F. W. Meyer) having spatulate petals occurs on hillsides and, according to Britton & Wilson, is "probably a race of" *C. Icaco*.

ILAMA; *Annona diversifolia* Safford.

First-class fruit tree, 5-7 m.; recently introduced; native to Mexico and Guatemala. A lot of seedlings, presented by the U. S. Department of Agriculture, is distributing from the Trujillo Plant Propagation Station. Fruits combine the good qualities of the Guanábana, the Anón and the Corazón. Two forms, a sweet, white-pulped and an acid, pink-pulped, with many sub-forms are known. Probably exportable.

JABOTICABA; Probably *Myrciaria cauliflora* Berg.

Recently introduced first-class fruit tree. At Río Piedras Experiment Station. Brazilian. Four or 5 species are included under this common name; all should be tested here.

JACANA; *Lucuma multiflora* A. DC.

An indigenous large tree, especially common on the south side of the Island; 20-30 m.; fruit ovoid or obovoid, 3-5.5 cm. long, usually one-seeded; amount of edible pulp small, but good.

JACINTO; Nasturtium; *Tropeolum majus* L.

In the higher localities (especially at Barranquitas) this beautiful plant grows luxuriantly. For flavoring fresh salads there is no better culinary herb; the unripe seeds, the flower buds, and the young leaves are excellent eaten fresh or pickled. Partial shade at sea-level allows the plants to make a larger growth (0.5-1 m.).

JAGUA; Genipap; *Genipa americana* L.

Fourth-class fruit tree, 5-15 m.; native throughout Island, never cultivated. Fruit used in making a tonic drink and other similar preparations; its strong unpleasant flavor and odor render it objectionable to most individuals. No variation noted. The fruit is quite commonly sold in the markets.

JAK; *Artocarpus integrifolia* L.

This second-class, East Indian fruit tree (5-10 m.) has been fruiting for several years in various parts of the Island. Probably

all the other races (perhaps some 25 or more) would succeed here at sea-level as well as the one now established.

The nearly ripe or ripe seed (better than that of the Seed Bread-fruit) is fairly good boiled or roasted. The pulp, hardly edible raw, when boiled with sugar makes a fair "dulce"; it should be thoroughly ripe—almost fermented.

JAMBOLANA; Java Plum; *Syzygium jambolanum* (Lam.) DC.

Introduced through the U. S. Experiment Station at Mayagüez in 1903. Still extremely rare. Propagating at Trujillo Station.

JENGIBRE; Ginger; *Zingiber Zingiber* (L.) Karst.

This Old-World spice root was early brought to Porto Rico by the Spanish colonists and during the 16th century was an extremely popular crop here—in fact its cultivation at one time so threatened cane culture that an edict had to be issued restricting its cultivation.

Very few fields specifically dedicated to ginger growing are in evidence here although the total acreage of scattered areas runs into hundreds; the total production is probably 50 to 100 tons now as against several (300 to "700") hundred tons around the close of the 16th century.

On account of the expensive labor here now it is impossible to peel the roots as is done in Jamaica, and largely for that reason the Porto Rican article is not known to any great extent on the mainland market. Several tons of roots were dried during the 1923-24 season of the By-Products Plant at Mayagüez and some of this material has been held over for one year partly to determine its keeping quality in sacks.

It appears there is a belief in the New York market that the Porto Rican root contains less oleo-resin, but this matter has not been positively settled.

Authorities differ as to whether the root grows best in sandy or in clay soils. The plant endures partial shade but, especially in the cooler regions, grows well in full sun. There is apparently no variation, however, in the species here. Should a practical method be found therefor and should the mainland market require it, extract of ginger could easily be made here, or even powdered (ground) ginger.

JENGIBRILLO; Turmeric; *Curcuma longa* L.

This East Indian species is naturalized in Porto Rico, occurring in many areas as a persistent weed which is difficult of eradication. The orange-colored rootstocks are of good size and rich in coloring.

material, but no market has been obtained for them in the mainland thus far. Locally, however, a moderate quantity of the root is used in coloring foods.

JOBO; Hog-Plum, Yellow Mombin; *Spondias Mombin* L.

Native third-class fruit tree, 2-20 m.; probably never actually cultivated, but extremely common (perhaps numerically the most abundant fruit tree in the Island) in all districts; planted (stake cuttings) as fence posts. Variable, but fruits always yellow, with comparatively little pulp; relished by animals. Probably the principal host plant of the West Indian Fruit Fly (*Anastrepha fraterculus*.)

JOBO DE LA INDIA; Hevi; *Spondias dulcis* Frost.

Introduced second-class fruit tree, 5-20 m.; fairly common in cultivation. Quite variable; probably easily improvable. Brought to Jamaica with the Pana from Tahiti in 1793. Select varieties may be propagated in the same manner as the Aguacate; cuttings do not root well.

JOBILLO, Ciruela Amarilla; *Spondias cirouella* (Bello) Tussac.

This variety, much more rare than the common Ciruela, occurs on west end of the Island. The tree closely resembles the Ciruela but the fruit never has the purple or reddish shades. The pulp seems to be somewhat sweeter and the fruit is rather larger.

JOB'S TEARS. See Camándulas.

JOHNSON GRASS. See Yerba de Johnson.

JUJUBA; Jujube; *Ziziphus mauritiana* Lam.

This Oriental species has been introduced through the Insular Experiment Station. It is apparently succeeding.

JUJUBA; Jujube; *Ziziphus jujuba* L.

Recently introduced second-class fruit tree, 5-9 m.; at Río Piedras Experiment Station. Will probably succeed at San Sebastián, Cayey and Utuado Model Farms.

JUJUBE. See Jujuba.

JUNQUILLO; Beggarweed; *Meibomia purpurea* (Mill.) Vail.

This exceedingly common old Tropical American weed has been cultivated here since 1900, partly as forage but largely as a nitrogen-gatherer; at Palo Seco plants have reached a height of 3 m.—twice the normal size.

KAFIR. See Millo.

KALE. See Berza.

KALE, CATTLE. See Berza de Ganado.

KAKI; Japanese Persimon, Kaki; *Diospyros Kaki* L.

Introduced by the Mayagüez Experiment Station in 1903, this first-class fruit tree has not well withstood the climate; a few small trees are in evidence at Trujillo.

KALPI; *Citrus webberi* P. J. Wester.

One of the 25 or more interesting citrus fruits endemic in the Philippine Islands; 5-10 m.; introduced (seed) in February 1925 from the Philippine Bureau of Agriculture; propagating at Trujillo Plant Propagation Station.

A "very variable species", according to the discoverer and author P. J. Wester, Agricultural Advisor to the Philippine Government; some forms have juicy, acid fruits up to 10 cm. or more in diameter. A promising stock.

KARANDA; *Arđuina Carandas* (L.) Britton.

A recently introduced second-class fruit shrub, 2-4 m., of East Indian origin. Seeds presented by Bureau of Agriculture of Philippine Islands; now distributing from Plant Propagation Station, Trujillo. The black, oblong, red-pulped fruits for jellies, sauces, etc.

KEMILI; * *Coleus rotundifolius* Chev. & P.

Tubers of this very interesting and potentially important new crop were received in 1925 at the Trujillo Plant Propagation Station from the College of Agriculture, Los Baños, Luzón, P. I.; native of French West Africa; 0.5 to 1 m.; three or four distinct races of two or three species are grown for food by certain tribes in the Western Sudan. The name Kemili is applied to this species in Sumatra and it has been adopted by Mr. P. J. Wester in his "Food Plants of the Philippines".

The irregular-shaped tubers, much smaller than those of the Girasole, are quite sweet and somewhat aromatic; according to Wester it is reported to yield from 30 to over 40 tons of tubers per hectare.

Easily propagated from cuttings.

* In 1907 the discoverer of this species, M. Chevalier, presented a collection of West African edible *Coleus* tubers for test by the U. S. Department of Agriculture; these were probably the first specimens to reach the Western Hemisphere and were carefully grown in large pots in the Department's greenhouses where they succeeded so well that the tubers overflowed their containers.

KETEMBILLA; *Dovyalis hebecarpa* Warb.

A shrub or small tree from Ceylon, recently introduced from the Philippine Islands (Bureau of Agriculture). First-class fruit, acid, purplish, 2-2.5 cm. in diameter; suitable for jellies and sauces. Distributing from Plant Propagation Station at Trujillo.

KIKUYU GRASS. See Yerba Kikuyu.

KOHLRABI. See Colinabo.

KOKAM; Kokam Butter; *Garcinia indica* Choisy.

A specimen of this splendid fruit tree is in evidence at the U. S. Experiment Station. The fruit resembles the Mangosteen but is more acid as to pulp, with more numerous seeds; these seeds are the source in India of an edible fat called Kokam Butter.

KOLA. See Cola.

KUDZU; Kudzu Vine; *Pueraria hirsuta* Schneid.

This Japanese forage vine has never given satisfactory results here, although its perennial rootstocks are an important factor in its favor. The velvet bean is far more popular.

KUMQUAT LARGO; Oblong Kumquat; *Fortunella margarita* (Lour.) Swingle.

Nowhere planted commercially, but fairly common among the citrus groves of the Island. Relished by many as a dessert fruit, and frequently preserved (as jam, marmalade, etc.) the exquisite, distinctive flavor of the peel, as well as its bright color, and the attractive shape of the (whole, halved or sliced) fruits place this species in a class by itself.

Three or four hybrids have been made by the citrus specialists of the Bureau of Plant Industry of the U. S. Department of Agriculture:

Limequat, with the lime.

Orangequat, with the orange.

Citranglequat, with the citrange.

Not only are the blended flavors of these hybrid fruits of dietetic interest, but the hybrid character of root, leaf, and branch may show advantages from the cultural point of view.

KUMQUAT REDONDO; Round Kumquat, Marumi; *Fortunella japonica* (Thunb.) Swingle.

A much less common species than the oblong but occasionally found in citrus orchards here.

The newly introduced (at the Plant Propagation Station at Trujillo) *Meiwa* may, perhaps, be included under this species.

LACUCHA; Lakoocha; *Artocarpus lakoocha* Roxb.

This excellent Oriental fruit tree was introduced in 1921 at the U. S. Experiment Station; 10-15 m. The fruit, resembling a small irregular-shaped breadfruit, has a rich creamy pulp which is eaten without cooking. Very rare in the Western Hemisphere, but has fruited in Trinidad for many years.

LAKOOCHA. See Lacucha.

LANGSAT. See Lanzón.

LANZON; Langsat; *Lansium domesticum* Jacq.

Very recently introduced and rare, first-class fruit tree, 5-8 m.; growing well at Río Piedras Experiment Station. Distributing from Trujillo Plant Propagation Station. An excellent Philippine fruit, occurring in several varieties.

LEAF-BEET. See Acelga.

LECHESILLO. See Caimitillo.

LECHOSA, Papaya; Papaw; *Carica papaya* L.

This very old cultivated tree of unknown original habitat has long been a common plant in all parts of the Island; 3-6 m. Escaped from cultivation in waste grounds in the lower elevations. Practically always diœcious although male trees sometimes bear small fruits.

Both the young and the ripe fruits are used, the former frequently made into a dulce with syrup. The ripe fruits are a popular breakfast or dessert fruit. The base of the trunk of young vigorous plants is also used, grated and boiled with sugar and flavoring.

The papain gum is not collected from the green fruits here. The red-fleshed varieties, common in the Philippines and the Canal Zone, are extremely rare here. While some fruits may reach a weight of 2 kilos the average size is about 1 kilo.

LECHUGA; Lettuce; *Lactuca sativa* L.

One of the commonest of the "temperate" vegetables; grown mostly during the rainy season and winter months. Many varieties, mostly of the head type (*L. sativa* var. *capitata* L.) are grown; the Cos, or Romaine (*L. sativa* var. *longifolia* Lam.) also does well in certain conditions. History unknown.

LEEK. See Puerro.

LEMON. See Limón.

LEMONIME; *Citrus aurantifolia* X *C. Limonum*.

Specimens of this interesting new hybrid were received December, 1924, from the U. S. Department of Agriculture and are now growing at Trujillo Plant Propagation Station. The "Mexican" Lime was the male parent.

LEREN; Sweet Corn Root; *Calathea Allouia* (Aubl.) Tindl.

Probably one of the principal food plants of the aborigines; on account of its inability to produce seed now it has obviously been under cultivation for thousands of years. Apparently indigenous throughout all the larger West Indian Islands and presumably in considerable areas in northern and central South America; yet it is doubtful whether it was ever in use by any of the prehistoric races of the mainland. It is one of the few primitive American crops showing today no tendency to variation in any part of the its wide range of habitat.

Unfortunately, this old crop requires a very long time,—not less than 15 months and usually about 18 months for maturing the tubers.

These tubers are almost unique in having a semi-transparent area in the center, although the texture and flavor of the entire fecula seems to be about the same. When well grown in loose moist soils these "eye"-less tubers are of a fairly regular oval shape from 2-5 cm. in length; the thin yellowish cuticle covering the snow-white starchy fecula is roughened by the points of attachment of the numerous fine roots which supply part of the nutriment to the tuber. The slender stem which attaches the tubers to the central rootstock is 5-10 cm. or more long. Propagated only by division of the "*cepa*", or cluster of rootstock bases.

Especially while cooking and while hot these tubers give off a pronounced odor of sweet corn and, if eaten when freshly cooked, they also have the taste. In 1903 they were introduced into the State of Florida and distributed from one of the largest nurseries there under the name of "Sweet Corn Root".

Most markets of the Island sell this interesting root crop from about December to May. The price is comparatively high but they are a favorite ingredient in stews, soups, etc.; also good cooked as a separate dish and eaten with butter or a milk gravy.

LENTEJAS, Lentils; *Ervum Lens* L.

Very rarely grown, never as a crop, but occasionally fruits fairly well. Very old legume, from S. Europe.

LENTILS. See Lentejas.

LETTUCE. See *Lechuga*.

LIBATO; *Basella rubra* L.

A very luxuriant, almost fiberless trailing vine, native of Tropical Asia, introduced several years ago as a salad plant. Two or three varieties, one green and one with purplish leaves are in evidence; 2-4 m. or more. These so-called "spinach" plants endure full sunshine in the rainy season but are perhaps better grown in partial shade. Their principal fault is their lack of distinctive flavor.

LIME. See *Limón Agrio*.

LIME-BERRY. See *Chinita*.

LIME, SWEET. See *Chinita*.

LIME, SWEET. See *Limón Dulce*.

LIMEQUAT; *Citrus aurantifolia* X *Fortunella japonica*.

Two varieties, the *Eustis* and a seedling of this interesting hybrid, were received in December, 1924, from the U. S. Department of Agriculture.

The *Eustis* hybrid was made between the Mexican Lime and the Marumi Kumquat. The seedlings may or may not "come true" to half-and-half type; the chances are that they will show considerable variations.

LIMON; Lemon; *Citrus Limonium* Risso.

Rather rare in fruit orchards, but usually very prolific and fairly vigorous, 2-4 m.; Asiatic in origin. Practically no local demand and, without expensive curing processes, hardly saleable in competition with the bright, "cured", imported fruit.

The *Sicily* and *Villa Franca* seem to be much the most common varieties; the very large *Ponderosa* is not marketed. Some few trees, apparently seedlings, practically worthless, have been found in out-of-the-way places. The export crop of *Sicily* lemons varies from 1,000 to 2,000 boxes per year.

A splendid variety of citrus fruit known as "California Dwarf Lemon" and presumably originating in China (collected near Pekin by Mr. Frank N. Myer about 1908) has been in evidence at the Insular Experiment Station since 1922; this tree is spineless, the leaves resembling the *Limón de Cabro*, round, smooth thin-skinned fruits about the size of a small orange but with a lemon flavor; this variety is now being propagated for wide distribution throughout the Island.

LIMON BOBO. See *Limón de Cabro*.

LIMON AGRIO; Lime; *Citrus aurantifolia* (Christm.) Swg.

Very common everywhere, but never cultivated in orchard form, 2-5 m.; of Asiatic origin. Comparatively little variation in the native variety. Commonly marketed but seldom exported; probably 75 per cent of the crop is not used. Nowhere sufficiently abundant to warrant attempts to utilize the juice; some citrate of lime was produced in 1923 at the Mayagüez By-Products Plant from local fruits.

The fine large *Tahiti*, the *Rangpur*, and a few other varieties have been introduced (about 1903); other varieties should be tested.

LIMON DE CABRO, Limón Bobo; Rough Lemon; *Citrus* hybrid.

Probably an old natural hybrid (or cultigen) between the true large Lemon (*C. Limonium*) and some fruit like the citron, or some pomelo; distinct from, but close to, several of the rare Philippine fruits, some of which are apparently natural hybrids (existing when discovered, in 1912-15, as only a few individual trees growing in small isolated areas).

A widespread but rather uncommon old fruit, semi-cultivated, 2-5 m.; famous as a stock for orange, grapefruit, etc. Rarely used as a fruit; the peel is sometimes preserved as a dulce or even candied. Slightly variable, but grows true from seed. Excellent root system for shallow soils, and a fairly rapid stock.

LIMON DULCE; Sweet Lime; *Citrus limetta* Risso.

Never common, but widespread, rather popular, very thorny shrub or small tree, 2-6 m. Somewhat variable; probably two or three forms recognizable here.

Has no particular interest or value; a tree, however, should always be in evidence on every farm and in all fruit collections.

LIMONCITO. See *Chinita*.

LITCHI; Leechee; *Litchi chinensis* Sonn.

A first-class Chinese fruit tree recently introduced; 8-15 m.; fruit bright red, 2-4 cm. in diameter, the rind covered with prominent fleshy tubercles encloses a very juicy white pulp and a moderately large seed.

Three specimens about 4 years old are in evidence in the collection of Mr. Harold I. Sewall, Naguabo.

LOCUST, WEST INDIAN. See *Algarrobo*.

LONGAN; *Euphoria Longana* Lour.

This second-class Indian fruit tree has been introduced at the U. S. Experiment Station; 5-10 m., but fruiting frequently at much smaller size. While closely related to the delicious Litchi the fruit is usually too sour to please most people. The fruit and plant are quite variable.

LOQUAT; *Eriobotrya japonica* Ldl.

Second-class introduced (from Asia) fruit tree, 3-6 m.; has fruited for years at the Federal Agricultural Experiment Station at Mayagüez; growing at Río Piedras. Variable; named varieties in Japan; would probably succeed better above 500 m. elevation.

LUFFA. See **Esponja.****LLAGRUMO;** **Trumpet-wood;** *Cecropia peltata* L.

An indigenous forest tree, 10-20 m. The fleshy mulberry-like elongate fruits (5-6 cm. long) are quite edible, but not used here. A variety ("*C. palmata* Wild."), introduced about 1910 into the Philippine Islands and listed by Wester as "Yaruma" has fruits 15-25 cm. long and 1.8 cm. in diameter.

The leaves are an excellent forage, fresh or dried.

MABI; *Colubrina reclinata* (L'Her.) Brogn.

This native tree attains a height of 20 m. The bark is a material of considerable importance, used in the preparation of a very popular drink; a decoction of the bark added to sweetened water is allowed to ferment overnight and thus develop considerable effervescence. An imported variety (from Jamaica?) is considered superior to the native and is sold in the drug stores.

MADROÑO; *Rheedia madruno* (H. B. K.) Tr. & Pl.

First-class fruit tree, 5-10 m., recently introduced (through the U. S. Department of Agriculture, Washington, D. C.) from Central America. Of the same family as the Mangosteen, this species is a valued acquisition, and is growing well.

MAIZ: **Maize, Indian Corn;** *Zea Mays* L.

Several thousand acres of Flint Maize are grown, mostly in the southwestern districts; plantings are made in April and May or in August and September, usually. Very little Dent and no Flour Maize grown. Some meal is imported for human food and for stock feed; small mills (particularly at Mayagüez) and hand stones provide a fair (usually coarse) product. The consumption of meal is probably increasing but it should constitute a much larger propor-

tion of the "small farmers' " diet; as proved in one of the hottest countries (Java), maize is not especially "heating"; when parched, dehulled, and finely ground (as in Nicaragua; *pinol* and *pinolillo*) and taken as a (thin gruel) beverage, or made into *tortillas* as in Mexico, there is no crop that could take the place of Maize in the interior districts as a cheap rich food; these ways of using the grain are not yet in evidence here. Immature ears are often marketed.

MAIZ DULCE; Sweet Corn; *Zea Mays* L. var. *rugosa* Bonaf.

One of the most difficult temperate crops to grow near sea-level in the Tropics of either Hemisphere. In the higher elevations some varieties can probably be grown with care. A hybrid (presented by the St. Croix Agricultural Experiment Station in 1924) between "Mexican June" and a local variety is being tried out with little hope of success.

MAIZE. See Maíz.

MALAGUETA, Guayavita, Ausu; Wild Cinnamon, Bay; *Amomis caryophyllata* (Jacq.) Krug. & Urban.

An indigenous tree fairly common in the forests and on hillsides, both in moist and dry districts; 10-15 m. This tree is seldom actually cultivated in groves but is frequently semi-cultivated especially in the south western part of the Island. Here the leaves are not used to any great extent for seasoning purposes; neither are the fruits used, as they really might be, as a spice. Many tons of oil are manufactured annually, principally in Cabo Rojo, Ponce and Guayama; crude stills are used; much of the oil is wasted and no attempt at rectification is made.

MALANGA; Taro; *Caladium Colocasia* (L.) W. F. Wight.*

This very old root-crop probably originated in India, thence spreading eastward through Polynesia—where it exists today under some 50, or possibly 75, forms. It probably reached the West Indies late in the 16th century.

No large fields of Malanga are in evidence here; it is usually planted along stream margins and in wet soil in the hills. The rhizome, usually weighing 3 to 6 (or occasionally 10) kilos when mature, is perhaps the cheapest food sold in the markets.

The extreme fineness of the texture, the smallness of the starch grains (about 1/10 the size of those of the Yautía), and the large amount of "gummy" substance in the fecula prevent using this

* Formerly known as *Colocasia antiquorum* Schott var. *esculenta* (L.) Schott.

cheap root as a source of starch: the emulsion of the grated root in water ferments before the light starch grains can settle.

The peeled and dried rootstock makes an excellent meal, of value as an invalid food ("Taroena"). The rarity here of even small plantings of this very cheap food crop is hard to explain.

MALAY APPLE. See Ohia.

MALOJILLO, Yerba Pará; Pará Grass; *Panicum barbinode* Trin.

This South American grass has long been widely cultivated as one of the two commonest forages of the American Tropics; succeeds better in wet fields, but will endure almost any soil if drought does not interfere. Propagated by stem cuttings; the short pieces of the ortos from stables, taken out with the manure, frequently sprout in crop fields, the species thus becoming a weed. Not regularly pastured; the cut fodder is sold in "manojos", or bundles. At the By-Products Plant at Mayagüez, a meal, which keeps indefinitely in sacks, can readily be prepared (by cutting, drying, and grinding) from the fresh forage.

MAMEY; Santo Domingan Apricot; *Mammea americana* L.

This handsome old native species occurs throughout the Island, especially in semi-abandoned fence-rows and on hill slopes; 5-20 m. Absolutely non-variable. The pulp is occasionally consumed raw put is usually made into a paste, conserve, or dulce. The seeds are not used. The leaves are frequently used to form protective cylinders to guard young plants, such as tobacco, against the attacks of the changa; most trees in the vicinity of tobacco fields are annually stripped of their leaves and small branches for this purposes. Probably of real importance to the Arawaks.

MAMEY SAPOTE; Marmalade Plum; *Achras Zapota* L.

(This species has heretofore been known in pomology as *Lucuma mammosa* [L] DC.).

Probably indigenous first-class fruit tree, 10-20 m. Remarkably rare in Porto Rico at present: probably less than 25 mature trees exist in the whole Island. Apparently not variable, and Porto Rican fruits appear to be identical with those of Panamá and México. Dessert fruit which requires, in the minds of many, some special treatment to render it entirely agreeable, probably on account of a mawkish, strong flavor and not very pleasant odor.

MAMEYUELO. See Sapote de Costa.

MANDARINA; Mandarin, Tangerine; *Citrus nobilis* Lour.

Sparingly cultivated throughout the Island; probably introduced by the Spaniards. Only one variety, *King*, has been extensively planted here. The following varieties (*C. n.* var. *deliciosa* Swg.) are found among the citrus groves on the north side of the Island; others should be tested; at least 6 good varieties occur in Trinidad and the Windward Islands; in the Orient there are many.

King. This very (and justly) famous variety stands in a class by itself; it is 2 to 4 times the size of the regular Mandarin. Here its color never becomes high enough to command a fair price—unless allowed to fully mature (when it is likely to rot). Reported to have originated in one of the royal groves in Siam. Extensively planted in 1901, but the trees were soon afterward cut back and re-budded. Becoming popular locally.

The following hybrids of this excellent species have been produced by the U. S. Department of Agriculture and, it is hoped, all can soon be tried out here:

Satsumelo (with the Grapefruit)
 Oranguma (with the Orange)
 Citrunshu (with the *Poncirus trifoliata* Raf.)
 Citrandarin (with the *P. trifoliata*)
 Citranguma (with the *Citrang*)
 Citrangarin (with the *Citrang*)
 Siamelo (with the *C. Grandis* (L.) Osbeck)
 Siamor (with the *C. sinensis* (L.) Osbeck) and the Tangelo (q. v.)

MANDARINA SATSUMA; Satsuma Orange; *Citrus nobilis* var. *Unshiu* Swingle.

This sub-species, which has succeeded so well along the Gulf Coast of Southern States, has not been well represented here. In January, 1925, about twenty-five 2-years-old plants of the *Owari* variety were set in the nurseries of the Trujillo Plant Propagation Station. None of the many other Oriental varieties seem to have been introduced.

MANDARIN. See Mandarina.

MANGO; Mango; *Mangifera indica* L.

From some points of view this old Indian tree is today the principal fruit tree of Porto Rico, since it reaches more people and is of greater importance in the way of food for the masses than any other species. According to Dr. A. Stahl* the mango was introduced in 1740 by Mr. Fitzpatrick, grandfather of don Santiago McCormick.

However, the crop period is comparatively short—June to October; and the great majority of the trees bear only very inferior

* A manuscript note in "Estudio sobre la Flora de Puerto Rico", 1883.

types of fruit. Almost every tree, outside of the Federal Agricultural Experiment Station collection (some 500 specimens), the smaller groves of the various Insular Government's properties, and those grafted trees on a few private estates, is a seedling; and, while certain types here do reproduce fairly true from seed the general run of trees indicate a tendency to vary, and hence there are hundreds of slightly distinct *forms* although the number of native types is perhaps less than 10.

Theoretically, all the old native sorts are polyembryonic: *i. e.*, each seed germ divides into 2 to 25 or more and under favorable conditions each of these plantlets may grow into a tree almost exactly like its parent; but there are still some factors in polyembryony that are not well understood, and the whole subject of mango variation requires much more study.

The seedling races of mangos in Tropical America are much better known and, of course, much fewer than those of the Orient, while those of Madagascar and the East African coastal area are very imperfectly worked up. The chief types of Porto Rican mangos are as follows:

Blanco; an extremely common prolific race.

Largo; a small, very fibrous variety.

Mangotina; a small or medium-sized fruit, common on the south side.

Piña; really a group name applied to several second-class varieties from all districts of the Island.

Redondo; a roundish, good-sized fruit.

Other country names are *Toro*: one of the commonest native sorts; *Rosa*, *Pazote*, *Masa*, *Manila*, *Hebra*.

The above varieties are all large, dense-headed forms, usually beginning to bear at three or four years of age (4-6 m.) and reaching a height of 15-20 m. Heavy crops of fruits are usually borne every two years. Rains on the north side of the Island seem to interfere with the setting of the fruit, though this affects the grafted varieties more than the natives.

Since the Mango grows so rapidly even in exposed sites on hillsides it is frequently planted as a wind-belt. It is also used for charcoal; and the leaves can be fed to cattle (as in Vieques) in time of drought. A pig and cattle feed has been made at the Mayagüez By-Products Plant from green mangos and also from the seed kernels of ripe fruits. The sugar content of the ripe fruit pulp varies from about 10 per cent to nearly 16 per cent; the acid content varies from one-fourth to one-half of one per cent. A diet composed almost entirely of mangos appears to be quite safe for a good number

of days, and during mid-season in some of the interior districts whole families subsist largely on these fruits. Domesticated animals also can live on mangos.

The introduction of budded India varieties from the Orient began about 1903, through the Experiment Station at Mayagüez. Some of these varieties came from Florida, others directly from the U. S. Department of Agriculture at Washington, D. C. Various introductions have been made by private parties, especially in the Island of Vieques, and there are probably today a considerable number of grafted trees, the names of which have been forgotten or lost.

The presence of the West Indian Fruit Fly (*Anastrepha fraterculus* Wied.) militates against the export of Porto Rican mangos, although comparatively few fruits here are attacked by the fly and then only when ripe—usually when lying on the ground rotting. No large orchards of grafted mangos are at present in evidence here and it is not likely that any will be established in the near future. Many of the introduced grafted varieties are severely attacked when in flower on the north side of the Island, by the common Mango Blight (*Colletotrichum gloeosporioides* Hume) and this fungus is so severe in most districts on the north side that few or no fruits set although the trees may be apparently in full vigor.

The following varieties of grafted mangos have been introduced from the U. S. Department of Agriculture, from the Botanic Gardens of Trinidad, Martinique, Guadeloupe, and Jamaica, and are now established here:

- Alphonse*, or *Hafu*; one of the West Indian varieties, a good producer of fiber-free fruits.
- Ameeri*, or *Amiri*; a large sour fruit with little fiber.
- Amini*; a smallish yellow, high-flavored nearly fiberless sort from Bangalore, India. One of the best, since it bears regularly here.
- Arbuthnot*; a small, very sweet and juicy yellow or greenish fruit with a firm, dark, yellow flesh.
- Bennett*; or *Douglas Bennett's Alphonse*; one of the best of the West Indian Afoos, or Alphonse, type.
- Bhadauria*, *Bhaduria*; a small, poorly colored fruit with a fibrous, subacid pulp.
- Bombay Green*; a smallish, green-skinned variety, very sweet, fiberless.
- Bombay Yellow*; a small or medium-sized, yellow or red-tinged fruit, with very juicy and sweet pulp of excellent flavor.
- Borsha*; a rare medium-sized variety, green-skinned (or red-tinged), of good quality.
- Brindabani*; small, green or yellowish, with very juicy, highly aromatic pulp with excessive amount of fibers.

- Bulbulchasm*; small roundish, greenish, variety with juicy and spicy but very fibrous pulp; the Porto Rican trees under this name have either varied *greatly* from the old Saharunpur type or else *are mis-named*; here the fruits are borne large, nearly fibrous and of a peculiar bronze or purplish red color.
- Cambodiana*; this medium to large regular-shaped, popular variety is precocious, prolific and vigorous; the fruits in Hawaii are resistant to the Mediterranean Fruit Fly but here it is one of the most susceptible to the attacks of the West Indian Fruit Fly. Introduced in 1902 (as a seed) from Saigon by the U. S. Department of Agriculture and sent to the Experiment Station at Mayagüez about 1907.
- Carabao*; the justly very famous Philippine variety, fiberless, large and of extra fine flavor; comes true to seed.
- Chempadan*; a very rare Indian variety.
- Climoise*; one of the many strong-flavored varieties from the French West Indies.
- Costa Rican*; sent to the Federal Agricultural Experiment Station as the "common fiberless" variety from some locality in Costa Rica, C. A.
- Curaçao*; a very inferior variety from Curaçao.
- Davy's Favorite*; medium to large oval fruit; pulp dry, sub-acid with little fiber.
- Divine*; an inferior variety from Guadaloupe (or Martinique).
- Enuria*, or *Ennurea*; large, long with juicy, firm, well flavored pulp.
- Faizan*; medium, green to yellow, with good, flavor and small seed.
- Fajri, long*; a long, large-sized fruit; skin uneven, green, tinged with yellow and red; pulp sweet, nearly fiberless.
- Fernández*; this old Bombay variety fruits well in the "Jardín de la Convalescencia," at Río Piedras; a medium-sized or large fruit, late in season, of excellent flavor.
- Gola*; a large, old Saharunpur variety; pulp sweet, juicy, well flavored, nearly fiberless.
- Gopalbhog* (seedling); small, roundish, old variety with very sweet aromatic flesh.
- Gordon, or General Gordon*; a splendid fruit of uncertain origin (but probably introduced here from Jamaica) which is bearing very well in the "Convalescencia" garden; green to orange or even reddish; fiber medium, very prolific; unfortunately monoembryonic.
- Haden*; a seedling of the Mulgoba originating (1910) at Coconut Grove, Fla.; one of the best large mangos (450-550 g.).
- Hafu*; this is one of the Alphonse, or Afoos, type from India.
- Itamaracá*; the strange "tomato-shaped" mango of Brazilian

- origin; color poor, but flesh very spicy and aromatic and nearly free from fiber; very late.
- Jamshedi*; very similar to if not identical with the Mullgoa.
- Julie*; an excellent West Indian variety presented (in November, 1924) by the Trinidad Department of Agriculture; probably best flavored of all the West Indians.
- Kachmahua*; a smallish Saharunpur fruit with good color and an excellent but fibrous pulp. A seedling of this variety has been noted, according to P. J. Wester*, as having a raspberry flavored pulp.
- Kissenbhog*; (seedling); the true Barbhanga fruit is large, roundish, with a "rosy-pink", sweet, fiberless, pulp of good flavor.
- Kistapal*; a small, yellow to reddish fruit; pulp, sweet, juicy, with little fiber.
- Langra*, lage; a medium-sized, roundish old variety of poor color, but good flavor, very sweet but somewhat fibrous.
- Madrás*; an old Saharunpur variety of medium size; skin brownish yellow to reddish green; pulp fair, fiber little.
- Malda*; a name which may apply to several varieties originating in or near that famous city of India; one variety (Kumrajali) is said to attain a weight of 2,700 grams, the largest mango and perhaps the world's largest single-seeded, dicotyledonous fruit; some have the flavor of cantaloupes, some the fragrance of roses, some are blue, some red; all should be brought in here.
- Maller*; a rare variety from Amritsar, India.
- Martin*; one of the high-flavored Martinique varieties.
- Martinique*; a short-oblong, flattened fruit of poor quality.
- Mekongensis*; a rare mango presumably from Burmah.
- Mulgoba*; this was the first grafted variety to be introduced (1899) from Poona, India, into Florida; a smallish, but very beautiful, fair-flavored fruit; very popular.
- Mullgoa*; a variety of uncertain origin; large, acid, aromatic, with a trace of turpentine and fiber.
- Nahababadi* (seedling); a small greenish or reddish yellow variety; pulp sub-acid; juicy, fibrous.
- Nucka*; medium-sized brownish or yellowish; pulp aromatic; juicy, fibrous.
- Paheri, Pairsi, Pirie*; medium or large; golden yellow marbled with green, garnet red on sun-exposed side, with a bluish white bloom; pulp aromatic, sweet, rich.
- Père Louis*; a small West Indian mango; roundish, or kidney-shaped; pulp sweet, juicy, fibers fine. Presented (November, 1924) by the Trinidad Department of Agriculture.
- Peter's No. 1, Peters*; a medium-sized fruit of uncertain origin, beautiful appearance, fair flavor and no fiber.

* "A Descriptive List of Mango Varieties in India", by P. J. Wester.

- Pico* (seedling); an excellent variety from the Philippine Islands, long, fairly large, fiberless, sweet.
- Reine Amalie*; one of the French West Indian varieties.
- Sandersha*; the largest mango in Porto Rico; fruits from a mature tree at Villa León, near Bayamón, sometimes reach a length of 20–25 cm. and weigh up to nearly 1.5 k.; nearly fiberless, pulp sour except near the skin; color yellow or greenish.
- Sanduria* (seedling); a small, roundish variety with smooth yellowish or reddish skin; pulp dry, very sweet; good flavor.
- Sans Pareille*; an inferior variety introduced from Martinique; size medium; color yellowish bronze; flavor too strong, sweet; fiberless.
- Savoy*; a Martinique variety of unknown merit.
- Singapur, Singapuri*; an old Saharunpur variety, large, green-and-orange skin; pulp sweet, somewhat aromatic, in flavor resembling the Loquat.
- Sufaida*; a very large fruit which has given excellent results in Porto Rico; color fair; flavor good; seed small, skin too thin, sometimes splitting (like that of the *Sandersha*), covered with a thick whitish "bloom".
- Sunahra* (seedling); small or medium-sized variety; color fair; pulp very sweet, rather fibrous.
- Surkha*; medium large variety from Saharunpur; yellow to reddish; flesh yellow, juicy, of good spicy flavor, fibrous.
- Totapari, or Totafari*; introduced from Bombay in 1902 by the Experiment Station at Mayagüez and sent hither in 1907.

Some efforts have been made toward canning some of the semi-cultivated fruits here, but it appears that the mango pulp oxidizes readily and the flavor changes rapidly even after thorough sterilization in the can. Dried mango pulp has been prepared at the By-Products Plant at Mayagüez. A preparation of mango pulp with sugar is sold as "pasta de mangó" but this is of small commercial importance; some of this material is occasionally exported to the mainland.

MANGOSTAN; MANGOSTEEN; *Garcinia Mangostana* L.*

This, the best fruit in the world, was introduced by the author in 1903 at the Federal Agricultural Experiment Station, from the Botanic Gardens, Trinidad, B. W. I. From the original lot of seeds 2 plants have survived and for several years have been producing fairly good crops at the said Station. Five seedlings have

* In Dapitan, Mintanao, the author found in 1911 trees over 10 m. in height,—probably the largest in the world.

been introduced through the Trujillo Plant Propagation Station from the Dominica Botanic Gardens during the past 2 years and these are growing as rapidly as could be expected. Seedlings are also being propagated at the Federal Agricultural Experiment Station. The two old trees are now over 5 m.—above the regular height of the trees in evidence in the Mangosteen orchards of Malaya.

MANI; Peanut; *Arachis hypogaea* L.

Widely cultivated in the drier districts, but nowhere on a large scale. Probably Brazilian. Prefers light, sandy soil. The Spanish variety is the only one grown to any extent; two or three other varieties are doing very well both at Vega Baja Farm and Trujillo Plant Propagation Station. Deserves extended trial; varieties resistant to fungus diseases may be found.

MANTECA DE SHEA; Shea Butter; *Pentadesma butyracea* Don.

Recently introduced (presented by the Dominica Botanic Gardens) by the Department; distributing from Trujillo Plant Propagation Station. Splendid tree, 10–20 m. West African. Large seeds contain edible solid fat, exported in vast amounts to Europe.

MANZANA; Apple; *Malus Malus* (L.) Britton.

This fruit has been repeatedly tried in various parts of the Island; the want of a resting period, it appears, gradually weakens the trees till pests or physiological troubles cause death. *Red Astrachan* and *Early Harvest* fruited first in 1906 at the Federal Agricultural Experiment Station.

MARACA; Edible Canna; *Canna edulis* Ker.

This magnificent species is indigenous to the West Indies and South America and was probably cultivated here by the Arawaks; 2–3 m.

Fifteen tons of rootstocks per acre are obtainable in good moist soil. No variations have been observed.

The starch grain is one of the largest known (about 30 times larger than that of the yautía), and largely for that reason Maraca starch cannot be used for laundry purposes; the grains, however, are most easily removed from the fecula. The fibers in the roots prevent their use on the table. Not widely cultivated at present.

MARANTA. See Yuquilla.

MARAÑON. See Pajuil.

MARICAO; *Byrsonima spicata* (Cav.) DC.

An indigenous forest tree, 10–25 m. The small (9–11 mm.) fruits quite edible. Related to cerezas. “Occasionally planted in Porto Rico”, according to Britton & Wilson.

MARANGUEY; *Zamia latifoliata* Preneloup.

An extremely common Cycad occurring in the northern limestone hills, abundant in the Vega Baja and Manatí districts. The stems are frequently partially hidden in holes in the limestone rock; a lever, especially in rainy weather, can readily remove the roots. When the scaly rind is removed and the smooth fibrous interior is grated, a very white starch is obtained,—which may be used for either eating or laundry work. The juice from the grated root is extremely poisonous, and the starch must be thoroughly washed before cooking for the table.

MARANGUEY DE GUANICA; *Zamia portoricensis* Urb.

This species is confined to the dry southwest portion of the Island. The starch from its roots is undoubtedly just as safe for human consumption as that of the other species but on account of its leaves being supposed to cause a strange disease of animals known as “ranilla” it is not used at present for human food.

MARANGUEY DEL INTERIOR; *Zamia media* Jacq.

This species is much less common than the ordinary plant of the limestone hills of the central northern coast district; it can be, however, and probably is at times used instead of the common species as a source of edible starch.

MARJORAM. See *Mejorana*.

MARJORAM. See *Orégano*.

MATA-GALLINA. See *Yerba Mora*.

MATE; *Paraguay Tea;* *Ilex paraguayensis* St. Hil.

Recently introduced (through the U. S. Department of Agriculture) shrub, 2–5 m. Distributing from Plant Propagation Station. Will probably succeed at Cayey and San Sebastián. The leaves here appear to contain a normal amount of them.

MATO DE PLAYA; *Bay-Bean;* *Canavali maritima* (Aubl.) Thou.

A wild species common on or near the sea-shore. A meal, rich in protein and probably safe as a feed for goats and cattle, has been made by drying and grinding this plant (green pods and leaves) at the Mayagüez By-Products Plant.

MATRACA; *Crotalaria* spp.

The following species have been tried out at the Plant Propagation Station at Trujillo, at Model Farms, at the Insular Experiment Station and the Federal Agricultural Experiment Station.

C. incana L. (practically cosmopolitan);

C. retusa L. (indigenous species);

C. juncea L. (from the Old World Tropics, frequently cultivated throughout the interior).

The leaves are undoubtedly of some use as fodder, especially for goats and possibly for cattle when properly dried; their use here however is almost entirely as nitrogen-fixing plants.

MAYA, Piñuela; Pinguin; Bromelia Pinguin L.

Probably indigenous. Common in waste lands and along sea coast. Planted in fence-rows and for hedges; 1-2 m. (or, in jungles, reaching 3 m.).

The fully ripe fruits contain considerable white juicy pulp, resembling in flavor hte pineapple; like the under-ripe *piña*, however, the raphides contained in the pulp irritate the oral membranes.

MAY POPS. See Parcha.**MEJORANA; Sweet Marjoram; Origanum Majorana** L.

This Oriental herb should be grown more widely here. The leaves and seeds are tonic-stimulant, in soups or stews, and (seeds) in pastry.

MELISA; Balm; Melissa officinalis L.

This European culinary herb has grown well in the test plats at Trujillo; very rare in Island gardens. Some plants develop purplish leaves and stems. Recommended for general cultivation.

MELOCOTON; Peach; Amygdalus Persica L.

This strictly temperate European tree might endure the highest localities here for a few years. The following varieties were introduced in 1905 at the Experiment Station at Mayagüez: Angel, Bidwell Early, Bidwell Late, Jewel, Japan, Dwarf Blood, Peen-to, Red Ceylon, and Waldo; not even the Chinese Peen-to, nor the Red Ceylon, have proved to be acclimatizable. A few varieties were introduced about 1899; it is reported that some variety was brought in by the old Toa Grange about 1515. The Peen-to is considered a distinct botanical variety (*platycarpa* Bailey).

MELON; Muskmelon; Cucumis Melo L.

Only one variety is successfully cultivated to any extent here; this seems to belong to the true *Cantaloupe* type (var. *cantaloupe* *pensis*

Nandin) but does not have a hard rind; it is grown in the cooler hilly districts and is marketed both during the rainy and the dry seasons; it commonly weighs about 2 kilos, but may reach 4; the shape is oblong, moderately furrowed, fairly smooth; color dull yellow to pale cream with orange-yellow pulp. This excellent melon appears to be extremely rare both in Europe and America, but a similar variety is produced in Canada; though sometimes called *Melón de España*, it seems to be unknown there. Origin uncertain. It comes true to seed of local production.

A much rarer melon is found at times on the Río Piedras market; this is roundish, almost without furrows, quite smooth, orange yellow outside and paler within; flavor good; known locally as "Melón de América", but seems to be a purely local variety which happens to come true to seed here. Neither of these interesting native melons seems to belong to any of the 6 botanical varieties.

MELON. See Condol.

MENTA; Peppermint; *Mentha piperita* L.

This splendid old European seasoning herb has recently been established at the Trujillo Plant Propagation Station.

Here it is growing off apparently as well as the two acclimated mints which have been here for a long time. This will be distributed promptly.

MESQUITE; *Prosopis juliflora* (Sw.) DC.

Probably native forage tree, 3-10 m. Occasionally planted especially on south side of Island for the nutritious pods (for forage); pastures and roadsides. Probably 2 forms.

MILLET. See Millo.

MILLO DE AFRICA; Indian, African, or Pearl Millet; *Pennisetum glaucum* R. Br.

This old cereal and forage crop of unknown nativity has given fair results especially at the Trujillo Plant Propagation Station; it is, however, not cultivated to any extent here at present, either for human consumption or as a fodder plant.

MILLO DE ITALIA; German Millet, Italian Millet; *Chenopodium (Setaria) italica* Beauv.

This common European forage grain is very rare here but has given fair results at the Trujillo Plant Propagation Station.

MILLO SORGO; Kafir, Sorghum, Guinea-corn; *Holcus Sorghum* L.

Several varieties of this old Old-World crop are grown on a small scale all over the Island, largely for poultry feed. Some 6

varieties have succeeded well at Trujillo Plant Propagation Station and are being distributed. None of the molasses Sorghums have been tested here, it seems.

MINT. See Sándalo de Jardín.

MINT. See Yerba Buena.

MIMUSOPS, Ciruela de Mozambique; *Mimusops marginata*.

Recently introduced from Mozambique through the Department of Agriculture at the Experiment Station, Mayagüez. Presumably only a second-class fruit tree but of value in the future breeding work of the Department with the lucumas and sapotes.

MIRRA DE JARDIN; Myrrh, Sweet Cicely; *Myrrhis odorata* (L.) Scop.

Old European seasoning herb. Has succeeded at Trujillo Plant Propagation Station, but not recommended for general planting.

MIRTO PELUDO; Downy Myrtle; *Rhodomyrtus tomentosa* (Ait.) Wight.

This Oriental species was introduced in 1903 through the U. S. Experiment Station in Mayagüez and began to fruit in 1905. Several specimens are in evidence about the island and it is expected that the tree will eventually become a popular small-farm fruit.

MOLASSES GRASS. See Yerba de Melado.

MOMBIN. See Ciruela.

MOMBIN. See Jobo.

MONKEY APPLE. See Corazón Cimarrón.

MORA BLANCA; White Mulberry; *Morus alba* L.

Introduced from Europe; second-class fruit shrub; 2-5 m. Fruit whitish, 2 cm. long.

MORA DE CHINA; Chinese Mulberry; *Morus multicaulis* Perr.

Introduced primarily for silk-worm forage, but also a second-class fruit shrub, 3-8 m. Fruits black, 2 cm. long.

MORA NEGRA; Black Mulberry; *Morus nigra* L.

Introduced first-class fruit shrub, 3-8 m. or more. Rarely cultivated, but worthy of extensive planting. Asiatic. Fruit purple to black, 2-3 cm. Rapid grower and easily propagated.

MOSTAZA; Curled Mustard; *Brassica japonica* Sieb.

Rarely cultivated, but an excellent vegetable for soups and greens.

MUNG; *Phaseolus aureus* Roxb.

This bean was introduced (probably first by the U. S. Agricultural Experiment Station) about 1903. When carefully handled

it fruits fairly well, and the small seeds make a delicious red purée. Too weak here to succeed as a forage crop. Possibly adaptable to soils too poor and dry for ordinary beans.

MURTA; *Eugenia axillaris* (Sw.) Willd.

A shrub or small tree in waste lands of the interior, 8-12 m.; also occurs on all the islands surrounding Porto Rico. Fruit black, smooth, round, 7-10 mm. in diameter.

MURTA; Guava-berry; *Eugenia floribunda* West.

A rather rare indigenous fruit tree which for many years has been quite famous in the American Virgin Islands (St. Croix, especially); 5-10 m. Fruit produced in the dry season, December to April, usually in enormous quantity. Formerly used as the basis of a special liquor which was exported to Denmark and various other countries in northern Europe. At present used in making an excellent but almost too strongly flavored jam. The dark red or nearly black fruits are 8-10 mm. in diameter and contain one fairly large seed; the pulp is intensely aromatic and fragrant and can probably be used for blending with less highly flavored fruits.

Three or four distinct forms of the species are known (at least in the Virgin Islands). Difficulty has been found in propagating this species at the Trujillo Plant Propagation Station.

MURTA. See Caimitillo.

MURTA (PALO DE); *Eugenia ligustrina* (Sw.) Willd.

This indigenous shrub or small tree, 5-8 m. high, is fairly common in waste lands on the south side of the Island and in Culebra and Vieques; the fruit is round, and about 8 mm. in diameter.

MUSKMELON. See Melón.

MUSK-SEED. See Algalia.

MUSTARD. See Mostaza.

MYRRH. See Mirra.

NABO; Turnip; *Brassica Rapa* L.

A very common vegetable; succeeds best in the cooler hills. Market season long. Nativity unknown. A white variety with a purple crown is much the commonest.

NAPIER GRASS. See Yerba Elefante.

NARANJA, Naranja Agria; Sour, Seville or Bitter Orange; *Citrus aurantium* L.

This old fruit is common everywhere in a semi-cultivated state, especially in the wild-orange region in the wetsern half of the

Island. Even allowing for its great vigor and rapid growth as a seedling, its abundance is not easy to explain, for it appears to have but little use as a fruit. As a stock for other citrus fruits (orange, grapefruit, etc.) it does have a place in Porto Rican citrology, though its long, over-developed taproot unfits it as a stock for planting in shallow soils. There are 3 or 4 varieties of this fruit here: the thinner-peeled bitter, the sour sour, and the sweet sour,—the two latter forms running together and varying in size, shape and color as well as texture and acidity.

The peel is a staple article in the drug and grocery trade; tests at the By-Products Plant at Mayagüez indicate that it can be dried readily, especially if just under-ripe, but that it does not grind so well as sweet orange peel. Tests there also show that a good cattle feed can be made from the peel, seeds, and pulp; the juice, at least from immature fruits, contains a fair amount of citric acid but the large percentage of gummy substances militate against the use of the juice for lime citrate.

The famous Curaçao variety used abroad in making liqueurs, etc., was introduced in 1904.

NARANJA DULCE. See China.

NASTURTIUM. See Capuchina.

NELLI; *Phyllanthus Emblica* L.

Second-class, recently introduced fruit tree, 4-10 m.; first planted (1903) at the U. S. Experiment Station at Mayagüez; established at College of Agriculture and Mechanic Arts; it gives a heavy crop of yellow, acid, roundish fruits, suitable for jellies and preserves.

NIGUA, Nigua de Playa, Temporana; Bay Lavender; *Mallotia gnaphalodes* (L.) Britton.

An indigenous fleshy shrub found along the coast of Porto Rico and of the surrounding islands; 3-12 dm. in height, with beautiful foliage and black, roundish fruits with a sweet-sour pulp. Much sought after by children.

NIGUA DEL MONTE; Chiggery Grapes; *Tournefortia hirsutissima* L.

A stout hairy vine, indigenous along river banks and forest borders; 3-5 m., becoming shrubby. Fruit white, roundish, about 5 mm. in diameter.

NIGHTSHADE. See Hierba Mora.

NISPERO; Sapodilla; *Sapota Achras* Mill.

A very common fruit tree, supposed to be indigenous, planted throughout the Island, largely for its very sweet fruit but partly

for its dense shade; 5-15 m. The fruit of the common Porto Rican variety is only 5-8 cm. in diameter; the pulp is always consumed raw. The content of sugar runs up to 12.7 per cent. One of the most widely-grown, but unfortunately one of the rarest of the first-class fruits of the Island.

NOGAL, Palo de Nuez; Wild Walnut; *Juglans jamaicensis* C. DC.

Forest nut tree, 20-25 m. in western mountains. Perhaps worthy of cultivation. Nuts 4.5-5 cm. long by 4 cm. broad.

NOGAL INGLES; "English" or Persian Walnut; *Juglans regia* L.

Rarely planted experimentally. This first-class nut tree from China and North India seems ill adapted to this climate.

NUEZ DE LA INDIA; Candle-nut; *Aleurites moluccana* (L.) Willd.

A rather uncommon East Indian tree, 10-20 m., semi-cultivated throughout the Island. Apparently two forms exist, one with strongly purgative seeds and another producing nuts which are quite edible even when not roasted. The oil is not used here as in Polynesia.

NUEZ MOSCADA; Nutmeg; *Myristica moschata* Thunb.

This Oriental spice tree was introduced through the Experiment Station at Mayagüez in 1903 (and possibly previously) but has never succeeded very well. Several lots of seeds have been introduced during the last two years but the germination has been extremely poor. Mace and nutmeg seem to be comparatively unpopular spices here.

NUEZ DE PAN; Breadnut; *Brosimum alicastrum* Schwartz.

This Jamaican fruit and forage tree has been introduced at the U. S. Experiment Station; 8-15 m. The fruit is round, yellow, about 2 cm. in diameter, with one large seed which is edible after roasting. The leaves, like those of the related breadfruit, are excellent cattle fodder.

NUEZ DEL PARAISO; Paradise Nut; *Lecythis zabucajo* Aubl.

Introduced in 1924 at the Trujillo Plant Propagation Station from Trinidad, B. W. I.; seeds presented by Mrs. Eugene André,—together with a collection of ornamentals. While reaching 10-15 m. or more in its original habitat, plants have fruited at much smaller size in Trinidad, and it is hoped that it will bear here at the height of 5 m. One of the finest table nuts in the world: richer than the true Brazil-nut (*Bertholletia* spp.), but sometimes slightly bitter.

NUEZ DE QUEENSLAND; Queensland Nut; *Macadamia ternifolia* F. Muell.

This splendid large (up to 15 m.) nut tree has been introduced at the Federal Agricultural Experiment Station from Australia via the U. S. Department of Agriculture. The very hard-shelled nuts have an excellent flavor and the tree has given fair satisfaction in several countries outside of its original habitat.

NUTMEG. See Nuez Moscada.

ÑAME DE AGUA, Ñame Blanco; Water Yam; White Yam; *Dioscorea alata* L.

By far the commonest yam in the world and much the most variable; probably native to Southern Asia, but now cultivated in most tropical countries. Never cultivated here in large fields, but semi-cultivated in fence-rows, field margins and thickets. The vine may attain 15-20 m. and each old root may have several vines.

The stem is always angled; the (usually four) thin membranaceous appendages of these angles are generally colored red or purple and are sometimes transparent; another species, the Yampee, has similar wings on the stems.

The leaf is distinctive in having 5 to 7 strong veins, a winged petiole, and a thick glossy blade more or less heart-shaped. How such a plant with apparently weak, soft, sappy leaves and stems can resist long droughts better than any other similar class of plants, is a mystery.

Most of the many (probably 30 or more) varieties of these "Ñames de Agua" produce axillary bulbils, sometimes of considerable weight.

The shape of the roots is very irregular, but seldom cylindrical. The color of the fecula varies from snow white through yellow shades to pink, lilac, and even purple.

ÑAME AKAM; Akam Yam; *Dioscorea latifolia* Benth.

This rare yam from West Tropical Africa is sometimes cultivated here and is confused with the old (Indian?) species *D. sativa*; leaves, 7-to 9-nerved and cordate.

ÑAME AMARILLO; Yellow Yam; *Dioscorea cayennensis* Lam.

One of the three commonest yams, closely resembling the Guinea, but differing in the more angular basal lobes of the leaf and in the less cylindrical roots which are always more or less yellow as to the fecula and the peel (toward the tip).

This slightly variable species probably originated in the West Indian region. It is hardier than the Guinea and can maintain itself in any dry situation.

NAME BLANCO. See *Ñame de Agua*.

NAME DE CHINA; Chinese Yam; *Dioscorea Batatas* Deene.

This rare and very interesting old species has recently been introduced; propagating at the Trujillo Plant Propagation Station. The very slender roots sometimes attaining a length of 1 m. or more are of fairly good quality and may be of value under certain soil conditions here.

NAME GUAYARO, Gulumbo; *Rajania cordata* L.

An interesting indigenous yam which refuses to be domesticated; 5-10 m. Grows wild on the Experiment Station grounds at Mayagüez. Vine slender, smooth, with variable leaves.

The exceedingly slender roots may attain a length of 1 m. with a diameter of only a few centimeters; their flavor, when mature is exquisite, sweeter and more delicate than that of most yams. On account of the difficulty of digging them, these roots are not marketed, unfortunately.

NAME GUINEA; * Guinea Yam; *Dioscorea rotundata* Poir.

This is the best of the common yams and is cultivated throughout the Island, though only in the western third is it grown in regular fields. The plant here is always supported on stakes (about 1.5-2 m. high); the vines attain a length of 3-6 m. the leaves are very dark green, thick, and heart-shaped; the stem is round and armed with curved spines near the base.

The roots are more nearly cylindrical than in any other species; weight from 2 to 20 kilos; surface grayish brown or (on the distal half) streaked with yellowish, peel corky and longitudinally ridged.

NAME GUNDA, Dungle; Air Potato, Turkey-liver Yam; *Dioscorea pilosiuscula* Bertero.

A probably indigenous wild species of the waste lands and forest borders; 10-15 m. Vine slender, nearly cylindrical; leaves bear large, peculiar-shaped, smooth bulbils (like *D. alata*) in their axils, and presumably these, rather than the seeds, are the plant's means of dispersion.

Old plants, produce small, roundish, coarse roots, suitable only for

* Britton & Wilson states that this species was "originally described from (probably cultivated) Porto Rican specimens". However, since this yam seems to be quite distinct from *D. Cayennensis* (probably a South American plant) and since we must at least pay some respect to the common name which seems to be unusually fixed there is excellent reason for believing that this very important food plant was brought to the Island by the slave ships some time during the 16th century from the Gulf of Guinea region. It appears similar species occur in India and quite possibly the Portuguese brought these yams from thence to the West African coast.

pig feed (when cooked). The axillary "potatoes" are too bitter to use for human food unless cut up and soaked in water for a day or two before cooking; they may weigh up to 300 or 400 grams and *can be kept a year*.

NAME HICAMO, Gunda; *Dioscorea polygonoides* H. & B.

One of the 4 or 5 formerly very common wild yams of waste lands and open thickets throughout the Island. Vine smooth, nearly cylindrical.

Root large, coarse, frequently deeply buried.

NAME MAPUEY; Yampee; *Dioscorea trifida* L. f.

The comparatively small number of varieties comprised under this species form a group of very distinct yams, generally conceded to be the best for table use; their low yielding qualities and somewhat tender nature offset their excellent roots. Mapuey yams are fairly common in all sections of the Island, but they are seldom grown on a large scale; the roots bring about double the price of ordinary yams. They can be grown without poles. The color of the fecula ranges from nearly white to a dark purple.

Only two varieties have been widely grown here; the Blanco and the Morado, the former being considered the better for general planting, but the latter is very highly appreciated—probably, the most expensive root on the market.

Several forms of the Yampee from other West India islands have been well distributed about Porto Rico, but their yield is light and the people do not yet appreciate them.

The Yampee type attains a length of 5-8 m. but the Mapueys are the smallest of all cultivated yams, 1-2 m.

Unquestionably a native of South America.

NAME PAPA; Potato Yam; *Dioscorea esculenta* (Lour.) Prain. Benth.

A rare species of much promise introduced several years ago. The Experiment Station at Mayagüez has for years distributed propagating material to farmers, but it does not appear on the market as yet. Probably of African origin. One excellent variety was discovered in the Canal Zone in 1915 whither it had been brought from old Panamá India gardens; but it is now apparently lost.

NAME DUNGUEY; *Dioscorea altissima* Lam.

One of the largest and perhaps the oldest of the indigenous West Indian yams; probably used as food many centuries ago here. Hardly any limit to its length, readily ascending to tall tree-tops. Rarely cultivated, if ever, here now.

Vine armed with large flat prickles; below sharply angled and even winged, brownish; even the petioles sometimes armed with small thorns.

Root coarse, very irregular, bearing many wiry rootlets.

OATS. See *Avena*.

OHIA; Pomarrosa de Malaya; Malayapple; *Jambos malaccensis* (L.) DC.

First-class introduced (East Indian) fruit tree, 5-20 m.; less than a dozen mature trees (near Río Piedras) known, but hundreds are being propagated; distributing from the Plant Propagation Station. Both a dessert and jelly fruit; skin scarlet, pulp white; the pronounced rose bouquet of the fruits persists after cooking. Two forms, one obconical (8-10 cm. long) and one roundish (smaller) are in evidence here; seeds of the latter were also brought from Dominica Botanical Gardens in 1924.

OKRA. See *Guingambó*.

ONION. See *Cebolla*.

ORANGE. See *China*.

ORANGELO; *Citrus sinensis* X *C. grandis*.

This new hybrid fruit of great promise was introduced (Dec. 1924) through the Plant Propagation Station at Trujillo.

OREGANO; Pot Marjoram; *Origanum vulgare* L.

A very popular European savory herb, grown in nearly every large garden; 1-1.5 m.

OREGANO BRUJO; Oriental, or Spanish Marjoram; *Coleus amboinicus* Lour.

One of the best and commonest seasoning herbs of the Island and one which should be in every kitchen-garden. Probably Malaysian. Apparently non-variable. The thick, juicy stems reach a height of 5 dm. or more. Frequently grown in tins and pots but fairly hardy in a partly shaded bed.

OREGANO CHIQUITO; Porto Rican Marjoram; *Lippia Helleri* Britton

One of the commonest Porto Rican flavoring herbs; 1-2 m. Stems distinctly woody, very slender. Leaves only 5-12 mm. in length. Bouquet rather stronger and better than the Common Orégano. *Endemic*. This remarkable plant should be distributed to all other tropical countries.

OREGANO DE ESPAÑA. See Orégano Brujo.

PAJUILL, Cajuil, Marañón; Cashew-nut; *Anacardium occidentale* L.

Probably native, extremely common tree, 8-12 m., seldom really cultivated but common throughout the island in fence-rows and

around hills near the sea shore, particularly near Vega Baja. Apparently not variable; fruits of both yellow and red colors, however, are in evidence and there is considerable variation in size of fruit. The pulp of the sour fruit is sometimes cooked up into dulces and is much relished raw by many people; the juice is astringent. The kernel of the seed is very much appreciated but although sold occasionally in the markets is never exported here (as is done in Haiti).

PALM. See Palma.

PALMA DE ACEITE; African Oil Palm; *Eleis guineensis* Jacq.

Introduced by the Experiment Station at Mayagüez; not seen outside. In Africa (Liberia and Sierra Leone, especially) reaches 15 m. Six or 8 types, with several minor "connecting link" forms, are known in West and West Central Africa.

PALMA DE AZUCAR; Sugar Palm; *Arenga pinnata* Merrill.

A few specimens, raised from seeds sent from the Orient and planted by the author at the Experiment Station in Mayagüez, in 1903, have fruited. Native to Philippine Islands, 6-12 m. Seedlings have been distributed. One mature specimen may be seen near "Stop 33" north of Río Piedras. Neither sap, seeds, nor sago (pith) used here.

PALMA DE BETEL; Betel-nut Palm; *Areca Catechu* L.

Numerous specimens grown as an ornamental at San Sebastián. Introduced from Orient; 4-6 m. Nuts not used here.

PALMA DE COROZO; Gru-gru Palm; *Acrocomia aculeata* (Jacq.) Lodd.

Very common native palm; 4-10 m.; prefers dry locations. Never cultivated. No variation. Nuts sometimes used. "Cabbage" bud seldom used, but edible. Oil can be made from kernels.

PALMA DE DATIL; Date; *Phoenix dactylifera* L.

Numerous specimens, rarely fruiting well, especially on south side of Island; 5-10 m. African origin. Treated as ornamental; cultivation might succeed in southwestern part of Island.

PALMA REAL. See Palma de Yagua.

PALMA DE TALIPOT; Talipot Palm; *Corypha elata* Roxb.

A few specimens were raised from seeds sent from the Orient, at the Federal Agricultural Experiment Station in 1903; one magnificent specimen appears nearly ready to flower; height 13 m., trunk 1 m. in diameter; leaves 4.5 m. in diameter.

PALMA DE VINO; Wine Palm; *Caryota urens* L.

A few specimens were planted at the U. S. Agricultural Experiment Station in 1903; some have flowered. Occasionally cultivated as ornamental; 8-15 m. Sap not used of this (nor of any other) species of Palm here. Oriental.

PALMA DE YAGUA, Palma Real; Porto Rican Royal Palm; *Roystonea borinquena* O. F. Cook.

Endemic species, 8-20 m.; prefers wet districts. Seldom actually cultivated. Seeds constitute important feed for swine; ground at By-Products Plant and used on Model Farms with or without admixture of other feedstuffs for pigs only. Crop, June to September; sometimes transported in bulk to localities where these palms are not abundant; seeds endure storage well. "Cabbage" rarely used here.

PALMA DE YAGUA DE CUBA; Cuban Royal Palm; *Roystonea regia* (H. B. K.) O. F. Cook.

Introduced about 1903 at the U. S. Agricultural Experiment Station, 8-20 m.; good fruiting specimens in evidence. Seeds like *H. borinquena* but purplish instead of light brown. Habitat, Florida, Cuba, Haiti.

PALO DE MURTA. See MURTA, Palo de.**PALO DE NUEZ. See Nogal.****PALO DE RAMON. See Ramón.****PALO DE VELA; Candle Tree; *Parmentiera cerifera* Seem.**

This interesting Panaman tree was introduced a few years ago at the Federal Agricultural Experiment Station: 4-10 m.; seedlings have been distributed. The slender cylindrical fruits, appearing as if made of wax and bright yellow when ripe, are eagerly devoured by cattle: if eaten in large quantities these fruits give the meat an apple-like taste. The bark also is eaten by cattle,—stripping the trunk up as high as they can reach.

PAMPANO, Plátano de Indio, Bihai; Wild Plantain; *Bihai Bihai* (L.) Griggs.

This very common old relative, if not ancestor, of the plantains and bananas was undoubtedly used for food by the aborigines; 3-5 m.; moist ravines from sea-coast to mountain-top.

The massive, irregular-shaped rootstock, though containing coarse fibers (like the Bananas) has considerable starch and could well be used today for pig feed.

PANA; Seedless Breadfruit; *Artocarpus incisa* L. f.

This splendid old Polynesian fruit tree was probably introduced here in the early part of the 19th century.

Though nowhere planted in groves it is fairly abundant in all districts, except, perhaps the driest. The difficulty of propagating it (from root cuttings and sprouts) and its liability to die back at the tips of the upper branches militate against its more general planting; besides, it (like the yuca) is looked upon as a cheap low-grade food fruit hardly worthy of gracing the tables of the well-to-do. Yet, if the small farmer had to restrict his number of food fruits to *one species*, evidence indicates that not the plantain, nor the avocado but the Breadfruit should be chosen to supply the needs of the family and the domesticated animals; for, it must be remembered, not only does it furnish 2 or 3 crops of the very wholesome large fruits every year, but its luxuriant leaves constitute (fresh or dried) a nutritious fodder, relished alike by the cattle, goats and horses; while any surplus fruits are eagerly devored by swine, cattle, and even (when cooked) poultry.

It usually begins to bear at 3 or 4 years from the rooting of the sprout, and may live 20 to 30 or more years, attaining a height of 15-25 m.

Soon after the opening of the By-Products Plant in Mayagüez in October, 1923, some 10,000 fruits were dehydrated and made into a meal for feeding the breeding cattle on the Model Farms; the average weight of the fruits was nearly 1 kilo and the cost of the meal ("Breadfruit flour"), using the entire fruit, sliced, dried, and ground, was only about 2½ cents per kilo. A higher-grade flour for human consumption was prepared from the pulp alone; this, like the feed, keeps well for many months. While there are some 200 varietal names of this and the Seed Breadfruit species scattered throughout Polynesia and Melanesia—probably representing about 100 distinct forms, there are today in the Western Hemisphere only the two species represented here and one other extremely rare form intermediate between these two found (in the author's knowledge) only about Greytown, Nicaragua. Presumably some of the Polynesian races would do even better here than the said two which have been in evidence here for some 135 years.

Here the fruit is never used in a fermented state, as (frequently) in Polynesia; but boiled, baked, or fried it is one of the farmers' cheapest foods; mashed and mixed with peppers, cheese, spices, meat, etc., it forms a rich, easily digested *piece de résistance*.

The following analyses are illuminant:

	Breadfruit flour	Breadfruit leaves
Proteins -----	6.169 per cent	24.39 per cent
Fats -----	1.600 per cent	6.58 per cent
Carbohydrates -----	75.831 per cent	34.83 per cent

PANA DE PEPITA; Seed Breadfruit; *Artocarpus communis* Forst.

This species, presumably brought into the West Indies in 1793 with the seedless breadfruit (*A. incisa*) by Captain Bligh; now thoroughly naturalized throughout Tropical America and of considerable importance though not as compared with the seedless breadfruit; 8-20 m. This species can readily be distinguished even at a distance from the true Breadfruit by the closer branch habit, by the smaller leaves and by the much less incised margin; whereas the leaf of the true Breadfruit is cut in almost to the midrib, the leaves of this species are cut in only about half way. The fruit moreover of this species is always covered with numerous short fleshy spines, instead of presenting a fairly smooth surface. The seeds are commonly used throughout the Island not only as human food (when boiled in salted water) but are also of considerable value as a pig feed (raw and cooked). If fully matured the seeds are inclined to have a bitter taste but if the fruit is harvested just before maturity the seed bitterness is not noticeable in the *fécule*. The entire fruit when thoroughly ripe is an excellent pig or cattle feed. Experiments at the By-Products Plant in Mayagüez indicate that this fruit can be easily sliced, dried and ground into a very nutritious cattle and pig feed,—even better than that of the Seedless fruit (on account of the high protein content of the seeds). The leaves of this species as well as of the other, whether fresh or dried and ground into a meal, are first-class fodder for the domesticated animals. The leaves may be removed 2 or 3 times a year without seriously injuring the tree's vitality. Naturally, if many leaves are removed the crop of fruits will be proportionately reduced.

PANAMA; Wild Alocasia; *Alocasia macrorrhiza* (L.) Schott.

One of the most conspicuous and widest spread weeds in the Island. Probably Oriental. In rich wet soil reaching 2-2.5 m. The rhizomes, almost entirely above ground, attain a diameter of 10-20 cm.; though poisonous (from the calcium oxalate raphides) raw, thorough boiling renders them fit for pig feeds. Never cultivated.

PAPA; Potato; *Solanum tuberosum* L.

The date of introduction of this South American species is unknown but has never until the last 25 years obtained any great importance in the island. From time to time small fields of com-

mon European or mainland varieties have been grown with partial success in the cooler districts. The presence of the tropical potato blight (*Bacillus solanacearum*) in (presumably all of) the soils of the Island militates strongly against commercial success with this crop here. While very fine specimens of tubers weighing up to one kilo can be grown in the mountainous regions, the average plant becomes so severely attacked by the said blight before its maturity that the growth of the tubers is checked so that the weight of edible tubers per plant is considerably below the economic yield.

Several European varieties, supposed to be resistant to the blight, are being tested at Cayey Model Farm and Trujillo Plant Propagation Station. The plant seems to be fairly free here from insect pests. Possibly some of the violet-skinned types from Colombia and Peru and hybrids with *S. Commersonii* might resist the bacillus here much better.

PAPAYA. See *Lechosa*.

PAWPAW. See *Lechosa*.

PARCHA; Bell Apple; *Passiflora laurifolia* L.

A rather rare woody vine, introduced through the Plant Propagation Station at Trujillo where numerous plants are ready for distribution; 5-10 m. Fruit yellow when ripe, with a hard shell, egg-shaped, 6-7 cm. long; pulp sweet and very aromatic, fragrant.

PARCHA, Curuba; *Passiflora maliformis* L.

An indigenous wine, sometimes cultivated for its fruit; also occasionally wild in the waste lands of the wet districts of the Island; 5-10 m. Fruit round, with a hard shell, about 3 cm. in diameter. Pulp fragrant, delicious, seedy.

PARCHA ENCARNADA; May Pops; *Passiflora incarnata* L.

This North American species was introduced in 1923 through a private garden at Ensenada.

PARRA; Wild Grape; *Vitis tiliæfolia* H. & B.

This widely distributed wild grape has long been known under the name *Vitis caribæa* DC., and has been used as a stock for other (hybrid, or cultigen, varieties); 5-15 m.; occurring in jungles and along banks of streams in the moister districts. Fruit 10-12 mm., purple.

PARSLEY. See *Perejil*.

PEA. See *Petit-Pois*.

PEACH. See *Durazno* and *Melocotón*.

PEACH PALM. See *Pejibaye*.

PEANUT. See *Mani*.

PECAN; *Hicoria Pecan* (Marsh.) Britton.

Rarely and only experimentally planted. First-class nut tree. Probably cannot endure continuous summer.

PEJIBAYE; Central American Peach Palm; *Gulielma utilis* Oersted.

Introduced in 1924 by the Department (presented by the U. S. Department of Agriculture, Washington, D. C.) and growing slowly at Model Farms, and Plant Propagation Station. The orange or red fruits contain a very nutritious dry, sweet pulp covering the useless seeds; pulp must be boiled, steamed, or roasted. Central American. A seedless variety known.

PEPINILLO; Gherkin; *Cucumis Anguria* L.

This West Indian relative of the Cucumber is quite common in the cooler districts, and marketed in considerable quantities. Seems to vary remarkably little.

PEPINO; Cucumber; *Cucumis sativus* L.

Though this old (probably African) vegetable is very subject to pests, diseases, and troubles from drought and bad soil conditions, it is fairly common in most districts but is grown mostly for sale (at high prices) in the larger markets. Eaten fresh (in salads) and seldom pickled here.

PEPINO ANGOLO, Curuba; Cassabanana; *Sicana odorifera* (Vell.) Nand.

This very interesting old vegetable (probably Brazilian) is common in most markets during most of the year, yet is very seldom seen on the vine. Its flavor and odor are exceedingly strong and render it unpopular as a cooked vegetable, even for dulces; but it is said to have great value in making medicinal beverages. Its keeping qualities are remarkable; one of the brownish red cylindrical fruits (30-50 cm.) may be kept hanging in a fruit booth for a week or more, pieces being cut from the bottom as required and a piece of paper stuck over the cut surface to prevent decaying.

PEPPER. See *Pimiento*.

PEPPER, DEVIL. See *Ají*.

PEPPERMINT. See *Menta*.

PERA; Pear; *Pyrus communis* L.

Even at the highest elevations, the cultivated pears are likely always to be a failure here. There is an interesting belief among small farmers that the seeds of the Pear (and Apple) grow into

Guava trees. The varieties Le Conte and Keiffer were introduced in 1905 at the U. S. Experiment Station at Mayagüez.

PERA DE ANCHOA; Anchovy Pear; *Grias cauliflora* L.

A third-class Tropical American fruit tree, 3-10 m.; leaves exceedingly large on the ends of branches; large white or yellowish flowers on the branches. Fruit 5-7 cm. long, brownish, fleshy, with one large seed. Distributing from the Plant Propagation Station at Trujillo. Presented by the Dominica Botanic Gardens.

PEREJIL; Parsley; *Apium petroselinum* L.

A common savory vegetable, widely cultivated but on a small scale only. Several varieties grown. Mediterranean. The variety *Crispum* DC.; is not so common; and the variety *radicosum* Alef. is very seldom attempted here.

PERIFOLIO. See *Cerafolio*.

PERIFOLIO LEVISTICO; Lovage; *Hipposelinum Levisticum* (L.) Britton & Rose.

This old South European culinary herb (related to Chervil), recently introduced from France, is growing well at Trujillo Plant Propagation Station.

PERUNKILA; *Arduina Carandas* (L.) Britton var. *dulcis* P. J. Wester.

An Indian fruit, introduced in September 1924 from the Philippine Islands (Bureau of Agriculture); distributing from Plant Propagation Station. A sub-acid, juicy, black, grape-like fruit. Described (Bul. 39, 3rd. ed., of Philippine Bureau of Agriculture) by P. J. Wester as new variety probably distinct from the true Karanda.

PETIT-POIS; Pea; *Pisum sativum* L.

With inoculated soil this temperate vegetable may be grown, especially in the higher districts (reaching 2 m. at Villalba,—P. R. Tropical Products Corp.). Becoming less rare. Apparently the only food plant here bearing a French name.

PE-TSAI; *Brassica pekinensis* Rupr.

A rare, recently introduced Chinese vegetable; cultivated only occasionally in kitchen gardens. Succeeds fairly well at Trujillo Plant Propagation Station.

PIGEON PEA. See *Gandul*.

PIMIENTA; Allspice; *Pimenta Pimenta* (L.) Cockerell.

This Jamaican species is sometimes planted in Porto Rico and neighboring islands as a spice crop though never more than a few

trees are in evidence at any point; 4-8 m. The spice is scarcely of any commercial importance here.

PIMIENTO; Red Pepper; *Capsicum annum* L.

Probably some forms of this pepper were used by the aborigines here. The principal varieties in common cultivation now belong to the botanical variety *grossum* Sendtner, which includes the bell peppers; several horticultural forms of these are popular. Their season is very long.

PIMIENTO LARGO; Long Pepper; *Piper incurvum* Sieber.

The remarks given under black pepper apply also to this species.

PIMIENTO NEGRO; Black Pepper; *Piper nigrum* L.

The Trujillo Plant Propagation Station possesses a few plants of this interesting species, brought in in March, 1924, from the Dominica Botanic Gardens. The fleshy leaves are eagerly eaten by poultry. Recommended for cool moist situations.

PINEAPPLE. See Piña.

PINGUIN. See Maya.

PIÑA; Pineapple; *Ananas Ananas* (L.) Cockerell.

Undoubtedly from Brazil, now widely cultivated throughout the Tropics as one of the four most popular fruits in the Torrid Zone.

The central section of the north coastal plain is the present center of the crop; formerly the southwest corner produced nearly all the fruits, and canning operations began there in 1902. The present area under cultivation is about 2,500 acres. During the first years of the Great War the annual export shipments amounted to about half a million boxes; now some 250,000 to 300,000 crates go out. The canned fruit (sliced and grated) now amounts to some 1,500,000 pounds.

Though probably introduced early in the 16th century, it appears that the piña was never grown for export till about 1870; the Cabezona was planted extensively then in the Lajas-Palmarejo district; there is still considerable acreage there. The introduction of the Red Spanish (probably from Florida) about 1900 gave the exporters a safe line of development; today it is the only variety planted on a large scale here.

The following varieties, brought in mostly by either the Federal or Insular Departments of Agriculture (since 1902), are established:

Cabezona; the largest variety (with the possible exception of the King, of Borneo) in the world,—the record fruit here

weighing about 14.5 kilos. Used in high-grade canning in the old Lajas district.

Caraqueña; Resembles the "native" "Pan de Azúcar" but has a rougher surface.

Negríta; A semi-cultivated old variety; color dark, but flavor very fair.

Pan de Azúcar, or *Sugarloaf*; very commonly cultivated for home consumption; size fair; very sweet.

Red Spanish; the export and canning variety cultivated for many years throughout the Bayamón and Vega Baja-Arecibo sections; not recommended for the texture or flavor of its pulp, but it is the *piece de résistance* of the canner as well as the shipper.

Smooth Cayenne; a fine old favorite with few or no spines on the leaf margins; large plant with a first-class fruit. A large direct (*via* New Orleans) shipment of suckers was received in 1923 from Hawaii.

Several unnamed varieties have been presented in 1925 by the U. S. Department of Agriculture.

The following varieties have been brought in from Dominica, Jamaica and neighboring islands:

Bullhead;* *Black Antigua*; *Ruby*; *Ripley*.

PIÑUELA. See *Maya*.

PISTACHE. See *Pistachio*.

PISTACHIO; *Pistache*; *Pistacia chinensis* Bunge.

Recently introduced first-class Asiatic nut-tree, 5-10 m.; at both Experiment Stations. May succeed better at Villalba and Sabana Grande Model Farms.

PITAJAYA; *Night-blooming Cereus*; *Hylocereus undatus* (Haw.) Britton & Rose.

A rather large climbing species, up to 7 m. in length, sometimes covering trees with its heavy 3-winged stems; cultivated; introduced from México; fruit 6-10 cm., red, with white pulp and black seeds. A very fine fruit, the pulp making a good drink, especially with ice and sugar.

PITAJAYA; *Hylocereus trigonus* (Haw.) Safford.

This common cactus produces large (6-10 cm. long) roundish fruits which resemble nothing else very closely in the whole Vegetable Kingdom. When well ripened the Pitajaya is a first-class fruit; it

* According to Mr. H. C. Henricksen, Specialist in Farm Management, of the U. S. Experiment Station, at Mayagüez, and a recognized authority on Pineapples, states that this variety was supposed to be identical with our Cabezona, but he found it to be quite distinct.

should be eaten fresh, though it may be preserved, and in Central America is often used in preparing cooling drinks.

It grows readily on any rough-barked open-topped tree, its roots clinging to but not injuring the host tree. Deserves a place in every fruit collection. Its white flowers which open at night, average about 15-20 cm. in diameter.

PITAJAYA; Sebucan; *Leptocereus quadricostatus* (Bello) Britton & Rose.

A branched species, 2-4 m. high, peculiar to the dry districts on the southwestern portion of the Island and to Icaos. Fruit reddish, 3-5 cm., smooth when ripe.

PITAJAYA AMARILLA; *Harrisia portoricensis* Britton.

A rare species peculiar to the southern coast near Ponce and Tallaboa and to Mona Island; slender, 2-3 m. high, fruit yellow or reddish, 4-6 cm. in diameter.

PLATANO; Plantain; *Musa paradisiaca* L.

Though frequently (in commerce and in the public conception) confused with the Banana (*M. sapientum* L.) the true Plantains may be distinguished by the following characters: the bracts composing the terminal and unopened portion of the inflorescence are thinner and by the time the fruits are half grown the said bracts become shriveled and hang loosely at all angles with the rachis—while in the banana they remain fresh and close-packed in the ovate, pointed “bud” at the tip of the “bunch”; the fruits (except, perhaps, in the Maricongo and the aberrant Chamaluco) are borne loosely in the (few) “gajos”, or hands, instead of being closely appressed, and their distal extremities are usually prolonged into a “beak”, or point, 2-5 cm. beyond the pulp; the ripe pulp is more pasty and “gummy” and is less wholesome when eaten uncooked.

The origin of the so-called “native” Plantains was presumably South Asia; they probably came around the Cape of Good Hope (with the Banana) in the 15th and 16th centuries into the West African countries and the East Atlantic Archipelagoes (Cape Verde Islands, the Canaries, Madeira, and the Azores). Since in historic times the Plantains have not been propagated from seeds, since very seldom do any of the 50 to 75 distinct cultivated varieties ever produce viable seeds, and since practically never is evidenced the slightest degree of variation in leaf, flower, or fruit characters, it is obvious that we have in this almost indispensable food plant the product of many centuries of cultivation; some of the varieties may have

originated as horticultural "bud sports" but probably most were descended from wild races, several of which seem to be in evidence still in Southeastern Asia, the Philippines, and the East India Islands.

This species, taken as a whole, is beyond question the most important food-producing fruit species here today. While closely resembling the banana in habit, the true plantain flower-bud, or *pámpana*, is very close to the distal end of the bunch of fruits, is much smaller, looser, and shorter and it tends to dry and shrivel before the (comparatively fewer, usually) fruits reach maturity.

Less than 12 distinct varieties of Plantains are in evidence here now. All the many (probably 75) Oriental and (few) African varieties should be grown here in a comparative test; many would probably prove more or less immune to the banana disease and some might well excel these old varieties. It appears no plant of any of the Polynesian Plantains (*M. Fehi*), with upright fruit bunches and violet-colored sap, has ever been brought to Porto Rico.

The true Plantains resist the banana disease much better than do the common Bananas: the Chamaluco (not a true Plantain) is even more susceptible than the banana.

None of the following Plantains should be eaten raw, even when fully ripe. Boiled, fried, or roasted these comparatively expensive but highly nutritious and most wholesome fruits constitute an almost indispensable part of the Porto Rican farmer's diet. Moreover, very few food plants of any class or clime equal the Plantain in economical productiveness; unless weeds or droughts prevent, a crop of fruits (among the most nutritious known), is almost certain; strong winds, cattle and root weevils are, however, to be reckoned with.

Ceniza; a sub-variety of the Chamaluco, having the fruits much paler and covered with an ashy bloom, whence the name. Like the Chamaluco, it is badly affected by the banana disease. Fruits practically inedible in the raw state, but considered as superior to the regular Chamaluco (more plantain-like) when cooked.

Chamaluco, Mafafó; formerly the commonest variety of plantain in the Island, but since the banana disease began to spread so disastrously (first noted by the author in 1902 and recognized as a serious disease about 1908) it has been almost exterminated in some districts, this variety being more severely attacked than any other *Musa* here, though it is apparently, as to soil and climatic conditions, the hardiest of all.

The short, thick-peeled, strongly angled fruits are seldom eaten raw but are made into a great variety of dishes, boiled, fried, roasted, or mashed and mixed with meat, cheese, and other vegetables for frying in small cakes.

This once very cheap and popular old variety (of uncertain, but probably Philippine origin) seems doomed to soon disappear from the farms of Porto Rico.

Judging from its flower-bud, this variety is not a true Plantain, but an intermediate type between the Banana and Plantains.

A monstrosity variety, known as Pata de Pato, has the fruits more or less grown together in the hands.

Congo, Congo verde, Congo legitimo; this is by far the commonest of the lesser plantains. The bunch is larger than that of the Plátano Hartón. The fruits are strongly curved (which distinguishes them from the Maricongo) and the peel is thin.

Congo Morado; an extremely rare Plantain having fair-sized fruits which are dull maroon or purplish until nearly full grown, when they gradually turn to dark green color. Practically never brought to the large markets, though apparently just as a good for home consumption as any of the Plantains. This remarkable Plantain deserves our best attention.

Congo Prieto; a very rare variety, probably becoming rarer, from the west end of the Island. The beautiful fruits are peculiar in being purplish or reddish black from the time of flowering to maturity. The plant has more color on the stem and petioles than any other Plantain except the Cuarenteno. The quality of the fruit seems to be average.

Criollo, Prieto, Vinagre; a fairly common but unpopular variety; vigorous and productive; but the fruits are sour, gummy, and require thorough cooking. Formerly the ripe fruits were used in making excellent vinegar, and in some back districts this interesting custom still prevails.

While it may be claimed that this is a "primitive" variety, or possibly, a sport from the chamaluco, its origin must remain very uncertain; and though it sometimes produces seeds here, it does not appear to be at all closely related to the really primitive bananas and plantains of the Philippine Islands, many (probably 25) varieties of which bear viable seeds in almost every fruit.

Cuarenteno; one of the most striking and distinct of our Musas, yet unfortunately rare. The young leaves are heavily blotched and marbled with maroon and chocolate-colored spots and the midrib and under surface are shaded purple; they are like those of the Congo Morado except in habit

they are like those of the Chamaluco. Even the fruit is purplish when young. Should be in all collections.

Enano; the smallest of the Plantains. The plant stem is decidedly short (2.5-3 m.), yet the bunch is frequently so heavy that it must be propped up to avoid being blown down by the wind; the fruits are comparatively large and of excellent quality. Recommended for sheltered situations.

The plant is much shorter (2.5-3 m.) than the ordinary Guarán, but the bunch and the fruits are both comparatively larger. The rachis is long and the naked part (between the "pámpana", or bud, and the terminal hand) readily distinguishes it from the true *Enano*. The fruits are blunt-pointed, sweet, and very plump. An excellent but top-heavy sort. Precocious, fruiting in 9 or 10 months.

Guayabo; the best of the 3 or 4 forms of the Chamaluco type. The peel is usually much cracked and may become brownish. The pulp is considered decidedly superior to that of the regular form.

Hartón, Macho; this is the most important food fruit variety common than the smaller forms of Plantain, or than the Guineo Guarán. The size of the fruit varies greatly according to the vigor of the plant but the comparatively short-pointed and weak-angled fruits are distinctive.

Possibly the Plátano Puro of the Ponce district is distinct: it seems to be straighter and less angled.

Though the market price is comparatively very high, one medium-sized fruit costing, say, 6 to 10 times as much as a Red banana, it is obtainable practically every day in the year in nearly every market of the Island. Fortunately, it keeps very well in storage, and is always brought to market in the "full" but green state and slowly ripened in heaps or in barrels; this fact, however, does not prove that the fruit is better treated thus than it would be if it could be safely (*sic*) left on the plant till fully matured. When the peel has turned from green to a dull yellow or, later, when the rather thick peel has become more or less black from bruising and decay, the fruit is known as an "amarillo" and is ready for frying, boiling, or baking; this term is also applied to all the Congos and the Mari-congo,—but not to the Chamaluco.

The flour made by peeling, slicing, drying and grinding the nearly ripe (but not yellow) fruits has long been famous throughout Tropical America as an invalid and infant food; it appears to possess some tonic quality for the intestinal membranes, and has un-

doubtedly saved many lives, not only here but also in Tropical Africa, from the insidious diarrhœas and dysenteries which frequently fail to respond to ordinary remedies. Many hundredweight of plantain flour have been made at the By-products Plant in Mayagüez since December, 1923; some of this has been purchased by hospitals and individuals in the mainland. The peels and stems cut in small pieces, dehydrated and ground to a coarse meal make an excellent feed for livestock.

The analyses of the flour and the feed are as follows:

	Flour (fécula)	Feed (peels, etc.)
Fats -----(est.)--	6.00 per cent	5.77 per cent
Proteins -----	3.09 per cent	6.43 per cent
Carbohydrates-----	68.77 per cent	71.78 per cent

Maricongo; the commonest of the lesser Plantains. The fruit generally weighing about one-half as much as the Plátano Hartón; the bunch has several or many times as many fruits as does the bunch of the large (true) Plantain,—up to 100 or even 200 if grown in very rich soil; the peel is much thinner and the distal beak is proportionately larger. Though this fruit, like all the other “Congos”, is a kind of Plantain and frequently marketed as such, the growers seldom confuse the two types—although both may be planted in the same small field.

The plant resists the banana disease very well, and is one of the very best varieties for the small farmer.

Trescientos, Congo Trescientos; this splendid variety is rare.

The stem is weak and slender, and therefore very liable to be blown down by winds unless the very heavy bunch is propped up firmly. The small, curved fruits are of first quality.

PLANTAIN. See Plátano.

PLUM. See Ciruela.

PLUM, NATAL. See Amatúngulu.

PLUM, WILD. See Almendrillo.

POHA; Husk Tomato, Ground Cherry; *Physalis peruviana* L.

A South American vegetable of considerable importance in many tropical countries, but rarely grown here. The fruit makes an excellent jam or preserve, especially when spiced, and may be pickled.

It is of such rapid growth and easy cultivation that varieties from Hawaii and Mexico should be tried out here with the view to introduce them into general use.

POHA SILVESTRE; *Physalis* spp.

The following species of this interesting genus occur in open grounds especially in abandoned fields near towns, and the fruits of all are quite edible and would probably improve under cultivation: *P. angulata* L.; *P. pubescens* L.; *P. turbinata* Medic.

POMARROSA; Roseapple; *Eugenia Jambos* (L.) Millsp.

Second-class introduced fruit tree, 4-10 m. Very common, especially in wetter districts. Seldom actually cultivated; usually occurring in open pastures and along streams, lakes and roadsides; from East Indies originally. Eaten fresh, but also of value as a preserve and jam fruit; like the Malayapple it carries its delightful rose perfume through moderate cooking.

POMARROSA DE MALAYA. See Ohia.**POMEGRANATE.** See Granada.**POMELO.** See Toronja.**POND-APPLE.** See Corazón Cimarrón.**POTATO.** See Papa.**POTATO, SWEET.** See Batata.**PRICKLY PEAR.** See Tuna Brava.**PUERRO;** Leek; *Allium Porrum* L.

A rather rare, onion-like vegetable, occasionally cultivated, 3-6 dm. Of uncertain origin. Two varieties are being tested on the Model Farms.

PUMMELO. See Toronja.**PURSLANE.** See Verdolaga.**QUEEN OF THE NIGHT.** See Reina de la Noche.**QUENEPA;** Guinep, Spanish Lime; *Melicocca bijuga* L.

Second-class fruit tree, 5-15.; semi-cultivated throughout Island; probably native. Very popular, though not a nutritious fruit; seed not eaten. Experiments at the By-Products Plant indicate that a good cattle feed may be made from the seeds and skins and a dulce from the pulp. Practically no variation in fruits. Tree has some value as a wind-break species. Not exportable.

QUIMBOMBO. See Guingambó.**RABANO;** Radish; *Raphanus sativus* L.

One of the commonest temperate vegetables; grown mostly for the foreign population. Probably Asian. Many horticultural varieties teseted. One botanical variety (*R. s.* var. *longipinnatus* Bailey), the huge Japanese radish, has succeeded at Trujillo.

RABANO PICANTE O RUSTICO; Horse-Radish; *Armoracia Armoracia* (L.) Cockerell.

This excellent seasoning or relish root has been introduced at the Trujillo Plant Propagation Station; thus far the climate does not seem to inhibit the growth but since it originated in southeast Europe it may not long endure our climate at the sea-coast.

RADISH. See Rábano.

RAIN-TREE. See Ramón.

RAMON, Ramoncillo, Palo de Ramón; *Trophis racemosa* (L.) Urban.

An indigenous tree of the limestone hills of the lower and middle elevations, 10-15 m. The leaves are occasionally used for forage here. Never cultivated.

RASPBERRY. See Frambuesa.

RASPBERRY, PORTO RICAN. See Zarza.

REINA DE LA NOCHE; Queen of the Night; *Selenicereus grandiflora* (L.) Britton & Rose.

Cultivated in gardens; stems frequently colored reddish to deep purple. Several meters long, about 3 cm. in diameter; fruit egg-shaped, 8 cm. in length. Should be in all gardens in the dry districts.

REMOLACHA; Beet; *Beta vulgaris* L.

One of the commonest of the "temperate" vegetables; succeeds well in the cooler, moister districts.

Several varieties marketed. Unknown wild, but probably a much changed form of a sea-coast plant of Western Europe. The sugar-beet (*B. vulgaris* var. *saccharifera* Alef.) has succeeded at Trujillo Plant Propagation Station.

RICE. See Arroz.

ROSEAPPLE. See Pomarrosa.

RUDA; Rue; *Ruta chalapensis* L.

This strong-smelling garden herb from the Mediterranean region is fairly common throughout the Island.

RUE. See Ruda.

RHUBARB. See Ruibarbo.

RUIBARBO; Rhubarb; *Rheum Rhaponticum* L.

Practically unknown in cultivation in the interior but growing well at the Plant Propagation Station at Trujillo; this Siberian plant, however, will probably not well endure the hot seasons.

RUTABAGA; *Brassica campestris* L. var. *Napobrassica* DC.

A rare forage vegetable; cultivated only occasionally for stock feed. Succeeds fairly well at Trujillo.

SABORIJA, Tomillo; *Thymus vulgaris* L.

No kitchen-garden here should be without this first-class seasoning herb from Europe; a few leaves cooked with beans, stews, maize dishes, etc., add an appetizing flavor.

SAGE. See *Salvia*.

SALSIFI; Salsify; *Tragopogon porrifolius* L.

Apparently recently introduced; succeeds fairly well, especially in the higher elevations such as the Cayey Model Farm; it is being tested at several localities. Native of South Europe.

SALSIFI ESPAÑOL; *Scolymus hispanicus* L.

This rare root crop from Southern Europe is being tested at the Cayey Model Farm.

SALVIA; Sage; *Salvia officinalis* L.

For a "temperate" (European) Herb this species behaves very well even at sea-level here. The very distinctive leaves make an excellent tea and should be used more commonly in stews and in seasoning meats. Plants 18 months old at the Trujillo Plant Propagation Station have been in flower for several months and are becoming decidedly woody at the base. Recommended for general cultivation.

SAMAN, Guango; Rain-tree; *Samanea Saman* (Wild.) Merrill.

Naturalized (from Mainland Tropics) long ago; forage tree, 8-20 m. Rarely planted here for forage; testing as a wind-belt species at Vega Baja, Arecibo and Cayey Model Farms. Curved black pods, very nutritious for swine and cattle.

SANDALO DE JARDIN, Yerba Buena; Mint; *Mentha nemorosa* Willd.

The delightful odor of its leaves makes this Old-World species welcome in every garden; unfortunately rare here. Naturalized.

SANDIA; Watermelon; *Citrullus Citrullus* (L.) Karst.

This garden fruit is very difficult to grow here, but small, usually pale-fleshed specimens are sometimes marketed. All the (few) varieties seem very susceptible to fungus and insect attacks. Not worthy of general cultivation here.

SAPOTE BLANCO; White Sapote; *Casimiroa edulis* La Llave and *C. tetrameria*.

Recently introduced Central American second-class fruit trees, 3-6 cm. Rare; several fruiting trees near Río Piedras show per-

fect adaptation to our coastal climate, though they are supposed to be sub-tropical and to never succeed in the Tropics below 1,000 m. elevation. Very variable as to fruit characters; there are several named forms (budded California varieties) in the trade.

SAPODILLA. See *Níspero*.

SAPUCAIA; *Lecythis usitata*.

This excellent Amazonian nut-tree has recently been introduced at the U. S. Experiment Station.

SATSUMELO; *Citrus nobilis* var. *Unshiu* X *C. grandis*.

A new hybrid between the Satsuma orange and a grapefruit. Five young seedlings were received in December, 1924, at the Plant Propagation Station at Trujillo from the U. S. Department of Agriculture.

SCORSONERA. See *Escorcionera*.

SEBUCAN; *Cephalocereus Reyei* (L.) Britton & Rose.

A short-trunk species, branching above, 2-8 m. high, growing on the southern side of the Island. Fruits 5 cm. in diameter, green or reddish, the pulp red, with many small black seeds. Also occurs on the neighboring islands.

SEBUCAN. See *Pitajaya*.

SESAME. See *Ajonjoli*.

SHALLOT. See *Eschalota*.

SHADDOCK. See *Toronja*.

SHEA-BUTTER. See *Manteca de Shea*.

SIAMELO; *Citrus nobilis* (King Orange) X *C. grandis*.

One of the new hybrids between the Mandarin and Pomelo. Two varieties, one with a Shaddock, the other with a Grapefruit parent, were received in December, 1924, at Trujillo Plant Propagation Station.

SILANI; *Philippine Cowpea;* *Vigna marina* (Brum.) Merrill.

Found here in 1914 at Punta Cangrejos, wild. Introduced (as a new form, probably) from the Philippine Islands (presented by the Bureau of Agriculture) in October, 1924, as a cover and forage crop. Unlike most similar legumes, this species, according to Mr. P. J. Wester, Agricultural Advisor to the Philippine Government, can readily be propagated *from cuttings*; and since the stem reaches

2-3 m. this is very important, especially when planted in loose sandy soils. Seeds too small and too few for use as human food. Being tested (at Arecibo Model Farm and Trujillo Station) as a forage plant.

SINCAMAS; Yam Bean; *Cacara tuberosa* (Lam.) Britton.

Formerly rather commonly cultivated for its turnip-like roots; rare now. Ripe seeds not eaten but young pods may be used. Origin not known. Highly prized in Mexico where the watery, sweet roots are one of the commonest vegetables; eaten both raw and cooked. A brilliant white starch can be made from the roots. The plant requires support—tree, fence, etc.—since it may attain a length of 10-15 m.

SONCOYA; *Annona purpurea* Moe. & Sessé.

This second-class fruit tree of Mexico and Guatemala has recently been introduced at the U. S. Experiment Station; the tree is of moderate size, like the other Annonas, and is cultivated to some extent in Mexican and Central American door-yards.

According to Popenoe, the fruit is round, 10-15 cm. in diameter and somewhat resembles the Corazón but its rind is covered with protuberances like those of the Ilama. Of value in the Department's annona breeding work which is just beginning.

SORGHUM. See Millo.

SOURSOP. See Guanábana.

SPANISH PLUM. See Quenepa.

SPINACH. See Espinaca.

SPINACH DOCK. See Espinaca sin aroma.

SPONGE, VEGETABLE. See Esponja.

SQUASH. See Calabaza.

STAR-APPLE. See Caimito.

STRAWBERRY. See Fresa.

SWEET-CORN ROOT. See Lerén.

SWEETSOP. See Anón.

SUGARAPPLE. See Anón.

SUCCORY. See Achicoria.

SUNFLOWER. See Girasol.

TABASCO. See Ají Pequeño.

TAGUA-TAGUA; *Passiflora serrato-digitata* L.

A strong-growing, woody vine occurring in open forests and along river banks at lower and middle elevations of the Island; 3-8 m. Fruit roundish or oblong, 4-5 cm.

TAMARIND. See Tamarindo.

TAMARIND, MADAGASCAR. See Voa-Vanga.

TAMARINDO; Tamarind; *Tamarindus indica* L.

Common naturalized third-class fruit tree, 5-15 meters. Planted, but never cultivated in orchards. Pulp (usually very acid, rarely sweetish) surrounding seeds used for making drinks and a paste with sugar. East Indies. The sugar content of the pulp is about 31 per cent but this intense sweetness is completely disguised by the 12 per cent tartaric acid.

TANGELO; *Citrus nobilis deliciosa* X *C. grandis*.

Several trees of this first-class citrous hybrid have been introduced from the mainland (U. S. Department of Agriculture) during the past 20 years, but probably because of the size of the fruit (8-12 cm.) and the comparative lack of interest in testing out citrous varieties locally, it has not been propagated here. A splendid old specimen, 4-5 m., of the *Sampson* variety is fruiting near Bayamón.

TANGELORIN; *Citrus nobilis deliciosa* X *C. grandis* X *C. nobilis* (form 'King').

This double hybrid was received December 24, 1924, from the U. S. Department of Agriculture and is growing at Trujillo Plant Propagation Station. Having the "blood" of both the King and Mandarin blended with the Pomelo, the flavor of the pulp may prove less acid than that of the Tangelo.

TANGERINE. See Mandarina.

TARO. See Culcas.

TARO. See Malanga.

TARO DE HAWAII; *Caladium Colocasia* var. *esculenta* (L.) Schott.

Two high-grade Taros were sent from the Federal Experiment Station at Honolulu, H. T., in 1924 to the Plant Propagation Station at Trujillo. The *Manaa* has yielded a good crop of corms and cormels of the rather rare yellow color. The petioles are pale green with brown-rose bases. This plant appears to stand between the true Taros and the true Dasheens.

The *Hapuu* Taro closely resembles the *Manaa* but its numerous small cormels are white.

TAYOTE. See **Chayote.**

TE; Tea; *Thea sinensis* L.

Introduced in 1903 by the U. S. Experiment Station at Mayagüez. Shrubs here seldom attain over 1 m. (where they *should* reach several—up to 9 m.; plants spend their vitality in excessive flowering with little leafage. Might succeed at Cayey or Utuado. Leaves possess good strength. A strong old plant (1 m.) is in evidence at Villa León, near Bayamón.

TEA. See **TE.**

TEA, PARAGUAY. See **Maté.**

TEMPORANA. See **Nigua.**

TETA DE BURRA. See **Caimitillo.**

THYME. See **Saborija.**

TI-ES. See **Canistel.**

TOMATE; Tomato; *Lycopersicon Lycopersicum* (L.) Karst.

This old South American vegetable is not now grown on a large scale; limited local consumption. On account of the bacterial blight (*Bacillus solanacearum*), which seems to be present in practically every district, it is seldom possible to get a good "stand" of plants, although individual plants may produce excellent fruits before succumbing to the blight. Several standard varieties are grown in a small way; the Stone and the Ponderosa are popular. Both the botanical varieties *cerasiforme* Alef. and *pyriforme* Alef. have given fair results. Fresh imported seed is used; otherwise the variety reverts.

TOMATE DE ARBOL; Tree Tomato; *Cyphomandra betacea* (Cav.) Sendtn.

This South American fruit vegetable was introduced in 1903, or perhaps earlier, and is now well established in the Maricao district and probably in other places; under cultivation it attains a height of 3 or 4 m., though it usually begins to bear at 2 m. Apparently no variation, except as regards color and size of fruits; fruit usually oval or oblong, 5–12 cm. long, dull red or purplish, with a slightly acid flavor distinctly tomato-like. Is usually cooked but may be eaten raw when thoroughly ripe.

TOMATO. See **Tomate.**

TOMATO, HUSK. See **Poha.**

TOMILLO. See **Saborija.**

TORONJA; Grapefruit, Pomelo. Pummelo, Shaddock; *Citrus grandis* (L.) Osbeck.

This old South Asian species probably reached the Island somewhere about the first or middle of the last century but no interest naturally awakened in the bitter, coarse fruits of those times and it was not until about 1902 that commercial interest was awakened in the named varieties of the so-called "grape fruit."

The U. S. Census Report for 1920 shows 219,000 bearing and 114,000 non-bearing trees. The acreage is estimated at about 4,500. During the past 2 years some 100 acres of unprofitable orchards in the Vega Baja-Manatí section have been uprooted.

In the 1909-10 season the number of boxes exported was 48,441 (valued at \$162,749); in 1919-20 the number was 419,629 (valued at \$1,332,742); in the 1923-24 season the export was 666,648 boxes (valued at \$2,000,000 which was an increase in value of some 44 per cent over the previous season); the 1924-25 season's output is estimated at 690,000 boxes.

About 1920 experiments in canning grapefruit were started here and in the 1921-22 season a beginning was made on a commercial scale. In the 1922-23 season 7 canneries were active and about 75,000 cases of tins worth about \$5 per case were put up. From various causes this canning business was not so successful in the 1923-24 season and at present comparatively little is being done. One of the canneries has at last begun to save a portion of the peels and seeds from cutting tables, as recommended by the Division of Agricultural Development, drying them in a special dehydrating apparatus (modeled after those at the By-Products Plant in Mayagüez). This dried and ground peel and seeds will probably hold a place in the cattle feed market here in competition with the imported feed stuffs.

The following varieties are the most popular here:

Duncan. This old Florida favorite has oblate, good-sized fruits, with a moderate amount of seeds and a well flavored juice abundant in a grayish-green pulp. Very popular here.

Ellen. A pink-fleshed variety, originating about 1907 at Oneco, Fla.; flavor excellent; not popular.

Foster. This very interesting variety originated a few years ago at Manavista, Fla., as a "sport" from the Walters; pulp and juice a rose pink or purplish color—sometimes showing through the yellow peel; very early and should become very popular as an "ade" fruit, now that cheap juice extractors are available.

Marsh, Marsh Seedless; ranks with Duncan as the most popular variety here today. A medium-sized sort, with light yellow, very smooth rind; juice abundant with fair flavor; nearly or quite seedless. Originated at Lakeland, Florida, about 1895.

Pink-fleshed; two or three presumably distinct varieties have been introduced here (both in the Mayagüez and north coast districts) but they appear not to be popular here; extended trials should be made. Several varieties of the so-called *Shaddock* race have rose or even *red* pulp; their peel is usually thick and the flesh is likely to be tough and bitter.

Triumph; a fine-appearing fruit, seedy, juicy but rather lacking in flavor.

The *Alamoén* is a peculiar type of Pomelo, introduced in 1924 (at Trujillo Plant Propagation Station) via the U. S. Department of Agriculture from Surinam. The fruit is reported as of very superior, distinct, mildly acid flavor. The young branches are *blackish*. Though no wild Citrus species are extant in northern South America, this fruit, of unknown origin, may have to be classed as a "new" quasi-cultigen "mutant".

Bianchi; a strange "mutant", having the flavor of a mild Pomelo, the rough and almost furrowed peel of a Limón de Cabro, and the size of a large Shaddock (12-15 cm.; the leaves smell like those of the sour orange; and the spines are unusually long and numerous. Only one mature tree (in the Añasco Valley) in evidence.

Pernambuco; one of the old Florida varieties of questionable value.

Tresca; a rare Florida variety.

Several forms of the so-called wild, or seedling grapefruit, are in evidence; these are usually thick-peeled and bitterish.

Unfortunately most of the growers here have not kept their varieties distinct, wherefore today it is almost impossible to tell anything about a grove tree except as to whether it bears seedless or seedy fruit.

TREBOL; Red Clover; *Trifolium pratense* L.

This Old-World forage crop is very rare and practically worthless here.

TREBOL HUBAM; Hubam Clover; *Melilotus alba* Desr. var. *annua* Coe.

One of the very best of the recently introduced forage crops. With inoculated soil it grows rapidly to 1.5-2 m.; seeds well within 6 months. Is being distributed from Model Farms. Probably as nutritious as alfalfa. Originated in Iowa in 1916.

TREBOL DEL JAPON; Japan Clover; *Lespedeza striata* Hook. & Arn.

This Oriental hay and forage legume was tried out at the United States Experiment Station about 1903; it has never succeeded well. Gandul would probably produce 10 times as much forage on the same area.

TREE TOMATO. See Tomato de Arbol.

TRIGO; Wheat; *Triticum aestivum* L.

An old and extremely important cultigen of undetermined and probably multiple origin. Introduced at the Toa Grange about 1515, but has never succeeded here as a crop.

TRUMPET-WOOD. See Llagrumo.

TUNA BRAVA; Prickly Pear; *Opuntia Dillenii* (Ker Gawl) Haw.

A much branched cactus of the coastal zone, especially on the south side of the Island, also on Mona, Vieques and Icacos; 0.5 to 2 m. high. Fruit pear-shaped, red or purple, edible, 5-8 cm. long.

TUNA BRAVA (Lisa); Semaphore Cactus; *Opuntia rubescens* Salm-Dyck.

This splendid tree-like species occurs wild in the southwestern district of Porto Rico, also on La Mona, Icacos, Vieques and Culebra. A spineless form was introduced in March, 1924, from the Gardens of the Danish Consulate in Charlotte Amalie, St. Thomas, U. S. V. I., the first 200 "pencas" giving only 2 living plants. Another introduction was made from the same source in November, 1924, with better results. Will probably become a first-class forage species on the south coast. The peculiar habit of the branches (more or less horizontal) and the peculiar fruits which readily take root and produce new plants, distinguish this species from any other except perhaps a rare species occurring on Desecheo.

TUNA BRAVA; Tuna; *Opuntia vulgaris* Mill.

A tall species introduced from South America occasionally planted on the south side of the Island.

TUNA DE ESPAÑA. See Tuna Mansa.

TUNA MANSA, Tuna de España; Cochineal Cactus; *Nopalea cochinellifera* (L.) Salm-Dyck.

Frequently cultivated, especially on the south coast; 3-4 m.; branches usually spineless or very nearly so. The young branches are seldom used for forage but more commonly for "cataplasmas".

Could be used as in Mexico in soups and stews; the young, half-grown "pencas" cut in small dice or slices, give a mucilaginous character to the liquid in which they are cooked. Fruit red, about 5 cm. in length.

TUNA MANSA; Indian Fig; *Opuntia Ficus-indica* (L.) Mill.

A much branched species, nearly or quite spineless, 3-5 m. Fruit red or yellow, 5-9 cm. long, cultivated very widely.

TURMERIC. See Jengibrillo.

TUNGULU. See Amatúngulu.

TURNIP. See Nabo.

UMKOLO, Umkokolo; *Dovyalis caffra* Warb.

Second-class fruit tree, 3-7 m.; introduced by the U. S. Experiment Station, Mayagüez, about 1903; from South Africa, used for preserves. Distributing from the Trujillo Plant Propagation Station.

UMKOKOLO. See Umkolo.

UVA; Grape; *Vitis vinifera* L.

Several varieties have been planted here during the Spanish régime; some very large vines are in evidence, especially on the south side of the Island; but the fruiting qualities of the plants leave much to be desired. The leaves are attacked by at least 3 species of fungi and the vitality of the plant is severely weakened thereby especially in the districts of heavy rainfall.

The Río Piedras Experiment Station has brought in a considerable number of the standard-named varieties from the mainland, but since a large percentage of these young plants is obviously doomed to disappear it is, at present, unfair to include them in a list of our food plants.

The principal varieties of this species here are: Málaga, Carman, Muscat, Isabella, Almeria, Zante, Fresno Beauty, Flame Tokay, Thompson Seedless, Black Monukka, Royal, Thomas, La Salle, James Ellen Scott, Amurensis (probably a distinct species).

UVA HIBRIDA; *Vitis* hybs.

The following collection of hybrid-grapes (Munson types) was received in December, 1924, at the Río Piedras Experiment Station from Texas, and it is expected that most if not all will endure our climate:

Champanel.

Bailey.

Lukfata.

R. W. Munson.

Edna.

Fern Munson.

Vitis Champinii (a cultigen).

UVA DE MAR; Sea Grape; *Coccolobis wifera* (L.) Jacq.

Very common native third-class fruit shrub, 2-8 m.; largely confined to the coastal zone. Apparently not at all variable. Unworthy of cultivation.

UVA MOSCADINA; Scuppernong Grape; *Vitis rotundifolia* Michx.

Several varieties of this large grape are being tested at the Insular Experiment Station; some of them appear able to withstand the climate but pollination difficulties are likely to militate against the successful culture of this type of grape.

VAINILLA; Vanilla; *Vanilla planifolia* Andr.

Introduction of uncertain date, but not commercially successful until last decade. Utuado district first to plant on large scale; Villalba now has only large plantation,—where a gross return of over \$2,000 per acre (at about \$10 per pound) was reported for the 1923-24 crop. Two varieties, the large-leaved pompon (*Vanilla* sp.?) and a Mexican strain, were recently introduced (August, 1924) from Guadeloupe by the Department and are propagating at San Sebastián and Arecibo Model Farms and the Plant Propagation Station. A serious root disease prevails. Hand pollination is necessary. Several varieties were introduced from Florida about 1905.

VANILLA. See Vainilla.

VERDOLAGA; Purslane; *Portulaca oleracea* L.

This common (European) semi-cultivated salad "weed" is rather popular here and deserves better attention. Two or three forms present. Large plants may weigh 300 grams.

VOA-VANGA; Madagascar Tamarind; *Vangueria madagascariensis* Gm.

Introduced third-class fruit tree, 4-7.; rare, perhaps confined to the Río Piedras district, where several trees are fruiting well. First brought in by the U. S. Agricultural Experiment Station in 1903. The brownish sour pulp of the roundish fruit is rather cloying.

WALNUT. See Nogal.

WAMPI; *Clausena lansium* (Lour.) Skeels.

Rare Chinese third-class fruit tree, 3-8 m.; introduced about 1903 by the United States Experiment Station. Even vigorous specimens do not seem to fruit well here, and its culture seems inadvisable, although Wester states that it is "rather a variable species" (and therefore, possibly improvable) and that the Lime-like fruits "may be made into preserves". It is nearly enough related to the orange that reciprocal budding may be performed.

WATER-CRESS. See Berros.

WATERMELON. See Sandía.

WHEAT. See Trigo.

WILD TAMARIND. See Hediondilla.

WINTER BARK. See Canela de Costa.

YAM. See Ñame.

YAM BEAN. See Síncamas.

+ **YAUTIA AMARILLA; Yellow Yautia; *Xanthosoma sagittifolium* (L.) Schott.**

This fairly common, very dwarf variety is widely cultivated in Cuba as well as Porto Rico but appears to be unknown elsewhere. The whole leaf is covered with a glaucous grayish "bloom"; the sinus is not marked with any color. The cormels are comparatively small, very much shortened (almost rounded), and contain a very rich yellow or dull orange fecula; when cooked these roots remain quite hard and are therefore not so popular as they deserve to be. The keeping quality of the roots is remarkable; they may be left in the ground for four or even six months after maturing, the separate cormels being broken off from time to time as required. The "madre", or central rhizome, is usually used like the cormels,—a great advantage over such varieties as Morada.

Careless dealers frequently include under this name the similar cormels of the very distinct Martinica.

+ **YAUTIA BELEMBE; *Xanthosoma brasiliense* (Desf.) Engl.**

This presumably indigenous species is used only as a "spinach" vegetable. The leaves, both petiole and blade, may be cooked in thick soups, or "callalous", as they are called in the Lesser Antilles,—with meats and vegetables or they may be boiled separately and served as "greens". It endures full sunlight, but in partial shade makes a larger growth.

+ **YAUTIA BELEMBE SILVESTRE; *Xanthosoma helleborifolium* (Jacq.) Schott.**

This now rare (here) species was probably common here once. While reported by Britton and Wilson as, "naturalized after cultivation in a ravine at Mayagüez", it appears to be a wide-spread species found from Central America to Dominica, Trinidad, and South America.

It is, presumably, near to the Belembe botanically. The leaves are pedately divided and borne on mottled petioles; useful as a spinach.

? **YAUTIA BLANCA**, *Yautia Rolliza*; **White Yautia**; *Xanthosoma caracu* C. Koch & Bouché.

This is the best of the 15 or more distinct varieties of *Yautia** which have been in cultivation here since the beginning of agriculture.†

The *Rolliza* is widely cultivated throughout Porto Rico but does not appear to be common in Santo Domingo, Jamaica, Cuba, nor in the other islands of the West Indies; however, it was taken over to West Africa, presumably in the slave ships, in the first half of the 19th century, and was carried from that region into the Philippines and probably also into the East Indian islands during the latter half of the said century. The plant is rather above medium size with a distinctly glaucous green color with a few rows of lilac markings on the wings of the petiolar sinus. The cormels are of good size with a white bud at the tip; they cook up more soft than do most varieties of *Yautia*; they have one rather disadvantageous character,—the deep penetration of the cormels below the central rhizome. The rhizome itself is sometimes eaten but is not nearly so delicate in texture as the cormels, and must be “dried out” well after harvesting before cooking.

The young unopened leaves of this variety are frequently used as a green spinach and in certain special stews and soups (“*Callalou*”) not only here but also in other West Indian Islands. The cormels, or so-called tubers, may be used in a great variety of ways on the table and are some 45 per cent richer in carbohydrates than the Irish potato; the fuel value (calories) per pound is about 529 to 538 in the case of the *yautia* as against 385 for the Irish potato and 570 for the sweet potato. The starch grain of the *yautias* is about five times the size of the taro, or malanga, starch grain (one-thousandth to 3-thousandths of a mm.)

? **YAUTIA CALALU**; *Callalou*; *Xanthosoma hastatum* Eggers.

A rare species which was probably indigenous here in pre-Columbian times; recorded (by Eggers in 1879) as both wild in forests and cultivated in the Virgin Island as a “spinach” vegetable like the *Be'embe*. Two or three forms of *Callalou* were collected in

* The “*Yautias and Taniers of Porto Rico*”, by O. W. Barret; Bull. No. 6, Federal Agricultural Experiment Station, 1925.

This appears to be the first Bulletin written on these crops, which have been considered the oldest.

† The word “*Yautia*”, or, as it was originally written “*Yahutia*”, meant, in the Arawak language “place of (ya’) the *Hutia* (or spiny rat, *Capromys* spp.); the *Hutia* was formerly very abundant in Tropical America and it fed upon roots as well as fruits. The strange idea of the Arawaks to name one of their principal crops after a place where they were wont to secure the *Hutia*, is one of the most remarkable cases of the kind in etymology.

Trinidad, British West Indies, in November, 1924, and are now propagating at Trujillo Plant Propagation Station; they may belong properly to this species; but only a careful study of their flowers (if produced at all) can decide the question. They are 2 to 4 times the size of our common Belembe, and appear more worthy of cultivation for their tender spinach-like leaves. As evidenced by the paucity of their flowers, they may have been cultivated longer than the Belembe.

(A so-called Wild Tanier, or Yautía, of every uncertain relationship, apparently a "connecting link" between the callalous and the yautías, was found near a Hindu farmer's garden in the mountains of northern Trinidad; under test at Trujillo Plant Propagation Station.)

YAUTIA DOMINICA; Yautía Samanal; *Xanthosoma sagittifolium* (L.) Schott.

This excellent (perhaps best of all* as regards the richness of the cormels) rare form is related to the Amarilla, but is larger, has more slender petioles with stripes or spots of purple on the sinus wings, and paler leaf-blades. Except for their over-firmness after cooking, the beautifully colored cormels are ideal, as far as any root can be in the way of concentrated nourishment and keeping qualities.

YAUTIA GUAYAMERA; *Xanthosoma violaceum* Schott.

This, with the Morada, is among the most striking of all cultivated plants. The almost unique color of the petiole and larger veins of the blade—a glaucous blue "bloom" over a violet-black shade—distinguish these two varieties from all others. The cormels are very different from those of the Morada,—pale rose or purplish, and rather slender. The leaf-blade, bent at an acute angle with the stalk, hangs nearly vertical and gives the plant a highly ornamental aspect.

Under various names it has traveled widely and has been for many years a popular ornament in the Botanic Gardens of the Far East.

YAUTIA DE HUEVO. See Yautía Martinica.

YAUTIA ISLEÑA; *Xanthosoma* sp.?

Two forms are known of this rare indigenous variety, and they may prove to be botanically distinct; one from the west end of the Island has the flat leaf-blade of the Manola and excellent regular-

* In Heft 71 of Das Pflanzenreich, A. Engler and K. Krause list 39 species and about 20 varieties of *Xanthosoma*.

shaped pinkish cormels; and one large (up to 2 m.) dark green form, from the south side, with high-colored cormels which are mealy and purplish when cooked, like those of the Vino.

YAUTIA JAMAICA-TRINIDAD; *Xanthosoma atrovirens* C. Koch & Bouché.

This, the largest of all known true yautías, has been introduced several times from the U. S. Department of Agriculture but thus far is not yet widely cultivated here; at the Trujillo Plant Propagation Station this magnificent variety reaches a height of over 3 m. and in rich moist soil would probably attain 4.5 m.—as tall as the largest Yautía Palma. The petiole is reddish brown toward the base, purplish along the sinus wing, and glaucous blue-green above; the midrib and basal veins are mauve-purple beneath.

The rhizome is orange-yellow inside, and the cormels are distinctly yellowish before and olive or grayish-yellow after cooking; the terminal bud is bright rose; the size is not so large in proportion to the size of the leaf as that of the rolliza, but cormels weighing 0.5 kilo are common.

The best of the introduced varieties, but it requires good soil for its proper development.

A variety having leaf characters similar to this was obtained from Jamaica by the U. S. Department of Agriculture, but its cormels are of a pronounced rose color, and the rhizome is pale rose inside. A similar variety having white-fecula cormels was sent to the U. S. Department of Agriculture from Kamerun, West Africa, about 1905; it probably originated somewhere in Central America.

Another similar sort was obtained from Guatemala; it appeared even more vigorous and perhaps more prolific than the type (which was obviously introduced into Trinidad from Jamaica).

YAUTIA JENGIBRILLA; *Xanthosoma atrovirens* C. Koch & Bouché var. *Kochii* Eng.

A rare indigenous species of uncertain relationship; this particular variety not occurring outside of Porto Rico, it appears. The leaf-blade is flat, like the Manola, but the leaf-stalk is slender and colored, and the cormels are very peculiar in shape—like those of the Arrowroot (whence the name!). This very interesting variety should be preserved; without encouragement by the Government's institutions it will probably soon become extinct (like many other sister forms, presumably).

YAUTIA MANOLA; *Xanthosoma Caracu* C. Koch & Bouché.

An indigenous variety, apparently becoming rare, distinguished by its dwarf size, very flat leaf-blades, short green petioles, and short

rough cormels with a yellow or orange fecula. Since it endures dry soils better than any other variety, perhaps, it should be more widely grown.

YAUTIA MARTINICA, Yautía de Huevo; *Xanthosoma sagittifolium* (L.) Schott (?).

One of the handsomest and largest of all the 50 or more true yautías. In rich moist soil this variety attains a height of 2-2.5 m.; it grows rapidly and matures in 8 to 11 months.

The petioles are the most marked of all yautías; the basal portion is striped and blotched with cream yellow, light and dark green, and the sinus wings inside and outside are splashed with various shades of rose, maroon, and reddish brown.

The cormels are cylindrical, have an unusual number of large roots, and (probably on that account) tend to produce leafy shoots from their terminal buds; because of the latter characteristics this yautía should be harvested as soon as it matures, the texture and flavor of a *growing* cormel being always coarser and less wholesome than a resting one. After cooking, the yellow fecula of the roots turns grayish or olive shade; like those of the Amarilla, the Martinica cormels never cook up soft. The "madres", or rhizomes are used on the table.

This variety not only flowers very frequently but the flowers often show teratological malformations.

YAUTIA MORADA, Yautía Prieta; *Xanthosoma violaceum* Schott.

This deplorably rare but very striking plant probably originated either in Boriquen or in Quisqueya (Hispaniola) tens of centuries ago, since, in the Yautía survey of the world made by the author (1904 to 1908), no proof was obtained of its existence outside of these two islands; the rather closely similar, though botanically distinct, Yautía Guayamera, however, is perhaps the most widely known of all yautías (though it has passed, in its guise as a decorative greenhouse ornamental, under many synonyms in many countries since its baptism in 1853).

The violet-shaded leaves borne upright on blackish petioles are as striking as those of the Guayamera; the blades are held, however, at a normal angle with the petiole. The cormels are very distinct; short, abruptly pointed at each end, and their firm fecula is pale orange brown instead of rose purple.

This, too, is one of our largest Yautías, in good soil attaining 2-2.5 m.

Recommended highly for general planting—not only as a food plant but as an ornamental.

YAUTIA ORQUETA; *Xanthosoma Caracu* C. Koch & Bouché (?).

One of the rarest endemic yautías, sometimes grown in one or two small areas of the interior of the Island. Belonging to the Amarilla group, but having very distinctive leaves—the palest of all known varieties (nearly white when grown in the shade!), the sinus wing always has a few maroon blotches, however. The cormel is light or dark yellow inside. The plant is weak, dwarf, and liable to fungus attacks. While not recommended for cultivation (except in shaded places) it does have value as an ornamental and on account of its strange color it deserves the respect of horticulturists, representing as it does an almost unknown and nearly extinct type of these, the oldest food plants of the world.*

YAUTIA OTO, Yautía de Panamá; *Xanthosoma* sp.?

This strange variety, of uncertain relationship, was introduced in 1904 from the Canal Zone by the Experiment Station at Mayagüez.

The leaf-stalks are reddish, remarkably erect, and have strongly reflexed sinus margins; the basal veins of the blade are less exposed than in most yautías.

The cormels are of a beautiful rose shade.

YAUTIA PALMA; *Xanthosoma Jacquinii* Schott.

This is the largest known species of this very interesting group of plants; in favorable situations it attains a height of 3–5 m. undoubtedly indigenous if not endemic. Largely used as a pig feed; the coarse rhizomes, weighing 5–15 k. or more, are boiled. One of the few species (of the 38 known *Xanthosomas*) which does not produce cormels. The nearly cylindrical rhizome grows almost entirely at the top, rising in old specimens to 1.5 m. or more above the ground. Semi-cultivated in coffee plantations—where its cool shade is believed to be beneficial: (the marginal veins of the leaf-

* "Promising Root Crops for the South; Yautías, Taros and Dasheens", by O. W. Barrett, Plant Introducer, Office of Foreign Seed and Plant Introduction, U. S. Department of Agriculture, Washington, D. C.; issued Feb. 5, 1910.

This bulletin seems to have been the first attempting the classification, on a more or less technical basis, of not only the Yautías, Taros and Dasheens, but also of the edible *Alocasias* and *Callalous*, or Yautías used as a spinach vegetable; the classification was based on the examination of about 100 "numbers" of Yautías and about 50 Taros and Dasheens, all grown under identical conditions in the tropical plant Propagation Houses of the U. S. Department of Agriculture, Washington, D. C.

blade do "weep", especially after rain in hot weather,—a common habit among Aroids).

YAUTIA PANAMA. See Yautía Otó.

YAUTIA PUNZERA. See Yautía Vino.

YAUTIA ROLLIZA. See Yautía Blanca.

YAUTIA SAMANAL. See Yautía Dominica.

YAUTIA VINO, Yautía Punzera; *Xanthosoma sagittifolium* (L.) Schott (?).

A rare old variety, so named from the claret-colored cormels which are perhaps the best flavored of all Yautías and also of excellent texture when cooked. The petiole is purplish along the sinus wings; the blade is dark green with light veins.

YERBA BUENA. See Sándalo de Jardín.

YERBA BUENA DEL JARDIN; Bergamot Mint, Garden Mint; *Mentha citrata* Ehr.

A fairly common flavoring herb here. Deserves a shady moist corner in every garden. Old World in origin, but now cosmopolitan. Produces stems up to 0.5 m.

YERBA ELEFANTE; Elephant Grass, Napier Grass; *Pennisetum purpureum* Schum.

Recently introduced and rapidly becoming one of the most popular forage grasses in the West Indies; habitat, Africa; 2-4.5. At the Cayey Model Farm a plat attained a height of 4 m. in about 3 months. When cut in a forage-cutter only the butts of the larger stems are refused by cattle and horses; swine chew up the cut portions of the culm but do not swallow much of the bagasse.

Adapts itself to almost any soil, but drought in sand prevents its due development. Propagated by stem cuttings, like cane. Elephant-hay meal may properly become one of the common tropical feeds of the future.

YERBA DE GUATEMALA; Guatemala Grass; *Tripsacum laxum* Nash.

Of recent introduction through the Experiment Station at Mayagüez. In deep moist soil this rank grass about equals Elephant Grass as a heavy producer; it endures several cuttings, the stools gradually spreading till nearly all the space is filled. Propagated by root division and stem (base) cuttings. Not adapted to shallow, hard or dry soils.

YERBA GUINEA; Guinea Grass; *Panicum maximum* Jacq.

This commonest forage of the Island, native of Tropical Africa, is today probably the most widely cultivated grass in the Tropics of both Hemispheres.

Propagated almost entirely by division of the root clumps, small handfuls of the culm bases set into the soil about 2 to 4 m. apart. Seeds freely if clumps are unmolested for 6 months; attains 2-4 m. Regularly pastured, but sometimes cut and sold in bundles; very seldom made into hay here. In rich soil with the proper amount of water this comparatively rich grass may be cut or fed down every 3 months; a yield of 118 tons from 1 acre has been reported. Elephant Grass is superseding this old species in many districts.

The hay can readily be ground and stored in sacks.

Probably brought hither from the Guinea coast by the slave ships, on which it was "used for bedding".

YERBA KIKUYU; Kikuyu Grass; *Pennisetum clandestinum* Chiov.

Recently introduced from East Africa.

A sweet, lush grass, easily propagated (by stem cuttings), but not enduring pasturing so well as expected, according to tests at the Insular Experiment Station.

YERBA DE MELADO; Molasses Grass; *Melinis minutiflora* Beauv.

A South American forage grass of considerable merit for certain conditions, but its popularity seems to be decreasing; 1-1.5 m. A strong odor of molasses is given off by this plant, especially when in flower and in full sunshine.

It has gained some popularity as a tick eradicator, but this quality seems to be largely fanciful.

YERBA MORA, Mata Gallina; Garden Nightshade; *Solanum nigrum* L.

This weed, common in many districts, is sometimes used like a spinach, though by many believed to be poisonous.

One of the most variable species of plants known. Some races produce edible fruits—Sunberry, Wonderberry, Morelle, etc.

YERBA PARA. See Malojillo.

YUCA, Casabe; Cassava; *Manihot Manihot* (L.) Cockerell.

Two types of this plant are recognized by the farmers of the island. There is probably no botanical distinction between these types, the *Dulce* and the *Brava*. Here the *Brava* or *Bitter*, variety is used almost entirely for the production of starch, while the *Dulce* or *Sweet* is boiled, baked, and sometimes fried. Grated yuca, slightly pressed to remove a portion of the starch, is used in thickening food and also in the form of thin cakes, partly toasted over a slow fire, to make "tortilla de casave" and "empanada", which are articles of domestic commerce. Special machinery is sometimes used for

extracting the starch on a fairly large scale. The following varieties of the *Brava* are recognized:

Pata Paloma. A popular variety for starch. Leaves purplish. Yields well.

Palo Blanco. A green-stemmed, small-growing sort.

Coriana. One of the largest starch yucas. Leaves purplish beneath.

Blanquilla. Purple stems and petioles. White root.

Several other varieties, under many names, are known. Some 6 or 8 varieties were introduced from Jamaica in 1903.

The following varieties of *Dulce* are more or less common throughout the Island:

Ceiba. A large, strong-growing white sort.

Coriana. Resembles the *Coriana Brava*, but has greener stems and leaves.

Mameya, or *Seda.* An excellent table root with yellowish, rich fecula.

Pana. The best table sort. Purple petioles.

A yellow-fecula variety from Trinidad was introduced in November, 1924, and is propagating. Several yellow varieties, were introduced from Colombia via the U. S. Department of Agriculture at the Mayagüez Experiment Station. Seedling varieties have never been properly tested here, although seeds are readily produced in vigorous plants, 10-15 months old.

YUQUILLA, Maranta; Arrowroot; *Maranta arundinacea* L.

Originally from South America, this once very widely cultivated root-crop is now rarely grown here. No variations (except the white-variegated form) known here.

As in the case of the Maraca, the strong longitudinal fibers preclude using it on the table. The readiness with which the large starch grain is removed from the fecula, however, makes it a favorite with the small farmer who prefers to grow his own starch.

Propagated from the white, scaly, tuberous rootstocks.

ZANAHORIA; Carrot; *Daucus Carota* L.

The cultivated variety (*sativa* DC.) of this old root-crop native to Europe, North Africa and Asia, is one of the commonest vegetables here. When quickly grown the roots are of good flavor without fiber and with no bitterness. It is in the markets practically every day of the year. Only comparatively few varieties are in evidence. Some large varieties have been tested at the Model Farms and the Trujillo Plant Propagation Station as cattle forage.

ZARZA; Porto Rican Raspberry; *Rubus florulentus* Focke.

Wild species found, according to Britton & Wilson ("Scientific Survey of Porto Rico and the Virgin Islands") in the mountain forests of Maricao and Adjuntas. Since this species attains a length of 10 m. it may prove of value as a parent.

ZARZA. See Frambuesa Común.

ZARZAMORA COMUN; Common Blackberry; *Rubus argutus* Link.

Recently introduced by the Insular Experiment Station; a very prickly plant, 1 m.; may succeed in the higher elevations.

ZARZAMORAS MISCELANEAS; Miscellaneous Blackberries.

The 3 following species have been introduced at the Insular Experiment Station:

Rubus cuneifolius Pursh. Sand Blackberry.

Rubus procerus Muell. Himalaya Blackberry.

Rubus loganobaccus Bailey. Loganberry, Calif.

Some of these Rubi, it is believed, will eventually not only supply the great lack of these fine fruits here but may be exported.

Some have begun fruiting at Cayey and San Sebastián Model Farms.

ADDENDA

The following species of "Citrus relatives" were received during August, 1925, from the U. S. Department of Agriculture:

AMONTAY; *Citrus hystrix* DC. var.

One of the best of the many varieties of this species.

CIDRA OLOROSA; Perfume Citron; *Citrus medica odorata*.

Probably from S. China. Introduced at Villa León several years ago, but lost.

CHINA CLEMENTIN; Clementine Orange; *Citrus* hyb. (?)

Supposed to be a hybrid between the Naranja and a Mandarin known as "Dancy Tangerine".

DELANDAN; *Citrus* sp.

A rare fruit from the Philippines.

ETROG; *Citrus medica* L. var.

This rare variety of citron is used ceremonially by the Jews. The fragrant fruits bring high prices.

ISKALAN; *Citrus* sp.

One of the least known of the Oriental citrus fruits.

KABAYAO; *Citrus (Papeda) hystrix* DC.

An old Philippine species. Pulp cells contain oil.

KAVISTA BATU; *Feroniella lucida* Sw.

From Java. Fruit roundish, 4-6 cm.

KUMQUAT DE AUSTRALIA; Finger Lime; *Microcitrus australasica* (F. Muell.) Swg.

From Queensland. Fruit edible. Drought resistant.

KUMQUAT DE HONGKONG; Hongkong Wild Kumquat; *Fortunella hindsii* (Oliv.) Swg.

From Hongkong. Fruit roundish, reddish.

LEMONQUAT; *Citrus* hyb.

A hybrid between the Kumquat and the Lemon.

LIMON DE CHINA; Chinese Box Lime; *Severinia buxifolia* (Oiv.) Ten.

A spiny shrub from South China. Fruit black.

LIMON DE DAVAO; Davao Lemon; *Citrus* sp.

This Lemon-like fruit comes from S. E. Mindanao, P. I.

LIMON DE GABON; Poir-a-poudre; *Balsamocitrus gabonensis* Sw.

From W. Cent. Africa; of value in breeding work.

LIMON DE INDO-CHINA; *Atlantia citrocides* Pierre.

Small tree from Indo-China. Fruit orange-like, 2 cm.

LIMON DE SUDAN; *Citropsis Schweinfurthii* (Engl.) Sw. & M. Kellerman.

A very rare "citrus relative" from the Sudan. Fruit lime-like, 3 cm. in diam., with a sweet pulp.

MAMIS; Philippine Mandarin; *Citrus nobilis* var.

The old Philippine Mandarin is one of the largest and best. Peel green. Comes true to seed.

ORANGEQUAT; *Citrus* hyb.

Another new hybrid between China and Kumquat.

TABOG; *Chaetospormum glutinosa* (Merrill) Swg.

From Luzon, P. I. Fruit 5-8 cm. in diameter.

TALAMISAN, Tamisan; *Citrus longispina* Wes.

First-class fruit tree, 5 m., from the Philippine Ids. Fruit 6 cm., very juicy.

TANGELOLO; *Citrus* hyb.

Hybrid between the Sampson Tangelo and a Grapefruit seedling.

TANGELOS; *Citrus* hyb.

Besides the already noted Sampson, the Thornton and Williams varieties are now in evidence.

TORONJA DE CHINA; Chinese Pummelo; *Citrus grandis* (L.) Osbeck.

A Chinese variety of the Oriental Grapefruit, or Pummelo.

WOOD-APPLE; *Feronia Limonia* (L.) Swg.

Oriental fruit tree. Fruit 6-9 cm., edible.

The following species were inadvertently omitted from previous text:

APRIN; undetermined species.

A rare fruit grown in Vieques; tree medium-sized, fruit 2-4 cm. in diameter, green; pulp more or less sour.

BAEL; Bael Fruit; *Belou Marmelos* (L.) (W. F. Wright) Correa.

Third-class fruit tree from North India. Introduced in 1913 at Villa León, Bayamón.

BIGNAY; *Antidesma bunius* Spr.

Second-class fruit-tree from Philippine Ids., recently introduced near Bayamón.

MABOLO; *Diospyros discolor* Ww.

Second-class Philippine fruit tree, introduced about 1910 at the Federal Experiment Station.

SPECIES INDEX

- Abelmoschus Abelmoschus* (L.) Cook & Collins. ALGALIA.
Abelmoschus esculentus (L.) Moench. GUINGAMBO.
Achras Zapota L. MAMEY SAPOTE.
Aerocomia aculeata (Jacq.) Lodd. PALMA DE COROZO.
Actinidia arguta Miq. ACTINIDIA.
Agati grandiflora (L.) Desv. GALLITO.
Aleurites moluccana (L.) Willd. NUEZ DE LA INDIA.
Allium ascalonicum L. ESCHADOTA.
Allium Cepa L. CEBOLLA.
Allium fistulosum L. CEBOLLA DE GALES.
Allium Porrum L. PUERRO.
Allium sativum L. AJO.
Allium Schœnoprassum L. CEBOLLÍN.
Alocasia macrorrhiza (L.) Schott. PANAMÁ.
Amarantus tricolor L. HAUM.
Amomis caryophyllata (Jacq.) Krug & Urban. MALAGUETA.
Amygdalus Persica L. MELOCOTÓN.
Anacardium occidentale L. PAJUIL.
Ananomis umbellifera (H. B. K.) Britton. CIRUELA DE SANTO DOMINGO.
Ananas Ananas (L.) Cockerell. PIÑA.
Anethum graveolens L. ENELDO.
Annona Cherimolia Mill. CHERIMOYA.
Annona diversifolia Safford. ILAMA.
Annona glabra L. CORAZÓN CIMARRÓN.
Annona montana Macf. GUANÁBANA CIMARRONA.
Annona muricata L. GUANÁBANA.
Annona purpurea Moc. & Sessé. SONCOYA.
Annona reticulata L. CORAZÓN.
Annona senegalensis Pers. ANIGLI.
Annona squamosa L. ANÓN.
Annona *hyb.*: *A. squamosa* X *A. Cherimolia*. ATEMOYA.
Anthemis nobilis L. CAMOMILA.
Apium graveolens L. APIO.
Apium graveolens L. var. *rapaceum* DC. APIO-NABO.
Apium Petroselinum L. PEREJIL.
Arachis hypogæa L. MANÍ.
Arduina bispinosa (L.) Desf. AMATUNGULU.
Arduina Carandas (L.) Britton. KARANDA.
Arduina Carandas (L.) Britton var. *dulcis* P. J. Wester. PERUNKILA.
Arduina grandiflora E. Meyer. AMATUNGULU.
Areca Catechu L. PALMA DE BETEL.
Arenga pinnata Merrill. PALMA DE AZÚCAR.
Armoracia Armoracia (L.) Cockerell. RÁBANO PICANTE.
Arracacia xanthorrhiza Baner. ARRACACHA.
Artocarpus communis Forst. PANA DE PEPITA.

- Artocarpus incisa* L. f. PANA.
Artocarpus integrifolia L. JAK.
Artocarpus Lakoocha Roxb. LACUCHA.
Asparagus officinalis L. ESPÁRRAGO.
Athyrocarpus persicariæfolius (DC.) Hemsl. COÍTRE.
Avena sativa L. AVENA.
Averrhoa Carambola L. CARAMBOLO.
- Basella rubra* L. LIBATO.
Benincasa hispida Cogn. CONDOL.
Beta vulgaris L. REMOLACHA.
Beta vulgaris L. var. *Ciela* (L.) Moq. ACELGA.
Bihai Bihai (L.) Griggs. PÁMPANO.
Bixa Orellana L. ACHIOTE.
Blighia sapida Koen. AKEE.
Brassica campestris L. var. *Napobrassica* DC. RUTABAGA.
Brassica caulorapa Pasq. COLINABO.
Brassica japonica Sieb. MOSTAZA.
Brassica oleracea L. var. *acephala* DC. BERZA.
Brassica oleracea L. var. *botrytis* L. COLIFLOR.
Brassica oleracea L. var. *capitata* L. COL.
Brassica oleracea L. var. *gemmifera* DC. COL DE BRUSELAS.
Brassica oleracea L. var. *ramosa* Alef. BERZA DE GANADO.
Brassica pekinensis Rupr. PE-TSAI.
Brassica Rapa L. NABO.
Bromelia Pinguin L. MAYA.
Brosimum Alicastrum Schwartz. NUEZ DE PAN.
Byrsonima spicata (Cav.) DC. MARICAO.
- Cacara erosa* (L.) Kuntze. HABILLA.
Cacara tuberosa (Lam.) Britton. SINCAMAS.
Cajan Cajan (L.) Millsp. GANDUL.
Caladium Colocasia (L.) W. F. Wight. CULCAS, MALANGA.
Caladium Colocasia var. *esculenta* (L.) Schott. TARO DE HAWAII, MALANGA.
Caladium Colocasia var. *esculenta* sub-var. *globulifera* Engl. & Kr. DASHEEN DE TRINIDAD.
Caladium sp. DASHEEN DE AZUFRE.
Calathea Allouia (Aubl.) Tindl. LERÉN.
Campelia Zanonía (L.) H. B. K. COÍTRE.
Canavali ensiformis (L.) DC. CANAVALI.
Canavali gladiata DC. CANAVALI COLORADO.
Canavali maritima (Aubl.) Thou. MATO DE PLAYA.
Canella Winterana (L.) Gaertn. CANELA DE COSTA.
Canna edulis Ker. MARACA.
Capriola dactylon (L.) Kuntze. GRAMA.
Capsicum annuum L. AJÍ, PIMIENTO.
Capsicum annuum L. var. *acuminatum* Fingh. AJÍ GRANDE.
Capsicum annuum var. *conoides* Irish. AJÍ PEQUEÑO.
Carica papaya L. LECHOSA.
Carum carui L. ALCARAVEA.

- Caryophyllus aromaticus* L. CLAVO DE ESPECIA.
Caryota urens L. PALMA DE VINO.
Casimiroa edulis La Llave. SAPOTE BLANCO.
Casimiroa tetrameria. SAPOTE BLANCO.
Castanospermum australe A. Cunn. CASTAÑA DE AUSTRALIA.
Cecropia peltata L. LLAGRUMO.
Cephalocereus Reyeni (L.) Britton & Rose. SEBUCAN.
Cerefolium Cerefolium (L.) Britton. CERAFOLIO.
Chaerophyllum bulbosum L. CERAFOLIO BULDOSO.
Chaetochloa (*Setaria*) *italica* Beauv. MILLO DE ITALIA.
Chrysobalanus Icaco L. ICACO.
Chrysophyllum argenteum Jacq. CAIMITILLO VERDE.
Chrysophyllum bicolor Poir. CAIMITILLO.
Chrysophyllum Cainito L. CAIMITO.
Chrysophyllum oliviforme L. CAIMITILLO.
Cicca disticha L. GROSELLA.
Cicer arietinum L. GARBANZOS.
Cichorium Endivia L. ESCAROLA.
Cichorium Intybus L. ACHICORIA.
Cinnamomum Cassia Blume. CANELA DE CHINA.
Cinnamomum zeylanicum Ness. CANELA.
Citrullus Citrullus (L.) Karst. SANDÍA.
Citrus aurantifolia (Christm.) Swg. LIMA.
Citrus aurantifolia X *C. Limonum*. LEMONIME.
Citrus aurantifolia X *Fortunella Japonica*. LIMEQUAT.
Citrus aurantium L. NARANJA.
Citrus grandis (L.) Osbeck. TORONJA.
Citrus hybrid. LIMÓN DE CABRA.
Citrus limetta Risso. LIMÓN DULCE.
Citrus limonium Risso. LIMÓN.
Citrus medica L. CIDRA.
Citrus mitis Blanco. CALAMONDÍN.
Citrus nobilis Lour. MANDARINA.
Citrus nobilis var. *deliciosa* X *C. grandis*. TANGELO.
Citrus nobilis var. *deliciosa* X *C. grandis* X *C. nobilis*. TANGELOIN.
Citrus nobilis var. *Unshiu* Swingle. MANDARINA SATSUMA.
Citrus nobilis var. *Unshiu* X *C. grandis*. SATSUMELO.
Citrus nobilis (King Orange) X *C. grandis*. TANGELO.
Citrus sinensis (L.) Osbeck. CHINA.
Citrus sinensis X *C. grandis*. ORANGELO.
Citrus webberi P. J. Wester. KALPI.
Citrus sp. CIDRA DULCE.
Clausena lansium (Lour.) Skeels. WAMPI.
Clitoria ternatea L. BEJUCO DE CONCHITAS.
Coccolobis uvifera (L.) Jacq. UVA DE MAR.
Coccolobis venosa L. CALAMBREÑA.
Cocos nucifera L. COCO.
Coffea abeokuta Cr. CAFÉ DE ABEOKUTA.
Coffea arabica L. CAFÉ COMÚN.
Coffea canephora Pre. CAFÉ CANEFORA.

Coffea congensis (Fro.) De Wild. CAFÉ DE CONGO.
Coffea Dewevrei De Wild. CAFÉ DE DEWEVRE.
Coffea Dybowskii Pierre. CAFÉ DE DYBOWSKI.
Coffea excelsa Chev. CAFÉ EXCELSA.
Coffea Laurentii De Wild. CAFÉ DEL CONGO.
Coffea liberica Hiern. CAFÉ DE LIBERIA.
Coffea quillou. CAFÉ QUILLOU.
Coffea robusta L. CAFÉ ROBUSTA.
Coffea stenophylla G. Don. CAFÉ ESTENOFILA.
Coffea "ugandæ". CAFÉ HÍBRIDO.
Coix Lachryma-Jobi L. CAMÁNDULAS.
Coix Lachryma-Jobi var. *Mayuen* Stapf. ADLAY.
Cola vera Schott & Endl. COLA.
Coleus amboinicus Lour. ORÉGANO BRUJO.
Coleus rotundifolius Chev. & P. KEMILL.
Commelina elegans H. B. K. COÍTRE.
Commerina longicaulis Jacq. COÍTRE.
Colubrina reclinata (L'Her.) Brogn. MABÍ.
Cordia blancoi. ANONANG.
Coriandrum sativum L. CILANTRO.
Corypha elata Roxb. PALMA DE TALIPOT.
Crotalaria incana L. MATRACA.
Crotalaria juncea L. MATRACA.
Crotalaria retusa L. MATRACA.
Cucumis Anguria L. PEPINILLO.
Cucumis Melo L. MELÓN.
Cucumis sativus L. PEPINO.
Cucurbita Lagenaria L. GÜIRO.
Curcuma longa L. JENGIBRILLO.
Cyamopsis psoralioides DC. GUAR.
Cynara Scolymus L. ALCACHOFA.
Cyphomandra betacea (Cav.) Sendtn. TOMATE DE ÁRBOL.

Dahlia pinnata Cav. DALIA DE AZÚCAR.
Daucus Carota L. ZANAHORIA.
Dillenia indica L. HONDAPARA.
Dioscorea alata L. ÑAME DE AGUA.
Dioscorea altissima Lam. ÑAME DUNGÜEY.
Dioscorea Batatas Decne. ÑAME DE LA CHINA.
Dioscorea cayennensis Lam. ÑAME AMARILLO.
Dioscorea esculenta (Lour.) Prain. ÑAME PAPA.
Dioscorea latifolia Benth. ÑAME AKAM.
Dioscorea pilosiuscula Bertero. ÑAME GUNDA.
Dioscorea polygonoides H. & B. ÑAME HICAMO.
Dioscorea rotundata Poir. ÑAME GUINEA.
Dioscorea trifida L. f. ÑAME MAPUEY.
Diospyros Kaki L. KAKI.
Ditremexa occidentalis (L.) Britton & Rose. HEDIONDA.
Dolichos Lablab L. CHÍCHAROS.
Dovyalis caffra Warb. UMKOLO.

Dovyalis hebecarpa Warb. KETEMBILLA.
Drypetes lateriflora (Sw.) Krug & Urban. CIRUELA DE GUIANA.
Durio zibethinus L. DURIÁN.

Eleis guineensis Jacq. PALMA DE ACEITE.
Eriobotrya japonica Lindl. LOQUAT.
Eryngium foetidum L. CULANTRO DEL MONTE.
Erythrina Berteroana Urban. BÚCARE.
Erythrina Pæppigiana (Walp.) O. F. Cook. BÚCARE.
Ervum Lens L. LENTEJAS.
Eugenia aruginia DC. GUASAVARA.
Eugenia axillaris (Sw.) Willd. MURTA.
Eugenia Dombeyana Skeels. GRUMICHAMA.
Eugenia floribunda West. MURTA.
Eugenia Jambos L. POMARROSA.
Eugenia ligustrina (Sw.) Willd. MURTA (PALO DE).
Eugenia monticola (Sw.) DC. BIRIJI.
Eugenia pseudopsidium Jacq. GUAYABA SILVESTRE.
Eugenia uniflora L. CEREZA DE SURINAM.
Euphorbia Longata Leur. LONGAN.

Feijoa Sellowiana Berg. FEIJOA.
Ficus Carica L. HIGO.
Flacourtia cataphracta Roxb. CIRUELA DE LA CHINA.
Flacourtia Ramontchi L'Her. CIRUELA DE MADAGASCAR.
Foeniculum Foeniculum (L.) Karst. HINOJO.
Fortunella japonica (Thumb.) Swingle. KUMQUAT REDONDO.
Fortunella margarita (Lour.) Swingle. KUMQUAT LARGO.
Fragaria chiloensis Duchesne. FRESA.

Garcinia Benthani Pierre. BUNAG.
Garcinia binucao Gy. BINUKAO.
Garcinia indica L. Choisy. KOKAM.
Garcinia Mangostana L. MANGOSTAN.
Garcinia spicata Hook. f. GARCINIA ESPINOSA.
Garcinia tinctoria (DC.) Dawn. GARCINIA.
Genipa americana L. JAGUA.
Gmelina arborea Roxb. CIRUELA DE MALAYA.
Gossypium barbadense L. ALGODÓN DE BARBADOS.
Gossypium brasiliense Macfad. ALGODÓN DE RIÑÓN.
Gossypium hirsutum L. ALGODÓN DE SILVESTRE.
Gossypium peruvianum Cav. ALGODÓN DEL PERÚ.
Gossypium purpurascens Poir. ALGODÓN DE PUERTO RICO.
Grias cauliflora L. PERA DE ANCHOA.
Gulielma utilis Oersted. PEJIBAYE.

Harrisia portoricensis Britton. PITAJAYA AMARILLA.
Helianthus annuus L. GIRASOL.
Helianthus tuberosus L. ALCACHOFA.
Hicoria Pecan (Marsh.) Britton. PECAN.

- Hipposelinum Levisticum* (L.) Britton & Rose. PERIFOLIO LEVÍSTICO.
Holcus Sorghum L. MILLO SORGO.
Hordeum vulgare L. CEBADA.
Hylocereus trigonus (Haw.) Safford. PITAJAYA.
Hylocereus undatus (Haw.) Britton & Rose. PITAJAYA.
Hymenæa Courbaril L. ALGARROBO.
Hyssopus officinales L. HISOPO.
- Ilex paraguayensis* St. H. MATE.
Inga laurina (Sw.) Willd. GUAMA.
Ipomœa Batatas (L.) Lam. BATATA.
Ipomœa rubra (Vahl.) Millsp. BEJUCO DE PUERCO.
Ipomœa stolonifera (Cyrill) Poir. BEJUCO DE COSTA.
Ipomœa tiliacea (Willd.) Choisy. BEJUCO DE PUERCO.
- Jambos malaccensis* (L.) DC. OHIA.
Juglans jamaicensis C. DC. NOGAL.
Juglans regia L. NOGAL INGLÉS.
- Lactuca sativa* L. LECHUGA.
Lansium domesticum Jacq. LANZÓN.
Laurocerasus occidentalis (Swartz.) Roem. ALMENDRILLO.
Leechthis Zabueajo Aubl. NUEZ DEL PARAISO.
Leechthis usitata. SAPUCAIA.
Lepidium sativum L. CRESÓN.
Leptocereus quadricostatus (Bello) Britton & Rose. PITAJAYA.
Lespedeza striata Hock & Arn. TRÉBOL DEL JAPÓN.
Leucæna glauca (L.) Benth. HEDIONDILLA.
Lippia Helleri Britton. ORÉGANO CHIQUITO.
Litchi chinensis Sonn. LITCHI.
Leontodon Taraxacum L. DIENTE DE LEÓN.
Lucuma macrocarpa Huber. CUTTIRIBÁ.
Lucuma multiflora A. DC. JÁCANA.
Lucuma nervosa A. DC. CANISTEL.
Luffa acutangula (L.) Roxb. ESPONJA.
Luffa cylindrica (L.) Roem. ESPONJA.
Lycopersicon Lycopersicon (L.) Karst. TOMATE.
- Maba Sintenisii* King & Urban. GUAYABOTA-NÍSPERO.
Macadamia ternifolia F. Muell. NUEZ DE QUEENSLAND.
Mallotonia gnaphalodes (L.) Britton. NIGUA.
Malpighia puniceifolia L. CEREZA COLORADA.
Malus Malus (L.) Britton. MANZANA.
Mammea americana L. MAMEY.
Mangifera indica L. MANGO.
Manihot Manihot (L.) Cockerell. YUCA.
Maranta arundinacea L. YUQUILLA.
Medicago sativa L. ALFALFA.
Meibomia purpurea (Mill.) Vail. JUNQUILLO.
Melicocca bijuga L. QUENEPÁ.

- Melilotus alba* Desr. var. *annua* Coe. TRÉBOL HUBAM.
Melinis minutiflora Beauv. YERBA DE MELADO.
Melissa officinalis L. MELISA.
Mentha citrata Ehr. YERBA BUENA DEL JARDÍN.
Mentha nemorosa Willd. SÁNDALO DE JARDÍN.
Mentha piperita L. MENTA.
Mimusops Elengi L. CEREZA ESPAÑOLA.
Mimusops marginata. MIMUSOPS.
Momordica Balsamina L. CUNDEAMOR.
Momordica Charantia L. CUANDEAMOR.
Morus alba L. MORA BLANCA.
Morus multicaulis Penn. MORA DE CHINA.
Morus nigra. MORA NEGRA.
Mouriri domingensis (Tuss.) Spach. CAIMITILLO.
Musa Cavendishii Lamb. GUINEO ENANO.
Musa paradisiaca L. PLÁTANO.
Musa sapientum L. GUINEO.
Myrciaria cauliflora Berg. JABOTICABA.
Myristica moschata Thunb. NUEZ MOSCADA.
Myrrhis odorata Scop. MIRRA DEL JARDÍN.

Nepeta Cataria L. HIERBA GATERA.
Nephelium mutabile BL. BULALA.
Nopalea cochinellifera (L.) Salm-Dyck. TUNA MANSA.

Ocimum Basilicum L. ALBAHACA DE LIMÓN.
Olea europea L. ACEITUNA.
Opuntia Dillenii (Ker Gawl.) Haw. TUNA BRAVA.
Opuntia Ficus-indica (L.) Mill. TUNA MANSA.
Opuntia rubescens Salm-Dyck. TUNA BRAVA.
Opuntia vulgaris Mill. TUNA BRAVA.
Origanum Majorana L. MEJORANA.
Origanum vulgare L. ORÉGANO.
Oryza sativa L. ARROZ.

Panicum barbinode Trin. MALOJILLO.
Panicum maximum Jacq. YERBA GUINEA.
Parmentiera cerifera Seem. PALO DE VELA.
Passiflora incarnata L. PARCHA ENCARNADA.
Passiflora laurifolia L. PARCHA.
Passiflora maliformis L. PARCHA.
Passiflora quadrangularis L. GRANADILLA.
Passiflora serrato-digitata L. TAGUA-TAGUA.
Pennisetum clandestinum Chiov. KIKUYU.
Pennisetum glaucum R. Br. MILLO DE ÁFRICA.
Pennisetum purpureum Schum. YERBA ELEFANTE.
Pentadesma butyracea Don. MANTECHA DE SHEA.
Pepo Pepo L. CALABAZA.
Pepo maxima (Duch.) Britton. CALABAZA.
Pepo moschata (Duch.) Britton. CALABAZA.

- Pereskia grandiflora* Haw. HORTENSIA.
Pereskia Pereskia (L.) Karst. HORTENSIA DE BEJUCO.
Persea Schiedeana Neis. COYO.
Persea drymifolia Cham. & Schlecht. AGUACATE DE MÉXICO.
Persea drymifolia X *Persea Persea*. AGUACATE HÍBRIDO.
Persea Persea (L.) Cockerell. AGUACATE.
Persea sp. AGUACATE DE CARACAS.
Phaseolus aureus Roxb. MUNG.
Phaseolus lunatus L. HABA DE SIEVA.
Phaseolus multiflorus Willd. HABICHUELA GALANA.
Phaseolus vulgaris L. HABICHUELA.
Phoenix dactylifera L. PALMA DE DÁTIL.
Phyllanthus Emblica L. NELLI.
Physalis angulata L. POHA SILVESTRE.
Physalis peruviana L. POHA.
Physalis pubescens L. POHA SILVESTRE.
Physalis turbinata Medic. POHA SILVESTRE.
Pimenta Pimenta (L.) Cockerell. PIMIENTA.
Pimpinella Anisum L. ANIS.
Piper incurvum Sieber. PIMIENTO LARGO.
Piper nigrum L. PIMIENTO LARGO.
Pistacia chinensis Bunge. PISTACHIO.
Pisum sativum L. PETIT-POIS.
Pithecolobium dulce (Roxb.) Benth. CAMANCHILE.
Portulaca oleracea L. VERDOLAGA.
Prosopis juliflora (Sw.) DC. MESQUITE.
Psidium cattleianum Sabine. GUAYABA DE FRESAS.
Psidium Guajava L. GUAYABA.
Pueraria hirsuta Schneid. KUDZU.
Punica Granatum L. GRANADA.
Pyrus communis L. PERA.
Rajania cordata L. ÑAME GUAYARO.
Raphanus sativus L. RÁBANO.
Rheedia edulis Planch. & Triana. CIRUELA DEL MONTE.

Rheedia madruno (H. B. K.) Tr. & Pl. MADROÑO.
Rheum Rhaponticum L. RUIBARBO.
Rhodomyrtus tomentosa Wight. MIRTO PELUDO.
Rollinia mucosa (Jacq.) Baill. CACHIMÁN.
Rollinia sp. BIRIBA.
Roystonea borinquena O. F. Cook. PALMA DE YAGUA.
Roystonea regia (H. B. K.) O. F. Cook. PALMA DE YAGUA DE CUBA.
Rubus adenophorus Rolfe. FRAMBUESA.
Rubus argutus Link. ZARZAMORA COMÚN.
Rubus chiloensis Duchesne. FRESA.
Rubus coreanus. FRAMBUESA.
Rubus cuneifolius Pursh. ZARZAMORA.
Rubus ellipticus Smith. FRAMBUESA AMARILLA.
Rubus florulentus Focke. ZARZA.
Rubus fructuosus. FRAMBUESA.

- Rubus glaucus* Benth. FRAMBUESA DE LOS ANDES.
Rubus glomeratus. FRAMBUESA.
Rubus hawaiiensis. FRAMBUESA DE HAWAII.
Rubus idæus L. FRAMBUESA AMERICANA.
Rubus innominatus S. Mone. FRAMBUESA.
Rubus lasiostylus Focke. FRAMBUESA.
Rubus loganobaceus Bailey. FRAMBUESA.
Rubus Macreii. FRAMBUESA AKALA.
Rubus melonasius. FRAMBUESA.
Rubus moluccanus L. var. *Fairholmianus*. FRAMBUESA.
Rubus moluccanus L. var. *macrocarpus*. FRAMBUESA.
Rubus niveus Thunb. FRAMBUESA DE NIEVE.
Rubus occidentalis L. FRAMBUESA NEGRA.
Rubus probus Bailey. FRAMBUESA DE QUEENSLAND.
Rubus procerus Muell. FRAMBUESA.
Rubus rosæfolius Smith. FRAMBUESA COMÚN.
Rubus Thunbergii Frank. FRAMBUESA.
Rubus trivialis Michx. FRAMBUESA.
Rubus sp. FRAMBUESA DE AUSTRALIA.
- Saccharum officinarum* L. CAÑA DE AZÚCAR.
Salvia officinalis L. SALVIA.
Samanea Saman (Willd.) Merrill. SAMAN.
Sapota Achras Mill. NÍSPERO.
Scolymus hispanica L. SALSIFI ESPAÑOL.
Scorzonera hispanica L. ESCORCIONERA.
Sechium edule (Jacq.) Swartz. CHAYOTE.
Selenicereus grandiflora (L.) Britton & Rose. REINA DE LA NOCHE.
Sesamum orientale L. AJONJOLÍ.
Sicana odorifera (Vell.) Nand. PEPINO ANGOLO.
Sideroxylon foetidissum (Jacq.). AUSUBO.
Sisymbrium Nasturtium-aquaticum L. BERROS.
Soja Max (L.) Piper. HABICHUELA SOYA.
Solanum Melongena L. BERENJENA.
Solanum nigrum L. YERBA MORA.
Solanum tuberosum L. PAPA.
Spinacia oleracea L. ESPINACA.
Spondias cirouella (Bl.) Tussac. JOBILLO.
Spondias dulcis Frost. JOBO DE LA INDIA.
Spondias Mombin L. JOBO.
Spondias purpurea L. CIRUELA.
Stachys Sieboldi Miq. ALCACHOFA DEL JAPÓN.
Stenotaphrum secundatum (Walt.) Kuntze. GRAMA BLANCA.
Stizilobium Deeringianum Bort. HABICHUELA ATERCIOPELADA.
Syzygium jambolana (Lam.) DC. JAMBOLANA.
- Tamarindus indica* L. TAMARINDO.
Teramnus uncinatus (L.) Sw. CRESTA DE GALLO BLANCO.
Terminalia catappa L. ALMENDRO.
Tetragonia expansa Mun. ESPINACA DE NUEVA ZELANDIA.

- Thea sinensis* L. TÉ.
Theobroma cacao L. CACAO.
Theobroma pentagona Ber. CACAO DE NICARAGUA.
Theobroma bicolor H. & B. CACAO WARIBA.
Thymus vulgaris L. SABORIJA.
Tournefortia hirsutissima L. NIGUA DEL MONTE.
Tradescantia elongata G. F. W. Meyer. COÍTRE.
Tradescantia geniculata Jacq. COÍTRE.
Tragopogon porrifolius L. SALSIFI.
Trifolium pratense L. TRÉBOL.
Triphasia trifolia (Bourm. f.) P. Wilson. CHINITA.
Tripsacum laxum Nash. YERBA DE GUATEMALA.
Triticum aestivum L. TRIGO.
Tropeolum majus L. JACINTO.
Trophis racemosa (L.) Urban. RAMÓN.
Typha angustifolia L. ENEA.
- Vangueria madagascariensis* Gm. VOA-VANGA.
Vanilla planifolia Andr. VAINILLA.
Vigna marina (Brum.) Merrill. SILANI.
Vigna unguiculata (L.) Wolf. FRÍJOL.
Vitis rotundifolia Michx. UVA MOSCADINA.
Vitis tiliæfolia H. & B. PANA.
Vitis vinifera L. UVA.
Vitis hybs. UVA HÍBRIDA.
- Xanthosoma atrovirens* C. Koch & Bouché var. *Kochii* Eng. YAUTÍA JAMAICA TRINIDAD.
Xanthosoma brasiliense (Desf.) Engl. YAUTÍA BELEMBE.
Xanthosoma caracu C. Koch & Bouché, YAUTÍA BLANCA, MANOLA, ORQUETA.
Xanthosoma hastatum Eggers. YAUTÍA CALALU.
Xanthosoma helleborifolium (Jacq.) Schott. YAUTÍA BELEMBE SILVESTRE.
Xanthosoma Jacquini Schott. YAUTÍA PALMA.
Xanthosoma sagittifolium (L.) Schott. YAUTÍA DOMINICA, VINO, MARTINICA.
Xanthosoma violaceum Schott. YAUTÍA GUAYAMERA.
Xanthosoma sp. YAUTÍA ISLEÑA, OTÓ.
- Zamia latifoliata*. MARUNGUEY.
Zamia media Jacq. MARUNGUEY DEL INTERIOR.
Zamia portoricensis Urb. MARUNGUEY DE GUÁNICA.
Zea Mays L. MAÍZ.
Zea Mays var. *rugosa* Bonaf. MAÍZ DULCE.
Zingiber Zingiber (L.) Karst. JENGIBRE.
Ziziphus mauritiana Lam. JUJUBA.
Ziziphus jujuba L. JUJUBA.