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Neotropical and introduced fruits with special tastes and consistencies that are consumed in Colombia

Frutas neotropicales y foráneas de especial sabor y consistencia consumidas en Colombia

Pablo Buriticá Céspedes¹ and José Régulo Cartagena Valenzuela²

Abstract. This paper reviews some Neotropical and introduced fruit species that are characterized by their special taste, anatomy and consistency. For the Colombian territory, the principal common names of the species in question are recorded, along with their taxonomic position, principal plant and fruit characteristics, regions where they grow, consumption modes, and specific uses.

Keywords: Botany, biodiversity, bioprospecting, promising fruit species.

Resumen. Se hace una reseña de especies frutales Neotropicales y foráneas que se caracterizan por su sabor, estructura y consistencia. Para Colombia, se registran los principales nombres comunes, su posición taxonómica, las principales características de la planta y la fruta, las regiones en donde son comunes, la manera de consumirlas y finalmente, sus usos.

Palabras clave: Botánica, biodiversidad, bioprospección, especies frutales promisorias.

The consumption of fruits is expanding worldwide, mostly due to their importance in nutritional balance, which in turn results from their contribution of vitamins, minerals and important metabolites for human metabolism (carbohydrates, lipids, proteins, antioxidants, etc.). In addition, transformation processes resulting from agribusiness innovation have introduced new presentations, which have made fruits more and more available to consumers.

The global fruit market is dominated by a few species, namely *Vitis* spp. (especially wine grapes), the *Rosaceae* family [apple (*Malus domestica* Borkh.), pear (*Pyrus* spp.), plum (*Prunus* spp.), peach (*Prunus persica* L.)], citrus fruits [(orange (*Citrus sinensis* (L.) Osbeck), tangerine (*Citrus tangerine* Tanaka), lime (*Citrus latifolia* Tanaka), lemon (*Citrus limon* L.), pomelo (*Citrus maxima* Merr.), grapefruit (*Citrus x paradise* Macfad)], banana (*Musa* spp.), pineapple [*Ananas comusus* (L.) Merr.], papaya (*Carica papaya* L.) and mango (*Mangifera indica* L.). Yet, there are a number of tropical and subtropical fruits, such as kiwi (*Actinidia deliciosa* A. Chev. Liang et Ferguson) and others, which are currently being introduced and correspondingly appreciated in the international market. People in certain countries are looking for exotic flavors and particular properties [e.g., the laxative effect of dragon fruit (*Cereus* spp.)] that can be easily found in tropical fruits.

Generally speaking, the main uses of fruits are: direct consumption of the harvested fruit and preparation

of juices, desserts (non-confectionery), sauces, jams, and fruit paste. Fresh consumption takes place when the fruit is washed and consumed in its entirety (e.g. apple), cut into portions [e.g. melon (*Cucumis melo* L.), watermelon (*Citrullus lanatus* (Thunb) Matsum et Nakai)] or peeled to consume the entire inner contents (e.g. banana) or a portion thereof (e.g. pineapple, papaya). Currently, fruits are being used in salad combinations complemented with dressings. In all of these cases, fruits are consumed by masticating the pulp. Although any fruit can be used to prepare juice by dissolving it in either water or milk, some of them are particularly adequate for this purpose, as is the case of lulo or naranjilla (*Solanum quitoense* Lam). Fruit desserts are usually prepared by adding sugar and cooking in water until the syrup reaches the "soft ball" stage. Although denser than the latter, fruit sauces are frequently used as meat dressings (e.g. plum dressing). In turn, jam results from concentrating fruit sauces, until obtaining a semisolid paste that can be spread on bread or crackers. By further concentrating and heavily sweetening fruit pulps, we obtain solid pastes such as that of guava (*Psidium guajava* spp.) and some jellies. Finally, the rind of some fruits (usually citrus ones) is sometimes used in syrup preparation.

A relatively unknown manner of fresh consumption is addressed in this paper, namely sucking or otherwise extracting the juice from specific parts of the fruit.

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Featured in special and somewhat exotic flavors, these fruits are usually not masticated due to their particular consistency and anatomy. Indeed, when the pulp is solid, it often melts in the mouth and then swallowed. Depending on the fruit, the pulp is consumed with the seeds [granadilla (*Passiflora ligularis* Juss.)] or without them [(mamoncillo (*Melicoccus bijugatus* L.)).

The way to reach the edible part is different in each of these fruits. Generally, it is inside the fruit, so the shell has to be removed. This is usually done manually and, only rarely, with a knife or other cutting device, as in the case of caimo [(*Pouteria caimito* (R. et P.) Radlk)].

The privilege of consuming these fruits is circumscribed to the tropics because they are quite unknown in temperate regions. Grapes could be considered an exception, but they are mostly tropical and subtropical.

Since the last century, fruits have garnered great attention in Colombia due to their export potential, especially after the rise of the Theory of Comparative Advantage in Economics (Valdes, 1995). Ever since, important progress has been made in banana, mango, pineapple, papaya and cape gooseberry (*Physalis peruviana* L.) exports. Some other local fruits, including those mentioned in this paper, are not well-known, even by Colombians.

Although excluding wild, uncultivated species, the present review describes the most common fruits that grow in Colombia and offer a distinctive taste and consistency, because of which they are usually not masticated. Instead, the edible part of the fruit is usually sucked or otherwise extracted. It is noteworthy how many of these species have not been the object of significant agronomic development. Indications are given about common and scientific names, edible fruit parts, taxonomic status, plant habit and habitat, and the regions where they are more frequent, as well as their consumption and processing modes. Furthermore, this paper aims to contribute to the knowledge of biodiversity that characterizes the Colombian geography that is abundant in ecological niches, where a variety of fruit species distinguished by their shapes, flavors, exotic flavors, nutritional value and medicinal qualities, grow and enrich the national landscape.

In alphabetical order by the most common name in the Colombian territory

STINKING TOE

Common names: Algarrobo, pecueca, algarrobillo, guapinal, nazareno, coubaril.

Family: Caesalpinaeae (Leguminoseae).
Scientific name: *Hymenaea courbaril* L.
Fruit type: Pod.

Main plant features: Tropical American xerophytic tree adapted to arid conditions, above 10 m tall, with umbrella shaped crown. Trunk cylindrical, erected, with smooth and gray bark and no buttresses (CATIE, 2000). Leaves bifoliate, alternate, asymmetrical and translucent; venation scarcely prominent (Catarino, 1993). Flowers white, growing in panicles on branch apices. Pods thick, coarse, brown greenish, 10 to 15 cm long, containing 2 to 3 seeds embedded in a creamy colored pulp of powdery aspect (Francis, 1990). The fruit is picked up from the ground. "Stinking toe" is used to describe the small and taste of the fruit.

Geographical distribution: It is widely spread in the department of Antioquia, particularly in the semi-arid regions of the Cauca river basin, together with those of some other rivers. It can also be found in the department of Meta (specifically in the *altillanura*, which is actually a large, slightly higher portion of the Eastern Plains) and in the Caribbean region, usually growing below 1500 m a.s.l.

Consumption mode: Having being picked up from the ground, the pod is slapped against a solid surface, or else hit with a stone or hammer in order to consume the powdery pulp that is around the seeds, which contains 3.2% sugar, 1.1% fat and 35.8% crude fiber (Hueck, 1961).

Uses: Direct consumption of the fruit pulp. In addition, juice and other preparations are appreciated (Wistberger et al., 1982).

Note. Due to its valuable timber, it has been extinct in some regions. Its bark possesses medicinal properties.

SUGAR APPLE

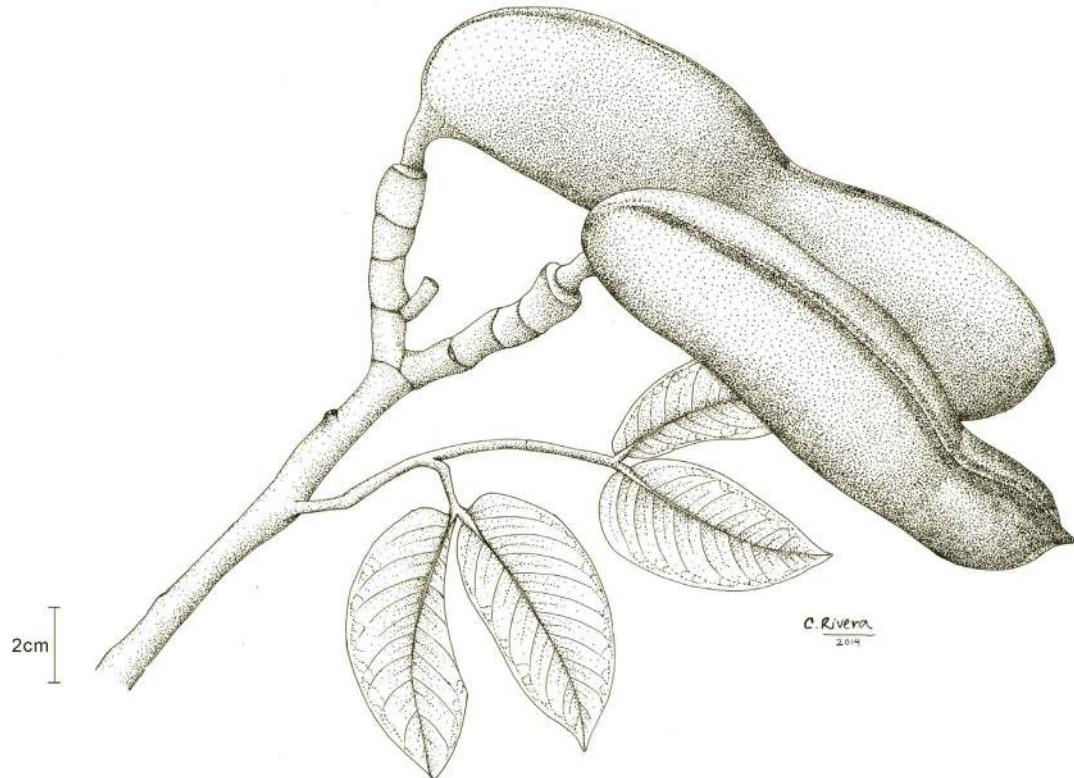
Common names: Anón, anon rugoso, tetillas, anón caucano, anón de verruga.

Family: Annonaceae.

Scientific name: *Annona squamosa* L.

Fruit type: Berry.

Main plant features: Woody shrub, 3 to 6 m tall. Leaves simple, alternate. Flowers arranged individually or growing in inflorescences bearing just a few of them. Fruit globoid, egg-shaped, with number of seeds highly variable, 5 to 12 cm diameter and 200 to 800 g weight, containing a sugary, very aromatic, white–yellow pulp with a pleasant flavor (Almeida et al., 2006; Guerrero and Fischer, 2007).



Hymenaea courbaril L.

Geographical distribution: It grows in hot, arid climates. This species is very common in the upper basin of the Magdalena river, as it crosses the departments of Huila, Tolima and Cundinamarca. It also grows in the departments of Valle del Cauca, Magdalena, Cesar and Guajira. In all cases it is found below 1000 m a.s.l.

Consumption mode: The ripe fruit is recognized for being soft. It can be easily opened to consume the mucilage (commonly known as *baba*) that surrounds the seeds, which are finally expelled from the mouth.

Uses: It is usually consumed fresh, while in some regions it is used to prepare alcoholic beverages (Pérez, 1956).

COCOA

Common names: Cacao, cacao dulce, cacao criollo, chocolate.

Family: Malvaceae.

Scientific name: *Theobroma cacao* L.

Fruit type: Berry.

Main plant features: Tree, 3 to 4 m tall, typically growing in the understory. Trunk glabrous or partially pubescent, with a dark gray-brown bark and brown, finely haired branches. Leaves coriaceous, simple, with entire margins, the flush (young and developing leaves) exhibit a range of colors from lightest green to red shades (Aragon, 2009). Inflorescences caulinar and cymose; flowers pentamerous, hermaphrodite, actinomorphous. Fruit polymorphous, spherical or fusiform, glabrous, with 5 to



***Annona squamosa* L.**

10 longitudinal grooves acquiring purple to yellow color when ripe, weighting 200 to 1000 g (Dostert *et al.*, 2012) and containing a soft, fleshy pulp of milky appearance.

Geographical distribution: In all humid regions of Colombia, below 1000 m a.s.l. The most productive departments are Nariño, Huila, Arauca, Tolima, Antioquia and Santander.

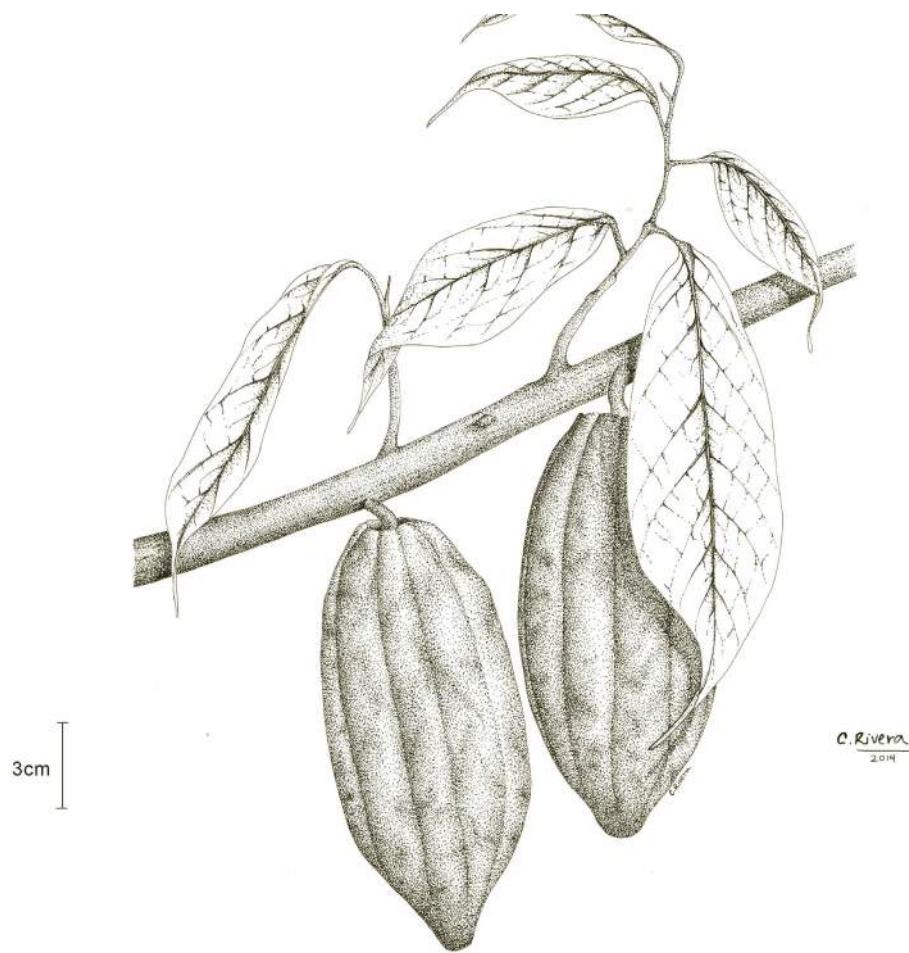
Consumption mode: The fruit is opened with a knife or by hitting it against a hard, angular surface in order to suck the mucilage (baba) that surrounds the seeds. The most important product of cocoa is the one obtained from the seeds themselves, which is used to produce pure

chocolate, cocoa liquor and its derivatives: cocoa butter and cocoa powder.

Uses: In cocoa growing regions, workers and children usually suck the mucilage, while in other countries such as Brazil; it is used to prepare jelly and alcoholic beverages. Still, the main use is the processing of the dried beans, which are the base for obtaining chocolate, chocolate confections and other derivatives.

CAIMITO

Common names: Caimito, caimito amarillo, madura verde, pega novios.



Theobroma cacao L.

Family: Sapotaceae.

Scientific name: *Pouteria caitito* (R. et P.) Radlk. (yellow),
Chrysophyllum caitito L. (purple).

Fruit type: Berry.

Main plant features: Tree up to 40 m tall, trunk whitish, bearing dense, thin, flexible, pendulous branches. Leaves bearing golden colored scales on the underside. Flowers white, small, hermaphrodite. Fruit green-purple or yellow, containing a soft, sweet, mucilaginous and white-translucent pulp (Lim, 2013).

Geographical distribution: It is distributed up to 1600 m a.s.l., on the piedmont of the Eastern plains and in the Amazon rainforest, from where it has moved to other hot regions of the country.

Consumption mode: Using a knife, the ripe yellow fruit is cut into quarters, each of which is hand-peeled to expose the edible flesh.

Uses: Fresh consumption.

Note. This fruit's pulp contains latex, which tends to glue the lips to one another; therefore, the name *pega novios*, figuratively indicating that it sticks "boyfriend to girlfriend". In order to consume the fruit without this limitation, people usually apply cocoa butter on the lips.

CHERIMOYA

Common names: Chirimoya.

Family: Annonaceae.

Scientific name: *Annona cherimola* L.

Fruit type: Berry.

Main plant features: Small, not very leafy tree, rarely reaching 8 m tall. Trunk firm and woody, with smooth bark. Leaves oval, hairy on the underside. Flowers hermaphrodite, with yellowish, purple marbled petals; they grow inconspicuously, solitary or in clusters of two or three units. Fruit evergreen, weighing 800 to 1000 g (sometimes up to 2 kg); it is a syncarp formed by multiple carpels attached to a common receptacle; fruit pulp white, fleshy, soft, moderately juicy, with creamy texture and sweet taste (González, 2013).

Geographical distribution: Cherimoya is produced between 1000 and 2000 m a.s.l., in the semi-arid regions of the Colombian Andes. Those from the Tenza valley

in the department of Boyacá, and from the basin of the Guaitara river in the department of Nariño, are very famous.

Consumption mode: The ripe fruit does not change color; instead, it is recognized through its softness. The pulp surrounding the seeds is sucked and the seeds are expelled.

Uses: Fresh consumption.

RED MOMBIN

Common names: Ciruela, hobo, jobo, cocota.
Family: Anacardiaceae.



***Pouteria caimito* (R. et P.) Radlk. (yellow),
Chrysophyllum caimito L. (purple).**

Scientific name: *Spondias purpurea* L.; reddish "hobo" corresponds to *S. bombin* L.; yellow "hobo", to *S. citherea* L. Fruit type: Drupe.

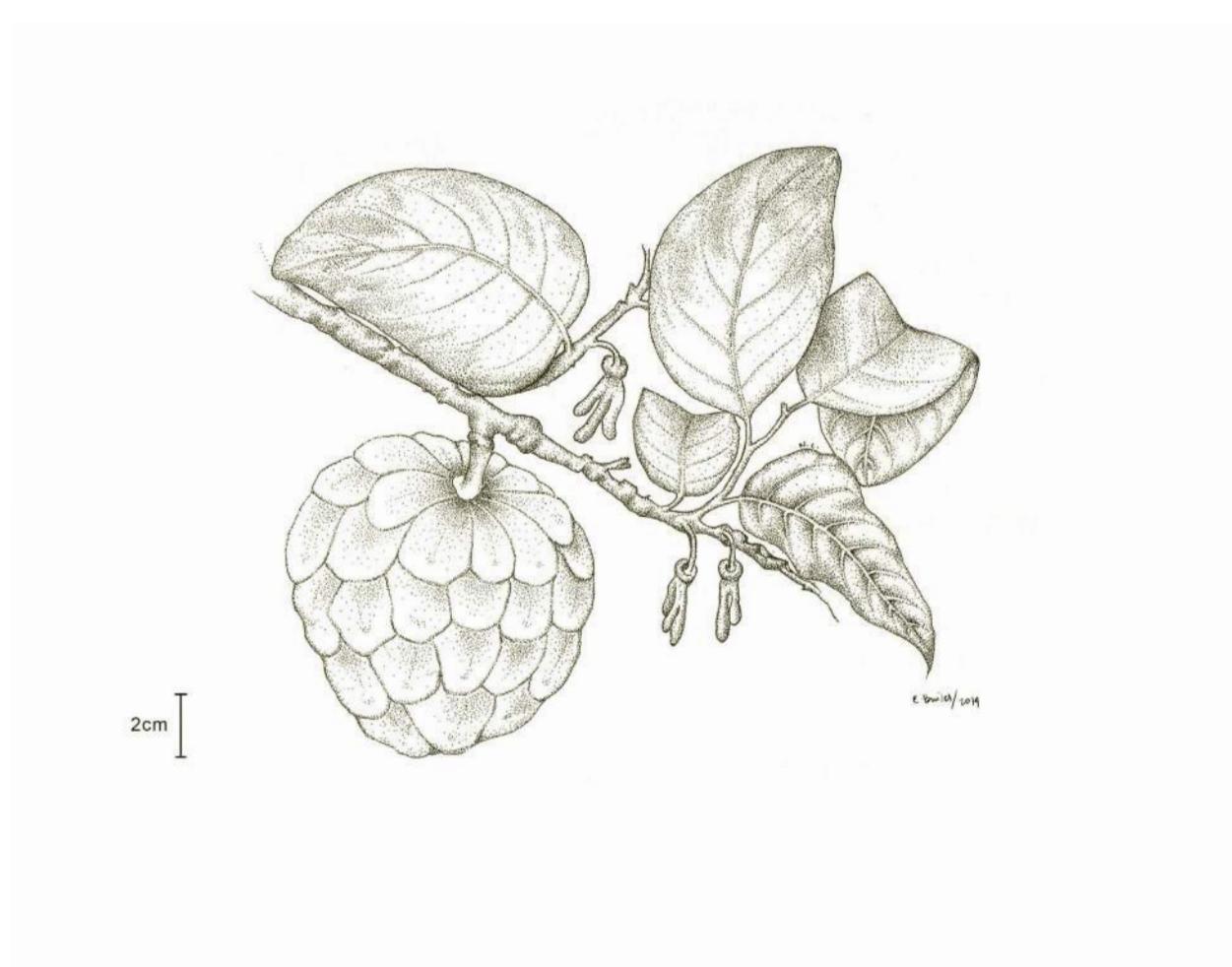
Main plant features: Tree up to 7 m tall. Trunk ramified, with a thick, coarse, gray bark rich in gums. Leaves compound, imparipinnate, bearing 17 to 19 leaflets. Flowers growing in axillary panicles. Fruits of wild cultivars are usually bright red, cylindrical, 2 - 4 cm long and 1.5 cm wide, more acidic than the cultivated fruits, with considerably less flesh surrounding the seed, growing in racemes and producing a juicy yellow flesh (Miller and Shaal, 2005; Vargas-Simón *et al.*, 2011).

Geographical Distribution: Below 1200 m a.s.l., in the hot and dry regions of the departments of Cauca, Huila, Tolima, Antioquia, Sucre, Magdalena Cesar and Guajira.

Consumption mode: It is washed and then is consumed fresh.

Uses: Fresh consumption.

Note. Out of the fruits treated in this paper, it is the only one in which the fleshy rind is masticated, the rest of the content being sucked, and the seed expelled.



***Annona cherimola* L.**

YELLOW GENIP

Common names: Cotoperí, cotopli, cutupli, juria, mamón, cotoprí, mamón de María, mamón de mico.

Family: Sapindaceae.

Scientific name: *Talisia olivaeformis* (H.B.K.) Radl. (= *Melicocca olivaeformis* H.B.K.).

Fruit type: Berry.

Main plant features: Tree about 12 m tall, with rounded and leafy crown. Trunk erected, with smooth bark. Leaves alternate, compound, paripinnate, petiolate. Inflorescences axillary or terminal. Fruit ellipsoid, 2 to 3.5 cm long and 1.5 to 2.5 cm wide, arranged in clusters of 10 to 25 units with yellow-orange shell and whitish hairs. Pulp also whitish, with sweet taste (Janick and Paull, 2008).

Geographical distribution: Below 1200 m a.s.l., in the warm and dry valleys of the departments of Sucre, Bolívar, Magdalena, Cesar and Guajira.

Consumption mode: The shell is removed with a small incision in order to suck the pulp that surrounds the seed.

Uses: Fresh consumption, juice and jam. It is refreshing and slightly laxative.

Note. According to Romero (1969), "this tree is adequate to reforest poor soils in hot regions".

BANANA PASSION FRUIT

Common names: Curuba de Castilla, curuba quiteña, curuba de indio, curuba antioqueña.



Spondias purpurea L.

Family: Passifloraceae.

Scientific name: *Passiflora mollisima* (H.B.K.) Bailey corresponds to curuba de Castilla; *P. mixta* L., to curuba de indio; and *P. antioquensis* Karst., to curuba antioqueña. The latter are considered by some authors to be varieties of the former.

Fruit type: Berry.

Main plant features: Creeping, very long stems. Leaves deeply lobed, serrated, petiole-glandular, stipulate, somewhat tomentose. Flowers tubular, solitary, pentamerous and hermaphrodite. Fruit 5-12 cm long and 3-4 cm wide, hanging on a long petiole; it acquires a cream or pale yellow color when ripe and contains an aromatic, gelatinous, orange pulp whose organoleptic features make it apt for beverage preparation (Aular *et al.*, 2004; Bernal and Díaz, 2005).

Geographical distribution: All regions of the Andes above 2000 m a.s.l., especially the departments of Nariño, Cundinamarca, Boyacá and Antioquia.

Consumption mode: The ripe fruits are peeled to suck the content, which is sometimes mixed with a little sugar. For other purposes, the seeds are removed with a strainer.

Uses: Fresh consumption. The juice, sorbet, ice cream and spongy of this fruit are very well known. Some people from Cundinamarca and Boyacá consider it to be the "queen fruit".

SWEET GRANADILLA

Common names: Granadilla, mocos de carbonero, parcha.



***Talisia olivaeformis* (H.B.K.) Radl. (= *Melicocca olivaeformis* H.B.K.)**

Family: Passifloraceae.

Scientific name: *Passiflora ligularis* Juss.

Fruit type: Berry.

Main plant features: Vines that climb by means of tendrils. Leaves alternate, stipulate (Hernández and Bernal, 2000). Flowers purple, strikingly influencing the presence of pollinating insects. Fruit weighting 113 g in average, out of which 60% corresponds to the edible part; it possesses a thick and brittle shell that changes from green to bright yellow depending on the degree of ripeness (Linares *et al.*, 2013).

Geographical distribution: From 1700 to 2000 m a.s.l. Commercially grown in the departments of

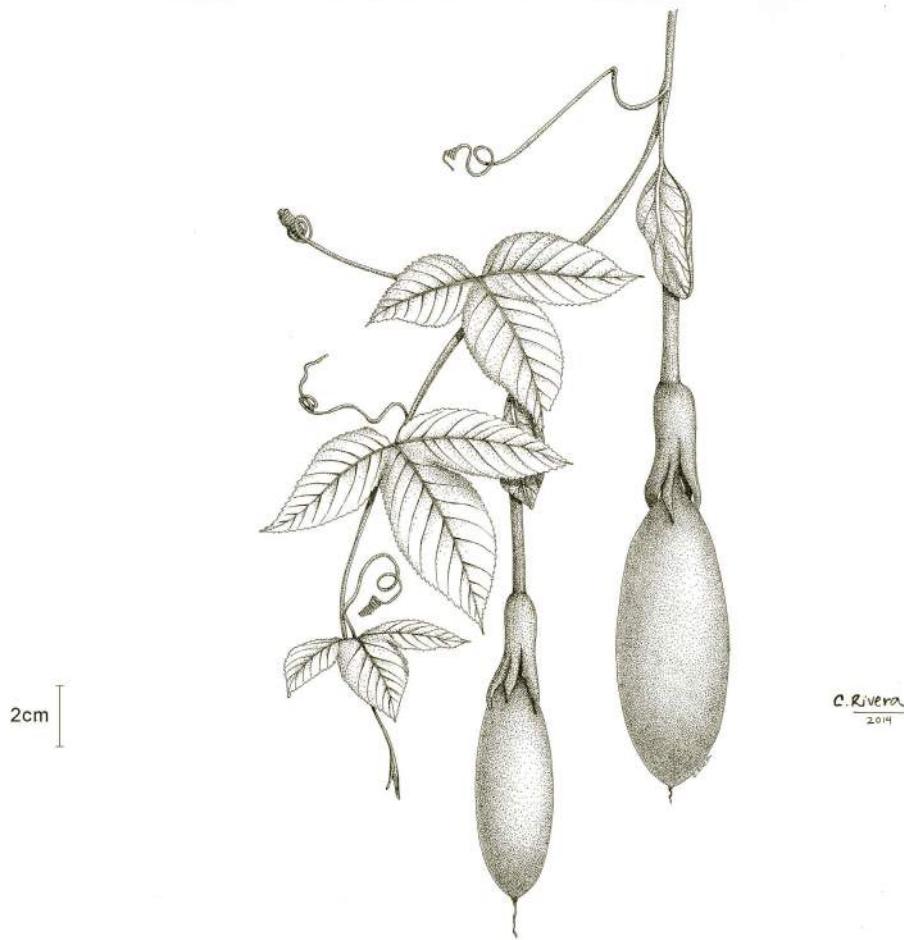
Antioquia, Huila, Valle del Cauca, Caldas, Risaralda, Cundinamarca and Antioquia.

Consumption mode: With a slight finger pressure, the thick shell is broken and then removed to expose the endocarp containing the seeds surrounded by mucilage, all of which is consumed. For juice preparation, the seeds are removed with a strainer.

Uses: Fresh consumption and fruit salads. It is also prepared in juice, especially for babies.

ICE CREAM BEAN

Common name: Guamo (*i.e.*, the name of the tree), guama, guama macheta.



***Passiflora mollissima* (H.B.K.) Bailey**

Family: Mimosaceae (Leguminosae)

Scientific name: *Inga spectabilis* (Vahl.) Willd. Corresponds to "guamo macheto"; *Inga edulis* Mart., to "guamo rabo de mono" or "guamo santafereño" and still, there are other species.

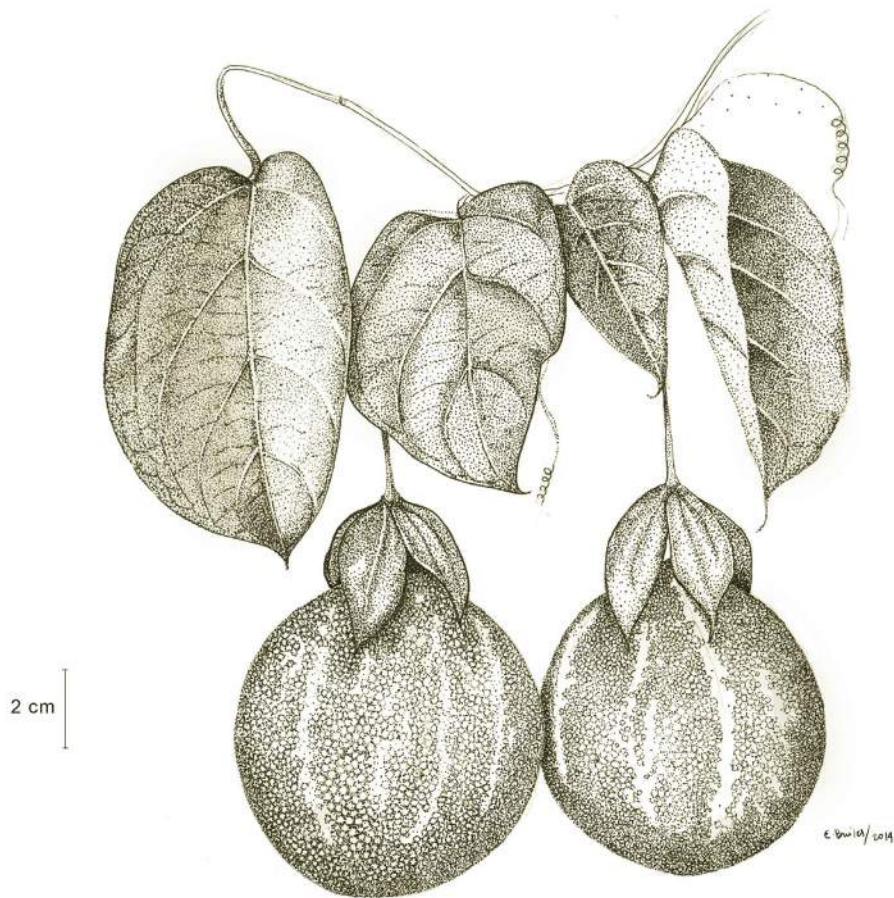
Fruit type: Pod.

250 to 600 g, containing $22 \pm 4\%$ of a very sweet and barely fibrous edible pulp (Falcao and Clement, 2000; Lojka *et al.*, 2010).

Geographical distribution: Since they were once recommended as shady trees for coffee, they can be found in all Colombian coffee regions, 1300 – 1900 m a.s.l.

Mode of consumption: The pod is opened, usually by twisting it to expose the seeds and their cottony arils, which are finally consumed.

Uses: The pulp surrounding the seed, which has a sweet vanilla taste, is consumed directly or in refreshing beverages.



***Passiflora ligularis* Juss**

SOURSOP

Common name: Guanábana, graviola.

Family: Annonaceae.

Scientific name: *Annona muricata* L.

Fruit type: Berry.

Main plant features: Tree, 6-8 m tall, with ramified trunk. Leaves alternate, bright green, 14-16 cm long, 5-7 cm wide. Flowers hermaphrodite, actinomorphic and hypogean, arranged individually along the stem. Fruit aggregate, ovoid-ellipsoid, 10-30 cm long, 10-15 cm diameter, weighing up to 7 kg (Miranda, 2012). Fruit skin dark green with short, fleshy spines; fruit pulp fleshy, creamy, juicy and subacid (Orwa, *et al.* 2009; García-Soto *et al.*, 2011).

Geographical distribution: It grows below 1900 m a.s.l., in the humid and semiarid regions of the department of Valle del Cauca and in the coffee zone.

Consumption mode: The ripe fruit does not change its green color, but its consistency, which becomes soft. It is easily opened by hand, in order to expose its content, which is white cottony due to the aryl that wraps the seeds.

Uses: Fresh consumption is frequent. Currently, however, it is more popular in juices, ice creams, sorbets, sponges and desserts.

GULUPA

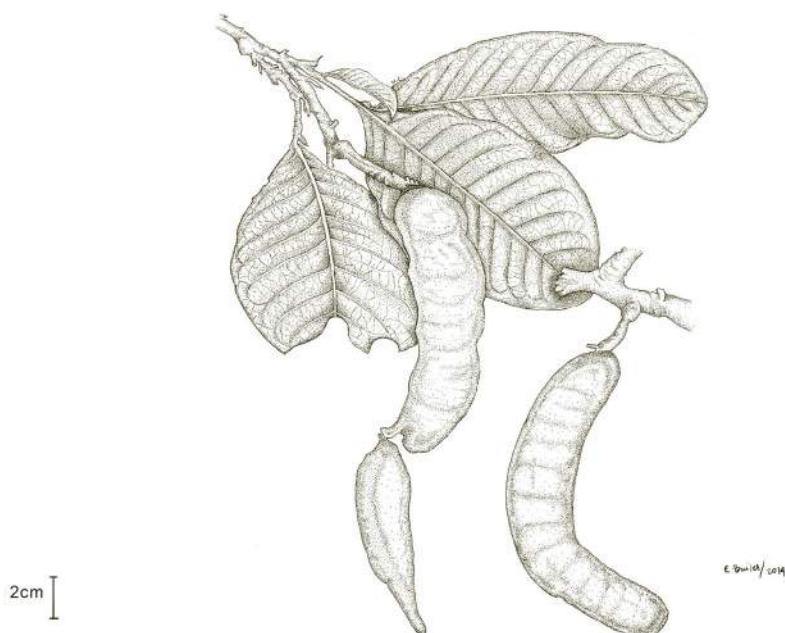
Common names: Gulupa, culupo, golupo, gulupo, curuba redonda, curuba morada.

Family: Passifloraceae.

Scientific name: *Passiflora edulis* var. *edulis* Sims.

Fruit type: Berry.

Main plant features: Climbing vine with glabrous stems. Leaves alternate, ovate, elliptical, cordate at the base.



Inga edulis Mart

Flower pendulous with three green bracts surrounding it when immature; when mature, it exhibits a crown with red and white stripes and lilac apex. Fruit is olive green when this immature and purple when ripe, round or oval, with hard shell; 4-8 cm diameter and 50 to 60 g weight (Pinzón *et al.*, 2007); fruit aryl orange, pulpy, slightly acid and with good organoleptic characteristics regarding taste and aroma (Franco *et al.*, 2014).

Geographical distribution: Temperate climate, 1500 - 2500 m a.s.l. Very popular in the coffee zone.

Consumption mode: By pressing the shell, it is broken, which allows slurping the content.

Uses: Fresh consumption and juice.

PRICKLY PEAR

Common names: Higo chumbo, chumbera, nopal.

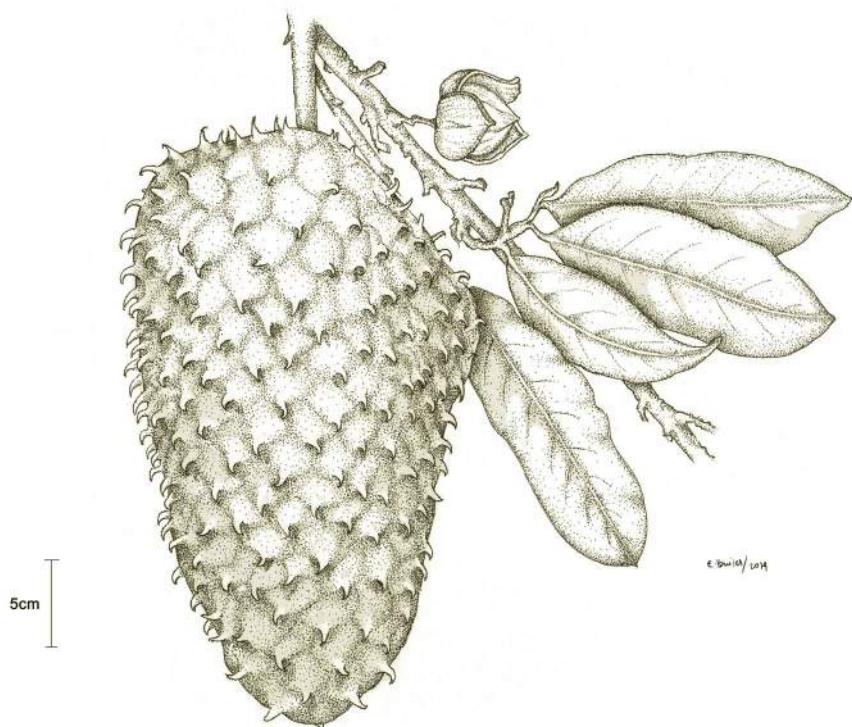
Family: Cactaceae.

Scientific name: *Opuntia ficus-indica* (L.) Miller.

Fruit type: Berry.

Main plant features: Arborescent plants up to 5 m tall, with woody trunk and flattened branches for water storage in tissues, which are recovered by a thick cuticle with green photosynthetic function. Leaves small, fleshy and deciduous. Flowers hermaphrodite, single, growing on the upper part of the stalk. Fruit spherical to ovoid, 5.2 – 12 cm long, 5.7–6.8 cm diameter, 114 g to 240 g weight, green when unripe and taking different colors when ripe; it is mainly composed of water (83%); fruit pulp gelatinous and sweet, containing many seeds (Pimienta-Barrios, 1995; Amaya, 2009; Almanza-Merchán and Fischer, 2012).

Geographical distribution: Semi-arid zones; it is grown between 1700 and 3000 m a.s.l. The prickly pears



Annona muricata L.

from the municipalities of Villa de Leyva (Boyacá) and Sonsón (Antioquia) are very famous.

Consumption mode: The fruit is opened with a knife and peeled to consume all the content including the seeds. Very popular in fruit salads.

Uses: Fresh consumption.

Note. The solid center of the fruit is sliced or eaten with a spoon, for it to dissolve in the mouth.

COCOPLUM

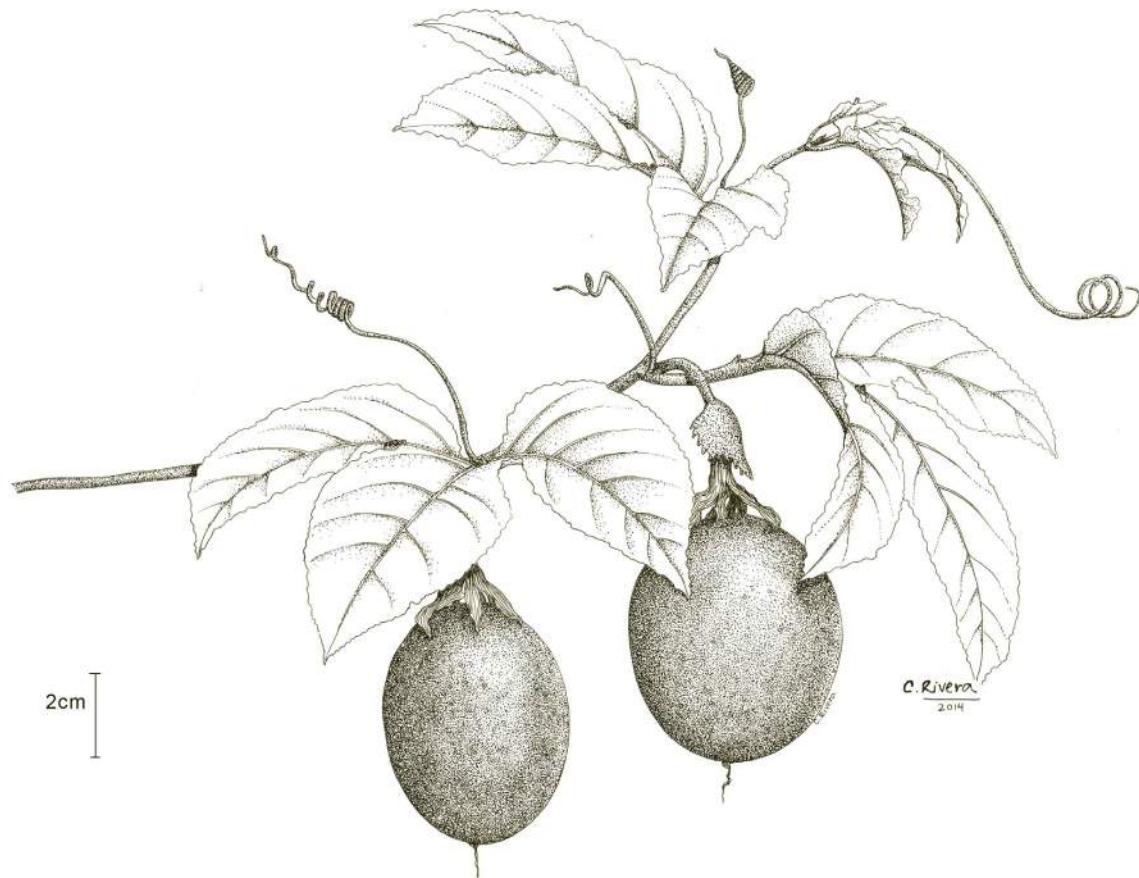
Common name: Icaco, coco-plum.

Family: Amigdalaceae.

Scientific name: *Chrysobalanus icaco* (L.) L.
Fruit type: Drupe.

Main plant features: Small tree up to 5 m tall, with decumbent crown and almost round leaves. Inflorescences are small and axillary cymules bearing white flowers. Fruit ovoid or spherical, 2-5 cm long, 4.36 ± 1.12 g weight, pink, red or purple; fruit pulp thick, white, juicy, slightly sweet or insipid, containing fats and phenolic compounds (Espinosa-Osorio *et al.*, 2002; Francis, 2003).

Geographical distribution: It grows in the Caribbean region and the departments of Boyacá, Caldas, Cundinamarca, Huila, Tolima, Santander and Norte de Santander, below 1000 m a.s.l.



Passiflora edulis var. *edulis* Sims.

Consumption mode: The fruit is washed in order to consume its cottony content directly.

Uses: Fresh consumption (barely attractive taste) and especially desserts.

MADRONO

Common names: Madroño, Fruta de mono.

Family: Guttiferae.

Scientific name: *Rheedia madruno* (HBK) Pl. et Tr.

Fruit type: Berry.

Main plant features: Tree 6-8 m tall with dense crown and attractive foliage. Leaves dark green, opposite, elliptic to oblong, containing yellow latex. Flowers unisexual, produced on branch nodes in clusters of 1-15 units. Fruit round, ovoid or ellipsoid, 4-9 cm long

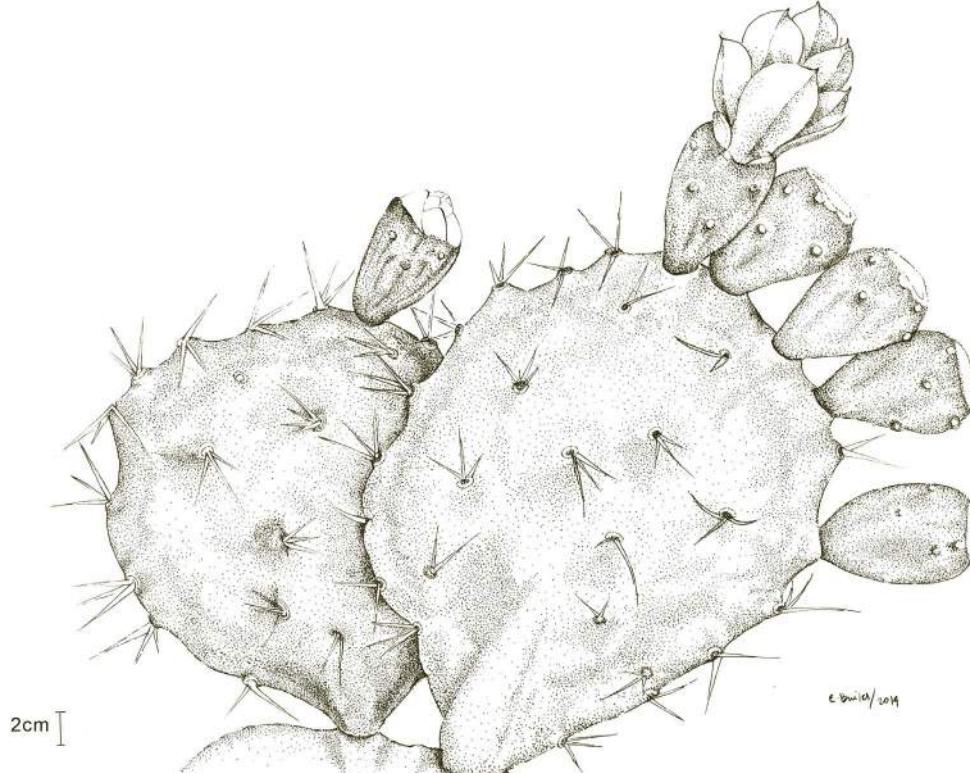
and up to 4 cm diameter, with a thick yellow shell that becomes tuberculate when ripe; fruit pulp white, aromatic, juicy and bittersweet (Flores, 2004; Rivero and Bruner, 2006).

Geographical distribution: Departments of Cauca, Caldas, Cundinamarca and Antioquia, between 1000 – 1500 m a.s.l.

Consumption mode: A slight pressure is enough to break the shell and expose the seed with its spongy bittersweet aryl.

Uses: Fresh consumption or as dessert.

Note. A new variety (species?) with smooth-skinned fruit has been found in the department of Meta.



***Opuntia ficus-indica* (L.) Miller.**

SPANISH LIME

Common name: Mamón, mamoncillo

Family: Sapindaceae.

Scientific name: *Melicoccus bijugatus* L.

Fruit type: Drupe.

Main plant features: Tree up to 15 m tall, with straight trunk and fissured bark. Leaves coriaceous, elliptical, glabrous, bright and green. Flowers greenish white, grouped in terminal panicles and growing on dioecious or monoecious trees (Francis, 1992). Fruits

almost rounded, growing in racemes, with coriaceous, green or greenish-yellow exocarp. At ripeness, the fruit flesh, which presents a strong bittersweet taste, is gelatinous and salmon colored (Morton, 1987).

Geographical distribution: It grows in dry climates, below 1000 m a.s.l.

Consumption mode: The shell is removed with a slight nail cut, or most commonly with teeth. Thus, the seed is released with its mucilage (locally known



Chrysobalanus icaco (L.) L.

as *baba*), which is sucked; finally, the seed is expelled. To prepare juice, the peeled fruits are put into a tall, narrow neck pot, commonly named *olleta*; then, making use of a handcrafted stirrer known as *molinillo*, they are shaken to remove the arils; after removing the seeds, water and sugar can be added to taste.

Uses: Fresh consumption and juice.

Note. This tree is very appropriate for protecting watersheds in dry regions. After all, it is never cut, because it is profitably harvested twice a year.

MANGO

Common name: Mango is originated in the Indo-Burma region and are indigenous to India and Southeast Asia; grow in tropical and subtropical climates, this means

they do grow in Colombia, where there are a lot of mango cultivars known as "criollos". According to Aristizábal (2004), this classification corresponds to cross-pollinated cultivars, with little selection and high genetic variability, propagated primarily by seed. A cultivar very important is the Azúcar mango.

Family: Anacardiaceae

Scientific name: *Mangifera indica* L.

Fruit type: Drupe.

Main plant features: Tree, 5 to 15 m tall, with an oblong, pyramidal or semicircular canopy. Leaves are lanceolate

or oblong lanceolate, dark green, with prominent light colored veins and entire margins. Emerging leaves on new growth flushes are bronze-red initially, and appear wilted. The inflorescence stem is red and covered with fine pubescence, has a conical and pyramidal shape, 20 to 30 cm long, and is high or low density flowered; above 16-45 are hermaphroditic. Fruit oblong oval, elliptical, irregular oval, cordiform and oblique oblong up to 9.7 cm long and 6.7 cm wide, weighing from 77-226 g; the skin is a combination of red and yellow colors, at ripeness the yellow flesh is juicy and sweet (13-25 °Brix) (Lozano, et al., 2010).



***Rheedia madruno* (HBK) Pl. et Tr.**

Geographical distribution: Below 1200 m a.s.l., in the warm and dry valleys of the departments of Huila, Tolima, Cundinamarca, Sucre, Bolívar, Magdalena, Cesar and Guajira.

Consumption mode: The ripe fruit is squeezed manually or against a flat surface, so that its internal content is softened, thus becoming semi-liquid. Then, a small perforation is

made on the apex of the fruit, in order to suck out the sweet syrup thus obtained.

Uses: Fresh consumption and juice. Furthermore, Corrales-Bernal et al. (2014) suggest that the fruit has antioxidant capacity and nutritional bioactive compounds with potential health benefits.

PURPLE MANGOSTEEN

Common name: Mangostino.
Family: Guttiferae
Scientific name: *Garcinia mangostana* L.
Fruit type: Berry.

Main plant features: Tree, 10-15 m tall. The trunk and main branches have resin canals on the cortex, which secrete thick, yellow or green latex (León, 2000). The foliage is dense, with intense green color; leaves opposite, with protruding veins on the underside. Flowers male or hermaphrodite, the former arranged on branch tips forming clusters of 3 to 9 units; hermaphrodite flowers grow solitary or in pairs (Morton, 1987). Fruit round, 6-7 cm diameter, 30 to 240 g

weight, glossy purple color, with an enhanced rosette at the apex. The edible part of the fruit consists of 4-8 fleshy segments of translucent white color and a very delicate taste (Kersul do Sacramento, 2007).

Geographical distribution: It is very well known in the department of Valle del Cauca. Also grown in commercial farms in the municipality of Mariquita (Tolima), below 1000 m a.s.l.

Consumption mode: The shell is opened to expose the four seeds with their cottony white aril, which is sucked.

Uses: Fresh consumption.



***Melicoccus bijugatus* L.**

Note. This species is native of Asia. According to Perez (1956), it was brought by English railway workers to the municipality of La Dorada, Caldas.

YELLOW PASSION FRUIT

Common names: Maracuyá, fruta de la Pasión, parchita.

Family: Passifloraceae.

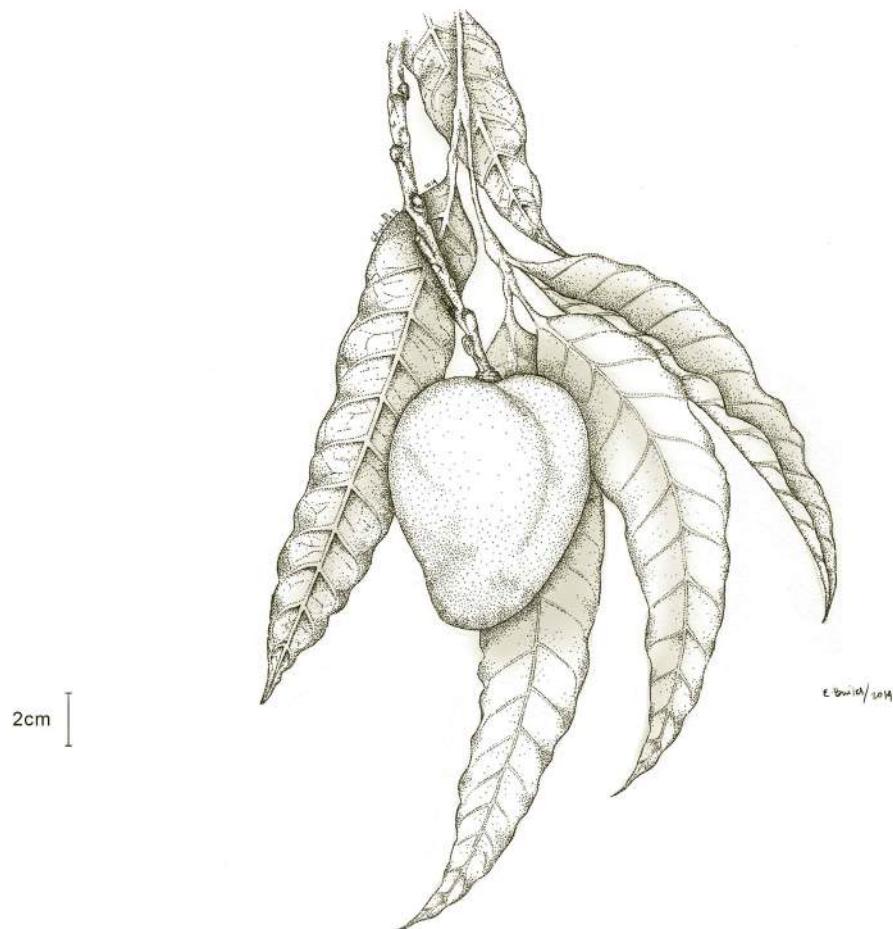
Scientific name: *Passiflora edulis* var. *Flavicarpa* Degener.

Fruit type: Berry.

Main plant features: Climbing vine, woody at the base, showing grooved, glabrous, green stems. Branches up to 20 m long, with axillary tendrils wound in spirals (Amaya, 2009). Leaves palmate,

three-lobed when mature. Flowers hermaphrodite, with flashy color, strong smell, dense pollen and abundant nectar at the base of the corolla. Due to self-incompatibility, they require cross-pollination for fruiting (Leitão Filho and Aranha, 1974). Fruit yellow, spherical or ovoid, 4 to 8 cm diameter, 6-8 cm long, and 70 to 150 g weight, containing 200 to 300 seeds. Each seed is surrounded by an aril that produces an aromatic sour juice with light yellow or intense orange color (Salinas, 2010).

Geographical distribution: Departments of Valle del Cauca, Huila, Meta, Caldas, Cundinamarca, Antioquia, Córdoba, Magdalena and Santander, below 1500 m a.s.l.



***Mangifera indica* L.**

Consumption mode: When ripe, the fruit wrinkles a little, which indicates it has lost water and is ready for consumption. A cut is made on the shell, which is then opened with the fingers, to slurp the seeds and the sour juice.

Uses: Although some people eat it fresh, it is also used to prepare juice, jam and desserts.

DRAGON FRUIT

Common names: Pitaya, pitahaya, pitajaya, pitayá.

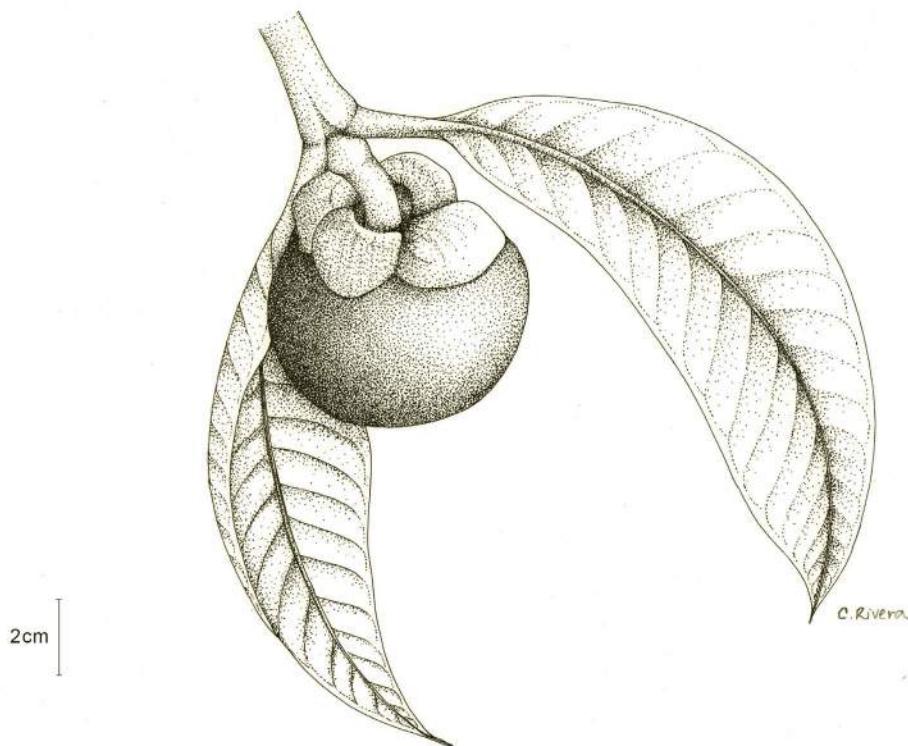
Family: Cactaceae.

Scientific name: *Hylocereus megalanthus* (K. Shum. ex Vaupel) Ralf Bauer.

Fruit type: Berry.

Main plant features: Climbing cactus with triangular green stems that branch and hang in the air. The hanging stems are the ones that bear flowers and fruits, thus requiring training. Flowers tubular, white or pink, hermaphrodite and nocturnal (León, 2000). Fruit ovoid, up to 12 cm long and 6 - 10 cm wide, weighing from 120 – 250 g; when ripe, it varies from red to yellow, depending on the species. The mesocarp, which is the edible part, is constituted by a bittersweet mucilaginous pulp with a delicate aroma and thousands of soft tiny seeds (Corredor, 2012; Esquivel and Araya, 2012).

Geographical distribution: Warm and temperate climates, below 1800 m a.s.l. It is a commercial crop in the coffee zone.



***Garcinia mangostana* L.**

Consumption mode: The fruit is opened to consume its mucilaginous seeds, either by eating them directly or with a spoon.

Uses: Fresh consumption.

Note. The mastication of the seeds should be avoided, unless the person wants to be under their laxative effect.

TAMARIND

Common names: Tamarindo, tamarindero, mandarín, tamarindo de la India.

Family: Leguminosae.

Scientific name: *Tamarindus indica* L.

Fruit type: Pod.

Main plant features: Tree with round, leafy and densely spread crown; trunk reaching up to 25 m tall. Leaves bipinnate, alternate, glabrous, bearing small opposite leaflets with rounded apex, entire margin and asymmetrical base. Flowers inconspicuous, produced in small yellow clusters and showing orange or red stripes (Morton, 1987). Fruit pod oblong, 7.5 to 15 cm long and 2.5 cm wide, pendulous and indehiscent, with 2 – 6 seeds; when ripe, it is brown, exhibiting a curved, thick and brittle shell; the pulp is fibrous and dark brown (Parrotta, 1990; Reyes, 2012).

Geographical distribution: Valleys and dry banks of the Cauca, Magdalena and Patía rivers, between 500 – 800 m a.s.l. It is very common in the department of La



***Passiflora edulis* var. *Flavicarpa* Degener.**

Guajira, where some crops for the extraction of tannins were once established.

Consumption mode: The dried pods are broken with a small blow; thus, pulp and seeds are exposed, so that they can be consumed by sucking the pulp and expelling the seeds. Its penetrating flavor is due to an elevated content of tartaric acid. To prepare juice, the pulp is separated from the seed and liquefied with water and sugar to taste.

Uses: It is rarely consumed fresh due to its very sour taste. Mostly used for juice preparation.

Note. For some people, it has a laxative effect.

TREE TOMATO

Common names: Tomate de árbol, tamarillo, tomate de agua, tomate andino.

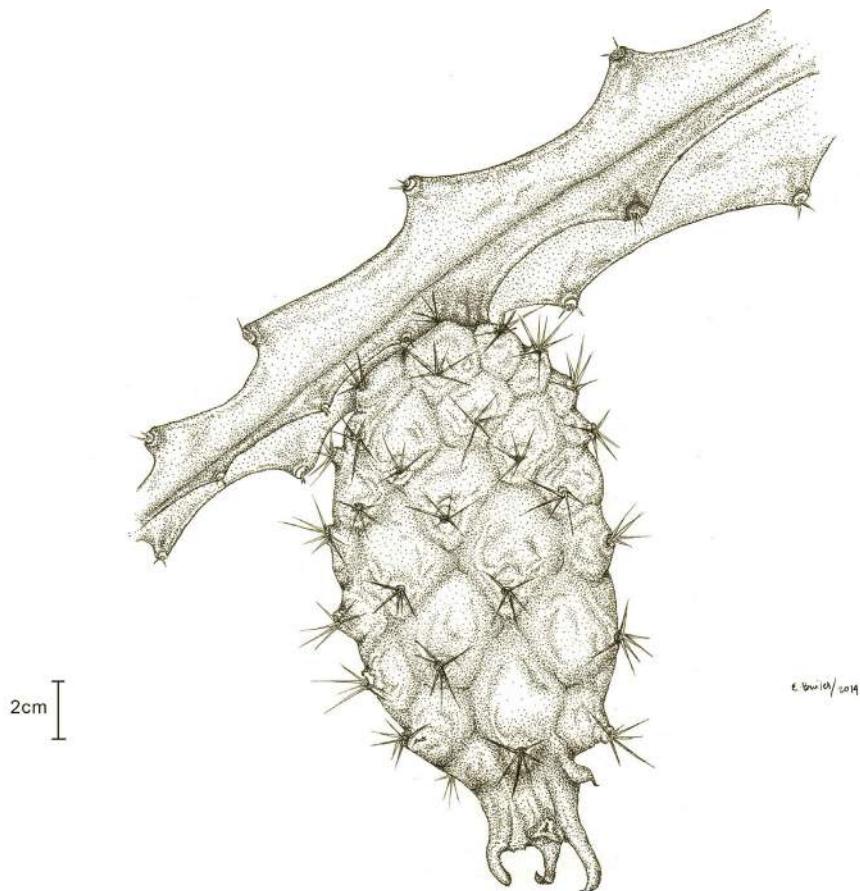
Family: Solanaceae.

Scientific name: *Cyphomandra betacea* (Cav.) Sendt.

Fruit type: Berry.

Main plant features: Shrub 2-3 m tall with herbaceous stem until the production stage, when it becomes woody. Leaves heart-shaped, subcarnose, softly pubescent on the underside. Flowers in numbers ranging from 10 to 73, grouped in white or purple inflorescences (Bernal and Díaz, 2003). Fruit dark red to orange, oblong, 8 cm long and 4 cm wide, weighing from 40 to 130 g; its juicy pulp can be orange or yellow, with red or cream hues and bittersweet taste (Meza and Manzano, 2009).

Geographical distribution: Moderately cold climate, 1700 – 2500 m a.s.l., in the departments of Cauca, Huila, Tolima, Caldas, Cundinamarca, Antioquia and Santander.



***Hylocereus megalanthus* (K. Shum. ex Vaupel) Ralf Bauer.**

Consumption mode: Some people take the ripe fruit and squeeze it with their hands until it feels soft; then a portion of the apex is removed and its content sucked out. Alternatively, the pulp can be removed with a spoon. For syrup preparation, the fruits are peeled and cooked with sugar. To obtain juice, the fruit is peeled and liquefied in water.

Uses: Fresh consumption and juice. Also, the fruit is prepared in syrup.

Note. It is considered to have an elevated content of antioxidants.

GRAPE

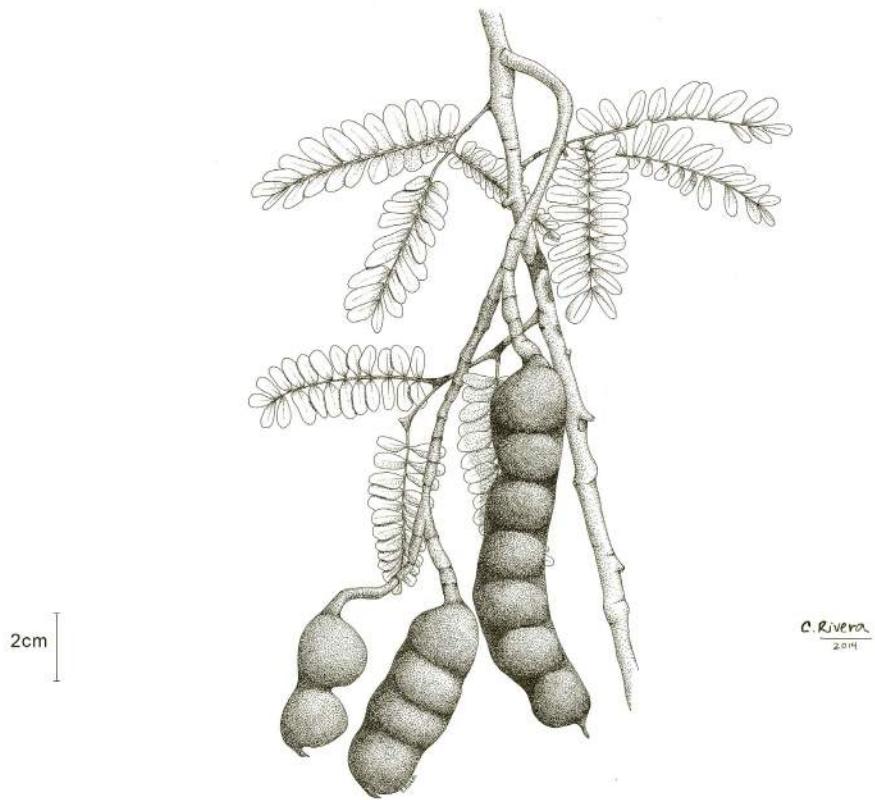
Common names: Uva. This being a commercial foreign specie not growing spontaneously or under incipient cultivation, it has no local common names.

Family: Vitaceae.

Scientific name: *Vitis labrusca* Lour.

Fruit type: Berry.

Main plant features: Climbing or creeping plant with twisted and tortuous trunk and thick and rough bark; young shoots flexible and thickened at the nodes. Leaves alternate, palmately lobed, usually heart-shaped, with 5-7 lobes, serrated margin and hairy/bristly abaxial surface. Tendrils grow opposing the leaf at the same node, except for the first two or three leaves at the base of the shoot. Flowers small, actinomorphic, hermaphrodite and pentamerous, arranged in hanging panicles opposing the leaves (Santos *et al.*, 2005). Fruit yellow, pink or purple, spherical to oval, presenting fleshy consistence and weighing from 5 to 10 g (Almanza, 2011); fruit pulp colorless, juicy and sweet.



***Tamarindus indica* L.**

Geographical distribution: Departments of Valle del Cauca, Boyacá, Cundinamarca, Santander and Norte de Santander, between 900 – 1660 m a.s.l.

Consumption mode: In Colombia, grapes are mainly consumed directly as fresh fruit. The fruit is detached from the bunch, and then washed and eaten directly, after which the seeds are expelled from the mouth.

Uses: Fresh consumption, juice and wine.

Notes. There are several grapevine species. Some of them are American, while others are European or Asian; nonetheless, they are all grown in tropical or

subtropical regions. On the other hand, the description corresponds to cv. Isabella.

SOUTH AMERICAN SAPOTE

Common names: Zapote, chupa chupa, zapote amarillo, zapote colombiano

Family: Bombacaceae.

Scientific name: *Quararibea cordata* Vischer.

Fruit type: Berry.

Main plant features: Tree 30-40 m tall, straight trunk with whorled branching. Leaves alternate, entire, ovoid or oblanceolate, pubescent and strongly innervated; during the dry season, they fall by 80%, indicating



***Cyphomandra betacea* (Cav.) Sendt.**

that the plant is at rest. Flowers white, pentamerous, born in clusters, with petioles 1-2 cm long; they grow under new branches or along leafless branches. Fruit ellipsoid or ovoid, 10-25 cm long / 8-12 cm wide and up to 3 kg weight, with a large permanent calyx at the base and a remnant of the pistil at the apex; fruit pulp orange, abundant, juicy, sweet and somewhat fibrous (León, 2000; Lim, 2013).

Geographical distribution: Wild plant of the lower Andes, growing below 800 m a.s.l. in the lowland and mild climate areas of Colombia. It does not grow in the

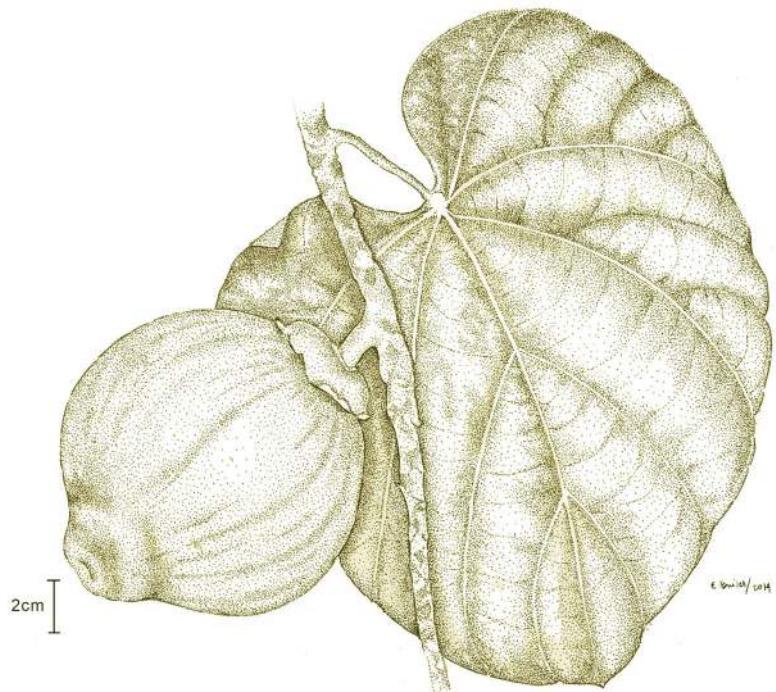
Caribbean region, where the coastal sapote (*Matisia cordata* Hum & Bonpl.) (a clearly different species with which it should not be confused) is typical.

Consumption mode: The fruit is usually harvested by cutting the peduncle 1-2 cm above the calyx attached to it, which is then manually removed. This leaves a hole in the fruit, through which the fingers are introduced to peel it and expose the pulp, which is sucked from around the seeds.

Uses: Fresh consumption.



***Vitis labrusca* Lour.**



***Quararibea cordata* Vischer.**

CONCLUSIONS

The native Neotropical flora includes a series of plants species with exotic tastes kept within the fruit shell. Although these greatly varied flavors had been known by indigenous peoples since ancient times, they are not very popular or well-known among most people today. These fruits are commonly referred to in terms of their taste, more than their abundant, solid flesh, thus setting a contrast with other foods, especially fruits from temperate regions.

Many of these species belong to tropical families, namely *Annonaceae*, *Passifloraceae*, or *Sapindaceae*, while others come from families with a wider biogeographical range. Still, they are all clearly tropical, some of them being native to certain areas of the Colombian territory. The specific edible parts of these fruits correspond to different anatomical structures in each case, while the remnants (often including the seeds) are normally not used.

Generally speaking, most of these special fruits grow below 1000 m.a.s.l., in arid or semi-arid regions. This makes them viable for reforesting creek or river watersheds. Likewise, the physiognomy of some of these trees makes them attractive for improving city aesthetics. Some madrones with a nice-looking color and shape can be found on the avenues of the city of Medellin.

In agronomic terms, many of the plant species that are grown because of their taste have only been recently domesticated, propagated and cultivated. It is common to find trees scattered in regions that are optimal for their growth, in spite of which they are the object of certain agronomic management practices by farmers. Since most of these fruits are produced seasonally, they are offered by street vendors during the harvest. Only a small fraction of this production enters formal fruit market channels.

Some other species have already overcome this condition and are currently undergoing intense

agronomic development. Several of these cultivated species have attracted the attention of industries, which have adapted them to obtain pulp, juice, jam and other processed products. Some of them have even conquered international markets.

The lack of knowledge on the adequate consumption characteristics of these fruits prevents many people from tasting them. Some of them do not change color when ripe; thus, their optimal consumption state is identified through fruit consistency at the touch of the hand. The harvesting periods are not well-known and, sometimes, it is hard to find the fruit in its optimal condition. On many occasions, it is necessary to finish the ripening of these fruits at home, normally by wrapping them in newspaper.

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