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## **Flora Grown and Traded in Panama City, in the 16th Century and Nowadays**

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### **Introduction**

The capital city of Panama is located on the Pacific side of the isthmus that united North and South America somewhere between 15 and 3 million years ago. The geology of that peculiar zone of the globe was first studied in detail in the 19th century (Moya, 2015), following the need to build a railway line that connected Panamá City to the Caribbean Sea port of Colón (1849-1855). The terrestrial connection was fed by the California gold rush, which further required a channel that could turn maritime travel from the Pacific to the Atlantic Oceans easier and faster. The Panama City area was colonised from the year 1514 onwards, when famous Spanish explorer Vasco Nuñez de Balboa discovered the so-called “Southern Sea” for posterity (Aritio, 2016). It was a small fishing pueblo for a while, up until official recognition of that specific location to harbour a city, in 1519, planned to have a regular grid of streets, drawn in a tropical environment that registers about 1,750 millimetres of rain per year, which favours the growth of food, medicinal herbs, fruit trees and ornamental species in gardens and pots.

In spite of having been destroyed by a British pirate called Morgan, in 1671, the urban agglomeration has been rebuilt further inwards and possesses uncountable number of churches and palaces, mostly Spanish style colonial buildings that are now a UNESCO World Heritage Site. After the completion of Panama Canal by the USA in 1914, a modern city grew in height, more recently fed by its fiscal paradise status. Even though the channel has been nationalised, following the end of North American exploration, Panama is still a very cosmopolitan urban centre, which location and biodiversity have fuelled the work of such institutions as the Tropical branch of the Smithsonian Institute (Coates and Stallard, 2015; Cramer, 2015). In early 2017 the University of Lisbon also conducted a scientific mission to the Latin-American environment in order to survey the local availability of flora, in contemporaneity, and compare those results with the plant species mentioned in a 16th century manuscript, as part of a long project initiated in Brazil in 1997, in the Portuguese Tropical Research Institute (IICT). The main objective of the research is to assess the availability of local food, spices and medicines in the early years of European colonisation and to evaluate the contribution of the Portuguese and the Spanish peoples to the evolution of flora consumption and therapeutic applications.

### **Material and Methods**

The research process was twofold: 1) Enumeration of the local flora as mentioned in the 1526 manuscript of Gonzalo Fernández de Oviedo (Gaibrois, 2002), with the construction of a database containing the vernacular names of the plants and the proposition of a scientific identification for them, as well as their uses in early colonisation times; 2) Design of a 2017

University of Lisbon survey to flora consumption and trade, including two categories of informants: i) three gardeners (3) devoted to food and medicines cultivation inside the urban tissue; ii) forty-seven (47) market, supermarket, pharmacy and natural product formal and informal traders.

The application of the survey was done by the author, using in-depth interviews similar to other Latin-American and Asian studies, conducted for about two decades (Madaleno, 2009; Madaleno and Delatorre-Herrera, 2013). Another database of modern vernaculars, their botanical identification and uses in contemporaneity was built, using the Missouri Botanical Gardens norm, available online (MBG, 2017). Finally, we compared both lists of taxa in order to evaluate the sustainability of both native and European introduced species, so as to permit us to add one more urban environment study to the thirteen previously explored (Belen and St. Louis, in Brazil; Lima and Piura, in Peru; Santiago and Iquique, in Chile; Río Cuarto in Argentina; Colonia del Sacramento, in Uruguay; Mexico City, Puebla and Cuernavaca, in Mexico; Havana, Cuba and San José, Costa Rica).

## Results and Discussion

Results show that 166 plants, corresponding to one-hundred seventy and one (171) different species are offered to the public in 2017, against fifty-five plants (55) mentioned by the chronicles in early colonisation days. More than half of the species have medicinal uses in our time and about a third are consumed as food. In the 1526 manuscript, Oviedo enumerated thirty-five native plants, even though some of the species he quotes have Asian origin, such as sweet oranges (see Table 1), or are from the Pacific Islands, in the case of coconuts (Mendes Ferrão, 1999). Coconuts are still preferred in Panama City, both as food and medicine, which gives ground to the theories that Pacific islanders have long visited each other, throughout Polynesia, and probably reached the Central and Southern American shores (Cochrane, 2002). Brought by navigators or just by sea currents, truth is coconuts predominate (17 occurrences).

The coconut tree description can be read in Chapter 45, a palm tree found wild in the Southern Sea coast (Pacific shores); the fruit, called coco, “is bigger than a man’s head” (Gaibrois, 2002, p. 152). The outer shell is good to make ropes, ship cables and even the sails, and the fruit pulp is highly nutritious and medicinal, with diuretic effects, as the water helps to brake kidney stones (Table 1). The survey reported that skin and scalp beautification are favoured nowadays, as well as the external application of creams to the legs, against circulatory problems. As evidenced in World Health Organisation studies, coconut milk is diuretic, allergenic, arrhythmogenic, hemotoxic, hypotensive, hypercholesteraemic, pyretic, antifungal, spasmogenic, estrogenic, and has positive effects in rehydration treatment (WHO, 2009).

According to Katie Cramer (2015), Latin America’s human presence dates from about 11,000 years ago. On the Pacific shores of Panama, human occupation was intensified around 5,000-3,000 B.C., as there are archaeological evidences of corn cultivation there. Indeed corn was also mentioned in Oviedo’s writings as being used to make a sort of bread and *chicha*, an alcoholic drink, but seeds were buried with dead relatives, either, in order to feed them in the sky, just under the assumption they needed to nourish themselves there (Gaibrois, 2002, p. 94, 97, 99, 149). In Santa Maria de la Antigua del Darién, where Oviedo had made a house built for himself, there were *huertos* with “many sweet and sour oranges, and citrus and lemons, as there was a good quantity of Christian settlements” (Gaibrois, 2002, p. 98-99). Some of these fruit trees could have been brought by the Spaniards as the text is not always clear about that; true is the apprehension of the 16<sup>th</sup> century author about the secondary role taken by the riverside city of Darién, despised in favour of the recently founded Panama City. Oviedo further mentions yuca (cassava) and potatoes as other local staples. These were occurrences (5) in markets and supermarkets, as they kept their usefulness in modernity.

Table 1 cross-examines the flora mentioned in Oviedo’s chronicles and the University of Lisbon survey. Plant species are organised by the number of occurrences during fieldwork, considered an

appropriate technique to assess the preferences in food, spices and medicinal flora consumption, in the urban environment under scrutiny. Only the top ten plant species are forwarded in this small contribution, and some of them are ranked ex aequo. More than half (6) of these plants were already harvested or cultivated in the 16<sup>th</sup> century. Gonzalo Fernández de Oviedo was the first Spanish writer of the newly discovered American continent, having lived there from 1514-1520. He left Central America one year after the foundation of Panama City, but in the meantime he had had the opportunity to extensively travel from coast to coast. His “Summary of the Natural History of the Indies” was published in Toledo, in 1526, and this fact provided him the possibility to become the official Crown writer, a job he got from the emperor Charles the fifth, in 1533.

**Table 1: Flora Used in 1526 and in 2017, in Panama**

Vernacular Name (English)	Botanical Name	Total N° of Occurrences	Uses in Oviedo	Medicinal Uses Reported in 2017
1.Coco <i>Coconut</i>	<i>Cocos nucifera</i> L. ARECACEAE	17	F, M	Hair care, body lotion, cream against circulatory problems, particularly in the legs together with arnica, sunflower, cocoa, calendula and chamomile.
2. Aloe, Sabila <i>Medicinal Aloe and American Aloe</i>	<i>Aloe vera</i> (L.) Burm. f., <i>A.barbadensis</i> Mill. ASPHODELACEAE	16	-	Skin problems, skin cleansing and softening, the sap has internal medicinal applications. Also applied to the scalp together with rosemary and coconut against baldness.
3. Ají, pimiento, pimentón <i>Chilli pepper</i>	<i>Capsicum annum</i> L. SOLANACEAE	14	F	Immune health enhancement supplement, the Cayenne pepper (2 reports). Main uses are as spice.
3.Mango <i>Mango</i>	<i>Mangifera indica</i> L. ANACARDIACEAE	14	-	Also consumed in refreshing tea together with <i>Thea sinensis</i> , and sunflower petals.
4.Limón, Cidro <i>Lemon and Citron</i>	<i>Citrus micrantha</i> Wester, <i>C. medica</i> L. RUTACEAE	13	F	Lemon oil is applied to the skin for body shaping. Also applied as butter cream and to the hair as oil ( <i>medica</i> ).
5.Manzanilla <i>Chamomile</i>	<i>Matricaria chamomilla</i> L. ASTERACEAE	12	-	The flowers are used to make creams and oils to apply for better blood circulation, particularly on the legs together with coco. Also applied in exfoliating creams and shampoos for blond hair.
5.Piña <i>Pineapple</i>	<i>Ananas comosus</i> (L.) Merr BROMELIACEAE	12	F, M	Infusion of the fruit together with passion fruit, mango, rose petals and sunflower.
5.Té verde y negro <i>Black and Green Teas</i>	<i>Thea sinensis</i> L. THEACEAE	12	-	Consumed in infusion, the green one for weight reduction.
6.Plátano <i>Banana</i>	<i>Musa paradisiaca</i> L. MUSACEAE	11	F	-
7.Naranjos dulces y agrios <i>Sweet and Sour Orange</i>	<i>Citrus sinensis</i> (L.) Osbeck, <i>C. aurantium</i> L. RUTACEAE	10	F	Fuels recovery, eliminates free radicals together with turmeric, acacia and Chinese skullcap (fruit and peel). Used in body creams together with the flower of sweet almond. Anti-flu teas (sweet fruit).

F = Food      M = Medicine

Sources: Oviedo, 1526 (Gaibrois, 2002); University of Lisbon 2017 Survey, Panama City.

During the survey, fourteen species were recorded to be used as spices, some of them introduced by the Europeans, such as marjoram, thyme, parsley, mustard, and basil, even though the last was a native *Ocimum*, in Oviedo's opinion. According to the Missouri Botanical Garden database, there are 422 species for this gender, one of them identified as *Ocimum americanum* (MBG, 2017). Another passage in Oviedo's manuscript refers to a wild banana that the Indians ate, called bihaos (*Caladium striatipes*), whereas the leaf was used to cover their shacks. This building material is no longer common in modernity, as it happens with other native species. Examples are annato (*Bixa orellana*) or genipap (*Genipa americana*) fruits, used in the early 16<sup>th</sup> century to paint the human body, in Panama. Genipap was also applied against skin and venereal diseases, in Brazil, according to Catholic priests Cardim and Lisboa (Madaleno, 2015). Annato is referred to in all the old chronicles written by European travellers, as from North to South, and in Central America, all over the New World the native peoples were known as red-skinned, the colour of this fruit, a good insect repellent. Similarly, poisonous species as curare herb (*Strychnos toxifera*), manzana yerba, (vernacular in Spanish), are no longer in use. Hope is to contribute for better knowledge of American underutilised species.

### Conclusions and Outlook

A total of twenty-nine species mentioned by Oviedo are still commonly used as medicine or consumed as food or spice, in our days. However, many European plants, or flora already known and cultivated in Spain, such as olive and strawberry trees, linen, Persian walnuts, laurel, cannabis, and fennel, were not necessarily grown in early 16<sup>th</sup> century Panama. Oviedo used the flora he knew in comparisons with the newfound plants, which is common to other old manuscripts. The recommendation is that more archival work should be developed on the issue of native American flora, in order to enrich our knowledge about the usage of forgotten staples and medicines, as only a few species are consumed worldwide, in our days.

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