The Dispersal of Bananas (*Musa* spp.) to the Americas in the Sixteenth Century

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The Dispersal of Bananas (*Musa* spp.) to the Americas in the Sixteenth Century. So far, studies on the spread of banana cultivation in the Americas during the first century of American colonization have given rise to several hypotheses that are not very well supported. In this paper we use different methodologies—ethnobotany, history, and linguistics—to explain how this process occurred and to resolve the doubts that have arisen about the presence of bananas in the Americas before the arrival of the Spanish and Portuguese. To do so, we used philological databases comprising 7,850 documents, produced between 1492 and 1600. This work shows how the speed of the spread of banana cultivation and the presence of foreign varieties in the Americas can be perfectly explained in the light of the historical and ethnobotanical analysis of the accounts written by the inhabitants of the continents in the 16th century.

Expansión del plátano (Musa spp.) en América durante el siglo XVI. Hasta el momento, los estudios realizados sobre la dispersión del cultivo del plátano en las Américas durante el primer siglo de colonización americana han dado lugar a varias hipótesis poco contrastadas. En el presente trabajo utilizamos diferentes metodologías, etnobotánica, histórica y lingüística, para explicar cómo sucedió este proceso y resolver las dudas aparecidas sobre la presencia de plátanos en las Américas antes de la llegada de españoles y portugueses. Para ello empleamos bases de datos filológicas integradas por 7.850 documentos, realizados entre 1492 y 1600. Este trabajo muestra cómo la velocidad de propagación del cultivo del plátano y la presencia de variedades extrañas en el ámbito americano pueden explicarse perfectamente a la luz del análisis histórico y etnobotánico de los relatos escritos por los habitantes del continente en el siglo XVI.

Key Words: Ethnobotany, banana, American chronicles, botanical geography, 16th century

Introduction

The banana is currently one of the most consumed foods on the planet. Over 115 million tons are produced annually, exceeded by only three other foods: wheat, maize, and rice (FAO 2020). In addition, an enormous amount of banana production is not recorded in official documents because it is eaten by the neediest inhabitants in areas of the world where it can be cultivated

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(Nayar 2009). Unsurprisingly, given these production figures and significant consumption levels, the banana has been the object of many botanical, genetic, historical, and economic analyses, among others. As a result, almost everything is known about this plant: its place of origin, how it was transformed from wild specimens to the varieties currently under cultivation, its life cycle, and so on. There is, however, less clarity on some points, such as how it spread over five continents. Some recent interdisciplinary studies (archaeological, ethnographic, linguistic, and genetic data [to varying degrees]) on the geodomestication histories of banana dispersal shed light on the domestication and/or dispersal of different groups of banana cultivars. These include banana cultivars as a whole (Perrier et al. 2011), bananas to Africa (Perrier et al. 2019), and the divergent origins of African and Pacific plantains (De Langhe et al. 2015). Many authors who have looked at the expansion of banana cultivation (De Langhe et al. 2009; Debnath et al. 2019; Heslop-Harrison and Schwarzacher 2007; Koeppel 2009; Marin et al. 1998; Nayar 2009; Piatti-Farnell 2016) have unhesitatingly placed the origin of bananas in Australasia. The bananas that have spread around the world come from the hybridization of various wild species, with a preference for *Musa acuminata* Colla (parent plant A) and *M. balbisiana* Colla (parent plant B) and, in a much smaller proportion, *M. schizocarpa* N.W.Simmonds (parent plant S) and *M. textilis* Née (parent plant T). Taxonomically, the species has been given various names, most frequently *Musa* × *paradisiaca* L. Currently, the preference is to name each cultivar with the proportion of its genes from each parent plant. Hence, *Musa* AAA is used for triploid varieties originating exclusively from *M. acuminata*, and *Musa* AABB is used for hybrid tetraploid forms from *M. acuminata* and *M. balbisiana*, and so on. (Simmonds 1962a, b). All parental species come from Southeast Asia and Papua New Guinea. This core group of plants was hybridized, and sterile, polyploidy, seedless varieties were created with exclusively asexual reproduction. The banana plant is a hemicryptophyte, with an herbaceous aerial part, a pseudostem formed by leaf sheaths and a flower stalk that eventually produces the inflorescence. The plant stays alive through the presence of a large rhizome at its base, from which numerous new shoots emerge and go on to produce new aerial parts. In cultivation, these shoots are removed and a new plant can be generated from each one. These young plants are easy to transport and can remain outside the soil for a certain number of days. With this method, or by transporting the plant's own rhizome, this crop is relatively simple to propagate. This characteristic meant that from the original nucleus, the crop was able to spread eastwards, towards the Pacific Islands and towards the west, first to India and then to Africa. This route was traveled thousands of years ago. It is known that bananas were cultivated on islands in Southeast Asia from 2,500 B.C.E. and with the expansion eastwards, bananas were found on all Pacific Islands around 2,000 years later (Donohue and Denham 2009; Nayar 2009). Towards the west, the crop must have started in India, the native range of *M. acuminata*. The country actively participated in expanding cultivation (De Langhe et al. 2009) through various routes: towards Madagascar and the eastern coast of Africa (Grimaldi et al. 2022), and towards the Mediterranean, especially Egypt, facilitated by contact with trade routes. The West first came to know about the plant via this route through the Greek philosopher, Theophrastus, aided by the Arabs in their march towards the West (García Álvarez 2001). Once the crop became established in Africa, contact must have increased with Europeans, especially the Portuguese who, in the 15th and 16th centuries, sailed along the African and Asian coasts in search of spices and humans to enslave. Along these coasts, the sailors came into contact with two products of similar origin that were easy to transport and lasted for quite some time in their holds: the taro or yam (*Colocasia esculenta* [L.] Schott) and the banana. Currently, the term yam names several species of the genus *Dioscorea* Plum. ex L. in America, but it is the African term with which *Colocasia esculenta* was known in the 16th century, according to the texts analyzed (for example, Fernández de Oviedo 1959 [1535-1557], CORDE (Real Academia Española de la Lengua 2019a, and CDH (Real Academia Española de la Lengua 2019b). There, over time, it became the name of several similar tubers, and today it has become quite fixed for *Dioscorea* spp. (Asociación de Academias de la Lengua Española 2010). In the Canary Islands today, the name *ñame* is still used for *Colocasia esculenta* (Santana Pérez et al. 2004).

Both crops must have become established very early on in the islands close to Africa, Cape Verde and the Canary Islands, and shortly afterwards in Madeira (1552). From the late 15th century to the 16th century, there was an intense campaign of incursions from the Canary Islands to African shores, from the banks of the River Niger to Cape Bojador. These incursions brought enslaved African and produce to the Canary Islands, and that produce almost certainly included bananas. Spanish incursions into Africa from the Canary Islands were forbidden by Felipe II in 1572 (Santana Pérez et al. 2004). By the early 16th century, the banana was commonly grown in the Canary Islands and must have been in Cape Verde, just as it was all along the Atlantic Coast of Africa below the Niger.

But the banana had one last leap to make: its arrival and expansion through the American continents, which is the focus of this work. The ideas about this phase are not as clear. Some authors think our understanding of how the crop progressed through the Americas is still vague (De Langhe et al. 2009), whereas others think that the crop could have arrived either from Africa or the Pacific Islands in the pre-Colombian era (Alcina Franch 1969; Bradley 1992; Forbes 1993; Langdon 1993). The main issue leading them to consider different hypotheses for the expansion of the banana through the Americas is the speed at which it spread. In one way or another, many researchers think it impossible for a crop to propagate itself fast enough within the dates that the banana became established; that is, the first half of the 16th century in Puerto Rico, Mexico, Costa Rica, Panama, Colombia, the Guianas, Brazil, Ecuador, and Peru (Langdon 1993).

Another aspect where opinions vary is the type of banana grown in the Old World, and where the current varieties of bananas that are now consumed throughout the world first appeared. There is a very widespread idea that until the 19th century, the banana varieties grown worldwide were characterized by being a hard, red or green, fibrous fruit that had to be cooked before it could be eaten; and that the current sweet, yellow fruits derive from a mutation that Jamaican grower, Jean François Pouyat, found on his plantation by chance in 1836 (Janick 2002; Koeppel 2009).

The main objective of our work is to enable the documents written by those who witnessed this process to speak for themselves. This aim is crystallized in the following research question: can the information provided by chroniclers of the period, analyzed from an ethnobotanical perspective, be used to explain the speed of expansion and the presence of numerous varieties of this crop in the Americas? Hopefully, this approach will provide an understanding of the speed of expansion, while also considering a variety of possibilities to explain some of the data reported by those defending the above-mentioned theories. These hypotheses are not mutually exclusive, and it is not the aim of our article to reject any theory, but simply to document the expansion of the banana in the New World and attempt to understand this process and its speed using documents from the period.

Material and Methods

The main tools on which this work is based are texts about the Americas written by chroniclers in the late 15th to the early 17th century. These texts have been searched for references to banana cultivation, trade, and any relevant ethnobotanical information (crop varieties, common names, references to the type of crop or consumption, etc.). To facilitate this search, some philological databases of Spanish texts were used, such as CORDE (Real Academia Española de la Lengua 2019a) and CDH (Real Academia Española de la Lengua 2019b), as well as dictionaries, such as DAmer (Asociación de Academias de la Lengua Española 2010) and *Nombres Comunes de las Plantas de Colombia* (Bernal et al. 2017). All these tools can be accessed online and free of charge. All species names throughout the text have been verified with Plants of the World Online (POWO), a website managed by the Royal Botanic Gardens, Kew (https://powo.science.kew.org/).

The interdisciplinary analysis that this work represents is the best way of approaching a topic like this one, which mixes botanical, agricultural, historical, and linguistic aspects, among others. The lack of an answer to the research question for this work may be due to lack of joint work between various disciplines. Ethnobotany

is a fundamentally interdisciplinary method and so all branches of human knowledge included in this type of contribution are extremely helpful for achieving a consistent result.

Results

The surprising speed at which the banana spread did not start with its adventures in the Americas, as researchers have already been astonished by how fast it spread in the Canary Islands. Cuban author, García Álvarez (2001), discussing the presence of the banana in the Canary Islands, wrote:

> *"The indigenous communities of the Canary Islands found [the banana] to be a particularly valuable food source. It is hard, but not impossible, to accept that the Spanish, at such a late stage as the end of the 15th Century were the ones to introduce the banana to these islands, because after barely twenty years bananas were widely grown on most of the islands. However, the ease at which the banana reproduces in favourable conditions leaves any such claim open to dispute."*

For the author of this paragraph, the speed at which banana cultivation spread in the Canary Islands can only be explained if the banana had been introduced before Spanish colonization of the Islands. Although in the end, he casts doubt on his own approach as he considers the plant's reproductive capacity. This claimed relationship between the indigenous inhabitants of the Canary Islands and the banana has another anchor point in the term *cambur* or *cambure*, the name for banana in Venezuela (Asociación de Academias de la Lengua Española 2010). Sometimes, this term has been indicated as being of Guanche origin, that is, from the pre-Hispanic settlers of the Canary Islands (Alvarado 2008). But neither the growing of bananas by the indigenous inhabitants of the Canary Islands (known as Guanches) nor the Guanche origin of the term *cambure* are real. Although the Guanches were farmers, they grew mainly cereals (*Triticum aestivum* L., *Hordeum vulgare* L.), pulses (*Pisum sativum* L., *Lens culinaris* Medik., *Vicia faba* L.), and figs (*Ficus carica* L.) (Morales Mateos 2010). The lack of water in the low-lying land where there was sufficient earth for their crops made it impossible to grow bananas at that time. There is no archaeological or ethnographic evidence for the presence of bananas among the Guanches (Morales Mateos 2010). It seems clear that bananas reached the Canary Islands by the late 15th century, and by the 16th century banana plantations existed alongside sugarcane, the main crop of the islands at the time. Bananas occupied the damper parts of orchards and vegetable gardens, close to irrigation channels and the sides of ravines, and they were grown exclusively for home consumption. They must have come mainly from the African coast of Guinea, Cape Verde, and so on, where the enslaved who worked in the sugar mills of the time came from, although they may also have originated from crops in the southern part of the Iberian Peninsula, mainly the coast of Almería (De Paz 2016).

Arrival in the Americas—The West Indies

The arrival of banana plants in the West Indies is well documented from the plants taken by Dominican Friar Tomás de Berlanga from the orchard in the monastery of San Francisco in the city of Las Palmas de Gran Canaria; although it was undoubtedly not the only shipment of banana plants from the Canary Islands, Cape Verde, or directly from the African coast to the New Continent. The special feature of the shipments from the Canary Islands is that they are fully documented.

> *"In truth, they cannot be called "plátano" (which they are not); more than that, as I have heard many say, this kind of plant was brought here from the island of Gran Canaria in the year fifteen hundred and sixteen by Friar Tomas de Berlanga from the Order of Preachers to the city of Santo Domingo" Fernández de Oviedo, 1535-1537/*1959.

The question is: which banana was taken from the Canary Islands to the Americas? According to descriptions provided by writers of the time, the bananas that reached the Americas were around 30 cm long and 5-8 cm wide, which

indicates they were not small, and were eaten as fresh fruit or baked. They must surely have been old varieties of *Musa* AAA from the African coast. Some researchers think it is impossible to know which variety Tomás de Berlanga introduced to the Americas (Simmonds 1959), although others think it could be the variety known as *Dominican* bananas (Langdon 1993). The latter suggestion is highly unlikely because the name is used in Latin America and the Canaries for a banana that is smaller and sweeter than usual, that is, smaller than the one taken to Santo Domingo in 1516 (Real Academia Española de la Lengua [CORDE] 2019a; Real Academia Española de la Lengua [CDH] 2019b). It is extremely difficult to draw conclusions from the common names for banana varieties because these names change from one territory to another and from one period to another, so any data associated with these terms must always be regarded as doubtful.

One piece of information that might be useful is that in the Canary Islands, most bananas were grown to be eaten fresh, as fruit, although bananas have also been produced to be fried or cooked, known on the islands as *plátanos macho* (plantains) since the 19th century (Corbella Díaz and Corrales Zumbado 2013). That same century also saw cultivation of the apple banana, *Musa* AAB, small, short stemmed, and with a faint green apple flavor (Corbella Díaz and Corrales Zumbado 2013). The study of these minority varieties in the Canary Islands is a future line of work that will certainly offer new information of interest for our understanding of banana cultivation in the Canary Islands through history.

The presence of sweet yellow bananas in the Canary Islands and on African coasts before they were found in the New World clashes with the aforementioned idea that this type of banana was produced for the first time in Jamaica from plants found by Jean François Pouyat on his estate in 1863 and that before this claimed discovery, bananas were only eaten cooked, not fresh (García 2008; Koeppel 2009). Actually, what was produced in Jamaica was the variety Gros Michel, technically known as *Musa acuminata* (AAA Group). This variety is native to Southeast Asia and was taken to a botanical garden on the Caribbean island of Martinique by French naturalist Nicolás Baudin in the late 18th century. Later in 1835, Jean François Pouyat took the fruit to Jamaica (Koeppel 2009). This variety was the most widely grown, especially in Central and South America, until it was replaced by other varieties because Gros Michel was prone to what is known as Panama disease, a fungal disease caused by *Fusarium oxysporum* Schltdl. (López-Zapata and Castaño-Zapata 2019).

There is no doubt about the taste of the first bananas to reach the Caribbean islands, because Fernández de Oviedo wrote about it in 1526, comparing them to dried figs.

> *"This bunch must be cut and one of the "plátanos" cut from it and then it should be hung in the house and there the entire bunch with all its "plátanos" will ripen. It is a very good fruit and when they are opened and dried in the sun like figs they are a very pleasant, sweet fruit and much better than excellent dried figs; and in the oven, baked on a tile or something similar, they are a very good, tasty fruit […]" Fernández de Oviedo 1526/*2000.

José de Acosta's texts explain how bananas were eaten during this period and show that it was not different from the way they are consumed nowadays:

> *"[…] because it is the most common fruit in the West Indies and is universal throughout almost all the islands, although some say they originated in Ethiopia and that they came from there and in fact black people use them a lot and in some places it is their bread; they also make wine from the banana. The "plátano" is eaten as fruit, that is, raw; it can be baked as well and cooked and they make a wide range of stews and even preserves and it is good in all of them. Acosta 1590/*1987.

More information about the presence of bananas in American territory during this period can be found at Real Academia Española de la Lengua (CDH) (2019b) and Real Academia Española de la Lengua (CORDE) (2019a).

The Leap to the Continent

From the West Indies, the banana leapt to the continent very quickly. When writing his

chronicle in 1535, Fernández de Oviedo himself said that the plant had already spread to the Caribbean coast from the South American continent, where it was grown successfully.

> *"[...] and from here it spread to the other villages on the island and to all the other islands populated with Christians and they have taken them to Tierra Firme [the Spanish Main] and put them everywhere, they have done very well; and on the estates of the residents of this island there are countless numbers of these "plátanos," [...]" Fernández de Oviedo 1535-1537/*1959.

Banana began to be grown in Mexico in 1531 (Marin et al. 1998) and spread through Central America, Colombia, and Venezuela to reach the remaining areas of South America where bananas were able to grow. A second expansion zone must have been South America's Atlantic coast (Brazil, Venezuela, Colombia), for which there is a great deal less documentation, but the expansion must have been quite significant as the varieties of cultivars that could enter at that point were undoubtedly much more diverse than those that came from the Canary Islands and subsequently from the Caribbean islands.

An anonymous chronicler speaks a little later of this second origin, in 1607, in a description of Portobelo, a city on Panama's coast.

> *"The fruits of the land are, the "plátano"; its quality is cold and flatulent and it leads to disease in "chapetones" (recently arrived Spaniards), who eat a lot because they are very tasty and drink water on top of that, and then they get fever and diarrhoea. There are others called "plátanos de Guinea," because the plant was brought from there to Cartagena and then to this city and to Panama and Lima where they call them "dominicos": they smell and taste better but with less sustenance and goodness" Anonymous* 1607.

Further information on this banana from Guinea and when it was introduced to South America is provided by Bernabé Cobo in 1653 in his description of the city of Lima.

> *"The "plátanos de Guinea" are similar to the former, except the plant is a darker green, especially the stem and the fruit is shorter and fatter than ordinary "plátanos" and the pulp is more tender, sweet and mild and has an aromatic scent. But experience shows that they must have some poison, as these "plátanos" are harmful and diseased; they were brought from Guinea to Tierra Firme [the Spanish Main] and from there a widow from the city of Panama brought a shoot to this city of Lima in 1605" Cobo* 1653.

The entry of bananas from Africa through the Brazilian coast has generated some confusion due to the Guaraní name, *pacobas*. The presence of an indigenous American term for bananas and the reference to the fact that these *pacobas* were American native plants suggests that these fruits may have arrived from Africa well before the 16th century (Bradley 1992; Forbes 1993; Van Sertima 1976). The first references to *pacobas* in Spanish texts were made by Gabriel Soares in 1580.

> *"Pacoba is a natural fruit of this land which is found in a very soft tree which is easy to cut... In India they call them small fig trees and the fruit figs... And these pacobas are called gentil pacobuçú which means large pacoba. There is another kind the Indians call pacobamirim, which means small pacoba" Forbes* 1993.

The first reference to this term must be found in the French André Thevet, in 1555 (Tomchinsky and Ming 2019).

One of the first people to assimilate bananas and *pacobas* was Vázquez de Espinosa in 1629.

> *"There is any amount of "trigo," "maíz," "cebada," "patatas," many types of "mandioca," I will explain what type in another Chapter, "yucas," "xicamas" they call "bacucu," "plátanos" which they call "pacobas" and in Brazil, "bananas," "piñas" which they call "Ánanas," "Ambaiba" which is a fruit*

the size of a hand and tastes of overripe fig, [...]" Vázquez de Espinosa 1629.

However, the plant name *pacoba*, with its variants, *pacoa*, *bacova*, and *pacora*, is very widely used not just in Brazil, but also in Panama and other countries, to designate many other plants, such as *Philodendron martianum* Engl. *Acrocomia panamensis* L.H.Bailey, and various species of *Heliconia* L. (*H. hirsuta* L.f., *H. bihai* (L.)L.) (Asociación de Academias de la Lengua Española 2010; Bernal et al. 2017). Fernández de Oviedo thought they were related because their leaves were very similar to those of the banana.

*"On this island Hispaniola and on the other islands around here and on the Spanish Main, certain herbs or plants created by Nature very similar in leaf to those which here they call "plátano" (but are not) which in Alexandria and other parts they call musas (I shall go on to talk about "plátanos" or musas later). Let us look at the "bihaos" which do not give any edible fruit, but certain other things and there is nothing like them and these fruits are very colorful but are not to be eaten" Fernández de Oviedo 1535-1537/*1959.

The Spanish author was, however, mistaken about the edibility of these plants, *bihao* (*H. bihai*) and some other species of the genus *Heliconia* have an edible rhizome (Acurio 2008). In short, *pacova* is not a native American banana, but a group of plants that look like a banana. In Guaraní, a linguistic phenomenon of adoption occurred, with the indigenous name used to designate a new product, as has often happened in Spanish where *ají* became *pimiento*, in French, *papa* became *pomme de terre*, and in Italian, *tomate* became *pomme de oro* (Cáceres-Lorenzo & Salas-Pascual 2020).

Spread

This stage has been less understood by many of the researchers who have studied this process. Most were impressed by the speed at which it occurred, which led them to think that it could have been introduced before the arrival of Europeans and that it may even be a native American crop (Alcina Franch 1969; Bradley 1992; Langdon 1993; Forbes 1993; De Langhe et al. 2009). But despite these ideas, it is now clear that the banana was brought to the Americas by European sailors, and that its expansion throughout the New Continent was very rapid (Marin et al. 1998; Nayar 2009). Some authors put the difference between the arrival of the banana in a territory, and its colonization by European settlers, at 10 years (León 1992). Our objective is to document this progression. To do so, the first step is to understand that, for the chroniclers of the time, the plantain was a European product that did not grow naturally in the Americas: "*Hay muchos plátanos y los han llevado los españoles, que no los había antes*" (There are many bananas and the Spanish brought them, there weren't any before) (Diego de Landa 1998 [1579]).

*"On the Spanish Main. [...] and so he told his soldiers who later saw clear evidence and indications that Spanish people had been before them on this land and that they were near where they had been because on certain rocks or Indian fields they found "plátanos" stems which is a tree that does grow naturally but is found around Spanish villages." Pedro de Aguado 1573-1581/*1916*-1917.*

And in Peru, although in this area, the crop was so familiar that it was considered a native fruit like pineapples, avocados, and maize.

*"The fruit trees of this land are: "caymitos," "paltas," "palmas" that bear "chontaruros" like dates, there are "plátanos," two types of "pacaes": pods like long cucumbers and others like wide ones; they have "zapallos," "piñas," "maíz," on "comales" they have "coca" and "algodón· and many types of fish" Gaspar de Torres 1597/*2001.

Many chroniclers of the period, like José de Acosta (1590/1987), include bananas on their list of American products, despite knowing and writing that many people considered them

to come from Africa. Indigenous chroniclers themselves, like Felipe Guamán Poma de Ayala (c1595-1615/1987) cite the banana in their Quechua lists of American plants, but keep the Spanish name. But that distinction between indigenous fruits and those from Spain was made by the Spanish themselves, because just like all the crops mentioned in the above paragraph by Gaspar de Torres, there were also large areas of oranges, olives, and other clearly Mediterranean crops. Oranges, for example, were already growing in the West Indies in the early 16th century (Fernández de Oviedo 1959), and reached Mexico in 1529 (Ordaz 1964). By 1552, they were in Peru (Cieza de León 1984). It is not surprising that, in 1605 in the north of Chile, chroniclers were talking about the following crops.

> *"The earth in all these valleys is loamy and watered with the channels the natives have made to water them, there is an abundance of all types of food, theirs and ours; there is a lot of "maíz," "trigo," "cebada," "frijoles," "pepinos," etc.; they have a lot of orchards with plenty of "membrillo," "manzana," "camuesa," "naranjas," "limas," "olivos" laden with very good olives, the biggest one better than that from Cordoba because it has more flesh; in many of the orchards there is very good wine and sugar cane grows abundantly and very thick so it is convenient for the sugar mills which are in many of the orchards as we will discuss later" Reginaldo Lizárraga 1605/*1909.

If these woody crops, which need years of growth before they are productive, were already prospering in those places, then obviously bananas, which are quick to reproduce and easy to grow, would too.

The ease of dispersal of this plant is largely due to its asexual form of reproduction. The cultivars brought from the old to the new world are sterile, so they do not reproduce by seed. From their underground corm sprout successive "progeny." One of these is allowed to grow into an adult and produce fruit, while the rest are eliminated until, when the main or "mother" plant has fructified, a new pseudo stem is allowed to develop. The production of buds is incessant, creating dozens of them in a single production cycle. These shoots can be detached from the main corm and removed or used for replanting, so that a single corm can generate dozens of offspring that give rise to new planting sites. Transporting these shoots is very easy, as they weigh about 2 to 3 kg, and usually have their own roots. In fact, the transport of the first specimens of bananas to the Americas had to be carried out with these initial stages of the life of the banana tree (CEDAF 2001; Méndez Hernández and Rodriguez Serrano 2016).

Contact with Pacific Crops—The Circle Closes

The story does not end there, however. Columbus reached the Americas thinking he was traveling to the Indies, and the journey that he was unable to finish was made by other seafarers, first by Magallan and Elcano, and then by many others. The first journey around the world was described by Antonio Pigafetta, an Italian who apparently was not familiar with the banana, or at least, he did not know its name. He does not mention it even once in his account written between 1519 and 1522, and always refers to bananas as *higos* (figs), describing them as big as the palm of a hand, but provides no further information (Pigafetta 1998). In 1527, Hernán Cortés sent three ships westwards with the idea of reaching Asia, but two of the ships were wrecked and the third, despite reaching the coast, could not get back because the return route was still unknown. This route, aided by the Kuroshio Current, was not discovered until 1565, when commercial journeys between the Americas and the Pacific became possible. The Manila galleon route was inaugurated that same year and connected both shores. The outward journey, which passed by the Island of Guam, took about three months, and the return, by a more northerly route, took around four to five months. The return journey very probably passed by the Hawaiian Islands, but it is not completely certain because the details of the route were kept secret (León Guerrero 2000).

At that time, the first journeys between the Americas and the Pacific Islands also took place. The journeys of Álvaro de Mendaña y Neira (1568-69) and Fernández de Quirós (1606) were particularly important. Reginaldo Lizárraga included Mendaña's adventures in

his work *Descripción breve de toda la tierra del Perú, Tucumán, Río de la Plata y Chile* (1909), which also indicated that on most of the islands visited, the natives grew bananas, which they offered as gifts. The chronicler did not notice any significant differences between the bananas he was familiar with on the American continent and those he refers to on the Pacific Islands.

> *"On this island there were also many "plátanos," "cocos," "palmitos," "cañas dulces" and other fruits that we were not familiar with; wild pigs, navel on the belly, tortoises and hens; after three or four days, the natives showed their weapons to drive them out of their land. [...]" Lizárraga 1605/*1909.

The work by the anonymous chronicler of the travels of Fernández de Quirós is more accurate, distinguishing different varieties of bananas among those they found on the Pacific Islands.

> *"There are many "plátanos" from six to eight kinds: some are colored, as wide as the width of your hand and others with the same color are very small and another kind of small bananas, even when ripe the skin is green and soft, but not so much: others are long, and twisted, with a great flavor and smell and lots of "plátanos" on each bunch" Anonymous c1605-1609/*1876.

And the person even describes some strange types of bananas for a person from the New World.

> *"[...] The "cacique" gave another one which was there and a bunch of strange "plátanos" because they were like medium-sized aubergines without a tip, the pith was orange colored, fragrant, soft and sweet. The other Indians gave "cocos," "cañas dulces" and other fruit, "cañucos" with water of more and less than four hands long, one wide" Anonymous c1605-1609/*1876.

Bananas with an orange, scented pulp were seen on the island formerly called Virgen María or Santa María Island, now known as Gaua, one of the Banks Islands in Vanuatu. From the description of the bananas offered by the chief, they may well be bananas from one of the many diploid varieties grown in the area, the rare *Musa* AA and even triploid varieties AAB (Kagy et al. 2016). The journey of Fernández de Quirós and the earlier journey by Álvaro de Mendaña ended with their return to Lima, precisely in the area where the cultivar "Pombo," AAB, is widely grown today. Pombo AAB is a variety of the "Maia Maoli-Popoulu" group, which was domesticated in the Pacific region (De Langhe et al. 2009; Kennedy 2008).

With this Pacific connection between Asia, Oceania, and America, the door was open for the transfer of crops between these areas, and the different varieties of bananas must have undoubtedly played a significant role in the many genetic exchanges.

Discussion and Conclusion

The banana is currently one of the world's most important crops. As with all the plant foods we use, it has a history that began in a specific territory, from where it spread across the planet throughout the centuries. Its economic importance has made it a worthy object of analysis from various perspectives and, in the places where it is grown, there is an enormous amount of information, know-how, and culture. Its common names, the way it is used, the growing methods, diseases, and its history are an inexhaustible source of discussion and analysis. This work focuses on a very specific stage of its history, its expansion through the Americas in the 16th and early 17th centuries, using information from documents of the time, with an awareness of their limitations, but giving credibility to what many chroniclers and travelers were telling us about the plant. In these narratives it can be seen how the banana arrived in the Americas, not at a single point but in at least two main centers: The West Indies, from Macaronesia, mainly the Canaries; and the Atlantic coast of South America, from Brazil to Cartagena de Indias, where it arrived directly from the African continent. Once in the New World, banana

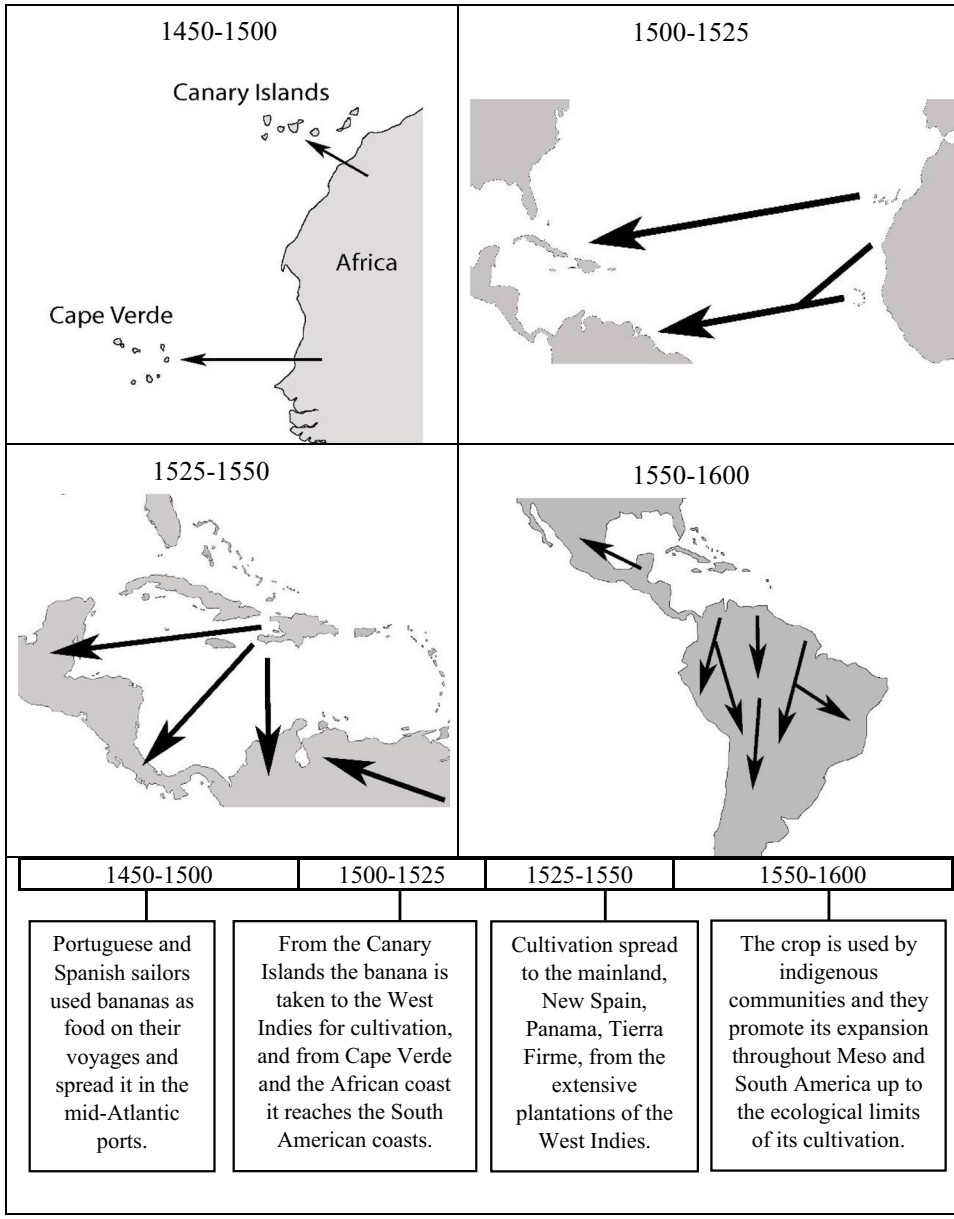

Fig. 1. Timeline of the chronology of the expansion of banana cultivation according to the analyzed texts.

cultivation spread thanks to various fundamental aspects, some related to the crop itself: its perfect adaptation to the tropical climate of a large part of the Americas and its incredible capacity for asexual reproduction, producing hundreds of shoots from a single mother plant in just one year (Denham et al. 2020). Other aspects are related to its relationship with humans, its nutritionally rich fruit, long storage ability, the many ways it can be eaten, and the ease of cultivation in areas where conditions are favorable. All of this makes it impossible for a food like the banana to be relegated to a specific area of the continent recently conquered by the plant. Dispersion happened

quickly, helped by the movement of humans through the Americas in that century, and by the traditional transport and trade routes that already existed in the Americas long before the Europeans arrived. The chronology of its expansion can be seen in Figure 1.

Before the banana, many other products used American communication routes to travel thousands of kilometers from their areas of origin, as occurred with maize, avocados, potatoes, tobacco, and most pre-Colombian American crops. And the same happened with products brought from the Old World, but not with the same ease and capacity for expansion as the banana. With contact between the Old World and the New World in the late 15th century, two thousand year-old routes for transport and crop exchanges joined up: the Asian, African, and European routes, as well as the American route. And they operated as they had done for thousands of years, largely outside the control of the authorities. Chroniclers and settlers witnessed and recorded this progress. All the above factors enabled banana growing in America in the 16th century to spread with amazing, but real speed as we have been told by chroniclers, travelers, and narrators whose voices we have borrowed to analyze this process.

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Declarations

Ethics There is no conflict of interest of the authors of this work. As it is an article in which a historical fact is studied, specifically the expansion of banana cultivation in the American continents during the 16th century, there is no possibility of obtaining any economic benefit or producing any type of damage in the territories involved in the process or its inhabitants. This implies that there is no possibility of violating any ethical standard. The protagonists of the process studied here are the people who made it possible, the Native Americans. These, through a network of transmission of knowledge and crops, which had centuries of experience, managed to carry out this expansion with such rapidity that many previous researchers doubted that it was possible.

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Both authors are responsible for the idea, the research, and the writing of the article. Marcos Salas-Pascual, a botanist and ethnobotanist, provided the botanical knowledge that resolved many historical doubts and provided information regarding the identification of the various varieties of bananas and other species mentioned in the text. Teresa Cáceres-Lorenzo, doctor in philology and expert in the history of the Spanish in the Americas, contributed with the knowledge of the authors and the works used for the study. All data found in this work is available for your use, indicating its source.

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