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COLOMBIA ORCHID FESTIVAL 2019 AT KEW (LONDON)

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The orchid is Mother Nature's masterpiece

Robyn

Kew Orchid Festival is an annual event at the Princess of Wales Conservatory in Kew Gardens (London) (Fig. 1). People come from all over to see some of the world's most beautiful orchids (see the video [4]).



The students of our project group have published some publications about Royal Gardens at Kew (London)

[33; 34; 36; 51; 59; 66; 83; 84; 85; 86; 99], and Kew Orchid Festivals [48; 74] (see the videos [81; 82]) (Fig. 2).

Fig. 1. The Princess of Wales Conservatory in Kew.

The 2019 Orchid Festival ((9 February to 10 March) celebrated the colour of Colombia with over 4000 species, dazzling wildlife displays and a carnival atmosphere that included beautiful traditional dancing [35], see the video [63] (Fig. 3).

That year, 6, 200 orchids brought the sights and sounds of Colombia alive, as we celebrated one of the world's most biodiverse countries (see the videos [45]).



Fig. 2. Our student project group: M. Rud (right), M. Lysenko [53], and V. Novokhatska.



Fig. 3. Colombian Dancers at Kew Gardens Orchid Festival 2019.

Colombia's landscape is as diverse as the flora and fauna that inhabit it, from tropical beaches to snow-capped mountains and everything in between (Fig. 3). Home to more orchid species than anywhere else in the world, Colombia's unparalleled biodiversity and vibrant culture was the inspiration for Kew's 24th annual orchid festival in February 2019 [47], see the video [65; 98].

The Colombian national flower is the orchid *Cattleya trianae*, or the "Christmas orchid" (Fig. 4, 6). "*Cattleya trianae*" grows as an epiphytic orchid, with succulent leaves, endemic to Colombia where it was nominated as the National Flower in 1936.

It is endemic to Colombia and naturally occurs in the wet lowland and cloud forest of the Colombian Andes.

It was picked as the Colombian national flower because the combination of blue, yellow and red colours in the flowers are reminiscent of the Colombian flag (Fig. 5) and because it was named after the prominent Colombian botanist Jose Jeronimo Triana (1828–1890) [49] (Fig. 7) [45].



Fig. 3. Colombia on the map.



Fig. 4. *Cattleya trianae* (the "Christmas orchid")



Fig. 5. The Colombian flag.



Fig. 6. *Cattleya trianae* growing in the tree.



Fig. 7. Colombian botanist Jose Jeronimo Triana.

Colombia is nicknamed the "gateway to South America" because it sits in the northwestern part of the continent where South America connects with Central and North America [10] (Fig. 3), see the video [28].

The Spanish landed first in La Guajira in 1499 and by the mid-16th century colonized parts of the region, establishing the New Kingdom of Granada, with Santafé de Bogotá.

Colombia, officially the Republic of Colombia, is a transcontinental country spanning South America and an insular region in North America. It is bordered by the Caribbean Sea to the north, Venezuela to the east, Brazil to the southeast, Ecuador and Peru to the south, the Pacific Ocean to the west, and Panama to the northwest. Colombia comprises 32 departments and the Capital District of Bogotá, the country's largest city (Fig. 9). It covers an area of 1,141,748 square kilometers (440,831 sq mi), with a population of 50 million (see the videos [12; 21]). Colombia's rich cultural heritage reflects influences by various Amerindian civilizations, European settlement, African slaves, and immigration from Europe and the Middle East. Spanish is the nation's official language, besides which over 70 languages are spoken (Fig. 11) [20].



Fig. 8. Coat of arms of Colombia.



Fig. 9. Panoramic view of Bogotá.

The coat of arms of Colombia contains a shield with numerous symbols (Fig. 8). Perched on top of the shield is an Andean Condor holding an olive crown and the condor symbolizing freedom. The national motto, **Libertad y Orden (Spanish for Liberty and Order)**, is on a scroll in between the bird and the shield in black font over golden background. The condor is depicted facing front with his wings extended and looking to the right (see videos [91; 37]).

The national flag is draped on each side of the shield (Fig. 5). The shield is broken into three portions. In the lowermost portion is a depiction of ships, pointing to the maritime history of Colombia, namely to the Isthmus of Panama, which was part of Colombia until 1903. Nowadays represents the two oceans that border the country (Atlantic and Pacific) (Fig. 3, 10). The sails mean the Colombian commerce with the rest of the world and the rising economy. In the middle section, over a field of platinum, the Phrygian cap is presented; this being a traditional symbol of liberty and freedom. The topmost section contains a pomegranate over a field of azure, as a symbol of the Viceroyalty of New



Fig. 10. Political Map of Colombia.

Granada (early colonial name of Colombia back in 18th century), in the middle flanked by two cornucopias or horns of plenty: the one at the right with golden and silver coins and the one at the left with tropical fruits. This portion represents the agricultural and mineral wealth of Colombian soil [20] (see videos [19; 1]).

Many aspects of Colombian culture can be traced back to the early culture of Spain of the 16th century and its collision with Colombia's native civilizations (Muisca [9], Tayrona) (Fig. 11, 12), see the video [90]. The Spanish brought Catholicism, the feudal *encomienda* system, and a caste system that favored European-born whites. After independence from Spain, the *criollos* struggled to establish a pluralistic political system, between conservative and liberal ideals [14].



Fig. 11. Population of Colombia.



Fig. 12. Colombian folk dance: Cumbia.

Colombia is known to be one of the most biodiverse countries in the world (Fig. 13), see the videos [6; 29]. Nevertheless, the current knowledge on inventory and monitoring of biodiversity and ecosystems does not fully reflect this richness, being incomplete in certain regions. Counteracting this situation, the nation-wide "Colombia Bio" programme has been recently established by the Colombian government with the main aim of making sustainable economic use of Colombia's biodiversity resources. This programme offers a unique opportunity for Kew and partner organisations in Colombia to undertake primary research on biodiversity and ecosystem services in parts of the country as yet completely unexplored. The ambition of this exploratory research is to enable long-term plans for the conservation and sustainable use of Colombia's natural capital to be established [80], (see the videos [11; 105]).

Kew Science will be involved in a significant number of research projects over the next 4–5 years (from 2017) under the umbrella of the Colombia Bio programme (see the video [96]) [80].

Colombia's landscape is as diverse as the flora and fauna that inhabit it, from tropical beaches to snow-capped mountains and

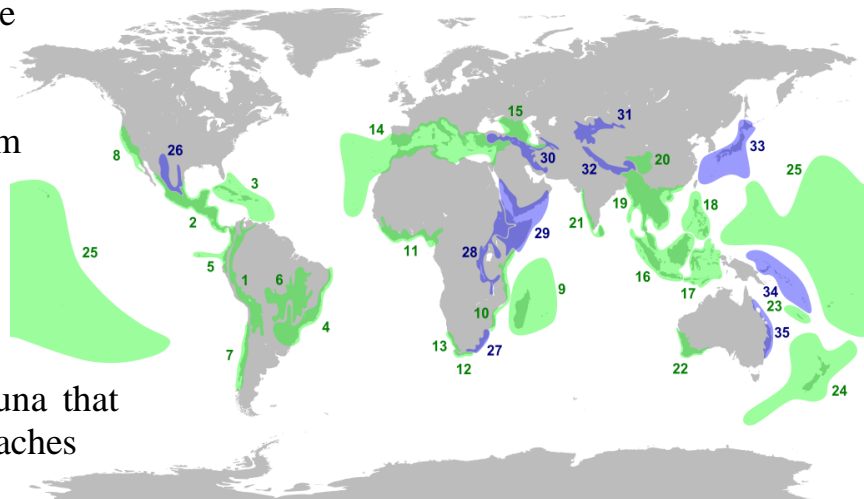


Fig. 13. Biodiversity hotspots on a world map

everything in between (**see the video [2]**). Home to more orchid species than anywhere else in the world, Colombia's unparalleled biodiversity and vibrant culture was the inspiration for Kew's 24th annual orchid festival in February 2019 [47].

Kew is a global leader in plant and fungal science and that year's festival (2019) would also showcase some of its ground-breaking work with Colombia to help identify, protect and promote the country's biodiversity. Colombia is the second most biodiverse country in the world, only behind Brazil (which is seven times larger than Colombia). Over 6,000 endemic plant species, found nowhere else on Earth (**see the video [68]**), have been identified in Colombia (the UK has fewer than 100). Since the signing of the peace accord between the Colombian government and the FARC guerrilla group, huge areas of the country previously unknown to science are now waiting to be explored (**see the video [18]**). Working with their Colombian counterparts, Kew's scientists are undertaking intrepid field trips to discover new plants, aid conservation efforts, and promote sustainable development in the country [47] (**Fig.14, 15, 16, 17, see the video[43; 96]**).



Fig. 15. Orchid in the wild.

Fig. 14. Bio Expeditions in Colombia

Fig. 17. New species in uncharted



**territory in Colombia, 2019
Mauricio Diazgranados (left).**

Fig. 16. Mauricio Diazgranados in Cocuy National Park, Colombia (2008).

Colombia is less documented than other countries in South America, Mauricio Diazgranados says. "There's no road access to half of Colombia, and the country still has 53% of its area covered by tropical rainforest. There's still lots and lots of places totally unexplored" [67; 32].

Today botanist Diazgranados (Fig. 16, 17) is based at the Royal Botanic Gardens, Kew in London, where he is research leader for diversity and livelihoods in

the Natural Capital and Plant Health Department. He oversees the Colombia Bio Programme, a collaboration between Kew Science and partner organizations in the UK and Colombia that documents the country's biodiversity [67; 44], **see the video [60]**.

And stepping into the Princess of Wales Conservatory, visitors were found themselves transported to an entrancing paradise evoking the sights, smells and sounds of Colombia (**see the video [61; 46]**). The experience was an immersive journey through the different zones of the glasshouse where visitors will encounter staggeringly beautiful displays representing aspects of Colombian wildlife and culture [47], **see the videos [16; 92]**.

La Batalla de Flores (Battle of the Flowers), part of the Barranquilla Carnival in Colombia, was serve as the theme for the half term activities on offer for families. The annual festival in Barranquilla is the second largest carnival in the world (surpassed only by Rio) with thousands flocking to the city each year for four days of music, dance and fun. Carnival workshops during half term was feature flower costume making, drumming, and dancing, with an hourly carnival parade leading to the Princess of Wales Conservatory (Fig. 14), **see video [8; 15; 38]**) [49].



Fig. 14. Barranquilla Carnival, Colombia.



Fig. 15. Flowers Festival, Colombia.

The Flowers Festival (Feria de las Flores) is a festival that takes place in Medellín, Colombia (Fig. 15). The festival is the most important social event for the city and includes a pageant, automobiles, a Paso Fino horse parade and many musical concerts (**see video [30; 56]**).

Thus, Colombia is famed for its wildlife diversity and boasts the greatest



Fig. 17. A toucan in the tree (wild nature).
number of bird species of any country in the world. To celebrate this, the central **Fig. 16. A toucan in flight.**

display of the festival at Kew was a 'carnival of animals' depicting a toucan in flight (Fig. 16, 17), a hanging sloth (Fig. 18), swimming turtle (Fig. 19), a jaguar (Fig. 24) and a pink dolphin (Fig. 20, 21, see videos [75, 76]) all composed of stunning orchids, bromeliads and other tropical plants (Fig. 22, 23, 25) [1], see the video [4; 63; 45]).



Fig. 18. A hanging sloth.



Fig. 19. Swimming turtle.



Fig. 20. Pink Dolphin.



Fig. 21. Amazon river dolphin.



Fig. 22. Stunning orchids at the Princess of Wales Conservatory, Kew (London).



Fig. 23. Orchids Pond.

But only for six evenings only, visitors could experience a taste of Colombia after dark at Kew. As night falls, the carnival atmosphere was in full swing with Latin big band and tropical fusion music raising the roof of the glasshouse (see video [26]).

Guests could craft their own floral headdress or mask, sample authentic Colombian coffee, tried their hand at Colombian dancing, and tucked into classic street food. All while sipping on a delicious Colombia-inspired cocktail from the pop-up bar [47].



Fig. 24. Jaguar



Fig. 25. Colombia's 'rainbow river' from vivid vandas (a type of orchid).

Over 6,200 orchids (see the video [17]) were featured in Kew's 24th annual orchid festival in February 2019 (9 February to 10 March) including the exquisite Flor de Mayo (*Cattleya trianae*) (Fig. 4, 26), Colombia's national flower [47] (see the videos [46; 94]. Colombia is rich in orchids with nearly 4,270 species known (see the video [27]).

Colombia is the richest country in the world in orchids with 274 genera, and 4270 species. Of these, around 1572 species of orchids are unique and exclusive to Colombia (see the video [94]). However, this is a small number. Given their size and taxonomic complexity, it is difficult to have an accurate estimate of the number of species of orchids that exist not only in Colombia, but in the entire world. Some botanists estimate that there are between 15,000 and 22,500 species of orchids, while others consider that there are as many as 30,000 to 35,000 species of orchids in the world (see the videos [17; 64]) [88].

In Colombia, each natural region has its own richness and diversity of orchids: 2542 species in the Andes, 533 species in the Pacific, 143 species in the Orinoco, and around 130 species

Fig. 27. National Parks of Colombia.

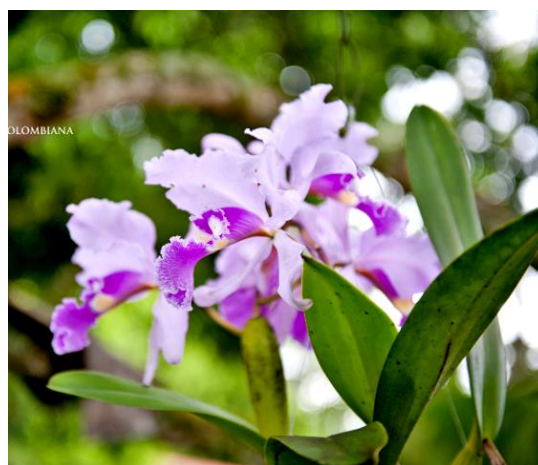


Fig. 26. *Cattleya trianae*.



distributed between the Amazon and the Colombian Caribbean regions (Fig. 27), **see video [13]**).

Additionally, Colombia's 42 National Natural Parks have 819 orchid species, representing a quarter of the total registered in the country (Fig. 27). Among the national natural parks of Colombia, the greatest representation of the total endemic and threatened species of orchids is found in the: National Park Las Orquídeas in Antioquia, Tatamá in Risaralda, Los Farallones de Cali in Valle del Cauca, Puracé in Cauca, Chingaza in Cundinamarca, and Munchique in Cauca. Moreover, the departments (Colombian states) with the largest number of orchid species are Antioquia, Chocó, Cundinamarca, Cauca, and Valle del Cauca [88], **(see the videos [50; 65])**.

In Colombia, 36.8% of the country's total orchid species are endemic. Most of the endemic species are distributed in very few genera, as about half belong to only five genera. Thus, *Lepanthes*, with 239 species [50] (Fig. 28), is the orchid genus with more endemism in Colombia, grouping 15% of the species in this category. Other genera with high richness of endemic species are *Epidendrum* (186 spp.) (Fig. 29), *Stelis* (114 spp.) (Fig. 30) [78], *Pleurothallis* (106 spp.) (Fig. 31) [77], and *Masdevallia* (99 spp.) (Fig. 32) [55], **see the video [54]**. The Andean region is the area with the highest number of endemic orchid species in the country with a total of 944, representing 78% of the endemic species registered for Colombia. It is followed by the Pacific region with 98. The Orinoco region has the fewest orchids native to Colombia with 15 species [88].



Fig. 28. *Lepanthes*.



Fig. 29. *Epidendrum Cinnabarinum*.



Fig. 30. *Stelis emarginata*.
rimarima-alba.



Fig. 31. *Pleurothallis*.



Fig. 32. *Masdevallia*

Below we present Colombia's most interesting orchids.

Orchid *Coryanthes macrantha* (Fig. 33). This massive orchid flower can reach up to 100 grams! Living in the Colombian lowland, the bucket orchid *Coryanthes macrantha* produce flowers which can be up to 12.5 cm in diameter. They grow in huge "ant-garden" nests that can be as wide as 150 cm, built on tree branches up in the forest canopy. This mutualistic association with the ants helps the bucket orchid to rapidly grow and produce such massive flowers throughout the year (Fig. 33) [97].



Fig. 33. *Coryanthes macrantha*



Fig. 34. Dracula orchid.

The Andean cloud forests in Colombia host 42 species of Dracula orchids, which is about the half of the world known species diversity of such group. Dracula are group of bizarre orchids, living up to their creepy name. They have dragon-like flowers that mimic the morphology and fragrances emitted by gilled fungi. That ends up fooling fruit flies, tricking them into pollination. The orchid *Dracula chimaera* is a common component of the cloud forests in Colombia and has the record of the epiphyte orchid with the largest wingspan (nearly 25 cm) in the American tropics (Fig. 34), see the video [98; 24]) [97].

Dracula lotax does have a dramatic name, but it's not from the infamous vampire created by Bram Stoker. Instead, they were given their name dracula because they resembled "little dragons" to the namer, Millian Fiske (Fig. 35). They grow in the Andean region of Colombia and prefer cooler temperatures, where they thrive and bloom. Even though they are not named after Dracula, they do seem to resemble a pale, open-mouth with fangs [93], see the video [24].



Fig. 35. *Dracula lotax* .

Cloud Forests are Perfect, well, they are perfect for growing orchids, anyway. Several of Colombia's endemic orchids grow the best in the cool, abundant moisture of the cloud forests, like *Stanhopea platyceras* (Fig. 36), with its creamy petals covered in plum spots, and *Masdevallia angulifera* (Fig. 37), a bell-shaped flower with triangular petals. These species don't fit the traditional idea of an orchid, but they are unconventional and embody an extravagant beauty, that is symbolic of Colombia itself [93], see the video [54].



Fig. 36. *Stanhopea platyceras*.



Fig. 37. *Masdevallia angulifera*.

The pacific lowland wet forests of Colombia are also the home of the endemic *Cycnoches barthiorum* (Fig. 38), commonly known as **Swan orchid** [23] (Fig. 39).

Below we give the Biological characteristics of *Cycnoches orchids*.

Biological characteristics of CYCNOCHES ORCHIDS

- Botanical Name:** *Cycnoches* (sik-NO-keys).
- Abbreviation:** Cyc.
- Common Name or nickname:** Swan orchids.
- Family:** Orchidaceae.
- Subfamily:** Epidendroideae.
- Tribe:** Cymbidieae.
- Subtribe:** Catasetinae.
- Number of recognized species:** 34 to 39 recognized orchid species, depending on the source.
- Origin:** South America, Central America, and southern Mexico.
- Blooming season:** Fall and spring.
- Color:** *Cycnoches* orchids produce blooms in deep red, bronze, green, pink, yellow, and white.
- Growing classification:** Epiphytic, sympodial [23].



Fig. 38. *Cycnoches barthiorum* [119].

Most orchids produce bisexual flowers, meaning that male (**Fig. 40**) and female (**Fig. 41**) reproductive organs are produced in the same flower.

Fig. 39. The Swan Orchid (red).



Yet, the Swan orchids are able to produce male and female flowers which do not look alike [97].

This medium sized, hot to warm growing epiphyte occurs in southern Colombia near sea level and has spindle shaped pseudobulbs carrying 7, elliptic-lanceolate, plicate, acuminate leaves that are deciduous and blooms in the late winter on a pendant, 6.6" (17cm) long, densely few to several flowered inflorescence carrying non-resupinate, fragrant flowers [62], (Fig. 42).

Cycnoches orchid is a unique orchid genus of sympodial epiphytic orchid plants (Fig. 43; 44), see video [40].

The differences between the male and female flowers of the same species can be so striking that botanists of the 19th century thought that they were from very different species [97] (Fig. 40, 41, 42).



Fig. 40. *Cycnoches barthiorum*. Male Flower [62].



Fig. 41. Female Flower.

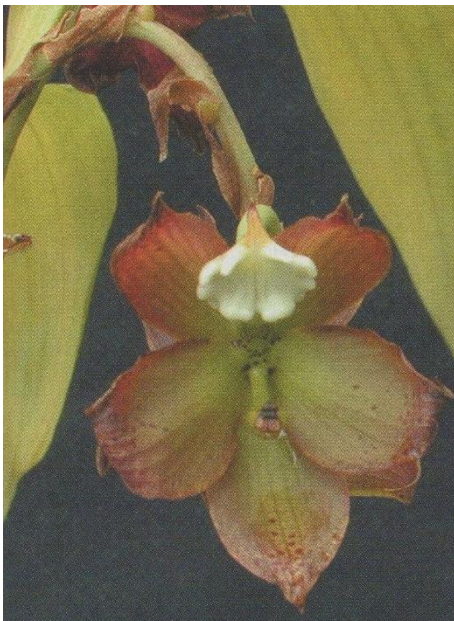


Fig. 42. Hermaphroditic Flower [62].



Fig. 43. *Cycnoches* orchid.



Fig. 44. *Cycnoches* orchid "Pink Dove".

Back to the Kew's 24th annual orchid festival in February 2019 the guests could walk through the different zones of the glasshouse at the Princess of Wales

Conservatory in Kew Gardens (London) to find a range of displays, each representing diverse aspects of Colombian wildlife and culture.

We have said above the the central feature was a "carnival of animals", depicting a toucan in flight, a hanging sloth and a swimming turtle, all created from an elaborate arrangement of orchids and other tropical plants. Other highlights included a floral recreation of Colombia's Caño Cristales river (Fig. 23), see the videos [3; 7; 57], an enchanted forest scene complete with life-sized jaguars, and a floating display of yellow orchids to honour the legend of El Dorado (Fig. 45).

It all started with the Muisca [9; 58] (Fig. 46), years before the Spanish colonizers came to America. The Muisca is a native Colombian tribe that inhabited, amongst other departments, the one that is now known as Cundinamarca – where the Guatavita lagoon (Fig. 47) is located. The Muisca considered the lagoon the center of the universe, a place of connection between the underworld and the world beyond, occupied by their God [41].



Fig. 45. El Dorado city.



Fig. 46. The Muisca



Fig. 47. The Guatavita lagoon.

The Muisca today are most famous for the legend of El Dorado or 'The Gilded One'. A Muisca ceremony held at Lake Guatavita, actually only one of many kinds, involved a ruler being covered in gold dust who was then rowed on a raft to the centre of the lake where he leapt into the waters in an act of ritual cleansing and renewal. Muisca subjects would also throw precious objects into the lake during the ceremony, not only gold but also emeralds.

The Spanish, on hearing this story, allowed their imagination and lust for gold to leap beyond the bounds of reality and soon a legend arose of a magnificent city built with gold. Naturally, as it never existed in the first place, the city was never found and even the lake has stubbornly refused to reveal its secrets despite several costly attempts over the centuries [9].

Archaeological research has shown that the scale and level of gold production in Colombia was of exceptionally large proportions by the time Europeans arrived in

1537. For the Muisca people, gold did not represent prosperity or wealth; it was nothing more than an offering to the gods. Even today, the Muisca people place no material value on gold.

While there is evidence to suggest that El Dorado was a person and not a place, the Spanish conquistadores had other ideas at the time. Along with other European explorers, they saw so much wealth in the north coast of South America that they became convinced that there was an entire city of extraordinary wealth buried somewhere on the continent [148], **see the videos 31; 39; 89; 95**.

El Dorado tells the legend of a lagoon, which was full of gold in its depths. There are two stories linked to how all that gold got to the bottom of the Guatavita lagoon. One of them is a love and heartbreaking story: The chief of the Muisca had a wife and a daughter, but apparently he did not know how to love his wife right, so she found herself a lover. The chief heard about it and commanded some of his servants to follow her day and night, and supposedly got her lover killed as well. His wife could not bear the situation anymore, and one night she jumped into the lagoon with their little daughter. This brought extreme sadness to the chief, who sent people into the lagoon to bring them back. They found the daughter's body with no eyes and told him that his wife was happily living in the depths of the lagoon. To honor his dead wife, he threw gold and emeralds into the lagoon for her and continued doing this ritual often [41].

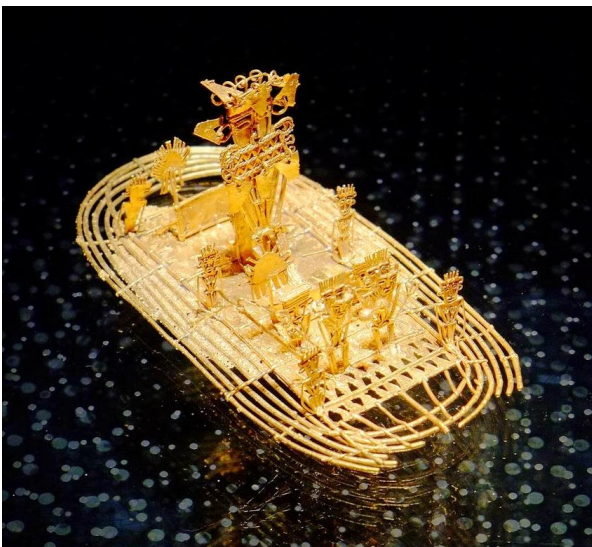


Fig. 48. Famous Muisca raft of El Dorado.

is nowadays kept in the Gold Museum in Bogotá. It is estimated that the figure was made between 600 and 1600 A.C.

When the colonizers and other explorers came to America after hearing about these stories, they became obsessed with finding that gold. They tried for many years but never succeeded [41], **see the video [25]**.

On this note, we concluded our review Kew's 24th annual orchid festival 2019.

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