Travel Scholarship Report

Heliconia species in Panama and Costa Rica

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September 2012

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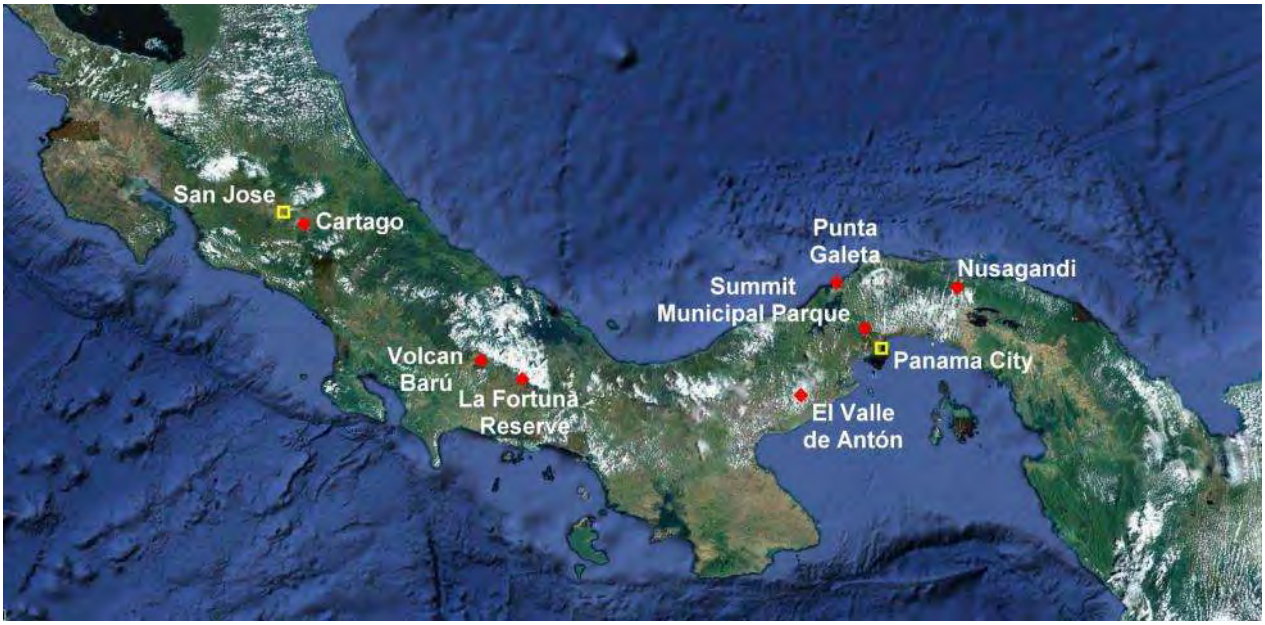
Map showing the locations visited:



Introduction

Tropical plants had always been a subject of great passion for me, even before I started a career in horticulture. The following article is a Travel Scholarship Report concerning *Heliconia* species in Panama and Costa Rica, undertaken between 15th May and 3rd June 2012.

During this three week period, I observed, studied and photographed various *Heliconia* species in the wild and in cultivation. I also visited gardens, hobbyists and commercial growers of *Heliconia* to better understand the horticultural impact of these ornamental flowers on their respective countries of origin and abroad.

The main aims are as follows:

- To study and photograph *Heliconia* and other related genera growing in the wild, enhancing the author's knowledge;
- To observe and learn how *Heliconia* species are grown in cultivation and evaluate potential species suitable for cultivation in Europe;
- To collect information and use it to improve the horticultural success of cultivated *Heliconia*;
- To visit an extensive range of plant habitats and gain field experience;
- To evaluate possible reasons for the restricted occurrence of some local endemic *Heliconia* species and assess their current conservation status;
- To improve plant identification skills by direct field observation and usage of identification keys;
- To write a report and conduct a Kew Mutual Lecture regarding the trip;

To comply with the aims above cited, the following objectives were stipulated:

- Visit the Parque Municipal Summit (Summit Gardens), University and Smithsonian Tropical Institute Herbarium in Panama;

- Meet with authorities, specialists and experts on *Heliconia* and other tropical flora;

- Study, record and photograph *Heliconia xanthovillosa* growing *in situ*, a challenging *taxon* in cultivation, considered by many as the 'Holy Grail' of all *Heliconia* species.

- Study, record and photograph *Heliconia bella* growing *in situ*, probably the species with the most restricted distribution known so far;

- Study, record and photograph other *Heliconia* species growing in the wild;

- Visit a commercial producer of *Heliconia* in Republic of Costa Rica and discuss the propagation and cultivation of different species and cultivars;

- Visit the Fortuna Reserve and learn about *in situ* interpretation for tourist purposes;

- Assess the conservation status and possible threats to *Heliconia* and other natural vegetation, and the negative impact of these menaces on their habitat, if feasible;

- Document the expedition, in order to share the knowledge and experience acquired, in the future;

Itinerary

The itinerary of the trip is provided in the table below.

Table 1: Itinerary

Date	Activity	Details
15th May 2012	Arrival in Panama City	-
16th May 2012	Visited Summit Gardens (Summit Municipal Parque)	Panama's only Botanic Garden.
17th May 2012	Free day in Colón	I went to visit the mangroves at Punta Galeta
18th May 2012	Met with Mireya Correa at Panama University; Begun the journey to Nusagandi; Arrival at Nusagandi	Mireya Correa is the Director of the Smithsonian Tropical Research Institute.
19th May 2012	Expedition at Nusagandi	*Heliconia xanthovillosa* is endemic to this area.
20th May 2012	Begun the journey to El Valle de Antón; Arrival at El Valle de Antón	This journey took most of the day.
21st May 2012	Expedition in El Valle de Antón	*Heliconia ramonensis* is endemic to the area
22nd May 2012	Begun the journey to Volcán Baru; Arrival at Volcán Baru.	This journey took most of the day.
23rd May 2012	Spent a day in Carla's Garden at Volcán Baru.	Observed *Heliconia* species in cultivation
24th May 2012	Journey to the Fortuna Forest Reserve	*Heliconia atropurpurea* is endemic to the area.
25th May 2012	Visit to Finca Dracula	Highland garden specialized on growing orchid species.
26th May 2012	Begun the trip to Costa Rica. Arrival in Cartago (Costa Rica)	This journey took most of the day.
27th May 2012	Visited the highland farm of Highland Heliconia	Observed, photographed and registered *Heliconia* in cultivation for the cut flower industry.
28th May 2012	Free day in Cartago	Visited the Lankester Botanic Garden.
29th May 2012	Visited the lowland farm of Highland Heliconia	Observed, photographed and registered *Heliconia* in cultivation for the cut flower industry.
30th May 2012	Took the bus back to Panama. Arrival at Volcán Baru	This journey took most of the day.
31th May 2012	Rest day	-
1st June 2012	Took the bus to Panama City. Arrival at Panama City	This journey took most of the day.
2nd June 2012	Free day at Panama City.	Visited the Panama Canal, the local market and other relevant areas.
3rd June 2012	Took a Bus to Colon. Free day in Colon.	-
4th June 2012	Visited Summit Gardens for the second time.	-
5th June 2012	Arrival at Heathrow Airport	-

Summit Gardens

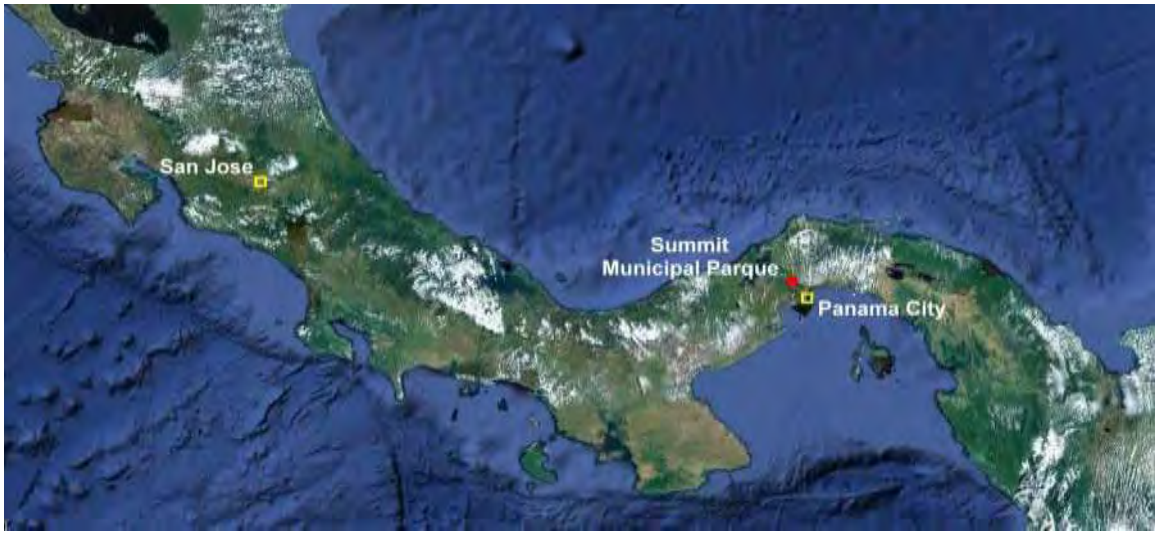


Fig 2: *Roystonea* palms, bamboos and tropical trees being cultivated at Summit Gardens.

Summit Gardens

The Summit Municipal Parque, better known as Summit Gardens, is located in the District of Panama, near the capital city. It covers approximately 55 hectares and was first established in 1923. Nowadays, it receives some 150,000 visitors a year and is a botanical garden mainly focusing on the development of tropical biology and horticulture.

A small zoo was created in the early sixties, as an additional attraction. Today, it totals approximately 300 animals; amongst these, the Jaguar and the Harpía Eagle (the national bird of Panama) are considered the main focus for conservation and research.

The gardens have an amazing arboretum, with tropical trees from all over the world. *Brownea macrophylla* was flowering at the time of my visit. The scarlet flowers emerge directly from the old wood in the main trunk and have very long stamens.
Another cauliflorous tree is the Cannon Ball Tree, *Couroupita guianensis.* However, unlike *Brownea* which has a sessile inflorescence, the Cannon Ball Tree produces its exotic flowers at the tips of very long penduncles that are borne on the main trunk and dangle down as they develop. If pollination has been successful, spherical fruits develop over a period of several months, attaining the size of a cannon ball.

Two other trees present in the arboretum collection are *Gmelina arborea* and *Lagerstroemia speciosa.* They are both very popular as street trees due to their peculiar showiness and fast growth. *Gmelina* has also been exploited in the past as a timber resource.

Regarding Heliconias, I was able to see three species in full bloom. Unfortunately, it was a bit too early for *H. spathocircinata*, as these were just starting to produce the inflorescences. But the characteristic which is typical of this species was already visible: the hairy bracts with a wavy edge that curl at their tips.

H. platystachys was looking its best. This lowland species needs a definite dry season to trigger blooming when the rainy season arrives. This might be the reason why it shows some reluctance to bloom in areas which have a less prominent seasonality, like up in the mountains.
The minute *Heliconia psittacorum* was also flowering prolifically in the gardens. It has the tendency to form lose colonies, due to its stoloniferous nature and because of this, it is widely used as a ground cover element, in Summit Gardens.

Fig 3 (Top): Spectacular cauliflorous inflorescence of *Brownea macrophylla*. Note the tree trunk in the background from which the flowers emerge.

Fig 4 (Middle left): The anemone shaped flowers of the Cannon Ball Tree (*Couroupita guianensis*)

Fig 5 (Middle right): Brown and yellow flowers of *Gmelina arborea*.

Fig 6 (Bottom left): *Lagerstroemia speciosa* inflorescence.

Fig 7 (Top): *Heliconia platystachys,* a very seasonal species which only blooms after the dry season.

Fig 8 (Top right): Inflorescence of *Heliconia psittacorum.* The striking orange flowers have a dark tip to guide the pollinators to the nectar.

Fig 9 (Bottom left): *Heliconia wagneriana* has typical peachy red markings on the centre of the bracts.

Fig 10 (Bottom right): Recently emerged inflorescence of *Heliconia spathocircinata*.

H. psittacorum also blooms year around and its flowers are not concealed by the bracts, as in most *Heliconia* species. The winter flowering *H. wagneriana* was found growing near the edge of the main path. It was thriving in full sun and in spite of being a winter blooming species, the inflorescences can last up to 9 months without losing their colour.

Further ahead, I found a lovely *Passiflora miniata* growing over a massive pergola and its vivid scarlet flowers with black corona filaments caught my eyes instantaneously. By then, nightfall was drawing near, so I started to head back towards the exit.
Suddenly I stopped halfway through, upon detecting a delicious vanilla fragrance that was filling the air. My level of curiosity rose rather rapidly as I started scanning the adjacent grounds to detect the source of such delightful perfume. To my own amazement, I spotted two species of night blooming shrubs flanking either side of the main entrance to the gardens. I still do not understand how these shrubs passed by me completely unnoticed, when I walked through the same grounds earlier on, during the day. Still, the pure white tubular blooms were very obvious and thanks to their overpowering fragrance, I ended up my very first day in Panama by taking some pictures of the spectacular flowers.

Fig 11 (Top left): Remarkable flowers of *Posoqueria latifolia* with extremely long corolla tubes.

Fig 12 (Top right): Crimson flower of *Passiflora miniata*.

Fig 13 (Left): *Brunfelsia gigantea* flowers with a flared corolla. The flower tube has a similar in length to the flowers of *P. latifolia*. It is likely that both species share the same nocturnal pollinator.

Punta Galeta

Fig 14: Coconut palms and mangroves growing at the seashore, in Punta Galeta.

Punta Galeta

Punta Galeta is a lowland shoreline facing the Atlantic Ocean. I knew I would not find any *Heliconia* species in the area (due to their intolerance of brackish waters and salt), but even so, I wanted to take advantage of my free day in Colón to visit the nearby mangroves and their interesting flora.

Mangroves are well known for their habit of producing aerial roots and pneumatophores for support and breathing purposes, respectively. In Punta Galeta, vast areas are swamped by these plants that have an important role in preventing erosion of the land by the sea. The tide fluctuates twice every day, and it is amazing how the mangrove seedlings are able to survive a complete submersion in dark muddy waters for a couple of hours, every now and then.

Higher up in the canopy, the flowers of the mangroves are open and ready to be pollinated. The fruits are curious pencil-shaped structures that drop and self-plant themselves on the mud when the tide is low. How convenient!

Also inhabiting the area was another interesting plant, but with a totally different lifestyle. Instead of being rooted in the salty mud, its roots prefer to cling firmly onto the mangrove trunks and its thick leathery leaves are well adapted to withstand the intense sunlight of the canopy. The delicate, pure white flowers are very fragrant at night and the intoxicating scent fills the air most lavishly, in the evenings. This orchid, called *Brassavola nodosa,* is pollinated by nocturnal moths. I have seen it growing interspersed throughout the mangroves and, more interestingly, seedlings were also commonly found.

Nearby, a *Prestonia portobellensis* was twining an *Apeiba timbourobou* tree. Both species are typical of coastal areas, but occur on slightly elevated areas which are less prone to flooding.

The landscape at the shoreline exactly conformed to the stereotype everybody has of the ideal tropical beach: numerous coconut palms growing on golden sand and being bathed by crystalline blue water. In areas where the water level was shallower, lots of crabs were gathering to feast on what seemed to be some sort of green algae. However, whilst consulting the flora of the local area to identify some local plants, I learnt that the algae I saw was, in fact, a marine angiosperm. It, too, is able to produce flowers in spite of being adapted to live permanently on the sea. Nonetheless, it is pollinated by the marine currents which carry the pollen grains from one flower to another. What an amazing pollination strategy!

Fig 15 (Top right): Image of a Mangrove forest.

Fig 16 (Middle): Detail of the pneumatophores during the low tide. (Note the two mangrove seedlings present on the image)

Fig 17 (Bottom right): Close up of mangrove flowers (*Rhizophora mangle*).

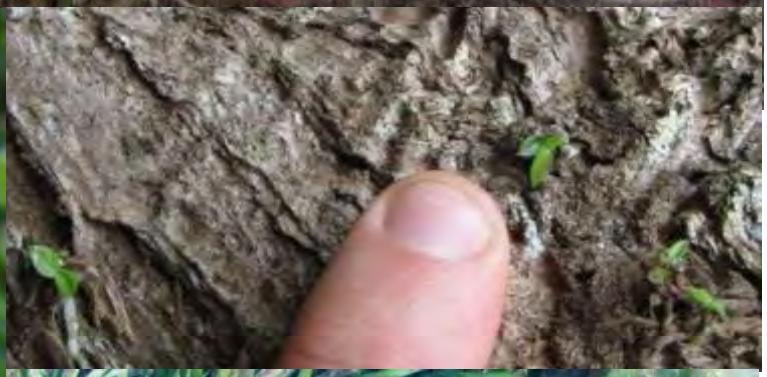


Fig 18 (Top): *Brassavola nodosa* colony.

Fig 19 (Middle left): *Prestonia portobellensis* flower.

Fig 20 (Middle right): *Brassavola nodosa* seedlings on mangrove trunk (index finger for scale purposes).

Fig 21 (Bottom left): *Apeiba tibourobou* flower.

Fig 22 (Bottom right): *Thalassia testudinum,* a curious sea grass which is a marine angiosperm.

Nusagandi

Fig 23: Lush tropical rainforest at Nusagandi.

Nusagandi

Nusagandi is an area located near the Atlantic side of the Panamanian isthmus and is protected by the Kuna people. The high humidity, combined with an overabundance of rainfall, nourishes the tropical rainforest that covers vast areas on this mountainous region.

Nusagandi is also the homeland of the fabled *Heliconia xanthovillosa*, an exceptional species that does not occur anywhere else in the world. Previous reports state that it flowers at the beginning of the rainy season, so the end of May seemed to be the perfect time to observe this species in bloom.

An entire day was needed to drive from the district of Colón to the district of San Blas, where the Nusagandi foothills are located. After a replenishing night at a local hostel, I departed very early in the morning of the next day, to have enough time to explore the area.

Upon arrival at Nusagandi, *Heliconia longa* was immediately spotted growing abundantly in the surroundings. Like most *Heliconia* species, this one seems to inhabit the boundary of the forest, growing along roadsides or wherever there is a glade in the forest. The pendulous inflorescences were quite amazing; very robust and often attaining more than 1m long, doing its name justice!

I then proceeded to a minor dirt trail that infiltrated deep into the forest and finished next to a small stream that was running approximately 50m below the level of the main road. The tree trunks were absolutely covered in a tangle of climbers and epiphytes. Beautiful aroids with enormous leaves were dangling down from high up in the canopy and flowering bromeliads were dotted all over the place. The jungle was noisy and full of activity, with the sound of insects and wild birds echoing everywhere, despite the fact I could hardly detect any of them with my eyes.

I was ecstatic upon discovering a colony of *Guzmania musaica* growing on a fallen tree trunk, a bromeliad that I grew for many years in my garden. There is absolutely nothing like the feeling of discovering a very familiar plant growing wild, on its natural environment.

Fig 24 (Top left): Myself with *Heliconia longa.*

Fig 25 (Top right): Detail of an inflorescence. The bright yellow flowers that are borne at the end of the vivid scarlet bracts provide a clear contrast for any potential bird pollinators.

Fig 26 (Bottom): Colony of *Guzmania musaica* dwelling on a fallen trunk, amongst leaf litter.

However, the main objective was to observe *H. xanthovillosa*, so I had to enter the water course and walk downstream, because this species is reported to grow on embankments and clearings that flank the creek.

During my aquatic hike, I noticed an interesting *Cyclanthus* which had a very specific ecological niche: it was growing exclusively in bare rocks and pebbles within the stream, with the roots firmly clinging to the rock surface and being constantly splashed by water. The striking white spidery flowers produced around the base of the plants and close to the water line were heavenly scented.

Further down, there was a magnificent colony of *Heliconia pogonantha* growing in a wide forest clearing. The leaves were 6m high and the pendulous inflorescence was even longer that *H. longa*, attaining more than 2m in length!

Also noticeable in the area, were extraordinary specimens of *Pentagonia macrophylla.* This member of the Rubiaceae family produces a single stemmed shrub with a cluster of outrageously enormous leaves clustered at the top. The colour and pattern of those leaves was simply beyond belief.

Two hours had passed since I began the hike down the river. However, I knew I was getting closer to my awaited reward, because I came across a hybrid of *H. xanthovillosa* X *H. pogonantha* flowering in the area, suggesting that it was imperative the presence of *H. xanthovillosa* in the surroundings.

Ten minutes later I was proved right, upon the mesmerizing sight of a golden spiralling inflorescence that confirmed to be the legendary *Heliconia xanthovillosa*. The thrill, awe and excitement I felt in that precise moment are totally indescribable!

The solitary plant was growing as predicted, in a soil embankment slightly overhanging the river. It was bearing a single mature inflorescence, dangling from an elegant arching pseudostem that was holding the flowers above the water. All the other inflorescences were still very young and had just recently emerged.

Fig 27 (Top): Impressive colonies of a rheophytic species of *Cyclanthus* that is well adapted to inhabit the highly disturbed areas within the stream.

Fig 28 (Left): Detail of the complex inflorescence produced by this species.

Fig 29 (Bottom): *Heliconia pogonantha* bract close-up.

Fig 30 (Top): *Heliconia pogonantha* habit. Note the imposing stature of this species.

Fig 31 (Right): Closer photo of the remarkable inflorescence with myself for scale purposes.

Fig 32 (Left): *Pentagonia macrophylla.* Note the size, conspicuous venation and purple underside of the leaves.

Fig 33 (Top): Seedling of this species growing in the deep shade of the forest floor. The seedlings display the same coloration as adult plants from a very early stage.

Fig 34 (Bottom): *H. pogonantha* X *xanthovillosa* bract detail. Note the conspicuous indumentum covering the entire inflorescence. The insect is *Leptocelis tricolor,* (Hemiptera, Coreidae).

Fig 35 (Left): *H. pogonantha* X *xanthovillosa* inflorescence. Note the orange coloration, intermediate between both parents.

Fig 36 (Top): H. pogonantha X xanthovillosa in situ. The picture clearly demonstrates the hybrid has the same habitat preferences as H. xanthovillosa.

The inflorescence was completely covered in a woolly indumentum of extraordinary beauty. This beauty was further enhanced by a few water droplets that were trapped in the woolly hairs and were shining like jewels in the sunlight. The epithet *xanthovillosa* means hairy and yellow, doing perfect justice to the physical characteristics of the unique inflorescence produced by this species.

Also noticeable is the extremely long peduncle that comprises almost half of the entire length of the inflorescence. The bracts only appear halfway through, and are arranged in a lose spiral that is very characteristic of the species. The lose angle in which the floral bracts are arranged brings the exoticism and extravagance for which Heliconias are known, to a whole new level.

To my eyes, this fascinating species epitomises all the glory and magnificence of all tropical flora, and there is little wonder why it is considered by many as the 'Holy Grail' of all Heliconias.

Fig 37: *H. xanthovillosa* growing in the wild. I was lucky enough to find a solitary well mature inflorescence, as most inflorescences were still starting to emerge and were immature at that moment.

Fig 38 (Top): *Heliconia xanthovillosa* inflorescence overhanging the stream.

Fig 39 (Right): Detail of a recently emerged, young inflorescence. Note the tight arrangement of the bracts.

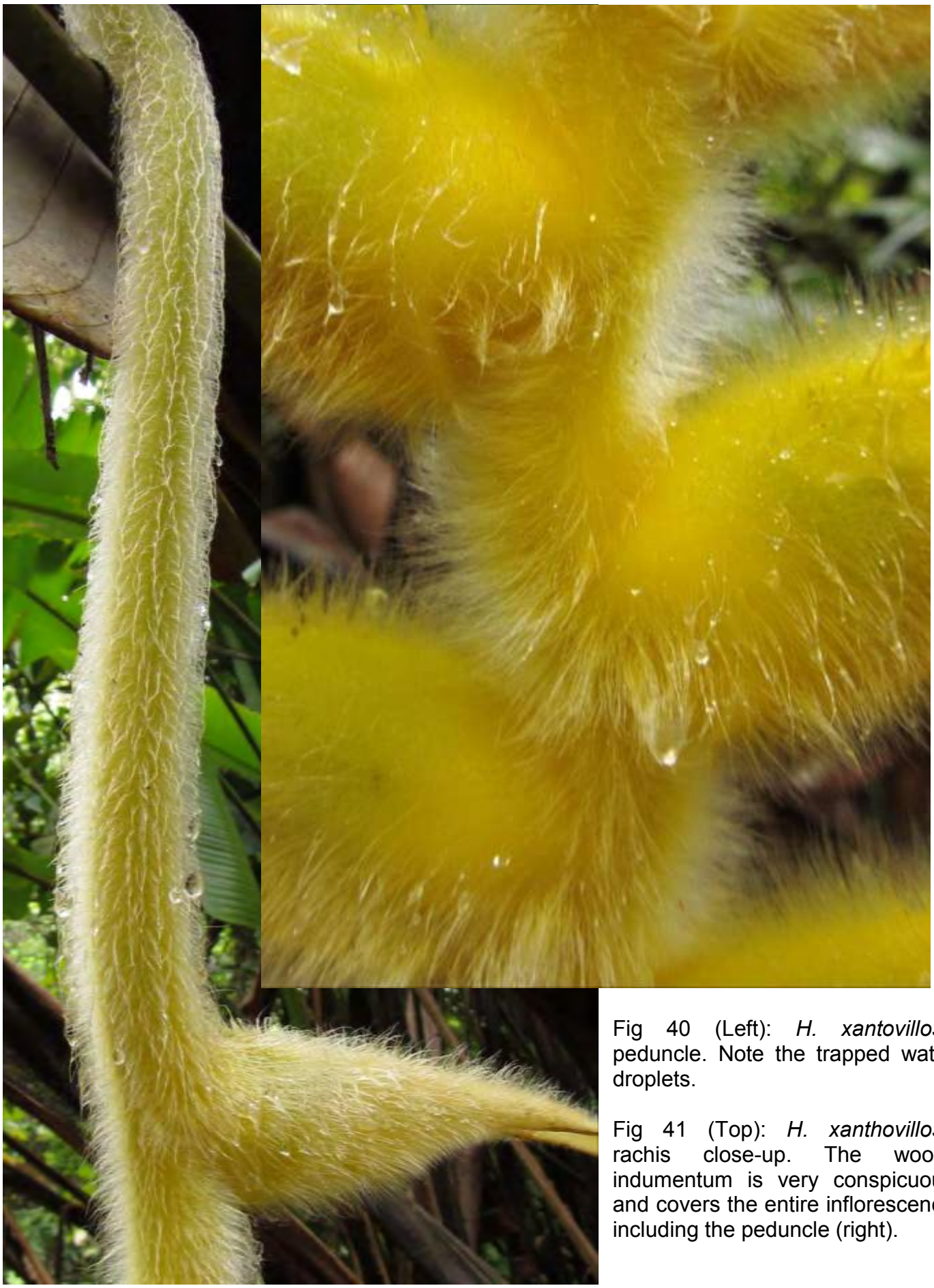


Fig 40 (Left): *H. xantovillosa* peduncle. Note the trapped water droplets.

Fig 41 (Top): *H. xanthovillosa* rachis close-up. The woolly indumentum is very conspicuous and covers the entire inflorescence including the peduncle (right).

Fig 42: *H. xanthovillosa* inflorescence photographed from below. Note the loose spiraling angle in which the bracts are arranged.

El Valle de Antón

Fig 43: Image of the luxurious highland vegetation that enjoys the cool damp conditions on El Valle de Antón.

El Valle de Antón

Due to the fact that Panama being located on the subduction zone that resulted from the interaction between the tectonic plates of Nazca and the Caribbean, the country has a very active geology. El Valle de Antón is the first and only town in the world which was entirely built within and completely surrounded by the intact walls of a volcano.

Here, due to the higher elevation and constant fog that provides plenty of humidity, ferns and mosses were demanding attention and thriving everywhere. Even the smallest twig was covered with mossy epiphytes dripping with moisture.

Psychotria correae, an endemic shrub of the coffee family, was locally abundant and the nodding reddish inflorescences were very striking. White star shaped flowers are born at the tip, amongst the colourful bracts, but even the inflorescences devoid of flowers were equally decorative. I think this plant would prove an excellent ornamental in tropical gardens, but its high altitudinal range might suggest difficulties in hot climates. This might be the reason why this beautiful plant is not found in cultivation outside its native range, which is a shame.

Another striking plant that I found along the way was a solitary individual of *Anthurium wendlingeri* that was flowering and fructifying at the same time. The leaves were very long, pendent and reached almost a metre in length. The inflorescence was also pendent and somehow dull in coloration. Nevertheless, I found the spiralling spadix very curious, especially when it enters the fruiting stage and bears bright orange berries almost over its entire length.

It didn't take long to find *H. ramonensis*, neither was the trip too difficult, in comparison to the *H. xanthovillosa* expedition. Probably because the former is much more abundant in its natural environment which makes it a lot easier to find. I have seen it growing scattered in small colonies, preferring glades and other open spaces, which provide the adequate amount of light required by this species to thrive. If it's too dark, the plants etiolate, acquiring a spindly nature and hardly producing any flowers.

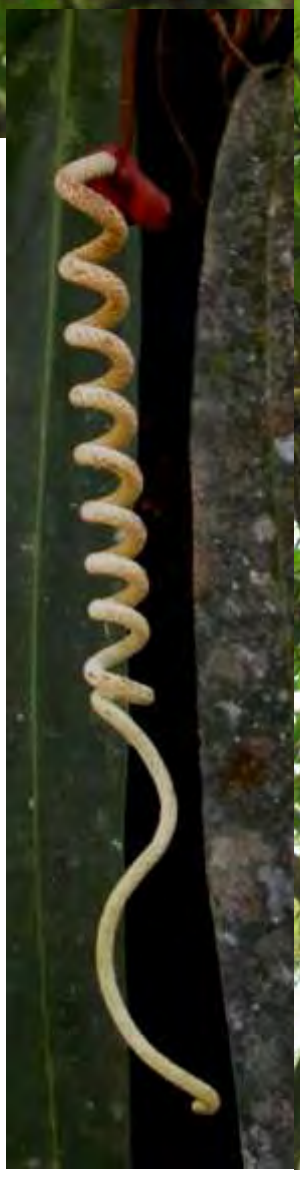


Fig 44 (Top): *Psychotria correae* inflorescence. There are 2 large bracts present at the base of the entire structure.

Fig 45 (Top right): Detail of *P. correae* flowers. Note the floral bracts arranged in a compact fashion. The white flowers are produced in succession, over a long period of time.

Fig 46 (Far right): Specimen of *Anthurium wendlingeri* growing epiphytically on a tree. The spadix was almost completely covered with fruits.

Fig 47 (Right): Spiralling inflorescence of the same individual. Note the curious coiled nature of the spadix.

In exposed situations and without the protection of nearby trees, the leaves are easily burnt (due to great UV incidence in higher altitudes) which causes the plant to assume a stunted growth habit, again to the detriment of the flowers.

However, in the right situation, *H. ramonensis* plants are very healthy and each clump produces up to a dozen or so dazzling inflorescences that have a spiral nature similar to *H. xanthovillosa.* The bracts are deep pinkish red and have a very sparse indumentum of hairs. The yellow flowers are produced in abundance and last for a day or two. However the whole inflorescence is able to produce hundreds of flowers over a period of 4 months.

Another great surprise was awaiting me, on our way back to the car. I spotted a *Columnea consanguinea* growing on a fallen tree branch. This type of gesneriad flowers year around and usually inhabits the higher levels of the forest canopy, where it enjoys brighter light levels, as I observed later on. However, this unusual opportunity to spot an individual growing close to the ground, provided me with the unique opportunity of making a good photographic record of this stunning, yet little known species.

The pale yellow flowers are produced close to the main stem and are quite inconspicuous. However, the most amazing feature of the plant resides on the leaves: They are deep green and have a pair of hyaline marks on the upper surface that allow light to permeate through the leaf mesophyll. On the underside of the leaf, a red pigment is produced in the area where the hyaline marks are located and the overall effect is that of stained glass in a church window, on a sunny day.

Due to the short lifespan of the flowers, it seems that this species of *Columnea* is exploiting the leaves as a better, longer lasting and more economical way of advertisement to attract pollinators, instead of investing in the ephemeral flowers. When I think I have seen everything, tropical plants never cease to amaze me…

Fig 48: *Heliconia ramonensis* inflorescence seen from above. Note the hairy peduncle and the spiralling nature of the bracts.

Fig 49 (Top): *Heliconia ramonensis* inflorescence with the *Heliconia* bug, *Leptocelis tricolor* (again!).

Fig 50 (Top right): Myself serving as scale next to a mature inflorescence.

Fig 51 (Right): Detail of the yellow flowers. Only one flower is open per bract, at any time.

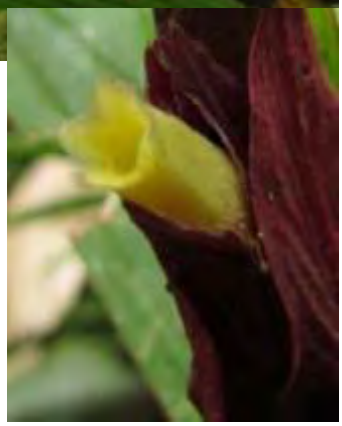


Fig 52 (Top): Specimen of *Columnea consanguinea* viewed from above.

Fig 53 (Top right): Detail of the window, on the underside of the leaf.

Fig 54 (Middle): The same plant viewed from bellow. Note the conspicuous bright red markings that serve to attract hummingbirds and the presence of a yellow flower closer to the stem.

Fig 55 (Right): Close-up of the pale flower produced by this species.

Volcán Baru

Fig 56: Image of Volcán Barú standing above the cloud belt.

Volcán Barú

Volcán Baru is situated in the Talamanca Mountains, a mountainous cordillera that crosses the border and is shared between Panama and Costa Rica. On the Panamanian side, Volcán Baru is the highest peak in the country, at approximately 3,475m above sea level. It is ironic that light frosts can often occur on the highest summits, but not in the areas I visited.

My friend Carla Black has lived in Volcán Baru since the early nineties, and she invited me to see her garden. She has built an amazing *Heliconia* collection over the years, and I was able to see more than 25 species blooming at the same time! I could describe her garden as a true *Heliconia* sanctuary!
Carla is also enthusiastic and keen to grow other members of the Zingiberales order, the same order to which the *Heliconia* genus belongs.

The first *Heliconia* species I saw was *H. rostrata,* a very colourful species which is one of the most, if not the most popular *Heliconia* in tropical gardens worldwide. The flowers are also used in floral arrangements because they are long lasting (see cover for an image of this species).

Growing nearby was an impressive clump of *Heliconia secunda.* The specific epithet originates from a Latin word that literally means one-sided, an allusion to the main feature of this species: the arrangement of the bracts in the inflorescence. They have the tendency to be arranged on the same plane because of the angle of torsion of the rachis.

As I continued my visit through the garden, my eyes were treated to a real tropical feast! Carla pointed at the curious *Heliconia reptans* while mentioning that is one of the very few *Heliconia* species which produces inflorescences that creep along the ground, instead of being placed higher up in the plant. I immediately started to wonder what kind of animal pollinates this beautiful Colombian species… Could it just be a lazy bird?

The next stop was *H. penduloides.* The bright pink inflorescences of this species were covered in a rather interesting white bloom that slowly disappears as the inflorescence ages.

Fig 57 (Top): Creeping inflorescences of *H. reptans.* This intriguing species always produces its flowers at ground level.

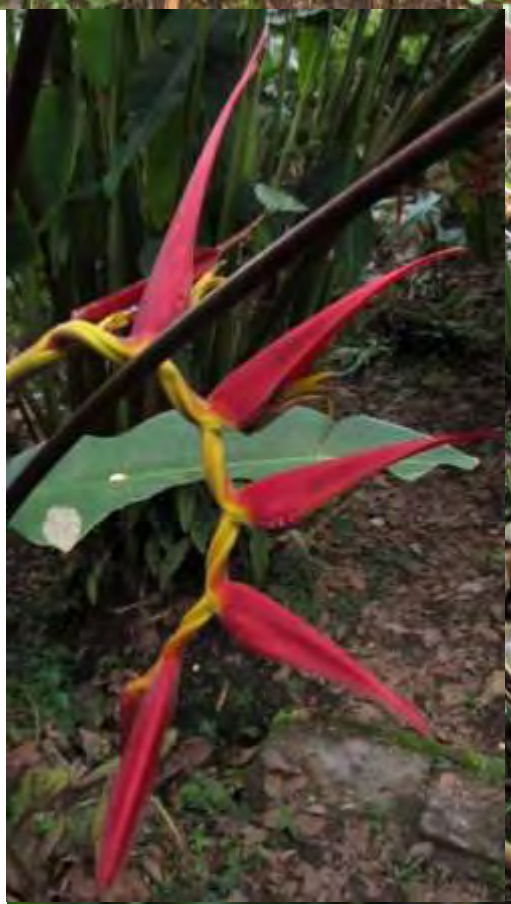


Fig 58 (Right): Inflorescence of *H. secunda.* Note the unilateral arrangement of the bracts in the whole inflorescence.

Fig 59 (Far right): *H.* penduloides inflorescence covered in a pruinose bloom.

Fig 60 (Bottom): Detail of *H. penduloides* bract. Note the whitish bloom that temporarily covers the bracts of this species.

Amongst all these tropical eccentricities, there was a *Heliconia* species which could push the limits even further - *H. vellerigera*. It possesses the fuzziest inflorescences of all *Heliconia* species I know of, so far. They look almost extra-terrestrial and could even be mistaken for an animal!

Another remarkable *Heliconia* that I saw in Carla´s garden is *H. carmelae.* This species has a very wavy rachis and the bracts are held almost parallel to the main axis of the inflorescence. The rachis is pinkish red and the tip is yellowish in colour, soon fading to red as the inflorescence gets longer and more bracts emerge from its tip.

Heliconia griggsiana stands amongst the giants of the genus. The clump I saw in the garden easily reached some impressive 8 meters high. The inflorescences have a reddish rachis, but the bracts are light yellow and green, covered in a light bloom in a similar fashion to *H. penduloides*.

In contrast, *H. aemygdiana* represents one of the smallest species in the genus. Each plant is barely taller than a metre. The erect inflorescences combine the bright yellow of the rachis with the showy pink of the bracts and the deep green of the flowers. This amazing colour combination makes for a stunning effect!

Heliconia mariae is commonly known as the beefsteak *Heliconia* or the crocodile skin *Heliconia* because the bracts have a very imbricate habit, thus concealing the rachis and giving the overall appearance of a crocodile's back. It is one of the very few *Heliconia* species which produces red flowers, a very unusual characteristic within the genus.

Carla was also cultivating a very peculiar species called *H. episcopalis.* The bracts of this species are deciduous, a completely unique feature across all heliconias. They are shed one by one, as the inflorescence develops new bracts that emerge from the top.

There also exists a *Heliconia* with very dark, almost black inflorescences, called *H. necrobracteata.* In my opinion, the name of this species is just perfect for it. The bracts are so dark that they are hard to detect. I wondered what animal could be able to detect them and pollinate this one…

Fig 61 (Top): Huge *Heliconia griggsiana* clump.

Fig 62 (Top right): Close up of *H. griggsiana* inflorescence. Note the reddish nature of the rachis.

Fig 63 (Bottom right): *Heliconia vellerigera* inflorescence. Note the open flowers in the uppermost pair of bracts.

Fig 64 (Bottom): *H. vellerigera* bract up close.

Fig 65 (Top left): *Heliconia aemygdiana*

Fig 66 (Right): *H. carmelae*

Fig 67 (Bottom middle): *H. necrobracteata*. Note the very dark bracts produced by this plant.

Fig 68 (Top middle): *Heliconia mariae*

Fig 69 (Bottom left): *H. episcopalis*

It was also the fructifying season for some *Heliconia* species in Carla's garden such as *H. nutans*. The fruits are round berries that contain up to 3 black seeds and have the most amazing electric blue colouring that I've ever seen in any plant organ. The contrast provided by the blue colour is so strong that it is impossible to miss the fruits, even from considerable distances. In addition, the infructescences are every bit as ornamental as the inflorescences, providing additional interest for when the flowers fade.

Besides the *Heliconia* collection, Carla also had an amazing collection of gingers and related genera. Perhaps my favourite of all was *Zingiber newmanii.*
The unusual flower spikes are borne at soil level and carpet the ground below the plant's foliage. According to Carla, this species flowers throughout the year. What a sensational experience it must be, living in the tropics!

Fig 70 (Top): Massive colony of *Zingiber newmanii.* Note the peculiar flowering habit of this species.

Fig 71 (Right): Close up of the fruits of *H. nutans*. Note the red bracts that add additional interest. The yellow structures are unfertilized ovaries.

La Fortuna Forest Reserve

Fig 72: The highlands at La Fortuna Reserve enjoy constant fogs year around, making this area a sanctuary for plants that cannot withstand the dry season.

La Fortuna Forest Reserve

My other main objective was to study, record and photograph *H. bella* in the wild, which grows naturally in Santa Fe. However, Carla told me it would probably not be in flower at this time of year, so we made a slight change of plan. We decided that it would be better to visit La Fortuna Forest Reserve instead, which is the homeland of the equally fascinating *Heliconia atropurpurea. H. bella* and *H. atropurpurea* are closely related species, hence both being placed in the subgenus Taeniostrobus.

I began my hike on an open hilly area which was extremely biodiverse and rich in numerous plant species. On a single hill, I was able to spot 3 different orchid species growing together and in simultaneous bloom! Next to them, there were some amazing neotropical Ericaceae members, consisting of 2 main genera: *Cavendishia* and *Psamisia*. Unusually for this well-known family, these neotropical ericoids often produce conspicuous colourful bracts that act as extra advertisements, thus attracting pollinators more efficiently.

Further up we finally entered the jungle and what a place to be! Just in front of me was an outstanding *Anthurium* whose leaves were, to date, the biggest I've ever seen in an epiphyte! They measured roughly 2m long which is quite an achievement for an epiphytic plant which has no control over the amount of moisture its roots receive upon the host tree. *Centropogon granulosus* was growing in the vicinity. This member of the Campanulaceae family has showy flowers that look like a parrot's beak!

Finally I arrived at the place where the population of *Heliconia atropurpurea* is known to occur. This species is quite distinctive, as it produces an erect inflorescence which is somehow bulkier in appearance than other Heliconias. Water collects inside the bracts and this allows some aquatic fauna to develop within the inflorescence. It seems that some invertebrate species are very specific and highly specialized for living inside the bracts of *Heliconia atropurpurea.* The extinction of this species would also mean the loss of all animal fauna associated with it.

On my way back, I found a *Blakea* species in flower. The showy flowers measured 10cm across and had a very interesting arrangement of reproductive organs.

At the end of the journey, I was very pleased to visit the natural habitat of *Heiconia atropurpurea*, and to see all those orchids and *Cavendishia.*

Fig 73 (Top Left): Striking pink and white flowers of *Psamisia ramiflora*

Fig 74 (Top middle): *Cavendishia bracteata.* Note the conspicuous bracts produced by this species.

Fig 75 (Top right): *Phragmipedium caudatum*, a lovely slipper orchid with extremely long petals.

Fig 76 (Middle left): *Cavendishia megabracteata*, with the nodding flowers poking amidst the large bracts.

Fig 77 (Top Left): An orange orchid belonging to the genus *Elleanthus*.

Fig 78 (Bottom): Ephemeral flower of a *Sobralia* species.

Fig 79 (Top left): Colossal specimen of *Anthurium pseudospectabile*. The humongous leaves dangle freely in the air and almost reach the base of the host tree.

Fig 80 (Top right): Flower of a *Blakea* species. Note the curious arrangement of the stamens and the style, which is typical of the Melastomataceae family.

Fig 81 (Middle right): Inflorescence of *Heliconia atropurpurea* with two open flowers protruding on the middle of the inflorescence.

Fig 82 (Bottom Left): Showy red and yellow flowers of *Centropogon granulosus,* a tropical member of the Campanulaceae family.

Highland Heliconia

Fig 83: Image of the landscape at Highland Heliconia, situated in Cartago, Costa Rica.

Highland Heliconia

After all these wild adventures to see Heliconias in Panama, it was time to head to Costa Rica and observe how these plants are grown for the commercial flower market. Mike and Mila Anderson are the owners of Highland Heliconia, a cut flower farm which is based in Cartago. The farm is split in two main centres of production: one is located in the lowlands and cultivates warm loving varieties whilst the other specialises in the cooler growing species and is located at greater altitudes.

I spent an entire day travelling all the way from Volcán Baru to Cartago, so on my second day in Costa Rica, I headed to the Highland Farm. Mike was there to receive me and gave me a tour around the facilities. I noticed that the land was terraced and each *Heliconia* variety is planted in rows. Mike explained that the flowers are collected twice a week, early in the morning, while they are still fresh and fully hydrated. This greatly expands their lifespan.

I had seen in the wild many of the species that Mike is cultivating on his highland farm, but the inflorescences were naturally smaller and often damaged by animal wildlife in comparison to the plants in cultivation.

Heliconia regalis was the centre of attention that day. This species is related to *H. ramonensis* and *H. xanthovillosa* which I had previously seen in the wild. It, too, had inflorescences both furry and pendulous, typical of this complex of *Heliconia* species that make the taxonomic section Barbatae. However, whilst *H. xanthovillosa* and *H. ramonensis* have a monochromatic inflorescence, *H. regalis* combines golden yellow, peachy orange, bright pink and vivid red all in the same inflorescence, and the result is just splendid.

A much broader and more diverse range of species and cultivars is grown in the lowland farm. Here, the plants are cultivated in a similar fashion as in the highlands, but without the terraces, as the terrain is less hilly. I managed to observe and photograph dozens of heliconias in bloom.

The lowland farm also grows other types of tropical flowers such as exotic gingers and bananas. Mike mentioned that one of the most popular gingers amongst local florists is the beehive ginger, *Zingiber spectabile*. Equally popular is the porcelain rose, common name for *Etlingera elatior*, a fascinating ginger from Indonesia which produces its flowers on bare stems that emerge from underground rhizomes. Last, but not least, the scarlet banana is perhaps the tropical flower with the longest lifespan, being able to survive up to one month in perfection on a flower arrangement, provided that the water is changed once a week.

Fig 84 (Left): Inflorescence of *Heliconia regalis* in cultivation. Neither pictures nor words make justice to the real magnificence of this stunning species. Conversely, it has a short lifespan as cut flower, but lasts for months if left on the plant.

Fig 85 (Top): Detail of lanuginose nature of the bract surface. Note the amazing change of colour hues, starting with yellow nearest the rachis, then orange, pink and finally red on the distal apex of each inflorescence segment. Exoticism reaching its apotheosis!

Fig 86 (Top left): *Heliconia bourgaeana*.

Fig 87 (Top right): *Heliconia caribaea*.

Fig 88 (Middle right): *Heliconia stricta*.

Fig 89 (Bottom): *Heliconia nickeriensis*.

Fig 90 (Top left): Inflorescence of *Musa coccinea*.

Fig 91 (Top middle): Golden inflorescence of a beehive ginger (*Zingiber spectabile*).

Fig 92 (Top right): Upright inflorescence of *Heliconia chapmeiana*.

Fig 93 (Middle right): Red inflorescence of the porcelain rose (*Etlingera elatior*).

Fig 94 (Bottom left): Pendulous inflorescence of *Heliconia chartacea*. Note the pink and green bracts and the scarlet rachis.

Finca Drácula & Lankester Garden

My report wouldn't be complete without mentioning 2 additional places that I visited in my free time: Finca Drácula and the Lankester Botanic Garden.

Finca Drácula is a highland orchid farm situated in Cerro Punta, a small mountain within the boundaries of Volcán Baru and close to Carla's Garden. I was astonished by the diverse collections of orchids that could be found in this garden. My favourite has to be *Dracula robledorum,* a very striking orchid which is seldom found in orchid collections. It is extremely hard to grow due to its specific temperature requirements: this species easily succumbs if it experiences warm temperatures for any length of time.

Lankester Botanic Garden, situated in Cartago, Costa Rica, also has an impressive orchid collection, but mostly made of warmer growing species that enjoy the hot weather year around. However, I was more fascinated by the collections of bromeliads displayed outside the garden's main entrance. *Aechmea mariae-reginae* has to be my elected species of review. This unusual bromeliad is endemic to Costa Rica and is one of the very few dioecious bromeliads there are. The flowers emerge from compact inflorescences that are subtended by the most amazing pink bracts I've ever seen on a bromeliad so far…

Fig 95 (Left): Colony of *Aechmea mariae-reginae* growing epiphytically on a tree.

Fig 96 (Right): *Dracula robledorum,* an orchid which mimics a mushroom and is pollinated by fungus gnats. Note the shape of the labellum.

Conclusion

After having such an awesome time in Central America, I was feeling rather sad to be leaving. Now, after seeing all these extraordinary plants live, I can affirm that my passion and fascination for *Heliconias* and other tropical plants will never know any limits or boundaries.

It always makes me wonder what sort of emotions the first European colonizers might have felt, when they first experienced visual contact with these mysterious plants, for the first time in their lives.

I return to London with many overwhelming memories and positive experiences that will never be forgotten. I have learnt a lot and was able to fulfil the majority of my objectives, enabling me to say that I have exploited the full potential of this trip.

Acknowledgements

I would like to show my gratitude to Carla Black and Marianne Akers for the warm welcome and all the assistance given during my trip in Panama. I also would like to thank Mila and Mike Anderson for sharing their incredible knowledge and leading me through their Heliconia farms in Costa Rica.

Additionally, I show my appreciation and immense gratitude to the staff at Royal Botanic Gardens Kew, to the Royal Horticulture Society, the Stella Ross-Craig Travel Scholarship Awards and the Merlin Trust, for all the financial support and for giving me this unique life opportunity to travel for the very first time to a tropical country. This allowed me to observe and study my favourite horticultural field of tropical botany.

Fig 97: *Heliconia xanthovillosa* in cultivation. Highland Heliconia Farm, Costa Rica.

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