BULLETIN

HELICONIA SOCIETY INTERNATIONAL

A Journal of the Zingiberales, including Cannaceae, Costaceae, Heliconiaceae Lowiaceae, Marantaceae, Musaceae, Strelitziaceae, and Zingiberaceae

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Two Beer Minimum, or How I Survived the HSI Conference in Brazil

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Photos by Steve Sarner and Carla Black

Pre-Conference Tour

2 Nov 2016
For most of us, the Conference started with our arrival at GRU Airport. Immigration was quite easy with your intrepid traveler's brand new visa. At customs we had a choice: "Nothing to declare" or a "Stand in line for a strip search." We chose nothing to declare and walked right out the exit. I never saw anyone in the strip search line again. We met Carlos and Charleston right outside customs and we were on our way to the hotel. Two hours later we arrived in Campinas NNW of Sao Paulo. At the hotel, it took us 12 hours to figure out that the switch on the headboard labeled "AR" meant "turn on the air conditioner." We had slept with the windows open risking the dreaded Zika mosquito. Oh well, no brain damage yet. I guess one needs an undamaged brain to notice.

3 Nov 2016
The next morning it was breakfast at 0500. I have to use the military time designation because civilians don't have a designation for 0500. Breakfast was an opportunity to meet our fellow travelers.

We were:

Lyn Crehan and Bronwen Carthew from Australia
Roy Maduro from Aruba
Cheryl Solomon from the US
Carla Black from Panama
Marianne Akers from Panama
Christine Marshall from Australia
Ravindra and Minal Patil from India
Richard Criley from the US
Gilbert and Lauretta D'Hollander from South Africa
Steve and Margie Sarner from Panama
Charleston Gonçalves from Brazil – organizer
Vivian Loges from Brazil – organizer
Carlos Castro from Brazil – organizer

Pre-Conference group photo at Holambra Veiling

Finally, on the bus by 0600. Even so, we arrived at Veiling Holambra a little late. Veiling Holambra is a COOP to auction the flowers and potted plants of some 400 local farmers. The buyers have about 5 seconds to make their electronic bids on any one lot before the system moves onto the next lot. I think I can speak for all of us when I say, "I need one of these in my town." The variety was astounding. A word or two about Holambra. It stands for Holland in Brazil, which is where many of the local farmers immigrated from after World War II. After trying pig and corn farming and not liking it, they reverted to what they did in Holland, growing flowers.

After the auction, we visited the son of one of these Dutch farmers, Jan de Wit, (www.jandewit.com.br) who stands about 2.2 meters tall. He grows nothing but lilies and callas (with some designer coffee and amaryllis on the side). He has about 4 hectares under roof, or not. I say this because the entire roof is retractable by sections. Everything is controlled by a computer with input from a weather station. The roof closes for too much rain, wind or sun. Parts of the greenhouse have been leveled so accurately they can water all the potted lilies in an area 10 meters by 50 meters by flooding the area with 3cm of water and fertilizer and not go over a 5cm barrier. I asked if it was difficult to get the ground so level. After 5 minutes of explanation the answer seems to be, "We hired a Dutch company." This seemed to be common theme in Holambra. Jan also imports all of his lily bulbs from Holland. He does not produce any bulbs, except for amaryllis which he exports back to Holland. The entire operation was quite impressive from the production of compost tea in 5000 liter vats, to the vast production of compost from pine straw, to the partially automated packaging of cut lilies for the auction the next morning.

Auction at Veiling Holambra

Opening retractable greenhouse roof by sections

After lunch, it was off to our next local farmer, Christiano. www.ecoflora.com.br He did not appear to be Dutch, but you never know. He grew nothing but Phalaenopsis orchids for the national market. Everything is done on a grand scale; you might almost say it was an orchid factory. He is working his way up from shipping about 8,000 plants a week today, to 20,000 plants per week in the near future, with a goal of 80,000 per week. Even at 8,000 it was impressive. The automation was quite extensive with the computer-controlled, pneumatically-operated machines

The Purpose of HSI

The purpose of HSI is to increase the enjoyment and understanding of *Heliconia* (Heliconiaceae) and related plants (in the families Cannaceae, Costaceae, Lowiaceae, Marantaceae, Musaceae, Strelitziaceae, and Zingiberaceae) of the order Zingerberales through education, research and communication. Interest in Zingiberales and information on the cultivation and botany of these plants is rapidly increasing. HSI will centralize this information and distribute it to members.

The **HELICONIA SOCIETY INTERNATIONAL**, a nonprofit corporation, was formed in 1985 because of rapidly developing interest around the world in these plants and their close relatives. We are composed of dues-paying members. Our officers and all participants are volunteers. Everyone is welcome to join and participate. HSI conducts a Biennial Meeting and International Conference.

Membership dues are (in $US): Individual $40, Family $45, PDF $25, Student $10, Contributing $50, Corporate $100, Sustaining $500, Lifetime Member $1000. Membership fees constitute annual dues from 1 July through 30 June. All members receive the BULLETIN (usually published quarterly) and special announcements. Join or renew your membership at www.heliconia.org.

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being imported from Holland. His greenhouses were controlled for light, temperature and humidity with one specifically for 18-20ºC to program flowering. The 14 workers were quite strict on what they allowed out the door. Less than five blooms, to the dust bin. Missing a sepal, to the dust bin. Several of us went dumpster diving to build a bouquet for our rooms. Again, Christiano imported all of his orchid tissue cultures in flasks from Holland, Taiwan and Thailand. After a bus ride by the local Dutch windmill, it was back to the hotel for a quick nap and dinner.

Phalaenopsis production

4 Nov 2016

The next morning, it was on the bus by 8:30 AM, a much more civilized hour. First stop was the CEASA Campinas Flower Market. Again, "I want one of these in my town." The market included a central flower market, and sectors for landscape plants, houseplants, and garden annuals, where 360 growers sell their products. Much browsing and shopping was accomplished. After lunch, it was on to the Agronomic Institute of Campinas (IAC). This is where Carlos works as Deputy Director. We visited the medicinal workshop where they distill essential oils from plants they grow in the garden just outside as well as native and exotic plants. This has been a long-term project of the Institute since 1940. Next, it was to IAC headquarters where we saw a video detailing the many aspects of their research programs. IAC was responsible for developing many coffee, sugarcane and manioc varieties used in Brazil today. The rest of the day was spent exploring and pillaging and grazing on the local IAC grounds. Someone needs to tell Carla, "oxalic acid is not your friend." At 6:00PM, IAC hosted a cocktail, brunch, happy hour in their green greenhouse. The food was excellent, but "cocktail" and "happy hour" must have very different meanings in Portuguese - the delicious fruit juices were a few days short of providing alcohol for the "happy" part of the hour. Then, back to the hotel for a night of wanton revelry.

CEASA Campinas Flower Market

5 Nov 2016

Once more into the breach. We were off at 0730, a semi civilized hour, going to Fazenda Citra. Operated by HSI members Christian and Ingrid Dierberger, this farm specializes in Zingiberales and fruiting plants. After an hour seeing all the bourgeoisie plants, he showed us his private, upper-crust stash. Those not on the pre-tour should be ashamed of yourselves. I won't even enumerate new species we saw, but just be impressed by heavily flowering 40 -ft *Amherstia nobilis* trees (known as Queen of Flowering Trees). Between drought and the hail in recent months, most of the plants were less than optimal. They were still great. We also were treated to a mid-morning break to sample different tropical fruits and fruit juices. And then we went to Plantarum Botanical Garden run by Harri Lorenzi.

Dierbergers' seedling production

Harri has specialized in palms and aroids. He claims have to all 335 palms native to Brazil and maybe he does. He also claims to have nearly all of the aroids native to Brazil. He has about 34 taxa of Heliconias which he proudly showed to the assembled conferees.

After a full day of seeing the botanical sights, we descended on Carlos's house. There he plied us with beer, wine and barbecue. He kept us out to all hours of the night depriving your humble scribe of much needed sleep (see 16 Nov 2016 entry).

Fazenda Citra

6 Nov 2016

Off again, 0730 this time to the Sao Paulo Botanical Garden. This garden has an area of 36, 160 or 360 hectares, depending on which part of the entrance sign you read. Most of it has been left to grow wild for nearly 100 years. The remaining 5 or 6 hectares is a formal garden. Highlights include a boardwalk

Dierbergers' Fazenda Citra

Plantarum Botanical Garden

trek through the wild part of the garden and the final day of the local orchid show. Carlos's first student, Dr. Armando Tavares, showed us around and was very helpful.

After lunch and some shopping, we decided to skip the visit to Sao Paulo's principal city part and go straight to the hotel. It was just as well, since the heavens opened to deluge the city and the three of our party who went exploring. We spent our time inspecting the inventory of a local supermercado for 45 minutes. Dinner was at a pizzeria near the hotel.

Chris Dierberger

7 Nov 2016

On the bus this morning at 0830 for our ride to Ubatuba. But first, a stop at the Sao Paulo public market. Oh wait. The market is closed for a surprise once-every-four-month cleaning; so on to Ubatuba. The drive from the 700 m high plateau where Sao Paulo is located to sea-level is a winding road through the Atlantic coastal forest. Sorry we couldn't stop and botanize a little. After a stop at the beach for picnic lunch, it was on to the hotel at Itamambuca, a quiet low-rise, bungalow-style resort set back from the highway by a pothole-filled road.

At the conference we were joined by Maria João Dragovic from Madeira, Chris and Ingrid Dierberger from Brazil, and Pam and Dorothy Dowd from New Zealand.

The Conference

8 Nov 2016

After some delay in getting the projection sync'ed with the computers, the Conference formally began with a presentation by Richard on *Strelitzia regina* cultivation and flowering physiology. Next was Carla with a preview of the seeds to be auctioned, followed by her experiences discovering in 2006, then describing *H. berguidoi*. Maria then related her experiences measuring the growth characteristics of 15 species of heliconia on Madeira. Her work is in support of local growers of cut flowers there. Following lunch Vivian discussed how heliconias were processed after harvesting up to shipping. She detailed injuries that can occur and how to avoid them. Then Roy gave an autobiographical account of his retail experiences in Aruba. Gilbert reviewed the heliconias he is growing in South Africa. Next, Carla regaled us with stories and photos of her trip to Colombia in 2015. Carlos listed all of the heliconias in Brazil and some of their uses. The day was closed by Cheryl who reviewed her recent trip to Indonesia with a Fairchild Garden group.

Plantarum Botanical Garden

9 Nov 2016

The morning was spent on the Bonete Trail. Some people would call it a road. The cars bouncing by us were a dead giveaway. There we saw *H. rivularis* and *H. farinosa.* Your uncoordinated commentator played break-the-pinata with a mucuna seed pod, and failed. What do you expect from a geriatric invalid? Finally, it fell to earth on its own out of pity for us. It was eventually sold at the auction for the grand sum of $1.00. [Unfortunately the seeds were too immature so no germination occurred.] The afternoon was spent exploring the IAC field plot near Ubatuba. It was somewhat neglected since the local drug growers/dealers

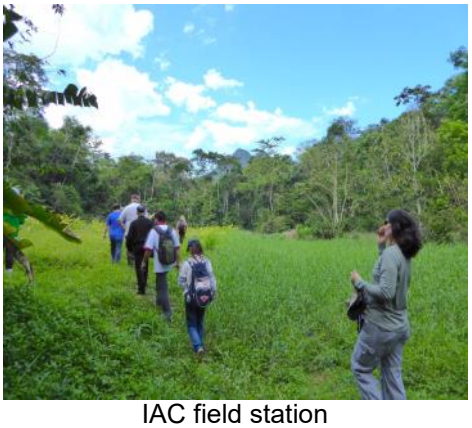
ran off Charleston with threats of foul play. Such a shame, it still was quite nice. A swarm of small stingless, black bees were agitated enough to run us off their territory, however.


Sao Paulo Botanical Garden

After a day of hiking, Carla called an all members forum before dinner. Normally, the annual board meeting is held at the conference, but a quorum was not present. The main topic was developing material for the HSI bulletin and secondarily to attract new members. Cheryl and Lyn volunteered to help Brian Brunner write up new heliconia cultivar descriptions that could be published in the Bulletin.

10 Nov 2016

Today was another day of presentations. The day began with your humble presenter describing the Soil Food Web (See Q&A, below). Next, Minal discussed animal husbandry and organic gardening in India. Marianne described her efforts restoring damage caused by erosion at Summit Garden. Vivian detailed her work on the pollination of heliconias, which she promises to summarize for the Bulletin.


IAC field station

Lyn showed us photos of the varied Zingiberales in her garden. Maria was back again with a travelogue of Madeira. She also discussed several endemic plants found in Madeira. Pam presented her work with Trade Aid, a group working to end child slavery and to help disadvantaged farmers. Richard, who opened the Conference, closed it with photos of his travels before and after the last HSI Conference in Bali.

Finally it was time for the group photo, with everyone in their conference t-shirts except Chris Dierberger. Apparently something to do with allergies to red dye number 7. Out by the fish sculptures and smile for 30 photos from 7 different cameras. All turned out well in the end (at least the one we used).

Next, was the gala dinner with promises of a big surprise and copious amounts of free adult beverages. The surprise was the next HSI Conference will be held near


Conference grounds

Mumbai India, hosted by Ravi and Minal. The adult beverages were indeed present, although Carlos withheld the Champagne until most of the ~~drunks~~ attendees had gone to bed. The auction was a success, raising $945.

Q&A

After my presentation, there were two questions, to which I gave abbreviated answers. The amended discussion is below:

Richard: Would you discuss the use of compost for different types of soil?

Your now coherent presenter: Thank you for that very prescient question Richard. I was just about to discuss that, but my time ran out. The answer is, it depends. If you are composting to dress your vegetables, you want a compost with a basic (high) pH and a high concentration of bacteria compared to fungi. To do this you start with green organic matter. Grass clippings and green leaves are best. The high glucose level in the green matter will attract bacteria who will multiply quickly before the fungi can get started. Inoculating the compost with a tea made with soil from an existing, healthy garden will help.


Official conference beach

Stand by the fishies and smile!

If you are dressing your Zingiberales or a fruit orchard, you want an acid (low) pH and a high concentration of fungi compared to bacteria. For this, you start with brown organic matter, chipped wood or shredded, dried leaves. The high levels of cellulose and lignin will make it difficult for the bacteria to get started allowing the fungi time to grow throughout the compost. Again, inoculating with a tea made with soil from a mature forest will help.

HSI hosts Vivian, Charleston and Carlos take a break

Gilbert: We have a strange fungus in South Africa that is taking over the coffee plantations. So far my heliconias are OK.

Your now coherent presenter: This a case of the Soil Food Web getting out of balance, or more likely, destroyed. It is always difficult to keep your soil healthy in a commercial agricultural setting. Farmers remove large quantities of organic matter from the soil every year. Farmers are also probably spraying the soil with commercial fertilizers, insecticides, herbicides and fungicides several times a year. These kill everything in the soil, allowing the pathogenic fungus to invade unopposed. With a healthy soil food web, your killer fungus probably would not stand a chance. You may have healthy soil around your heliconias, which is saving them. Adding a low pH, high fungus compost will help (see above). As for your neighbor's dying coffee, about all you can do is say, "Tisk, tisk. You should have maintained a healthy soil food web."

Highlights of the post conference tour, and additional conference photos will appear in the next issue of the Bulletin.

IAC field station

Following Ruiz

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Over 200 years ago the Spanish botanists Hipólito Ruiz and José Antonio Pavón were commissioned by King Charles III to explore present day Peru and Chile to study and collect specimens of the plants found there. More than 3000 plant specimens were collected during the ten years of the expedition. After their return to Spain in 1788, 10 volumes of descriptions of these plants were published in the *Flora Peruviana et Chilensis*. Included among these descriptions are 11 species in Zingiberales that to this day carry the names Ruiz & Pavon as the original authors.

***Canna iridiflora* Ruiz & Pav.** (Vol 2, pg 304)
***Canna paniculata* Ruiz & Pav.** (Vol 2, pg 303)
***Calathea capitata* (Ruiz & Pav.) Lindl.**
(Originally as *Maranta capitata* in Vol 2, pg 308)
***Calathea lateralis* (Ruiz & Pav.) Lindl.**
(Originally as *Maranta lateralis* in Vol 2, pg 308)
***Costus laevis* Ruiz & Pav.** (Vol 2, pg 307)
***Costus scaber* Ruiz & Pav.** (Vol 2, pg 306)
Dimerocostus argenteus* (Ruiz & Pav.) *Maas
(Originally as *Costus argenteus* in Vol 2, pg 307)
***Heliconia subulata* Ruiz & Pav.** (Vol 3, pg 70)
***Heliconia rostrata* Ruiz & Pav.** (Vol 3, pg 71)
***Heliconia lingulata* Ruiz & Pav.** (Vol 3, pg 71)
Renealmia thyrsoidea* (Ruiz & Pav.) *Poepp. & Endl.
(Originally as *Amomum thyrsoideum* in Vol 2, pg 305)

I was especially interested in seeing the live plants of the three species of Costaceae in habitat and in the original forms as they were collected and described by Ruiz and Pavón. The names of some of the localities where these species were collected have long since been changed or lost, not to be found on any current maps of Peru. It was therefore necessary to study Ruiz' journal and try to retrace his steps to find these localities.

In 1793 Ruiz prepared a detailed journal from his diaries when he returned to Spain, but inexplicably they were lost for 140 years, until discovered and published by the Spanish Academy of Sciences in 1930. The work was translated to English in 1940 by B. E. Dahlgreen of the Department of Botany, Chicago Field Museum of Natural History. Aided by Google Earth and some detailed school system maps of Peru, I was able to use Ruiz' journal to follow his travels and identify the localities where he collected these plants in the Zingiberales.

Cuchero

Ruiz makes numerous references in his journal to a place called Cuchero. Based on his description of the place and by the satellite images on Google Earth, I have concluded it to be the present day site of a place known locally as San Juan de Cocheros, located at GPS coordinates -9.5405, -75.9372, elevation 1265 meters with a 1600 meter peak just to the north and the 800 meter valley of the Río Huallaga about 1 km to the east. When I traveled to this place, I found it matches very closely with the description in Ruiz' journal[1]:

DESCRIPTION OF THE PUEBLO OF CUCHERO
At a dis tance of 26 leagues toward the north from the town of Huanuco, the pueblo of Cuchero is situated in a small plain on a hill surrounded on all sides by other higher and rough hills clothed with big trees, shrubs, reeds, and innumerable plants that cover the entire ground, without leaving the smallest place to plant anything, and without pasture. The pueblo of Cuchero hardly occupies 300 yards in length and 50 in width; in this space there are 11ranches, a small church with a room for the missionary…

Present day Cuchero

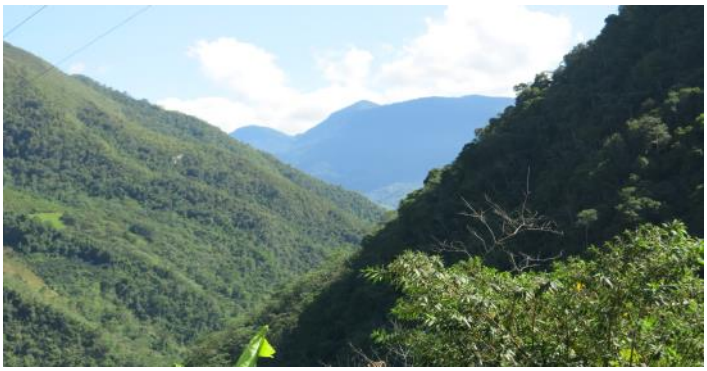
There are only two entrances to Cuchero, one to the south from Huanuco and the other through the north on the road to the landing place two short leagues downhill to the Huanuco river; it passes there with a considerable volume of water, which comes from the Chumayo, Cascay, Acomayo, Yaru mayo, Panao, Sto. Domingo, and Chacahuasi rivers, and many other small brooks that descend from all those montañas. At half a league from the wharf it is joined by the Chinchao river, a league farther down by the Cayumba river, and five leagues down the large Monzón river empties into it, going on through Pampahermosa to Lamas until it joins the famous Marañón river near the pueblo of Laguna.

Mountains in the area of Cuchero

Today there are but a few houses remaining here and most of the surrounding forests were cleared in the 1990's for growing coca for the Colombian drug cartels.

Ruiz stayed at Cuchero from July 6, 1780 until August 1, 1780 when an Indian attack drove them away. From there he moved to another place about 18 km upstream on the Río Chinchao to the pueblo of Chinchao where he stayed from about August 2, 1780 until September 1, 1780.

Chinchao is located at -9.6294, -76.0546 at an elevation of 1500 meters, on the south side of the Río Chinchao. Here he collected *Heliconia latifolia* and *Heliconia angustifolia* and *Costus ruber* - names all according to his journal.



The gorge of the Río Chinchao

In April 1784 Ruiz packed "55 boxes of dried plants, ores of gold and silver, animals, birds, dried fishes, shells, stones, soils, and other curious natural products and instruments and Indian clothing; also 800 sketches of plants painted in their natural colors ...." to be shipped back to Spain on the vessel *San Pedro Alcantar*. Tragedy struck when in 1786 the ship sank off the coast of Portugal with the loss of 128 lives, and presumably all or most of Ruiz' plant specimens and drawings. Those three species names collected at Chinchao do not show up again in his journal or in his published descriptions.

In September of 1784 he stayed at a place called Puzuzo where he "described 403 plants and corrected descriptions of some 250 of those gathered in Cuchero, Chinchao, and other places." Puzuzo is a locality about 75 km southeast of the Cuchero area, elevation 750 meters.

The next relevant entries in his journal were in June-August 1785 at a place called Hacienda Macoro where he continued his work describing plants collected in the region. This hacienda, it seems from reading his journal, was somewhere in the vicinity between Chinchao and Cuchero, as they were traveling from Huanuco and camped one night "beyond Chinchao" and the next day arrived at the hacienda.

In his journal he complained about the poor work of the draftsmen here drawing the plant illustrations - something of significance as will be explained later in this article. The illustrations from this expedition can be seen on the internet at plantillustrations.org/volume.php?id_volume=5903. Ruiz, H., Pavón, J., Drawings of the Royal Botanical Expedition to the Viceroyalty of Peru, vol. 0 (1777-1816) There are 2,319 thumbnail images here on 5 pages of thumbnail sheets contributed by the *Real Jardín Botánico*, Madrid, Spain. These include not only the plates that were published in the *Flora Peruviana et Chilensis*, but also other illustrations Ruiz did not choose to accompany his botanical descriptions.

> Before this occasion we had not discerned here, any more than in other parts of Macora, the aim and desire of the drafts men and we gave each one of them 2, 3, and even 4 plants a day to sketch as they were wont to do, even though incompletely, and without the care and accuracy with which they worked many times in the cities. For this and other similar reasons, few sketches were finished to our satisfaction and, although we complained of the inaccuracy of their work, they answered that they did not know how to do any better. Nor did we succeed in getting them to draw the fructification first, as being the most important part and most likely to wilt and spoil before the branch or plant. Hence, in Macora as in other places, many sketches were left without the parts of the fructification.

On August 6, 1785, there was another tragedy, a fire that destroyed the hacienda and most of the work that Ruiz had completed.

> In this fire I lost all the clothes and baggage that I had carried from Huanuco for my use, all the natural products gathered in those montañas during two months, diaries for three and a half years, the botanical descriptions for four years (among which there were 600 observed in the preceding years, and finally corrected and perfected in Puzuzo and the quebradas of Chin chao from the same living plants); the works of Linnaeus, Murray, Plumier, Jacquin, and several other books on botani cal as well as other subjects; the presses, and drying, preserv ing, and writing paper...

After the fire at Macora until the end of July 1786, Ruiz, according to his journal, worked on re-writing descriptions, including the following Zingiberales, all apparently from the Cuchero-Chinchao region: *Heliconia discolor, Amomum racemosum, Costus argenteus,*and *Costus scaber*. From the Puzuzu area he re-wrote his descriptions of *Canna paniculata* and *Canna indica* locally called achyra, and said both these species are used by the natives eating their rhizomes.

Chacahuassi

On September 26, 1787 Ruiz made the last of his trips relevant to collection of Zingiberales. He left the mountain town of Pillao to go to Chacahuasí, or the "house of the bridge" across what is now known as the Río Huallaga. By closely following his likely path from his journal descriptions, over the Cerro Sillcay and down through a boggy area to the river I was able to identify its location as the present day site of a dam for the Chaglla Hydroelectric project that was begun in 2011 and completed just this year. The location was confirmed when I visited the area and found a local resident who immediately knew the name Chacahuassi and told us it is now called Chulla. He took us to a quebrada he said is called Quebrada Chacahuassi. GPS coordinates are -9.6863, -75.8482, elevation 1000 meters.

When we found ourselves in that very narrow, deep dungeon where the sun penetrates only at midday and, surprised, surveyed with our eyes that oppressive and gloomy, place, in which at night, if it ever were clear at that season, one could count the stars; nothing could make us stay one single day, except the desire to comply with our commission by examin ing those three towering and inaccessible hills, covered from the summit to the banks of the two turbulent rivers, with tall trees, shrubs, and bushes…

Chacahuasi, or the "House of the Bridge," is situated at the foot of one of the three very tall, rough hills that form that narrow, triangular depth, bathed by two confined rivers that descend from the quebradas of the south and east; uniting there with incessant noise, its waters run very precipitately through the quebrada of the north towards Cuchero. In the vicinity of Chacahuasi there is not the smallest clear space to be found and, although there are three or four coca groves, these are located on the slopes of the hills and at the margins of the rivers on rocky ground and surrounded by bushes and precipices, so that no one could travel through those places at night without being in imminent danger of losing his life. The river that passes by the south quebrada is the same that Flows past Huanuco with the name of Pillco, but carrying Much more water, and its waters are quite salty, on account of the several saline springs that empty into it from Huanuco on.

After visiting the location I can fully understand his description as the river forms a very deep and narrow gorge at that point, precisely where the dam was constructed, and the most logical place the indigenous people would have built a bridge across the river.

Quebrada Chacahuassi looking east across the Río Huallaga

Ruiz stayed at Chacahuassi from September 28, 1787 to October 22, 1787. At Chacahuassi, Ruiz collected *Heliconia tricolor, Heliconia angustiflora, Costus laevis*, and (possibly at higher elevation near Pillao) *Canna iridiflora.*

Quebrada Chacahuassi looking south west

The area Ruiz explored is about 25 km to the south of the town of Tingo Maria and there are similar habitats along the upper Río Huallaga and the surrounding mountains to the north including the northern part of Department Huanúco and the southern part of Department San Martin.

The dam across the Río Huallaga, Chaglla hydroelectric project

A dangerous place

Beginning in 1979, this region around the city of Tingo Maria became a center of violent activity by the Shining Path (Sendero Luminoso) revolutionaries and their narco-trafficker associates. In all of Peru it is estimated that there have been 70,000 deaths or disappearances resulting from the war that ensued between these revolutionary terrorists and the government of Peru. Unfortunately, many of these deaths were of innocent civilians.

In this region alone, there have been documented 1,857 instances of violence causing 5,550 deaths, and it is estimated there have been many more - as many as 11,000 - that were not reported. The Senderistas allied themselves with the Colombian Cartels to finance their so-called revolution. The peak of the violence by the Senderistas occurred between 1987 and 1999 with sporadic instances of armed conflict continuing for several years thereafter until 2012, but mostly involving the coca growing and drug trafficking activity in the region. The activity of the Shining Path revolutionaries in this area was effectively ended on

Google Earth capture of area explored by Ruiz

February 12, 2012 with the capture 100 km north of Tingo Maria of "Comrade Artemio" their last remaining original leader.

Today, the U. S. State Department still discourages tourists from visiting areas outside the city of Tingo Maria itself, and in fact prohibits its employees from traveling there by land.

I could wait no longer. In November 2016, I spent a wonderful week exploring the entire region around Tingo Maria and retracing the steps of the Spanish explorer Hipólito Ruiz.

The natural beauty of the area has been somewhat spoiled by the clearing of the forests for coca growing, but there are still many places of beauty without the crowds of tourists that flock to Cusco and other Peruvian tourist destinations.

I had the good fortune to find an excellent guide, Luis (Lucho) Egusquiza, the owner of Tincco Tours in Tingo Maria. Lucho took me to the places I wanted to go and also showed me many other beautiful places to see the plants in the region. We hiked through the mountains looking for plants, crossed back and forth along an unspoiled river to spectacular waterfalls, and went to areas with caves and natural swimming pools.

The search for *Costus laevis*

Costus laevis (as currently defined and circumscribed) includes a rather diverse group of plants with a range from Guatemala to Peru. I have seen thousands of plants in Costa Rica, Panama, Colombia, and Ecuador that all seem to fit best within this species. However, there seem to be distinct differences between the plants in Central America and west of the Andes in South America, compared with the forms of this species found along the eastern side of the Andes, such as the region where Ruiz found and described the species.

My primary objective for this trip was to find the form of the original *Costus laevis* that was described by Ruiz and Pavón, published in 1798 in Tomus I, page 3 of his *Flora Peruviana et Chilensis*, and abbreviated here.

Costus laevis *(from Tomus 2, pg 307)*
2. C. floribus in thyrso conico, bracteis lanceolatis apice incurvis, corollis patentibus, *Flor. Per. et Chil. tom. I, pag. 3Planta* perennis, biorgyalis. *Habitat* in *Peruviae* nemoribus ad vicum *Pillao* juxta *Chacahuassi* et *Pampamarca* locis imis, umbrosis humidisque *Floret* Septembri, et Octobri.

The holotype for Ruiz' *Costus laevis* is stored at the Institut Botànic de Barcelona (BC), BC872966 in Spain. When Paul Maas completed his 1972 monograph of neotropical *Costus*, he stated he had not seen this specimen in person - only a photograph. In the photograph of this specimen (available through JSTOR) the inflorescence is mostly covered by the upper leaves. It is difficult to tell for certain, but to me the bracts do not appear at all to be "lanceolate" or "incurved at the apex," but rather more like the *Costus laevis* we would expect to see from collections in other countries. The form of the flowers, as often is the case with *Costus,* is not visible, and would not be expected in a 200-year-old specimen.

Inflorescence of *C. laevis* holotype

Strangely, there is no illustration plate for *Costus laevis* (as in the other Zingiberales species) included in the *Flora Peruviana et Chilensis.* However, among the thousands of illustrations said to be from this same expedition, that are archived at the *Real Jardín Botánico* in Madrid is this unlabeled illustration by José Gabriel Rivera.

Clearly it is a *Costus*, and it could represent the species *Costus laevis*. It seems to have bracts that are consistent with the holotype - but not at all consistent with the written description of lanceolate shaped bracts incurved at the apex. This illustration does show a "corollis patentibus" ie: the open labellum type of *Costus* flower and not the tubular type. This too is consistent with what we might expect to see in an illustration of *Costus laevis*.

The origin of this illustration is unclear. It is possible that it was not really from the Ruiz and Pavón expedition as indicated on JSTOR, but rather from a later expedition by Juan Tafalla. Jose Gabriel Rivera did not join the expedition until 1796, after Ruiz had returned to Spain and Juan Tafalla had taken charge of the continuation of the explorations into what is now southern Ecuador. Unfortunate-

Illustration of *Costus* sp. by Rivera

ly this illustration is not titled or dated, so the locality of the plant depicted in the illustration cannot be determined. Tafalla did briefly explore another river valley in Huanuco, Peru, the area around Chicoplaya on the Rio Monzon, which is about 40 km west of Tingo Maria, so it is possible this illustration came from there, but Ruiz did not include it with his 1798 description of the species *Costus laevis*. In fact, no illustration was included for this species as was done for nearly all the others Ruiz described in his Flora Peruviana et Chilensis.

So I arrived in the region where Ruiz and Pavón had made these collections of Zingiberales over 200 years ago and set about looking for the live plants that had not been investigated by botanists in so many years. My first destination was the locality of Cuchero that is the center of the area they explored.

Costus aff. spiralis at Hauchi-

As our 4 x 4 Toyota Hilux crept up the rocky road from Hauchipa toward Cuchero, the first *Costus* I saw was this one:

It has the general appearance of what I would expect to see in a *Costus laevis*, but the flowers were tubular - not the open labellum type *C. laevis* is known for. The shape and orientation of the flowers seemed closer to *Costus spiralis*, but with greenish bracts instead of red. The corolla lobes were noticeably shorter than the tubular labellum.

Unsure of the significance of this plant, we drove on until we reached the end of the road at Cuchero. And there we found a plant that almost exactly fits the description Ruiz had written for *Costus laevis*. But there was one major problem! This was nothing like the *Costus laevis* known to present-day botanists - it was rather a clear example of *Costus guanaiensis* var. *tarmicus* - (formerly *Costus tarmicus)* a variety described by Paul Maas, and with a holotype collected near La Merced in Dept. Junin of Peru in 1856 by Weberbauer, in similar habitat about 175 km to the south.

Costus guanaiensis var. *tarmicus* at Cuchero

Over the next five days we covered this region thoroughly, going to Hauchipa, Chinchao, Villa La Gloria, Mallqui, Chacahuassi, Huanipampa, Pampamarca, Santa Rita Sur, San Miguel, Cayumba, along the Río Repente (a/k/a Río Cayumba), Parque Nacionál Tingo Maria, and points in between, as well as areas to the north and to the west of Tingo Maria. We saw numerous examples of both of these two species throughout the region, but did not see anything remotely like a *Costus laevis* in a form like the plants that are usually associated with that species. Nor did we see anything close to the unidentified illustration that is purportedly from this expedition. Details and photos of these observations as well as the other Costaceae seen in the region can be found on the iNaturalist website at inaturalist.org/observations/selvadero.

Conclusion

I am left with the conclusion that the plant that was described and named by Ruiz & Pavón is NOT the same species that later botanists have ascribed to *Costus laevis*. Rather, it is the species *Costus guanaiensis* var. *tarmicus*.

The holotype for *Costus laevis* that is in Barcelona should be examined more closely than can be done from a photograph, but I expect it will turn out to be the same plant found in this region that has a close affinity to *Costus spiralis*.

There is no doubt in my mind that Ruiz would have seen both of these species as they are both very common in Chacahuassi where his holotype was collected and throughout the region. It seems likely to me that his *Costus laevis* is actually TWO DIFFERENT SPECIES, neither of which is anything close to the *Costus laevis* as it is currently known.

If my conclusions are correct, I am unsure what the rules of taxonomy will dictate, but it looks to me like it is going to be a mess to straighten out.

Which takes precedence to the name, the description or the holotype? If the description takes precedence, then all the *C. guanaienis* var. *tarmicus* will have to be changed to *Costus laevis* and all the current *Costus laevis* that were merged into this species will have to either go back to their original names or be described and named anew.

If the holotype takes precedence, and if it is found to match the *C.* aff. *spiralis* of the region, then all the green bracted plants in Peru of that form will become *Costus laevis*, and all the others from Guatemala to Ecuador will have to either go back to their original names or be described and named anew.

Or does this discrepancy between the holotype and description simply invalidate the name? Or will there be a neotype for Costus laevis that is consistent with the plant generally known under that name?

All these questions are "above my pay grade." I only hope that botanists will take these findings seriously and do justice to the beautiful plants that are so widely known as *Costus laevis.*

[1]Travels of Ruiz, Pavón, and Dombey in Peru and Chile (1777-1788)
By Hipólito Ruiz
With an Epilogue and Official Documents Added by Agustin Jesus Barreiro
Translation by B. E. Dahlgren, Chief Curator, Department of Botany
Botanical Series, Field Museum of Natural History
Volume 21, March 28, 1940, Publication 467
Available for downloading from a number of internet sites.

Stereotypical *Costus laevis* from Costa Rica, near Wilson Botanical Garden

Young plant (Mallqui)

Mature plant (Hauchipa)

Ligule & Petiole (Hauchipa)

Lower Bracts (Hauchipa)

Holotype of
Costus laevis Ruiz & Pavon

Inflorescence detail

Ligules and petioles

Flower parts (Hauchipa)

Young inflorescence
(Santa Rita Sur)

Older inflorescence
(P. N. Tingo Maria)

Mature inflorescence
(Hauchipa)

Comparison of living plants (*c. aff. spiralis*)
With the holotype of *Costus laevis*

COSTUS LAEVIS.

2. C. floribus in thyrso conico, bracteis lanceolatis apice incurvis, corollis patentibus.

RADIX tuberosa, fasciculata; fibrillis plurimis longis; tuberculis oblongis, geniculatis, oculatis, intortis.

CULMI plures, teretes, erecti, glabri, laeves, biorgyales.

FOLIA sparsa, lanceolata, acuta, lineata, nervosa, integerrima, subundulata, utrinque glabra, ferè pedalia: *inferiora* gradatim minora, oblongiuscula, deflexa: *intermedia* patentia: *superiora* erecta, breviora.

PETIOLI vaginantes, glabri, laeves, ore purpurei.

FLORES in thyrsum conicum, obovatum, acuminatum, *bracteis* imbricatis, unifloris compositum. *Bracteae* lanceolatae, infernè rubrae, supernè virides, incurvae, apice strictae. *Bractea altera* sub singulo flore, carinata, rubra, calyce brevior.

CALYX ruber.

COROLLA: *Petala* tria, basi nectarii adnata, lanceolata, concacava, calyce sextuplò longiora, erecta, nectario paulò breviora, nitida, luteo-carnea: *superius* reliquis duplò latius.

NECTARIUM maximum, ventricosum, subringens, bilabiatum, in centro rubrum, lineis carneo-lutescentibus striatum: *Labium inferius* magnum, concavo-carinatum, trifidum; *laciniis* subrotundis, *intermediâ* trifidâ: *Labium superius* oblongum, supernè angustatum, integerrimum.

STIGMA compressum, subinfundibuliforme, bilobum, infernè squamulâ obovatâ, subtriangulari, emarginatâ.

CAPSULA obovato-oblonga, triquetra, carnosa.

SEMINA trigona, pulpâ filamentosâ subinvoluta, nitida, nigra.

HABITAT in *Peruviae* nemoribus ad vicum *Pillao* juxta *Chacahuassi* locis umbrosis humidisque.

FLORET Septembri, et Octobri.

1. Stems/petioles smooth, glabrous
2. Ligule with purplish margin
3. Leaves glabrous both sides
4. Bracts lanceolate with incurved apex, reddish below, green above
5. Corolla yellow, shiny
6. Labellum red striped

Costus at Cuchero matched against Ruiz' description of *Costus laevis*

Comparison of *Costus laevis* description with *Costus guanaiensis* var. *tarmicus* form in region

HSI Photo Contest Guidelines and Requirements

January 2017

At the HSI Members' Forum in Brazil, there was enthusiasm for a photo contest to stir up member interest and participation. Submissions will reflect a quarterly theme. A set of guidelines and requirements has been drawn up (see below).

HSI Photo Contest theme for 2017: Zingiberales used in flower arrangements.

Deadlines for receipt of entries; the winner from votes counted during those months will be reported in the next quarterly bulletin:

15 February: Heliconia in arrangement
1 May: Zingiberaceae in arrangement
1 August: Strelitzia in arrangement
1 November: Costaceae in arrangement

Guidelines:

There will be up to four photo contests per year, to coincide with the quarterly bulletin. Each will have a theme; entries should clearly adhere to the theme. The quarterly themes and deadlines will be emailed to all current HSI members and posted on our website www.heliconia.org

The contests are freely open to members of HSI. Multiple entries are permitted, though any one photographer can win only twice per year. The entrant warrants that he or she is the creator of that image and grants to HSI the right to reproduce the image on its website, Facebook page, in the Bulletin and elsewhere. Attribution will always be given to the originator, unless he or she requests otherwise.

Entries will be posted on the HSI website as they are received. Winners will be selected by the number of Likes on HSI's Facebook page.

Deadline for entries is the 1st of the month of February, May, August and November. Voting will take place during the month following the deadline. So go to the Facebook page in February, May, August and November and VOTE! (For our first contest, entries may be submitted by February 15th and voting will be extended until March 15th).

Winners will receive recognition in the Bulletin and other media, and the acclaim of HSI members and the general public. If HSI board members offer, the winner could also get a packet of interesting seeds.

The winner of the Best Photo of the Year will receive a year's free Regular membership in HSI. The winner will be chosen by a committee of board members and will be notified in June.

Requirements:

Digital photos in .jpg format.

Minimum resolution: 2400 pixels on the long side.

Cropping and enhancements such as sharpness, color balance, contrast or brightness are permissible. Other digital tools may be used for artistic effect, but not for the purpose of misrepresenting the subject of the photo.

No watermarks or copyright symbols should be imbedded in the image.

Include:
• your full name
• e-mail address
• identification of the subject or a brief description of each image. If you are not sure of the identification of a plant in your image, we will do our best to help. For the arrangement theme, the name of the designer (if known) would be appropriate to include.

Email entries to:

Colton Collins, HSI Webmaster
cocollins@plantgrouphawaii.com

Example of a tropical floral arrangement featuring heliconia

HSI Headquarters
Dr. David H. Lorence
National Tropical Botanical Garden
3530 Papalina Road
Kalaheo, Hawaii 96741 USA

HELICONIA SOCIETY INTERNATIONAL

In this issue:

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