

The Discovery of the Amazing *Sabinaria* *magnifica*

RODRIGO BERNAL
*Instituto de Ciencias
Naturales,
Universidad Nacional de
Colombia,
Apartado 7495,
Bogotá, Colombia.
rgbernal@gmail.com*

1. The
locality where
Sabinaria
magnifica
grows.



The new genus of fan palm, *Sabinaria*, was recently discovered in the area bordering Colombia and Panama. Here is a narrative of its discovery.

The discovery of a new palm genus in the western hemisphere is a rare event. So rare, indeed, that out of the 184 genera accepted in the family up to 2012, only eleven were discovered in the Americas during the past 100

years. No wonder, then, I was shocked on 15 April 2013 when Saúl Hoyos, a former student of mine, sent me some photos of an unusual palm that looked unlike any genus known to date. Saúl had taken the photos at the base of

the Serranía del Darién, the remote, forested mountain range that forms the border between Colombia and Panama, and had grabbed a specimen in a rush, while returning from a trip to the Serranía in search of the elusive *Magnolia sambuensis*. With daylight fading and five hours of forest walk ahead to their base in Capurganá, an idyllic village by the Caribbean Sea, there was no time to botanize anymore, and Saúl and his colleagues collected the specimens and took the photos while the guides urged them to move on.

The images Saúl sent me after returning from the jungle showed a magnificent palm with numerous large, circular leaves split almost to the base into two large, perfect fans, the whole blade resembling a huge butterfly. The unripe fruits were tightly packed into a short, compact mass hidden among the leaf bases. A quick look was enough for me to realize that the plant represented a new species in the tribe Cryosophileae, as revealed by the central split of the lamina into two halves. The further undivided fans, however, and the tightly packed fruits were unlike anything else known to date in the group. When the patchy distribution of species and genera in the group is considered, the new palm might even represent a new genus. But the images did not

include any details of the stem, the leaf bases or the flowers, which were vital details to proceed any further.

Full of excitement, I called Gloria Galeano, my lifetime companion and fellow palm researcher for over 30 years, who was on her way back from a field trip. "You won't guess what I have in front of me," I told her over the phone. As expected, she did not. "A new palm genus," I claimed, speaking out of my intuition and enthusiasm, rather than from any compelling evidence. I told her the story, and, as I later knew, I spoiled (or blessed – she could not identify the feeling) her ten-hour ride out of the forest.

When Gloria watched the images on the computer screen that evening, she matched my thoughts, not yet put into words: "This is the most beautiful of all Colombian palms," she declared. This wasn't a trivial statement, considering the magnificence of our native palm flora, the largest one this side of the world, which includes the majestic wax palms of the Andes, the fascinating *Wettinia* spp. of the cloud forests, and the elegant riverside *Leopoldinia* spp. of the Rio Negro.

We immediately called Saúl to get more information. He had had no time to make any

2. Our airport shuttle in Acandí (No, that's not the plane we arrived on).





3 (top). The Serranía del Darién in the background. 4 (bottom). Our camp at the base of Serranía del Darién.

detailed observations but he did remember that the stem was unarmed, which ruled out *Cryosophila*, distinctive in its adventitious roots modified into branched spines. Was the leaf sheath medially split at the base? He hadn't observed that, and, alas, the photos didn't

reveal that detail. He didn't even remember if there was anything else in the hastily grabbed specimen, besides one leaf and an unripe infructescence. Thus, we asked the curator of the Herbarium at the Medellín Botanic Garden, our old friend Álvaro Cogollo, to send the

specimens on loan to the National Colombian Herbarium in Bogotá.

After three itchy days, the specimens were finally at hand. By then, we had already considered all taxonomic possibilities and discussed all potential names for the new species and, just in case, the new genus. If it were a new genus, I suggested, we should call it *Sabinaria*, as a gift to our daughter Sabina, who has learnt since her childhood what it means to have as parents a couple of botanists who are away in the forest most of their time. And the specific epithet? Honoring Saúl Hoyos, who had brought the new palm to our attention, seemed obvious.

The herbarium specimen turned out to have an old inflorescence with some flower remains still partially recognizable. These showed some resemblance to the flowers of the beautiful *Itaya amicornum*, a rare palm known from a few scattered localities in the northwestern Amazon, on the other side of the Andes and at least 1300 km away from our conundrum. The discovery of a second, trans-Andean species of *Itaya* would be as surprising, indeed, as finding a new genus.



6. The oily fruits of *Elaeis oleifera*.

There was no time to lose. We immediately planned a field trip with Saúl to the Serranía del Darién, managing to slip a full week of

5. A stand of *Elaeis oleifera* near Capurganá.





7. Habit of *Sabinaria magnifica*.

absence into our previous agendas. We would fly to Acandí, a small town by the coast some 20 km southwest of the Serranía, the nearest operating airstrip after the closer airport at Capurganá ceased commercial operations in 2012. From Acandí we would take a 40 minute

boat trip along the Caribbean coast to Capurganá, where a seven-hour walk through the forest would take us to our enigmatic palm. But two days before our departure on May 18, a general strike broke out in Acandí and Capurganá, every kind of transportation was



8. Leaves of *Sabinaria magnifica*.

paralyzed, and the airport was blocked. There was no way to reach the area. By the time the demonstrations ceased four days later, it turned out to be impossible for the three of us to match a suitable gap in our schedules within the next 100 days.

On August 26, 2013, after three long months of expectation, we finally met Saúl at the

airport in Medellín, where we would board our plane for Acandí. Saúl was accompanied by Norman Echavarría, an enthusiastic student of biology whose family runs a beach hotel in Capurganá. Norman was in Saul's team when they first collected the palm, and it was he who first called Saul's attention to the strange palm; at the last minute he had managed to

join us – if he found an available seat in the fully booked small plane. After a long wait he got the seat of the only passenger who did not show up, and we boarded the small twin-engine propeller aircraft.

After an uneventful flight over the northern end of the Andes, we landed in Acañá, a small and friendly coastal town in the northwestern most corner of South America. The Serranía del Darién with its spectacular forests was in front of us when we got off the plane. A couple of two-wheel buggies took us to the town, where we stopped to buy our supplies. By noon we boarded a boat for Capurganá, a smaller, quiet village, where we stayed at Norman's wonderful family hotel.

Early next morning our mule driver, Orlando, showed up with his brother and three boys, two for our gear and one for himself. By seven o'clock we were already underway in what is considered by many people to be one of the most dangerous crossings in the continent. The trail winds up and down through three forested ranges before reaching the place where our palm grows, and then crosses the Serranía and continues into Panama. Although the distance from Capurganá to our campsite is only eight kilometers as the crow flies, it takes at least five hours to reach there. At a botanist's

pace, however, we counted on no less than seven hours. It took us eleven!

The path leaves the village quite soon, and then leads through a narrow coastal plain, where a superb wild stand of the American oil palm, *Elaeis oleifera*, still survives the menacing advance of vacation houses. The thick recurved stem of this palm is prostrate on the ground, and it takes strange forms as the palm crown falls and resumes growth once and again several times throughout the plant's lifetime. The abundant red bunches of ripe, oily fruits reminded us of the paradoxical fate of this promising species, which should have been domesticated long ago, but has seen instead a decline of its wild populations, and is now an endangered species, whereas its African sister, *Elaeis guineensis*, has become one of the country's major crop plants.

After leaving the coastal plain, the mule trail ascends through the moist forest, crossing crystalline creeks here and there. As our mule drivers had to return to Capurganá the same day, we soon agreed that they should better continue at their own pace, leave our sacks at the camping site and return right away, while we proceeded our slow march. We stopped many times to study the various palms and other interesting plants we found on the way,

9 (left). A leaf of *Sabinaria magnifica* held by Angie Henao. 10 (right). Leaf bases of *Sabinaria magnifica*.





11. Young seedlings of *Sabinaria magnifica* showing the silvery undersides of their leaves.

and to look for the fruits of a giant *Magnolia sambuensis*, the tree Saúl and Norman had sought during their previous trip in the area. We also enjoyed following a noisy troop of silvery-brown tamarins, who jumped among the branches, and later we watched a group of large howler monkeys, who observed us as attentively as we observed them, and then bombed us from the canopy with dung.

It was past three in the afternoon when Saúl proudly introduced us to the first individual of the palm that had captured our minds for the past months. *Spectacular* was the first word

that came to my mind. The photos we had seen before had revealed but a hint of its actual magnificence. The palm has a stem that is usually about three meters tall, and bears over thirty leaves held on petioles almost that length. Each leaf blade is deeply divided almost to the base into two large fans, so that the whole crown looks like a bouquet of giant butterflies. The leaf undersurface has a beautiful silvery-white color that is not evident at first glance when seen with backlight but which is striking when the crown is lit with a light, as that of a camera flash. The first thing we checked was the petiole base, which turned



12. *Sabinaria magnifica* at its typical habitat.

out to be medially split. This ruled out the genus *Chelyocarpus*, one of the potential candidates, with one species, *Chelyocarpus*

dianeurus, well known to us from further south in the Chocó region.

The population had lots of adult palms, as well as many seedlings and juveniles. We eagerly sought flowering plants, but all the palms that we inspected had only old inflorescences that broke into pieces when touched, leaving only the peduncular and rachis bracts. While we inspected the palms, our mule drivers passed by on their way back to Capurganá. They were familiar with the palm, which they call *girasol* (sunflower), and they said they use the large leaves as impromptu umbrellas when surprised on the trail by a downpour. They continued their return and we went on inspecting the palms. After an hour of excitement and avid search, we decided that it was time to proceed our way, as we were still about one hour's walk from our campsite, and daylight was fading. And we had had no lunch so far. Thus, we walked on for a while and made a halt by the diaphanous pool of a forest creek, where we ate the lunch that the hotel's cook had wrapped for us in banana leaves.

The place where the mule drivers had left our gear turned out to be a wonderful settlement in a small forest clearing, with five basic wooden houses, a large and cozy kitchen, nice sanitary facilities and a kind family in charge of the place. There were gardens under

13. The discoverers of *Sabinaria magnifica*. Left to right, Saúl Hoyos, Norman Echavarría, Angie Henao and Gloria Galeano.





14. A ripe infructescence of *Sabinaria magnifica* camouflaged among litter at the leaf bases.

development near the houses, a vegetable patch, and a nursery with all kinds of edible plants, conceived to eventually reach their goal of being close to self-sufficient. As we soon learned, this settlement is one of several similar places owned in wild areas throughout South America by a group of people having a deep

sense of oneness with the universe. Their attitude toward nature seems to be more based on their philosophical perception of the world than on sheer conservation or economic grounds. They welcomed us warmly and offered their facilities. Cristina, the housewife, also accepted to cook our food.



15. Fruits of *Sabinaria magnifica* on a leaf of the palm.

Early next day, after breakfast, we were finally ready to look for complete specimens of our wonderful palm. We followed the trail leading into Panama along the crystalline creek, exploring upstream the steep forested slopes here and there, wherever we saw the magnificent butterfly-like leaves. We had been warned by our hosts of the presence of a large jaguar in the area, so we were very cautious, particularly as we were accompanied by Angie Henao, the lovely and avid eleven-year-old daughter of our hosts, who wanted to learn from us and to teach us her knowledge of the forest.

We checked dozens of palms but none had flowers or fruits. In our search we bumped into many other different species of palms, though, including three species previously known from Panama but not yet known to occur in Colombia – the tiny *Bactris charnleyae*, with pencil-thin stems and undivided leaves, the acaulescent *Attalea iguadummat*, with leaves 6 m long and large infructescences that are borne at ground level, and the poorly known *Pholidostachys panamensis*, with thick stems that grow prostrate on the ground like those of *Elaeis oleifera*, and with compact infructescences hidden among the leaves. Despite our excitement with these wonderful discoveries, our concern grew as the day went by and we found no individual of our enigmatic palm with either flowers or fruits. We had only a few more hours for exploration, as next day we had to return to Capurganá.

After a few hours of exploring upstream, we decided to go downstream toward the area

where we had seen the first population the day before. We inspected many individuals on the steep slopes along the creek, and we finally found one with two infructescences. These had black fruits about one inch in diameter, tightly packed into a short mass hidden among the leaf bases and covered with litter; they could have been easily overlooked, had we not inspected each palm in detail. These

16. Inflorescence of *Sabinaria magnifica*.



infructescences were unlike any other in related genera, and the closely packed fruits suggested a unique kind of inflorescence. Our excitement grew and we now desperately looked for flowers. We seemed to be actually in the face of a new genus.

By half past two we reached the area where we had found the palm the day before, which we had explored only partially, late as we were to our destination. We spread ourselves throughout the forest, as we had done so far, in order to comb the area. After a few minutes we heard Saul's voice announcing "Flowers!" We all rushed to the place whence his voice had come, some 20 meters north of the trail, and there it was – a palm with a stem 2 m tall, bearing a wonderful inflorescence in full bloom, the numerous whitish flowers being visited by meliponine stingless bees! We all embraced and gave each other high-fives in excitement. We would finally know where our mysterious palm belonged.

After a long session of photography, we were finally able to examine the nice flowers more closely. Our first surprise was to discover that all exposed flowers were only male, but additional flowers were still to be found hidden

under the large light brown bracts that covered the lower portion of the flowering branches. Upon carefully opening the bracts to expose the hidden flowers, it was evident that they were different from the ones we had just seen. They looked roughly similar, but they had an evident ovary and the numerous stamens had no anthers – they were female flowers. So, this unusual palm had unisexual flowers, something unknown so far in this branch of the family's evolutionary tree. The palm represented indeed a new genus – *Sabinaria*!

The occurrence of female flowers only on the basal portion of the lower flowering branches accounted for the compact fruit bunches we had found in the morning. This kind of infructescence is not found in related genera, all of which have hermaphroditic flowers, and produce looser bunches with fruits scattered throughout most of the rachillae, and exposed beyond the leaf bases. The hidden female flowers of *Sabinaria* restrict access to the bees that gather pollen from the male flowers, so that they cannot effect pollination. Instead of bees, we found among the female flowers small mystropine beetles, which are probably the true pollinators. These minute, flattish beetles,

17. Detail of the male portion of the flowering branches of *Sabinaria magnifica*.





18. Male flowers of *Sabinaria magnifica* visited by a meliponine bee.

which look as if they are wearing a vest because their front wings are shorter than their bodies, are ubiquitous in palm inflorescences in tropical America, and in some cases a particular beetle species is associated with a single species of palm. In fact, it would come as no surprise if the beetles we found on *Sabinaria* turned out to be a species unknown to science.

We made specimens of the palm for herbaria, with detailed measurements of all its structures, and then continued our search of additional individuals in flower. After some time of unsuccessful exploration, we decided that it was time to return to our base. On our way back we spared time to take a short swim in a gorgeous large pool of the creek and to receive a much-needed massage from the snow-white cascade that flowed into it. While we swam in the pool, we kept thinking of the evolutionary meaning of the discovery we had just made and of the name the new species should bear. Although we had initially planned to name it after Saúl, we were now aware that

the name this unique palm would be given might be vital for its future conservation, so it should be an appealing name, one that properly bespoke its magnificence. We kept thinking of it as we walked upstream along the diaphanous creek, and by the time we reached our camp with the last rays of daylight, we had come up with a beautiful name – *Sabinaria magnifica*.

That evening we pressed the specimens of the new palms we had found, but left those of *Sabinaria magnifica* to be pressed with daylight next morning, as our mule drivers were expected to arrive at 10 am. After a pleasant night we woke up early next morning and started pressing the specimens, making additional photos of details, and examining carefully the inflorescence we had at hand. We could hardly believe that we were actually in front of a new genus, but there remained no doubt. The two most similar species, and probably also the closest relatives, are the above-mentioned *Itaya*, of the Amazon, and

the Central American *Schippia*, from Belize and Guatemala.

Itaya has hermaphroditic flowers throughout the whole inflorescence, with no large rachis bracts hiding the flowers; the fruits are scattered throughout the flowering branches, and clearly exposed beyond the leaf bases. The leaves are also divided in two halves, but each half is additionally split into several roughly similar groups of segments, the whole leaf blade thus evoking a cart wheel. *Schippia*, on the other hand, has hermaphroditic flowers in the basal portion of the branches and male flowers in the upper portion, and its fruits are also loosely arranged and exposed beyond the leaf base. The leaves are divided to the base into numerous narrow segments, so that the division of the blade into two halves is scarcely noticeable at first sight. Populations of *Schippia concolor* are found 1500 km northwest from those of *Sabinaria magnifica*.

Unlike most other palms, populations of several genera in this group are usually quite local, and one can walk many hours through the forest in the regions where they thrive without finding a single individual until reaching the very spot where they grow. At that place they are extremely abundant, but a few kilometers farther they disappear altogether, and the next population may be dozens, or even hundreds, of kilometers away. No wonder, *Schippia*, *Itaya* and most species of *Chelyocarpus* remained undiscovered until the 20th century. As a matter of fact, in 2001 Gloria and I had made extensive collections of palms in the Serranía del Darién, only eight km north of the place where *Sabinaria magnifica* grows, and we never spotted a single individual of this species.

This time we had found it, and we now had a complete specimen well pressed, carefully packed, and loaded onto the mules. At 11 am we said goodbye to our friendly hosts, and took the trail to Capurganá, where we arrived in the early evening, exhausted but joyful. Next day we flew back to Medellín, where we bid farewell to Saúl and Norman, and continued our way to Bogotá.

Ten days later, the paper presenting *Sabinaria magnifica* to science was already in the hands

of the Editor of the New Zealand journal *Phytotaxa*. One month of expectation went by before we got any response. Finally, by mid-October we received three extremely positive reviews, with some recommendations that substantially improved the manuscript. The paper describing the new genus was finally published in *Phytotaxa* in November 2013, and is now freely available in the internet.

Research on *Sabinaria* has still a long way to go. We are now planning to do molecular studies to clarify its position within the tribe Cryosophileae, as well as studies of floral development to understand the nature of the petals and sepals, which have characters not found in other palm genera. Additionally, a study of the palm's reproductive biology is most desirable. For the time being, Norman is planning to do a demographic study under my supervision, in order to understand the state of the population and the extent of its distribution and to provide tools for its future conservation.

But the discovery of *Sabinaria* was to have an unexpected epilogue, as surprising for us as the finding itself. In the course of our search for the palm, we fell in love with the lush forests of the Serranía, with its crystalline creeks and its jaguars and wonderful monkeys and toucans, the giant magnolias and the numerous and fascinating palms, and with its pivotal role as a bottleneck in the route of biotic exchange between North America and South America. As Saúl and Norman had already been captured by the charm of this jungle, and they knew a man selling a large piece of land, the four of us decided to spend as much money as we were able to put together, and we are now in the process of buying a 100 hectares (250 acres) piece of forest on the Serranía, for establishing a natural reserve. Furthermore, we are trying to raise further resources for buying yet another piece of 1000 hectares (2500 acres) that is being sold, before it is bought by some greedy logger. By establishing a private preserve, we intend to promote knowledge of this fascinating region, and to protect at least a small piece of the lush forests where *Sabinaria magnifica* grows, before the relentless advance of fake progress wipes them out forever from Earth.