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Cephalium-bearing and globular cacti of eastern Brazil Part 1. Bahía

Compared to other cactus-rich areas of the world, eastern Brazil has relatively few genera of globular cacti. There are just three actually: *Discocactus*, *Melocactus* and *Uebelmannia* (though the last becomes short-columnar in age). But the paucity of globular *genera* is compensated by the wealth of *species*. The majority of the *Discocactus* species are native to Brazil, over half of all *Melocactus* species are found here, and *Uebelmannia* is endemic—it is found only in Brazil. Perhaps more significant is that *Discocactus* and *Melocactus* are the only genera of globular cacti that develop a cephalium—a highly modified portion of the stem in which the structure of the ribs is lost, and areoles become densely packed together, producing copious amounts of bristles and wool that serve to protect the developing flower buds and unripe fruits. In fact, this is the cephalium's only job, since it produces no chlorophyll, and thus is not green and does not perform photosynthesis.

Discocactus and *Melocactus* have what is called a terminal cephalium, because it is produced at the apex of the stem, replacing the green, ribbed growth of the juvenile plant (the development of the cephalium is the onset of maturity in these plants, because they only produce flowers and fruits from the cephalium). But a cephalium can also occur on just one side of a plant (a lateral cephalium), or a cephalium can be apical but revert to a normal stem that grows through it, the whole process being repeated each season so that the successive cephalia form rings along the plant's stems. These are called ring cephalia.

When it comes to plants with cephalia, eastern Brazil has an edge: many genera of cephalium-bearing cacti, producing among them all three types of cephalia, can be found here. In fact, Brazil has the greatest diversity of cephalium-bearing cacti, with the majority of the genera only found here. Besides those mentioned, the other genera of cephalium-bearing cacti from Eastern Brazil are *Arrojadoa*, *Coleocephalocereus*, *Espostoopsis*, *Facheiroa*, *Micranthocereus*, and *Stephanocereus*, plus a few species of *Pilosocereus*.

Melocactus violaceus ssp *margaritaceus* is the smallest melocactus in Brazil. It grows at the edges of the bushes in the white sand dunes north of Salvador, Bahía.

We began our trip near Salvador, the capital city of Bahía, with a visit to the white sand dunes north of town near the airport. Four cactus species are found at this habitat: *Pilosocereus catingicola* ssp *salvadorensis*, *Pilosocereus pentaedrophorus*, *Cereus*

fernambucuensis, and *Melocactus violaceus* ssp *margaritaceus*, the last a charming bright green plant with a reddish cephalium and white fruits. It is the smallest *Melocactus* species found in Brazil—just 10–15 cm in diameter—with plants developing a cephalium after four or five years from seed.

We left Salvador and drove northeast towards Morro do Chapéu on day two. About midway along the journey we stopped at a granitic inselberg near the small village of Bravo, and here we found *Melocactus ernestii* and *Tacinga inamoena* ssp *subcylindrica*. In the inselberg's surroundings, *Cereus jamacaru* and *Pilosocereus catingicola* can be found. Our stop here was intended to break up the long journey from Salvador to Morro do Chapéu, and also to introduce the first of the many *Melocactus ernestii* populations we were to see during the trip. *Melocactus ernestii* can be easily recognized because of the characteristic long spines, especially the ones lowermost in the areole. It has a green body, a cephalium of reddish bristles and white wool, and pinkish fruits. The population at this location was very healthy, with many dozens of plants scattered in groups over the rock face.

The city of Morro do Chapéu, in the central part of the state of Bahía, has the richest cactus flora in Brazil, with 38 species occurring within the county. This diversity is due to the number of different habitat types that can be found in the region, from lowland, semiarid caatinga vegetation[1] to mountainside forests, rock outcrops, and sandy plains on high-altitude mountain tops[2].

The road to Morro do Chapéu was not in the best condition, so when we arrived in town after some delay we went straight to visit our next habitat, instead of going to the hotel first. The location was an extensive area of sandstone rock out-

CACTI AND SUCCULENTS FOUND WEST OF MORRO DO CHAPÉU

Cacti *Arrojadoa rhodantha, Cereus albicaulis, C. jamacaru, Discocactus zehntneri* ssp *boomianus, Leocereus bahiensis, Melocactus concinnus, M. albicephalus, M. ernestii, M. glaucescens, Micranthocereus flaviflorus, Pereskia bahiensis, Pilosocereus catingicola, P. gounellei, P. pachycladus, Stephanocereus luetzelburgii, Tacinga funalis, T. inamoena, T. werneri.* **Succulents** *Euphorbia phosphorea, E. sarcodes, Jatropha mutabilis, Commiphora leptophleos.* **Bromeliads** *Neoglaziovia variegata, Encholirium spectabile.*

Melocactus ernestii grows on a granitic rock outcrop near the village of Bravo, Bahía.


LEFT In rock pavements west of Morro do Chapéu *Discocactus zehntneri* ssp *boomianus* grows to 10 cm across in pockets where pebbles and sand have accumulated. This mature specimen has a cephalium. Plants eventually offset from the base to form little clusters. **RIGHT** *Melocactus albicephalus* in flower at the same habitat. This melo has a wooly white cephalium that becomes more bristly, and thus more reddish, as it ages.

crops and pavement west of the town, a marvelous place where no fewer than 18 species of cacti grow, along with a number of other succulents, xerophytes, and bromeliads. No other place has so many species of *Melocactus* growing together, and a total of six cephalium-bearing cacti can be found here.

My favorite plant at this site is *Discocactus zehntneri* ssp *boomianus*, a small globular plant that offsets freely, its stem covered with many white spines, and forming at the apex a small cephalium with dense white wool and long peripheral bristles. Thousands can be found at this location wherever gravel and sand accumulate in the rock. Unlike melocacti, whose day-opening flowers are small and brightly colored in shades of red and pink in order to attract hummingbirds, the flowers of *Discocactus* are large, white, and strongly scented, opening during the night in order to attract moths and other insects. Pity, as we could not see the discocacti in flower!

Of the *Melocactus* species at this location, the most interesting are *Melocactus glaucescens*, a species endemic to Morro do Chapéu, with a glaucous blue body and a totally white cephalium bearing deep red fruits and *Melocactus albicephalus*, a plant of hybrid origin[3], the stabilized product of crosses between *Melocactus glaucescens*, the reddish-spined form of *Melocactus ernestii* that grows at this spot, and probably a bit of *Melocactus concinnus* as well. *Melocactus albicephalus* looks like a green version of *Melocactus glaucescens*, with darker and longer spines, reddish bristles on the edge of the cephalium, and pinkish fruits.

A few kilometers further along the road we visited an area of rocky plains to see a another cepha-

LEFT *Discocactus bahiensis* ssp *gracilis* lies flat to the ground and has a large tuberous root that pulls the plant below soil level in times of drought. **MIDDLE** *Melocactus glaucescens* north of Morro do Chapéu has stronger spines than the normal form. **RIGHT** *Melocactus pachyacanthus* grows in large numbers on slabs of limestone rock near the cave Gruta dos Brejões north of Morro do Chapéu.




LEFT *Melocactus paucispinus* from its type locality near Seabra, Bahía, sits low in the soil and has few spines in each cluster, as the species name implies. **RIGHT** *Discocactus catingicola* grows near Porto Novo in sand flats. The dark bristles in the cephalium are the reason for another name given to this population: *D. nigrisaetosus*.

lium-bearing cactus: *Discocactus bahiensis* ssp *gracilis*, different from the previous species in that it has a well-developed tuberous root and fewer spines, which makes the green body a bit more visible. It also has a more disk-shaped body pressed quite flat against the ground. In times of drought the tuberous root pulls the plant below ground level, making it difficult to find!

On the third day of the trip we drove to a huge cave north of Morro do Chapéu, the Gruta dos Brejões—not to visit the cave itself, but instead to see some interesting cactus habitats found en route. The first stop took us to a new location for *Melocactus glaucescens,* which I discovered a few years ago. Here the plants differ from the typical form found further south in that hey have longer spines. Strong grayish spines and a blue body topped with a white cephalium make this the best form of the species, to my taste.

Moving further down the suffering road we came to a series of interconnected limestone rock pavements that form clearings in a forest composed of *Commiphora leptophloeos* and *Pseudobombax simplicifolium* interspersed with the bottle-tree, *Ceiba pubiflora*. The limestone rocks harbor a huge population of *Melocactus pachyacanthus.* Thousands of plants of all sizes grow amidst *Pilosocereus gounellei* and silvery clumps of *Encholirium spectabile*. *Melocactus pachyacanthus* has strong spines, as implied by its name (*pachyacanthus* means thick-spined), and one has to be very careful here to avoid getting one's feet impaled. Spine clusters are scattered everywhere, the remains of long-dead plants. *Melocactus pachyacanthus* is usually taller than it is wide, with a glaucous blue body and a deep red cephalium from which white fruits are borne (just the opposite color scheme of the *M. glaucescens* cephalium). A vine-like opuntioid, *Tacinga funalis,* grows in the surrounding dry forest, along with another interesting cephalium-bearing cactus, *Stephanocereus leucostele*, a tall column of white spines and wool with ring cephalia along its stem.

Eventually we made it to the cave, which has the biggest cave mouth in Bahía: 126 meters high and some 60 meters across. We arrived in the afternoon, and because we still had a long drive back to the hotel, we decided not go inside, contenting ourselves with taking pictures of the cave entrance.

We started day four by visiting rock outcrops near town harboring *Stephanocereus luetzelburgii*, *Micranthocereus purpureus*, and an interesting miniature succulent, *Euphorbia appariciana*, a Morro do Chapéu endemic. In the sandy plains surrounding the rocks we saw *Pilosocereus glaucochrous*, *Micranthocereus polyanthus* ssp *alvinii*, and *Melocactus paucispinus*—an altogether different cactus flora, owing to the altitude: higher and wetter than the surrounding caatinga.

I took the group to see the biggest specimen of *Cereus jamacaru* I know, a much-branched eighteen-meter-tall tree growing on a farm near town. Then we headed out of Morro do Chapéu for Bom Jesus da Lapa in the western part Bahía, a distance of over 500 km on poor roads. We drove south to Seabra and then west towards Ibotirama, stopping a few kilometers west of Seabra to visit

▲ **TOP** It is exceedingly rare to find well-variegated cacti in habitat, so our group was fortunate to see this specimen of *Melocactus levitestatus* at the limestone mountain near Iuiú, Bahía. **BOTTOM** Bicolored tubular flowers of *Arrojadoa multiflora* south of Caetité, Bahía.

SUCCULENTS OF PORTO NOVO

Cacti *Melocactus levitestatus*, *Micranthocereus* (*Siccobaccatus*) *dolichospermaticus*, *Arrojadoa rhodantha*, *Cereus jamacaru* ssp *calcirupicola*, *Pilosocereus pachycladus*, *P. densiareolatus*, *P. braunii*, *Tacinga inamoena*, *T. saxatilis*. **Succulents and xerophytes** *Euphorbia attastoma*, three bromeliads of the genus *Encholirium*, the frankincense relative *Commiphora leptophloeos*, and a number of bottle trees: *Cavanillesia arborea*, *Ceiba pubiflora*, *Ceiba rubriflora*, and *Pseudobombax simplicifolium*.

the type locality of *Micranthocereus streckeri* and *Melocactus paucispinus*. The micranthocereus grows on rocks at the top of the hill, the melo in white sand at the base of the hill. Other cactus species found here are *Micranthocereus purpureus*, *Pilosocereus glaucochrous*, *P. pachycladus*, and *Tacinga inamoena*. *Melocactus paucispinus*, which also grows further north in Morro do Chapéu and further south in various other locations, is a nice plant with a flattened, bright green, disk-shaped body, deep red cephalium, pinkish fruits, and few spines—three to five per areole.

We made only one further stop, a few kilometers before arriving in Ibotirama, in order to stretch our legs. Growing by the roadside was *Pilosocereus gounellei* and *Tacinga inamoena*. After this we drove nonstop until we arrived at Bom Jesus da Lapa, where we spent the night.

Our plan for day five was to visit a couple of localities west of Bom Jesus da Lapa near the small village of Porto Novo. Not a great distance to travel, but the roads were deteriorating, with lots of potholes to negotiate, which slowed our progress considerably. We also had to cross a large and fast-moving river by barge in order to get to the habitats we wanted to visit. But eventually we made it to our first stop a few kilometers north of Porto Novo, where an extensive limestone outcrop is home to three cephalium-bearing cacti: *Melocactus levitestatus*, *Micranthocereus* (*Siccobaccatus*) *dolichospermaticus,* and *Pilosocereus braunii*, a form of *Pilosocereus gounellei* ssp *zehntneri* that differs from typical plants of that species in that it develops lateral cephalia. This is the type locality for all three of these species. The location is truly spectacular, with dark

gray limestone rock packed with succulent plants everywhere you look.

But the two special plants of this place are indeed *Micranthocereus dolichospermaticus*, a tall, unbranched blue column with a large lateral cephalium composed of dense white wool and reddish bristles; and *Melocactus levitestatus*, one of the largest species of the genus, whose bright green body can reach 50 cm in height, topped with a dark red cephalium that can eventually reach 30 cm or more in height in very old plants. It has strong but short spines and white fruits.

After lunch we left the limestone outcrop and visited another habitat not too far away, an area of sandy soil inhabited by sparse forest. In the clearings between the trees we found *Arrojadoa rhodantha* and *Cereus mirabella*, a species with thin, arching stems and a huge tuberous root. But the plant we came to see was *Discocactus catingicola*, and this is the type locality for the form described as *D. nigrisaetosus*. *D. catingicola* is larger than the two previously seen, and attractive, with a flattened green body whose ribs are broken up in large tubercles. The areoles on top of the tubercles have relatively few spines that do not obscure the shape of the body. And the cephalium has many dark bristles, as implied by its original name (*nigrisaetosus* means with black bristles). These plants also retract to the ground in times of drought, but not as much as *D. bahiensis* will. Seedlings can be difficult to spot, because when dry they change color to a brownish hue that closely matches the sandy soil.

▼ *Melocactus bahiensis* ssp *amethystinus* growing near Brejinho das Ametistas.

Day Six: We left Bom Jesus da Lapa

and drove east on the road to Santana do Riacho and Caetité. Near the village of Juá we stopped to see a population of *Melocactus deinacanthus*, a species that is listed in Appendix I of CITES, but which is actually quite common in the area. It grows on sloping granitic rock outcrops and on flat conglomerate-rock outcrops in the area. We visited the latter habitat type a few kilometers north of Juá, where *Melocactus deinacanthus* numbers in the thousands. The plants, with their long, strong, reddish spines, a more cylindrical shaped body, cephalium of red bristles, and white fruits, were rather dry and withered here. But we did manage to see some curiosities, including plants with crested cephalia and a variegated seedling.

We drove on to Caetité and then southwest on the road to Guanambi toward our destination, the town of Iuiú, south of which we visited a hill with limestone rock outcrops that are home to a number of succulent plants, including two cephalium-bearing cacti: *Melocactus levitestatus* and *Facheiroa cephaliomelana* ssp *estevesii*.

The form of *Melocactus levitestatus* here is a bit smaller than that found near Porto Novo, and its stems are narrower, differences that led to its original description (in this journal) as *M. securituberculatus*. One large, variegated plant is found here, a rare sight in the field, since variegated plants are at a competitive disadvantage from birth. They cannot photosynthesize as much and thus grow more slowly than their siblings. And competition is fierce; only the fittest plants typically survive to maturity, quite unlike the conditions of cultivation, where weaker seedlings can survive and are even encouraged to do so. Plants that would perish almost immediately in nature are grafted and papered such that now many beautiful variegated cacti are available to collectors. In nature, cactus variegations are usually slight, restricted to a few small pale blotches or streaks of whitish or yellow tissue, making this large and well-streaked specimen particularly special.

SUCCULENTS NEAR IUIÚ

Cacti *Melocactus levitestatus*, *Facheiroa cephaliomelana* ssp *estevesii*, *Quiabentia zehntneri*, *Pilosocereus pachycladus*, *P. gounellei* ssp *zehntneri*. **Succulents and xerophytes** *Euphorbia attastoma*, two species *Encholirium*, the frankincense relative *Commiphora leptophloeos*, and the bottle trees *Cavanillesia arborea* and *Ceiba rubriflora*.

TOP *Melocactus zehntneri* grows near the village of Brejinho das Ametistas, Bahía. This form has large, globular green stems with straw-colored spines and a bright red cephalium. It was once called *Melocactus macrodiscus*. **BOTTOM** The globular *Melocactus inconcinnus,* with stout, conical stems and strong spines, is one of the three *Melocactus* species found growing at Serra Escura.

LICÍNIO DE ALMEIDA

12 km north of Licínio de Almeida we found *Brasilicereus phaeacanthus, Leocereus bahiensis, Micranthocereus albicephalus, Melocactus bahiensis* ssp *amethystinus, M. concinnus, Pilosocereus pachycladus, P. splendidus,* and *Tacinga inamoena.*

We left Caetité and drove south on the seventh day toward the little village of Brejinho das Ametistas, named for its nearby amethyst mines. A drizzling rain came down all day, so our next stop was a short one to see *Arrojadoa multiflora* just a few kilometers south of Caetité. Growing in sandy soil, out of flower this species is unremarkable, with thin stems hidden in the shrubs. But the plant is transformed in bloom, with buds emerging from ring cephalia, each flower a reddish tube topped with yellow petals, tailored for attracting hummingbirds.

Just south of Brejinho das Ametistas we made our second stop of the day at some sandstone outcrops, home to *Micranthocereus polyanthus* (the type species of the genus) and a number of other cacti, including *Melocactus bahiensis* ssp *amethystinus*, *M. zehntneri*, *Pilosocereus pachycladus*, and *Tacinga inamoena*, plus succulent orchids and bromeliads growing on the rocks and the caudiciform *Pseudobombax campestre*.

Melocactus bahiensis ssp *amethystinus* is a cone-shaped plant with dark green body, short straight spines, dull reddish-pink cephalium, and pinkish fruits. The other melo here is a form of *M. zehntneri* originally described as *Melocactus macrodiscus*. It has a stout, globular, bright green body with strong, recurved spines and a cephalium of bright red bristles and lilac-colored fruits.

Further south along the road, a dozen or so kilometers north of Licínio de Almeida, we made our last stop of the day, this time to see *Micranthocereus albicephalus*, a stout plant that branches from the base and whose branches are covered in short golden spines. It has a wide lateral cephalia of pure white wool. *Melocactus concinnus* was found growing in the white sand areas at the base of the rocky outcrops. It is a small species with glaucous green body, reddish cephalium and pinkish fruits. After visiting this habitat we drove on to Licínio de Almeida and from there to the town of Brumado, where we spent the night.

We left Brumado early in the morning of the eighth day and drove east to the village of Sussuarana. The nearby mountain, Serra Escura, was the main attraction of the day, as it is home to one of the most remarkable cephalium-bearing cacti to be discovered in Brazil in recent times, *Arrojadoa marylanae*, a species that I had the honor of describing[4,5]. (A nicely illustrated article about this species appeared in this *Journal*. See Vol 77–2). Serra Escura is actually a huge outcrop of white quartz, and this is the only place where *Arrojadoa marylanae* grows. At Sussuarana we met Marylan Coelho (the biologist who discovered the plant and after whom the species is named) and some of her friends, who would accompany us to the habitat. We drove to the small farm at the base of

the mountain. After taking a trail that climbs the mountainside, passing through the dry forest at the base of the mountain, we reached the lower slopes of the rocks' outcrops of pure white quartz.

Arrojadoa marylanae has very thick stems when compared to the other *Arrojadoa* species, and much woolier ring cephalia, besides having smaller and somewhat different flowers, which resemble those of *Melocactus*. Unfortunately the plants were not in flower at the time of our visit. This is the biggest species in the genus, growing up to five meters tall, usually as a single column but sometimes branching when the apex of the stem suffers damage. *Arrojadoa marylanae* has many ribs with flexible, golden spines, making it an exceedingly beautiful plant. In cultivation the spines remain golden colored, but in habitat they quickly become dark brown. Although the Serra Escura is the only habitat known for the species, the plants are quite successful here. Thousands of plants, including tiny seedlings, can be found.

Serra Escura is home to another magnificent cephalium-bearing species, *Espostoopsis dybowskii*, which forms beautiful shrubs of white columns, branching from the base and forming a white cephalium along the sides of mature stems. Other cacti growing here are *Pilosocereus pachycladus*, *Melocactus bahiensis*, *M. ernestii*, *M. inconcinnus*, *Tacinga inamoena*, and *T. palmadora*. *Melocactus inconcinnus* resembles *M. bahiensis*, but it is much stouter—usually twice as big—and with stronger spines. Otherwise the two are similar, with a bright green cone-shaped body, short straight spines, a dull reddish cephalium, and pinkish fruits.

This was my fifth visit to this habitat, and the place still amazes me as if I were seeing it for the first time. But this place may soon disappear, and *Arrojadoa marylanae* may become extinct in the wild. A mining company is prospecting the rocks that compose the mountain, and if they deem the quality of the rock to be worth exploring, the whole mountain will be taken apart. The habitat was already recently marred, as a fire that started at the base of the mountain swept to its top and burned about one third of the *Arrojadoa* population, scarring and killing many plants.

On the way back from Sussuarana to Brumado, we stopped to see a population of *Melocactus zehntneri*, with *Arrojadoa penicillata*, and *Tacinga palmadora* growing in the surrounding shrubbery. A bit further along the road we stopped again, this time to see of *Coleocephalocereus goebelianus*, a thick unbranched column up to six meters tall and with a wide lateral cephalium. Growing in the same place we saw *Cereus jamacaru*, *Melocactus salvadorensis*, *M. zehntneri*, *Pereskia bahiensis*, *Pilosocereus catingicola*, *P. gounellei*, and *Tacinga palmadora*.

FOREST CACTUS SPECIES

No fewer than ten cactus species were found in the deciduous forest outside of Itambé: *Brasiliopuntia brasiliensis*, *Epiphyllum phyllanthus*, *Hylocereus setaceus*, *Lepismium cruciforme*, *Pereskia aculeata* (the only vine-like species in the genus), *Rhipsalis baccifera* ssp *hileiabaiana*, *R. floccosa*, *R. lindbergiana*, *R. russellii*, and *R. teres*.

On the ninth day of our trip we left Brumado and drove southeast to the city of Vitória da Conquista from which we took the road to Itambé for about 12 kilometers before arriving at our first stop. This was an unusual place to look for cacti, since it is a dense forest with trees up to 25 meters tall! But this is not a rainforest. Rather it is a seasonally deciduous one. There are quite a few species of epiphytic cacti here, and also many plants of the strange opuntioid *Brasiliopuntia brasiliensis*, a species that grows into a tree as tall as the other trees in this forest.

Our last habitat visit of the day, before retreating to our hotel in nearby Vitória da Conquista, was a visit to the habitat of *Melocactus conoideus*, a species endemic to Vitória da Conquista and threatened with the quarrying of the coarse sand found at the places where it grows. The area we visited was declared a nature preserve to protect *Melocactus conoideus*, and a fence around the area was built with the financial support of the British society[6]. *Melocactus conoideus* is similar to *Melocactus bahiensis* (dark green body, reddish cephalium, and pinkish fruits), but it has a more depressed body and shorter and fewer spines.

The trip resumes in Minas Gerais in our next issue...

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