ROOT GORELICK

Brasilicereus, Cipocereus, and Pilosocereus in eastern Brazil

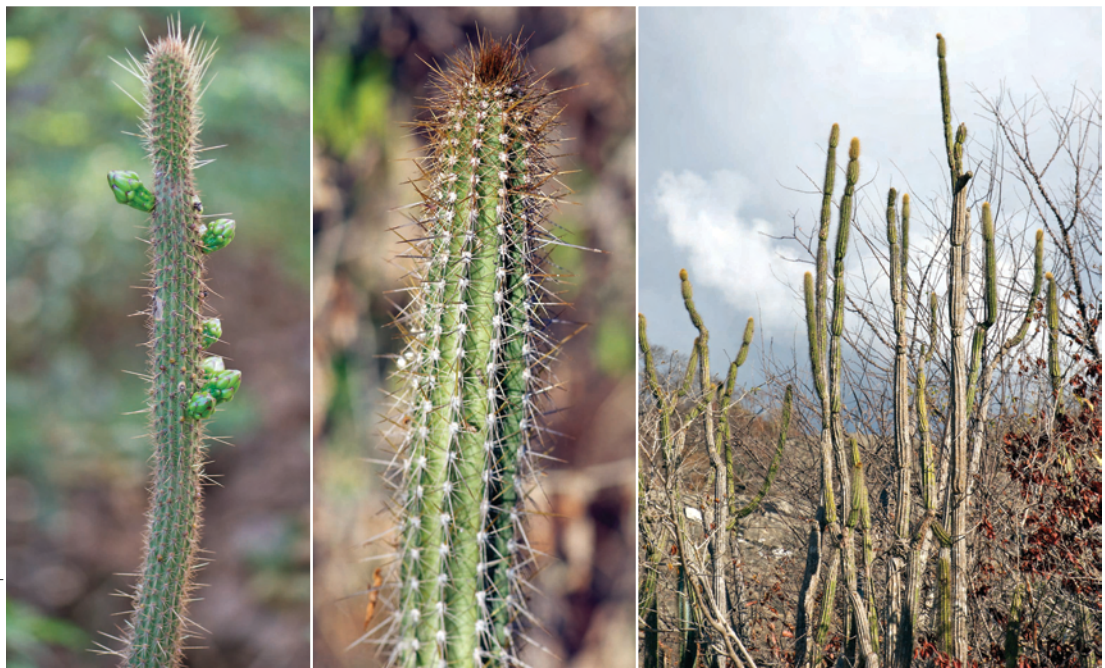
Nobody goes to Brazil to see *Brasilicereus* or *Cipocereus*. *Pilosocereus* is hardly any more popular. Indeed, the only species in these three genera that most of my cohorts were anxious to see on the CSSA field trip was *Pilosocereus fulvilanatus*. Yet plants in all three of these genera are often statuesque and easy to cultivate, and *Cipocereus* and *Pilosocereus* plants often have waxy cuticles in various shades of blue and green, large bat-pollinated flowers, and big fruits that split open to yield brightly colored pulp.

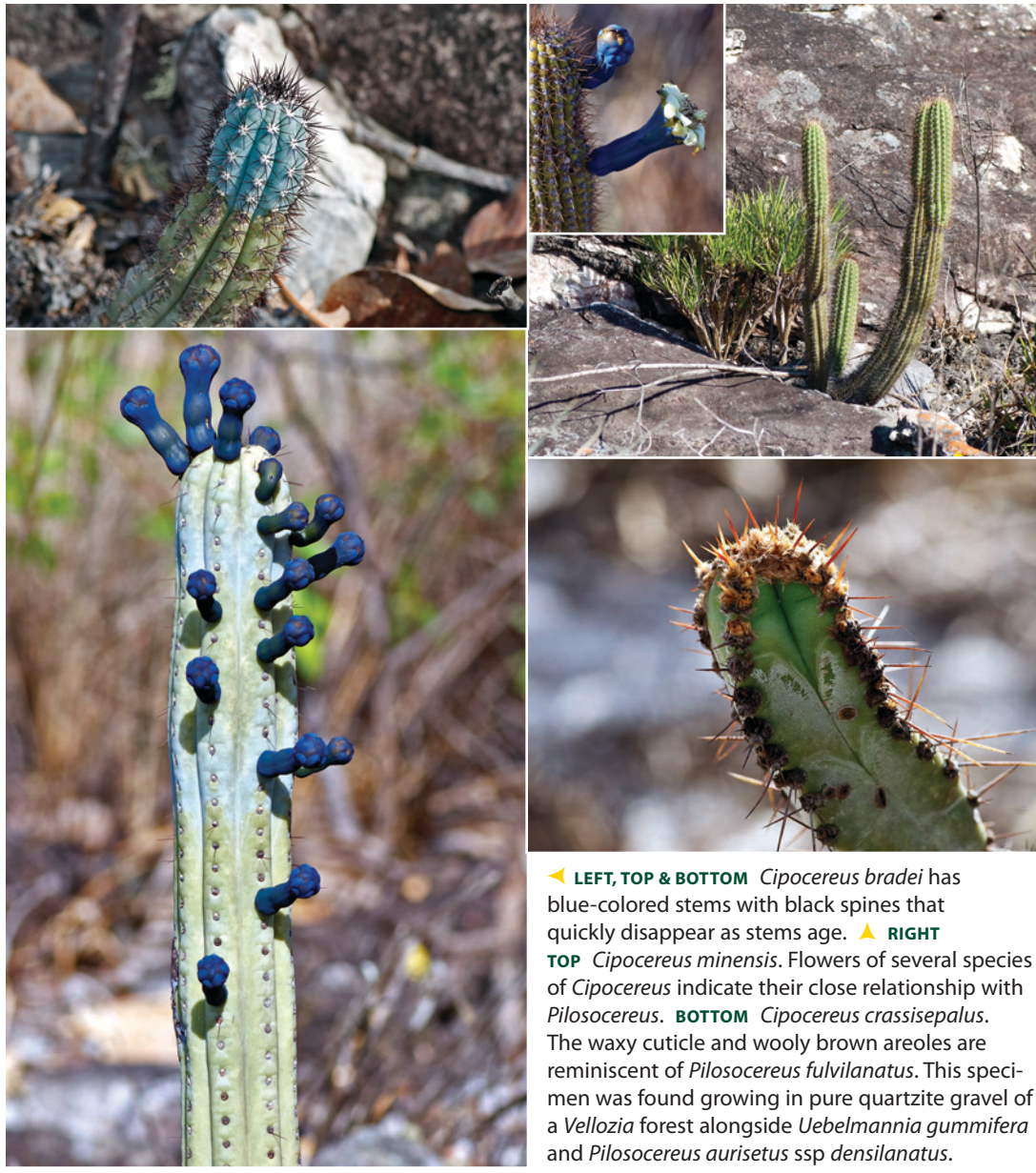
Brasilicereus

Brasilicereus is a genus of two species, *B. phaeacanthus* and *B. markgrafii*, endemic to Bahía and Minas Gerais. These are thin-stemmed, slightly branched columns covered in short, straight spines. Considering how thin the stems are, they remain remarkably upright, although they may occasionally flop over and rest on rocks or other vegetation for support. *B. markgrafii* is the more diminutive of the two, with virtually unbranched two-meter-tall stems just 1–2 cm in diameter. While the spines are short and very light brown, they can briefly sport a lovely shade of red on new growth. Closed flower buds are usually green and have few petals, but the petal tips are red or, rarely, bluish, which seems to hint at the relationship with *Cipocereus*.

The more robust species, *B. phaeacanthus*, usually has chocolate brown spines, from which the name is derived (*phaea* = brown; *canthus* = spine). This species branches more, forming plants to

LEFT *Brasilicereus markgrafii*; these typically upright stems are only 1–2 cm diameter. **CENTER** *B. phaeacanthus*, with typical 2–6 cm diameter stems. **RIGHT** *B. phaeacanthus*, possibly hybridized with *Pilosocereus magnificus*. This 6 m specimen has trunks that are 12–15 cm diameter.





◀ **LEFT, TOP & BOTTOM** *Cipocereus bradei* has blue-colored stems with black spines that quickly disappear as stems age. ▲ **RIGHT TOP** *Cipocereus minensis*. Flowers of several species of *Cipocereus* indicate their close relationship with *Pilosocereus*. **BOTTOM** *Cipocereus crassisepalus*. The waxy cuticle and wooly brown areoles are reminiscent of *Pilosocereus fulvilanatus*. This specimen was found growing in pure quartzite gravel of a *Vellozia* forest alongside *Uebelmannia gummifera* and *Pilosocereus aurisetus* ssp *densilanatus*.

five meters tall with stems 2–6 cm in diameter, though most of the specimens we saw were much shorter. One plant (or a few, as I could not discern if it was a single plant that had branched below ground level) that we saw at the type locale of *Coleocephalocereus purpureus* had some 30 stems, each 5–6 meters tall, looking like an Amedeo Modigliani version of an organ pipe cactus. The primary trunks on this plant were massive at approximately 12–15 cm in diameter, far larger than any reported in the literature. I do not know of any purported hybrids of *Brasilicereus* with *Pilosocereus*, but hybridization could explain this massive specimen, which was growing sympatrically with *P. magnificus*.

Cipocereus

Ritter segregated *Cipocereus* from *Pilosocereus* thirty years ago, though the two are similar and probably very closely related to one another. The primary difference between them is that only *Cipocereus* has fruits with watery, translucent pulp[2], a somewhat useful character if you like to snack on cactus fruits in the field. Both genera are columnar, usually branching near the base, and both harbor species with striking blue coloration in their stems, flower buds, and fruits. (The only other cacti I can think of with blue flower buds are a few *Gymnocalycium* species and *Disocactus* [*Wittia*] *amazonicus*). But not all species have this blue

▲ *Pilosocereus gounellei* **(LEFT)** is a candelabra-shaped species that does not bear a cephalium, ranging in size from low creepers to 3–4 m trees. Marlon Machado pointed out one marvelous clump **(CENTER)** that did not form a candelabrum, but made up for this by producing 25 cm long spines! Its subspecies *zehntneri* **(RIGHT)** looks radically different from the type subspecies. It has a prominent lateral cephalium, a much more upright habit, and fewer branches, which arise much higher up the trunk and at more acute angles than those of subspecies *gounellei*. Cephalia start forming when stems are about one meter tall. ▼ *Pilosocereus tuberculatus* houses ants, which defend the plant in exchange for nectar secreted by its flower buds.

L Martin

color. For example, *C. pleurocarpus*, the type species, has greenish yellow outer perianth parts[1].

Endemics of eastern Brazil, the six species of *Cipocereus* are columnar cacti of modest height (1–3 m) that, unless injured, only branch from the base. This genus is often considered the most ancestral (basal) of the tribe Cereeae[1]. As an evolutionary biologist that's all I need to get interested. It is the same hook that gets people enamored with plants like *Pereskia*, *Blossfeldia*, and *Calymmanthium*, even though your local florist would be hard pressed to stock them.

In cultivation, *Cipocereus bradei* is probably the best known, despite having one of the most

TYPE

The type species of a genus is usually the first-named species in the genus. The type is also usually the actual plant, deposited as a preserved specimen in an herbarium, from which the description is derived. The type locality of a taxon (at any rank, be it a genus, species, subspecies, etc) is the locality from which the type specimen was selected—most often where the plant was first discovered. If a plant is named as a subspecies—for instance *Pilosocereus gounellei* ssp *zehntneri*—the original species, by default, gains a subspecies name the same as its species name, in this case *P. gounellei* ssp *gounellei*. This is referred to as the "type subspecies."

restricted distributions. It forms 2–3-meter-tall stems that are glaucous blue when young, especially when stressed. (Unlike with humans, stress can bring out the best in plants.) But both the spines and the waxy cuticle tend to be shed as the stems mature, making habitat plants, frankly, rather ugly. Other than new growth, the stems are quite vertical and dull gray, with a few gray spines, almost like a smooth version of *Euphorbia abdelkuri*. The stems seem to break rather easily, a feature that seems common in the genus and may have some interesting biological explanation, such as peculiar wood anatomy. *C. bradei* can be quite floriferous, both in habitat and cultivation, and the flowers are a spectacular blue outside and white within.

Cipocereus minensis is a much spinier, greener-stemmed, more widespread, and more typical-looking cactus than *C. bradei*. Usually it's about one meter tall, although it can be twice that. *C. minensis*, at least in some of its forms and varieties, has flowers that look almost identical to those of *C. bradei*, with the same spectacular blue exterior and white interior.

To me, *C. crassisepalus* is the most charming of the genus. It did not hurt that we saw this species growing in a *Vellozia* forest, in pure quartzite gravel, surrounded by stacks of *Uebelmannia gummifera* and *Pilosocereus aurisetus* ssp *densilanatus*. *C. crassisepalus* supposedly grows to two meters tall, but the specimens here were much smaller, about 50 cm. And like *C. bradei*, *C. crassisepalus* has a conspicuous waxy cuticle on new growth that's shed as the stems grow. Unlike *C. bradei*, however, the wax on new *C. crassisepalus* growth is vibrant green, not blue. This provides a lovely contrast to the yellowish brown hairs in the areoles, something that is evident even in tiny seedlings. Light brown wool also appears in *C. laniflorus* and the renowned *Pilosocereus fulvilanatus*, but in *C. crassisepalus* it seems to be shorter and thicker.

Pilosocereus

Although little has been written about *Brasilicereus* and *Cipocereus*, Daniela Zappi has done a wonderful job writing about *Pilosocereus* in her native Brazil[3]. *Pilosocereus* contains approximately three dozen species that extend from Ecuador in the west, Paraguay in the south, and the Florida Keys in the north[3]. In terms of geographic range and number of species, *Pilosocereus* has been an incredibly successful genus. The heart of its distribution lies in eastern Brazil, affording us opportunity to visit a dozen species.

P. gounellei is widespread and variable. The type subspecies is a candelabra-shaped column with-

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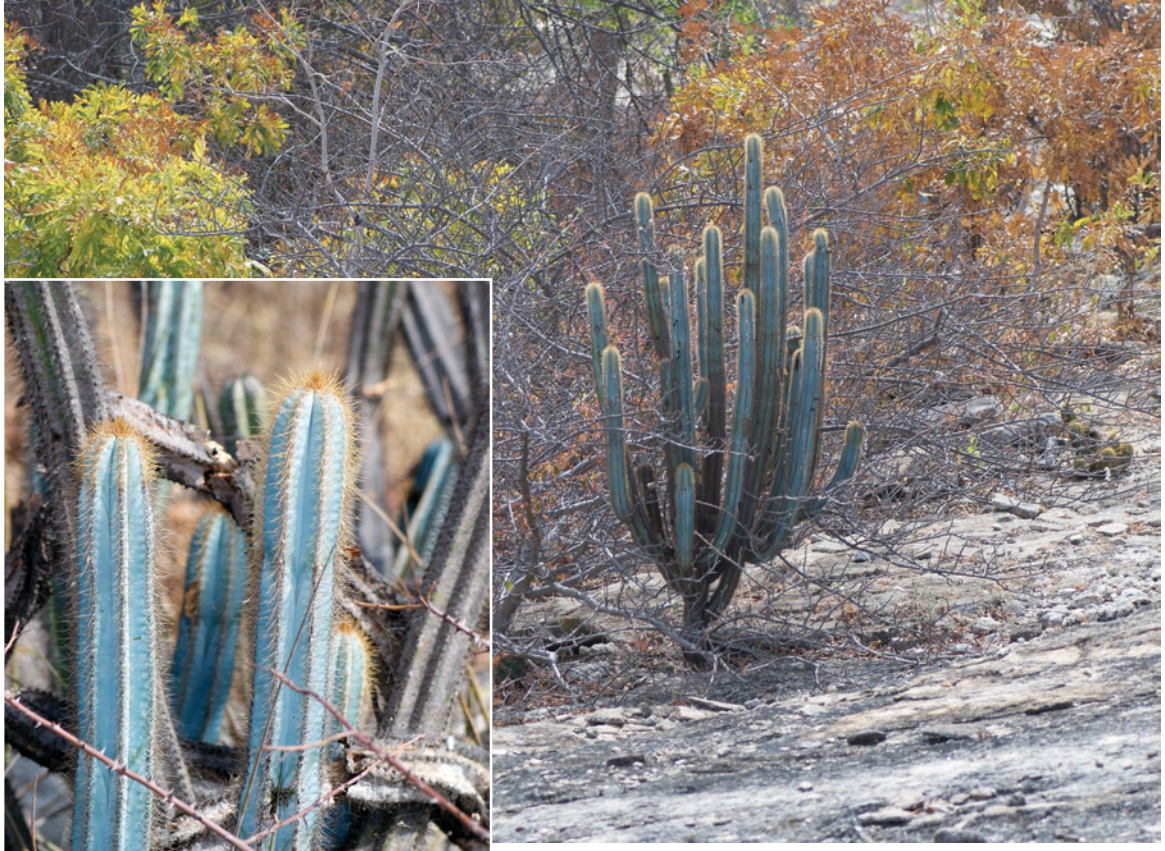
➤ *Pilosocereus fulvilanatus* was on everyone's must-see list, the only pilosocereus to receive such honor.



▲ *Pilosocereus magnificus*, somewhat less than magnificent by my taste.

▶ **Pilosocereus** continued from **page 129**

out a cephalium (or pseudocephalium; I use these terms interchangeably), although there are tufts of wool in flower-bearing areoles. Sometimes the candelabra are so short that the plant nearly resembles the Baja-endemic Creeping Devil (*Stenocereus eruca*), and the heights progress through a continuum culminating in small trees of 3–4 meters. Although I have never seen subspecies *zehntneri* in cultivation, it would make a neat specimen, as it doesn't sprawl or spread, and aestheti-

▼ The closely related *Pilosocerus flocossus* **(LEFT)** and *P. splendidus* **(MIDDLE)**, although both may be *P. flocossus*. It's hard to tell. **RIGHT** Pilosocereus *multicostatus* is a short plant usually only branching from the base. We saw plants about 1.5 meters high, although it can supposedly grow taller. This species invariably branches from the base.

cally it holds its own, even with the magnificent *Pilosocereus densiareolatus* and *Siccobaccatus dolichospermaticus* holding court nearby.

Also in Zappi's subgenus *Gounellea*, *P. tuberculatus* is known from just a few sandy locales. It is named for its prominent tubercles, which bear large areoles and jet-black spines that quickly fade to ashen gray. Branching is almost entirely from the base, with very straight, upright stems 2–3 meters tall. It's a nice-looking plant, although without flowers or fruits doesn't much resemble

▼ *Pilosocereus aurisetus* ssp *densilanatus* is the wooly form of the species.

other members of the genus. Zappi reports that older woody stems are hollow and house ant colonies that vigorously defend the plant and further benefit from nectar produced from outer portions of flower buds[3]. Touch one of these stems and be in for a rude awakening!

Pilosocereus rosae is a poorly understood species that grows far from its congeners. So far, in fact, that we had to drive a day out of our way to see it and another day to get back. It only grows on a single, privately owned hillside at an upscale eco-tourist resort, where we had to stay in order to see the plants. We arrived at dusk and literally raced up (and down) a boulder-strewn guided tour to see the plants. OK, *some* of my compatriots took the terrifying power-hike up the hill to see nicer specimens. I settled for seeing specimens from the bottom of the hill (glaucous and sparsely-branched tall plants on verdant cliffs), and the rest of the group sat at the bar by the pool and never saw this species at all. In retrospect, I sometimes wish I had taken the latter approach. It was a nice resort.

Some researchers have considered *P. rosae* to be a subspecies of *P. fulvilantus*[4], but this seems unlikely. This rarity lives some 200 km to the northeast, has marvelous dark blue stems showing through a coat of light brown wool that sometime verges on orange, and was the one pilosocereus everyone wanted to see. Stems are typically very stout, with only four or five ribs and occasional branching from near the base. Even the plants that had greener stems were beautiful. Seeing this species growing alongside *Discocactus horstii* and *Micranthocereus auriazureus*, the latter in full flower, was breathtaking.

Pilosocereus splendidus is a short and slender plant with dark green stems, 5–6 ribs, and areoles bearing tufts of wool and long, golden spines. It is provisionally recognized as a good species in the *New Cactus Lexicon*[5], but not by Taylor and Zappi[3,4] who consider it a form of *P. pachycladus*. In retrospect, the plants we saw may have simply been a short form of *P. floccosus*, which is variable in height. Later, we saw unambiguous plants of *P. floccosus*: 6-meter-tall trees growing so ensconced in thorny vegetation that they were difficult to photograph.

Beauty, they say, is in the eye of the beholder, and with regard to *Pilosocereus magnificus*, maybe I didn't see the best specimens, but the combination of bright blue stems and dense, thin, golden

spines did not strike me as all that magnificent. Too many had dying or blackened stems. Otherwise it looked to me like a haphazardly-branched *P. pachycladus* with nicely combed spines. As I was to learn upon my return, Zappi considers the two to be closely related[3]. I much preferred *P. multicostatus,* another intensely golden-spined species with vibrant green stems, appropriately named for its many ribs.

Very similar in stature (1–1.5 m), *P. aurisetus* ssp *aurisetus* has similarly long, dense, and golden spines and slightly fewer ribs. Even highly stressed individuals of this plant just glow. And healthy-looking specimens are marvelous, especially when backlit. Short hairs are intermixed with its golden spines, and if you were to imagine the long, golden spines becoming enveloped by many more and much longer hairs, you'd form a perfect mental image of the delightful *P. aurisetus* ssp *densilanatus*. Superficially resembling seedlings of *Espostoopsis dybowskii*, it grows to about 1.5 m tall, with further growth seemingly limited by tall stems breaking off. Both subspecies of *Pilosocereus aurisetus* are unusual in having shiny flower buds, a characteristic apparently also found in *P. glaucochorus* and *P. machrisii*[3]. Subspecies *densilanatus* grows in a forest of three-meter-tall vellozias in pure quartzite gravel alongside the exquisite *Uebelmannia gummifera* and the charming *Cipocereus crassisepalus*. Curiously, we did not see the supposedly sympatric *C. minensis* and *C. bradei* reported by Zappi[3].

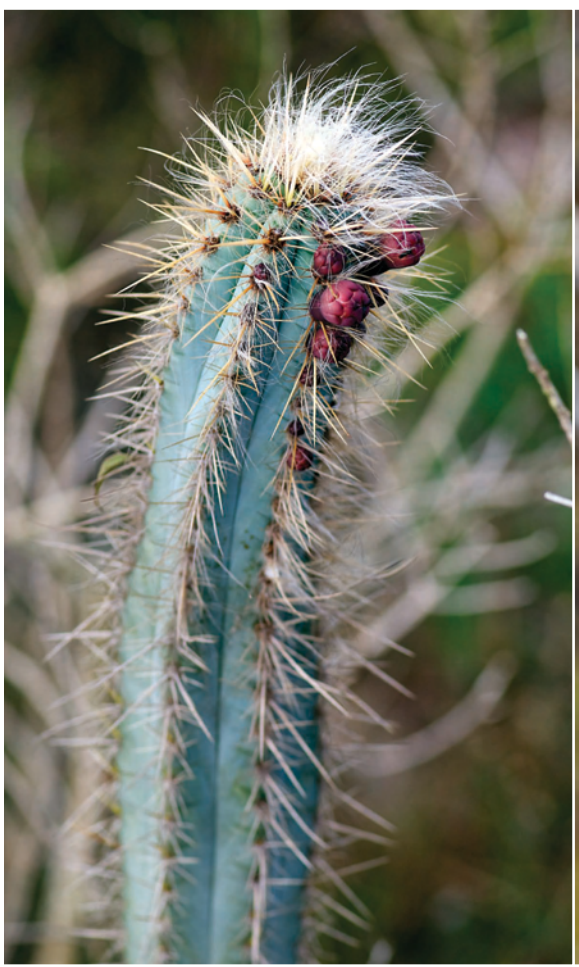
This brings us to a pair of closely related, slender, blue *Pilosocereus* species, both widely distributed. The more diminutive of the two, *P. glaucochorus*, has stout yellow spines and long, albeit hardly dense, white hairs. The plants we saw were about two meters tall and unbranched, but they are known at twice that height, and in some populations, plants do branch. The outside of the flower buds we saw were not shiny as expected, but in every other aspect the plants were clearly *P. glaucochorus*. While also thin, *P. pentaedrophorus* ssp *robustus* were tall, five-ribbed plants, often looking like blue utility poles set a bit too far off of the road. Frequently with a few branches,

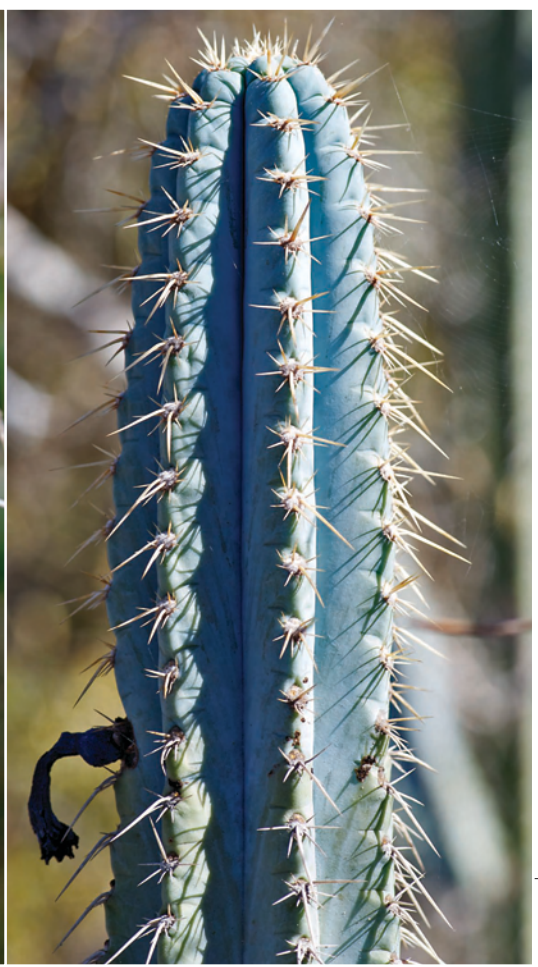
Pilosocereus aurisetus ssp *aurisetus* grows alongside a red-leaved, xeric *Pleurothallus* orchid.

these plants had short, stout yellow spines and no hair. Their stems were perfectly upright and 4–5 meters tall, but never more than 10 cm wide, and often narrower, with comically large fruits. They must possess the wood anatomy that *P. aurisetus* so lacks, and perhaps that's what's robust about this, the thinnest *Pilosocereus* we saw.

P. pentaedrophorus and *P. pachycladus* are two members of the genus that sometimes have blue perianth parts and fruits, indicating the close rela-

▲ *Pilosocereus pachycladus* is the most widespread and most variable member of the genus in eastern Brazil. They are usually the tallest and most massive plant in their habitats. ▼ *Pilosocereus glauchchorus* specimens we saw **(LEFT)** lacked the expected shininess to their flower buds. The related *P. pentaedrophorus* ssp *robustus* **(RIGHT)** was the thinnest taxon we observed in this genus (often narrower than 10 cm), and yet its stems remain perfectly erect to heights of five meters or more!





tionship between *Pilosocereus* and *Cipocereus*. *P. pachycladus* was the most widespread, ubiquitous, and—at least to my eyes—the most magnificent *Pilosocereus* we saw. Most specimens were the size and shape of many species of *Pachycereus*, graced by thick white wool and a vibrant blue epidermis. They were often the largest plants in the landscape. From close up or far away these were stunning and virtually unblemished plants with plenty of variation in the blue color of the stems, length and copiousness of the wool, and color and conspicuousness of the spines. These appeared to be fairly fast-growing plants and are undoubtedly worthy of being cultivated in warm areas, if just to witness all the variation in seed-grown specimens. The one distinctive set of plants we saw of this species had diminutive stems with a ghost-like grayish blue cuticle. These plants are sometimes labeled *P. cenepequei*.

Last, but not certainly not least, are the towering light green stems of *Pilosocereus densiareolatus*. Most of the 5–6-meter length of each stem is largely devoid of hairs or long spines. However, flowering areoles typically produce some of the densest masses of long white hairs that I have seen in any cactus—often exceeding the diameter of the stems. Flowering areoles, with their long wool, were invariably 2.5–5.0 m above the ground. While probably impossible to get good looking specimens in cultivation, assuming one had warm enough temperatures or a tall enough greenhouse, these massive plants are a joy to behold in the wild.

While *Brasilicereus*, *Cipocereus* and *Pilosocereus* are almost never the jewels of collections nor on the top of people's lists of plants to see in nature, these are marvelous and charming genera, ones that I never fully appreciated until seeing these plants in the wild.

References

1 Zappi DC, Taylor NP. 2007. *Cipocereus pleurocarpus*. *Cactaceae Systematics Initiatives* 24: 8–11. **2** Anderson EF. 2001. *The Cactaceae*. Timber Press: Portland. **3** Zappi DC. 1994. *Pilosocereus* (*Cactaceae*): *The Genus in Brazil*. Kew: Surrey. **4** Hunt DR and others. 2006. *The New Cactus Lexicon*. DH Books: Milbourne Port. **5** Taylor NP, Zappi DC. 2004. *Cacti of Eastern Brazil*. Kew: Surrey.

► *Pilosocereus densiareolatus* is one of the giants of the genus, not even flowering nor growing a (pseudo)cephalium until at least 2.5 m tall. Length and density of hairs in flowering zones are so great that Zappi considers this species (and *P. gounellei* ssp *zehnteri*) to possess true cephalia. These magnificent specimens of *P. densiareolatus* were growing sympatrically with—and in many instances within a few meters of—the cephalium-bearing *Siccobaccatus dolichospermaticus*, *Pilosocereus gounellei* ssp *zehtneri*, and *Melocactus levitestatus*, as well as some huge and magnificent specimens of the bottle tree, *Cavanillesia*.