

The real *Agave giganteensis* in Baja California Sur, Mexico

The exact characteristics of *Agave giganteensis* from Baja California Sur, Mexico, have been ambiguous since it was originally described (Gentry 1978). Most of the plants in cultivation bearing this name tend to be medium-sized solitary rosettes with few, broad, gray, laterally banded leaves with fierce marginal teeth and strong terminal spines. While mapping desert vegetation on the peninsula, a new species of agave was discovered and named (Webb and Salazar-Ceseña 2011), and other species were found to be poorly documented in terms of distribution and characteristics. We quickly realized that an overhaul of Gentry's 1978 monograph, *The Agaves of Baja California*, was sorely needed, and during the course of field work for a revision, we encountered at least one other undescribed species and several puzzles to solve, one of which was the identity of the true *Agave giganteensis*.

Quite a few herbarium specimens have been collected bearing the name *Agave giganteensis*, all originating from various parts of the Sierra de la Giganta. This sierra was named for Queen Calafia, a fictional giant, dark-skinned goddess from a fantasy land called California that Garcí Rodríguez de Montalvo (1992) introduced in his 1510 novel, *Adventures of Esplandián*. Hernán Cortés, a fan of this novel and the Spaniard who conquered Mexico and "discovered" Baja California, named the range of dark-colored volcanic rocks for the giant, presumably prostrate queen (Schulman 2013). The Sierra de la Giganta is an extensive, rugged mountain range encompassing many smaller sierras, and it extends much of the length of the Mexican state of Baja California Sur (Fig. 1).

Description of *Agave giganteensis* Gentry

When Howard Scott Gentry studied the agaves of Baja California between the 1950s and the early 1970s, he spent much time around Comondú on the

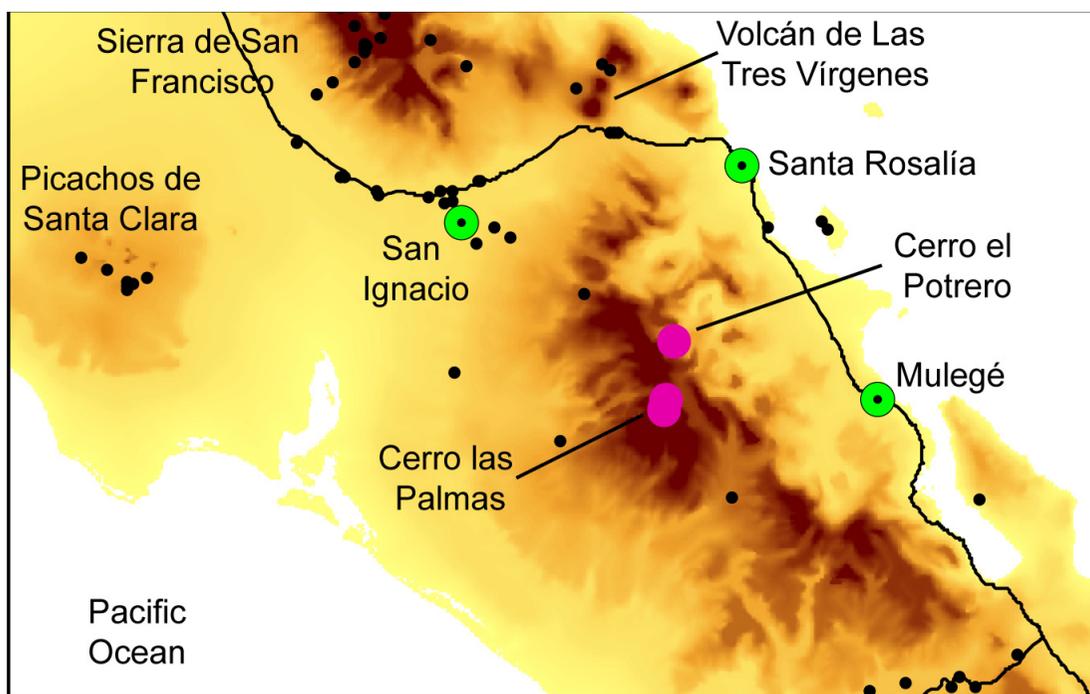
west-central slopes of the Sierra de la Giganta. While there, Gentry collected *Agave sobria* Bdge., which T. S. Brandegee had described in 1889 from specimens collected from the cliffs above Comondú. Brandegee chose the specific epithet *sobria* because, as he notes, "one of the species which the inhabitants say is not good for making mescal." Although agaves in general are called maguey, Gentry reported that the people of Comondú refer to *A. sobria* as "mescal pardo" or "pardito" and that it was good for eating and distilling, despite the epithet. In fact, it is another species, *Agave aurea* Bdge, which also grows around Comondú, is unsuitable for distilling mescal. Gentry notes that the accounts about agave uses made by the Jesuit priest Miguel del Barco, who lived for over 30 years at Mission San Javier, southeast of Comondú and southwest of Loreto, apparently applied to both *Agave sobria* and *A. giganteensis*.

The residents of Comondú claimed that an agave better for consumption, known as "lechuguilla," grew in the Sierra de la Giganta. Gentry dispatched his assistant, Juan Arguelles, and a local guide to collect samples. They traveled by horse and returned with plants from near the base of the sierra, and although they found no flowers, their leaf specimens were pressed and cataloged as *Agave giganteensis*. Young plants that were collected were planted at Gentry's California ranch and flowered, thereby becoming part of the description for *A. giganteensis* (Gentry 1978). Given what we know of where they travelled, these plants likely were *A. sobria*, but we'll never know for certain.

Gentry explored the northern part of the Sierra de la Giganta from Santa Rosalía on the east coast to see these plants for himself. Traveling southwest, he came to Rancho San Sebastián, an old place on the eastern side of the range. He was guided into the Sierra de las Palmas, which was known locally as the Sierra Campana and is now known as Cerro las Palmillas. There, on the top of the sierras, he found a distinctive maguey that he described and named *Agave giganteensis*, and his guide told him that maguey were more abundant on Cerro el Potrero to the north (Gentry 1978). He does not mention collecting plants for his California ranch.

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I. Map of a part of northern Baja California Sur, Mexico, showing the terrain of the northern Sierra de la Giganta and the location of Cerro el Potrero. The black line is Mexico 1, the green dots are cities, the black dots are localities where agaves have been observed, and the purple dots are localities of *Agave gigantensis*.

Gentry (1978) described *Agave gigantensis* as solitary with medium-sized rosettes up to 1 m tall and 1.2 m wide. The leaves are green to glaucous green, smooth, thick-fleshy, sclerophyllous, turning red to purplish with flowering. The leaf margins are undulate to prominently mammillate with large, gray or white teeth (“sometimes grotesque”), variously flexed, curved, and up to 6-8 cm apart. The inflorescence is 4-5 m tall, slender, and bears narrow panicles, all aggregated in the upper one-fourth to one-third of the scape (main peduncle), aligning it phylogenetically with *A. avellanidens* and *A. moranii* within the *Deserticolae*, a group that is mostly endemic to Baja California. In his description (Gentry 1978), he emphasized that the species occurred in an oak woodland community where the tree *Nolina palmeri* var. *brandegeei* (misidentified as *Nolina beldingii*) was a conspicuous component of the plant assemblage.

In his exsiccatae, or list of collections, Gentry (1978, 1982) lists several specimens from the vicinity of San Javier under the name of *Agave gigantensis*, all which appear to have gray or gray-green leaves and not the dark-green leaves of the plants from his type locality. Gentry (1978: 68) shows a photograph of an *Agave gigantensis* in habitat on Sierra de las Palmas with a thick, upright inflorescence that agrees with the species description. In contrast, in his more widely

read compendium of North American agaves, Gentry (1982: 66) shows a photograph of a transplanted plant at his California ranch (without provenance) in flower that shows an arching inflorescence, which Gentry calls “geotropic flowers,” which implies a thin main inflorescence similar to *Agave sobria*. This could be one of the plants collected by Arguelles from east of the Llano San Julio.

We believe these inconsistencies in Gentry’s account of *Agave gigantensis* has led horticulturalists and botanists to think this species can have glaucous blue to blue-green leaves with thin, arching inflorescences. As a testament, we visited several localities listed under *A. gigantensis* in Gentry’s Exsiccatae, and we found what appeared to be different forms of *A. sobria*. With some reluctance, we decided we had to go to the type locality where Gentry collected his original specimens and determine the characters of *A. gigantensis* for ourselves.

Agave gigantensis found

In April 2013, near the end of a very productive trip finding and photographing agaves in the southern half of the Baja California peninsula, we found ourselves on a long but relatively good dirt road heading from south of Santa Rosalía into the



2. A form of *Agave* aff. *sobria* on the east flank of Cerro el Potrero.

northern interior of the Sierra de la Giganta. We found Rancho San Sebastián in a different place and at a lower elevation than the map suggested, with no obvious magüey in the vicinity, and the owners directed us westward to other ranchos at higher elevations. Eventually, we reached Rancho la Huertita, where Francisco agreed to guide us up the mountain to the west of his rancho, which, as it turned out, was Cerro el Potrero.

Francisco took us up a steep chiva (goat) path that connects ranchos on either side of the peninsular divide to the northern end of Cerro el Potrero. Along the way, we encountered many of the gray-leaved magüey we identified as having an affinity to *Agave sobria* (Fig. 2), some of which were flowering. Near the top, in the steepest trail sections, we came upon a beautiful blue-green plant that resembled photographs we had seen of an herbarium specimen that allegedly depicted *A. gigantensis* on Cerro la Giganta to the south. It was yet another plant with an affinity to *A. sobria*. Given the difficulty of the climb,

we thought to stop, but Francisco was insistent that another magüey grew on top and that we had not come to it.

We reached the northern summit after some effort, and still we saw the glaucous blue-green magüey. Walking was a lot easier along the top using a network of chiva paths, and we traveled southward towards what appeared to be the southern summit of Cerro el Potrero. *Nolina palmeri* var. *brandegeei* appeared, first solitary, then in large groups, and then we saw a few small oaks. We found a large, solitary, green agave, which we knew immediately must be the elusive *Agave gigantensis* (Figs. 3-7). The setting and characters of the plant matched what Gentry had described, although he had failed to emphasize the green color, large size, and erect inflorescence with the side branches closer together compared with *A. sobria*. We took a steeper route down through the cliffs and saw *A. gigantensis* in many places, but only a few had flowering peduncles that had just started.



3. *Agave gigantensis* on Cerro el Potrero showing the rugged terrain of the northern Sierra de la Giganta in the midground. Volcán de las Tres Virgenes appears on the distant horizon at center. *Nolina parryi* ssp. *brandegeei* appears behind the agave, and *Fouquieria splendens* and *Opuntia* sp. are also visible.



4. *Agave gigantensis* with emerging inflorescence on Cerro el Potrero. Gentry (1978) mentions the leaves that turn reddish upon flowering.



5. Details of leaves of *Agave gigantensis*, Cerro el Potrero.



6. *Agave gigantensis* on Cerro el Potrero, with *Ferocactus rectispinus* and *Fouquieria splendens* in the background.

What is *Agave sobria*?

Brandegee (1889) presented the prologue for *Agave sobria* Bdge., which he found in the cliffs north of the twin towns of Comondú (Figs. 8–9). In his 1911 monograph, Trelease described *Agave affinis* Trel. as distinct from *A. sobria* because it had scabrous leaves with lighter brown marginal teeth with capsules that are more beaked and more stipitate. Rose had collected this at the head of Bahía Concepción south of Mulegé. Trelease recognized the close affinity to *A. sobria* hence the specific epithet of *affinis* (meaning “related to”). Plants we found near Mirador la Cuesta south of Loreto, overlooking el Mar de Cortés, could be examples of this (Fig. 10). Trelease (1911: 55–56) also described *A. carminis* Trel., with a type locality of Isla Carmen east of Loreto, as having smooth, gray-green, triangular-oblong leaves about 30–40 cm long and 5 cm wide with a slightly glossy, light-brown terminal spine and light-brown spines on mammillate margins. He does not report whether it offsets or is solitary. Plants we encountered on Cuesta Agua Verde, south of Mexico 1 where it crosses the peninsular divide, may actually be this form (Fig. 11).

Even more confusing are the forms of *Agave sobria* near San Javier southwest of Loreto. Gentry (1978) specifically mentions *A. gigantensis* in this vicinity,



7. *Agave gigantensis* with old fruiting stalk showing the erect nature of the scape and the congested panicles.



8. *Agave sobria* Bdge. in the vicinity of the type locality of Mesa Comondú, north of San Jose de Comondú, Baja California Sur.



9. The “geotropic” flowering stalk of *Agave sobria* Bdge. in the vicinity of the type locality of Mesa Comondú north of San Jose de Comondú.

and in our search for the localities of herbarium specimens bearing this name near San Javier, we came across gray-green plants with many leaves and prominent cross banding (Figs. 12 & 13) that we think are even more forms of *A. sobria*; we also found clusters of *Agave aurea*, a widely distributed species. At a little roadside church near Rancho las Parras, east of the summit of the cuesta, we found a solitary, glaucous, gray-green leaved agave planted in a garden that looked intermediate between one of the various forms of *A. sobria* and *A. gigantensis*. This suggests that *A. gigantensis* might

occur on the mesas near San Javier, but we did not search extensively for it.

After examining many specimens, Gentry (1978) created *Agave sobria* Bdge. ssp. *sobria* Gentry to set it apart from two subspecies he described from the cape region, and he attempted to encompass all of the plants found in the Sierra de la Giganta,



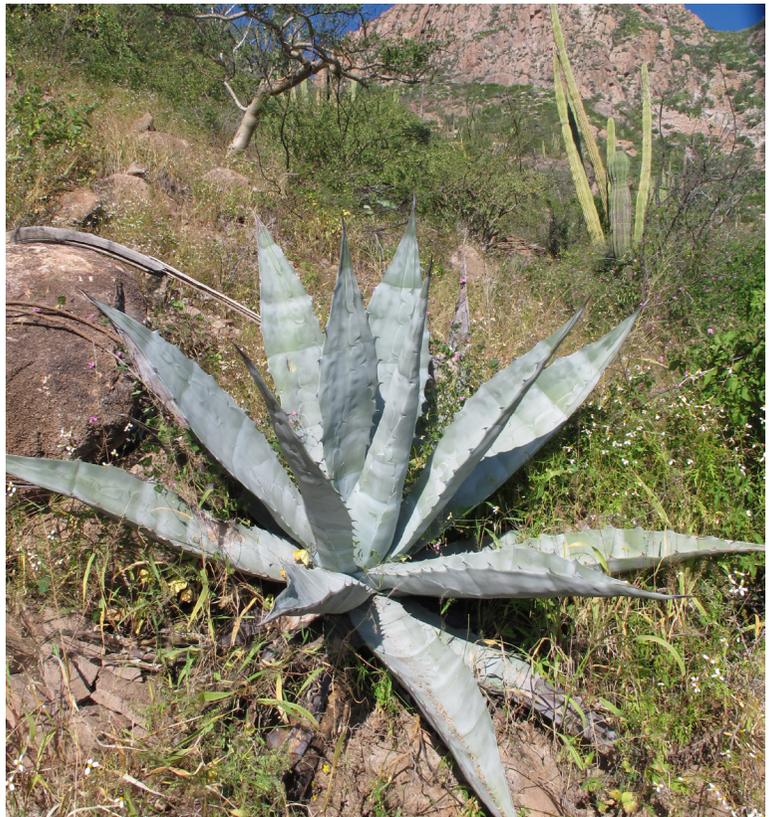
10. *Agave sobria* ssp. *sobria* near la Cuesta de Mirador south of Loreto. This plant is growing approximately 100 m above el Mar de Cortés, and it may represent *A. affinis* Trel.



11. *Agave sobria* ssp. *sobria* on Cuesta la Agua Verde south of Loreto and Mexico 1. Herbarium specimens collected in this vicinity have been stored as *Agave gigantensis*. These plants may represent *A. carminis* Trel.

including *Agave sobria* Bdge, *A. affinis*, and *A. carminis*. His description states that this species has small- to medium-sized rosettes 50–150 cm in diameter, usually cespitose, with few bright glaucous-gray leaves that are linear to lanceolate, long acuminate, straight to recurved, mostly 45–80 cm long × 5–10 cm wide and frequently cross-banded. The margins are undulate to mammillate with spines 5–10 mm long, straight or reflexed, with gray

12. *Agave sobria* ssp. *sobria* on the peninsular divide north of Mission San Javier southwest of Loreto. Herbarium specimens collected in this vicinity have been stored as *Agave gigantensis*. *Bursera microphylla*, *Stenocereus thurberi*, and *Pachycereus pringlei* appear in the midground.



bases and reddish tips, and the terminal spine is 3–6 cm long. The main shaft of the inflorescence is slender, sometimes curved, sometimes twisted, plane to somewhat arching, 2.5 to 4.0 m tall with 12–20 short lateral peduncles.

How did *Agave sobria* become confused with *Agave gigantensis*?

Our conclusion is that the reason for all those *Agave sobria* masquerading as *A. gigantensis* in cultivation and in herbaria is simple. Gentry (1982) had inconsistencies in his description and illustration of *A. gigantensis*, and this has led to misconceptions as to what this species looks like and how widely it is distributed. *Agave gigantensis* is a dark green, solitary species with a relatively stout flowering inflorescence, and we believe Gentry (1982) erred when he included specimens from low elevation on the western slopes of the Sierra de la Giganta with the thin inflorescence and



13. *Agave sobria* ssp. *sobria* on the hills northwest of Mission San Javier.

“geotropic flowers,” therefore creating unnecessary ambiguity. As a result, we believe the more robust, much easier to access plants, which occur along roadsides and major trails, are forms of *A. sobria* or possibly *A. affinis*, if the latter is resurrected as a viable species. After all, when faced with an all day, suicidal climb up a rugged cliff to collect specimens or seed of *Agave gigantensis*, wouldn’t you stop at the first nice maguey you saw, which happened to be an unusual form of *Agave sobria*? We restrict *A. gigantensis* to the dark-green, solitary plants with the stout and more compact inflorescence that grow on mesas or in cliffs in the northern Sierra de la Giganta, particularly on Cerro las Palmillas, Cerro el Potrero, and possibly on mesa tops in the vicinity of San Javier.

Bottom line: Does *Agave sobria* need to be split again?

The real question is whether Gentry’s composite *Agave sobria* Bdge. ssp. *sobria* Gentry encompasses too wide of a range of variability in the plants that occupy the length of the Sierra de la Giganta. The plants at the type locality near Comondú are

considerably different than those we saw elsewhere, notably near the crest of the sierra and on its eastern side. This agglomeration of plants includes surculose and solitary rosettes that vary from small to medium size with leaves that can be long and very narrow to triangular or deltoid. Further field work is needed to work out the relations among these forms of *A. sobria*, their distributions, and whether additional species, subspecies, or varieties are warranted.

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