

xerophilia

the passion for cacti and other succulents

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Xerophilia

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5 • *Ariocarpus kotschoubeyanus* (Lem.) K.Schumann | Juan Miguel Artigas Azas

To be continued!
¡Continuará!
Va urma!

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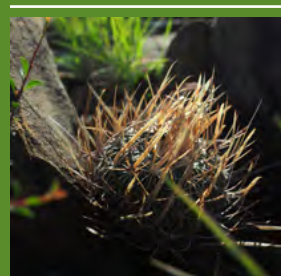
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Front cover

Mammillaria saboae ssp. *haudeana*,
Yecora, Sonora, Mexico.

Photo by
Ricardo Ramirez Chaparro.



Back cover

Echinofossulocactus lloydii,
Sierra Zuluaga, Zacatecas, Mexico.

Photo by
Grzegorz matuszewski.

Xerophilia

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no 26 2020

Xerophilia magazine will no longer appear in the already known format. In the last two years, the publication of the magazine - a quarterly magazine - has become, by force of circumstances, an annual publication.

Of course we are not happy and we believe that you, our readers, are just as unhappy with this. Fewer and fewer people are interested or have the time to devote themselves to writing articles in online magazines for the general public. Some write only in scientific journals, paying the price of months of waiting, before being published or even paying the price of receiving refusals after these months of uncertainty; others prefer to post photos on social networks, commenting here and there. It is much easier.

The general online magazines in our field had their moments of glory, after which they began to ... etiolate, more and more. Social networks are killing them slowly, just as surely as they have killed most cactus and succulent forums.

Thus, some faithful authors came to give us articles in time, with their usual promptness. Others are just late. There are also those who send us incomplete materials ... We write a summary, we build a page based on some photos and the text, well the text doesn't come. We do not admonish - everyone's work is voluntary and without any obligations to us, but we just want to give an explanation.

For these reasons we have come to the conclusion that we will move the magazine to another format: we will follow the principle of "first come, first served". At the end of the year we will build a volume with everything that appeared in the past year. Also, when it comes to long and complex articles or species descriptions, we will continue to publish special issues.

We hope that this system will satisfy more than the expectation of a magazine that does not seem to want to appear.

And specifically because of this expectation, we want thank you for your loyalty!



editorial 26

We apologize to the authors who waited to see their published works!

We apologize to the readers who waited to read them!

d. ponce

June 2020

summary →

ABSTRACT - scurtă sumarizare a articolelor

Ariocarpus kotschoubeyanus (Lem.) K.Schumann **pagina 5** Juan Miguel Artigas Azas

Cunoscut autor al mai multor articole, apărute în paginile noastre, Juan Miguel Artigas Azas revine cu o fișă deosebit de interesantă despre o specie care, oricât ar fi de cunoscută, rămâne totuși dorită de oricare colecționar de cactuși: *Ariocarpus kotschoubeyanus*. Cu stilul sau clar, precis și lipsit de cuvinte inutile, autorul face a siteză a principalelor aspecte legate de această specie, care fascinează, atât botaniștii, cât și colecționarii, de mai bine de un secol și jumătate. Citind articolul, veți găsi elemente interesante despre istoricul introducerii speciei, taxonomia acesteia, arealul și biologia ei, situația speciei în habitat și desigur, nu sunt uitate nici sfaturile de cultură.



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Pasiunea ne unește!

Ariocarpus kotschoubeyanus (Lem.) K.Schumann

Die natürlichen Pflanzenfamilien, Nachträge zum II-IV Teil, S. 259, (1897).

Lemaire, Charles Antoine. 1844. *Anhalonium kotschoubeyanus*. L'Horticulteur Universel, Journal Général des Jardiniers et Amateurs. 6: 63.

June 5 2020



Juan Miguel Artigas Azas

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Text and photos by the author

1 - *Ariocarpus kotschoubeyanus* growing in habitat in San Luis Potosí.

The diminutive living rock cactus *Ariocarpus kotschoubeyanus* must be one of the most elusive of the cactus species, an elusiveness that guarantees its survival hidden and protected from predators in a harsh desert environment, while providing the plant with a unique mostly free of competition ecosystem. The small footprints of this plant, barely visible, just sometimes, are properly referred locally as "pezuña de venado" (deer hoof) or "pata de venado" (deer foot).

This plant hides so well that if not during the right time of the year they may be completely invisible to the observer. But in their finding, one can appreciate their unlikely and delicate form that is as unique as beautiful.

In this article I intend to summarize the knowledge about the taxonomy, distribution and habitat, biology and conservation of *Ariocarpus kotschoubeyanus*. In addition to the information in literature, I offer a very small contribution with my own field experience with this wonderful cactus.





2-*Ariocarpus kotschoubeyanus* growing in habitat in San Luis Potosí.

Taxonomy

Ariocarpus kotschoubeyanus was described as *Anhalonium kotschoubeyanum* in 1844 by Charles Antoine Lemaire (1800-1871), a French botanist and botanical author noted for his publications on *Cactaceae*. The genus of choice *Anhalonium* had been described by Lemaire himself in 1839 to describe *Anhalonium prismaticum*, a plant we now know as *Ariocarpus retusus*. The generic name *Anhalonium* is referenced by Lemaire as “without areole” from Greek, which properly typifies *Ariocarpus* small areoles in relation to other cactus. The specific name honors the Russian prince Wassili Wiktorowitsch Kotschubei (1812–1850), who was a benefactor of the collector of the first specimens of *A. kotschoubeyanus*.

In 1842, a mention of a publication by Lemaire describing this plant in the “Cels brothers’ Collection Catalog in the Bulletin du Cercle de conférence horticole du département de la Seine, Paris” is made available and established as reference (even today), but the pagination, article, and even the publication appears not to exist! It was two years later in 1844 that the plant description was published by Lemaire in volume 6 of the illustrated magazine “L’Horticulteur Universel, Journal Général des Jardiniers et Amateurs”, which was published in Paris between 1839 and 1845. Although its amateurish title (The universal horticulture: general journal of gardeners and amateurs translated to English), the publication regularly contained botanical descriptions. The description by Lemaire has several problems, as it does not contain a Latin diagnosis and also lacks a drawing or illustration of the plant or the mention of a plant in a herbarium. The name *Cactus Kotschoubeyi* Karwinsky is listed as a synonym without any reference given.

The plant(s) supposedly used by Lemaire in the description have their origin in a collection made by the German (born in Keszthely in today’s Hungary) baron Wilhelm Friedrich von Karwinsky von Karwin (1780-1855), a naturalist who made extensive botanical collections both in Brazil and in Mexico, where he was sent by the Bavarian government in 1826 to make collections of natural history objects, something he made for five years, mainly in Oaxaca. In 1840 he visited Mexico again with the same purpose, this time by request of the Russian government, sending most of his collections to St. Petersburg.

According to Lemaire (1845:63), Karwinsky collected three specimens of *A. kotschoubeyanus*, which he sent to Kotschubei, then Russian Minister of Internal Affairs (according to Schumann 1898:544) and his benefactor; the account goes that prince Kotschubei kept one of the specimens for himself; sent one to the Botanical Garden in St. Petersburg; and the third one he sold to the French plant collectors Cels brothers in Paris, at the unbelievable price of 1,000 francs (Schumann, 1898:544), a price described as far exceeding its price weight in gold. Using an online calculator (www.historicalstatistics.org) I obtained that in recent (2015) money that sum accounts for about \$5,182 US dollars. It is in the Cels brothers’ catalog the plant description was supposed to have been published by Lemaire.

A rather conflicting account of the later is given by Schumann (1898: 544 referencing Lemaire 1863:42) when he mentions that Karwinsky collected three specimens of *A. kotschoubeyanus* in San Luis Potosi in 1842, which he sent to Europe: one of the plants to Kotschubei (not the three of them); one to the Botanical Garden in St. Petersburg; and the third one he sold to the Cels brothers at 1,000 francs. Lemaire (1863:42) mentioned that two specimens were sold at a price of 1,000 francs a piece, without further elaboration. The origin of the plants in San Luis Potosi is not backed by Lemaire.

In 1850, the German aristocrat Joseph zu Salm-Reifferscheidt-Dyck (1773-1861), an amateur botanist, published the description *Anhalonium sulcatum* Salm-Dyck, which refers to the same species: *A. kotschoubeyanus*.

When Lemaire described *Anhalonium* and *Anhalonium prismaticum* in 1839 he was probably not aware of the recent description of *Ariocarpus retusus* in 1838 (Now senior synonym of *Anhalonium prismaticum*), but he stuck to the genus *Anhalonium* when he described *A. kotschoubeyanus* several years later.

Schumann in 1894 accepted *Anhalonium sulcatum* in *Ariocarpus* as *Ariocarpus sulcatus* (Salm-Dyck) K. Schumann, but in a subsequent supplement in 1897 for the same publication he established that the priority principle (now principle III of the International Code for Botanical Nomenclature) should apply and the right name for the plant is *Ariocarpus Kotschoubeyanus* (Lemaire) K. Schumann 1897.

In 1925, the new name combination *Roseocactus kotschoubeyanus* is proposed by Alwin Berger, read as *Roseocactus kotschoubeyanus* (Lemaire ex K. Schumann) Berger, with the new genus name given in honor of Dr Joseph Nelson Rose. Berger believed that *A. kotschoubeyanus* (together with *A. fissuratus*) differed enough from *A. retusus* to justify the splitting into two genera, based in two characters: the origin of the flowers and the nature of the tubercles. The new genus was rejected first by the American William Taylor Marshall (1886-1957) in 1946, who proposes it as subgenus, and subsequently by the American botanist Edward Frederik Anderson (1932 –2001) in 1961, considering that those small differences ignored the greater similitudes (probably unique among *Cactaceae*) in those species, and *Roseocactus* was proposed instead as a subgenus.

The combination *Ariocarpus kotschoubeyanus* (Lemaire) K. Schumann 1898 synthesizes all this history.



3 - *Ariocarpus kotschoubeyanus*, growing in habitat in San Luis Potosi, note the variability of flower coloration in the same population in this and the following pictures.

3



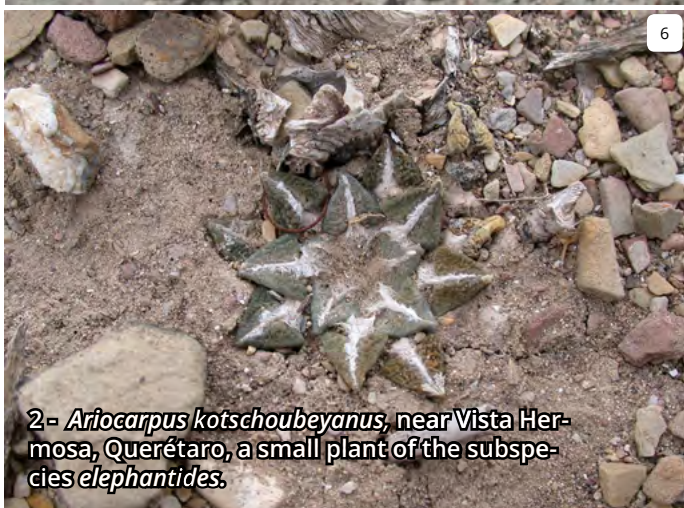
4 - A large specimen of *Ariocarpus kotschoubeyanus* blooming in habitat in San Luis Potosi.

4



5

5 - A landscape view of *Ariocarpus kotschoubeyanus* blooming in habitat in San Luis Potosi.



6

2 - *Ariocarpus kotschoubeyanus*, near Vista Hermosa, Querétaro, a small plant of the subspecies *elephantides*.

Description

Ariocarpus kotschoubeyanus is a dark green olive plant, with body flattened at ground level to slightly rising, centrally depressed, with a variable diameter from 3 – 7 cm, most commonly 4. It has napiform roots. The tubercles are elongated basally and angled up to 13 mm long truncated in a flat triangle to an apex end, roughly as wide as long. They are deeply fissured from the base. Areoles in wooly fissure; without spines. Mucilaginous sap. Flower from young areole near plant center, to 2.5 cm diameter, pink to magenta, flowering in autumn. Fruits are reddish, elongated to 16 mm long. Seeds 1.0 to 1.2 mm wide, 1.2 to 1.4 mm long, tuberculate, black.



7 & 8 - *A. kotschoubeyanus* ssp. *albiflorus*, blooming in habitat near Tula, Tamaulipas. 9 - *A. kotschoubeyanus* ssp. *elephantides*, near Vista Hermosa, Querétaro, with a view of the gravelly habitat. 10 - A very large plant of *A. kotschoubeyanus* ssp. *elephantides* near Vista Hermosa, Querétaro. A comparison with a coin of 10 pesos, having a diameter of 25.5 mm is offered.

Distribution and habitat

Ariocarpus kotschoubeyanus has a wide distribution in the high lands of the Chihuahuan desert from San Luis Potosi north to the Mexican state of Coahuila with a disjoint population south in the mountains of the state of Querétaro. In all its range it is found in isolated populations at 800 to 1850 meters asl. At least 35 populations are known (Gómez-Hinostrosa et al., 2017) in the states of Coahuila, Nuevo León, Zacatecas, San Luis Potosí, Tamaulipas, and Querétaro.

This large noncontiguous distribution has given rise to variations in the plants, some of which have been officially recognized as varieties or subspecies. Four are generally mentioned in literature, although more have been proposed and may refer to the same plants.

Ariocarpus kotschoubeyanus ssp. *albiflorus* (Backeberg) Glass 1997.

Described from populations around Tula, Tamaulipas, the main distinctive characteristic of this unique population is their white instead of pink or magenta flowers.

Ariocarpus kotschoubeyanus ssp. *elephantides* Halda 1998.

Described from populations in Vista Hermosa, Querétaro, the main characteristic is its size, with larger plants than in the northern populations, having a diameter of up to about 7 cm. Halda published this name based on *A.*

kotschoubeyanus var. *elephantides* Skarupke 1973, which is invalid as it lacks a Latin diagnosis and type designation.

Ariocarpus kotschoubeyanus ssp. *mcdowellii* Backeberg 1949.

It represents northern populations which are smaller and with small beak-like tubercles and pale mauve flowers, often with a high white content in the outer petals.

Ariocarpus kotschoubeyanus ssp. *sladkovskyi* Halda & Horáček 1998.

From populations in San Luis Potosi, it differs from other populations in having a smoother and shiny epidermis.

A. kotschoubeyanus usually grows in calcareous or gypsum silty dry lakes, which receive water only after substantial rains and have little if any other vegetation present. It is also sometimes found on flat to sloping calcareous soil with low desert vegetation. Some populations, particularly those in Querétaro, are found in low hills in open areas among gravel.

Temperatures in the habitat of *A. kotschoubeyanus* may go down to a few degrees under 0° Celsius during the dry winter months, particularly in the early mornings, with an expected increase of temperature during the day to at least a little over 10° Celsius most winter days. Most of the cold days are sunny but there could be a few cloudy days. During the summer, low temperatures are always above 10° Celsius and particularly for the northern populations in Coahuila and Nuevo León, they may reach over 40° Celsius in the early afternoon. Populations in the southern part of the range are blessed with a narrower more benign temperature range, with very few days reaching freezing point or temperatures of over 32° Celsius.

Yearly rainfalls may range from around 30 cm in the northern part of the range to over 60 cm in the southern part. Rains start during the last part of May or early June and extend to early November, with a peak in September.



11 - *Ariocarpus kotschoubeyanus* near, breaking through a crack in the accumulated silt with its flower in San Luis Potosí.

11



12 - *Ariocarpus kotschoubeyanus*, blooming in habitat in San Luis Potosí.

12



13 - *Ariocarpus kotschoubeyanus*, blooming in habitat in San Luis Potosí.

13

Biology

After rainfalls, most populations of *Ariocarpus kotschoubeyanus*, with their tops laying at ground level, may remain submerged for a few days (but the soil is almost water proof and may help to protect their roots from rotting) and are covered by a thin - up to about 5 mm - layer of silt; it seems that this layer protects them from the sun during the harshest months of the year. After heavy rains slow down, around October, the layer dries up and breaks, exposing the plants, which are now a little fatter by water and ready to bloom.

Blooming may happen twice a year in late September and late October or early November, although this later range should be considered blooming time, in my experience they won't always bloom in late September. On particularly dry years, they may not bloom at all as far as I have been able to experience. The blooming period may extend for a week, with some plants blooming some days after the others. In a normal sized population (not particularly abused by collectors) thousands of flowering plants are simultaneously seen resembling pink dots on the dry flat mud, which is quite a spectacle.



14- *A. kotschoubeyanus* near, blooming in habitat in San Luis Potosí.



15- *A. kotschoubeyanus*, blooming in habitat in San Luis Potosí.



16- *A. kotschoubeyanus*, breaking through a crack in the accumulated silt with its flower in San Luis Potosí.

Conservation

Even in face of its extremely wide distribution that extends to an area of about 60,000 km² (Gómez-Hinostrosa et al., 2017), *A. kotschoubeyanus* is currently (2019) listed in category “Near Threatened” by the International Union for the Conservation of Nature.

This is because they are very slow growing taking several years to mature, its distribution very fragmented, primarily because the species is an environmental specialist but there is also habitat loss and degradation that have impacted in populations.

To add to this, many of the locations are threatened by local people who collect the plants for medicinal purposes.

Some of the locations have impacts that seem irreversible. For example the main population in Tula Tamaulipas, where the ssp. *albiflorus* is found, is now inside the city and just a fence protects the few remaining plants.

Since June 1992, *Ariocarpus kotschoubeyanus* has been included in the Appendix I of CITES, which includes species that are the most endangered, threatened with extinction and CITES prohibits international trade in specimens of these species except when the purpose of the import is not commercial.

The Mexican Official Norm (NOM-059-SEMAR-NAT-2010) lists *A. kotschoubeyanus* with the category “Pr” representing species under special protection.



17 - *A. kotschoubeyanus*, blooming in habitat in San Luis Potosí.

In culture

Ariocarpus kotschoubeyanus is a hardy but a very slow growing plant. Because of its morphology, it requires deep pots where it can grow its large napiform root, well drained substrate is also necessary to prevent roots from rotting by excess humidity. In regards to light, although they are found exposed to the sun we should take into consideration that for some months they may have a layer of soil on top of them completely covering them, and even in periods when they don't they do still have some silt protecting them. So, although they can get accustomed to full sun and thrive well, indirect sun with bright light is good enough for them to grow healthy and flower.

A. kotschoubeyanus can be grown from seed by keeping their seeds in a humid environment and not exposed to sun light. I have used clear plastic containers which I keep

closed after sterilizing the soil in the microwave oven to prevent fungus growth. I add a few centimeters of water so the level remains well under the substrate of the substrate. I place the seeds on the surface of the soil, sprinkle over some soil without completely cover them and keep them there for one year, when I open the container to get them accustomed to a drier environment. When large enough I transplant them to small individual pots. Please take into consideration that this is not “the method”, but “a method” that has worked well for me.

I know of people that graft the little scions, making them grow faster with this, but also shape unnaturally. I prefer natural growth even if I have to wait several years. In the case of *A. kotschoubeyanus* (and other *Ariocarpus* species) you may have to wait for more than seven years for the plants to get mature and flower, but it is well worth the effort.

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Acknowledgements

I would like to thank my friend Dag Panco for suggesting me writing this article and for his big help in offering me historical information about this plant and his valuable comments, which helped in making a better article.

18- *A. kotschoubeyanus*, blooming in habitat in San Luis Potosí.

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