

xerophilia

the passion for cacti and other succulents

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Xerophilia

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Front cover

Pinguicula gypsicola, Potrero de Sta Gertrudis, San Nicolás Tolentino, México
photo by Pedro Nájera Quezada



Back cover

Echinocactus platyacanthus - Aramberri, Nuevo León, México
photo by Aldo Delladdio.

Xerophilia

the passion for cacti and other succulents

editorial 10

It was a sad summer for the Romanian C&S community as several important members passed away, within a space of less than two months. Among them was Basarab Popa (well known as BB), a man of great soul, who probably was the most important East-European cactus collector of the last decade, who had a sudden and untimely death.

Another great loss was the passing away of prof Petre Dobrota, the author of the first Romanian book on cacti. Rest in Peace!

From this edition we recommend to take time and read Andrea Cattbriga's report on the ninth edition of Festa del Cactus, one of the most important European cactus fairs, held under the devise "**Legal cacti, in the name of the law**", as one can read on the official **website**. We hope this kind of attitude and respect for nature will settle in and prevail in all such events worldwide. We also wish to mention the first edition of the WIG contest (wild grown plants) organized during this event... yes, you can grow plants like in the wild, and you don't have to buy plants illegally extracted from the habitat just to show off.

Our 10th issue also brings a new level of innovation: Xerophilia became a layered multi-lingual set of texts! With the help of the new included buttons you can select the preferred language - English, Romanian or Original, the latter presenting the original text version, be it English, German, Spanish, Romanian, or in any other language the article was originally written in. We hope this will be so pleasing to many of our readers for whom English is not their first language and to all non-Anglophone authors who would like their articles published in their native language as well. Also, we ask our Romanian readers to excuse our errors in regards to the diacritics in the text. We had to choose between having a partial translation attached or offering full texts, corrected but only "whenever possible" considering the large number of pages. We chose



the second option, hoping that we will meet a positive vote.

We also would like to introduce a new member of the Xerophilia Team - the new Senior Editor Miguel Angel Gonzalez Botello, President of the "Sociedad de Cactáceas y Suculentas del Estado de Nuevo León", and Consultant for Geographical Information System & Remote Sensing (GIS&RS). Miguel is a keen connoisseur of the genus *Astrophytum*. He will make good use of his professionalism and become Xerophilia's special cartographer. We will be able to enjoy all of his maps in a series of miscellaneous articles.

As always at the end of the editorial - we want to thank, once again, to our loyal readers from all over the world and to all our collaborators for this new issue!

Eduart

carnivorous xeric flora in san luis potosi, mexico

contributions



by **Pedro Nájera Quezada**, San Luis Potosí, Mexico - email: pnajeraq@gmail.com

Carnivorous-insectivorous plants are grouped into few families: Bromeliaceae, Byblidaceae, Cephalotaceae, Dioncophyllaceae, Droseraceae, Drosophyllaceae, Lentibulariaceae, Nepenthaceae, Roridulaceae, Sarraceniaceae, Stylidiaceae; of these, only Lentibulariaceae is found within the state of San Luis Potosí and of these there are species that occur in the most extreme arid zones and the great central plateau.

The main objective of this paper is to review the species and populations of carnivorous plants from semi-arid and arid regions of the state of San Luis Potosí, define their risk status by the Methodology for Risk Assessment (MER) stipulated in the NOM-059-SEMARNAT-2010, and propose their inclusion following the same rules.

When you think about carnivorous plants, one usually takes as a basic assumption that they come from wet areas, with large numbers of insects; however, they also managed to establish in arid regions of Mexico and grow along with species that would appear as the most

Pinguicula macrophylla, Mesas de Juan de León Sierra de San Miguelito.



unlikely associates, such as:¹ *Hechtia glomerata*, *Yucca carnerossana*, *Agave lechuguilla*, *Larrea tridentata*, *Quercus* spp. and *Lindleya mespilioides*, which suggests that in the past climates in the highlands were milder, with a more suitable humidity and temperature range, and with less vegetation to outcompete cacti, succulents and the Lentibulariaceae and thus covering a much

contents →



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Associated: 1 - *Turbinicarpus pseudoplectinatus*. 2 - *T. schmiedickeanus* ssp. *klinkerianus* (*P. Sta Ana, Guadalcazar*).

larger area. The climate became more extreme in time, next step being biological barriers that opened soon after, which may have caused the contrasting diversity of species in the study area.

These plants are more often distributed in wetter areas, with less harsh temperatures, and although usually found in alpine regions, their main centers of origin and diversification are located in Central America and parts of Europe.

Of all the species, *Pinguicula* spp. in the region have not developed any bio-mechanical ability of capturing insects, so that they capture passively without having to perform any movement and using only their sticky mucilage containing digestive enzymes that are temporarily produced by the leaves, inducing the capabilities to capture small insects and assimilate the nutrients via the stomatal pathway.

It's amazing how these species are able to adapt to various ecosystems lacking resources such as water, nutrients and prey fauna; however, the places where they are present are located in areas that provide shelter, whether canyons, ravines, sinkholes, or any terrain feature that make the conditions a little less adverse than the surrounding ecosystem.

They also display extremophile (*) qualities in addition to their resistance to aridity, because

you can find them growing on chalky rocks and limestone in most on the areas, making the possibility of mycorrhizal associations in most of the species found very plausible, facilitating the absorption of nutrients and moisture from the atmosphere.

They also display certain dependence on nurses, whether plants or rocks, rosetophyllous colonies (*Yucca*, *Agave*, *Hechtia*), shrub scrub and low trees (*Prosopis*, *Quercus*, *Lindleya*, *Larrea*, *Acanthoamnus*, etc.) and large rocks, walls or near vertical slopes which seem to be preferred by plants of the genus *Pinguicula* in the xeric regions of the San Luis Potosí state, so that an analysis of nurse plant associations was performed in order to clarify the dependence of this group to other plants serving as a refuge from the elements and the environmental damage.

Family Lentibulariaceae

The family comprises three genera of carnivorous plants, *Genlisea*, *Pinguicula* and *Utricularia*, of which only *Pinguicula* and *Utricularia* are found in the state of San Luis Potosi.

Pinguicula L.

The genus *Pinguicula* is the most abundant throughout the state. It displays two distinct



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1 - *Pinguicula gypsicola* associated with *Selaginella* and *Hechtia* sp.. 2 - *P. tataki* is highly associated with *Selaginella* sp.. 3 - *Utricularia livida*, Cañada de Lobo, SLP.

morphologies throughout the year; at first, for half of the year, it tends to develop fleshy leaves, like those of Crassulaceae, which have the normal functions of any leaf, namely synthesizing nutrients through photosynthesis; during the other half of the year, they lose the true leaves and develop the ability to catch insects, which helps them survive in nutrient poor environments. This morphology is present at different times for each of the species, but it exists usually in the spring when they generate their carnivorous leaves; during the cold season they grow their succulent leaves.

No record was found, and could not register anything about the insect species caught because of the time restrains, and effort and money that required but such a task, but it was possible to briefly note different species of tiny flies and small nocturnal Lepidoptera.

The very whimsical flower shape, which looks like a spur nectary located behind the flower, suggests that its pollinator has to be an animal with elongated proboscis (**), which means it has to be large, and because of the sensitivity of the flower, this animal also has to keep flying to avoid damaging the inflorescence, so I theorize that the activity is pollinated by Lepidoptera of the Sphingidae family, probably *Eumorpha* genus.

Dispersal by wind and rain is limiting its distribution in the arid zone of Mexico always to highly protected areas assuming it managed to find shelter from the surrounding climatic factors; it is also worth mentioning the great partnership (of closely related species) that they have with other endemic species in each of the regions studied; another evidence to suggest a past with different climate and vegetation.

Most of these species are highly threatened



1 - *Pinguicula debbertiana* from culture. 2 - *P. debbertiana* winter rosette. 3 - White flowered *P. debbertiana* from culture. 4 - *P. debbertiana* flower from culture. (photos 1-4 by Oliver Gluch)

by their growing fame and increasing number of specialized collectors and traders who are able to wipe out entire populations because plants can reach stratospheric prices in the niche market; some other populations are also affected by mining activities while the incidence of livestock in numbers exceeding the natural carrying capacity of the ecosystem and for prolonged periods of time, prevents the regeneration of forest cover and decreases the niches for these species.

MER analysis was performed, as stipulated in the NOM 059 SEMARNAT 2010, to establish the degree of risk and the conservation status of these species that must be protected properly, allowing the species to thrive in the future.

***Pinguicula debbertiana* Speta & F. Fuchs**
 Published in: Linzer Biol. Beitr. 24(1): 375 (1992).
 By Dr Franz Speta and Franz Fuchs
 No synonymy.

After the last 3 years of extreme drought, has been unable to find the species during several exhaustive searches in type area, so that its evaluation is postponed until better information at own hands and determine their possible

extinction in the wild, which would very sad news to which we do not yet anticipate without first making further sampling in the area during times better rainfall patterns and more thoroughly.

Table 1: Recorded Locations – see **Annex 1**
 MER analysis is omitted because of lack of data.

***Pinguicula ehlersiae* Speta & F. Fuchs**
 Published in: Stapfia 10: 114 1982. By Speta F. and F. Fuchs
 Synonymy: *Pinguicula cyclosecta* {auct. non Casper: Hort.}. Published: in sched. (1984); *Pinguicula ehlersiae* {Speta & Fuchs} var. *albiflora* {Debbert ex Duschek} nom.nud. Published in: Taublatt 1993, 2:27 (1993); *Pinguicula hintoniorum* {B.L.Turner}. Published in: Phytologia 74:71 (1994)
 Type: below Puerto Pino, Dr. Arroyo, Mpio. Zaragoza, Nuevo Leon, MX, 16. 3. 1993, G.B.Hinton & al. 22661 (TEX)
 According to ICPS (International Carnivorous Plant Society)
 Ecology: biennial plant with carnivorous leaves during spring-summer and vegetative leaves in winter, very hard to see if not in bloom because



1 - Colony of *Pinguicula ehlersiae* nursed by *Selaginella*.
 2 - *Pinguicula ehlersiae* nursed by *Hechtia* - *Guaxcama Villa Juarez*. 3 - *Pinguicula ehlersiae* growing in pure gypsum stones. 4 - *Pinguicula ehlersiae* showing inflorescence and seed capsule. 5 - Associated: *Mammillaria pilispina* - *Nuñez Guadalcázar*.

of its close relationship with *Hechtia glomerata*, *Agave striata* and *Agave asperrima* ssp. *potosiensis*, very well hidden. (see **Table 8**)
 Habitat: It is distributed in areas of exposed rocks with rosetophyllous or leafless vegetation (lacking leaves) such as *Agave lechuguilla*, *A. funkiana*, *A. striata*, *Hechtia* spp., *Fouquieria splendens*, *Acanthamnus aphyllus* and *Ephedra* spp.

In arid environments in the state it is the *Pinguicula* with the widest distribution.
Table 2: Recorded Locations – see **Annex 1**



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1 & 2 - *Pinguicula esseriana* nursed by *Hechtia glomerata*.
3 & 4 - *P. esseriana* growing in rock crevices. 5 - Associated:
Astrophytum myriostigma fma. *nudum*, *Huizache*,
Guadalcazar. 6 - Associated: *Krameria navae* (*Krameriaceae*),
Guadalcazar.

MER Analysis results?: Score 1.650768555 =
subject to special protection (Pr) (see **Table 9**)

***Pinguicula esseriana* B. Kirchn.**
Published in: *Willdenowia* 11(2): 317-319, f.
1 1981, Bernd Kirchner "*Pinguicula esseriana*

(*Lentibulariaceae*) - eine neue Art aus Mexiko"
No synonymy
Ecology: Annual-biennial plant forming in spring-
summer a rosette of carnivorous leaves and
succulent leaves that store water during the
winter, its nodricism^(***) relies mainly on cracks of
rocks being shaded *Hectia glomerata* and *Agave*
lechuguilla on a lesser degree. (see **Table 8**)
Habitat: It is distributed in exposed rock crevices,
and associated with rosetophyllous or leafless
vegetation (lacking leaves) and *Agave lechuguilla*,
Hechtia glomerata, *Fouquieria splendens*,
Acanthothamnus aphyllus and *Ephedra* spp.



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1 - *P. gypsicola* with flower and seed capsule - photo by Jacqueline del Rocío Cadena Martínez. 2 - *P. gypsicola* - intermediate rosettes turning from summer to winter shape. 3 - *P. gypsicola*, winter rosette - Buenavista, Villa Juárez. 4 - *P. gypsicola* among *Dasyliirion longistylum* and *Selaginella*.

Table 3: Recorded Locations – see [Annex 1](#)
MER Analysis results: Score 2.189196311 =
Endangered of extinction (P) (see [Table 9](#))

***Pinguicula gypsicola* Brandege**

Published in: Brandege Univ. Calif. Publ. Bot.
4(11): 190, 1911.

No synonymy.

There is a wrong interpretation of the data collected by CA Purpus, registered in 1910 as Minas de San Rafael which is a former abandoned mining cattle ranch, located between the cities



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1 - *P. gypsicola* - vegetative reproduction in nature. 2 - Associated -*Turbinicarpus laui* - N Buenavista Villa Juarez. 3 - *P. reticulata* before blooming. 4 - *P. reticulata* - nursed by *Hechtia* sp - Los Ángeles II. 5 - *P. reticulata* - nursed by *Hechtia* sp - El Jaujal. 6 - *P. reticulata* - nursed by rocks - La Joya Guadalcazar.

of Cerritos and San Nicolás Tolentino, just north of Potrero de Santa Gertrudis, where the plant has also been reported; leaving a conclusion that *Pinguicula gypsicola* is only found in the western and southwestern highlands near the Sierra el Tablón, where it is associated with several endemic species of the same mountain. Ecology: The species has two morphologies

throughout the year, during the winter, when it generates a compact rosette composed of succulent non-carnivorous leaves, while in the wet season, spring and summer, it generates carnivorous leaves and enters the reproductive period. Habitat: it establishes only on rocks of gypsum (anhydrite) and soils derived from the geological



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1 - *P. reticulata*, nursed by rocks. 2 - *Dichromanthus cinnabarinus* (Orchidaceae) is highly associated. 3 - Associated: *Calochortus mendozae* (Liliaceae), Buenavista Guadalcazar. 4 - Associated: *Thelocactus tulensis*, La Ventana, Guadalcazar.

formation Guaxcamá, closely associated to submontane scrub, albeit not present under their canopy; however, it is present in the uncovered areas with high weathering; it is associated with *P. ehlersiae* and *P. takaki*, and other endemic species of the area such as *Calochortus mendozae*, *Sisyrinchium zamudioi*, *Tigridia catarinensis*,

Turbinicarpus laui, etc. (see **Table 8**)

Table 4: Recorded locations – see **Annex 1**
MER Analysis results: Score 2.18612209 = Endangered of extinction (P) (see **Table 9**)

Pinguicula reticulata Schlauer / *P. kondoi* Casper
Published in: *P. reticulata* (Der Palmengarten,



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1 - *Pinguicula takaki* flower - photo by Jacqueline del Rocío Cadena Martínez. 2 - *P. takaki*, habitat view. 3 - *P. takaki* captured an ant. 4 - *P. takaki* - plants can grow very close to each other.

55(3): 28 1991.) / Published in: *P. kondoi* (Feddes Rept. 85(1-2):1-6, f. 1-4 1974.)

These two species have caused some confusion over the years, *P. reticulata* is well distributed in collections and *P. kondoi* is known only from one herborized collection and its population has not been rediscovered since.

In 1995 Hans Luhrs compared the description of Jan Schlauer with herbarium specimens of *P. kondoi* and concluded that there were many similar characteristics in *P. reticulata* and therefore should be considered a synonym of *P. kondoi*, but apparently did not compare Hans Luhrs' original and unique collection of *P. kondoi*, using instead material from herborized collections of the Plant Resource Center, in Austin, Texas, US., which are of *P. reticulata*.

Ecology: Annual-biennial plant with succulent typical winter and presence of carnivorous leaves during the summer morphology. Habitat: different populations of what appear to be all *P. reticulata*, separated by huge distances and intermediate areas unsuitable for development and spread, but all were found at more than 1400 m and 2300 m altitude and

growing within desert rosetophyllous scrub composed mainly of *Dasyilirion acrotriche*, *Agave striata*, *Agave lechuguilla*, *Hechtia glomerata*, *Karwinskia humboldtiana* and *Fouquieria splendens*. (see **Table 8**).

Table 5: Recorded locations – see **Annex 1**
MER Analysis results: Score 1.714448836
=Threatened (A) (see **Table 9**)

***Pinguicula takakii* Zamudio & Rzed.**

Published in: *Phytologia* 60(4): 260-262, f. 3 1986. "Tres especies nuevas de *Pinguicula* (Lentibulariaceae) de Mexico"

No synonymy

The species discovered by F. Takaki has a great similarity with *Pinguicula lilacina* Schlecht. & Cham. and also with *Pinguicula sharpii* Casper and Kondo, although it differs in leaf size and other almost imperceptible features; however, but the best way to differentiate it is by habit: the extremophile *P. takaki* occurs exclusively on weathered gypsum, quite different from *P. lilacina* and *P. sharpii* preferring limestone areas dominated by oaks, pines and cloud forest. Ecology: annual plant that has no vegetative



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morphology, presents autumn flowering and is virtually absent during the winter and part of spring.

Habitat: submontane scrub consisting mainly of *Dodonaea viscosa*, *Gochnatia hypoleuca* and *Ptelea trifoliolata*, but is presented along *P. gypsicola* in areas with low vegetation coverage and high weathering; its major nurses are *Selaginella* spp., *Brahea decumbens*, *Agave funkiana*, *Dasyllirion longissimum*, *Dasyllirion longistylum* and *Hechtia glomerata*.(see **Table 8**).

Table 6: Recorded Locations – see **Annex 1**
MER Analysis results: Score 2.14264383 = Endangered of extinction (P) (see **Table 9**)

1 - *P. takaki*, plant size 3cm, the captures - photo by Jacqueline del Rocío Cadena Martínez. 2 - *P. takaki* is highly associated with *Selaginella* sp. 3 - *P. takaki*, seedlings growing on pure gypsum.

Utricularia L.

The genus *Utricularia* is represented only by a single species growing in the arid and semi-arid San Luis highland, *Utricularia livida*, which is found in various permanent bodies of water usually around major mountain ranges which allow the creeks to flow in the valleys below and generate perennial water standstills that work like oasis in the desert.



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***Utricularia livida* E. Mey.**

Published in: Comm. Pl. Afr. Austr. 281 1838.

This genus if has the ability to capture its prey in vacuum in submerged sacks allowing the passage of a small insect or crustacean; once on position it is absorbed by the plant and assimilated into the small sack.

Ecology: The species is dependent on water bodies with slow water flow, is difficult to develop in eutrophic standing water areas; flowering occurs indifferently between spring and autumn, all depending on the rainy season.

Habitat: The main areas where this species is found are around the Sierra de San Miguelito,

1 - *Utricularia livida* - Rio la Laja Sierra San Miguelito. 2 - *U. livida*, Cañada de Lobo SLP. 3 - *U. livida*, Rio la Laja Sierra San Miguelito.

the Sierra Guanamé and the Sierra Bocas, where small permanent water bodies maintain an excellent ecosystem for the development of this species.

It is in grave danger of local extinction because of irrational use of water and the growth of the urban area, which favours the drying of natural water bodies where *U. livida* exists.

Scarce in all locations except the municipality of



Turbinicarpus laui

Villa de Reyes, where several hundred individuals were observed.

Table 7: Recorded Locations – see **Annex 1**

No NOM analysis is performed on this species due to the lack of data on its distribution and status of the plant in other states.

Conclusions

Overall, plants of the Lentibulariaceae family are found in arid areas facing a big problem with the modification of the habitat, overgrazing and continuous looting; all this should allow for the inclusion of these species in the NOM-059-SEMARNAT for adequate protection and enabling the support for propagation and correct in situ protection.

Likewise, the high dependency on nurse plants is denoted by close relation to the genus *Hechtia*, which facilitates their establishment and protects from sunburn, also many individuals growing on exposed rocks were observed, but these establish always in shaded areas where light sun does not reach them directly.

In this paper the analysis of nurse role played by rocks is omitted, since this works differently and requires different methods of sampling and analysis to be carried out soon.

After analysing the risk assessment we conclude that all species of *Pinguicula* mentioned in this paper should be included in the NOM-059-SEMARNAT, to facilitate protection and justification for defining the future protected areas.

Dedication

This work is dedicated to Dr. José Luis Flores Flores, without his help, friendship and teaching, I would have not been able to complete this research, thanks.

Annexes

List of recorded locations (**Tables 1-7**) – **Annex 1**

Analysis of biodiversity and nurse plant species (**Table 8**) – **Annex 2**

MER analysis (Methodology for Risk Assessment - Nom-059-SEMARNAT-2010) (**Table 9**) – **Annex 3**

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 www.pinguicula.org

Author’s Notes

- (1) Scientific names are presented without authors; they are in Table 8 – Annex 2
- (2) MER relationship analysis is in Table 9 – Annex 3.

Editor’s Notes

(*) An **extremophile** (from Latin extremus meaning „extreme“ and Greek philia (φιλία) meaning „love“) is an organism that thrives in physically or geochemically extreme conditions that are detrimental to most life on Earth (**Wikipedia**).

(**) A **proboscis** is an elongated appendage from the head of an animal, either a vertebrate or an invertebrate. In invertebrates, the term usually refers to tubular mouthparts used for feeding and sucking. In vertebrates, the term is used to describe an elongated nose or snout (**Wikipedia**).

(***) **Nodricism** is the association between the nurse plant and the nursed plant.

three weeks in mexico

part one

march 31 - april 13



by **Aldo Delladdio**, Rovereto, Italy.

What follows is the travelogue of my most recent trip to Mexico, the twelfth I made to this beautiful country, from March 31st 2014 to April 21st 2014.

A few words of explanation are probably appropriate. When I started these travels in 2004, with my wife Daina first and then with my Italian friends too, anything we could see was exciting. I remember stopping the car on a curve of the road in Baja California and jumping off to take pictures of a *Ferocactus gracilis*. The first of millions. Things get more complicated if one wants to see plants that are very small and/or have a very small distribution: without precise information, finding them is almost impossible, although it can happen, as it happened to us. We found *Turbinicarpus klinkerianus* near the roadside of a major highway, after stopping the car to eat something. Unfortunately this information is hard to get, the main reason for this is the willingness to protect the plants, especially the recently

discovered species, or the more desirable, from illegal collectors. This is certainly a valid reason; however, as the great plant explorer Charles Glass used to say, bad people always manage to get that information, while good people are denied the pleasure of seeing the plants they love in their habitat. Published data is usually too generic to be useful, for example *Geohintonia mexicana*, Galeana, NL, means that the plant is located in the municipality of Galeana, which is more than 7,000 km² large. Luckily in recent years I have been able to establish contact with some people, both European and Mexican, who trusted me enough to share data. In the past few years, I also had the pleasure to spend some time with some Mexican friends and we have had really good time together. Having said all this, the information contained in this travelogue will still be generic enough not to endanger any plants, and I will also leave out some species we found, since their only mention here would cause too much controversy. However, I hope that despite this, it will encourage cactus and succulents enthusiasts to visit beautiful Mexico.



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1 - San Miguel de Allende, Guanajuato. 2 - Turbinicarpus pseudomacrole, Bellavista Del Rio, Querétaro. 3 - Turbinicarpus krainzianus, Presa de Zimapán, Hidalgo.

March 31 – From Ciudad de México to San Miguel de Allende, Guanajuato

My flight from Frankfurt, Germany, landed on time at half past five in the afternoon. Daina was waiting for me at the exit, waving a heart shaped balloon with the word “Bienvenido”.

We took the bus to Querétaro where we arrived after three hours, just in time to catch the bus to San Miguel de Allende, where we arrived at almost midnight.

April 1 – San Miguel de Allende

Spent the day relaxing (fig. 1).

April 2 – From San Miguel de Allende to Ixmiquilpan, Hidalgo (273 km)

We left San Miguel at 10 o'clock, after buying some provisions at the supermarket, and headed eastwards. We passed Ezequiel Montes and Cadereyta, without making a single stop, since it was already late in the day. However, we did



stop before Bellavista del Rio, Querétaro, just to check how *Turbincarpus pseudomacrochele* was doing. This time we found it in flower luckily (fig.2). We then descended to the Presa de Zimapan (dam). The zone in the proximity of the dam is militarized and you can't stop the car, not even for taking a picture of the lake. The dam marks the border between Querétaro and Hidalgo. If you are not the driver, you can lift your head and rapidly scan the vertical cliffs above the dam to see a few *Echinocactus grusonii* perched on the rocks. However, the best way to see them at close distance is to stop at a small fishermen dock located right when the road starts to climb and leave the lake. For a small fee, you can ask a fisherman to take you to see the "bisnaga amarilla". They know where they are, since there must be quite a few cactophiles asking for this service. If you are in the mood, and have the time, for some walk, there are some plants on the opposite side of the lake, which you can reach by walking along the shore. Having done this in 2012, this time we moved on and stopped after some kilometres to search for

4 - Canyon North of Presa de Zimapán, Hidalgo. 5 - My wife Daina and the Statue of Diana Cazadora (Artemis), Ixmiquilpan. 6 - *Turbincarpus krainzianus minimus*, San Andres Daboxtha, Hidalgo.

Turbincarpus krainzianus (fig.3). We found it on a hilltop, in company of *Ferocactus glaucescens*, *Astrophytum ornatum*, and a *Mammillaria* aff. *formosa*. The adult specimen weren't that many, but around them a lot of young seedling proved how quickly turbincarpi can reproduce if they are left undisturbed. From this hilltop we were also able to enjoy the magnificent view of a huge canyon (fig. 4). We arrived at Ixmiquilpan at about 21 o'clock, found a hotel one block from the zócalo (main square) and then went to eat in a restaurant in the zócalo. The restaurant was full of young people and the addition of high volume music made it very noisy. We asked a waiter whether there was a quieter place, and he told us we were already sitting in the quietest place. How lucky! The food was great though, and the cerveza de barril (draft beer) was fantastic.



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7 - *Echinocereus pulchellus*, *El Cubo*, *Hidalgo*. 8 - *Impressive Cephalocereus senilis* at *Grutas de Tolantongo*, *Hidalgo*.

April 3 - From Ixmiquilpan to Pachuca, Hidalgo (198 km)

We left the hotel at about 7 o'clock, but before leaving Ixmiquilpan we took a few pictures of the zócalo, and Daina posed beneath the bronze statue of Diana cazadora (Artemis) (fig. 5). We then moved in north-east direction. First we stopped not far from San Andre Daboxtha, to check a population of *Turbincarpus krainzianus* var. *minimus*. There were many plants (fig.6), and lots of seedlings, sometimes dozens of them all packed together, however, as it happened in October last year, we saw several plants in bud, but not a single open flower. Perhaps 10 o'clock was too early. This time we found a crested specimen though. After taking many pictures, we moved on to Cardonal, where we stopped to see whether the local *Turbincarpus pseudopmacrochele* population was in flower, but unlike the population of Bellavista, it wasn't. Moving further east we stopped at El Cubo. Here we had stopped in October to look for *Echinocereus pulchellus*, since I had very precise information of its whereabouts. I couldn't believe it was growing in the middle of an agave field (possibly *Agave salmiana*, this is pulque¹ zone) and very close to the houses. As a matter of fact, there was a lady with some sheep grazing around the agaves, and the land owner too. I asked him whether we could look for a small cactus, but he said no, we couldn't. This is very uncommon, since Mexicans are generally friendly with foreigners. Anyway, this time I moved straight to his house, hoping that he wouldn't recognize me after six months. My excuse was that I wanted to buy some pulque. While crossing the agave field, I saw a few magenta dots in the ground: they were there (fig.7). I continued to his house, but there was nobody home, only a dog barking inside the

courtyard. I retraced my steps, called Daina, who was waiting in the car, and then we photographed the plants at leisure. Without the flower it would have been more difficult to see them, since they are very green and very low in the ground, almost hidden by the grass. Apart from seeing plants, our main goal of the day was to spend some time at the fantastic resort of Grutas de Tolantongo. The place is famous for its thermal spring. Hot water is everywhere: one can relax for hours in the stream, the cave, and the (probably man-built) tunnel that seems like a dark, big Turkish bath (a waterproof flashlight might come handy). But for the cactophile there's another reason for visiting this place: the mountain slopes surrounding the stream are full of giant, impressive *Cephalocereus senilis* (fig.8). The locals have built some bungalows (cabañas) and several small pools next to them, so it's possible to enjoy the view of these magnificent plants towering above the rest of vegetation, while soaking in warm water. Obviously there are other species of cacti in the area, *Ferocactus glaucescens* and *Astrophytum ornatum* amongst them.

We left this beautiful place late afternoon and arrived at Pachuca by night. The reason we went there is that the following day we were due to explore the Barranca de Metztlán with a Mexican friend that lived in Pachuca. Since traffic is usually chaotic in large cities, we stopped at the first hotel we found near his house. We aren't picky at all in terms of hotels, but when I opened the door of our room, I almost fainted: there was an incredibly strong smell of naphthalene, probably covering an even worse smell. I almost couldn't breathe. Not only this, the room was windowless. How could a hotel have rooms without windows it's a mystery to me. Anyway, we asked for a room with windows, luckily there



9 - *Mammillaria gracilis*, north of Gilo, Hidalgo. 10 - *Turbinicarpus horripilus* ssp. *wrobelianus*, Gilo, Hidalgo. 11 - *Fouqueria fasciculata*, Gilo, Hidalgo.

was one available, went to eat at the nearest fast-food, and then slept with the window fully open.

April 4 - From Pachuca to Ixmiquilpan (342 km)

Our friend joined us at the hotel early in the morning and we headed north, to Metztitlán. Not long after leaving Pachuca we made our first stop at Mineral del Monte. This mining city is famous for its pastes (pastry), which look like a pocket of dough filled with many ingredients: meat, potatoes, vegetables, etc. Pastes were introduced in México by Cornish miners. The next stop was at the northern edge of the Barranca de Metztitlán, south of Gilo. Our goal was to try again to find *Mammillaria humboldtii*, one of the failures of the October 2013 trip. After two and half ours of searching all I found was a fairly large

population *Coryphantha octacantha (clava)*, so we gave up, and, in desperation, went to the village of Gilo to look for some help. After explaining what we were doing in Gilo, our friend managed to convince an old man to take us to the place where he said a small white cactus was growing. If I understood correctly, he called it "bolahilo", ball of thread. We immediately thought: it must be it. He took us on a very narrow road north of Gilo, and then in a wood. After a walking around for quite a while, Daina cried: "I found it". We rushed where she was staying, but to our disappointment what we saw was *Mammillaria gracilis* (fig. 9). I wasn't too disappointed after all, since I had never seen this species in habitat and I had no idea that it was growing under the shadow of trees, amongst dead leaves. The plants were single or forming small clumps. On my



12 - Pinal de Amoles, Querétaro. 13 - *Wilcoxia schmollii*, Vizarrón, Querétaro.

return I gave away my 40 cm pan of *Mammillaria gracilis*: too different looking from the plants I saw in habitat.

On the way back, the old man was pointing us to plants that had medicinal use, but unfortunately I didn't take any notes. After saying goodbye, (he refused the tip I offered him), we went down the barranca in direction of Almolón. We had been here in October, but I wanted to see whether the plants were in a different status. In fact, *Turbincarpus horripilus* ssp. *wrobelianus* (fig. 10) and *Astrophytum ornatum* were in flower, while *Ferocactus glaucescens* were already fruiting. Although we missed *Mammillaria humboldtii*, there were many mammillarias to be seen here: *Mammillaria geminispina*, *Mammillaria schiedeana*, *Mammillaria longimamma*, none of them in flower unfortunately.

But, in my opinion, the species that really stand out here, are the succulents, apart from *Agave striata* and *Agave xylonacantha*, the most impressive ones are *Fouquieria fasciculata* (fig. 11) and *Bombax ellipticum*, growing next to each other with their large caudices, the "seedlings" looking nicer than the old plants actually.

All these plants were growing on rather steep slopes, very difficult to climb. Thinking that perhaps *Mammillaria humboldtii* was living further up, we decided to go back in direction of Metztlán, and spend a couple of hours exploring the barranca on the rim above the point we were now, but again, no success.

We then returned to Pachuca to leave our friend, we made our final stop in Ixmiquilpan. We stayed at the same hotel, and had dinner at the same restaurant. The restaurant was even more crowded and noisier than two nights before, since it was Friday night, but this time there was a band playing *musica ranchera*, so we enjoyed ourselves.

April 5 - From Ixmiquilpan to Pinal de Amoles, Querétaro (269 km)

It was our intention to cross the Sierra Gorda up to Xichú, but since it was impossible to drive all that road and make some useful stops, we decided to set our final destination of the day at Pinal de Amoles, which is a beautiful little mountain town in the middle of the sierra (fig. 12). There are various attractions near Pinal, Puende de Dios amongst them, and a natural rocky bridge above the Rio Escanela, which we visited in 2012. Before arriving at Pinal, we made our first stop north of Vizarrón, to check whether *Wilcoxia schmollii* was in flower, but the flowering season we already over, with fruits already forming (fig. 13). We continued north and then turned east, to Maconi. Several kilometers from Maconi, overlooking the canyon formed by the Rio Moctezuma, a tributary of the Presa de Zimapan, lives *Strombocactus corregidorae* (fig. 14a, 14b). I had already seen this species the year before, but I wanted Daina to see it. However, when we were there, she refused to walk any further, since the slope was too steep, and the stones easily detached from the ground (fig. 15). All the way here for nothing!

The view was gorgeous though (fig. 17). We returned back to the Road 120 and continued north. South of Peña Blanca we stopped to visit a population of large *Strombocactus disciformis*, living near a river bed in company of *Lophophora diffusa* (fig. 16), *Mammillaria parkinsonii* and *Thelocactus leucacanthus* var. *schmollii* (the magenta flowered *leucacanthus*).

We stopped again some kilometres north to check another population of *Strombocactus disciformis* (fig. 18), again living next to a river bed (fig. 19). Daina and a friend discovered this population by accident in 2005, while I was rushing up to a nearby hill and they were waiting



14a



14b

for me. I had actually found two small plants of *disciformis*, both in flower, living on schist, on the other side of the hill, and while descending it I was laughing thinking about the two poor girls that stayed there, but it turned out that they found hundreds of plants not far from the car. I have never seen any water in the riverbed, but there must be a lot at certain times of the year, since every time we visit this location, the river banks look heavily transformed, with hundreds of plants washed away each time. Only the plants high up in the canyon are left in place, probably re-populating the lower areas in favourable years. We were on our car again, starting the long

14a & 14b - *Strombocactus correjdorae*, *Maconi*, *Querétaro*.

uphill road that climbs the Sierra Gorda up to 2548m, the Puerta del Cielo (Heaven's Door), a sort of big cut in the mountain, being the highest point, and then descends to Pinal the Amoles, where we arrived at 20 o'clock.

April 6 - From Pinal de Amoles to San Miguel de Allende (271 km)

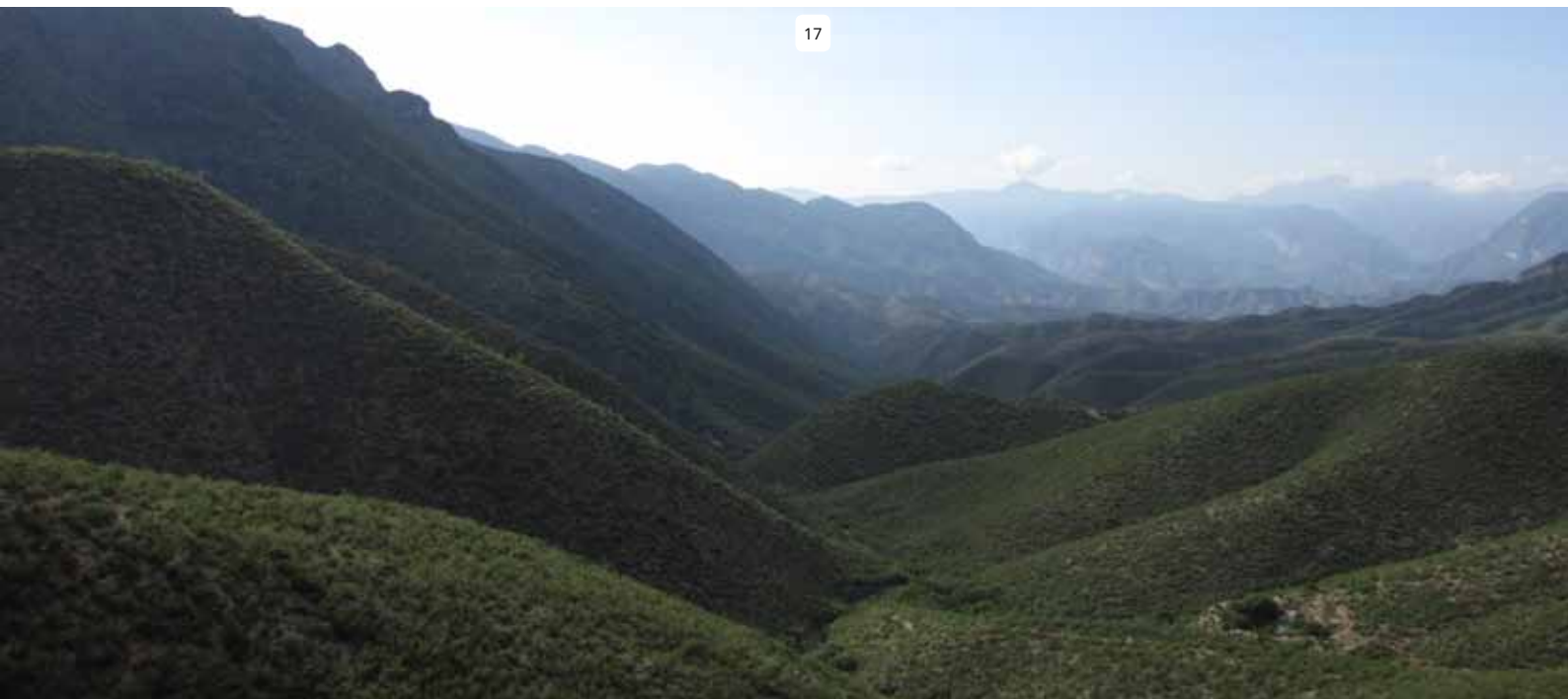
After looking on the map, I had planned to cross the Sierra Gorda via Santa Maria de Los Cocos-Atarjea-Xichú, but I had no idea how the



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road would be, since I had never done it before. However, the previous day, while driving uphill to Pinal, I noticed a new road going from Camargo to Atarjea.

As it happens rather often in Mexico, the map indicates an unpaved road (terraceria), and you prepare yourself for some suffering, but find a completely new paved road instead, which allows to save a lot of time and to spend it exploring. We left the hotel at 7 o'clock and went back to Camargo, and then we took the new road to Atarjea. Unfortunately after not many kilometres the paved road ended, and the terraceria started. The road wasn't bad at all, but this didn't prevent us from getting a flat tyre. After replacing the wheel we continued slowly until we reached Atarjea. There wasn't any tyre repairing shop (vulka) in Atarjea, so we went back, slowly, to Manga Cuatas where we finally found one. All this caused a considerable delay, which forced us to change plans. Rather than going to Xichú, we headed for Santa Catarina and the paved road. Along the way, we stopped at a river bed; there was a trickle of water flowing, where I saw a population of *Strombocactus esperanzae* in

15 - Habitat of *Strombocactus correjidorae*, Maconi, Querétaro. 16 - *Lophophora diffusa*, south of Peña Blanca, Querétaro. 17 - View of the Sierra Gorda, Querétaro.

October 2013. This time however, some of the plants were in flower (fig. 20). We then continued to Santa Catarina on a very scenic route (fig. 21). We arrived to Santa Catarina at half past four, so we still had some time to spend before returning to San Miguel de Allende. I decided to drive to Pozos and show Daina *Mammillaria herrerae* var. *albiflora* (fig.22), growing together with *Mammillaria perbella* (fig. 23). We then took an unpaved road that lead stright to the Highway 57, stopping for a few minutes on the spot where we saw our first *Ferocactus latispinus* back in 2005. Unfortunately I couldn't revive the excitement of that time. We arrived at San Miguel de Allende at half past nine in the evening.

April 7 - San Miguel de Allende
Day of rest.



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18 - *Strombocactus disciformis*, north of Peña Blanca.
 19 - Habitat of *Strombocactus disciformis*, north of Peña Blanca.
 20 - *Strombocactus esperanzae*, West of Atarjea, Guanajuato.
 21 - Road from Atarjea to Santa Catarina.

April 8 – From San Miguel de Allende to Cerritos, San Luis Potosí (316 km)

We left San Miguel very late, at 14 o'clock, but didn't make a single stop until we arrived at Charco Blanco, three and a half hours and 250 kilometres later. We stopped for a few minutes to check a small population of *Turbincarpus klinkerianus* (fig.24) we found by accident in 2005, after stopping at the roadside to eat something. This population is located twenty meters off the Highway 57, but it's still there, after many years we have been checking it, in company of various other cacti: *Stenocactus sp.*, *Mammillaria sp.*, *Echinocereus aff. penthalopus*, *Echinocactus platyacanthus*.

It was rather late in the day; however, we found the time to drive east of Guadalcázar to look for *Turbincarpus knuthianus* (fig.25). We could barely photograph the plants, since it was already getting dark. We went back to our car and drove to Cerritos to spend the night. We arrived to Cerritos at 22 o'clock, and luckily found a place where we could still eat something.

April 9 – From Cerritos to Matehuala, San Luis Potosí (249 km)

We left the hotel at 8 o'clock and spent the entire morning looking for *Turbincarpus laui* south-west of Cerritos and then south of Villa

Juarez, but found only one plant. A population we saw in 2011 seems to have been erased. Whether that happened for natural causes or human activities is unknown.

Unfortunately finding *Turbincarpus xmombergeri* still remain an unsatisfied dream.

After this almost total failure, we went back to the Highway 57 and headed north towards Matehuala. We made a stop along the way to see *Ariocarpus bravoanus* (fig.26). This plant has been decimated by illegal collecting in recent years, however, it's still possible to find fairly large specimens. I think that when the excitement about a new species subsides, and its locality is left undisturbed for some years, that species is actually able to recover, thanks to the seed bank in the ground.

We arrived at Matehuala at 19:30.

April 10 – From Matehuala to Galeana, Nuevo León (285 km)

We left Matehuala at 8 o'clock, after a quick breakfast at the nearest OXXO (2), and drove eastbound in direction of Dr. Arroyo. We made



our first stop at the type locality of *Turbinicarpus macrochele* (fig.27), a locality we always visit when we drive along that road. Here too, the number of plants seemed to be declining in previous years, however, now it seems to be recovering, since we find more and more plants lately every time we stop.

Once in Dr. Arroyo we turned north-east, on the NL 2 road, in direction of Aramberri. We stopped south of La Escondida to see *Turbinicarpus subterraneus*. Unfortunately flowering had just finished (fig. 28). We stopped again just before Aramberri to take pictures of *Echinocactus platyacanthus*. The hills were full of plants in flower (figs. 29, 30). We didn't stop in Aramberri though, but continued north, to Joya de Bocacelly. My goal was to find *Turbinicarpus hoferi* and I had an old drafted map of the place where it was growing, but after 2 hours of walking on a steep gypsum slope, all I found was *Mammillaria picta*. This was my second unsuccessful attempt to locate it. While returning to the car on a different route, I stumbled on a large *Echinocactus texensis* in flower (fig. 31). Once at the car, I had to spend another hour looking for Daina, since she refused to walk on the steep gypsum slopes and decided to explore the valley floor instead.

We returned to Aramberri, then to La

22 - *Mammillaria herrerae* var. *albiflora*, Pozos, Guanajuato. 23 - *M. perbella*, south-east of Pozos. 24 - *Turbinicarpus klinkerianus*, Charco Blanco, San Luis Potosí. 25 - *Turbinicarpus knuthianus*, Guadalcazar, San Luis Potosí.

Escondida, and finally headed north, to Galeana. At La Ascensión we turned west, and stopped after a few kilometers near a forest. Here, at 2059 m altitude, we found *Turbinicarpus beguini* (fig. 32), *Escobaria missouriensis* var. *asperispina* (fig. 33) and large clumps of *Echinocereus parkeri* (fig. 34), all in flower.

We arrived in Galeana at 21 o'clock, dropped our bags at the usual hotel and then went to eat at a restaurant full of pictures of Pancho Villa, where we had an excellent dinner (fig. 35).

April 11 - From Galeana to San Miguel de Allende (539 km)

We left Galeana at 8 o'clock and went westward, in direction of San Roberto and Highway 57.

Our first stop was several kilometres east of San Roberto to find *Echinocereus sharpii*. After walking around for some time we found a single plant (fig. 36). Unfortunately flowering had just finished, and the plant was low in the ground and hidden in the grass. I'm sure we would have found many more if they had been in flower. We then went to a gypsum hill where in 2006 I found



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a population of *Gymnocactus beguinii* in company of my friends. Before we arrived to the northern side of the hills, we found some large *Ariocarpus retusus* we had completely missed in 2006. The *Gymnocactus beguinii* were in good shape (fig. 37), alas, flowering had just finished, but I got the impression there were many more pines and yuccas on this hill years before. We returned to our car and stopped one more time just before arriving to the Highway 57 to take pictures of more *Ariocarpus retusus* growing with *Mammillaria formosa*.

Our original intention was to go further up

26 - *Ariocarpus bravoanus* - Nuñez, North of San Luis Potosí. 27 - *Turbinicarpus macrochele*, West of Dr.Arroyo, Nuevo León. 28 - *Turbinicarpus subterraneus*, La Escondida, Nuevo León. 29 - *Echinocactus platyacanthus*, Aramberri, Nuevo León. 30 - Hills with *Echinocactus platyacanthus* in flower, West of Aramberri, Nuevo León. 31 - *Echinocactus texensis*, Joya de Bocacelly, Nuevo León.

north, however, the engine of our ancient Jeep Cherokee (with more than 260,000 miles), had started to go by fits and starts the day before during the ascent to La Ascension. The problem seemed to have disappeared when we left



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34



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32 - *Turbincarpus beguinii*, La Ascensión, Nuevo León. 33 - *Escobaria missouriensis asperispina*, La Ascensión, Nuevo León. 34 - *Echinocereus parkeri*, La Ascensión, Nuevo León. 35 - Restaurant La Casona del General - Galeana, Nuevo León.

Galeana in the morning, so I gave the blame to the last tank filling, but unfortunately here it was again. Worrying that we would end up being stranded in the middle of nowhere, we decided to go back to San Miguel de Allende, so we turned south, with the engine's RPM suddenly dropping from time to time, but not dying completely.

Despite this problem, we made another stop near the border between Nuevo Leon and San Luis Potosí to look for *Turbincarpus valdezianus*. We found several plants near a hilltop (fig. 38).

We then continued south and stopped again to have lunch at a roadside restaurant (Parador) where we had an excellent traditional goatling meal (cabrito) (3). We normally eat some fruits, tortillas, etc. while driving, but this time we could take it easy.

We made it to San Miguel at half past eight.

April 12 - San Miguel de Allende

First thing in the morning I took the car to a mechanic to get it fixed. Unfortunately there was no way that they would repair the car shortly,

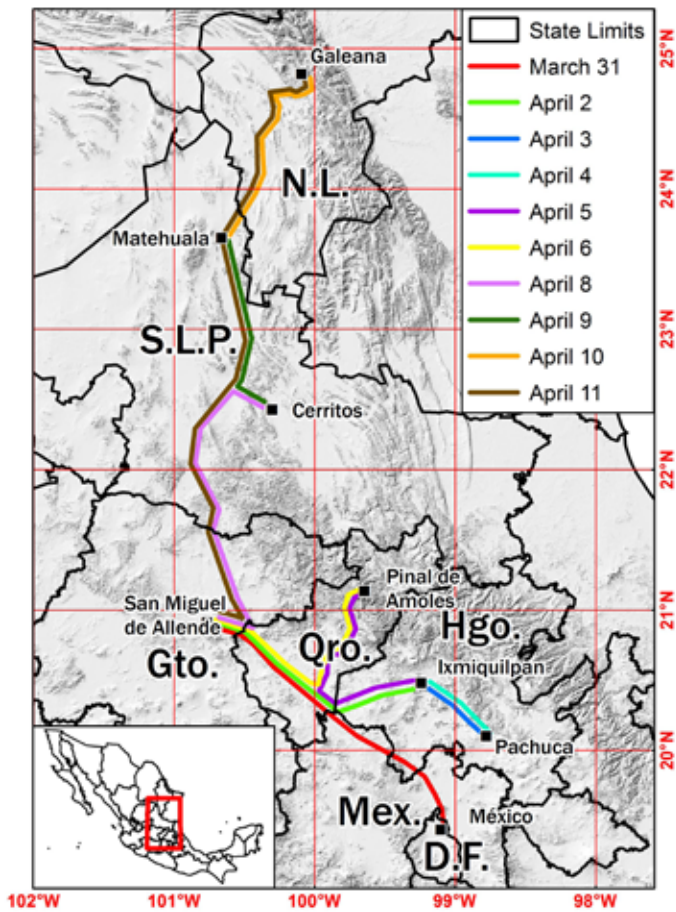
since the following week was the Holy Week (Semana Santa), and in Mexico it's holiday the entire week. So I left the car there and returned home by bus.

We then started looking for a car rental, but there were two problems, the first was that due to the holidays, car availability was lower than usual, and second, more important, no car rental company was offering an all-terrain car. I knew this, but I tried nevertheless. Despite the fact that all their web pages offer SUVs, this is a deception, since they aren't 4x4, they are good for bar cruising perhaps, but not for the type of roads we usually travel on.

After spending a lot time on the internet and on the phone, I settled for a 2x4 "SUV", available at the airport of Querétaro.

April 13 - San Miguel de Allende

A friend took us to the airport of Querétaro where we collected the car. Here another big disappointment: the spare wheel was really a "small" wheel. Only a madman would drive a car



First part of the travel, 31 March - 11 April (map created by Miguel Angel González Botello).

with a small spare wheel in the remote areas of Mexico. I had no choice and took the car.

Bibliography

- 1) Piante Grasse 30(4): 186 (182-183; photos). 2010 [Oct-Dec 2010]

Editor's Notes:

(1) **Pulque** is an alcoholic beverage made from the fermented sap of agave plants. It is traditional to central Mexico, where it has been produced for millennia. It has the color of milk, somewhat viscous consistency and a sour yeast-like taste. ([Wikipedia](#))

(2) **OXXO** is a primarily franchised chain of convenience stores from Mexico, with over 11,000 stores across Latin America.

(3) **Cabrito**, a word of Spanish origin, refers specifically to young, milk-fed goat.



36 - *Echinocereus sharpii*, San Roberto, Nuevo León.

37 - *Turbinicarpus beguinii*, San Roberto, Nuevo León.

38 - *Turbinicarpus valdezianus*, Puente Orégano, Nuevo León.

an example of evolutionary regression



By **Andrea Cattabriga, Bologna, Italy**. Email a.cattabriga@mondocactus.com

This late summer I found two interesting curiosities in my greenhouse. They are the fruits of two distinct specimens of *Epithelantha micromeris* ssp. *greggii* SB 321 which I grow for many years. Both had fruit with typical stem morphology: elongated tubercles and areoles with tufts of spines. This is a phenomenon of evolutionary regression, since in fact the fruit of cacti is a transformed branch, but it's really rare that in the Cactoideae, the "advanced" Cactaceae, the typical anatomical features of the corm are shown again, as it commonly happens in the "ancient" Opuntioideae subfamily where fruit shows clearly as a shortened branch with its areoles, spines and leaves primordia.



contents →

iconography of agave univittata haw. and agave lechuguilla torr. (agavaceae)



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Introduction

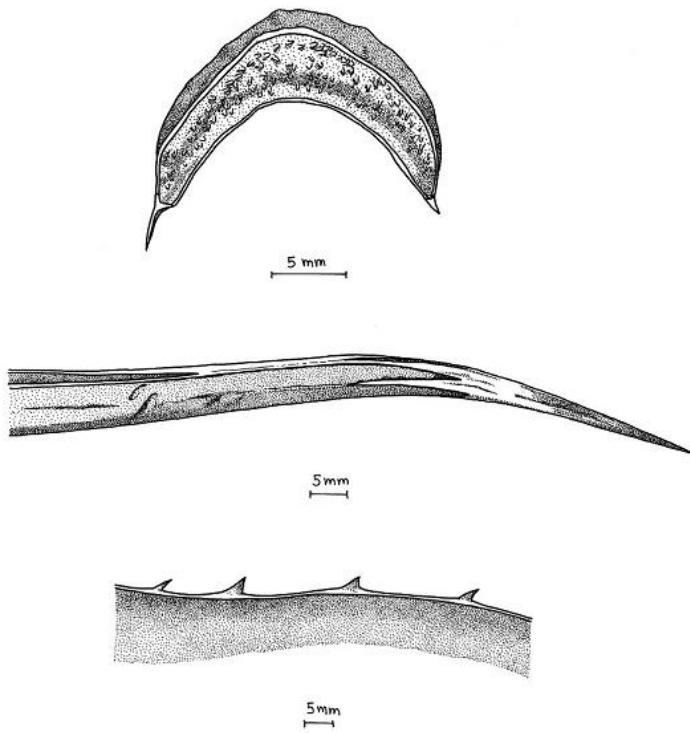
In this paper we will present an iconographic work on *Agave univittata* Haw. and *Agave lechuguilla* Torr., and a group of horticultural varieties and forms of specimens grown as ornamentals in the Iberian Peninsula, illustrated by Charles Puche. Some of these horticultural forms have been represented for the first time in this paper. We continue, from a taxonomic point of view, to describe the varieties of *Agave univittata* according to Breitung (1968), with regards to the species as defined by Govaerts (2014) (Gentry, 1982, in the most important work on this genus and the natural range of these species, is including *A. univittata* in the synonymy of *Agave lophantha*).

Recently several studies focusing on the study of this group of taxa have been published: the species *Agave lophantha* in Spain (Guillot & van der Meer, 2013), have designated a new cultivar, *Agave lechuguilla* 'Daniel Guillot' (van der Meer & Puche, 2013), and have signified the cultivar 'Quadricolor' (Puche, 2014).

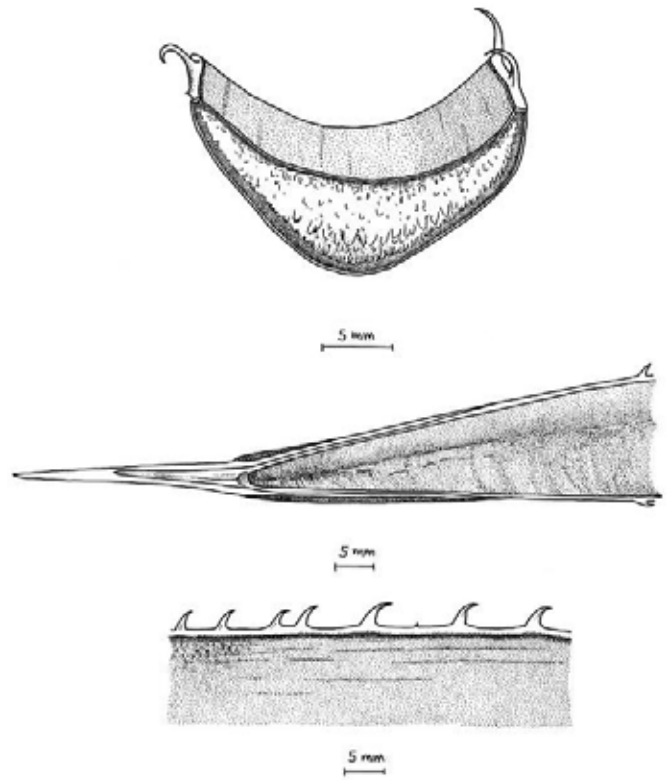
Agave univittata Haw.

A. univittata Haw. (*Agave lophantha* Schiede), also referred in the English literature as the Thorn-crested Agave or the Big Lechuguilla, (University of Texas, 2008), has been grown in Spain since the nineteenth century XIX (Guillot & van der Meer, 2005). It grows naturally in the Rio Grande Valley in Texas in Starr and Zapata counties, where it is a locally rare species flourishing on sandy hills. Its range continues in Mexico, in the state of Veracruz, at altitudes of 100-5000 feet (30-1520 metres) in limestone formations (Irish & Irish, 2000). According to Gentry (1982) (referring to *A. lophantha*), this species has the following characters:

"Small, radiate, single or surculose rosettes, 30-60 x 50-100 cm, the old sometimes with visible stems; leaves numerous, generally 30-70 x 3-5 cm, patulous, light green to yellow-green, with or without pale mid-stripe, linear to lanceolate, rather thin, pliant, somewhat thick toward base and rounded below, plane to concave above; margins corneous, undulate to crenate, the teeth single or



Agave lechuguilla leaf section, margin and apex.



A. lechuguilla var. *coerulescens* leaf section, margin and apex.

occasionally double on broad low nipples, straight or mildly curved, slender, mostly 4-8 mm long and 1-2 cm apart; spine small, 1-2 cm long, subulate, ferruginous to gray, flattened above at base; spike 3-4.5 m tall, slender, with flowers in upper half of shaft, single or paired on single or dichotomously branched pedicels 5-10 mm long, or in clusters of 3-7 on short lateral peduncles; flowers light gray glaucous green to yellow, 35-47 mm long; ovary fusiform, 18-22 mm long with neck short or long (5-7 mm) and constricted; tube short, open, 2-4 mm long, 8-10 mm wide; tepals subequal, erect to ascending, 14-20 mm long, persisting erect around filaments; filaments 30-45 mm long, greenish or lavender, spreading, inserted at level of inner tepals on rim of tube; anthers 15-20 mm long, pale yellow; capsules oblong, 18-24 x 10-12 mm or orbicular 15-20 x 12-18 mm, sessile or on short (2-3 mm) slender stipe; seeds crescentic, 5-6 x 3-4 mm, the faces with wavy ridges, the edges with raised margins."

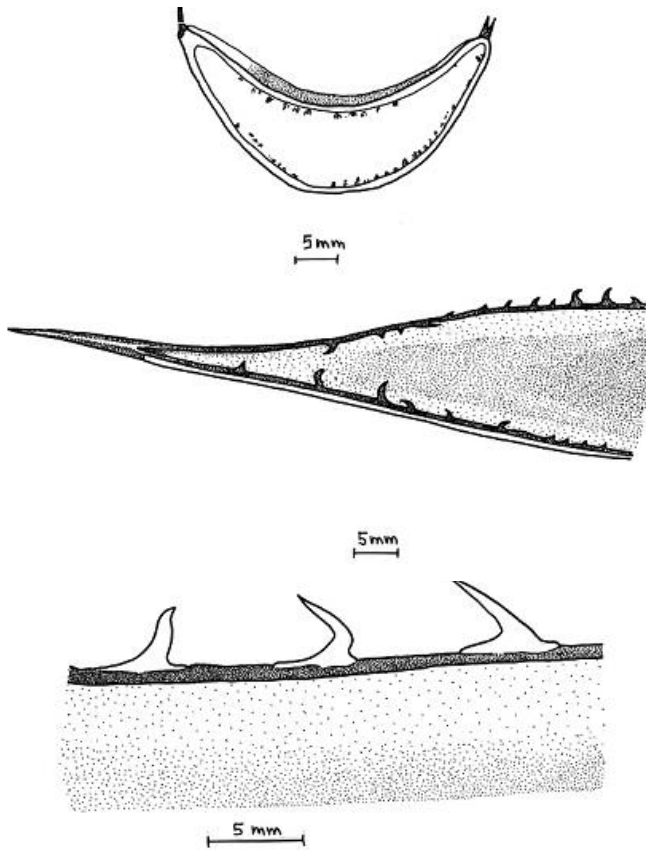
Agave lechuguilla Torr.

Agave lechuguilla Torr. dwells naturally in the United States in southern New Mexico and Texas, and in Mexico in Chihuahua, Coahuila, Nuevo Leon, Tamaulipas, Durango, Zacatecas, San Luis Potosí, Querétaro, Hidalgo and Mexico DF (Thiede, 2001) in associations with xeric scrub plants, desert scrub and microphyll rosette desert scrub (SIRE, 2014). It covers in Mexico an area of 142,115 sq. km (Pando-Moreno & al., 2004). According to Gentry (1982) *Agave lechuguilla* is: "Small, widely suckering, rather open,

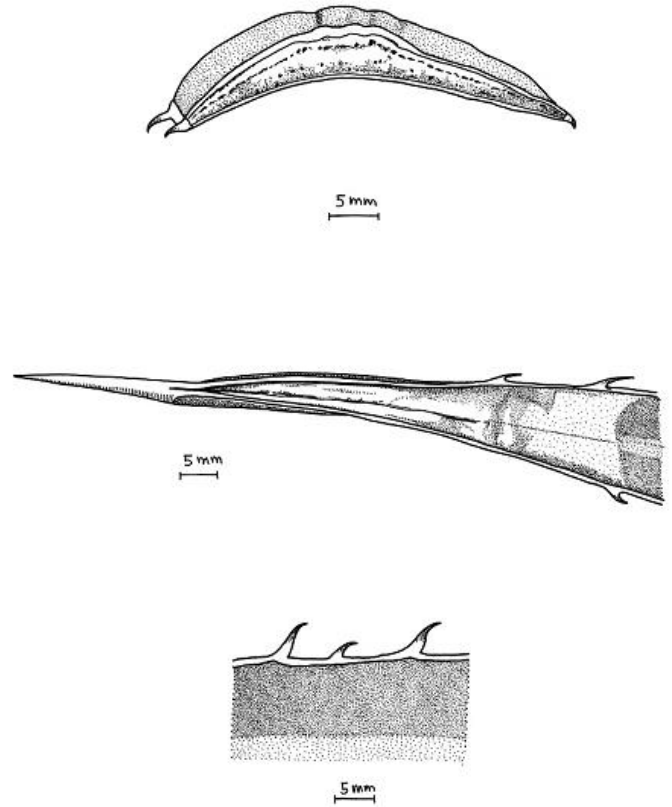
few-leaved rosettes, mostly 30-50 x 40-60 cm, with yellow or reddish flowers, freely seeding; leaves generally 25-50 mm x 2.5-4 cm, linear lanceolate, light green to yellow green, mostly ascending to erect, sometimes falcately spreading, concave above, deeply convex below, sometimes green check marked, thick, stiff, the margin straight continuous, light brown to gray, easily separable from dry leaf; teeth typically deflected, regular 2-5 mm long, brown or mostly light gray and weak-friable, mostly 1.5-3 cm apart, 8 to 20 on a side; spine strong, conical to subulate, 1.5-4 cm long, grayish, the short groove above at base open or closed; spike 2.5-3.5 m tall, the shaft generally glaucous, the flowers short pedicellate in twos or threes, rarely on longer (2-15 cm) paniculate several-many-flowered ascending laterals; flowers 30-45 mm long, yellow or frequently tinged with red or purple; ovary 15-22 mm long, fusiform, roundly angled, constricted at neck; tube 2.5-4 mm long, shallow, open; tepals subequal, linear, 13-20 mm long, ascending, involute around filaments, the outer widely overlapping the inner at base, thickly hooded; filaments 25-40 mm long, spreading; anthers 15-20 mm long; capsules oblong to pyriform, 18-25 x 11-18 mm, abruptly very short pedicellate or sessile, rounded and short-beaked at apex, glaucous; seeds 4.5-6 x 3.5-4.5 mm with small hilar notch and low fluted wing around curved side."

Ethnobotanical information on *Agave lophantha* and *Agave lechuguilla* and their infraspecific taxa

Lechuguilla has been along with samandoca palm



A. lechuguilla x A. scabra leaf section, margin and apex.



A. univittata leaf section, margin and apex.

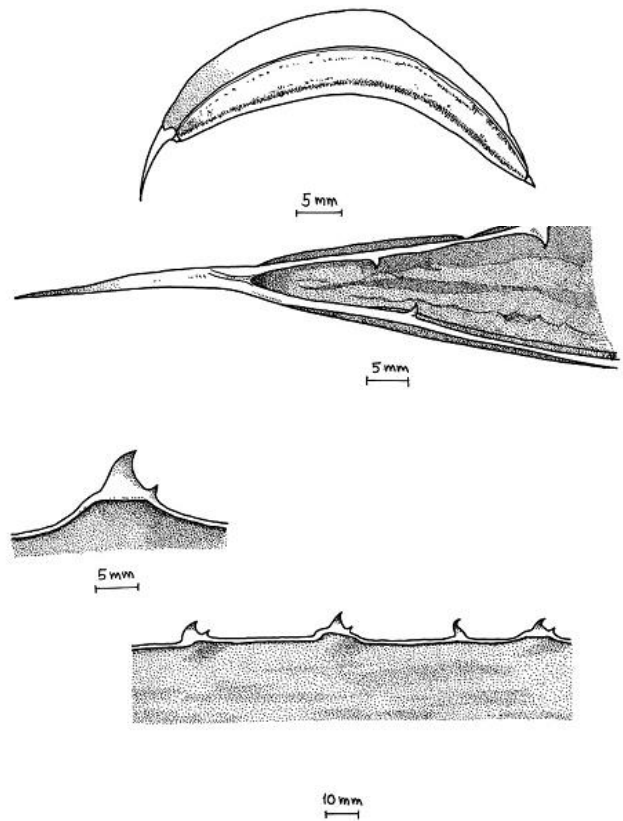
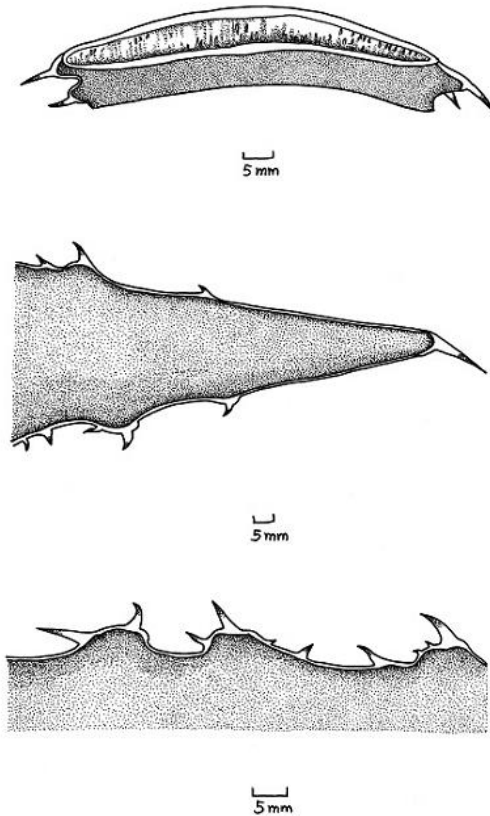
(*Yucca carnerosana*) a significant component of the material culture of the inhabitants of the arid zones of Mexico for millennia (Sheldon, 1980), having been collected intensively in this country since the nineteenth century, and still is even now a key element in the economy of many rural families (Reyes-Agüero & al. 2000). Archeological evidence indicates that lechuguilla fibre was used in the north-central Mexico in as early as 8080 B.C.; Frightful Cave (Cueva Espantosa) excavations in the centre of the state of Coahuila have unearthed large quantities of sisal rope sandals while ceremonial sticks made of floral stems of *Agave lechuguilla* and *Yucca carnerosana* have been also discovered in many places in Coahuila (Taylor, 1966, cf. Sheldon, 1980).

It has been exploited through the process of carving ixtle, as commonly the fibre is known, although the hard variety is commercially known as Tampico fibre (Naturalista, 2014). The use of the mechanical method in carving dates back to ancestral lechuguilla defibring by hitting the ground and pulling the stalk over barrel cactus spines (*Echinocactus* spp.); then the same procedure was continued on a board with inserted nails (Mayorga-Hernández & al., 2004). Lechuguilla fibre (sisal) is exported to countries in Europe, Asia, North and South America (Mayorga-Hernández & al., 2004). This material is used to make various products such as brushes for polishing metals, furniture upholstery and seating, rugs, carpets, automotive filters; when

mixed with resins it is used in the manufacture of doors, ceilings, walls, sheets, shelves, and furniture (Mayorga-Hernández & al., 2004), also to produce conglomerates with synthetic resins used as building materials (Nobel & Quero, 1986). It also can be used as precursor of steroid sapogenins, such as smilagenin (Ricker & Daly, 1998). It is also used in the manufacture of ropes (Reveal & Hodgson, 2008) and ties, backbands, martingales, sacks, bales of cotton covers, mats, while leaves juice can be used as detergent (SIRE, 2014). We also found references to its uses as a medicinal plant used against internal injuries (e.g. kidney pain), macerated in water, along with other species; leaves are used for diabetes, and against bleeding (Biblioteca Digital de la Medicina Tradicional Mexicana, 2009). The water stored in this plant is rich in minerals and is often sold in Mexico as a sports drink, but the plant itself is poisonous to sheep, cattle and goats (Naturalista, 2014). It is a poisonous plant (Wagstaff, 2008) for cattle, being the dominant species in the Chihuahuan Desert (Reveal & Hodgson, 2008). From *A. heteracantha* rhizome vegetable soap was obtained in Mexico, for the same purpose *A. lechuguilla* leaves (Rose, 1897-1901) were used. The nectar of the flowers is a great nutrient in the diet of insects, bats and birds (Naturalista, 2014).

Taxonomy, history and varieties

Taxonomic relationships between these two species, and some of the taxa included in this



A. univittata var. *carchariodonta* leaf section, margin and apex.

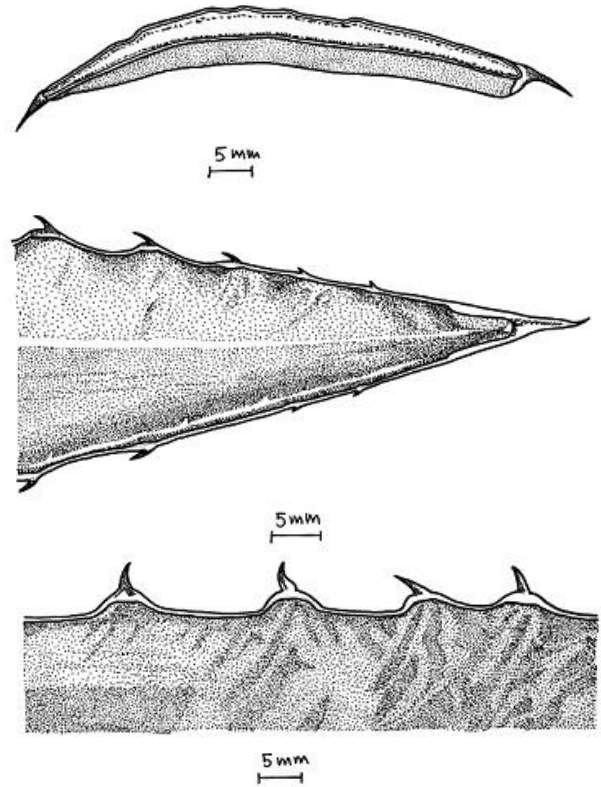
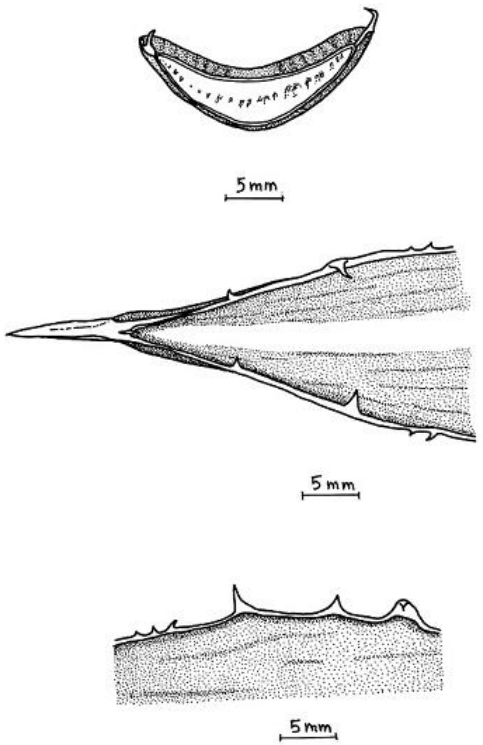
A. univittata var. *heteracantha* leaf section, margin and apex.

study, such as "*Agave heteracantha*" or "*Agave coerulescens*" (including the relationship *Agave lophantha* - *Agave univittata*, considered by some authors different species) have been complicated and variable, according to the authors who have addressed the group, having also been cited numerous taxa and / or cultivars throughout the nineteenth and early twentieth centuries. There are many horticultural forms offered by nurseries today, mainly of *Agave univittata* (often named as *A. lophantha*).

Some historical data of the nineteenth and the first half of the twentieth centuries can provide an idea of the taxonomic complexity of this group of taxa / cultivars. Schiede, when referring for the first time the species *Agave lophantha*, did not provide any description stating only that it was one of the two agaves growing in Malpais de Naulingo, Veracruz, Mexico [although the locality was incorrectly named, it is actually Malpais de Almolonga in Veracruz (Miguel Chazaro, pers. comm.), a place visited by one of the authors of this work, Piet van der Meer, where he observed the typical *A. lophantha*, with its yellow stripe in the centre of the leaf but also totally green specimens].

Kunth added something else: "*Caulix simplex, 2-pedalus, floribus flavescentibus dense coopertus, Schiede. Affinis A. univittatae C. Bouche*". Jacobi used in 1864 the name given by Schiede, but his description corresponds to *A. lechuguilla*

Torr. The same was applied by Berger in 1915. Trelease (in Standley, 1920), appears to be the first to provide us a description of *A. lophantha* Schiede, which can be applied to two or three other species. Baker (1888) distinguishes *A. lophantha*, *A. univittata* and *A. heteracantha* as different taxa: "*It was introduced by Schiede around 1840, is now known in collections, with many named varieties. It has flowered in Kew in autumn 1887. A. caerulescens Salm-Dyck is a variety with very glaucous leaves, which is related to the type through varieties subcanescens and grisea. A. funkiana K. Koch & Bouché seems to be a variety (...) (A. univittata). Hab. in Mexico, was introduced in cultivation in the 1830s, flowered in Kew in 1880, in the collection of Mr. Peacock at around the same time, and at Mr. Wilson Saunders in 1869. I cannot separate, using the description, A. ensifera Jacobi (...) (A. heteracantha) hab. in Texas and Northern Mexico (...). We have a specimen of Mr. Shaw, a plant that bloomed in the Missouri Botanical Garden in January 1885. The strong and short fibres of the leaves are used, as recounts Mr. Morris, in the manufacturing of brushes.*" Williams (1876) mentions this species as being cultivated as "*A. lophantha rubro-spina*", adding that "*it is usually in collections without this different name, but is clearly a variety of A. lophantha, and is different enough to merit attention. This plant produces larger leaves, which are also more oblique, but the difference lies in the margins and spines, instead of being white,*



Agave univittata var. *heteracantha* 'Multiacaule' leaf section, margin and apex.

Agave univittata var. *latifolia* leaf section, margin and apex.

are much longer and deeper red."

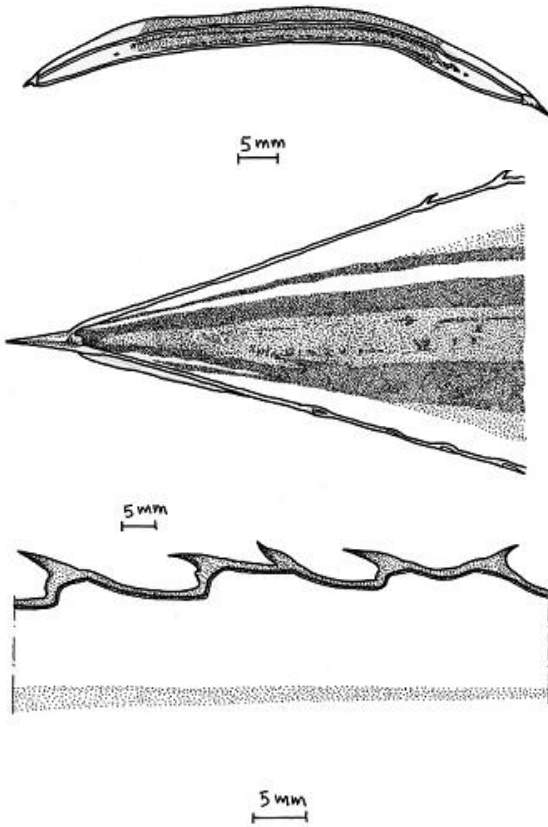
Mulford (1896) states: "A plant called *A. heteracantha* by Mr. Baker of Kew, was obtained from seeds sent to the Gardens about 70 years ago. It's not like our *A. lechuguilla*, but is strongly caulescent. Its shoots or stem branches are placed quite close to the substrate, giving a strange effect. This plant flowered here for the third time in January 1892. Has a very healthy appearance and is emitting right now shoots from two of the side branches."

Most recent authors, for example Irish & Irish (2000), indicate that *Agave lophantha* is often confused with *A. lechuguilla* with which hybridizes (Irish & Irish, 2000). For Mulford (1896) "it certainly shows affinities with *A. heteracantha* Zucc." *A. lophantha* is related to several taxa and is distinguished from *A. lechuguilla* by its leaves with a sinuous, wavy margin, the tubercles being usually armed with at least a double set of teeth, often more; *A. xylonacantha* is a coarser plant with relatively few leaf margins having marked tubercles and bent teeth in many forms. Some forms of the broadleaved *A. lophantha*, with crenate margins and long tubercles look like *A. xylonacantha*, and may actually be inseparable. The teeth of *A. lophantha* are consistently more elongated and more closely arranged compared to *A. lechuguilla* and *A. xylonacantha*, and seem finer than in *A. funkiana*. These four closely related taxa form a complex; plants of all forms possess broad leaf and clear stripes, but are not consistently present in some of them. Some

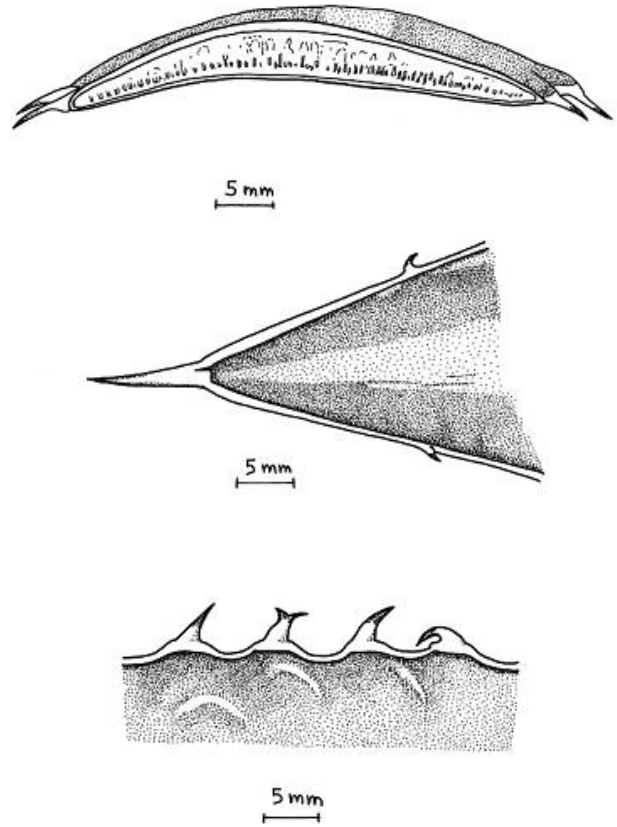
populations of *A. lophantha* show simple patterns while other form rosettes or grow in clusters, all developing apparent stems (Gentry, 1982).

Several varieties are cited in the botanical literature. Many of these plants are the result of hybridization to closely related species such as *A. xylonacantha* and *A. ghiesbregtii*. Plants known as *A. x perbella* Hort. are hybrids between *A. lophantha* and *A. xylonacantha* and plants known as *A. pulcherrima* Hort. may have been caused by the crossing between these same parents. *A. lophantha* var. *angustifolia* Berger has variegated leaves, *A. lophantha* var. *brevifolia* Jacobi has short leaves, of only 12 inches (30.5 cm) long, *A. lophantha* var. *coerulescens* (Salm-Dyck) Jacobi (*A. coerulescens* Salm-Dyck) (grown in Spain, and referred to in this paper), has light blue-grey leaves, *A. lophantha* var. *subcanescens* Jacobi has almost white leaf margins and spines (Irish & Irish, 2000).

With regard to *Agave lechuguilla*, Gentry (1982) indicates that Berger included in 1915 six varieties under *A. lophantha*, and in 1973 Rowley and Jacobsen transferred them to *A. univittata* Haw. Should probably be assigned to *A. lechuguilla* varieties. Silva-Montellano & Eguiarte (2003) suggest that a latitudinal gradient of the floral traits clearly vary in the species; southern populations have elongated, tubular, light flowers, which produce large amounts of nectar and are heavily visited by nocturnal and diurnal pollinators, unlike northern populations



Agave univittata var. *latifolia* 'Quadricolor' leaf section, margin and apex.



Agave univittata var. *latifolia* 'Splendida' leaf section, margin and apex.

which have shorter flowers, more open, reddish, producing smaller amounts of nectar concentrate and are less intensively visited.

Hatch (2013), in an article intended for documenting the varieties of the genus *Agave*, mentions numerous horticultural forms of *A. univittata* (as *Agave lophantha*) and *A. lechuguilla*. From *A. lophantha*: 'Bandaïd', 'Goshiki Bandai', 'Goldstrike', 'Latifolia', 'Coerulescens', 'Quadricolor', 'Marginata', 'Marginata Lutea', 'Picta Quadricolor', 'Ruths Gray Sword', 'San Carlos', 'Splendida', 'Wide Leaf'. Likewise he mentions the cultivar 'Akiro' (*A. lophantha* or *A. funkiana*) and the hybrids and possible hybrids: 'Green Gene' (*A. lophantha* x *A. colorata*), 'Awesome' (*A. lophantha* x *A. colorata*), 'Mateo' (*A. bracteosa* x *A. lophantha*), 'Mega Tooth' (*A. lophantha* x *A. xylonacantha*), 'Miel', (*A. colorata* x *A. lophantha*), 'Queen' (*A. lophantha* x *A. colorata*), 'Tiger Tooth' (*A. lophantha* x *A. xylonacantha*). From *A. lechuguilla*, 'Compacta marginata' and the hybrids and possible hybrids of *A. lechuguilla* with other species: 'Guadalupe Gracilis' (*A. lechuguilla* x *A. neomexicana*?), the aforementioned 'Perbella' (*A. lechuguilla* x *A. asperrima*), and on the other hand the cultivar 'Titan' (*A. carchariodonta* x *A. colorata*). In their natural environment *A. lechuguilla* hybridizes with *A. havardiana* Trel., *A. neomexicana* Wooton & Standl., *A. gracilipes* Trel. and *A. x glomeruliflora* (Reveal & Hodgson, 2008).

History in Spain

In Spain, *A. lechuguilla*, *A. univittata*, *A. heteracantha* and *A. coerulescens* are mentioned in some documents of the Botanical Garden of Valencia: "Seeds collected in 1893 and offered in exchange for other in 1894" and also in 1894 and 1895 (Guillén, 1894; 1895; 1896), in the document "Año 1903. Escuela Botánica" is mentioned *A. coerulescens*, in "Existing plants in the Botany College in 1901", in "Index of existing potted plants in 1904" and also in "Catalogus Seminum in Horto Botanico Universitatis Valentinae anno 1920 collectorum" (Beltrán, 1920), and *A. heteracantha* in 1929, 1930 (Beltrán, 1930, 1931) and 1936 (Quilis, 1936). *Agave lechuguilla* is mentioned in documents of the Jardín Botánico de Valencia: in "Catalogus Seminum in Horto Botanico Valentino anno 1878 collectorum", while *A. caerulescens* Salm-Dyck is mentioned in the final paragraph of "Plantae Vivae cum Aliis Commutandae" (Arévalo & Boscá, 1879), as well as in "Index Seminum quae Hortus Botanicus Universitatis Valentinae Pro Mutua Commutatione Offert. 1887" and the corresponding volumes for 1886 and 1888 (Arévalo & Boscá, 1886 a; 1886 b; 1887). In the document entitled "Seeds collected during 1888 and offered in exchange for other" (Arévalo & Boscá, 1888), is cited "*Agave coerulescens*" alongside *A. mexicana*.

In Spanish horticulture papers from the late nineteenth century, for example in Cortes (1885),



is mentioned *Agave univittata*.

Agave lophanta is mentioned in the catalog of the early twentieth century "*Catalogue with the planting calendar for seeds of vegetables, cereals, forage, trees and shrubs, palm trees, flowers and grasses of all kinds and countries*", simply stating "*Agave lophanta*" (Diez, 19 --). Also cited is "*Agave univittata* (Mexico)" (Kanda, 1948?).

Boscá (1892-1893) in a list of the specimens of the *Agave* grown in the Botanical Garden of Valencia, in the article "*Notes on some American plants grown in the Botanical Garden of Valencia*", is mentioning *A. heteracantha*, *A. lophantha* and *A. caerulescens*.

Materials and methods

For the development of this work, in terms of obtaining the specimens of species corresponding to infraspecific taxons, we have relied on extensive work, both in the field and visiting the main collections of succulents, as well as querying many Spanish and foreign nursery catalogues who sold their products in Spain, over 1000 in total, during the period from 2000 to 2014, acquiring live and exchange specimens

A. lechuguilla in a grassland in central San Luis Potosí.

from both Spanish and foreign nurseries. For each of the taxa we presented the origin of the specimens.

Furthermore, we relied in the allocation of infraspecific taxa to either species, regardless of the literature and information available on the Internet, mainly in field work of Piet van der Meer, who has observed during several campaigns in Mexico and the southern United States this group of taxa in their natural environment.

Results

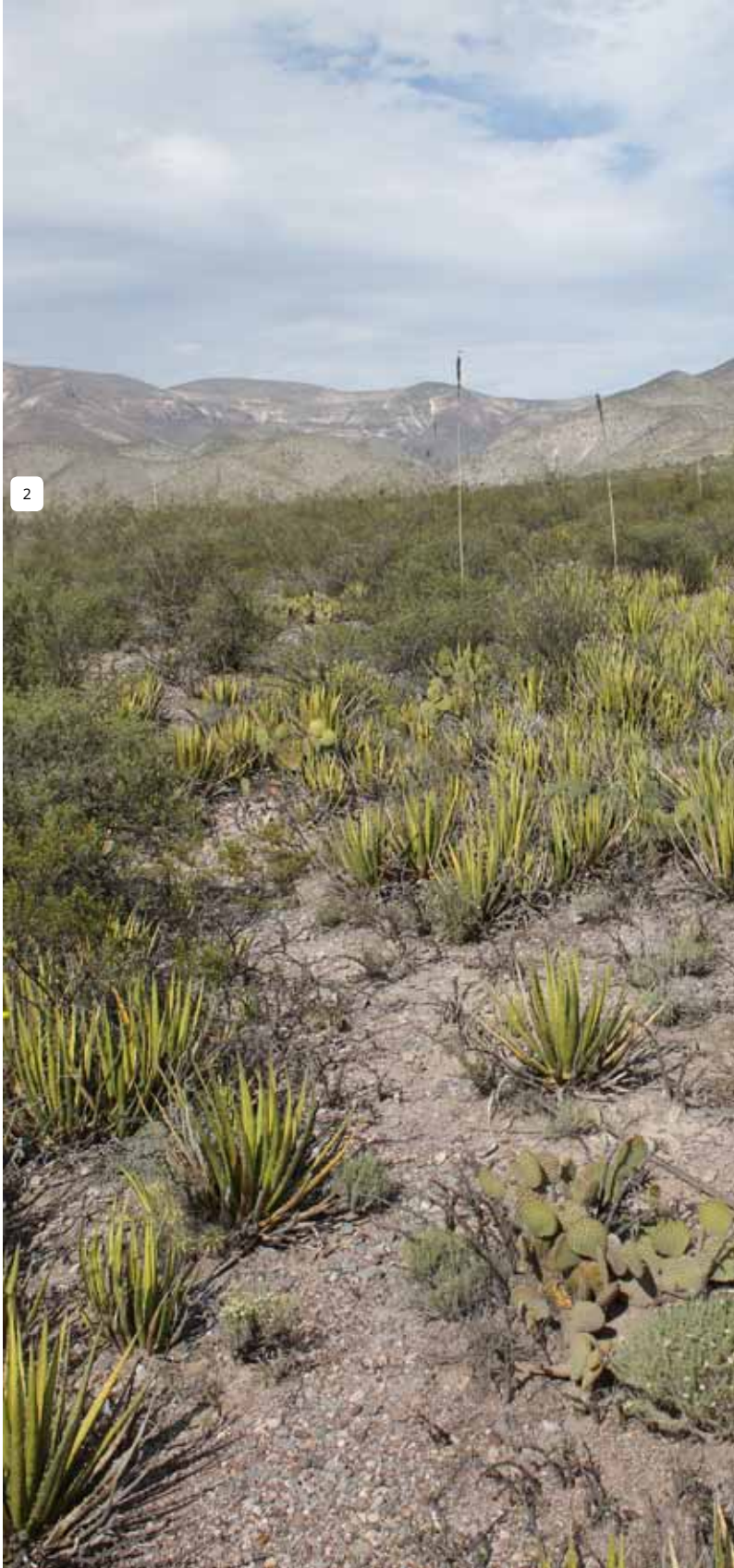
Depictions of the following species, varieties and horticultural forms are presented below:

1) Of *Agave lechuguilla* Torr.

- 1.1. *Agave lechuguilla* Torr., the type species, from specimens obtained from Patrick Bourain (February 2011) (Figs. 1-3).
- 1.2. *Agave lechuguilla* var. *coerulescens* P. van der Meer, D. Guillot & C. Puche comb. & stat. nov. (= *Agave lophantha* var. *coerulescens* (Salm-Dyck) Jacobi). Irish & Irish (2000) indicate that *A.*



1



2



3



4

lophantha var. *coerulescens* (Salm-Dyck) Jacobi (*A. coerulescens* Salm-Dyck) has clear blue-gray leaves. Specimens from the collection of Stef van Dort, Holland, in 2001. (Figs. 3-6).

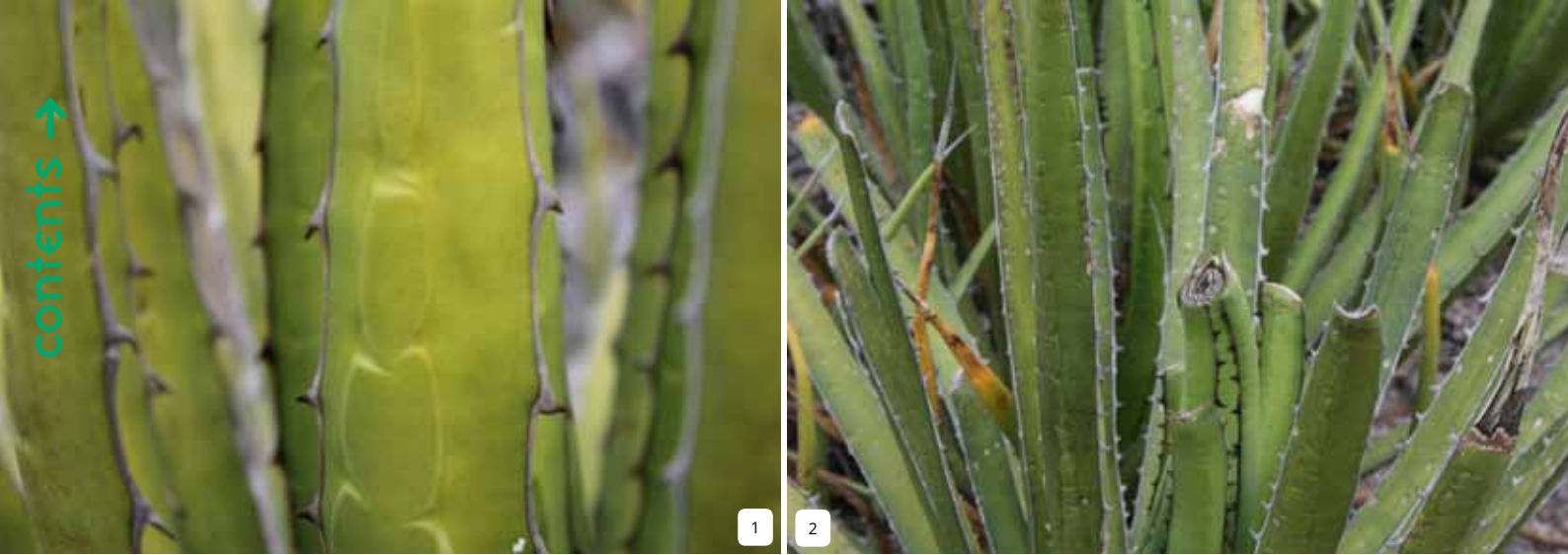
1.3. *Agave lechuguilla* Torr. x *A. scabra* Salm-Dyck. An intermediate form between the two species. Specimens received from the United States in 2006 (Figs. 7-9).

2) Of *Agave univittata* Haw.

2.1. *Agave univittata* Haw., the type species. Specimens acquired from Jean André Audisson

1 - *A. lechuguilla* in a rosetophilous desert shrub in northern San Luis Potosí. 2 - *A. lechuguilla* in a microphilous desert shrub in western San Luis Potosí. 3 - *A. lechuguilla* plantations for fiber manufacturing. 4 - *A. lechuguilla* plantations for fiber manufacturing.

(February 2002) (Figs. 10-12).
2.2. *Agave univittata* var. *carchariodonta* (Pampanini) Breitung (*A. carchariodonta* Pampanini): Similar to var. *latifolia* but is distinguished by the interrupted corneal



1 2 3

margin extending from the spine to the first couple of teeth and then half way to the base of the leaf (Breitung, 1968). Cultivated specimens from Valencia (Figs. 13-15).

1 - Detail of the lateral spines. 2 - *A. lechuguilla* renewing the central staff shoot after correct harvesting. 3 - Traditional fiber manufacturing from *A. lechuguilla* leaves.

- 2.3. *Agave univittata* var. *heteracantha* (Zuccarini) Breitung (*A. heteracantha* Zuccarini; *A. ensifera* Jacobi): it differs from the type by its gray-green or less red, longer, more variably curling leaves and teeth in pairs on fleshy prominences (Breitung, 1968). Specimens of Euthymius, Elche, Spain obtained in 2000 (Figs. 16-18).
- 2.3.1. *Agave univittata* var. *heteracantha* ‘Multiacaule’: exhibits blue-green leaves,

- is forming dense clumps, with leaves much smaller than *A. univittata*. Specimens from the collection of Anjani, India, in 2003, sent to us as “*Agave liliput*” (Figs. 19-21).
- 2.4. *Agave univittata* var. *latifolia* (Berger) Breitung (*Agave lophantha* var. *latifolia* Berger): It differs from the type by the armed broader leaves, with longer variably inclined and curved teeth

on fleshy prominences, without dark lines on the leaf undersides (Breitung, 1968). Specimens from the Spanish nursery Jadedflor, October 2000 (Figs. 22-24).

We include in this variety two cultivars presenting the following characters cited by Breitung (1968):

2.3.1. *Agave univittata* var. *latifolia* 'Quadricolor': a very distinguished and attractive agave of about 30.48 cm across and 15.24-20.32 cm length, with dark green leaves with yellow margins and light green central stripe (San Marcos Growers, 2014 a). Specimens from the collection of Anjani, India, received in 2003 with the name "*Agave kerchovei pectinata*" (Figs. 25-27).

3.2. *Agave lophantha* var. *latifolia* 'Splendida': this is a plant that forms tight groups of rosettes, of height and width of 45.72 cm, with 17.78 cm long and 5.08 cm wide leaves, dark green with a striking central stripe and greenish-yellow patterns underside and prominent teeth along the margins, producing a 365.76 cm high flower stalk bearing flowers with long stamens typical for the species (San Marcos Growers, 2014 b). Specimens received from Cactus Cachipay, Colombia, in 2006 (Figs. 28-30).

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agave potatorum and other xerophytes in tepanco de lopez, Puebla, Mexico



by **Francisco Moreno**, Puebla, Mexico.



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Some months ago I went to take a walk in a place around Tepanco de López, in Puebla, where there are some nice xeric plant species to see, and also two of my favorite agaves: *Agave potatorum* and *Agave kerchovei*. *Agave potatorum* is famous and widely used in some neighboring regions to produce “mezcal”, a popular alcoholic drink that burns but also brings

joy to the mouth, this is the reason this specie is called “maguey mezcalero”, also locally known as papalometl, papalomé and tobalá.

Its blue color, compact form and the shape of the short leaves makes it an interesting *Agave* species, which grows easily from seed and is hardy and highly ornamental.

As most other xeric species, it seems that this *Agave* grows bigger and taller in deeper soils, very probably as a result of more nutrients



2 - Agave potatorum. 3 - A bigger form of Agave potatorum growing in deeper soil. 4 - A smaller and more compact form of Agave potatorum growing in rocky soil. 5 - Leaves detail of Agave potatorum showing the fierce spines.

and humidity available to the plant, and on the contrary it grows more compact and short when it receives a lot of direct sun or is placed on rocky soils. This species grows frequently to 30-50 cm high, and to 40-60 cm in diameter, developing between 30-60 short leaves for each plant, with strong short spines and rarely showing suckers on its base; that is why it is propagated almost only by seed. It flowers from August to October and the fruits are produced from October to February, releasing the seeds in March, April and May, when the rains start to fall in the region and they have increased chances to germinate successfully in a little crack in the rocks or under the protective shadow of another plant.

During this visit I could see many of the plants producing seed pods and some others with the capsules already opening and releasing the seeds when the wind moves the floral peduncle. Some of the seeds are white colored while others are black, but only the black ones are viable and freely germinate. The seeds germinate easily, after being soaked, after 5 to 10 days and grow then very quickly and start forming their first true leaves in four weeks.

I could also see there some flowering *Beaucarnea stricta*, with many bees and other insects collecting the pollen. I like a lot this species with its swollen base, I'm always wondering how old each specimen is, and try to imagine the story of the plant since it germinated many years ago. I also tried to locate some juvenile specimens growing in the area but couldn't see any there.

As I continued walking with the hot sun above, I could see another xeric species growing there together, many palms of the specie *Brahea dulcis*, some *Echinocactus platyacanthus* and *Dasyllirion acrotiche* also.

Some of the *Dasyllirion* were also releasing seeds. They are locally known as "cucharillas" as these plants are used locally to make arrangements for the community celebrations. As I said before, there was also a xeric palm growing in the same area, *Brahea dulcis*. These palms



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grow profusely in some localized spots producing thickets similar to oasis near dry riverbeds crossing the region. Many of these palms were already producing a lot of seeds while some others were still flowering. Very interestingly, it occurred to me that in some places the palm grows "short" with the trunks growing horizontally and forming patches of dense vegetation, while in other places they grow tall, forming vertical trunks almost 10 m tall. So when I saw one of these "oases" I took advantage of it and stocked

6 - Habitat view at Tepanco de López, Puebla. 7 - Immature seed pods of *Agave potatorum*. 8 - Immature capsules of *Agave potatorum*. 9 - Mature capsules of *Agave potatorum* releasing the seeds. 10 - The seeds of *Agave potatorum* start to germinate freely after 5 days. 11 - Detail of the germinating *Agave potatorum* seeds.

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12 - *Agave potatorum* seedlings, detail of the radicle magnified 10X. 13 - *Agave potatorum* seedlings detail. 14 - *Beaucarnea stricta*. 15 - *The palm Brahea dulcis*, with *Echinocactus platyacanthus* and *Dasyliroium acrotiche*.

contents →

up my water supplies and eat something while resting and contemplating these nice palms.

As I was walking around I also saw some huge clusters of *Ferocactus robustus*, some of them of 4 m wide, really big, each individual head having some 10cm in diameter and armed with powerful spines that can easily pierce your shoes if you inadvertently step on them. Their fruits are yellow and very bitter and the seeds germinate easily



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16 - Brahea dulcis. 17 - Dasyliirion acrotiche. 18 - Echinocactus platyacanthus. 19 - Brahea dulcis thickets near dry riverbed.

without any pre-germinating treatment.

Another species growing in the area is *Agave kerchovei*. Some of the specimens were starting to form the floral peduncle. The seeds of this species are smaller than other agaves, but are also achieving high germination rates.



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20 - The author near a *Ferocactus robustus* clump. 21 - Habitat view at Tepanco de López, Puebla. 22 - Three nice species growing together - *A. potatorum*, *E. platyacanthus* and *Hechtia* sp. 23 - *Agave kerchovei* starting to flower.

a new fantastic plant: mammillaria bertholdii linzen spec. nova

Xerophilia

photos by Thomas Linzen

We might rightfully wonder how is it possible that in this time and age new species are still discovered and, more, they sometimes are so diverse and strange that they only put once again into question the proviso of classifications.

Yet, in late June 2014 another new spectacular cactus species was published: ***Mammillaria bertholdii* Linzen spec. nova** in *Mitteilungsblatt des Arbeitskreises für Mammillarienfreunde e.V.* 38(2):124-128.

Shortly after being discovered by Andreas F. Berthold in Oaxaca, with first notes and pictures being published in 2013, readers wondered if somehow the photos are a prank. Flowers place this new species in series Longiflora, but other characters are from across the board. „*Mammillaria bertholdii* is a characteristic and remarkable species in every way, combining the features of different known species in itself. The growth habit and slender tubercles have a certain similarity with *M. luethyi*, while the peculiar



Mammillaria bertholdii, spring blooming.



1 - *Mammillaria bertholdii* - spring blooming. 2 - *M. bertholdii* in autumn. 3 - *Mammillaria bertholdii* detail.

spines are reminiscent of *M. pectinifera* and *Pelecyphora aselliformis*."

Congratulations to all those who contributed to the discovery, study, description and publication of this new natural jewel, with the hope that its habitat and populations will not fall prey to plant looters, Mexicans and foreigners alike, whose shameless mercantilism is fuelled by the selfishness of certain plants „collectors“, for whom the pleasure of possessing „rare items“ stays well above their love for plants or nature, if they have any.

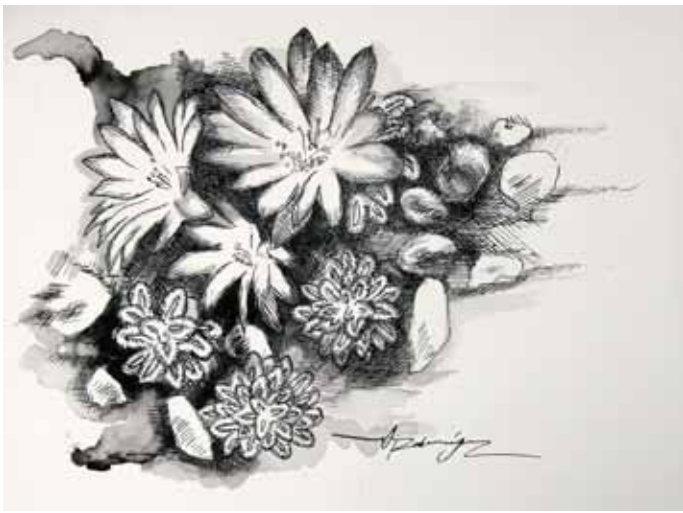
Below there's a short interview for our magazine kindly given by Linzen Thomas, who described this new species.

Xero: Hello Thomas Linzen, it is a pleasure for us to have you Sir as a guest in our pages and interview you for our readers!

TL: Hello Eduart, we were already at the „you“ and we can keep it this way. Nevertheless, the pleasure is on my side. At the end of the day, the online magazine „Xerophilia“ is a well-known publication with interesting articles.

Xero: Ok, you're a well-known member of the Arbeitskreis für Mammillarienfreunde e.V. (AfM). You have described several new species of the genus *Mammillaria*. This is known not only to the members of the AfM, but also to many other *Mammillaria* enthusiasts. The first question that comes to mind: What triggered your passion for cacti and why did you chose to specialize in *Mammillaria* in particular?

TL: You've already pointed out correctly, I have already published several *Mammillaria*. But obviously people are interested only in spectacular stuff or is categorized as such.



Mammillaria bertholdii, drawing by Leo Rodriguez, specially made for this article in *Xerophilia*.

Nobody was certainly interested in *M. paulii*, *M. sinforosensis*, *M. scrippsiana* subsp. *schumacheri*, *M. hermosana*, to name a few. Are they common? I actually do not think so. Now, how did I start being interested in cacti? Surely it happened to me at first like many of your readers. I wanted not only to collect stamps but something else, something peculiar and, at the same time, connected with nature. Cacti are without a doubt. I had actually three main reasons why I chose to keep me busy with Mammillarias: a) the Mammillaria is the genus with the largest number of species, which b) I was able to purchase the easiest at that time and c) within the ZAG Mammillaria was established in 1975 a working group dealing very comprehensively with this genus and I joined it immediately. So, I had the opportunity to study at the beginning of my passion very extensively the Mammillarias. And I still do it to this day. And ultimately I became interested in Mexico, the main distribution area for *Mammillaria*, a fascinating country in every respect, from culture and history to breathtaking landscapes.

Xero: Apart from the fact that it is a spectacular species, what makes the discovery of *Mammillaria bertholdii* a special event? Many of us see this new description as a huge sensation, perhaps similar and just as important as the discovery and description of *Aztekium valdezii*.

TL: To my knowledge, the discovery of *M. bertholdii* was rather the opposite of a special event. It was more of a coincidence and it passed some time, until the importance of this discovery has been perceived. Its characters were simply too unusual. Undoubtedly *M. bertholdii* is a special species, that was already clear to me at first sight. You

don't need to be an expert for that. I know of nothing comparable in habit. When I saw the first flowers then this was for me the even bigger surprise. Many of its currently known characteristics highlight the close relationship with the *M. saboae* group, even if the distribution range speaks against it. More compelling further investigations are needed in order to obtain more clarity in this regard.

Xero: Unfortunately, very few of the *Xerophilia* readers have access to *Mitteilungsblatt des Arbeitskreises für Mammillaria Freunde (AfM)* and as such for the majority of our readers, the characteristic features of the description remain a mystery. Can you mention the most important characteristics of the species?

TL: First of all, every cactus enthusiast interested in Mammillarias should actually become a member of the AfM. The AfM is the world's largest association specializing in mammillarias and the related genera and it has a quite international setup. A good 20% of the members are located outside Germany, so many notes from our quarterly bulletin are also translated into English. The newsletter is published since 1979 and currently has quarterly issues, and is a recognized high-quality magazine containing many interesting contributions.

In regards to *M. bertholdii*, this is a unique species in any possible way, combining the characteristics of *M. luethyi* (body, tubercles), of *M. pectinifera* and *Pelecypora aselliformis* (spination type) and of *M. saboae* (flower shape). I know nothing similar to this.

Xero: What do you think, what are the survival chances in future for this species in its habitat? How can become this species put at risk after the discovery? We have the *Aztekium valdezii* precedent ... and many more.

TL: Undoubtedly *we* are the biggest threat to *M. bertholdii* at the site, all cactus enthusiasts and all who think they are, but then only smell the business opportunity. It is the urge, the craving to possess everything that is new and still has the appearance of unusual. As far as I know *M. bertholdii* should be classified as endangered in habitat. My great hope is that the few people who had been at the site, are aware and therefore circumvent accordingly in their actions and with sharing their knowledge. I quite understand the interest of cactus lovers for this new taxon. But an assault on its habitat, as for example known from *Aztekium valdezii*, would *M. bertholdii* not survive. It would be destroyed even before properly known to the world.

Xero: So far we have asked the expert, this time we ask the cactus enthusiast Thomas Linzen to tell us how he would grow *Mammillaria bertholdii*. What are the essential elements that one can take from the study of the morphology and ecology of this new species, which are the necessary lessons a for successful cultivation?

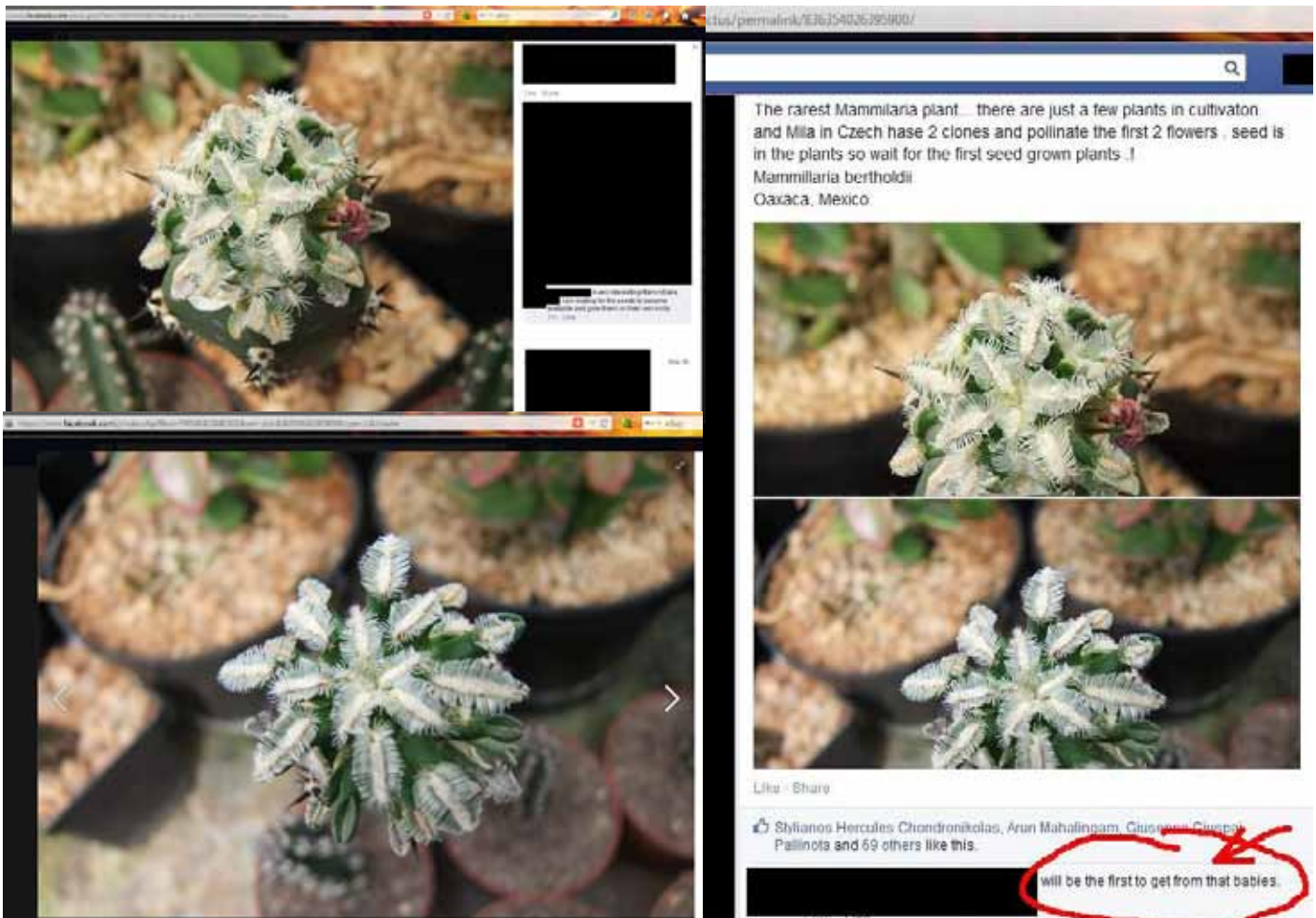
TL: I have no growing experience with this species whatsoever. I can only assume it should be similarly grown as *M. saboae*, *M. haudeana*, ... because of the site conditions, which according

to my present knowledge are quite comparable. Therefore a well drained, strong mineralized substrate should be used, while waterlogging should be avoided. But we will probably have to be patient for some time. I still see no possibility to legally grow this plant for the time being.

Xero: Thank you Thomas, for the interesting comments that you have made and I hope our readers will have again the opportunity to read you ... maybe a new description !?

As anticipated in the "*Aztekium valdezii* Dossier" in our June 2014 issue, the assault on this new species has already begun. Below there are some screenshots of a Facebook page, showing two clones illegally possessed in the Czech Republic by a certain Mila, who does not own them but was required to propagate them, also illegally, and place them on sale for an amount - you can be sure - which is downright astronomical.

Xerophilia



a dane visiting românia

a story about friendship and cacti



by **Erik Holm**, Herning, Denmark - Chairman of the **Nordisk Kaktus Selskab** (*)

Preface

During spring and summer of 2012 I did a lot of intense searching on the internet, especially on Facebook. Searching for groups about cacti I came upon **Cactus Romania** and **Xerophilia - Fan group**.

I found here a lot of people, who seemed to be very active and very skilled when it comes to growing cacti. I mingled all I could posting my own photos and commenting others.

Most important I found the e-zine Xerophilia, a worthy competitor to **The Cactus Explorer**. The emission in august of the English edition of *The Stone Eaters* my hobby as a cactus collector changed radically. I have always had the interest of making good soil for my plants and had already skipped using peat, but the idea of growing plants in pure mineral was new to me. I read *The Stone Eaters* repeatedly and began finding out what to do living in Denmark that has no mountains at all – a true challenge.

I had become Facebook friend with a lot of Romanians, amongst those also with the author of *The Stone Eaters*, Dag Panco.

On Dec 13 I asked him a question and got a

nice reply. We ended up chatting on an almost daily basis. Once I said that it would be nice to see in real life Romanian collections and above all to see plants grown correctly in mineral based soil. Dag replied *“why don't you just come then?”* and stopped my whining about having the money for such a trip and all the trouble of organizing. *“Just come here and I'll make a tour of Romania for you.”* After some hesitation I accepted.

My last plane ride was in 1976, so I was a bit nervous; when my wife drove me to the airport in the hot Danish summer (for once the Danish summer was very sunny and hot for months). However, of course I managed everything alright. Via Frankfurt I arrived to Otopeni, Bucharest in one piece and was met by Dag Panco. It was midnight, so we drove to his home, met the family and I got a good meal before going to bed.

Day 1, Constanța

Next morning after breakfast we left home and headed for Constanta by the Black Sea. Most of the way there was through flat landscape with large fields some of which were quite wet after the heavy rainfalls that had struck Romania



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1 - Storks in their nest. 2 - BB in his collection. Note the large containers/pots. The greenhouse is slightly shaded to control the sun and heat. 3 - Ferocactus, Echinocactus and Agave. 4 - Table landscape with various Mammillarias.

during spring and summer. I discovered storks were very common here. There were hundreds, which was interesting for me since the stork is very rare in Denmark.

Around 12 o'clock we arrived at Basarab Popas (nickname BB) place and had a nice lunch. BB's firm is filled with plants: palms, cycads, trees, bushes pot plants ... you name it! Amazing sight, but we had come here for the huge collection of cacti and other succulents. I never saw the like of it. A half greenhouse of 1000 square meters.

It's hard to choose where to begin describing this collection. A very huge work has been put into it. For a description of this work and the ideas behind it I refer to the Stone Eaters and instead I concentrate on some details.

1. *The landscapes and the table landscapes* are built up to look natural with stones and rocks as very important parts. The plants obviously like it. I will never have the place for building these landscapes, but I enjoy seeing them especially

when they are made with the knowledge of which soil to use and the ability to actually do the work properly, which means digging away a lot of common soil and bringing in large quantities of mineral soil and rocks.

2 *The pots and containers* are very large and often also remarkably deep. Collectors tend to grow cacti in pots that the plant hardly fits in. Here I hardly ever saw a plant that needed a repotting in the usual sense. What you gain from giving the plant space is a more natural and flat growth. I repotted my Thelocacti this spring. Not to a pot one or two sizes bigger but much bigger. During the following 4-6 weeks I noticed many of them seem to become flatter and broader and looking much more healthy. Seeing BB's plants I learned that I'm on the right path, but still an amateur.

3. *Cacti growing in cracks and holes of rocks* is an amazing sight and very decorative as well. Seen from the point of view of a gardener it's a foolish idea. He would want the plant to grow



to selling size quickly. So he uses peat based soil and adds fertilizers. His method results in big swollen, elongated plants as we see them in supermarkets. Alas the gardener method has found its way into literature leading cactus collectors to use the same method. Good bargain for the nurseries as the collectors will need to replace plants often because of plants dying. Cacti growing in cracks and holes represent the exact opposite to the gardener's method. The plant has no peat – just the rock and no fertilizer. Will the plant die? No, it will grow into a nice

1 - Most of these plants would have been in a 9 cm pot in most collections in Europe. Here they have the space they need and the soil they nourish from. The pieces of rock are not there just for decoration. The plants actually eat them in symbiotic company of a microbiota who can dissolve and free the nutrient elements used by the cactus. 2 - Strombocactus disciformis thriving in mineral soil in a large pot. 3 - Blossfeldias on own roots are actually quite easy to grow if you give the good conditions: space and mineral soil with a little amount of humus. 4 & 5 - Epithelantha micromeris growing in a hole of a calcareous rock. 6 - Epithelantha micromeris and other plants growing in holes and crevice of the same calcareous rock.



natural looking plant.
4 Spectacular plants. I have more than 100 photos from BBs collection. I could have spent several days there and still found interesting plants to photograph. I took photos of what happened to catch my eyes, but I'm sure I missed a lot. I share with you a few eye catchers that happened to get into range of my camera lens.

BB is an excellent and very generous host. I'll remember this visit for a very long time. As said before I could have stayed here much longer and photographed even more, but we had another

1 - This *Mammillaria plumosa* is growing from 2010 on this calcareous rock without any organic soil or fertilizers.
2 - Some *Mammillaria elongata* and *Mammillaria viperina* growing from 2010 in the holes of an almost flat calcareous rock.
3 - *Echinocactus texensis* cultivar. 4 - *Geohintonia mexicana*, a branching seedling. 5 - *Echinocactus polycephalus*, an old plant. 6 - *Echinocactus horizontalis*.



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1 - Ariocarpus scenery. 2 - A very old Ariocarpus kotchoubeyanus var. albiflorus.... 3 - And a beautiful Ariocarpus trigonus.... 4 - And this magnificent Ariocarpus trigonus fma. elongatus. 5 - A group of Mammillaria theresae on own roots. 6 - A lot of Astrophytum hybrids and cultivars.

visit on the program of the day... but this is for the next issue.

(*) **Nordisk Kaktus Selskab** - is the association of the Scandinavian cacti and other succulents lovers, which includes Denmark, Norway, Sweden, Finland and Iceland.

*This article was envisioned and written before the tragic end of **Basarab Popa**. Although the author has shown willingness to revise it, we considered that, for all who knew him, the text should not be changed, keeping in our memory those moments when he was host for many of us, who have found the door open and felt the warmth of a smile, a friendly glance in his eyes, and the reaching hand of a good and generous friend.*

Xerophilia

mammillaria theresae cutak and mammillaria deherdtiana farwig (on the history of cv. albiflora)



by **Stefan Nitzschke**, Cologne, Germany.

1 - *Mammillaria theresae* cv. *albiflora*, the Swoboda clone.

In regards to the quite widespread cv. of *Mammillaria theresae*, we deal here with the propagation of an initially in habitat collected plant. The original plant was collected and imported from Mexico by Heinz Swoboda of Fischamend, Austria, in the late 1980's or early 1990's. The variation in flower colour was first observed in the nursery of Karl Bruch of Mayen, Germany, among some normal flowering *Mammillaria theresae* plants. This variation was first passed to the *Mammillaria* enthusiast Helmut Rogozinski of Cologne, Germany, and from there began a slow propagation by cuttings of this exceptional variation. Gradually the enthusiasts had to realize that, because of fungal infestation, the rooting of cuttings from the original clone was barely succeeding. In the meantime, from the vicinity of the type location have been discovered several separate populations, none of which was, however, reported as a pure white flowering population. Grafted propagations of the original clone form in culture, with a remarkable frequency, several flowers from the same axilla and partly even an intergrowth of two flowers so that it leaves the impression of a crested flower.



We have a very similar situation with the 1983 imported *Mammillaria deherdtiana* cv. *albiflora* presented afterwards in 1987 in KuaS by Franz Strigl of Kufstein, Austria. This variation was also discovered among the thousands of flowering plants at the site. Shortly after the article was published, I received from Mr. Strigl two cuttings of this plant allowing me to establish it in cultivation and later distributing it further, very slowly, to other enthusiasts. Unfortunately, the group of forms of *Mammillaria deherdtiana* / *dodsonii* is flowering only very sparse in my



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cultivation. Striking, both original clones of the species presented here differ from their normal flowering siblings by a slightly lighter colour of the epidermis.

Then, in the favorable climate of Mallorca, the expert Jürgen Menzel of Mallorca, Spain, succeeded to select both white flowered forms by crosses with the corresponding red-flowering type forms, as white flowering cultivars. I have today in my collection, originating from these breedings, several clones of *Mammillaria theresae* cv. *albiflora*, however, a propagation from seed

M. theresae cv. *albiflora*, the Swoboda clone. 2 - Overgrown flower tube. 3 - Two flowers in the same axil. 4 - Comparison between flowers in pot 2 and 3. 5 - Areols and buds.

of these plants couldn't be carried out yet in my collection.

The goal of this article is to document that we have in this instance, at least for these two presented species, original mutations at the site and not, as for e.g. *Astrophytum asterias* cv. Rote Blüte, very variable hybrids incurred by controlled



Mammillaria deherdtiana with red flowers.



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6 - *Mammillaria theresae* cv. *albiflora*, seedgrown.
7 - *Mammillaria theresae* ROG235, Coneto Pass, Durango.
8 - *Mammillaria deherdtiana* cv. *albiflora*, Strigl clone.
9 - *Mammillaria deherdtiana* cv. *albiflora* - seedgrown, photo by J. Menzel. 10 - A. *Mammillaria deherdtiana* cv. *albiflora*, an old plant. 11 - *Mammillaria deherdtiana* ST.N.504, Llano Grande, Oaxaca, photo by Milan Zachar.

crossing between different species.
Further *albiflora* cultivars known in culture of the genus *Mammillaria* are:
senilis cv. *albiflora*

crucigera cv. *albiflora*
hernandezii cv. *albiflora*
wherein so far, for none of the species referred here a habitat origin has been confirmed yet, although through this article may also shed some light into the dark origin of these mutations.

Literature

Auf der Suche nach *Mammillaria deherdtiana* Farwig und *Mammillaria dodsonii* H. Bravo oder: Die Stecknadel im Heuhaufen! Franz Strigl, KuaS 38 (6) 1987 155-156.

festa del cactus 2014



by **Andrea Cattabriga, Bologna, Italia**. Email a.cattabriga@mondocactus.com. Photo Camilla Cattabriga.

As announced on this journal, 19 to 21 September 2014 was held the ninth edition of what is now considered the largest trade show dedicated to the succulent plants in Italy. The success was unprecedented.

We had no much expectation in a year which is, as said by many, among the worst in living memory. The economic crisis that plagues our country is taking a toll on consumption and the sales of succulent plants, which are considered superfluous goods, have decreased significantly. Undeterred by market we dedicated to the organization of this edition with great enthusiasm and commitment and, in the end, we were rewarded.

The reason of the event

Normally, the market-exhibitions specialized in plants (whether succulent plants, orchids, bonsai and so on...) are the natural products of associative activities. In our case, it is rather an initiative entirely independent, born in

The numbers of the event

Area occupied by event: 2,400 sqm
Number of participants: 35
Visitors: 3,000

the context of relationships woven by our organization with the City of San Lazzaro (Bologna), which is the institutional partner of the event.

It all started in the early 2000's. I was an environmentalist and passionate grower of succulents and I already had a considerable collection of succulent plants belonging to rare and endangered species which amounted to more than 35,000 seed grown specimens. Finding myself in financial difficulties and in the face of the risk of losing all of my plants, in 2002 I proposed to the City of San Lazzaro to make available my collection. The idea was to create a small botanical garden dedicated to biodiversity, a sort of Ark for threatened plants in which to store the most important specimens.



Backed by ethologist Giorgio Celli, a well known to the Italian public personality, the idea was shared by the public administration that was committed to finding a place for the botanical garden, but do not have funds to finance the construction.

In order to find the resources needed to start the project we immediately thought of organizing a public event and so it was that in 2006 came Festa del Cactus.

In 2013, the City of San Lazzaro di Savena has finally completed the process for the allocation of a place dedicated to the creation of the botanical garden, entrusting us an area of 1000 square meters which includes three small industrial, iron and glass greenhouses, built in the 50s of the last century and then abandoned, for a total covered area of 180 square meters.

Now our commitment is to implement the restoration works of the greenhouses and finally make them accessible to the community.

To give voice to those who did not have

In its original idea Festa del Cactus had to be some sort of huge sounding board to amplify the voice of the plants of this collection, which ran the risk of being dispersed rather than to be used in educational projects.

But there were other voices of things at risk of extinction, so we decided that we would host those who had the need to speak to the world,

such as the representatives of the Italian Tibetan community who claimed the freedom of their country from the domination of China (2008), of the children, victims of civil war in Syria, the animals, victims of vivisection (2012) and women of all the World, victims of femicide (2013).

Our political commitments made us more visible, but the outcome was even more important as a result of which the Municipality offered the honorary citizenship of the city of Bologna to the Dalai Lama and that some



September 18, 2013, is inaugurated the Botanical Garden of Biodiversity 'Giorgio Celli' in San Lazzaro (Bologna); it is the only one specialized in threatened succulent plants. Now it must be made accessible by the community.



journalists left for Syria to make a connection with some schools in town, in order to gather direct evidence about what was happening over there.

The commitment to participate

Festa del Cactus has always been based on law, for which the full observance of the laws on CITES is taken very seriously. Our website contains pages that demonstrates clearly **the meaning of**

CITES, is also published an updated list of species listed in **Annexes A and B**. Recently, it has been also published a list of species of Mexican cacti **described after 1997**, some of which refer to entities already known to science before that year, which were later renamed and then their trade is allowed, but the majority of these species is derived from material collected without permission and then selling them is not legal.

Of some significance is **the information page**



contents ↑

on peyote. Plants of the species *Lophophora williamsii* cannot be traded and possessing them could cause problems if you are under investigation for use or trafficking of narcotics. To avoid any problems at Festa del Cactus are banned plants belonging to all species of the genus *Lophophora*.

For the reasons expressed above, the nurserymen who wish to participate in the Festa

del Cactus accept responsibility to abide by the rules. Failure to comply with these rules shall preclude participation in the event.

Seriousness (little) first

An event of this kind, packed with rules and driven by sounding ethical goals resulted in inevitably heavy stakes, even at the limit of tolerability, especially for those who wanted to



join just to sell or to buy some cactus. I decided to introduce some new features.

What we all expect to happen in a market-exhibition on succulents organized by an association is the fateful CONFERENCE. I have attended many conferences and I was also part, having held numerous lectures in Italy and abroad. That's why I decided to abolish this event. The long hours of sleep-inducing disquisitions

by the expert on duty, especially if originating in distant places, generally focused on the diameter of the pollen grains, on the count of radial spines and on the diameter of the fruits of some botanical genus were to remain only a memory.

In their place arose the Festazza del Cactus, the event on Saturday evening to which are invited all those who want to share wholesome foods typical of their country of origin, and that opened



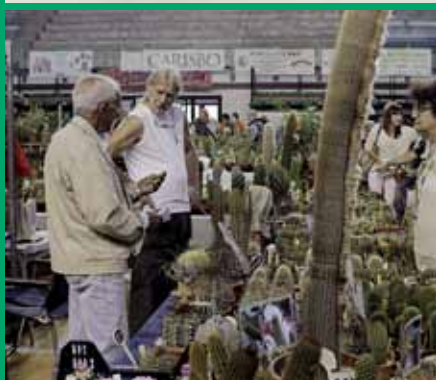
generally with a hectolitre of mojito, to dissolve the shyness and convince the most reluctant to jump into the wild dance of the after-dinner.

Year after year it draws more and more successful **the exchange corner**, where collectors can leave their plants in excess and take what is most interesting in return, left by others.

One, ten, a hundred associations

Festa del Cactus is formally organized by the Association for Biodiversity and its Conservation (**ABC**), an environmental organization founded by me to carry out the project of the Botanical Garden.

It is not, as already stated at the beginning, an association of enthusiasts growers of succulents, but this festival has garnered the support of all



the associations of this kind that are found in Italy and some international associations such as the International Asclepiad Society and the International Sansevieria Society. In the end, the Festival is a melting-pot of different associative experiences, which helps to bring unity in a severely fragmented space.

It is hoped that in future Festa del Cactus can gather signatures from other European

associations and non, and accommodate groups of visitors who come from far away.

And ... 2014?

After outlining the features of this event is now to tell what has happened in the last edition, held from the past 19 to 21 September.

New year, new theme



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Among the various things to be decided in the process of organization was the theme 'we give voice to ...' which was yet to be established. Who could be the focus of this edition of the Festa del Cactus?

One of the most important issues that had characterized the world of succulents in 2013 was an operation conducted by the State Forestry Corps in Trento on the occasion of the fair market Eurocactus, organized by the association presided over by my friend Renzo Merler. Many agents raided among the participants, threatening to ruin this wonderful event. They were found to be numerous fines and seizures for some

1 - Saturday night: The peyote-almond ceremony starts. 2 - Giovanni, self-proclaimed Master of Ceremonies performs the partition of the sacred food. 3 - Rudy, pleasantly dazed after ingestion of peyote.

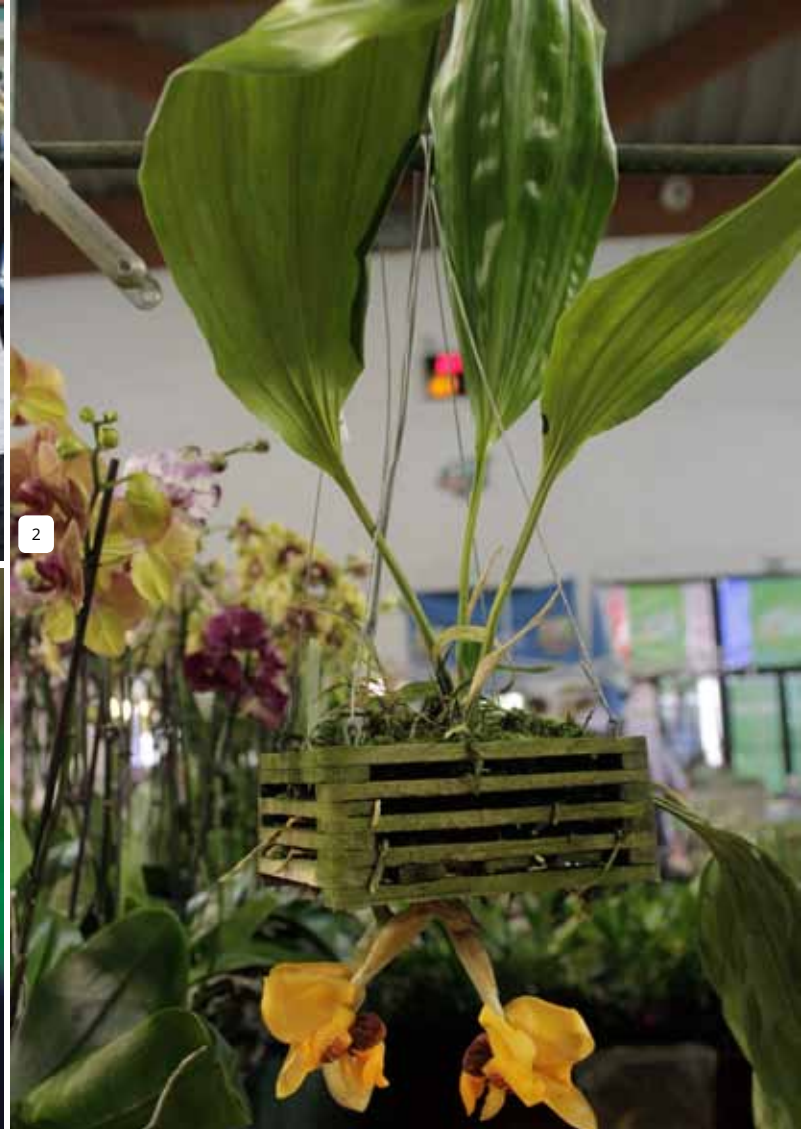
irregularities in the trade of plants of species listed in CITES. Nothing really serious happened, but the incident very demoralized Renzo and gave way to lengthy discussions that have not subsided at all. At the end of 2013, instead exploded on the case of a small cactus just discovered, *Aztekium valdezii*, which was denounced the massive collection of plants in the wild and their selling



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around the world, accompanied by the sale of large quantities of seeds. In the summer of this year, with a statement issued by the Ministry of Environment was recalled to the Italian nurseries that CITES did not allow the trade of plants and seeds belonging to Mexican cactus discovered after 1997, which threw a lot of discontent among small and large traders, because they were just novelties justifying the higher prices.

For all these tensions that resulted happily in lively discussions on various forums, I decided to dedicate the 2014 edition of Festa del Cactus to

1 - Me and Alessandro Guiggi. 2 - One of the Franzel 's orchids. 3 - Hunting for slugs. 4 - The T-shirts of Festa del Cactus. 5 - The competition of natural plants.

the lawfulness in the trade of plants.

Participants

Following a trend of steady growth, 2014 marked a new record of vendors: 34 in total, including 28 nurseries specialize in succulent, one in orchids and other businesses in consumer goods (pots,



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1 - Ada and Santana, organizers of the event. 2 - Greek-roman fight tournament between Hertus and Giovanni. 3 - Original pots for succulents. 4 - Festa del Cactus is also a business opportunity for nurserymen (from left: Giovanni Longo, Rudolf Kraica, Nello Torino and Tomáš Duben).

potting soil, soaps, natural remedies, necklaces of seeds etc.). The countries represented among the nurserymen were Italy (16), the Czech Republic (7), Germany (3), Hungary (1), the Netherlands (1) and Slovenia (1).

The variety of plants presented was very high, in part because many participants had acquired interesting material from the trade show held the previous weekend in Elk, Belgium.

Aside from occasional irregularity, all the nurseries owned the appropriate documentation to the sale of plants belonging to the species listed in CITES, which is the register of loading and unloading that in Italy it is mandatory in order to avoid high penalties.

Unfortunately, there are many nurseries that are not yet adequate in relation to the restrictions on trade in species of Mexican cacti discovered after 1997.

The conferences

Although the meetings were banned by an

internal rule at Festa del Cactus, this year we made an exception to accommodate those who have asked to acquire some useful information regarding the cultivation of succulents. So, just for very simple and straightforward technical interventions. We have to thank Alan Butler, our cherished guest, who has agreed to give a lecture on the genus *Hoya* and explain these plants cultivation. Instead Alex Guiggi, an expert in the naturalization of succulents in Italy has presented his latest book: "The World of Cactaceae", published by the Publishing House Il Sole 24 Ore Edagricole in 2013.

The competition

Also new in 2014 was the contest for the most beautiful natural grown plant, but has not had the desired result, since the end was awarded a plant certainly well cultivated and perfectly shaped, but far from natural-looking which, however, was evident in other competitors. The problem arose due to the lack of time that forced



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me to ask the judges (Alan Butler and Davide Donati) a vote on the basis of the characters most commonly assessed (maturity, propensity to flowering, shape, rarity, health, presentation). In a next opportunity the assessed characters will be more relevant to the aims of the competition.

Conclusions

For some years Festa del Cactus is considered by nurseries and many visitors as the largest and most beautiful Italian succulent show. I hope that our formula can determine such a success that would place us at the same level with the largest European events, attracting an even wider audience and demanding in terms of quality, legality and fun.

1 - Alan Butler holds a conference on Hoya and their cultivation. 2 - 'To be continued ...!'. 3 - Fans of Gymno hybotan. 4 - Delegation of the City of San Lazzaro in visit to Festa del Cactus. To the left the Mayor Isabella Conti, to the right the councilor for the productive activities Andrea Monteguti.

touring some lithops in the wild

(what?... an entire genus of plants from southern africa only?)



by **Judd Kinkel Welwitch**, Johannesburg, South Africa. www.wildsucculent.co.za - email juddkinkel@yahoo.com

Photography - copyright 2014 Judd Kinkel Welwitch

Introduction

Most of you will know that growing *Lithops* can be very challenging especially getting all the conditions right for success. Why all the conditions must be right? Well, that's because this entire genus of about 100 species is only found in Southern Africa and if that's not exciting enough, well, most of the group grows around or in close proximity to the Orange River, a river which almost cuts South Africa in half and which almost causes the whole of South Africa to be an island as there is water in the form of an ocean around three quarters of the country already. Looking for *Lithops* in the wild, with not many leads, is like looking for the proverbial, "needle in a haystack" a sort of time bomb as you only have so many days in which to put your head down and search. Most people fade after the first day let alone last as long as 2 - 3 weeks of searching the fine gravels and climbing high enough to locate depressions of sand in which the many of the species grow. Having another partner or an extra pair of eyes comes in extremely handy. So, *Lithops* searching is much more fun when there are many people involved and your chances of spotting plants

increases the more eyes you have searching the terrain. I have many people to thank for tipping me off on some of the localities. One such person is the late Charles Craib, who gave me the locality description of *Lithops naureeniae*, which we would definitely not have found, without the detailed paragraph he gave us consisting of the precise measurements needed in order to find the exact spot at the locality. It took me and a friend directly to the *Lithops naureeniae* plants. We arrived at about 9 in the evening and searched with flashlights for about 10 minutes. Indeed we found about 10 plants. I can't even tell you how exciting it was to travel almost a full day and arrive in the dark of the night and find *L. naureeniae* with our headlamps and torches on.

(Figs 1, 2, 3, 4)

It is my wish for you to understand just how amazing the diversity of species, there are, in our country, South Africa. However it is not possible in this brief article to show you all the diversity of the species, so I have included just a fraction of them in this article. I have also endeavoured to show you what the terrain looks like in some cases and the typical localities. Contained in this



1 - Klein Karoo, South of Laingsburgh, the locality of *Lithops terricolor*. 2 - The locality of *Lithops marmorata* East of Springbok. 3 - Habitat of *Lithops olivacea* with *Aloe dichotoma*. 4 - *Lithops terricolor* growing among solid white quartz.

article is a mere representation of a handful of species which have interested myself in more than 10 trips through the region, stopping at various places, old and new and roughly about 40,000 km worth of exploring at different times of the year. This area is really captivating and is worth much more of anyone's exploration time. Make sure you have ample time when wanting to locate these plants, otherwise the searching could become tiresome and frustrating for most who are not prepared. (Figs. 5, 6, 7)

Most of the flora mentioned in this article falls under the general Succulent Karoo region of floristic endemism. To be more specific, we mainly explored the "Gariiep centre of endemism", the "Richtersveld Zone" and the "Khamiesberg centre" which falls under the Cape floristic region (A.E.Van Wyk & G. Smith: Regions of floristic endemism). This book is an extremely useful work which lays out exactly where the concentration of diversity of our succulent flora actually exists. This book coupled with some localized maps is all the ammunition you need to go on a successful *Lithops* plant hunt and increase

the number of species you may find. Even though the title of the book comes across intimidating at first, it is a great place to start as a beginner or novice in that it roughly guides you to the right localities and the "Representative succulent/near succulent lists" which are contained at the end of each section, helps immensely with narrowing the odds when it comes to identifying some specimens which you may encounter. The most important thing to note is that not only will these areas contain *Lithops* species but they will reveal many other succulent plant species which grow in cohabitat with the *Lithops* plants, species that you will encounter are *Tylecodon*, *Crassula*, *Euphorbia*, *Anacampseros*, and a wide range of mesembs, aloes, bulbous and other interesting plants. (Figs. 8, 9)

Below I have mentioned briefly and described some of the most beautiful *Lithops* mainly from the Northern Cape Region, Karoo and Interior extending to Gauteng. Yes, just outside of Johannesburg are colonies of *Lithops leslii* plants. A good route to plan when touring South Africa would be to start in Johannesburg and travel



5

5 - *Habitat of Lithops bromfieldii* var. *glaudivinae* 20 km South of Witsand Nature Reserve. 6 - How many *Lithops aucampie* subsp. *aucampie* var. *koelemanii* do you see in this picture? 7 - *Lithops hookeri* var. *lutea* growing together with other xerophytes among the rocks. 8 - *Lithops herrei* (*Richtersveld National Park*) growing among solid quartz. 9 - *Lithops bromfieldii* var. *insularis* near Kakamas, close to the Orange River.



6



7



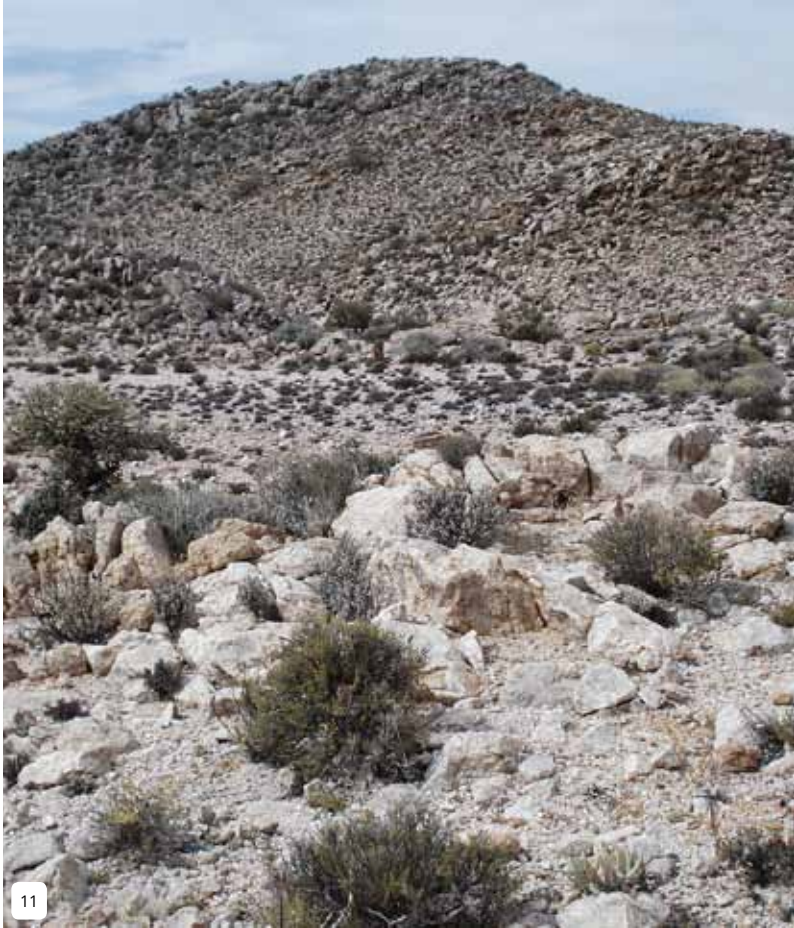
8



9



10



11

10 - Here it is: *Lithops bromfieldii* var. *insularis*. 11 - Habitat of *Lithops marmorata*, East of Springbok.

to Kuruman, from Kuruman to Upington and then onto Poffadder, Aggenuys and Springbok. Depending on your available time, you can travel South to Khamieskroon, onto the Knersvlakte at Van Rhynsdorp then onto Kenhardt and back to Johannesburg via Prieska and Hopetown. These major towns all have their own *Lithops* localities associated with the certain areas and mountains. It's a great experience and a bonus when you find *Lithops* plants.

(Figs. 10, 11)

If you think trying to spot a chameleon in the thick of the jungle is challenging, think again, because trying to find *Lithops* in habitat is like dropping a coin in the Atlantic ocean and then trying to retrieve it. If that's not almost impossible, well, then you will be amazed to know that these remarkable succulents only occur in Southern Africa and nowhere else on the globe. Yes, other countries have laid claim to certain *Lithops* (e.g. *Lithops steineckiana*); however, they are hybrids that have arisen from collections, literally from the dead...Wow!! *Lithops* are very specific and are only known from certain areas and localities...and in some cases only from one locality in the whole world. Take the elusive *Lithops hookerii* var. *lutea*. What grips me so much is that these plants have evolved around the Orange and Vaal rivers (anything from 30 – 100 km from the vicinity of the river). Yes, there are various outliers and deviations. Like the colonies in Namibia and The Small Karoo, but the general region for these plants is around the Gariiep or Orange River, how amazing is that!

Understanding *Lithops*

Lithops belong to the Mesembryanthemaceae family (Mesembryanthemoideae subfamily in Aizoaceae). The name is derived from the Greek word "Lithos" meaning stone and "opsis" meaning face like. This is due to the fact that they look like stone pebbles.

In Afrikaans they are named "beeskloutjies" which means "cows hooves" as they are double lobed looking like two sides of a cow's hoof. The main flowering time is from autumn, early winter, April to July in the Southern hemisphere. The majority of the flowers are either, yellow or white in colour only one species – *Lithops optica* fma. *rubra* – has very light white pinkish blooms (See Fig. 46). All other *Lithops* have either white or yellow flowers. Isn't that amazing...?

These two colours are at the bright range of the spectrum and it is very interesting that it should be like this. One theory for this has to lie with the pollinators, since these plants are so well camouflaged and they blend in so well with the stones that they cannot be seen. So, they obviously need the brighter colour flowers to attract as many pollinators as they can. This is one theory on how these plants have survived during a long evolutionary process.

Preparation before planning a *Lithops* hunting expedition

To try and hunt for *Lithops* successfully a certain amount of research is necessary before hand...



12 - *Lithops julii subsp. fulleri var. fulleri* perfectly blending with the environment. 13 - *Lithops olivacea var. olivacea*.

lots of reading and a good supply of maps and habitat descriptions and loads of patience. After all, I wanted the joy and excitement to go hand in hand with photographing these wonderful plants in their natural surroundings. Three weeks is just not enough time to try and find everything, so some photos are in habitat and others (flowers) which I could not locate, are in cultivation. A photograph of these plants, when in pots, just does not excite me as much as seeing them in their natural environment. The reason for this is that the key to *Lithops* and their survival is their remarkable ability to mimic the stones in the soil in which they grow. Even the surrounding stones look like plants at times and once you start to delve into each species you will see this very sensitive balance in colour which *Lithops* plants are able to mimic and for sure they are the best examples of mimicry in the plant world.

The fine art of mimicry at its best

Take for instance *Lithops aucampiae* subsp. *aucampiae* var. *aucampiae* [the Kuruman form] and you will notice that it has a darker colour than all the other *aucampiae* varieties...why? Well, if you take a look at the stones in the area there is a high amount of iron in the rocks and stones, specifically in this locality, therefore the plants have, through evolution, learned how to mimic this darker colour which is found in the iron ore rocks...fascinating or just a coincidence? Look at *Lithops aucampiae* subsp. *aucampiae* var. *koelemanii*, known from only 3 localities in the whole world. Where I found them, at one of the localities, I was standing on them before I actually saw any and so specific they were, not only on the quartz, they were on red stained quartz, a deeper look into the grooves of the window

surface of the plants revealed general colours of brown with some red veins within the ripples. Amazing, these plants were just at one with the red oxide stains in the quartz stones.

(Figs. 12, 13)

Lithops halli var. *ochraceae*...with generally a brown dusty, opaque appearance absolutely mimics the sands of this Kalahari region. These are found at a number of recorded localities. Where I found them, there were hardly any stones present they seemed to like the flatter sandy plains with bits of gravel here and there and the odd stone. So, what I am trying to say is the mimicry within the genus is too remarkable for words and is extremely well adapted to the characteristics in that area. There seems to be a delicate balance here. I mean, after all, these plants not only occur here in Southern Africa, they are nowhere else on the planet, they all have evolved according to their surroundings on a microcosm scale. Truly unique and as ancient as the very earth's crusts in which they live.

Let's discuss some of the species

Lithops marmorata (N.E.Br.) N.E. Br. var. *marmorata* 1922 (Figs. 14a, 14b)

Plants were located East of Springbok, magnificent specimens which had more than 10 heads to a single plant. This species was named *marmorata*, which is Latin for 'Marbled', owing to the effect one sees when viewing the leaf surface of this species. It is distributed around the town of Springbok, with a radius of about 70km to Steinkopf and Port Nolloth and North-East towards Poffadder, with an outlier South-East of Vioolsdrif.



14a



14b



15a



15b

14a & b - *Lithops marmorata* var. *marmorata* East of Springbok. 15a & b - *Lithops julii* subsp. *fulleri* var. *fulleri*.

***Lithops julii* (Dint. & Schwant.) N.E. Br. subsp. *fulleri* (N.E. Br) B. Fearn (1927) var. *fulleri* (Figs. 15a, 15b)**

This species was first collected by Ernest

Russell Fuller. He was the postmaster at Kenhardt Post Office in about 1926 and thus named after him. At the type locality "near Kenhardt" I located plants just 5km out of the town. I returned some



16a



16b



17a



17b

16a & b - *Lithops olivacea* var. *olivacea*. 17a & b - *Lithops naureeniae*.

years later to find that someone had ploughed up the ground for roadworks, completely destroying this lovely colony. Plants have been known to be quite variable in colour and differ considerably in markings. The general colour is a dusky, opaque light grey, tinged with light pink tones. A striking and beautiful species this is one of my favourites.

***Lithops olivacea* L. Bolus 1929 var. *olivacea* (Figs. 16a, 16b)**

Again, first collected by Ernest Russell Fuller in 1928 around the area of Aggenuys and South-West and West of Pofadder. The Latin meaning of *olivacea* is 'Olive green', referring to the lovely green glow that the plants have when catching their colour against the sunlight. One sure way to tell that you've got this species is to look at the main fissure line and most of the time it is flush and flat with each other, in other words it has a straight face and does not really smile at you. The plants we found had many heads to them making the plants look big due to the clustering, otherwise the heads on their own are quite smallish in size. The flowers are yellow with a white centre.

***Lithops naureeniae* D.T. Cole 1980 (Figs. 17a, 17b)**

Collected by Desmond T. Cole and his wife Naureen A. Cole on the 29th of April 1977. From a follow up of information supplied by M. Bruce Bayer and Peter V. Bruyns, who discovered it in November 1976. It was named in honor of Naureen Adele Cole. Found in the small area of 60 km South-East of Springbok, which happens to be the type locality, is in the heart of the Khamiesberg Mountains.

***Lithops aucampiae* L. Bolus 1920 subsp. *aucampiae* var. *aucampiae* [Kuruman form - C173] (Figs. 18a, 18b)**

On first sight there is no orange coloration as found on other close relatives of this plant. It has a more purplish and darker colour. This photo was taken 20km South-West of Kuruman where plants are found next to stones containing high amounts of iron ore.

***Lithops aucampiae* subsp. *aucampiae* var. *aucampiae* [C172] (Figs. 19a, 19b)**

Note the many spots, the orange colouration and



18



19a



20



19b

the almost lacking windows on the surface. Taken North of Danielskuil.

***Lithops aucampiae* subsp. *aucampiae* var. *aucampiae* [C298] (Fig. 20)**

The C298 plants differ from the C172 ones, note the increased window surface area (the dark green portions) which typifies this variety. The photograph is taken from the North of Danielskuil.

18 - *Lithops aucampiae* subsp. *aucampiae* var. *aucampiae* [Kuruman form - C173]. 19a & b - *Lithops aucampiae* subsp. *aucampiae* var. *aucampiae* [C172]. 20 - *Lithops aucampiae* subsp. *aucampiae* var. *aucampiae* [C298].

***Lithops aucampiae* L. Bolus 1920 subsp. *euniceae* (de Boer) D. T. Cole 1988 var. *euniceae* (Fig. 21)**

Picture taken in cultivation. A gorgeous variety of *aucampiae*... I tried to locate the plants but I was



21



22a



22b



22c



23

unsuccessful. Habitat is restricted to an area 25 km North of Hopetown.

***Lithops aucampiae* L. Bolus 1920 subsp. *aucampiae* var. *koelemanii* (de Boer) D. T. Cole 1960 [C016] (Figs. 22a, 22b, 22c)**

The C016 plants are at the type locality, located between Olifantshoek and Lohatla. Photos were taken South-East of Olifantshoek in a small area with few plants. Mainly found in shadier conditions under the margins of shrubs and small

21 - *Lithops aucampiae* subsp. *euniceae* var. *euniceae*.
22a, b & c - *Lithops aucampiae* subsp. *aucampiae* var. *koelemanii*. 23 - *Lithops bromfieldii* var. *glaudinae*.

bushes. These plants are extremely cryptic in the wild. Note the red stained Quartz, characteristic of the stones which it grows around. The plants are quite distinctive, being redder in colour and they do not have windows on the surface just the reddish veins and a mainly opaque look.



24a



24b



24c



25



26



27

***Lithops bromfieldii* L. Bolus 1937 var. *glaudinae* (de Boer) D.T. Cole 1960 (Fig. 23)**

Easy to identify, with its dusky dots that reflect a metallic lustre and its greenish brown like colour. Photo was taken about 20 km South of Witsand Nature Reserve. This is South of Postmasburg in a small area in the vicinity of the Langeberg Mountains. Only known from this region and named in honor of Mrs Glaudina Venter who supplied information about the plants she had seen on her father's farm.

24a, b & c - *Lithops hookeri* var. *lutea*. 25 - *Lithops hallii* var. *ochracea*. 26 - *Lithops hookeri* var. *elephina*. 27 - *Lithops salicola*.

***Lithops hookeri* (A. Berger) Schwantes var. *lutea* (De Boer) D.T. Cole 1964 (Figs. 24a, 24b, 24c)**

Lutea means yellow, which is a bit misleading as the plants don't look yellow at all. The reference is to the flower colour. Unfortunately they were not in bloom when I found them. They are fairly



28



29a



29b



30



31



32

easy to identify as they are similar to var. *hookerii* except the network patterns are deeper and more grooved. Windows are also absent. Photos taken at the type locality in close proximity to the Orange River, East of the town of Groblershoop. Only known from one locality on the Globe! Note the coarse network of facial grooves which separates this variety from others of its relatives.

***Lithops hallii* De Boer 1957 var. *ochraceae* (De Boer) D.T. Cole 1962 [C059] (Fig. 25)**

The name *ochraceae* refers to the red coloration

28 - *Lithops lesliei* subsp. *burchellii*. 29a & b - *Lithops herrei* (*Richtersveld National Park*). 30 - *Lithops herrei* (*Alexander Bay*). 31 - *Lithops bromfieldii* var. *insularis* at the base of *Aloe gariensis*. 32 - *Multi-headed Lithops bromfieldii* var. *insularis*.

found with this variety. It is distinguished by the generally brown opaque colour. Flowers are white. Photo taken halfway from Marydale to Prieska (30 km North-West of Prieska).



33a



34



33b

33a & b - *Lithops terricolor*. 34 - *Lithops optica fma. rubra*.

***Lithops hookeri* (A. Berger) Schwantes var. *elephina* (De Boer) D.T. Cole (1970) [C092] (Fig. 26)**

Photo was taken in cultivation. “Elephina” means elephant grey. Known from North and North-East of Britstown, Cape Province.

***Lithops salicola* L. Bolus 1936 [C086] (Fig. 27)**

Salicola means growing in salt referring to these plants which prefer to grow on the edges of brackish pans and low limestone ridges. Photo Taken in cultivation. This plant is also found at Kraankuil and Petrusville. Type locality is at Fauresmith.

***Lithops lesliei* (N.E. Br.) N.E. Br. 1922 subsp. *burchellii* D.T. Cole 1988 (Fig. 28)**

This plant has a resemblance to *L. aucampiae* subsp. *euniceae* yet upon a closer look at the seed and capsule structure it is unmistakably *L. lesliei*. It also occurs in a small area Nort-East of Douglas,

so its range is quite isolated. It was named after William John Burchell, who in fact discovered the first *Lithops* known to science and hence travelled in this area around the time October 1811. I went to the type locality as stated by Cole, Nort-East of Douglas, where these plants are thought to be growing on a military base, yet was unsuccessful. Photo taken in cultivation.

***Lithops herrei* L. Bolus 1932 (Figs. 29a, 29b, 30)**

Photographs 29a and 29b were taken in the Richtersveld National Park of plants in habitat, growing in solid white quartz. The contrast of the landscape is incredible and the plants were quite large some had up to 15 heads on them, quite astonishing to see these ancient specimens thriving. Photo 30 is of plants growing in the foreground of Alexander Bay area, where I located plants within 5km of the Orange River mouth. They were growing here amongst flat grey stones in very sandy dune like sand deposits.

Very unusual as *Lithops* normally likes stable ground, the bedrock underneath the sand was extremely hard and stable. Magnificent to see how they grow in nature.

***Lithops bromfieldii* L. Bolus 1934 var. *insularis* (L. Bolus) B. Fearn 1970 (Figs. 31, 32)**

Found on vertical rocks on hills in close proximity to the Orange River near the town of Kakamas, on Southern side of the Orange River. Large 8-12 headed specimens were found growing at the base of *Aloe garipeensis* (Fig 31) where they were seeking shade, the plants were in bud but unfortunately the flowers were not open. In other areas on the rock ledges plants were to be found but they were tiny and well hidden.

***Lithops terricolor* N.E. Br. 1922 (*Lithops localis* (N.E. Br.) Schwantes 1938) (Figs. 33a, 33b)**

This is a magnificent species which would be encountered in the Klein Karoo. Surprisingly this locality South of Laingsburg is quite far from the Orange River. It is substantially more to the south. Plants are very cryptic and populations are not very dense. This is truly a marvellous species when seen in the wild. I have also located another population about 100 km away, near Prince Albert, in the Great Karoo. Some authors refer to it still as *Lithops localis*.

***Lithops optica* (Marloth) N.E. Br. 1922 fma. *rubra* (Tischer) H. Jacobsen 1933 (Fig. 34)**

This is a plant in cultivation. Please note that this is the only *Lithops* that has slightly pink tipped petals; all other *Lithops* have a white or yellow flower. This species is highly sought after amongst growers and its locality is very unique, it grows amongst the boulders in sand dune areas in the Luderitz Bay district of Southern Namibia, on the coast where the inland fog keeps it well moisturised. This flower radiates its beauty when in bloom.

Cultivation Tips

If one looks at *Lithops* it is interesting to note that they do not occur in areas like Kwazulu Natal with its summer rainfall and high humidity. This is an important clue to their cultivation suggesting that these plants prefer the more arid parts of our country and the majority go through a dormant period. Depending on what species you are growing, the general rule is to grow under a green house and to water in the growing period before flowering and then to cut down on

watering after the flowering season or the colder months. Obviously if growing from seed you must remember seedlings need more frequent watering. The best time to sow seed is in the summer.

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when succulents attack!

(a peninsula under threat)



by **Jennifer Pannell**, Christchurch, New Zealand.

A small disclaimer to begin with – I can't really claim great expertise in succulent plants. My PhD focuses on ecological modelling, and I am more at home in front of my computer than identifying plants in the field. That said, I am lucky enough to have spent the past few years studying the non-native succulents of Banks Peninsula, New Zealand. Although I view them through the eyes of bio-protection, I have come to admire these unique and exciting plants, which continue to surprise (and perplex) me the more I learn about them. In the following few pages I will offer some of the insights I have gained studying Banks Peninsula and some of its prettiest pests.

A little help from my friends: Robyn helping with transplant experiments of Aeonium and C. orbiculata.



contents →

Banks Peninsula: a history of invasion

Banks Peninsula Region (known as Horomaka in Māori) lies directly south of Christchurch City, jutting into the Pacific Ocean and covering some 1,150km². Once an island, which merged with the Canterbury Plains, its volcanic origins are clearly visible from its terrain. Steep mountains



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1 - Amy doing the tough job of surveying wild Aeoniums at the beach. 2 - Dramatic sea-cliffs surround Akaroa Harbour. Remnants of native forest and scrub can be seen, but tussock grassland is still plainly visible on the right. 3 - Many of these coastal habitats have been invaded by succulents, such as *C. orbiculata* at Pigeon Bay. 4 - Spot the natives? This roadside approaching Diamond Harbour is swamped by invaders. *A. arboreum* (in flower, yellow), *A. haworthii* and their hybrids dominate, also other ornamentals such as lupins are well-established.

and hundreds of valleys surround the harbours of Lyttelton and Akaroa, once the craters of huge shield volcanoes, while volcanic cliffs dominate the bays of the intricate coastline. Historically, these hills were covered in podocarp forest but human interference has left them mostly bare. By 1900 only 1% of the natural forest remained, though there are now pockets of regeneration[1]. The slopes appear yellow in summer, covered by the tussock grassland of sheep farms and banks of exposed loess blown from the Canterbury Plains. As a result, rocky outcrops and geological features are easily visible and there are plenty of open niches waiting to be exploited.

Despite its altered habitat, the Peninsula remains rich in biodiversity. It is home to a number of endemic species such as the Banks Peninsula tree weta *Hemideina ricta* and at least six plant species[2]. Recently, a population of Cook's scurvy grass (*Lepidium oleraceum*) was rediscovered on the Peninsula, thought to be extinct from Canterbury[3]. Various microclimates provide pockets of habitat for species that would otherwise not survive in the area, such as Nikau Palm Gully in Akaroa, where a handful of *Rhopalostylis sapida* survive at their extreme southernmost limit. The cliffs and rocky outcrops provide valuable refugia for species otherwise

Table: Exotic Crassulaceae on Banks Peninsula, according to the Flora of New Zealand[6] and my own sightings. Reproductive mechanisms listed according to Flora, asterisk denotes seed is known to be viable.

Genus	Species	In Flora?	Seen in Wild?	Reproduction
Aeonium	<i>arboreum</i>	☑	☑	Seed*, Vegetative
	<i>haworthii</i>	☑	☑	Seed*, Vegetative
	<i>undulatum</i>	☑	☑	Seed*, Vegetative
<i>Cotyledon</i>	<i>orbiculata</i>	☑	☑	Seed*, Vegetative
Crassula	<i>coccinea</i>	☑	☒	Vegetative only
	<i>multicava</i>	☑	☑	Vegetative only
	<i>tetragona</i>	☑	☑	Vegetative only
<i>Echeveria</i>	<i>secunda</i>	☑	☑	Vegetative only
Sedum	<i>acre</i>	☑	☑	Seed*, Vegetative
	<i>decumbens</i>	☑	☒	Seed, Vegetative
	<i>praealtum</i>	☑	☑	Vegetative only
	<i>reflexum</i>	☑	☑	Seed*, Vegetative

pressured by grazing and monocultures of grassland, and were the focus of an extensive study by Dr. Susan Wiser in 2009 who estimated that up to 50% of the region's endemics are found there[4]. For the interested reader, the ultimate authority on the biodiversity of the region is Hugh Wilson[5], who has devoted a large portion of his life to describing the flora of the peninsula.

Banks Peninsula has a history of invasion, not least by humans – the region has seen influxes of various Māori iwi, European colonisers and is even home to New Zealand's only French settlement. Nowadays, the only invaders are of the plant and animal variety. Domestic and wild mammals are a constant threat to native wildlife, and recent protective measures, such as an enclosure for a colony of little blue penguins (*Eudyptula minor*), only go so far. Meanwhile, deforestation, conversion to grazing land and deliberate planting have paved the way for exotic plants to naturalise. Alongside the obvious candidates such as gorse (*Ulex europaeus*), broom (*Cytisus scoparius*) and *Pinus* species, garden escapes are also impacting on the region.

Within these ornamental plant invaders the Crassulaceae family have been particularly successful; out of 35 species in New Zealand (discounting numerous hybrids) 22 are exotic, while natives are all within the genus *Crassula*[6]. 14 of these exotics can be found on Banks Peninsula and in some areas entire cliff faces are swamped by these admittedly beautiful, but damaging, plants. These very cliff faces and outcrops that are prone to invasion are the ones

providing pockets of refuge for natives often struggling to survive.

In 2009-2010, I surveyed the region and identified the three main offenders in the family – *Aeonium arboreum*, *A. haworthii* and *Cotyledon orbiculata*. This was not only because of the extent of invaded areas (which are among the largest), but also because where they are present they tend to dominate and they are some of the few species which produce viable seed. They have been my focus since then, and I have been attempting to understand why they are so successful, and how they might spread.

The secrets to success

Origins and Habitat

Despite their apparent success in New Zealand, these species originate from countries with surprisingly different climates to here. The *Aeoniums* come from Macaronesia (*arboreum* from coastal areas of Morocco, *haworthii* from Tenerife), while *C. orbiculata* is native to South Africa where it is a characteristic member of the Succulent Karoo biome. We might ask why, then, they do so well in the South Island of New Zealand? One possible explanation is that they can tolerate a wider range of climates than is reflected in the native range, perhaps partly due to a high stress tolerance originating from their harsh semi-arid native habitat. Generally, it is the warmer, drier areas of the peninsula they invade, which may not be an exact match to the native climate, but may share key similarities. Of course,



it is also possible that they have adapted to fill a new climatic niche in New Zealand, but since they have been here for a relatively short time this seems less likely.

Despite the species' varying origins their distributions overlap in New Zealand, and the readiness with which they hybridise (especially the *Aeoniums*) has led to a spectrum of morphologies which can be difficult to identify. Their distributions are patchy and largely coastal, and Banks Peninsula is no exception.

Some findings on Banks Peninsula & the Port Hills:

- 1 - *Amphipsalta zelandica* visiting *C. orbiculata* and *A. arboreum*.
- 2 - *Sedum reflexum* & *Sempervivum* sp.
- 3 - *C. orbiculata* and *A. haworthii* growing beside *Carpobrotus edulis*.
- 4 - *Sedum praealtum*.
- 5 - *A. arboreum* growing in shade.
- 6 - *Crassula tetragona*.



The northern coastline is where they are most abundant, the pattern indicating an original source in Sumner, coinciding with anecdotal stories from local residents. It is believed that they were introduced in the early 1900's when succulent gardens were fashionable, after which they spread rapidly. By 1959 A. J. Healy described *Aeoniums* covering the cliffs of Sumner and Redcliffs[7], and a local resident recalls *C. orbiculata* being present on a farm near Pigeon Bay in 1947, spreading along the coastline over the next 30 years until it reached Little Akaloa[8].

As a rule, they are absent at high elevations, although they can be found to just below 500m in parts of the Peninsula. They are absent further inland and the Southern Bays appear to be unoccupied, at least for now. Their preferred habitats are cliff faces and rock outcrops, but *Aeonium* species can be found in sandy substrate and loess banks (and I have even found some under pine canopy). *C. orbiculata* inhabits a wider range of habitats; not only bare rock or loess, but within tussock grassland as well. A tentative and untested hunch of mine is that they may favour substrate high in silicon compounds – volcanic rock, loess and quartz fields (as found in the Succulent Karoo) are all characterized by high levels of silicates. Silicon is used for structural support and disease resistance, and application of silicates has been shown to boost growth in *Kalanchoe blossfeldiana*[9], while other members of the Crassulaceae accumulate silicon at notably high levels[10].

Aeonium haworthii thrives on a beachside track at Camp Bay. Two distinct growth forms are visible, perhaps the result of hybridisation (compare the tight pinkish rosettes in the foreground to the large, flatter green ones in the background). Some *Sedum praealtum* also breaks through the mass of *Aeonium*.

What makes them expert invaders?

The reasons behind these plants' success are numerous and difficult to disentangle. A key factor is their reproductive strategy - they can reproduce not only by seed but also through vegetative material, like many other succulents. Even a single *C. orbiculata* leaf can develop into a new plant, though *Aeoniums* require a full rosette to root. The seed yield of a single plant is impressive – a single *C. orbiculata* can produce over 85,000 seeds, according to our surveys. Insects are the most likely pollinators in New Zealand, but are unnecessary for reproduction as all three species are capable of self-fertilising[11].

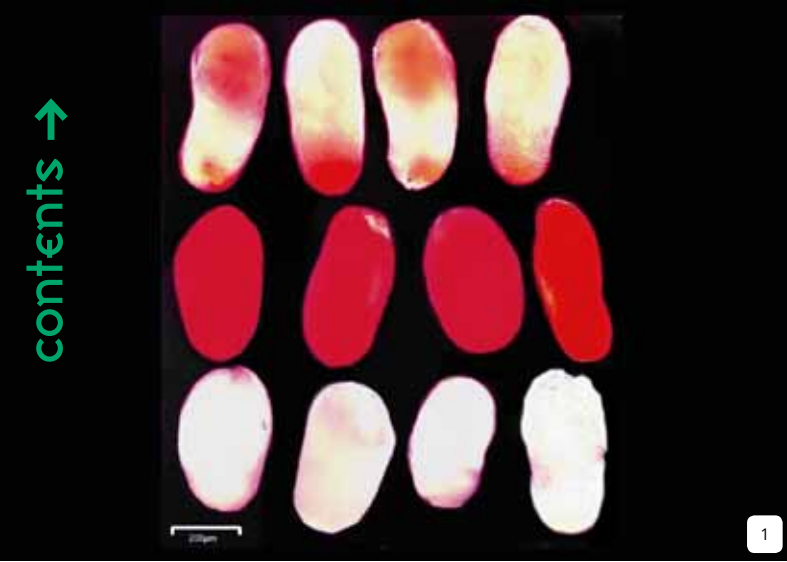
Once produced, seeds are microscopic and barely visible with the naked eye. Their proper name, "dust diaspores (*)", gives you an idea of the difficulty involved in working with them! Laboratory tests revealed that the vast majority of seeds are viable but germination is, of course, dependent on conditions and sheer luck. Given the number of seeds produced though, only a small percentage need germinate to incite rapid population growth.

Not only are these plants highly fertile, but their dispersal is efficient. Wind-dispersed seeds



mean that individuals at the top of a cliff could spread offspring over vast distances. Although that is the textbook explanation (owing to their size), avian dispersal has been suggested to me a handful of times. I think it unlikely that birds would deliberately consume the seeds as they are too small to have any nutritional value (in fact, the seeds contain so little energy that they require additional nutrients to germinate). They could, however, be unwitting vectors; spreading seed by brushing against plants or using the vegetative material to build nests. Their droppings could

1 - Succulents ready for the transplant experiment. 2 - Two years later doing rather well on Godley Head. 3 - *Cotyledon orbiculata* in flower brightens up the monotony of tussock grassland at Godley Head. Invasions into grazing land are especially concerning as the plants are highly toxic to livestock. Evidence that sheep occasionally nibble was seen in the wild in *C. orbiculata* (photo 4) and at my experimental sites in *A. arboreum* (photo 5). also provide fertilizer, aiding in germination, but with only anecdotal evidence their role in dispersal is difficult to test.



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1 - *Cotyledon orbiculata* seeds under microscope. Seeds have been stained with Tetrazolium for viability testing and the seed coat removed. Live tissue is stained red – only the middle row is capable of producing fully formed seedlings. The top row will exhibit deformities and will likely die shortly after germination. Scale bar shows 200 μ m.

Succulents in flower at experimental sites: 2 - *C. orbiculata*. 3 - *A. haworthii*.

Some *Aeoniums* reached 20 cm height with multiple branches only 18 months after planting. 4 - Germination experiment one year after planting on the Port Hills. 4 - *Aeoniums* developed much more rapidly than *C. orbiculata*. 5 - Newly emerged *A. haworthii*. 6 - *Aeonium haworthii*, *Aeonium arboreum* & *Cotyledon orbiculata* germinating in shade

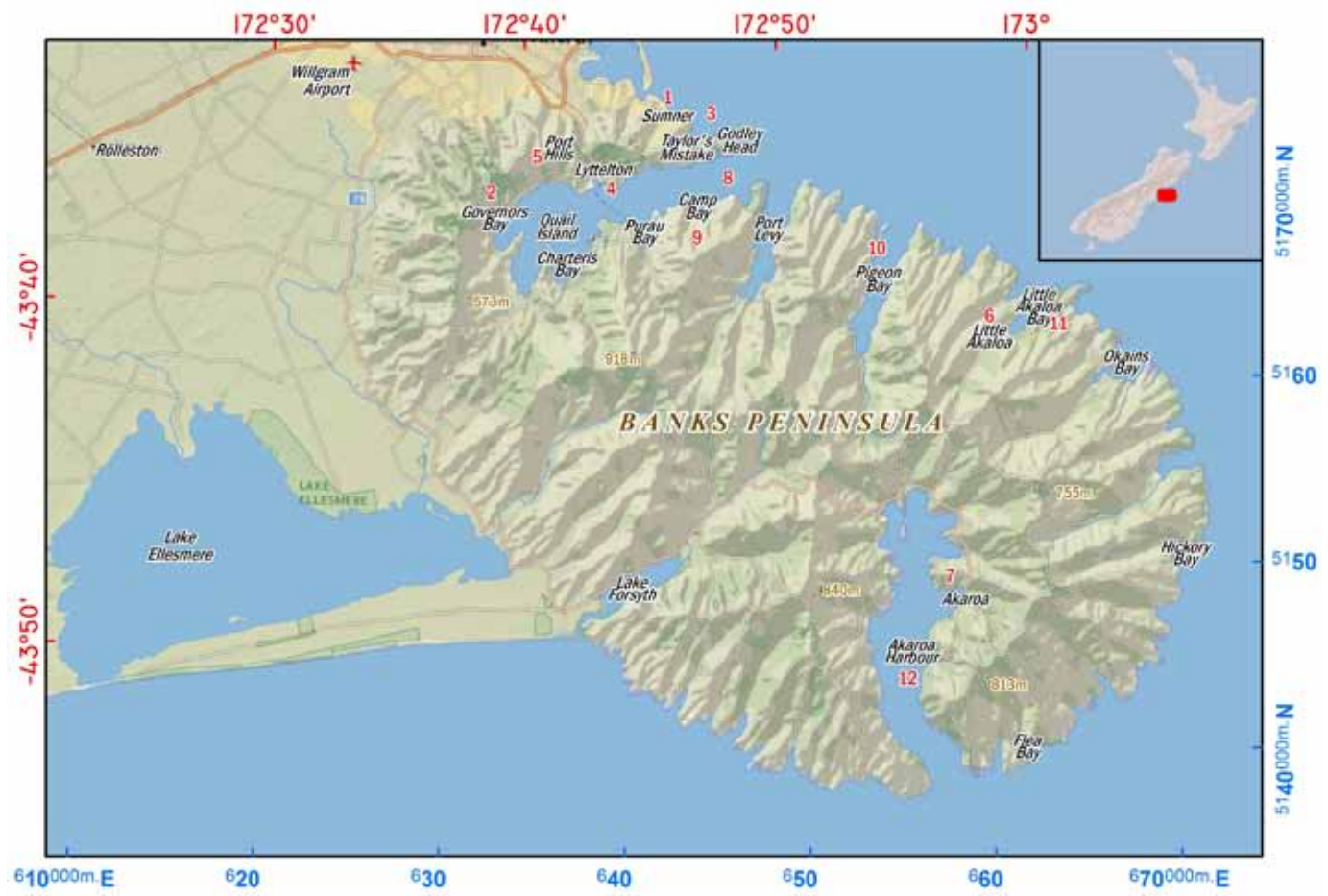


After germination, seedlings grow rapidly into fertile adults. The smallest flowering *C. orbiculata* recorded in the wild was likely no more than a year or two old, though *Aeonium* plants require longer. When fully grown, plants are highly resistant to damage and can regrow even from plant material that appears to be dead. An anecdotal example is of a broken piece of *C. orbiculata* stem that lay around on my desk at university. It had been there for around a year and thoroughly dried out but, astonishingly, formed new leaflets along the stem as soon as it

1 - Godley Head track: A few *C. orbiculata* individuals cling to life after being carried downslope by landslides in the 2011 February earthquake. 2 - Pockets of invaders at Taylor's Mistake, stemming from the dumping of organic waste from nearby baches. 3 - Nearby *C. orbiculata* growing wild in grazing land, on the hills above the baches.

came in contact with water. Traits like these make the Crassulaceae highly efficient invaders.

Of course, choice of habitat is key to their success. Colonising vertical habitats means they can cram large, dense populations into a



Banks Peninsula - map by Miguel Gonzalez Botello - credits - National Geographic, ESRI, Inc.

relatively small area, and Banks Peninsula has no shortage of interconnected cliffs, rock faces and slopes. Disturbances that decimate other plant populations may open windows for further spread – a fire on the hills above Taylor’s Mistake killed most of the plant life but *C. orbiculata* was largely unharmed, giving it a head-start in the race to repopulate. Landslides and rock falls after the 2011 Christchurch earthquake certainly relocated many of my tagged plants in wild populations, but failed to actually kill many of them.

Arguably though, the most important factor in their spread is us. Were it not for their initial (and ongoing) popularity as a garden plant, they would not be a problem. A tour of Sumner or Governors’ Bay will confirm that popularity has not waned. It is not always intentional, though - people can be unwitting vectors of spread by transporting seed or vegetative material. This is especially likely along road corridors and walking tracks, and in residential areas dumping of organic waste can create large populations rapidly.

How can we protect from invasion (without digging up our gardens)?

Admittedly, it is probably too late to reverse the damage already done but we can attempt to contain further spread, or at least slow it down. Official management, be it from City Council, ECan (Environment Canterbury) or MPI (Ministry

for Primary Industries) will certainly have its place, but individuals can still make a difference even without actively taking part in conservation.

I am aware that many readers in New Zealand may be cultivating these plants themselves, and in fact I also have some in my garden (although not *C. orbiculata*, it being an Unwanted Organism!). However, I would urge readers to grow these plants responsibly in areas that are vulnerable to invasion. Plenty of the *Aeonium* hybrids are sterile and as such pose little threat, and risk from non-sterile plants can be minimised by removing flower heads before they seed.

A vitally important step is ensuring garden waste is dead before it is disposed of, and Birdling’s Flat is an example of the results if this isn’t done. Large unchecked populations of *C. orbiculata* grow along the beach and spit - they are popular ornamentals in the area, and vegetative material is often discarded on the beach where it roots easily, alongside a plethora of other garden plants. Currently, populations are restricted to around the residential area thanks to the efforts of local weedbusters, but to the west is the Kaitorete Spit reserve hosting a number of rare and endemic species[12], and to the east are the currently unoccupied Southern Bays. The problem has an easy fix - succulents can be safely disposed of by spraying vegetative material with herbicide before disposal. We conducted a small-



scale herbicide trial for the City Council and found that Glyphosate (Round Up™) is by far the most effective, and even better with a penetrant such as Pulse™.

Barring any large-scale intervention from government bodies, which is unlikely at this stage, abating further spread is up to us. If we do nothing, preliminary results of experiments, surveys and models confirm what we already suspect – they are likely to continue to spread around the coastline of Banks Peninsula. All in all, these beautiful and fascinating species are a pleasure to grow, but we mustn't forget that plants rarely stay within our garden walls, and can impact the unique and vulnerable environment that is New Zealand. To quote a wise man- "Life breaks free, it expands to new territories and crashes through barriers, painfully, maybe even dangerously, but...Life, uh... finds a way"

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1 Jeff Goldblum, *Jurassic Park* (1993)

Banks Peninsula seen from space (NASA, public domain)

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the step forward



by **Dag Panco**, Tegheş, Romania - dag.panco@xerophilia.ro

One year ago, we started a new section in our magazine: **Aztekium valdezii Dossier**. By doing this, we hoped that we will be contributing to the sharing of knowledge on a new species. However, after only one single edition, we were forced to immerse ourselves in a swamp filled with stories about looted and trafficked habitat plants, all over the world... for good money. For 4 issues, we simply carried out watching the show of some unethical persons and of some others' who just wanted to show off what others haven't got yet...

The climax is reached when you hear the apology of theft from habitat: The law is permissive, says "one" and if so, one should take advantage of it. And not only this, but posing as a sort of Robin Hood of the hobbyists deprived of the opportunities because of idiot lawmakers, becoming a kind of vigilante who takes himself what others are forbidden to have... Surprisingly, however, the climax is even exceeded when some "other" illegally harvested and imported

plants and seeds merchant, *persona non grata* in Mexico, everyone knows why, simply promotes his illegal trade by embezzling large fragments from Xerophilia articles, in which we strongly condemn exactly what he is doing! At this point, where audacity and shamelessness are displayed with such insolent ostentation, we decided to discontinue our **Aztekium valdezii Dossier**. No, we won't give up! On the contrary! We will not quit disclosing the habitat thieves and looters ... not only that, but we will also seek elsewhere, through other countries, and in other continents. We will also address similar problems encountered by other plants, and point out other type of burglars and the different ways they sell... It was a mistake to cling to a single species, which, just because of its nature, is prone to become famous and sought after. Just as an example: who really speaks about **containers of plants** shipped into the port of Amsterdam? And if there is no legal restriction for a species, can we still collect it from the habitat anyway ...? Or should we first wait until a species requires special protection, or until it is declared threatened or endangered or even extinct in order to finally grasp, protest,

and fret, while „some“ others hypocritically cry crocodile tears, while hiding their „treasures“ in the back of their greenhouse, not to be seen by the „fools“? I can almost hear them: “Have you seen this one? It DISAPPEARED FROM THE WILD, but I HAVE IT, I HAVE even two of them...! And there are not many in this world who can boast with what I HAVE.”

Fortunately there are countries, institutions and people who decided to act! We must bring up the actions of the Italian Ministry of Environment, which has sent letters to all cacti and succulents nurserymen from this country, reminding them of the law prohibiting the sale of Mexican plants discovered after 1997 without legal documents of origin for the seeds. It's not perfect, you can still bypass it and most certainly some will avoid the law, but procedures will be created to fill the loopholes. There will be checks and many questions will be asked, questions often uncomfortable and perhaps too numerous and

most surely increasingly relevant. It's a first step and this is great!

More important, however, is the action taken by individuals. Although they risk losing exhibitors, the organizers of Festa del Cactus have warned sellers to strictly comply with CITES regulations, as can be seen [HERE](#). There is a larger story further, in the article reviewing this event. At least at Festa del Cactus it will be much harder for the Robin Hood wannabes to share with the “poor” plants ransacked from the habitat. In Bologna it will be harder to sell plants in the parking lots, as still practiced a bit more to the north, at the other the famous September cactus and succulent fair...

Congratulations to Italy and to the organizers of Festa del Cactus! ...

Before discontinuing the **A. valdezii Dossier**, we invite you to marvel some revealing photos in the [Annex...](#)

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ebay Shop by category Search... All Categories Search Advanced

Back to home page | Listed in category: Garden & Patio > Plants/Seeds/Soils > Cacti/Succulents

Aztekium collection

Condition: --

Sold 04h (25 Oct, 2014 17:11:07 GMT)

US \$386.00 0 bids

Approximately 1233.22

Enter your max bid

Place bid

You will confirm this bid on the next screen.

Add to Watch list Add to collection

100% positive feedback

Collect 339 feedback points Get Started | Conditions

Postage: **US \$10.00** (approx. 11.00) Standard Intl Shipping | See details
Item location: Kmko, default, Czech Republic
Post to: Worldwide

Delivery: **Estimated between Thu, 6 Nov. and Fri, 14 Nov.**
Seller ships within 3 days after receiving cleared payment.

Payments: Processed by PayPal | See payment information

Returns: No returns accepted

Protection: **ebay MONEY BACK GUARANTEE** | See details

Print | Report item

ebay item number: 191380932136

Seller assumes all responsibility for this listing.

Item specifics

Brand: Cactus
Model: aztekium
MPN: aztekium

0,5-1cm, seedlings 1-4 years old, very good heritage 15 plants (5x3pcs.)

A.hintonii 2km before Rio San Jose,NL (3 x 12=36USD)

A.hintonii km17, Cementerio,NL (3 x 12=36USD)

A.ritteri El Poblado, S of Rayones,NL (3 x 9=27USD)

A.ritteri Cañon de Los Metates, E of Rayones,NL (3 x 9=27USD)

A.valdezii our first seedlings (3 x 90=270 USD)

Who is this mysterious 2014-**nicer** from above? Is missing an “S” in his nickname?? I let you make a guess...

sprekelia formosissima

Xerophilia

Sprekelia formosissima is a bulbous geophyte plant in the family Amaryllidaceae native to Central America. The so-called Aztec lilies (not a true lily though) is quite common in cultivation. However, here are few pictures by Pedro Najera Quezada in habitat. *Sprekelia formosissima* grows typically near xeric forested areas, on exposed or rocky outcrops.

S. formosissima is present in exposed forested areas, and especially on exposed rocks.



some of my recent fine art works

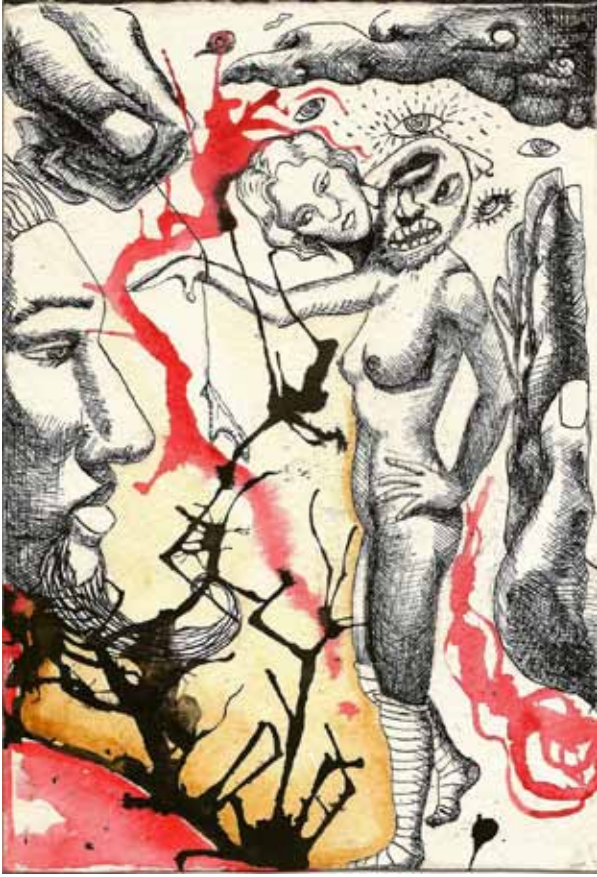


de **Leo Rodríguez**, Salamanca, Mexico.



1. **The mural of the conquest** is a 350 m² mural which was commissioned for a municipality townhouse. Right here in the centre there are some opuntias as a symbol of ancient Mexico.

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2. **Chinese ink drawing.** This is one of the drawings illustrating a fiction book by a friend writer.



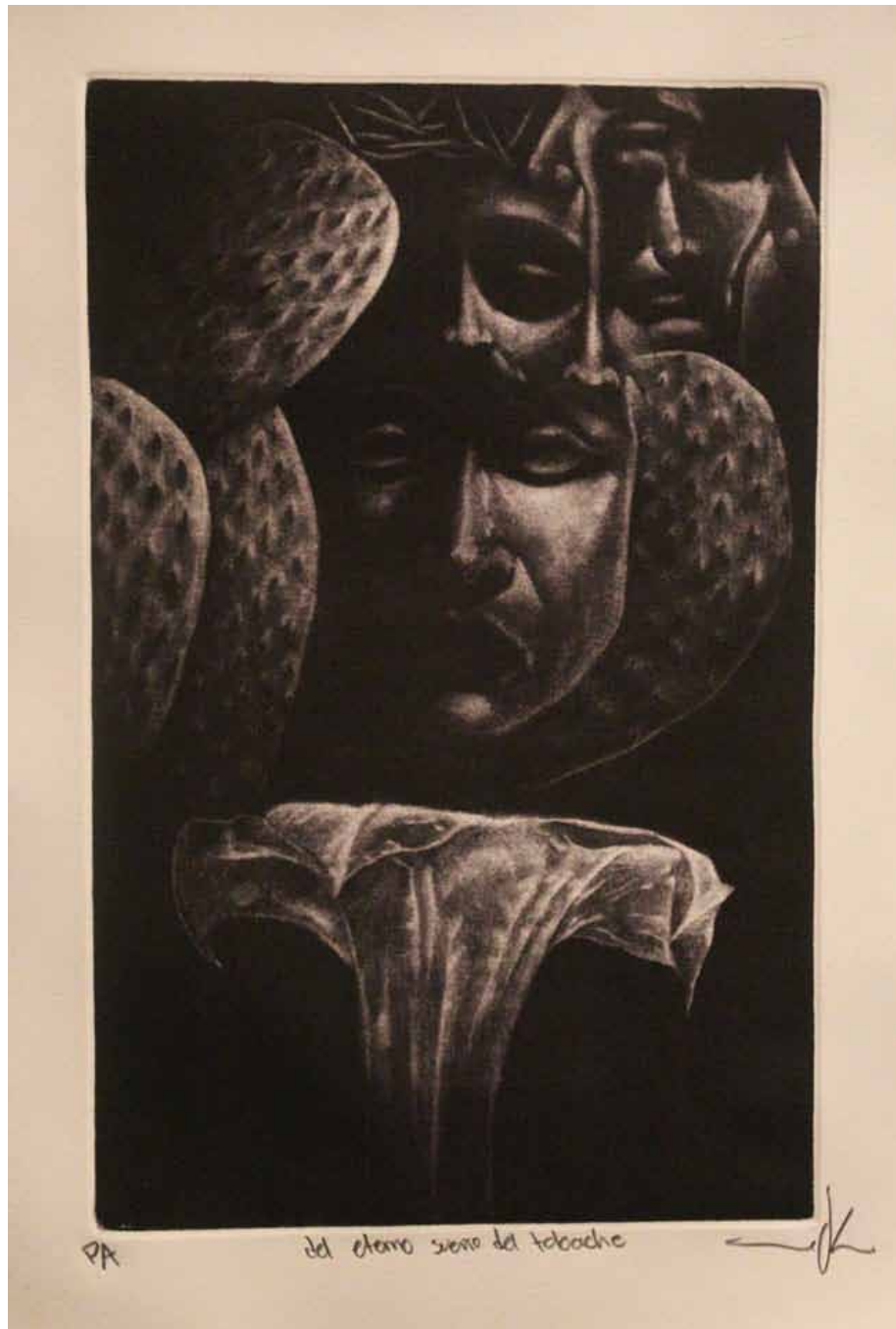
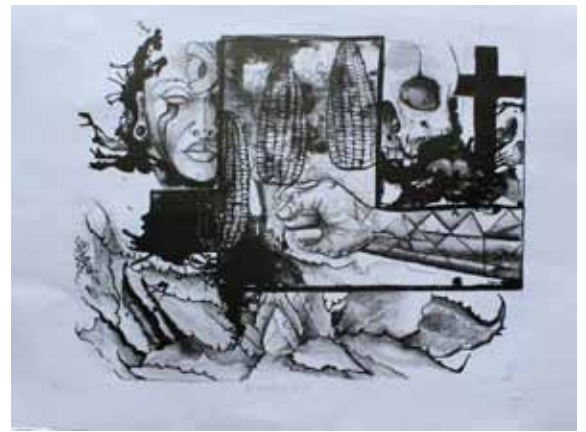
3. **Prehispanic mud masks.** This is an oil on canvas that was the result of an investigation into prehispanic mud masks.



4. **Ariocarpus.** The fourth is also a from the series of drawings for a story book, unfortunately not able to publish. Features botanical elements, such as Ariocarpus and Opuntia cacti.



5. **The Carhartt mural.** This is a mural for Carhartt, the clothing company.



6. - 8. **The eternal anguish of lacking conscience / The Quincunx / The eternal sleep of the Moonflower.** *The last are a series of engravings, mezzotints, and lithographs, part of the work I am currently doing. Some of them include botanical elements (Agave, Opuntia).*

a sad summer for the romanian cactus enthusiasts

Xerophilia

Petre Dobrota, photo by Valentin Posea.

Three cactus enthusiasts, three eminent growers, three very special people passed away during this sad summer, only few weeks apart!

They were, each in his own way, exemplary mentors and, especially, left behind them many followers encouraged and nurtured by their great passion for cacti. When we talk about the passing of people we have known, we have treasured, or of whom we only heard about, but who were part of the same community with us, we cannot rank them as we maybe did when they were still alive, because in the face of death are even more equal than before the law.



Of course, **Petre Dobrota** was and remains the last living legend of the Romanian collectors. Of course, he was the last survivor of the incredible generation of pioneers. Of course, he has the merit of having passed down, both knowledge and passion in the hands of many good and hardworking disciples, not only verbally, but also by writing the first Romanian book on cacti. He

1- Ruse Petroff, photo by Eugen Belu. 2 - Basarab Popa, photo with Cactusi.Com permission.

was a man with an impressive and unmatched cactus knowledge. He has corresponded with all the great collectors of the world of his time and had a huge library on cacti. He was a living spirit. He was a true innovator. He used to be a great Professor.

I wonder how many collectors from Bucharest, some younger, some somewhat elderly, still remember **Ruse Petroff** as the man who handed them their first cactus, or who gave them the first piece of advice, or who always had the time to listen and help? He was not a legend – but was, however, well known, respected and cherished. He was one of the few who knew us all, from all over the country, by visiting our collections. Life was hard on him and struck as none of us could even imagine, but still he had the strenght to get up and carry on. Deep inside Rusica had a good nature. He was a good man. He was a simple man. He was a Man.

The last to pass away, in the first decade of September, was **Basarab Popa**, of Constanța – well-known as BB for all of us. Thousands of beautiful things can be told about BB, but for now we'll limit only to a few words. BB was the owner of a fabulous collection, which was visited by all cactus enthusiasts while on their way to the Black Sea ... it was visited like any great attraction from tourist spots. All those who got there for the first time, overcoming their stunned shyness of entering into the unknown, Romanians and foreigners alike, were met by a warm, jovial, and welcoming host, ready to enjoy the presence of the visitors. BB was a man of elevated generosity and unparalleled benevolence among us, Romanian cacti and succulents collectors. Many started or had the courage to pursue collecting cacti, only after they left BB's greenhouses with boxes full of plants donated by him. BB was loved by all who really knew him. BB was a genuine enthusiast. BB always sought to exceed himself and managed to do so. BB was shining. BB leaves behind mountains of memories that can not be forgotten. BB was a good man, a really fine man. BB was and remains a friend. A dear friend.

The Romanian C&S movement loses enormously by their disappearance.

Xerophilia Magazine brings a humble tribute and transmits the mourning families heartfelt condolences. Rest in Peace!



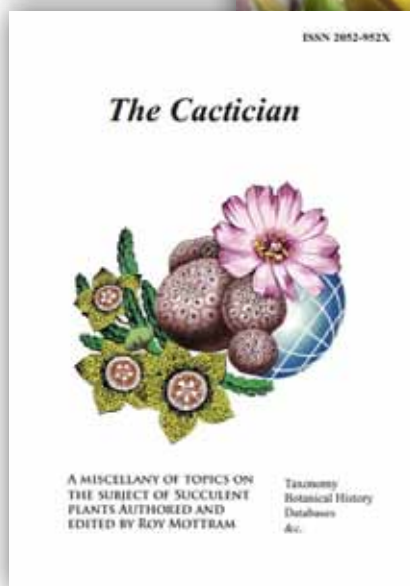
online magazines

Xerophilia

First of all we would like to introduce to our readers **Spinette**, the monthly journal of The Cactus and Succulent Society of Australia, which was the first society journal to be distributed in printed and pdf format (monthly editions). For the last 58 issues up to June 2014, the editor was Attila Kapitany. The last two issues seen by us (June and July 2014) include as usual some very interesting articles, such as *What's new with ant plants* (Attila Kapitany), *The genus Cremonophila and some of its hybrids* (Noelene Tomlinson), *All change in Aloe and Haworthia* (Dr. C. Walker), along society news.

Acc Aztekium Journal (Romanian). From the last issues we have seen (June, July and August 2014) we would like to mention: *Agave albopilosa* (Liviu Jidoveanu), and a presentation of *Richard and Franziska Wolf, Austria* (by Lörincz István).

Avonia-News (German). We've seen last the double July & August and September issues, which include several remarkable articles: *Huernia oculata in Angola* (Petr Pavelka) and *Chile 2010 – die Xerophyten* (Jean-Marie Solichon) and reports



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on Namibian flora (Konny von Schmettau) and Botswana (Cornelia Klak). **The Cactician** – the 5th issue came out in July: *Allotaxa of the Cactaceae* (Roy Mottram).

Succulentopi@ (French) the journal edited by our francophone colleagues; in the latest two issues (No. 10 & No. 11) include, among other things, an interesting article on *Orchidaceae* (Jean-François Thomas) and an overview of the genus *Austrocyllindropuntia* (Philippe Corman).

The Cactus Explorer No. 12 came out in August. Main articles: a presentation of the recently discovered *Mammillaria bertholdii* Linzen; the first description of *Echinocereus pectinatus* subsp. *rutowii* W. Blum; *An update on Ayopaya, Bolivia* (John Carr); *Maihueniopsis leoncito* (Graham Charles). **Echinocereus Online-Journal** (German with English abstracts) – Vol. 2, No. 3, July 2014 features an in depth morphometric analysis of *Echinocereus*, section *Triglochidiati*: *Erstaunliche Ergebnisse* (Werner Rischer). **Sansevieria Online** (German with English abstracts) – comes out with a special issue : the list of *Sansevieria* field numbers compiled by Peter A. Mansfeld.

Schütziana (German with English abstracts) Vol. 5 (No. 2) includes a highly interesting article by Wolfgang Papsch - *Comments on Gymnocalycium bodenbenderianum and Gymnocalycium riojense*.

In early July came out **Acta Succulenta** with the second issue of this year of. From the very interesting summary: *Travelogue of a photographer and a naturalist, Part two* (Stefano Baglioni); *Inula crithmoides, the false Crithmum who dreamed of being a true one* (Gérard Dumont and Antoine Mazzacurati); *WIG: Succulents with style!* (Andrea Cattabriga – extensive and explanatory notes on wild grown cultivation); *Sempervivum montanum, a jewel from the high peaks* (Davide Donati and Gérard Dumont).

Crassulacea, Boletín electrónico de la SLCCS – we did not see new releases by the time we had to close off our current edition.



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what's cooking?

In preview

Xerophilia

Xerophilia 11

- **Aldo Delladdio** - Three weeks in Mexico, Part 2.
- **Leo Rodríguez** - *Mammillaria polythele*, *M. zeilmanniana* and other cacti from Guanajuato
- **Erik Holm** - A Dane visiting Romania (A story about friendship and cacti), Part 2
- **Cristian Perez Badillo** - *Ephitelantha*: "Biznaga blanca chilona"
- **Malcolm A. Grant** - Distribution of the trifold disease of cacti in habitat
- **Eduart Zimer** - Whakaari (White Island)



... and much more!

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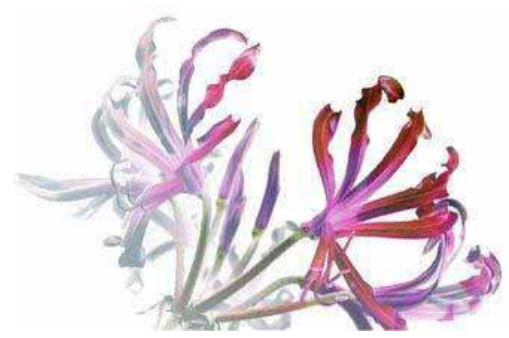


"Avonia", the quarterly member journal of the German Society for other Succulents, written in German with English summaries, non-German manuscripts in original language too, containing colour photographs, excellent drawings and articles on all aspects of the other Succulents.

Annual subscription:
Germany: 30 € incl. PP
Other countries: 35 € incl. PP

Free available coloured online journal "Avonia-News", annual seed list for members and many more. Stakeholders for Aloe (incl. Haworthia a.s.), Ascleps, Euphorbia, Mesembs and Yucca/winter-hardy Succulents.

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