

The Cactus Explorer

The first free on-line Journal for Cactus and Succulent Enthusiasts

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February 2024

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Cover Picture: *Perucactus ostolazae* flowering in cultivation.

Photograph: Luis Enrique Alomía. [See page12](#)

The No.1 source for on-line information about cacti and succulents is <http://www.cactus-mall.com>

The best on-line library of cactus and succulent literature can be found at:

<https://www.cactuspro.com/biblio/en:accueil>

Invitation to Contributors

Please consider the Cactus Explorer as the place to publish your articles. We welcome contributions for any of the regular features or a longer article with pictures on any aspect of cacti and succulents. The editorial team is happy to help you with preparing your work. Please send your submissions as plain text in a 'Word' document together with jpeg or tiff images with the maximum resolution available.

The copy deadline is just a few days before the publication date. I will publish an issue when sufficient material is available. Please note that **advertising and links are free** and provided for the benefit of readers. Adverts are placed at the discretion of the editorial team, based on their relevance to the readership.

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INTRODUCTION

Happy New Year!

In October, I made my first visit to Peru since Covid. The objective was to explore the coastal valleys, especially those south of Lima. I was particularly interested to see if there was a gap in the distribution of *Matucana haynii* at high altitude in these valleys. I was wondering whether to recognize *Matucana hystrix* as a separate species. Our investigations show that there is no break in the distribution and no clear morphological differences so I will include *M. hystrix* in the synonymy of *M. haynii* in my forthcoming book.

During our travels we met up with Peruvian botanists Guillermo Pino and Luis Enrique Alomía (pictured right). They showed us the locality of a new cactus they were planning to describe as a new genus. Later, at a meeting of SPECS (the Peruvian Cactus Society) in Lima, the latest edition of their journal *Quepo* was revealed with the first description of *Perucactus ostolazae*. The specific name honours our friend Carlos Ostolaza who has done so much for the cacti of Peru and guided me on my first visit to the country in 1998. You can read more about this distinct new plant on [page 12](#).

The long running German study group *Echinoceenfreund* ceased publication at the end of 2023. You can read about it on [page 20](#) and buy their excellent special publications at discounted prices.

And now I hear that *CACTACEAE etc.*, a Czech journal published since 1991, has also come to an end with the last issue of 2023: Volume 33, number 4. Igor Drab will have some part and some complete (new, unused) sets for sale at the beginning of April:

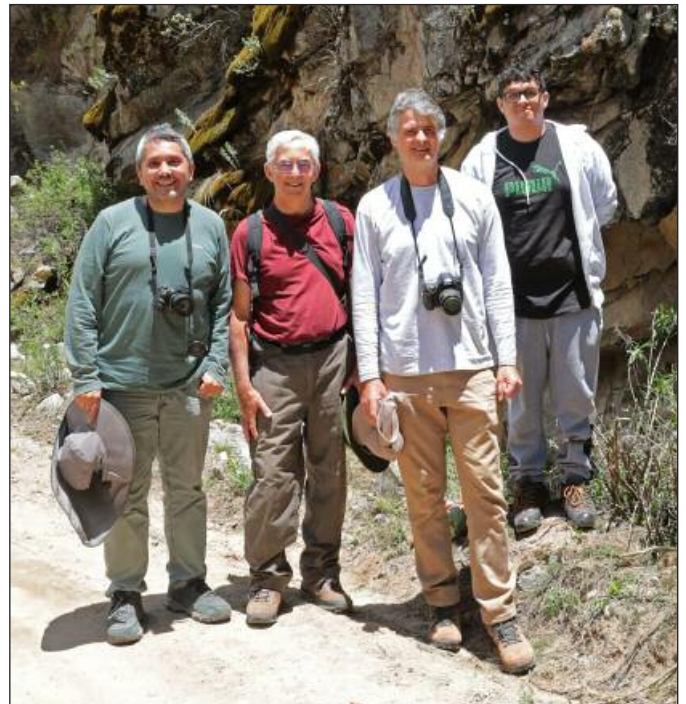
1991-2007 (3 or 4 complete)

1991-2023 (2 complete)

You can contact him at igor.drab@gmail.com

Good Growing!

Graham Charles



Guillermo Pino, Martin Lowry, Paul Hoxey and Luis Enrique Alomía at a habitat of *Perucactus ostolazae*.
Photograph: Graham Charles.

New Combinations

As you may know, I have been working on a book about the genus *Matucana* for several years and hope to publish it in 2024. An unpublished molecular study of Borzicactinae shows that species of *Oroya* belong in *Matucana*. As has been seen in other genera, this is an example of the floral syndrome and fruits varying within a genus.

So, in preparation for my book the following combinations are needed:

Matucana borchersii (Bödeker) G. Charles
comb. nov. **Basionym:** *Echinocactus Borchersii* in *Kakteenkunde* **1933:** 112 (1933);
syn. *Oroya borchersii* (Bödeker) Backeberg.

Matucana peruviana (Schumann) G. Charles
comb. nov. **Basionym:** *Echinocactus Peruvianus* in *Gesamtbeschreibung der Kakteen, Nachträge:* p.113 (1903); **syn.** *Oroya peruviana* (Schumann) Britton & Rose.

GC

New Book Offer

The genus Matucana Species from the Cajamarca region by Nelson Cieza Padilla & Olivier Camille Klopfenstein.
See [page 26](#) for details of how to buy it.

NEWS AND EVENTS

We are looking forward to events in 2024 but please note the details are subject to change.

Cactus at the Castle 2024



Saturday 14th - Sunday 15th September

11.00am–5.00pm
Lullingstone Castle
Eynsford, Kent
DA4 OJA

The largest Cactus Mart in the south-east with over 20 leading nurseries.

Talks and Plant Sales
Guided tours of the World Garden with Tom Hart Dyke

Adults **£12.50** Under 16s **FREE**
Cactus & Succulent Review Readers **£6**
BCSS Members **£10**
(Admission charges subject to change)
Refreshments available

[Website](#)

New Book offer for Explorer readers:

The genus Matucana
Species from the Cajamarca region
Nelson Cieza Padilla &
Olivier Camille Klopfenstein

See [page 26](#) for details and how to buy it.

The 15th Spalding Cactus Mart

Saturday 20th April 2024
10.00am–3.00pm



Holbeach Community Centre,
Fishpond Lane,
Holbeach, Lincs P12 7DE
17 nurseries and growers in attendance

Ample free parking
Free admission to the Mart
Refreshments available all day

For further details please see the
BCSS Spalding Branch website:
www.spalding.bcsc.org.uk

BCSS Showing & Judging Weekend

21st & 22nd September 2024

Presentations by experts
Fun interactive sessions
Improve your showing and judging skills
Take a test and qualify as a judge (optional!)
Plant sales
Plenty of time for meeting friends
Full weekend or day delegate rates

The Leicester Hilton Hotel
(next to M1 junction 21)

Bookings: Bill Darbon:
william.darbon77@btinternet.com

The Cactus Explorers Club 17th Meeting in 2024

August 2–4th 2024

The Leicester Hilton Hotel
(next to M1 junction 21)



A weekend of good company with about 15 talks including overseas speakers. A good place to meet old friends and make new ones in a relaxed environment.

The talks are designed to give a more in-depth view of particular cacti or specific places. The informal atmosphere encourages discussion and there is ample opportunity to meet the speakers.

The price for the weekend will be **£260** which includes two nights in en-suite hotel-quality single rooms, all meals, refreshments, and use of the large meeting room.

There will be sales of plants, literature and seeds, free for vendors.

Anyone interested is welcome and there are places available so please [email](#) me and I will send you an invitation in January 2024.

Graham Charles

RHS Harlow Carr Autumn Cactus and Succulent Show

Sunday 22nd September 2024



**RHS Garden Harlow Carr,
Crag Lane, Harrogate,
North Yorkshire, HG3 1QB**

11.00 – 16.00

(Gardens open 9.30 – 18.00)

FREE admission for BCSS Members!

For more information, to volunteer or to request a schedule when it becomes available, email the [Secretary](#).

Bradleya Sale!

The price of Bradleya, the yearbook of the British Cactus & Succulent Society has been reduced by £5 so No.42 for 2024 (available in May) will be just £15.

Back numbers are also on sale so now is the time to complete your set.

BCSS National Plant Fair A New Event for 2024!

10–11th August 2024

NAEC, Stoneleigh,
Kenilworth CV8 2LG

For the first time, the BCSS are holding a National Cactus and Succulent Plant Fair

The focus will be on plant sales, and there will also be talks and other attractions.

Contact:

showschairman@bcss.org.uk

The BCSS AGM

27th April 2024

Leicester East Forest Parish Hall,
Kings Drive, Leicester Forest East,
Leicester LE3 3JE

FREE entry

11.00 – 16.30

Plant Sales and Talks

Further details from

secretary@bcss.org.uk

North West Cactus Mart

Saturday 4th May 2024

Parish Hall, St. Thomas More Church,
Mainway, Alkington, Middleton,
Manchester M24 1PP

10.15 – 14.00

Contact email: peter@bint.myzen.co.uk

BCSS Oxford Show & Mammillaria Show

Saturday 13th July 2023

Old Mill Hall, School Lane,
Grove, Wantage OX12 7LB



Lots of plants for sale from Oxford Branch and dealers.

SHOW OPEN 10.00am – 3.30pm

FREE ENTRY

Details/schedule from [Bill Darbon](#)

THE MIDLANDS SHOW

A New Show for 2024!

Saturday 27th July 2024

Wollaton Park Community Centre,
15 Harrow Road, Wollaton,
Nottingham NG8 1FG

10.30 – 15.30

Hosted by Nottingham Branch

Refreshments & light lunch available

Sales by Ian Armstrong, Woodside Cacti,
Alan Pocock, Bob and Beryl Potter and
Branch sales.

Show schedule available on request
from g_darbon@yahoo.com

British Cactus & Succulent Society

NATIONAL PLANT FAIR

10-11 AUGUST 2024

NAEC, STONELEIGH
WARWICKSHIRE CV8 2LG
(CV8 2LH SAT NAV)

Bringing you all the main
sellers of succulent plants in
the UK under one roof!

Tickets £10 for both days
18 and under FREE



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**13-14-15 sept
2024**

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blankenberge / belgium

www.elkcactus.eu

Le Couleurs Cactus Club présente la 15^{ème} édition de

Couleurs Cactus

Le salon des cactus et plantes succulentes



Echeveria X blue wave par Brandon Blachère



Nouvelle salle
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mairie de
Saint-Beauzire



Plus d'infos :
www.couleurs-cactus.fr



Gymnocalycium par Jean-Michel Ulleviellie

9h - 18h

Vente - Expo - Conférences
1^{er} - 2 juin 2024
63360 Saint-Beauzire
ENTRÉE GRATUITE



Mammillaria haudeana par Midouze

Le Cactus Francophone



www.cactuspro.com

Saint-Beauzire



THIRD INTERNATIONAL SANSEVIERIA CONFERENCE IN ARUSHA, TANZANIA JUNE 16 – 22, 2024



The First International Sansevieria Conference (2022), held in Potsdam, Germany, and the Second International Sansevieria Conference (2023) held in Arusha, Tanzania, were great successes, bringing together Sansevieria research scientists and admirers of the genus from Europe and Africa.

The **Third International Sansevieria Conference** will be held in Arusha, Tanzania on June 16 (arrival day) to June 22, 2024. Attendees for the Conference only will depart on June 22.

The Conference is sponsored by the Tanzania Sansevieria Foundation, and the National Herbarium of Tanzania. Your hosts are Dr. Neduvoto Mol lei (National Herbarium of Tanzania, TPHPA) and the Tanzania Sansevieria Foundation's Robert Sikawa and Barry Yinger.

The Conference will be followed by an optional Sansevieria Safari June 22 to June 29.

Conference schedule

Day 1, June 16: Guests arrive at JRO Kilimanjaro International Airport. Transportation to the Silver Palm Hotel is provided. There are both morning, afternoon, and evening arrivals at JRO. We will be doing morning, afternoon, and evening pickups as required.

Day 2, June 17: Breakfast at hotel, then by coach to the farm of the Tanzania Sansevieria Foundation at Robert Sikawa's farm on Mt. Meru. In the morning you will see the Foundation's collections of 1200+ unique documented collections, including many unnamed species. You may look around on your own or join a group tour. Return to the hotel for dinner.

Day 3, June 18: Breakfast at hotel, then by coach to

the Conference Center at the TPHPA compound adjacent to the National Herbarium of Tanzania. Full day of presentations with lunch at the Center. Return to hotel for dinner.

All attendees are encouraged to submit a paper in advance for consideration as a presentation.

Day 4, June 19: Breakfast at hotel, then by coach to the Conference Center at the TPHPA compound adjacent to the National Herbarium of Tanzania. Full day of presentations with lunch at the Center with discussions in the afternoon. Return to hotel for dinner.

Day 5, June 20: Breakfast at hotel, then by coach to the Conference Center at the TPHPA compound adjacent to the National Herbarium of Tanzania. In the morning there will be a workshop at the Herbarium led by Dr. Michel Burkart from Potsdam University. The workshop will focus on the finer morphological details of *Sansevieria*, such as leaf surface texture and details of fruits and seeds. You will need to bring a hand lens so that you can see details under magnification. Lunch at the Center. In the afternoon the group will travel by coach to locations in Arusha area to see *Sansevieria* in nature. Return to hotel for dinner.

Day 6, June 21: Breakfast at hotel. Group will travel by coach to locations in the greater Arusha area to see *Sansevieria* in nature. Box lunch on the road. Return to hotel for farewell dinner at a local restaurant.

Day 7, June 22: Breakfast at hotel. Departure day for those who are not joining the optional Sansevieria Safari. Transportation to the airport is provided.

For those who are joining the safari, we will leave the hotel by coach after breakfast.

Optional Sansevieria Safari

Days 1 to 6, June 22 to 28: We are still working on the exact itinerary for the safari, but we have decided on a circular route from Arusha east to the Pare Mountains, then south to Tanga and Morogoro, west to Dodoma, and north to Arusha via Kondoa. Further details will be provided as the program develops. The safari is designed to visit three “hot spots” of *Sansevieria* speciation where large numbers of undescribed species have been found. You will see many species of *Sansevieria* in nature, including unnamed taxa.

Return to Arusha on June 28.

Day 7, June 29: Breakfast at hotel. Departure from Arusha. Transportation to JRO International Airport is provided.

Price of Attendance for 3-day short Conference

Anyone may attend the Conference on June 18,19 and 20. This price is for full-day meetings on June 18 and 19, and morning workshop on June 20. It includes lunch. It does not include any other meals, hotel, or transportation: 50,000 TSh per day, 150,000 Tsh for three days.

Price of Full Conference only

The Conference is an all-inclusive land package including all expenses except travel to Arusha, alcoholic beverages and personal items. (The safari is an optional additional program not included in this price).

Guests who are not citizens of an African country: \$1350.00 Guests who are citizens of an African country: 900,000 TSh

Price of Sansevieria Safari only

The Sansevieria Safari is an all-inclusive land package including all expenses except travel to Arusha, alcoholic beverages and personal items. Attendance is limited.

Guests who are not citizens of an African country: \$1450.00 Guests who are citizens of an African country: 1,000,000 TSh

You must register and pay by May 15, 2024 to attend any part of the Conference programs.

Please register by email to tzsansevieria@gmail.com. We will confirm and send instructions for payment.

Sansevieria plants for sale to attendees

Attendees will be able to buy a number of rare and interesting *Sansevieria* with documented wild provenance to take home with you. Phytosanitary certificate will be provided. Some of these species, such as *rugosifolia*, *forestii*, *lineata* from Tanzania, *enchiridiofolia*, *bhitalae*, true *braunii*, *nitida*, *newtoniana* and others, are rarely if ever available for sale. You must order and pay in advance so that we can prepare the necessary documents for you legally to take the plants out of Tanzania and into your home country. These are offered only to attendees. Send an email to tzsansevieria@gmail.com for the list of offerings

Travel to Arusha

Several international airlines fly to JRO, Kilimanjaro International Airport. KLM has daily non-stop service from Amsterdam. Ethiopian Airlines, Turkish Airlines, and Qatar Airways, plus some African regional airlines also have flights to JRO. Please arrange your flight to arrive at Arusha on June 16, 2024.

Most visitors will need a visa to enter Tanzania. You can apply online at <https://eservices.immigration.go.tz/visa/> You can also visit the visa on demand desk upon arrival at JRO airport and get the visa there. It costs \$50 for Europeans and Canadians, \$100 for US citizens. Cash only.

Questions? Please email us at tzsansevieria@gmail.com

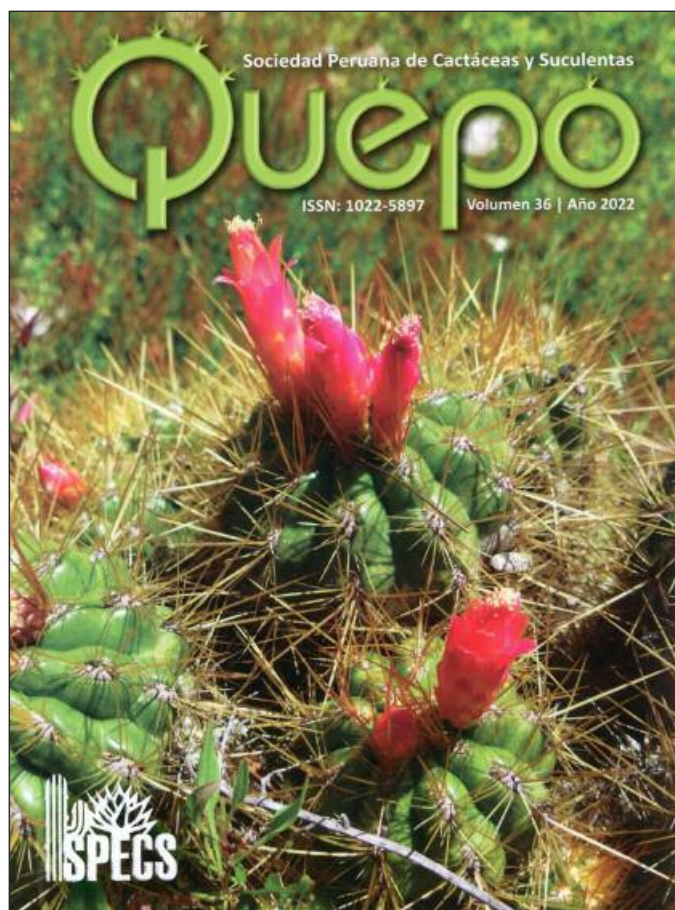


RECENT NEW DESCRIPTIONS

The latest edition of *Quepo*, the journal of the Peruvian Cactus & Succulent Society, was published on November 5th 2023 (although the cover suggests 2022 as the publication year). It contains the description of an important new discovery, *Perucactus ostolazae*, by Dr. Guillermo Pino and Luis Enrique Alomía.

This new taxon was discovered by the local people of the Ulcumayo Valley, Junín, Peru, who know it as 'Umankasha' (The head cactus, because its sap is rubbed on the forehead to relieve headaches). It had been featured on local social media networks since 2013 where it was seen by Guillermo and Luis Enrique who decided to investigate.

They first saw the plant in habitat in July 2021 which is after the flowering season so only fruits and seeds could be found. Then, in May 2022, flowers were observed in habitat and digital photographs taken including the one used for the cover of *Quepo* 36 (below).



Perucactus ostolazae

Photographs by Luis Enrique Alomía unless otherwise shown



Figure 1. Fruits containing ripe seeds. They will continue to expand, see Figures 8 & 9.

The First Description:

A succulent, globular to shortly columnar **plant**, erect, rarely decumbent when growing on cliffs, caespitose, rarely solitary, bright green, (7–)10–15(–20)cm tall, (up to 50cm long when decumbent) 5–7(–15)cm diam. **Root**, a short taproot, then branched and fibrous. **Apex** flat. **Branches** offsetting from base, 1–15, spirally attached. **Ribs** 8–12, well defined, straight to slightly sinuous, with conspicuous tubercles, oblong to ovate, (1.5–)1.8–2(–2.5)cm long, (1.3–)1.5–2.2(–2.5)cm wide, separated by a transverse v-notch below. **Areoles** narrow elliptic, 7–11mm long and 3–4mm wide, grey, with a felt of miniature inconspicuous



Figure 2. Flower section showing the nectary, ovary and bases of the stamens and style.

trichomes. **Spines**, straw-yellow to orange, darker with age; radial spines 14–18, 5–15mm long, 0.5–0.6mm diam., straight; central spines 1–3(–5), 3–4cm long, aligned vertically, straight. Flowers slightly zygomorphic, 1–3(–5), subapical, flower buds ovoid, subconical, dark red, 1.5–5cm long, 1.3–1.5cm diam., in anthesis 6.5–7cm long, perianth 5–5.5cm max. diam. **Perianth segments** 16–20, bright red to dark red with age, 2–2.5cm long, 0.4–0.5cm wide, long oblong, acute. **Floral tube** 1.5–1.8cm diam., green at the base, then yellowish to reddish towards the apex, with 24–30 acute scales (0.8–)1.2–1.9cm long, 0.5–0.6cm wide with 12–20 trichomes, 2–4mm long on borders and apex. **Ovary** cup-shaped, 0.4–0.5cm long, 0.6–0.8cm diam.; **nectar chamber** 0.6–0.7cm long, 0.7–0.9cm diam., closed by diaphragm, its distal half purplish when ripe, with 12–16 longitudinal white sail-like nectar glands. **Style** white, 6–6.5cm long, 0.8–1mm diam. **Stigma** trilobed, each lobe 0.6–0.7cm long. **Filaments** ca. 100, born from the diaphragm and from the inner proximal half of tube, white at base, pinkish distally, 4.5–5.5cm long, 0.25–0.3mm diam. **Anthers** ellipsoid, 1.5–1.8mm long, 0.5–0.9mm wide, light yellow. The anthesis is continual for 3 days, from March to June. **Fruit** ovoid to pyriform, reddish-brown, yellowish-green at the base where not exposed, (1.5–)2–2.3cm long, 1.7–2.4cm diam. at the basal third, with 8–10 blunt vertical ribs 1–2mm



Figure 3. The flower, external view and section.

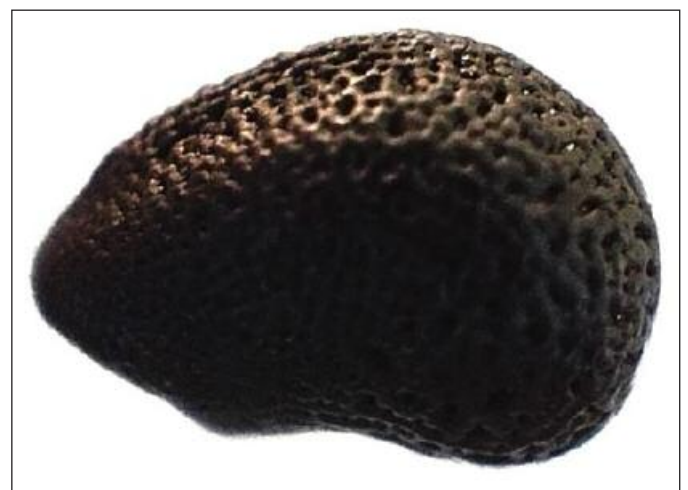


Figure 4. The seed.

deep; inside hollow, fruit wall 3–4mm wide, containing 80–200 seeds, inner wall yellowish green with long yellow papillae 0.5×2.5–4mm. Dry perianth frequently persistent, 2.5–4cm long, 4–6mm diam. at the base, light grayish-brown, and pinkish at the apex. Seeds are released through a basal pore. **Seeds** matt black, ovoid, 1.86–2.25mm long, 1.33–1.6mm wide, 1.08–1.25mm thick, testa surface rugose to foveolate, edge of testa expanded around hilum, devoid of foveolae; periphery with an inconspicuous keel in the dorsal region formed by undifferentiated cells. Hilum-micropylar region oval; 0.71–0.86mm long, 0.42–0.57mm wide; oblique, 20–60° with respect to the longest axis; impressed; hilum and micropyle conjunct forming a single complex but separated by a sclerified band; micropyle protruding from the funicular tissue of the hilum or not; mucilage sheath absent; testa cells



Figure 5. Flowering in habitat at the type locality in May 2022.

gradually smaller towards hilum; isodiametric; relief low-convex; cuticle not loose.

Type locality: PERÚ, Dept. Junín. Prov. Junín. Dist. Ulcumayo. A difficult walk from the rural hamlet of Santa Ana de Piscururay at 3850m. First visited on July 30th 2021.

Holotype: G. Pino & Luis E. A. Alomía C. No. 3308. (USM 328991).

Etymology: The specific epithet of *P. ostolazae* has been coined in recognition of Carlos Ostolaza, a medical doctor, general surgeon and botanist, national expert and authority of Cactaceae in Peru, member of the IOS, Fellow of the CSSA, founder/past-president of the Peruvian Cactus and Succulent Society (SPECS) and author of many books and articles about cacti.

Distribution, habitat, and accompanying species: To date, this species has only been found in the north of the province of Junín on steep rocky slopes and clay soils. The type locality is located at 3,850 meters above sea level and plants grow in a range between



Figure 7. In fruit in habitat at the type locality in July 2021.

3,050m and 3,950m.a.s.l. on the right bank of the Ulcumayo River, near the border of the provinces of Junín and Tarma, Department of Junín, Peru. Temperatures range between -4°C and 15°C. Its distribution is likely to extend further south. It grows together with other cacti such as *Austrocylindropuntia subulata* subsp. *exaltata* (Berger) Hunt, *Austrocylindropuntia floccosa* (Salm-Dyck) Ritter, and other succulents, such as *Crassula connata* (Ruiz & Pavón) A. Berger, *Oxalis* sp. and *Puya* sp.

What Genus? Before deciding to erect a new genus for this interesting plant, the authors considered if it was a *Matucana* species since the stems look similar to *Matucana hastifera*. Or perhaps it is an *Oreocereus* because its fruits are similar. The flowers and fruits are like those of *Oroya*, although larger. It appeared to be somewhat intermediate between *Matucana* and *Oroya*. Holger Wittner, a specialist in *Matucana*, wrote (pers. comm.) that the seeds 'At first sight the seeds are not the seeds of *Matucana* but more little like those of *Borzicactus*'.



Figure 8. The fully ripe expanded fruits.
 Photograph: Martin Lowry.

So, the obvious next step was to conduct a molecular analysis. The result shows that this plant is basal to a clade containing matucanas and oroyas (which are now considered to be matucanas, see [page 3](#)) so it would be appropriate to treat *Perucactus ostolazae* as a *Matucana* species:

New Combination

Matucana ostolazae (Pino & L.E.Alomía)
 Pino & L.E.Alomía **comb. nov. Basionym:**
Perucactus ostolazae Pino & L.E.Alomía
Quepo 36: 16 (2023).

Acknowledgements: My thanks to Dr. Guillermo Pino and Luis Enrique Alomía for the use of their words and pictures in this article and also for taking Paul Hoxey, Martin Lowry and me to see the plant in habitat. I am grateful to Dr. Hanno Schaefer for undertaking the molecular analysis.

GC



Figure 9. Fully ripe expanded fruits showing the remains of a sack in the top of the fruit.
 Photograph: Graham Charles.



Figure 10. The interesting flower is like that of *Oroya* but much larger.

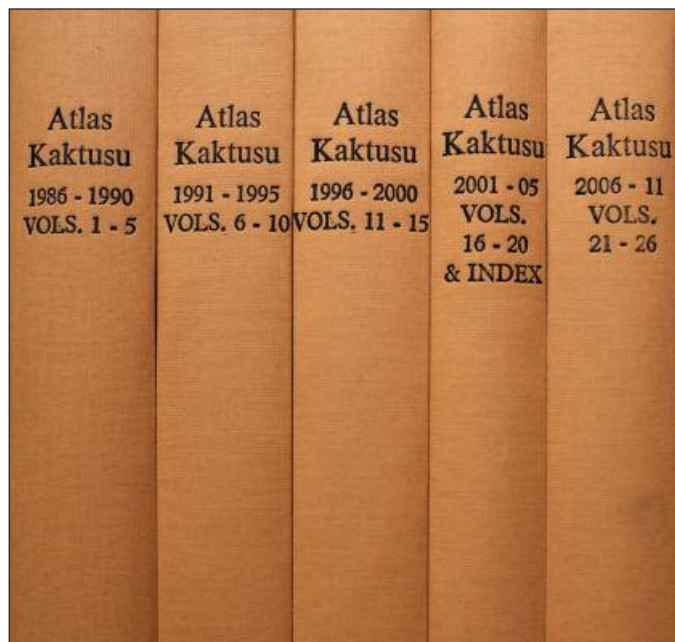
ATLAS KAKTUSU

Over the years, there have been many attempts to build a comprehensive encyclopedia of the cactus family by the regular publication of parts. Few have got anywhere near completion but you have to be impressed by the dedication to the task shown by *Atlas Kaktusů* which has been published since 1986.

This Czech language cactus annual serial publication comprises a set of loose sheets 165 × 247mm. Every set has about 40 sheets, so that by this year (2023) the appearance of the 38th set means that over 1500 sheets have been produced.

Each page features a single cactus species. There is a good quality colour photograph of the plant either in cultivation or habitat. A brief taxonomic history is given, including synonyms. The description is followed by paragraphs about variability, ecology and distribution, notes about the species, literature and cultivation recommendations.

The quality of the printed pictures is excellent and show the plant in cultivation and/or habitat. The sheets are delivered in a card folder with an index to the year inside the front cover. The last cumulative index was produced in 2015 so I am told there will be



another in 2025.

You can subscribe to *Atlas Kaktusů* and buy back numbers at <https://cs-kaktusy.cz/home-page/atlas>

IN THE GLASSHOUSE

Kamiel Neirinck shares another of his favourite Brazilian cerei with us. The splendid blue-stemmed *Pilosocereus magnificus* is surely one the very best columnar cacti to grow. Text and Photographs (except where shown): Kamiel Neirinck



Figure 1. *Pilosocereus magnificus* GC1044.02 south of Padre Paraiso, Minas Gerais, Brazil, 600m
Photograph: Graham Charles.

Pilosocereus magnificus (Buining & Brederoo)
F.Ritter, *Kakteen Südamerika* 1: 72. (1979).

Synonyms

Pseudopilocereus magnificus Buining & Brederoo, *Cactus Succ. Journal (Los Angeles)* 44(2): 66–70. (1972).

Pilosocereus supremus n.n.

This cereus did not steal its name; it has a beautiful blue epidermis and short golden-yellow spines on the areoles, it really is magnificent! This makes it one of Brazil's cactus jewels. Its natural habitat is subtropical or tropical dry forests, scrubland and rocky areas. The plant is threatened due to cultivation of its habitats, which are in eastern Brazil. *P. magnificus* was discovered in 1964 by Ritter in Itaobim in the federal state of Minas



Figure 2. *Pilosocereus magnificus* HU224 in cultivation.

Gerais, on rocky ground.

It was later renamed as *Pseudopilocereus magnificus* by Buining & Brederoo. This description states that Uebelmann and Horst found the plant in February 1968. Ritter, who already had a description ready for this cereus under the name *Pilosocereus supremus*, was too late in publishing it. *Pilosocereus magnificus* is therefore the correct name. In the 1969 seed catalogue of Frau Hildegard Winter - sister of Ritter - seeds were offered under the name



Figure 3. *Pilosocereus magnificus* HU224 in cultivation.

Pilosocereus supremus.

In 1979, when visiting Kakteen Iwert in Krienz (near Lucerne), a *Pilosocereus supremus* was offered under the erroneous name: *Pilosocereus superbus*, the latter being a variety of *Pilosocereus pachycladus*.

Pilosocereus magnificus has a bushy growth, up to 2–5m high in the wild. The stems are 7–8cm in diameter and are blue-green in the new growth, after which they become beautifully blue and glaucous. Ribs: usually 5–7, rarely 4 or 8. The areoles are covered with white wool that turns grey over time. Spines: honey-



Figure 4. *Pilosocereus magnificus* HU224 in cultivation.

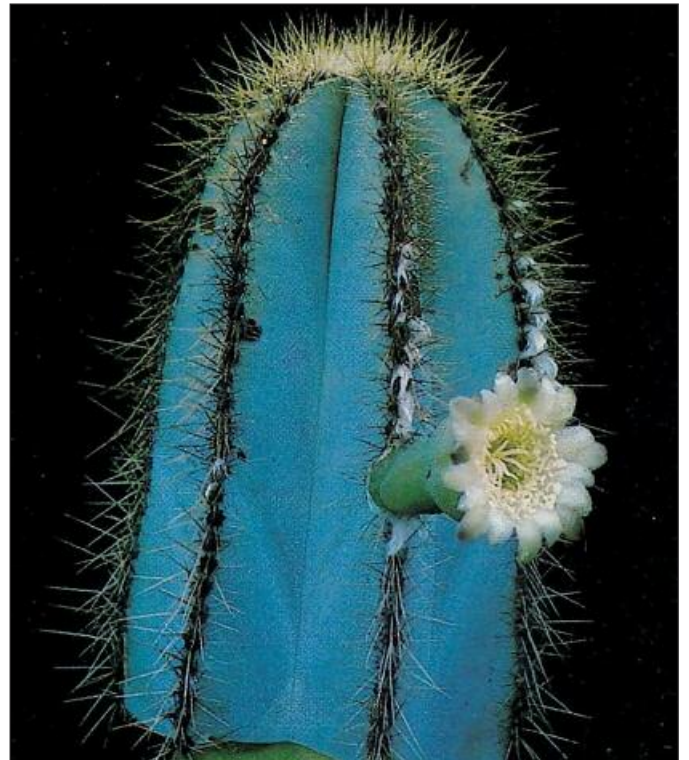


Figure 5. Farbb. 1. FR1345 from Ritter Kakteen in Südamerika, Band 1 (1979).



Figure 6. *Pilosocereus magnificus* GC1046.05 west of Itaobim, near Itinga, Minas Gerais, Brazil, 300m.

Photograph: Graham Charles.

yellow to brown golden yellow, straight, needle-shaped; radial spines: 10–14, radiating laterally, 4–10mm long; central spines: 6–8, 6–20mm long. It flowers at night with a flower that diffuses a slightly unpleasant fragrance. The creamy-white flowers are 5.5cm long with a diameter of 3cm; the floral tube is pale green. The fruits are wine-red to purple, the seeds brown to black.

The top cutting of *Pilosocereus magnificus*, purchased from Uebelmann in Sarmenstorf 40 years ago, has only flowered a few times in my collection. However, it has already produced numerous side branches to grow as a bush, as in nature (Figure 6). One of these side branches is cultivated on hydroculture, potted in clay granules and is growing superbly. The plant retains its original diameter and beautiful, blue-coloured epidermis. Ion exchanger Bayer

Lewatit HD5 (NPK 2.1.2) is used as fertiliser.

Some Field numbers: HU224, FR1345, AH330.

Literature

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kamiel.neirinck@telenet.be

Thanks to Ronald Fonteyne for making the translation.

DER ECHINOCEREENFREUND (1987-2023)

A BRIEF HISTORY OF AN EXTRAORDINARY GROUP

Peter Berresford, famous for his interest in the genus *Echinocereus*, tells us about this German study group which has just ceased publication of their journal. Their excellent publications are being offered to you at discounted prices.

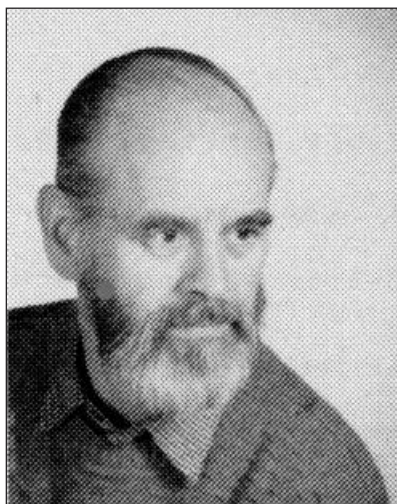


Figure 1. Lothar Germer 12.11.1936 – 14.3.2018.

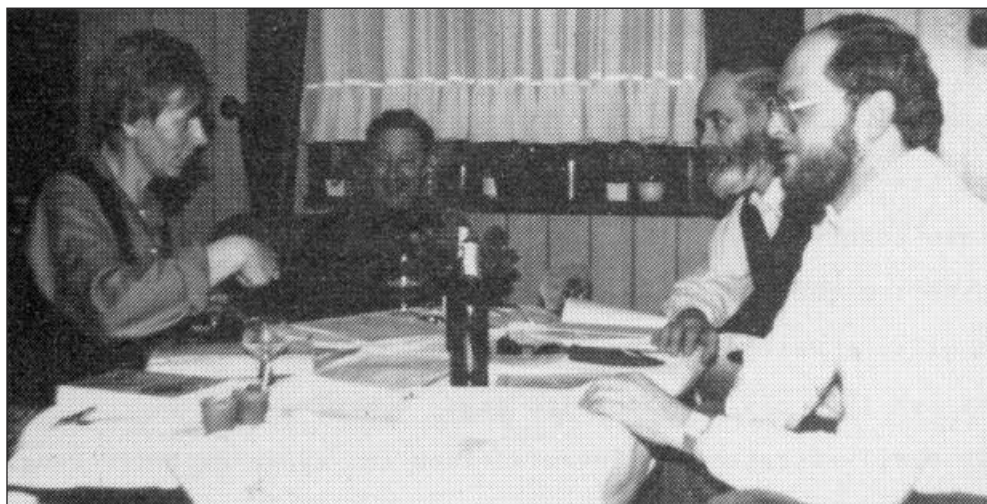
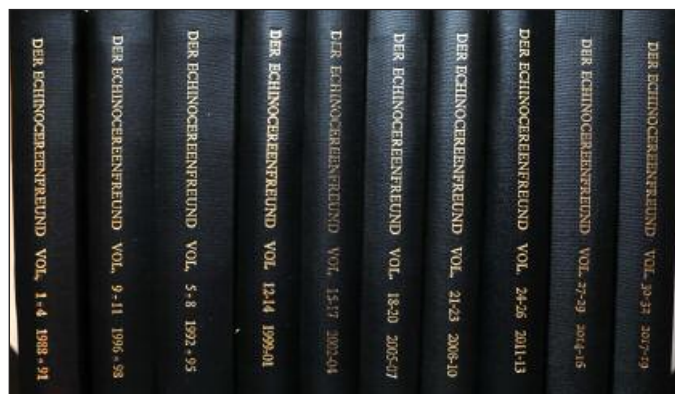


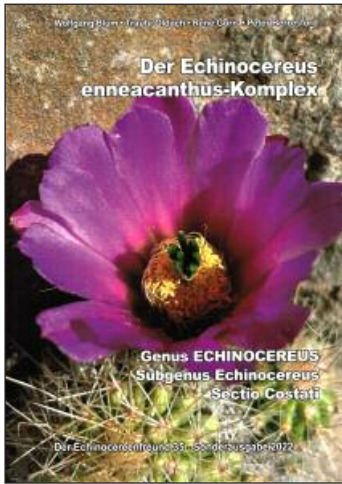
Figure 2. Board meeting at Jörn Oldach's in Oststeinbek (Left to right): Traute Oldach, Jörn Oldach, Lothar Germer and Edgar Pottebaum.

On the 27th September 1987 nineteen *Echinocereus* enthusiasts, with a feeling that the formation of a group focussed on *Echinocerei* was well overdue, met on the occasion of the Osnabrück cactus and succulent exchange. The old town of Osnabrück in Lower Saxony is one of only two large states which have a coastline with the North Sea. Three men were appointed, namely Lothar Germer[†] (Fig. 1)), a probation officer (later Head of the Service) born in 1936, Edgar Pottebaum, a 34 year old deputy purchasing manager in a large company in Osnabrück and Jörn Oldach[†] born in 1930 who

was then a mechanic at the now Hamburg electricity works. Some might say this was an unlikely team with disparate talents but they shared one thing in common; they all developed an interest in cacti and then later decided to focus on *Echinocerei*. I think most of us can empathise with this experience and it is part of what makes attending meetings so enjoyable.

The following Board Meeting of the three officers took place on 28th November 1987 and defined the aims of the group and programme for the first meeting of the Arbeitsgruppe in Wiesbaden on 16th April 1988 . Amongst the group of 19 were names which became very active in subsequent fieldwork including Wolfgang Blum, Peter Momberger[†] and Werner Trocha[†]. By February of the following year another 19 members joined, including Freddy D'hont, Richard Römer[†] and Martin Haberkorn. At the meeting Dr. Gerhard Frank[†] gave a talk on "New or rediscovered plants" and Peter Momberger entertained the audience with Baja California.

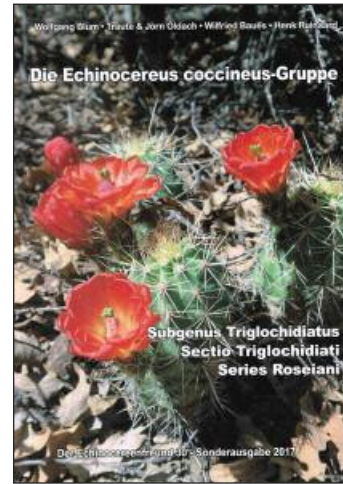




Der enneacanthus Komplex



Die acifer Gruppe



Die coccineus Gruppe



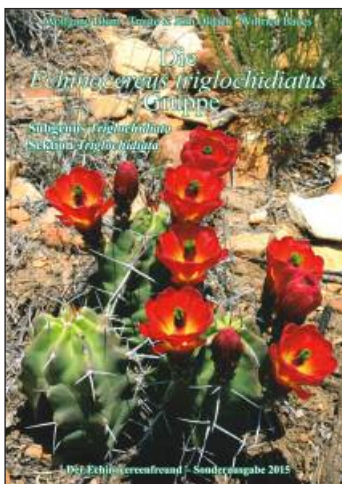
Die scheeri Gruppe

The first issue of the quarterly magazine, named after the new group, *Der Echinocereenfreund*, was published from 1988 and included an article "At the location of *Echinocereus pacificus*" by Peter Momberger and Eberhard Lutz on "We introduce Lz 40 - *Echinocereus kuenzleri* or a new variety of *Echinocereus fendleri*". Both articles were illustrated with reproductions from colour slides.

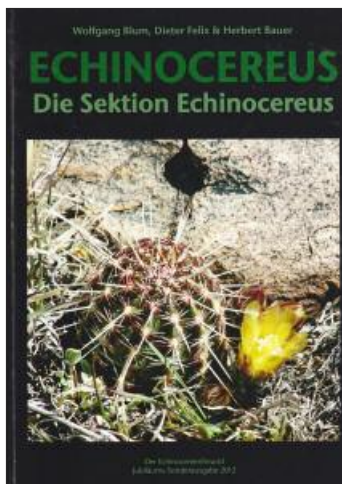
The next few issues to the end of 1990 saw the publication of articles by many names which are now well-known, particularly in 'Echinocereus circles'; Sybille and Klaus Breckwoldt†, Werner Trocha, Jürgen Rutow, Udo Raudonat and David Ferguson. By now the membership had increased to over 130 including Deeter Sieger, Bernard Roczek, Horst Kuenzler, Andy Ohr, Urs Eggli, Udo Raudonat†, Dieter Felix, Wolfgang Metorn and Jürgen Rothe. Issue 3/1995 of the journal saw the pictures being printed directly onto the pages, rather than being stuck-in.

In 1992, *Der Echinocereenfreund* produced the first Sonderheft (or Special Issue) in addition to the quarterly magazine, however, by 1996 it was deemed necessary produce a corrected new edition, taking into account the latest literature organising the illustrated section more clearly. This was a spiralbound softback of 62 pages of which 46 pages were stuck-in colour illustrations. This high ratio of colour photographs in each subsequent "Special Issue" has been maintained in every Special issue since, a further 8 of which were issued before 2009 and are now 'out of print' and unavailable.

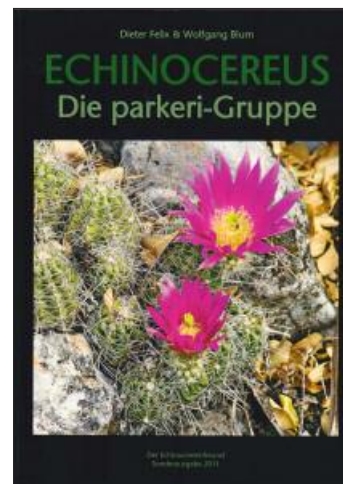
Circumstances, not the least of which has been the diligence of the group's work has led to the closure of the *Der Echinocereenfreund* at the end of the 2023 calendar year. Special editions are still available in limited quantities from Ulrich Dosedal and anyone interested in this discounted material should contact him directly at dosedal-kakteen@ewetel.net. Details of these editions are listed below:



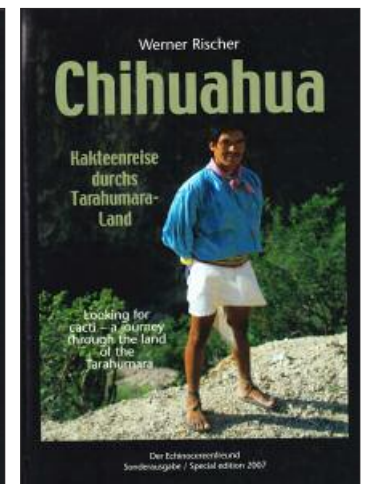
Die triglochidiatus Gruppe



Die Sektion Echinocereus



Die parkeri Gruppe



Chihuahua

Title	Pub. date	Price	Pages (inc. ± col photos)	Size (cm)	Weight	Postage
Der Echinocereus enneacanthus-Komplex (text file for easy translation available)	2022	49.50 € 30.00 €	416 (±370)	17.7 X 24 X 2.7	1.35kg.	8.99 €
<i>E. enneacanthus</i> subsp. <i>enneacanthus</i> , <i>E. dubius</i> , <i>E. merkeri</i> , <i>E. sarissophorus</i> , <i>E. uspenkii</i> , <i>E. enneacanthus</i> subsp. <i>carnosus</i> , <i>E. carnosus</i> , <i>E. enneacanthus</i> subsp. <i>intermedius</i> , <i>E. enneacanthus</i> subsp. <i>brevispinus</i> , <i>E. blanckii</i> , <i>E. albiflora</i> , <i>E. occidentalis</i> subsp. <i>occidentalis</i> , <i>E. occidentalis</i> subsp. <i>breckwoldtiorum</i> , <i>E. stramineus</i> , <i>E. conglomeratus</i> , <i>E. zapalinamensis</i> .						
Der Echinocereus acifer-Gruppe (text file for easy translation available)	2018	49.50 € 20.00 €	416 (±650)	17.7 X 24 X 2.7	1.29kg.	8.99 €
<i>E. acifer</i> subsp. <i>acifer</i> , <i>E. marksianus</i> , <i>E. acifer</i> subsp. <i>tubiflorus</i> , <i>E. acifer</i> var. <i>tricanthus</i> , <i>E. acifer</i> subsp. <i>ventanensis</i> , <i>E. matthesianus</i> , <i>E. huitcholensis</i> , <i>E. ortegae</i> , <i>E. topiensis</i> .						
Die Echinocereus coccineus-Gruppe (text file for easy translation available)	2017	43.50 € 25.00 €	560 (±760)	17.7 X 24 X 3.5	1.7kg.	15.49 €
<i>E. coccineus</i> subsp. <i>coccineus</i> , <i>E. coccineus</i> subsp. <i>rosei</i> , <i>E. coccineus</i> subsp. <i>transpecosensis</i> , <i>E. coccineus</i> subsp. <i>paucispinus</i> , <i>E. coccineus</i> subsp. <i>roemeri</i> , <i>E. polyacanthus</i> , <i>E. pacificus</i> subsp. <i>pacificus</i> , <i>E. pacificus</i> subsp. <i>mombergerianus</i> , <i>E. bakeri</i> , <i>E. canyonensis</i> , <i>E. santaritensis</i> , <i>E. bacanorensis</i> , <i>E. yavapaiensis</i> , <i>E. gurneyi</i> , <i>E. x neomexicanus</i>						
Der Echinocereus scheeri-Gruppe	2016	24.50 € 15.00 €	176 (±230)	17.7 X 24 X 1.4	0.615kg.	8.99 €
<i>E. scheeri</i> subsp. <i>scheeri</i> , <i>E. salm-dyckianus</i> var. <i>noctiflorus</i> , <i>E. scheeri</i> subsp. <i>gentryi</i> , <i>E. gentryi</i> , <i>E. cucumis</i> , <i>E. scheeri</i> subsp. <i>paridensis</i> , <i>E. salm-dyckianus</i> , <i>E. koehresianus</i> , <i>E. koehresianus</i> subsp. <i>gruberianus</i> , <i>E. sanpedroensis</i> , <i>E. klapperi</i> , <i>E. rischeri</i> , <i>E. chaletii</i> .						
Der Echinocereus triglochidiatus-Gruppe (text file for easy translation available)	2015	24.50 € 15.00 €	262 (±490)	17.7 X 24 X 1.4	0.72kg.	8.99 €
<i>E. triglochidiatus</i> subsp. <i>triglochidiatus</i> , <i>E. monacanthus</i> , <i>C. gonacanthus</i> , <i>C. hexaedrus</i> , <i>E. triglochidiatus</i> subsp. <i>mojavensis</i> , <i>C. mojavensis</i> , <i>C. mojavensis</i> var. <i>zuniensis</i> , <i>E. sandersii</i> , <i>E. triglochidiatus</i> subsp. <i>mojavensis</i> f. <i>inermis</i> , <i>E. phoeniceus</i> var. <i>inermis</i> , <i>E. arizonicus</i> subsp. <i>arizonicus</i> , <i>E. arizonicus</i> subsp. <i>matudae</i> , <i>E. arizonicus</i> subsp. <i>nigrihorridispinus</i> .						
Echinocereus -Die Sektion Echinocereus	2012	24.50 € 15.00 €	334 (±300)	17.7 X 24 X 2.2	0.875kg.	8.99 €
<i>E. davisii</i> , <i>E. viridiflorus</i> subsp. <i>viridiflorus</i> , <i>E. viridiflorus</i> subsp. <i>correllii</i> , <i>E. chloranthus</i> subsp. <i>chloranthus</i> , <i>E. chloranthus</i> subsp. <i>rhyolithensis</i> , <i>E. rusanthus</i> subsp. <i>rusanthus</i> , <i>E. rusanthus</i> subsp. <i>fiehnii</i> , <i>E. rusanthus</i> subsp. <i>weedini</i> , <i>E. neocapillus</i> , <i>E. carmenensis</i> , <i>E. blumii</i> , <i>E. milleri</i> , <i>E. viridiflorus</i> var. <i>canus</i> , <i>E. canus</i> , <i>E. mapimiensis</i> .						
Echinocereus -Die parkeri - Gruppe	2011	14.50 € 8.00 €	144 (±220)	17.7 X 24 X 1.0	0.42kg.	8.99 €
<i>E. parkeri</i> subsp. <i>parkeri</i> , <i>E. parkeri</i> subsp. <i>arteagensis</i> , <i>E. parkeri</i> subsp. <i>gonzalezii</i> , <i>E. parkeri</i> subsp. <i>mazapilensis</i> , <i>E. parkeri</i> subsp. <i>rayonesensis</i> , <i>E. nivosus</i> .						
Chihuahua	2007	20.00 € 15.00 €	409 (±540)	17.7 X 24 X 2.5	1.426kg.	8.99 €
This is a travelogue through Chihuahua recording impressions, people, landscapes and of course cacti with a focus on Echinocerei (32 taxa are recorded and photographed) plus all other succulents/cacti encountered, other flora and animals. The book is in German AND (parallel) English.						

Bücher-Angebot



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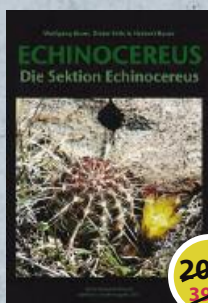
Die *Echinocereus acifer*-Gruppe

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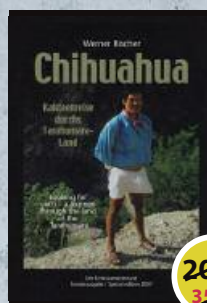
Die *parkeri*-Gruppe

~~10⁰⁰€~~
~~14⁵⁰€~~



Die Sektion *Echinocereus*

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Schütziana

The latest issue of *Schütziana*, the specialist on-line journal for *Gymnocalycium* enthusiasts, 13(3) was published in December 2022 and features:

Marx, Ulf Review of the 3rd International Gymno Conference from 30th June to 1st July 2023 in Linz (Austria).

Wick, Mario Studies on the level of ploidy in the genus *Gymnocalycium*.

The text of this valuable publication is available in English, German, Russian and Japanese. You can download free all the issues from: www.schuetziana.org



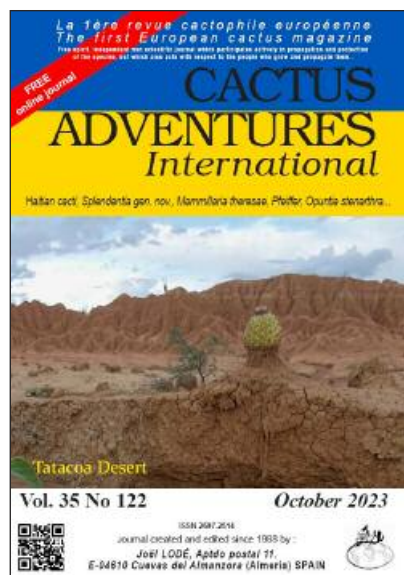
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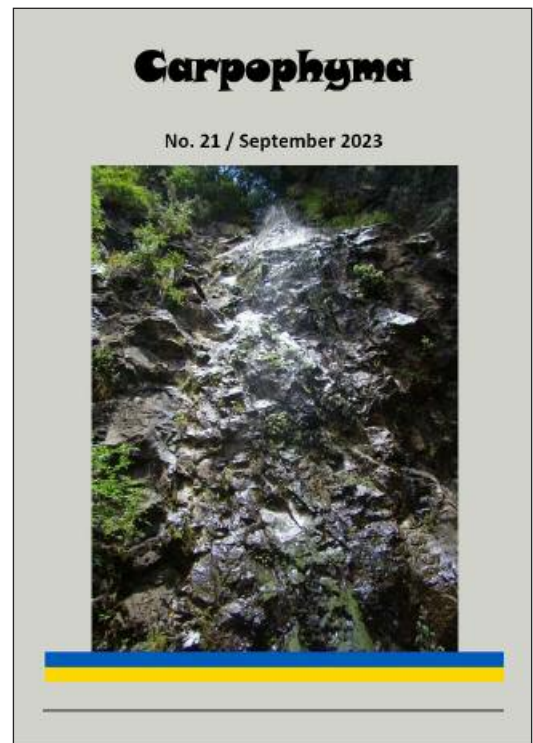


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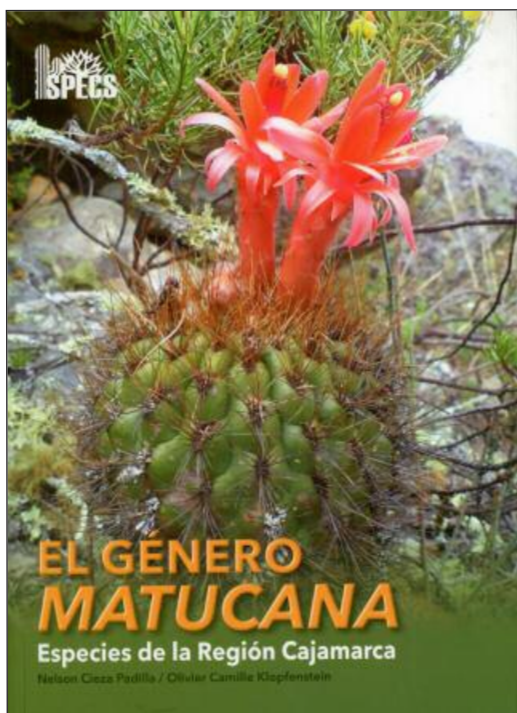
THE LOVE OF BOOKS

Here you will find information about new publications together with some that were published years ago and remain a valuable source of information.

The genus *Matucana*.

Species from the Cajamarca region

Nelson Cieza Padilla &
Olivier Camille Klopfenstein



It is good to see a book produced in Peru about the cacti of that country. This useful book has been published by SPECS, the Cactus and Succulent Society of Peru.

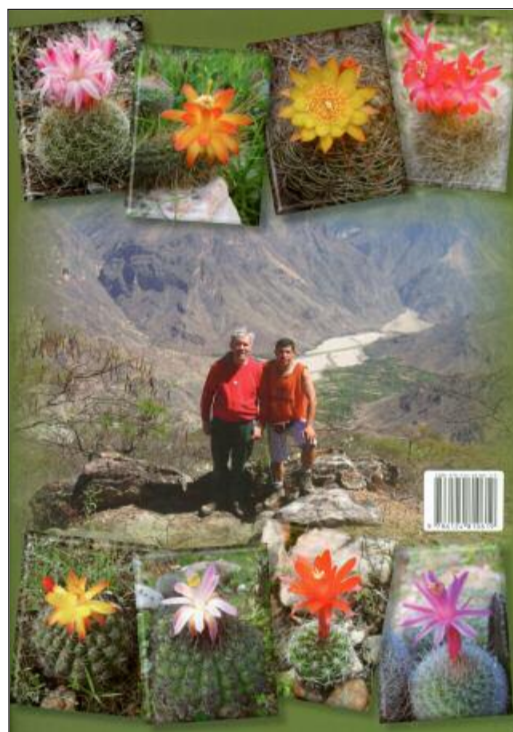
The twelve species of *Matucana* that occur naturally in Cajamarca are described and illustrated in detail with pictures of the flowers and seeds. All the pictures depict plants in habitat and show the variability of the species.

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Presentation of the genus: This chapter provides information on the morphology,



pollination and reproduction of the genus *Matucana* in the Cajamarca region.

Description of the species: This chapter describes the species of *Matucana* in the Cajamarca region, as well as their habitats and some tips on how to recognise them in the field where they grow naturally.

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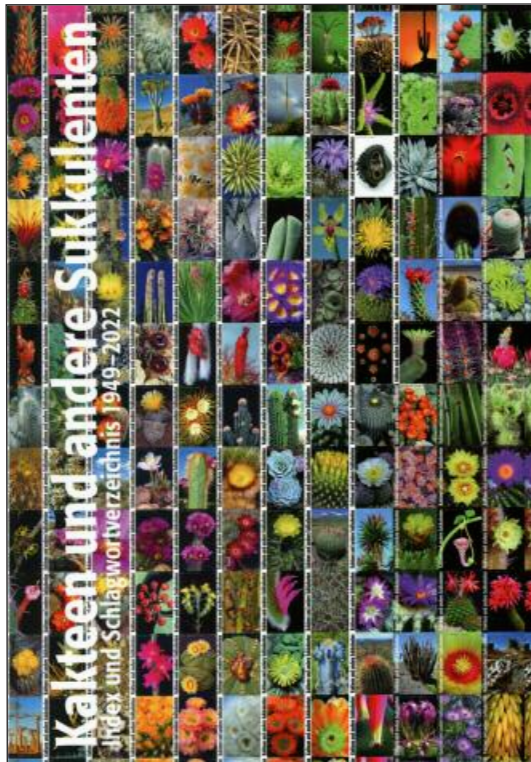
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Kakteen und andere Sukkulente

Index and Subject Index 1949–2022



It is so useful to have indexes for my cactus journals. I sometimes remember reading an article but cannot recall where it was published or I am researching a particular subject and need to look up what has already been published. German language.

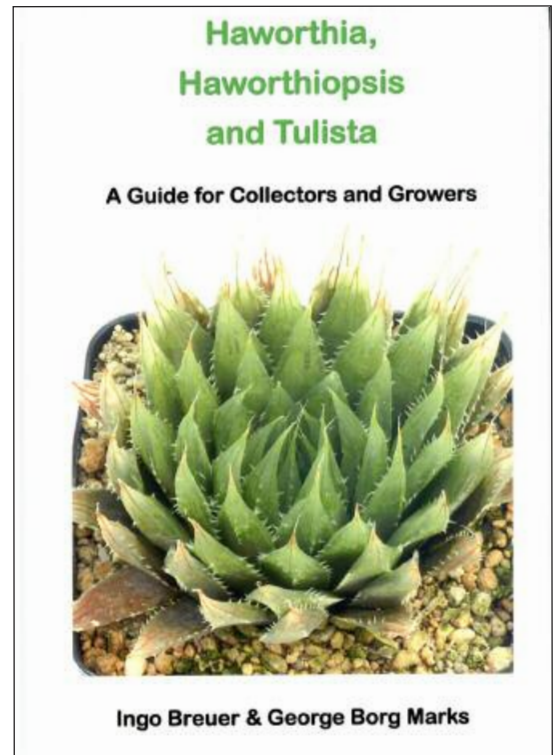
This is a monumental undertaking by our good friend *Detlev Metzger*. It is a really complete index housed in a convenient hardback book the same size as the journal.

As he says in the introduction: "The preparation of the index turned out to be a lengthy task, as the data from thousands of articles published in *KuaS* and the *Nachrichtenblatt* had to be recorded, entered into the PC, edited and compiled. If the index, with its more than 27,500 entries, now contributes to rediscovering *KuaS* and stimulating one's own practical or theoretical interest in cacti and other succulents, the work will have been worthwhile!"

456 pages, 240 x 170mm, hardback with pictorial covers. **Overseas Price:** 35€ to bank account IBAN DE42 6405 0000 0008 5808 38 and BIC SOLADES1REU (KSK Reutlingen).

Haworthia, Haworthiopsis and Tulista

A Guide for Collectors and Growers



This is a well produced book and the large number of pictures of cultivated plants with provenance could be useful for growers and collectors. They are captioned with their habitat locations and approximate growing places are shown on a map.

The author has created names for the slightest variants. This is the nightmare consequence of a dedicated splitter. It is said that the more you specialize in a genus, the more you look for minute differences to justify a different name. The book recognizes 519 species of which 261 are *nomina nuda*! This is a daunting target for collectors who want to own the whole set!

The book has about 300 pages, English language, with 1000 pictures and 250 maps. It is hardcover in A4 format and weighs about 1.5kg. You can order it by paying the amount for the book, including the mailing charge, to Breuer's PayPal account:

info@eden-plants.com.

The book costs €49.50, plus postage within Germany €5.50, to Europe €16.50 and to all other countries €22.50.

SUCCULENTS ON A PLATE

Graham Charles admires an amazing book which includes many fine illustrations of succulent plants. The *Hortus Elthamensis* has been described as 'the most important book to be published in England during the eighteenth century on the plants growing in a private garden'. This rare book was an important landmark in succulent literature.



The first edition, published in London in 1732 in two folio volumes, is a major work for the pre-Linnaean taxonomy of South African plants. According to Rowley (1997), it was the prime source for Linnaeus on succulents.

Johann Jakob Dillenius (originally Dillen) (1684–1747) was a German botanist from Darmstadt, who was brought to England in 1721 by William Sherard. About this time, William Sherard's brother James, who had a flourishing medical practice in London, purchased a country estate at Eltham in Kent. William spent a good deal of time on the property and, assisted by Dillenius, built it up into one of the leading gardens in England.

When William died in 1728 he endowed a chair of botany at Oxford with the proviso that Dillenius should be the first incumbent. He also left his herbarium, library and manuscript to the University. At the insistence of James Sherard, Dillenius embarked on an account of the more interesting plants growing at Eltham, with the result that he did not take up residence at Oxford until 1734.

After eight years of work, the resulting *Hortus Elthamensis*, London 1732, appeared in two handsome folio volumes with 324(325) plates drawn and engraved with great fidelity by Dillenius himself. Rowley tells us that he personally hand coloured just three copies.

It is said that only 145 copies of the plates and 500 copies of the original text were printed. In 2002, Christie's sold the coloured copy originally belonging to Sir Hans Sloane for £41,825. Then, in 2022, Sotheby's sold another coloured copy from the library of Henry Rogers Broughton, 2nd Baron Fairhaven, for £32,760.

Rowley states that a quarter of the illustrations are of succulents: 46 Mesembryanthemaceae, 10 Lilaceae, 9 Crassulaceae, 6 Cactaceae, 5 Compositae, 2 Euphorbiaceae, 2 Portulacaceae and 1 Geraniaceae.

The illustrations are important in typifying many Linnaean names and, unlike Bradley, Dillenius made herbarium specimens, which are preserved in the herbarium of the Botany Department, Oxford. The text, written in Latin, describes the plants in detail, so when Linnaeus visited the garden in 1736, he gave the book his unqualified approval (Rowley, 1997).

Dillenius's name was memorialised by Linnaeus in the genus *Dillenia*, a genus of Australian and Asian evergreen plants.

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GC

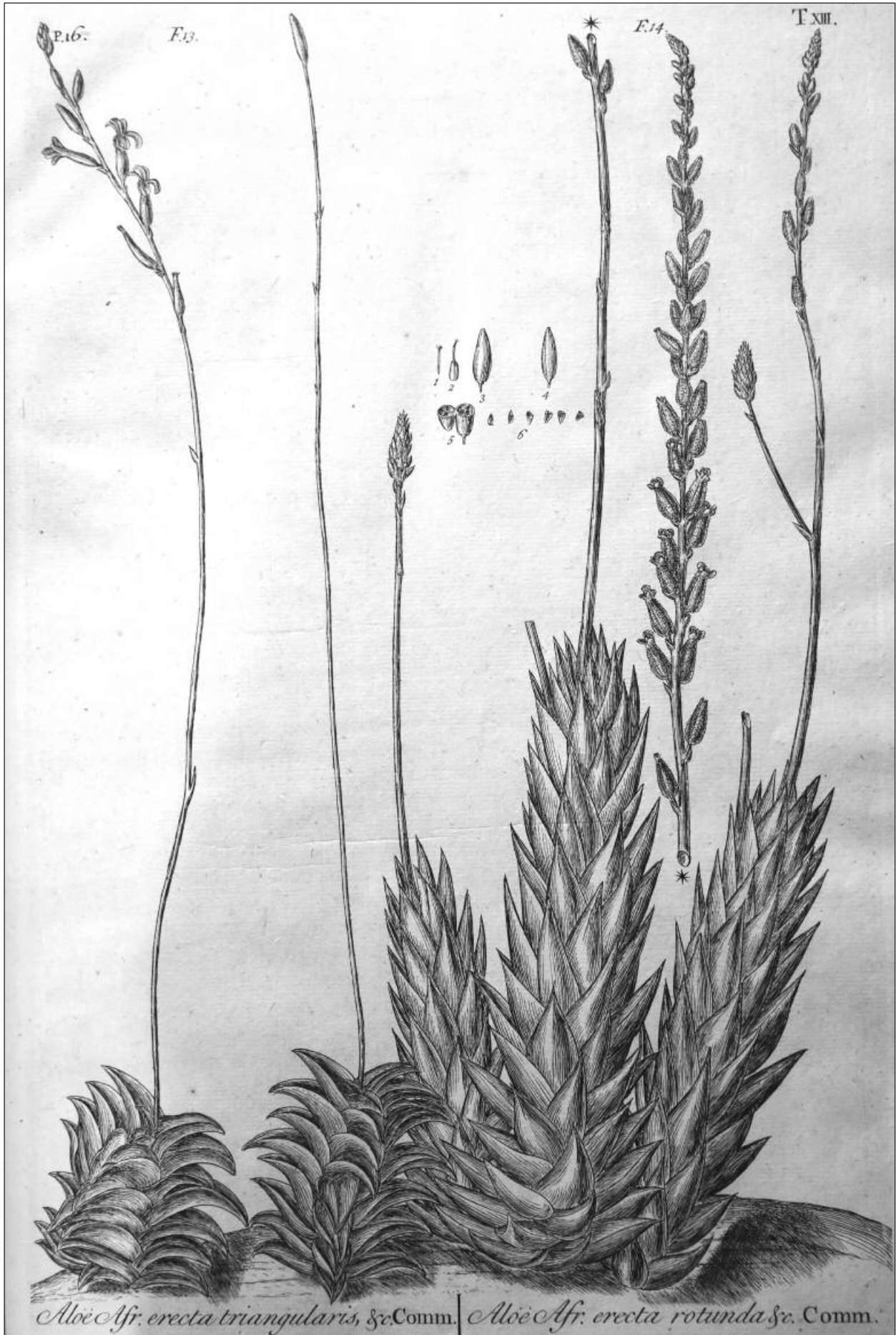


Plate XIII. *Aloe africana erecta triangularis* et *triangulari folio viscosa*. Today: *Haworthia viscosa*.
Aloe africana rotunda, folio parvo et in acumen rigidissimum exeunte. Today: *Astroloba pentagona*.



Plate LXIV. *Cereus Scolopendrii folio brachiato*. Name today: *Epiphyllum phyllanthus*. Designated as the lectotype of *Cactus Phyllanthus* by Leuenberger in *Flora of the Guianas* (1997).



Plate CCXXVII. *Pereskia aculeata* flore albo fructu flavescente. Name today: *Pereskia aculeata*. Designated as the lectotype of *Cactus Pereskia* by Leuenberger in *Pereskia* (*Cactaceae*), (1986).

IDENTIFYING UNIQUE SPECIES OF THE GENERA *AEONIUM* AND *GREENOVIA* (CRASSULACEAE) IN LA PALMA (CANARY ISLANDS)

Carlos Pedrós-Alió, Centro Nacional de Biotecnología, CSIC. Madrid, Spain.

For the crassulacean plant lover, the island of La Palma (Canary Islands) is both irresistibly attractive and a challenge. It has 12 or 13 species in the genera *Aeonium* and *Greenovia*, plus the many hybrids (family Crassulaceae). Six of them can only be found in this island and some of them have been described only recently. Marco Cristini published a trip report of his visit to La Palma on August 2019 in this journal. This kind of trip report is something I would have loved to have had the first time I visited the island. However, next to several useful observations, there are a few statements that will confuse visitors. I will try to clarify them to enrich the experience of future botanical visitors to La Palma.

Cristini states that he was unable to discriminate between *Greenovia aurea* and *Greenovia diplocycla*. Perhaps the fact that in August most plants are in summer rest, often with reddish leaves, many times closing on themselves, was confusing. Cristini is not alone in this confusion. The presence of both species has been affirmed and negated by different visitors in the past. However, there are relatively simple morphological differences between the two. The clearest is that flowers have 18–20 parts in *G. diplocycla* and 30–35 in *G. aurea* (Figures 1–4). Of course, in August, Cristini could not see the flowers. Another more subtle difference is that *G. aurea* has completely glabrous leaves, while *G. diplocycla* has subtly ciliated edges, especially in young plants. This character was already mentioned by Bramwell and Bramwell (2001). Finally, *G. diplocycla* usually presents itself as single rosettes, while *G. aurea* usually has a few. Paying careful attention to these discriminating characters in La Palma most plants are *G. diplocycla*. The presence of *G. aurea* cannot be ruled out, because there is always the possibility that a few individuals or even a substantial population may inhabit

some remote barranco. But those that are accessible are clearly *G. diplocycla*.

Another statement by Cristini is more worrisome. He says “I wonder if we should consider *Aeonium calderense*, *Aeonium escobarii* and *Aeonium hierrense* (of La Palma) as distinct species, since they could simply be local forms of *Aeonium davidbramwellii* (for a similar conclusion, as far as *A. hierrense* is concerned, see Stephenson, 2003: 128).” This sentence suggests that there are no clear characters separating all these species. But this is not true. The four species are presented, for example, in Lodé (2010) with their differentiating characters.

First, Stephenson published his trip report in 2003, when *A. escobarii* and *A. calderense* had barely been recognized yet. He thought that the *A. hierrense* plants in La Palma might be unbranched forms of *A. arboreum* subsp. *holochrysum* (notice, not of *A. davidbramwellii* as implied by Cristini). There certainly are some young plants of *A. arboreum* that are not branched yet. However, the rosettes are characteristically flat, unlike the cup-like rosettes of *A. hierrense* (Figures 5 & 6). Another very typical difference is that leaves of *A. arboreum* almost always have a longitudinal red stripe, while those of *A. hierrense* only have a reddish margin. In conclusion, it is almost impossible to confuse *A. hierrense* and *A. arboreum*.

The next confusion might be with *A. escobarii*. This species was recognized by Malkmus in 2002, but was only validly published by Rebmann and Malkmus in 2013. However, with good criterion, Lodé (2010) had already included it in his book, just in case it would be validly published, as it was a few years later. This species is always monopodial. A few plants may show some branching usually when the apical meristem has been damaged. But if one looks around to the surrounding plants almost all will be



Figures 1 – 4.
Comparison of rosettes and flowers of *Greenovia diplocycla* (left) and *G. aurea* (right).

monopodial. *A. davidbramwellii*, on the other hand, is almost always variably branched. Besides, *A. hierrense* and *A. escobarii* are glabrous, while *A. davidbramwellii* is pubescent. Again, it is difficult to confuse these different species.

A. escobarii has been confused with *A. hierrense* for a long time, since they are both monopodial and glabrous. However, there is a very important character to discriminate them: phyllotaxis. This is the number of leaves and turns it takes for a leaf to be exactly above another leaf as they are inserted in a spiral around the stem. This follows mathematical laws and is a character that does not change at all (unlike branching). It was Liu (1989) in his monograph on the genus *Aeonium* who used phyllotaxis for the first time. He mentions a phyllotaxis of 8/21 for *A. hierrense* (this means 21 leaves after 8 turns). O. Arango (personal communication) has determined phyllotaxis for *A.escobarii* as 5/13 (13 leaves after 5 turns).

Some authors have claimed that *A. hierrense* does not exist in La Palma and that all monopodial plants are *A. escobarii*. Both assertions are false. As explained, they can be easily discriminated with the phyllotaxis and they both have extensive distributions in La Palma (Arango, in press).

Another erroneous decision by Cristini was to assume that all branched plants that were not *A. arboreum* had to be *A. davidbramwellii*. It is true that *A. calderense* was not validly published until 2023. However, it was already considered by Lodé (2010), again in a farsighted decision. So, there was no excuse to be at least cautious. The “typical” plants of *A. calderense* and *A. davidbramwellii* are very easy to tell apart. But it is true that they are both quite variable, that both are widespread around the island and, on top of that, they hybridize frequently. Thus, in case of doubt one may leave a plant as *Aeonium* sp. But in many other cases one should find it possible to



Figures 5 & 6. Unbranched plant of *Aeonium arboreum* subsp. *holochrysum* (left). Notice flat rosette and attached dead leaves. In the past this was considered a different species named *A. vestitum*, but it has been shown to be a matter of growth conditions. To the right *A. hierrense*, with its cup like rosette and robust stem.

discriminate between the two species. The typical *A. calderense* has rather unique verticillate branching, that *A. davidbramwellii* never has (Figures 7 & 8). Also, typical *A. calderense* is totally glabrous and has only cilia in the leaf margins, while typical *A. davidbramwellii* is pubescent and combines cilia and hairs in the leaf margins. Pubescence, both in *Aeonium* and *Greenovia* species, can be subtle and may require a magnifying glass to be seen. As mentioned, the observer will find puzzling individual plants that will require further careful study to determine whether they are hybrids, outlier individuals, or even a new species. However, many plants can be properly identified.

One last point. This is not Cristini's nor Lodé's fault, because nobody knew the existence of yet another species of *Greenovia* in La Palma until Arango published it in 2023 (*Greenovia ignea*). This species has a few populations, always at high altitudes, exposed to intense solar radiation and low night temperatures. It lives far away from most other

Aeonium or *Greenovia* species, except *A. spathulatum*, with which it shares its habitat and hybridizes (Figure 9).

The remaining species that I have not mentioned are very easy to recognize as shown in Cristini's pictures. I hope these notes are helpful to all the aficionados that want to visit La Palma looking for its fascinating crassulacean flora. But do try to go in the spring, not in the summer.

Species of the genera *Aeonium* and *Greenovia* present in La Palma. Endemic species shown with an asterisk:

- Greenovia diplocycla* Webb ex Bolle
- **Greenovia ignea* Arango
- (?) *Greenovia aurea* (C. Sm. ex Hornem.) Webb & Berthel.
- Aeonium arboreum* (L.) Webb & Berth. subsp. *holochrysum* (H.-Y. Liu) Bañares
- **Aeonium calderense* Malkmus ex Arango
- Aeonium canariense* (L.) Webb & Berthel. subsp. *christii* (Burchard) Bañares



Figures 7 & 8.

Top: *Aeonium calderense* with the typical verticillate ramification. Bottom: *A. davidbramwellii*.



Figure 9. High altitude populations of *Greenovia ignea* and *Aeonium spathulatum*.

**Aeonium davidbramwellii* H.-Y. Liu

**Aeonium escobarii* N. Rebmann & B. Malkmus-Hussein

**Aeonium goochiae* Webb & Berthel.

Aeonium hierrense (R P. Murray) Pit. & Proust

**Aeonium nobile* (Praeger) Praeger

Aeonium sedifolium (Webb ex Bolle) Pit. & Proust

Aeonium spathulatum (Horn.) Praeger.

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A CACTUS STOP IN HUALFIN (N.W. ARGENTINA)

Gerard Delanoy tells us about the cacti he found near to the town of Hualfin in north west Argentina.

Photographs by the author

Hualfin is a small town in the province of Catamarca, located in the Rio Hualfin valley. This valley stretches along the famous National Route 40 and forms the southern end of the Calchaquíes valleys in north-west Argentina. The town of Hualfin lies around 190km from Cafayate to the north and 300km from La Rioja to the south.

Hualfin is famous for its pre-Columbian archaeological heritage, as well as its bodega, which produces fine Malbec and Torrontes wines from almost 100 hectares. But Hualfin is also well known to Cactaceae enthusiasts, as a number of interesting species can be seen in the surrounding area, not to mention the fact that it is the type locality for *Lobivia huascha* var. *robusta*, described by Rausch in 1985.



Figure 1. Pozo Verde sign.



Figure 2. Pozo Verde parking and picnic place.



Figure 3. *Lobivia huascha* var. *robusta*.



Figure 4. *Lobivia huascha* var. *robusta* with the typical yellow flower of this variety.



Figure 5. *Lobivia huascha* var. *robusta* with the typical yellow flower of this variety.

It was during a trip in 2018, the main aim of which was to discover the cactus flora of north-west Argentina (NOA), that we stopped off at Hualfin, and more specifically at the Pucara de Hualfin. Pucara are fortifications erected by pre-Columbian peoples from Ecuador to central Chile and north-west Argentina. We hadn't originally planned to make this stop, but photos and data found on the web had aroused our curiosity.



Figure 6. *Lobivia huascha* var. *robusta*.

To reach the Pucara, you first need to park at Pozo Verde (Figure 2), a sort of "campsite" located at the entrance to a canyon and at the bottom of the hill at the top of which is the Pucara. The campsite is in fact a large, flat area planted with trees, with pitches marked out with large stones and solid wooden tables and chairs, which were very useful for our picnic. When we visited, there was no-one there and the place was very clean and pleasant. A few Patagonian parakeets (*Cyanoliseus patagonicus*) were noisily watching us in the trees. From here, you can go down into the canyon cut into the red sandstone rocks of the Hualfin geological formation, or climb up a footpath passing through the Pucara, which is now just the remains of walls a few decimetres high.

As you climb the path leading to the Pucara, you will soon spot beautiful clumps of the *Lobivia huascha* var. *robusta* (Figures 3 & 15), which grows in clumps up to a metre or more in diameter. Some are even found at the side of the path. The stems are thick, around 8–10cm wide, sturdy and a lovely soft green. The spines are pale yellow to amber in colour at the apex and top of the stems, turning white later on. Rare specimens have yellow-brown spines running almost the entire length of the stem. On more or less steep slopes, the stems can be hanging. To our great regret, the plants seen on the way up to the Pucara, or in the vicinity of it, showed no flowers, at best flower buds and/or wilted flowers. It was only a little later, as we continued our exploration of the hill, that we finally found a plant with an open flower (Figure 4). It showed the yellow colour



Figure 7. *Lobivia huascha* var. *robusta* with *Gymnocalycium pugionacanthum*.



Figure 8. *Echinopsis leucantha*.

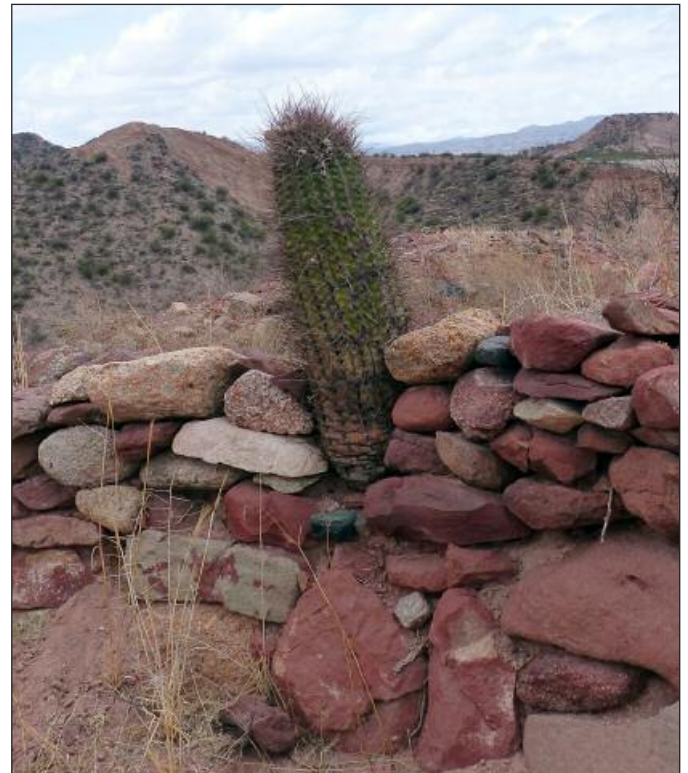


Figure 9. *Echinopsis leucantha*.



Figure 10. *Denmoza rhodacantha*.

that is so characteristic of this variety of *T. huascha*, represented here by numerous specimens in good shape. Only the semi-free-ranging donkeys cause them any damage.

Of course, this *Lobivia* is not the only species present on the site. *Echinopsis leucantha* (S-D) Walp. and *Gymnocalycium pugionacanthum* Backbg. ex Till (Figures 7 & 8) are represented by numerous specimens. We also find the ubiquitous *Opuntia sulphurea* Gill ex S-D (Figure 13) and a few specimens of *Cereus aethiops* Haw (Figure 14) which is easily recognisable by its blue skin but which, unfortunately, donkeys seem to have a tendency to graze. *Trichocereus atacamensis* ssp. *pasacana* (F.A.C.Weber ex Rümpler) G.Navarro is rare on the hill, becoming more abundant in the upper part of the massif which, unfortunately, we did not have time to explore. The rest of the vegetation consists mainly of small, low shrubs that are leafless at this time of year and



Figure 11. *Denmoza rhodacantha* with the author who is 1.87m tall .

a few shrubs, including Palo Verde (*Cercidium* sp.).

Echinopsis leucantha is a taxon with a very wide distribution in Argentina, but it was in Hualfin that we saw the largest specimens encountered during our trip. In fact, some of them reached, or even exceeded, a metre in height, or rather in length, as these few large specimens were lying on the ground but very much alive. Had they been pushed over or is this a common occurrence with this species? The question obviously remains unanswered, but the second hypothesis seems the most likely. On the other hand, the number of young plants is significant. For the record, we found specimens growing in the remains of a wall in the Pucara, a photo of which can be found on the Web. It was this photo that sparked our curiosity about the Pucara of Hualfin.

Another very common species is



Figure 12. The crown of *Denmoza rhodacantha* with flower buds.

represented by large plants of a *Gymnocalycium* (Figure 16) corresponding to *G. catamarcense* Till & Till, a taxon now considered to be a synonym of *Gymnocalycium pugionacanthum* Backbg. ex Till (Charles, 2009). Adult specimens reach a size of 25–30cm in diameter, with numerous ribs and a globular to slightly elongated shape in older specimens. Younger plants have a more discoidal shape, fewer ribs and proportionately more robust spines. None of the specimens we observed bore flowers, at best we could see poorly developed flower buds. This species is mainly found in the lower parts of the hill. It becomes less frequent and then absent as we climb higher.

As we continued to climb, the bedrock became increasingly exposed and this was the preferred area for terrestrial Bromeliaceae of the genus *Deuterocohnia*, which formed beautiful clumps of bluish-grey leaves with very thorny edges. The almost bare rock, exposed as a steep and slippery structural surface, forced us to head back towards the canyon, roughly following the soil-rock boundary. This led to a pleasant surprise, as we discovered a fine population of *Denmoza rhodacantha* (S-D) B.&R. (Figures 10–12), associated with a few *Echinopsis leucantha* and *Opuntia sulphurea*. The species is also widely distributed in Argentina (Catamarca, La Rioja, Mendoza, Salta, San Juan, Tucuman). The population we saw at Hualfin is made up of a fairly large number of specimens of various sizes, but slender in shape, from 20cm to 80cm high, some showing flower buds. The spines are relatively long and flexible with numerous



Figure 13. *Opuntia sulphurea*.

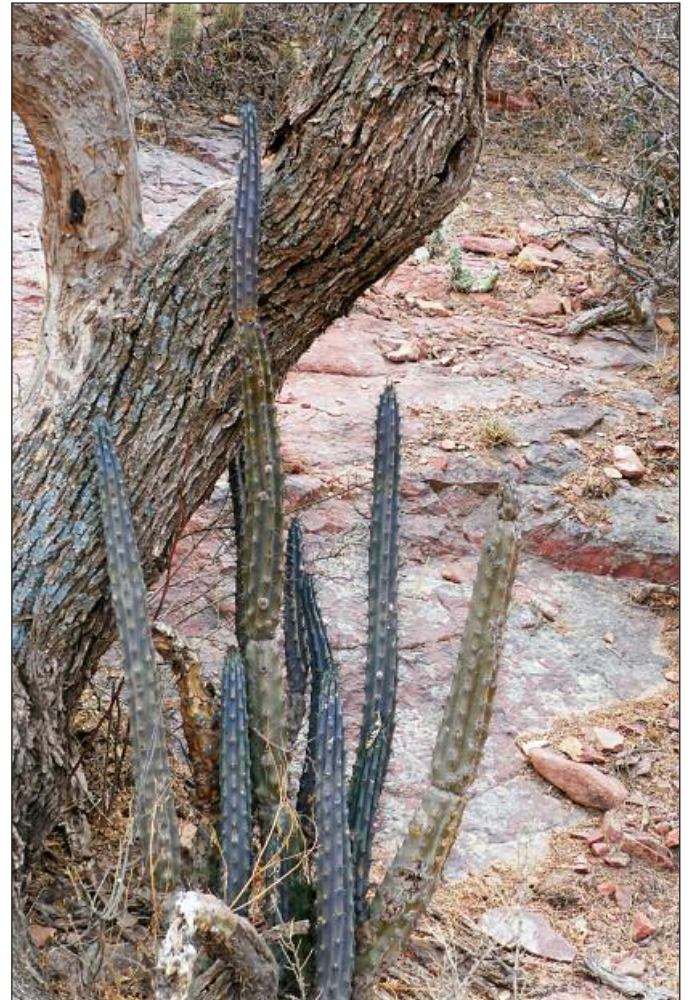


Figure 14. *Cereus aethiops*.

white hairs in the upper part of the stem, reminiscent of the form described under the name *D. erythrocephala*. But the biggest surprise of the day came from a somewhat isolated specimen of *Denmoza*, over 1.5 metres high. Unfortunately, we didn't have any measuring tape with us to make an exact measurement, but Figure 11 gives you an idea of the plant's size, as I'm1.87m tall!



Figure 15. *Lobivia huascha* var. *robusta*.



Figure 16. *Gymnocalycium pugionacanthum*.

Alas, time flies and we had to think about getting back to the car as we then had to travel to Tafi del Valle, a journey of almost 3 hours, the next day being reserved for discovering *Lobivia bruchii* Br & R.

We did, however, make a brief incursion into the canyon and its natural pools. The beauty of the place made us regret not having more time to spend there. There were obviously few plants here, apart from some small *Tillandsia* sp. clinging to the vertical rock.

It was with regret that we left Hualfin, hoping that one day we would be able to return and spend much more time there.

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LOOKING FOR CRASSULACEAE IN NORTH-WESTERN TENERIFE

Marco Cristini describes his explorations in north-western Tenerife and gives us his thoughts on the mysterious *Aeonium mascaense*. Photographs by the author

In August 2023, I spent a week exploring the north-western tip of Tenerife, a region rich in Crassulaceae species and endemic plants (Figure 2). Most of this area is covered by the Teno massif, a volcanic mountain range with many deep gorges, called barrancos in Spanish. My main aims were to visit the area of Masca, where the mysterious *Aeonium mascaense* is supposed to grow, and the laurel forest (laurisilva) of Monte del Agua, where I intended to locate the elusive *Aeonium cuneatum*, but I also planned to look for the newly described *Aeonium dodrantale* ssp. *millennium* in the mountains north of Masca.

On the first day, I walked along the coast from Buenavista to Punta El Fraile on a very good path which allows tourists to admire the rugged seashore of north-western Tenerife (Figure 1). I hoped to spot *Aeonium sedifolium*, which was seen in this area on coastal cliffs by Voggenreiter (1974: 416–419), but I failed to observe it, although there was plenty of xerophytic vegetation.

Then, I climbed to El Frontón following the coastal road TF-445 and then descended to Punta de Teno. The road is closed to cars from Friday to Sunday, but residents and buses are allowed to pass, therefore caution is called for, especially when crossing a long tunnel. Along the road, I observed plenty of small specimens of *Aeonium urbicum*, *A. tabuliforme* and some dense colonies of *Monanthes polyphylla* (Figure 3). Punta de Teno is a popular tourist attraction because of its lighthouse and beaches of volcanic sand, but it is remarkably free from Crassulaceae species apart from a few stunted *A. urbicum*. *A. sedifolium* has been reported here along the coast as well (Bañares, 2015: 154), but I could not spot it. On the whole, this is a nice walk if you wish to admire the landscape. Yet, the Crassulaceae which can be found here occur also in other, easier-to-reach places.

A more botanically satisfying route is that from Buenavista to Teno Alto and Mount Baracán. The starting point is the place where the road to Punta de Teno is closed, which can



Figure 1. The coastline near Buenavista.



Figure 2. Map of north-western Tenerife (source: www.losviajeros.com, slightly modified).

be reached by car, bus, or on foot from Buenavista. The first stretch of the path is the most wearisome one, since it takes you from an altitude of 100m to 700m in little more than 1km, but it offers a comprehensive overview of the cliff-dwelling succulent flora of Teno, starting with *Aeonium haworthii*, *A. urbicum* and

Monanthes pallens. While climbing up, the first plants of *Aeonium tabuliforme* soon appear (Figure 4), immediately followed by waxy specimens of *Monanthes laxiflora*, which at times look almost entirely white (Figures 5–6). I also spotted some small groups of *M. polyphylla* and several stoloniferous or double-



Figure 3. *Monanthes polyphylla* along the road leading to Punta de Teno.



Figure 4. *Aeonium tabuliforme* along the Camino del Risco.



Figure 5. *Monanthes laxiflora* on sheer cliffs along Camino del Risco.

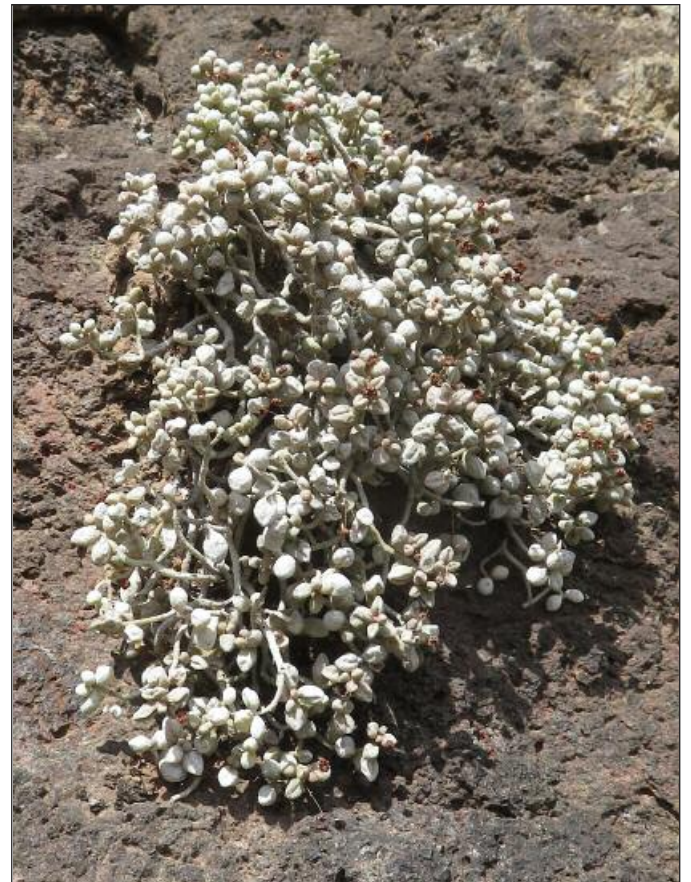


Figure 6. *Monanthes laxiflora* on sheer cliffs along Camino del Risco.



Figure 7. A stoloniferous *Aeonium tabuliforme*.



Figures 8 & 9. Cumbre de Baracán, *Aeonium haworthii*.



Figures 10 – 12. Cumbre de Baracán, *Aeonium dodrantale* ssp. *millennium*.

headed specimens of *A. tabuliforme* (Figure 7), a plant normally consisting of a single rosette. I think that this feature, which is mirrored by *A. urbicum* growing in windy and exposed locations, is due to the peculiar environmental conditions of the upper parts of the Teno mountains, where young plants can easily be damaged and thereby develop more than one rosette.

Once I reached Teno Alto, I found an entirely different landscape, at times almost

barren. Near the village, there were some trees, offering precious shade to nice bushes of *A. haworthii*, *M. laxiflora* and *Aichryson laxum*. Then, I proceeded to Barranco de las Calabaceras, but I only found abandoned, terraced fields, and a very dry environment, not at all suited to most Crassulaceae. Still, I was able to photograph nice specimens of *Aeonium urbicum* while walking back towards Teno Alto. From there, I moved to Cumbre de Baracán following the path PR-51, which is



Figure 13. The Barranco de Masca.

highly recommended for all people interested in Crassulaceae. Apart from *Aichryson laxum* and *Aeonium urbicum*, I observed many bushes of *A. haworthii* (Figures 8–9), *M. pallens* and the rare *Aeonium dodrantale* ssp. *millennium*, which grows between Pico de Baracán and Cruz de Hilda, from 850 to 950m of altitude. This succulent, which was described by Arango in 2021 as *Greenovia millennium*, is said to differ from *Aeonium dodrantale* 'sensu stricto', which grows in eastern Tenerife (Anaga), by its bigger rosettes with fewer stolons, and taller inflorescences. I was unable to find any specimen of *A. dodrantale* while exploring Anaga, so I cannot confirm these distinguishing features, but the plants I saw in Teno correspond well to the description by Arango.

The botanically high point of every trip to Western Tenerife is undoubtedly a visit to the Masca barranco (Figure 13), which has become a popular tourist attraction and is now

accessible only with many restrictions. Visitors have to book their trip well in advance on the internet (I was lucky enough to find a free place a couple of days before going there, but it is advisable to book several weeks, or even months in advance), have to wear a safety helmet throughout their stay in the barranco and are not allowed to stray from the path. Moreover, visits can be suspended without advance notice on especially hot or windy days. I am under the impression that it was by far easier to explore this gorge at the times of Voggenreiter or Bramwell, namely in the 1960s and 1970s, also because fields located deep in the barranco were still tilled then and paths leading to them were regularly repaired.

Nowadays, most of the terraced fields in both Masca and other parts of the island have been abandoned and the network of paths that enabled past botanists to reach remote areas is slowly decaying. In spite of all these limitations,

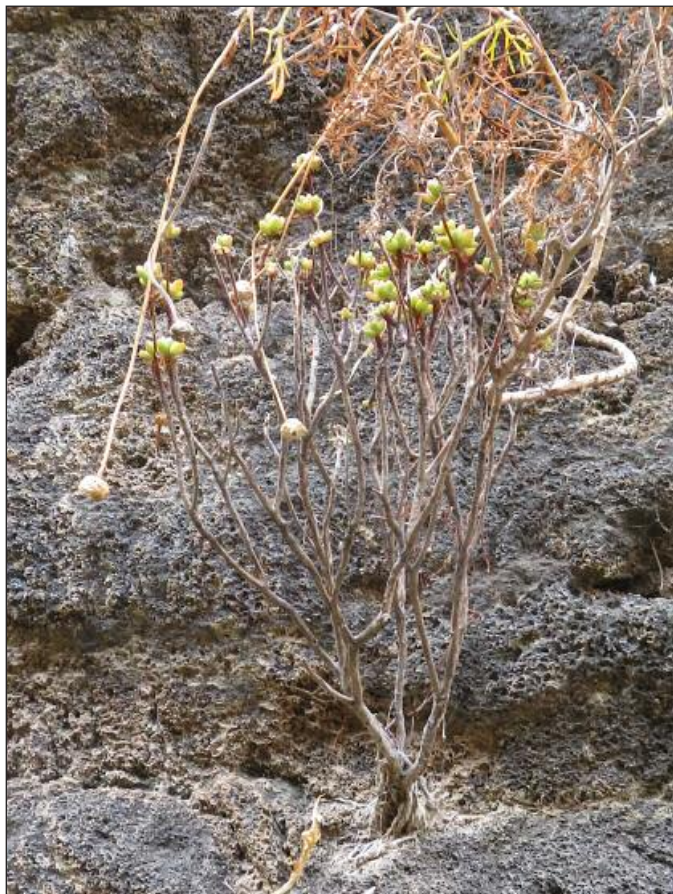


Figure 14. *Aeonium sedifolium* in the Barranco de Masca.



Figure 15. *Aeonium canariense* in the Barranco de Masca.



Figure 16. *Aeonium tabuliforme* in the Barranco de Masca, growing together with *A. canariense* and small plants of (possibly) *A. urbicum*.

Masca is worth a visit. The hamlet is a charming place, provided that the weather is not too warm, and several roofs host many healthy specimens of *A. urbicum*. Just 50-100m from the start of the path going through the barranco, one can admire *A. sedifolium* (Figure 14), which I also spotted along the road

leading to Masca. *Aeonium canariense* (Figure 15), *A. tabuliforme* (Figure 16) and *M. pallens* are well represented throughout the gorge and I was also able to observe a single group of *A. dodrantale* ssp. *millennium* in the upper part of the barranco. Some specimens of *M. polyphylla* and *M. laxiflora* manage to survive in shaded spots at the bottom of the valley, although I suspect that they are mostly plants which have fallen from the sheer cliffs above (Figure 17) and survived in spite of far-from-perfect environmental conditions. I also found a cross between *A. canariense* and *A. urbicum* (namely *A. ×bornmuelleri*), resembling the former parent apart from its narrower leaves and woody, bare stem.

I obviously looked for *A. mascaense* (Figure 18), in hope of catching a glimpse of this enigmatic plant, which has become a kind of succulent yeti since its description (Bramwell, 1982). It was first collected by Bramwell on 26 March 1969, who reported that he found it “in a very small area and with a known population of less than fifty plants [...] at about 400m



Figure 17. The Barranco de Masca seen from the bottom.

above sea-level [...] amongst the loose rocks and boulders beneath the high vertical cliffs of the valley below the hamlet of Masca". Liu (1989: 44) was the first to raise doubts on the origin of the plant, which may be a hybrid between *A. haworthii* and *A. sedifolium* according to her, a reconstruction that has been accepted by Piens (2002: 27), Nyffeler (2003: 16), Schulz (2007: 31; however, he thinks about a hybrid with *A. urbicum* on p. 68) and Mottram (2015: 21–22), whereas it is considered as a species by e.g. Carbonell (2007: 60), Lodé (2010: 80–81), Bañares (2015: 122–124) and Muer *et al.* (2016: 283). Bañares (2015: 123–124) is not convinced of the hybrid origin, although he does not completely rule out the hypothesis, and supports his position by mentioning a genetic study by Jorgensen & Frydenberg (1999: 617), who acknowledge the specific rank of *A. mascaense*, but at the same time admit that "a hybrid origin involving other species cannot be rejected". Still, the Barranco de Masca seemingly hosts a population of *A. decorum* (Hernández, 1998) as well, a circumstance that had already been reported by Bramwell & Bramwell (1974: 149). Kunkel (1980: 157–158) called this plant *Aeonium decorum* var. *mascaense*, an invalid name because it lacks a Latin description. In the second edition of his work in 1987, Kunkel seems to establish an equivalence between *Aeonium decorum* var. *mascaense* Kunkel and



Figure 18. *Aeonium mascaense* photographed in August at the Jardín Canario 'Viera y Clavijo', on Gran Canaria.

Aeonium mascaense Bramwell (Kunkel 1987: 173). Interestingly, Bramwell deposited in the herbarium of the Jardín Botánico Canario Viera y Clavijo a sheet (LPA 11055) containing a specimen of *A. decorum* collected in Masca in 1969. As Hernández (1998) rightly notes, the type of *A. mascaense* was initially labelled as *A. cf. decorum* by Bramwell (LPA 11428) who, however, did not report that the latter species grows in Masca in his article on *A. mascaense* (Bramwell, 1982), perhaps because he considered all *A. decorum* from Masca to be *A. mascaense*. In 1997, Hernández observed *A. decorum* in Barranco de Masca at an altitude of 400m, exactly the same altitude at which



Figure 19. *Aeonium haworthii* photographed in August near Roque los Carrizales.



Figure 21. *Aeonium urbicum* north of El Turrón.



Figure 20. A red-striped *Aeonium haworthii* in the upper Barranco Juan López.

Bramwell (1982: 63) claims to have found *A. mascaense* in 1969, the same year of the discovery – also by him – of *A. decorum* in Masca (on 27 July, see Hernández 1998: 158). To further confuse the matter, Bramwell & Bramwell (1974: 149) write that *A. decorum* grows in Masca at an altitude of around 350m.

A. mascaense is believed to have become extinct, since it has supposedly not been observed since its discovery according to Bañares (Bañares *et al.* 2004: 77; Bañares 2015: 124). Still, the same Bañares authored the file on *A. mascaense* included in the 1996 Red Book of Canarian threatened species (Gómez Campo 1996: 58–59), where he writes that there are fifty plants of *A. mascaense* in the wild (in all likelihood taking the information from Bramwell 1982) and considers it as endangered, not extinct.



Figure 22. *Aeonium dodrantale* ssp. *millennium* at Roque los Carrizales.

A quick perusal of botanical literature shows an even more intricate situation. It is true that *A. mascaense* has been looked for in vain in the Masca gorge by Rebmann (2003: 24), Piens (2007: 15), and Lodé (2015: 80), who observed instead many *Aeonium* hybrids, none of which corresponded to the elusive species. However, Piens also reports that Bramwell told him that an unnamed Frenchman had found again *A. mascaense*. Lüthy (1991: 159–162) does not consider the plant as extinct and publishes a picture of a few young specimens seemingly taken in habitat. In 2013, Leroy (mentioned in Arango, 2021a: 39) published in a blog some images of *A. mascaense* allegedly taken in habitat in Barranco de Masca, Barranco Seco and Barranco de Juan López. Some of them are reminiscent of the specimens of *A. haworthii* I observed in the upper



Figure 23. Laurisilva near Roque de los Pasos (Anaga).

Barranco Juan López and near Roque los Carrizales (Figure 19), while others are more similar to the traditional description of *A. mascaense*. Hochstätter (2019: 99) included in his privately published book an image of a dwarf plant reminiscent of *A. mascaense* he saw in Barranco de Masca. The better documented sighting of *A. mascaense* after Bramwell is that reported by Perrier (2010: 203 & 243), who observed a few similar plants on 20 April 2009 and published an image of them. Unfortunately, precise field data have not been provided for any of these sightings.

My brief visit to Masca did not allow me to solve this riddle, although it provided me with plenty of food for thought. First, I was surprised that I spotted no *A. haworthii* in the Barranco de Masca, although I observed this species along the road north-east of Masca and on the path between El Carrizal and Roque de los Catorce Reales, around 1–2km away from Masca as the crow flies. Interestingly, *A. haworthii* seems to be absent from the path between Cruz de Hilda and Roque La



Figure 24. *Aeonium tabuliforme* grows copiously in the Barranco de Bucarón.

Fortaleza as well, that is from the mountains encompassing the north-western side of the Masca barranco. I suspect that the environmental conditions of this gorge are not suited to *A. haworthii*, which is unable to give birth to healthy and self-sustaining populations. The hypothesis that the valley of Masca hosts plants somewhat similar to *A. haworthii* ssp. *volkeri*, regardless of their exact taxonomic rank, which was put forward by Bramwell & Bramwell (2001: 169: *A. mascaense* “may be a local form” of *A. volkeri*), is dubious at best, since I noticed that this subspecies grows profusely at the bottom of Barranco de Chamorga (Anaga, Eastern Tenerife), often forming medium-sized bushes consisting in dozens of rosettes. I am at pains to imagine that botanists and visitors by the score have missed such an easily recognizable plant in the past decades, also because I observed many specimens of (for instance) *A. canariense* and *A. tabuliforme* throughout the Masca gorge. The seeds of Crassulaceae species are dust-like and easily carried for long distances by the wind, which is strong in barrancos. Moreover, small



Figure 25. *Aeonium* ×*hawbicum* in the Barranco de Bucarón.



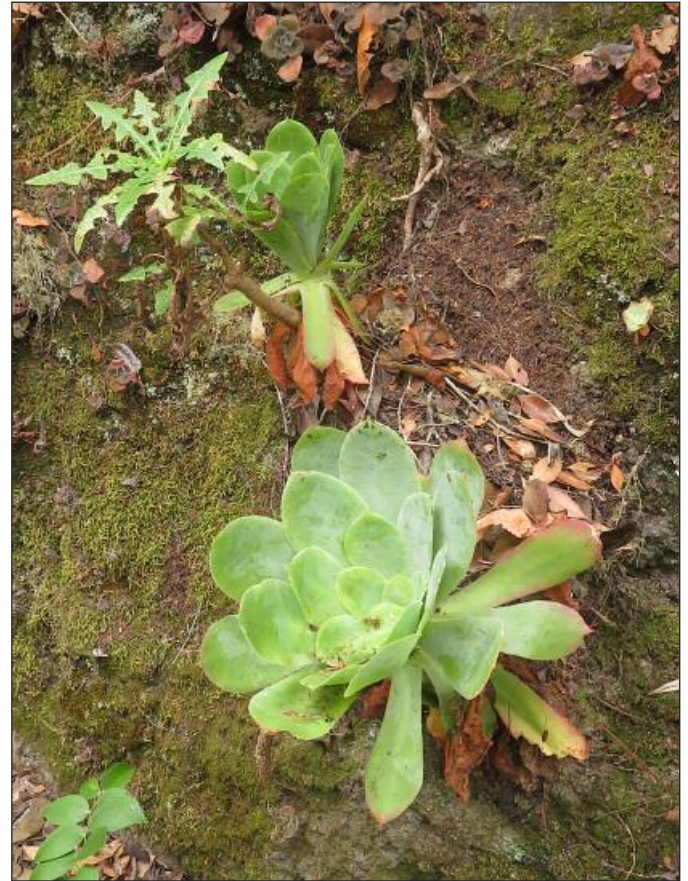
Figure 26. *Aichryson laxum* on Monte del Agua.

bits of *M. laxiflora* and *M. polyphylla* were able to grow at the bottom of the barranco. It is quite surprising that neither seeds nor rosettes of *A. mascaense* have been able to take root in the Masca valley, if we consider the distribution of both *A. haworthii* ssp. *volkeri* in Barranco de Chamorga and the Crassulaceae species growing in the Barranco de Masca.

Most of the sightings of *A. mascaense*

concern very small plants, 1-2 years old at most, which do look like stray seedlings or bits of succulents which have fallen from above, although they never managed to get a firm foothold in the barranco. Since I noticed that several *A. haworthii* rosettes growing near Roque de los Carrizales and in the upper Barranco Juan López show a reddish longitudinal stripe and have a size which is almost identical to that of *A. mascaense* (Figures 19&20), the latter may well be closely related to the former. All in all, I remain convinced that the best way to solve the “*Aeonium mascaense* riddle” is to consider it as a hybrid, either between *A. haworthii* and *A. sedifolium* (as proposed by Liu 1989: 44) or between *A. decorum* and *A. haworthii* (as I argued more in detail in my *Aeonium* monograph, see Cristini 2022: 90–92).

Arango’s recent attempts to invalidate this hypothesis by artificially crossing these plants and pointing out the differences between the hybrids he created and *A. mascaense* (Arango, 2016, 2021a) are, in my opinion, unconvincing for several reasons. First, it is widely known that crossings between the same species of Crassulaceae can result in remarkably different hybrids, depending on the pollen parent, the genes of the specimens involved and their geographical origins. Moreover, cultivated plants are mostly dissimilar from specimens growing in habitat, therefore it is pointless to try to reconstruct how a natural hybrid between (e.g.) *A. decorum* and *A. haworthii* would look in the wild by growing it in a garden. With regard to this crossing, Arango used a specimen of *A. decorum* from La Gomera (Las Toscas), not from Tenerife, which might have different genes. The specimen of *A. haworthii* he employed is said to come from “the region of Teno”, which is vague information, since this species grows almost exclusively in this area. I observed remarkable differences between the specimens from (for instance) Barranco Juan López, Baracán and Las Portelas, which can result in hybrids with dissimilar features. Finally, the possibility of back-crossings (introgression) should not be dismissed, especially given the ease with which *Aeonium* species and hybrids cross with each other.



Figures 27 & 28. *Aeonium cuneatum* near Alto Salto Báez.



Figures 29 & 30. *Aeonium cuneatum* in the upper Barranco de los Cochinos.

All in all, I would not be surprised if it turned out that *Aeonium decorum* ssp. *mascaense*, *A. volkeri* of Masca and *A. mascaense* are all stray *A. haworthii* hybrids, which managed to survive for a while in the gorge or in nearby cliffs and then disappeared without leaving any trace. Being of hybrid origin, they might have been able to tolerate conditions which are prohibitive for *A. haworthii*, but could not build a self-sustaining population. Interestingly, 1967 and 1968 were respectively

the fourth and fifth wettest years on Tenerife in the period 1931–2022 according to the Extreme Weather Watch, whose information is based on data made available by the NOAA (Extreme Weather Watch 2023). It may not be a coincidence that *A. mascaense* was discovered a year later, in 1969, and then disappeared, since an hybrid might have taken advantage of an exceptionally wet period to spread and then succumbed to a drier, more normal weather. To better evaluate this reconstruction, it would



Figure 31. A damaged *Aeonium cuneatum* specimen in the upper Barranco de los Cochinos.



Figure 32. *Aeonium tabuliforme* in the upper Barranco de los Cochinos.

be necessary to thoroughly explore the Masca gorge, first of all to understand if and to what extent *A. decorum* grows there, and to have a look at the mountains encompassing the barranco as well. However, botanically-minded visitors can hardly undertake such a task if the norms regulating hikes in Masca are not changed, and I deem such an eventuality

unlikely, given the rising popularity of this area among tourists. It is up to local botanists (ideally keen on climbing) to solve the many puzzles surrounding the *A. haworthii*-like plants seen from time to time in the depths of the Masca gorge.

Descending and – above all ascending the Barranco de Masca can be tiring, especially on hot, sunny days, and it is not recommended to people who are unused to trekking.

A more feasible alternative is represented by the path from Cruz de Hilda to Las Portelas, which offers splendid views of the Masca Valley, as well as several Crassulaceae species, starting with *Aeonium arboreum* ssp. *holochrysum*, *A. urbicum* (Figure 21) and *M. pallens*. Near the top of Cumbres de Martín Bay, I also observed some specimens of *A. dodrantale* ssp. *millennium*, whereas *A. haworthii* and *Aichryson laxum* only appear while climbing down towards Las Portelas. Still, the best place to observe these species (plus *A. canariense* and *M. polyphylla*) in the area of Masca is in my opinion the path leading from El Carrizal to Roque de los Catorce Reales. In little more than 2km, I saw plenty of nice specimens, especially of *A. dodrantale* ssp. *millennium* (Figure 22), which grows profusely on the north face of Roque de los Carrizales. I was surprised to find *A. tabuliforme* both here and in the Masca barranco, as well as deep in the laurisilva of Monte del Agua (see below). When I visited Tenerife back in 2016, I had the impression that this plant grows mostly on north-facing vertical cliffs along the northern coast, but now I realize that it has a wider distribution than I thought, also thriving in barrancos that are located south of the Teno and Anaga watershed.

Tenerife is famous for its laurel forest, which grows mainly in the Anaga region, in the north-eastern part of the island (Figure 23). Still, some areas covered with laurisilva can be found in Teno as well, especially on the slopes of Monte del Agua (“Mountain of Water”). The laurel forest of Anaga and Teno manages to thrive on an island located not far from the shores of Morocco and the Sahara desert thanks to a natural phenomenon known as



Figure 33. *Aeonium cuneatum* at the bottom of Barranco de los Cochinos.

“horizontal rain”, which I was able to observe at both ends of Tenerife during my stay there in 2023. It happens when clouds coming from the ocean are carried by trade winds (mostly blowing from north/north-east to south/south-west) to the northern coast of the Canary Islands, where they brush against the mountains and their vegetation. Humidity condenses on the leaves into very small droplets of water, which merge together to form veritable drops and then fall to the ground. Moss, ferns and many species of plants survive thanks to this peculiar kind of rain, which enables the growth of luxuriant vegetation on the northern and north-eastern parts of the islands.

My first trip to the Teno laurisilva began from Los Silos, a small village a couple of kilometres east of Buenavista del Norte where several paths start. I took the one called PR-54, crossing the Barranco de Bucarón, a narrow valley whose lower part is rich in succulents. I observed nice specimens of *A. haworthii*, many *A. tabuliforme* (Figure 24) and several *A. urbicum*, as well as *Monanthes laxiflora* and *M. polyphylla*. *A. tabuliforme* grows copiously on the slopes of the barranco, but it is not easy to photograph nice specimens, since most are located 5–10 metres above the path and the few I found in accessible places were partially hidden by surrounding bushes, damaged by

grazing animals or spotted. The geometrically perfect plants we often admire in collections and botanical gardens are grown under ideal conditions, which are rarely present in habitat. I also observed a cross between *A. haworthii* and *A. urbicum*, namely *A. ×hawobicum*, whose features were clearly intermediate between those of its parents (Figure 25).

After crossing the upper reaches of the barranco, I entered the laurel forest at an altitude of around 700m and began to see the first specimens of *Aichryson laxum* (Figure 26). Then, I took a large path circling a hill called Alto Salto Báez and I was able to find again a population of *A. cuneatum* that I already observed in 2017 (see Cristini, 2017). I was glad to see that the plants looked much better than during my previous visit, when I noticed that many leaves had been gnawed by insects or small animals. Although not many, the rosettes showed no obvious sign of distress this time and there were several small specimens as well, thereby indicating that some plants have managed to grow from seed during the last few years (Figures 27&28). The rosettes seemed to me more numerous and widespread than six years ago, with the two groups I noticed then now forming a single population.

In 2017, I did not know Voggenreiter’s *Geobotanische Untersuchungen*, so I believed that there was no other *A. cuneatum* population in



Figure 34. *Aeonium urbicum* near Santiago del Teide.



Figures 35. *Aeonium urbicum* near Santiago del Teide.

accessible places on the Teno mountains. After learning that Voggenreiter had spotted this species in Barranco de los Cochinos (at 500m), where they were noticed in 2021 as well according to iNaturalist (at around 650m, see <https://www.inaturalist.org/observations/71620038>), I decided to explore more carefully the area of Monte del Agua and I started by having a look at a forest road called Carretera Monte del Agua (leading from Las Portelas to Erjos), but I did not observe any specimen there.

One of my aims was to find the mysterious locality of “Fuente de Calera”, where Burchard first spotted the Teno *A. cuneatum* back in the early 1920s (Burchard 1929: 128). I was unable to find this toponym either on my 1:50,000 Kompass Map of Tenerife or my 1:25,000 Alpina map of the Teno area. A quick search on GoogleBooks revealed that the expression “Fuente de Calera” seemingly occurs only in Burchard’s book. Still, my Kompass app does show a small stream called La Calera just north of the Las Portelas – Erjos road. I reached it by walking on a semi-abandoned path, but was unable to find any specimen of *A. cuneatum* or the two springs mentioned by Burchard (1929: 42). On the contrary, the forest there was remarkably devoid of water. It is likely that Burchard did observe the species in this area in the 1920s, followed by Praeger, who found “it in abundance in several places in the great wooded valley behind Los Silos, 750–1050 metres” (Praeger 1929: 472). Still, it has by now



Figures 36. Flowers of *Aeonium urbicum* near Santiago del Teide.

disappeared due to global warming and the increasing need for water caused by the exponential growth of tourist facilities since the 1970s, which have greatly reduced the local aquifer.

My second attempt to locate *A. cuneatum* was more successful. I noticed that there is a path leading from Los Silos to Barranco de los Cochinos, but it is considered as dangerous, since it is not well-marked and crosses flooded galleries. I chose instead to reach the upper part of the barranco from Monte del Agua and I found plenty of healthy specimens of *A. cuneatum* 500m north of Pico de los Villanos, at an altitude of 800m (Figures 29&30). This population can be easily reached by climbing up from Los Silos and Barranco de Bucarón on the path I already mentioned (PR-54). Then, you have to turn left at a crossroad with signs for Erjos (6.1km), Monte del Agua (3.3km), Los Silos (5.6km) and Las Moradas (3.2km), thereby walking on a large path with no sign posts. After just 50m, the first specimens of *A. cuneatum* appear. Alternatively, you can reach Erjos or Las Portelas by car or bus, walk on the road linking these villages and then take the path leading to Los Silos at a crossroads with signs for Las Portelas (6.1km), Erjos (4.5km), Las Moradas (4.7km) and Los Silos (7.2km). After a little more than 1 km, you will find the first crossroads I mentioned, from which you can quickly reach the place where *A. cuneatum* grows.



Figure 37. *Aeonium arboreum* ssp. *holochrysum* near Arguayo.

This population is much larger than the first I observed, with plenty of big, healthy specimens growing lushly along the path, although I noticed a few with gnawed leaves (Figure 31), exactly like the ones I saw back in 2017 near Alto Pico Báez. *A. cuneatum* grows together with *A. haworthii* and *A. tabuliforme* (Figure 32), with which it may well cross, since the former flowers from April to June, while the latter blooms from April to July and from May to August respectively. I did not expect to find many plants of *A. tabuliforme* so deep in the laurisilva, but they seemingly enjoy the damp, shaded environment of the upper Barranco de los Cochinos, since they were on average bigger and less stressed than the specimens I saw in more exposed locations.

After duly taking some photos, I climbed down the barranco until I reached its bottom, where I observed other specimens at an altitude of around 600m, growing on sheer cliffs and rocky outcrops (Figure 33). I would have liked to explore this area further, but the path disappears in a gallery after reaching an

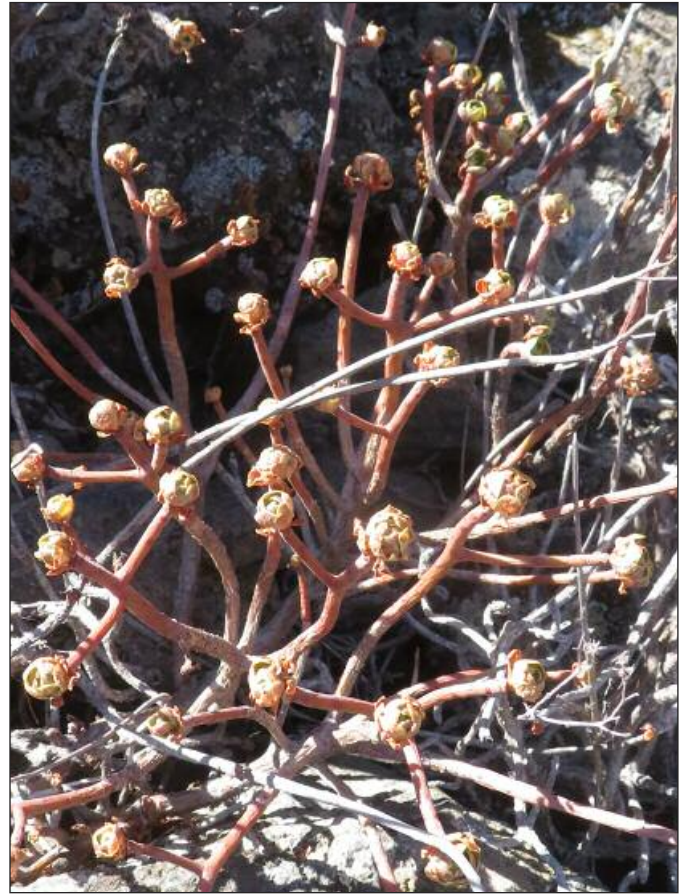


Figure 38. *Aeonium spathulatum* near Santiago del Teide.

abandoned settlement. There, I noticed some remains of a narrow-gauge track and small wagons, possibly used to carry goods and people to the upper reaches of the barranco, where there used to be waterworks.

Theoretically, it should be possible to find a way from here to Cuevas Negras and Los Silos, but I deemed it too risky and turned back. When exploring this area, the overall impression is that Burchard, Praeger and Voggenreiter were able to take advantage of well-trodden paths, which have since then been abandoned. I think that other populations of *A. cuneatum* may well exist in the Monte del Agua area, but reaching them might prove challenging for all those who lack a first-hand knowledge of local, minor paths. For instance, I very much doubt that the plants growing near Alto Salto Báez are the only ones to be found in that area. Voggenreiter (1974: 606–607) has argued that seeds of *A. cuneatum* specimens growing at the bottom of barrancos are often brought upwards by trade winds and root in the upper parts of these narrow valleys,



Figure 39. An *Aeonium spathulatum* whose rosette has not entirely closed up.

a situation which may find confirmation in Barranco de los Cochinos, since the plants I observed along the path were obviously thriving on a man-made structure and probably came from the bottom of the barranco. I suspect that the first *A. cuneatum* population I spotted may have similar origins and be traced back to a bigger colony located somewhere north-west of Alto Salto Báez.

Although strictly speaking not part of Teno massif, the village of Santiago del Teide and its surroundings are worth a visit if someone happens to spend a few days in the north-western part of Tenerife. Here, you can admire some comparatively recent (115-years-old) lava flows, which are still almost entirely free from vegetation. The most beautiful Crassulaceae species growing in this area is undoubtedly *A. urbicum*, which is one of the first plants able to colonize lava fields, thereby enjoying the lack of competition from other taxa and reaching an height of 1.5 or even 2m, with stems 6–7cm in diameter (Figures 34–36). Still, there are many plants of *A. arboreum* ssp. *holochrysum* as well (Figure 37), at times reaching a height of 2m. Just east of Santiago, I observed plenty of *A. spathulatum* bushes (Figures 38&39), whose rosettes were folded inwards to better withstand the hot summer weather. They may appear dry at first sight, but a closer inspection reveals that the rosettes are closed up to reduce the loss of water through evaporation.

One of the main aims of my trip to Santiago del Teide was to observe *Aeonium smithii*,

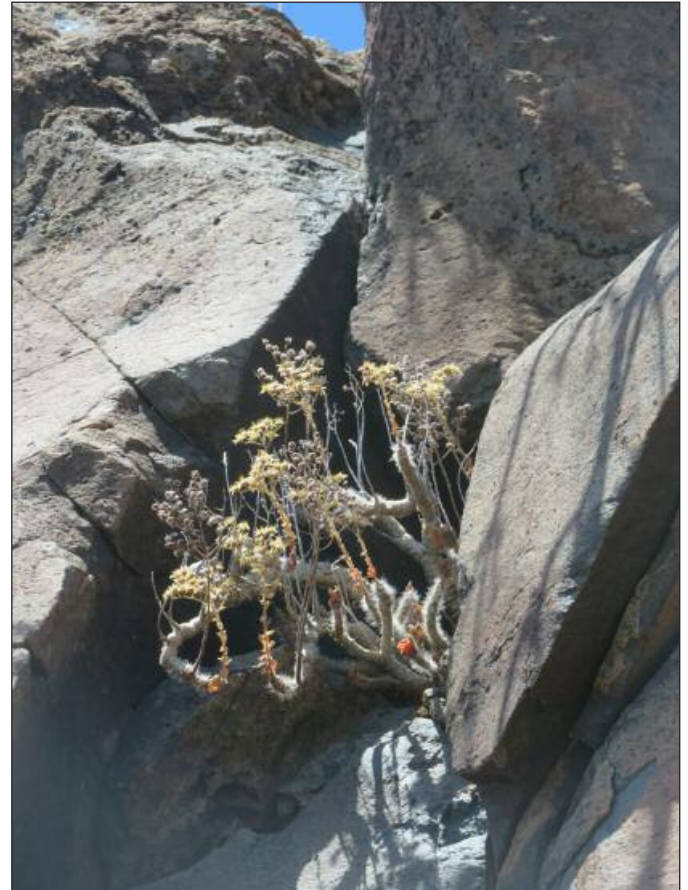


Figure 40. *Aeonium smithii* near Arguayo.

which has been reported from several places near this village. However, I only managed to spot a couple of specimens growing on a vertical rock face along a path west of Arguayo, at an altitude of around 1000m, on the south-western slope of Roque de Arguayo (Figure 40). *A. smithii* features a dormancy phase which is even more extreme than that of *A. aureum* or *A. spathulatum*, since it sheds almost all its leaves, leaving bare, hairy stems vaguely reminiscent of a tylecodon. In August, they are not the easiest succulents to spot, but the hairy stems are a telltale sign.

I also observed a few *A. smithii* near Montaña Chirigel in north-eastern Tenerife, at an altitude of around 1600m, next to *A. aizoon* and *A. aureum*. I have been growing this species for several years and noticed that it is not as temperamental as it has been reported, since my plants were able to overcome both some brief spells of excessive humidity and a certain degree of shade. Only after visiting its habitat, I fully realized how different the conditions under which I grow it are from those I noticed on Tenerife.

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Appendix

Selected locations of Crassulaceae species growing in Teno (Tenerife)

In the following appendix, I indicate the position of most Crassulaceae species I observed in Teno (Tenerife). Of course, I make no claim to completeness; these data refer exclusively to the parts of the island which I visited in 2023.

Buenavista del Norte area

- Buenavista – Punta de Teno (along the road TF-445): *Aeonium tabuliforme*, *A. urbicum*, *Monanthes laxiflora*, *M. polyphylla*.
- Camino del Risco – Teno Alto: *Aeonium haworthii*, *A. tabuliforme*, *A. urbicum*, *Aichryson laxum* (Teno Alto), *Monanthes laxiflora*, *M. pallens*, *M. polyphylla*.
- Cumbre de Baracán: *Aeonium dodrantale* ssp. *millennium* (between 850 and 950m), *A. haworthii*, *A. urbicum*, *Aichryson laxum*, *Monanthes pallens*.

Masca area

- El Carrizal – Roque de los Catorce Reales: *Aeonium canariense*, *A. dodrantale* ssp. *millennium*, *A. haworthii*, *A. tabuliforme*, *A. urbicum*, *Monanthes pallens*, *M. polyphylla*.

- Upper Barranco Juan López: *Aeonium haworthii*, *A. sedifolium*, *A. urbicum*.
- Cruz de Hilda – Roque La Fortaleza: *Aeonium dodrantale* ssp. *millennium*, *A. urbicum*, *Monanthes pallens*.
- Cruz de Hilda – Las Portelas: *Aeonium arboreum* ssp. *holochrysum*, *A. dodrantale* ssp. *millennium*, *A. haworthii* (near Las Portelas), *A. urbicum*, *Aichryson laxum*, *Monanthes pallens*.
- Barranco de Masca: *Aeonium arboreum* ssp. *holochrysum* (only along the road TF-436 above Masca), *A. canariense*, *A. dodrantale* ssp. *millennium*, *A. sedifolium*, *A. tabuliforme*, *A. urbicum*, *Monanthes laxiflora*, *M. pallens*, *M. polyphylla*.

Monte del Agua

- Barranco de Bucarón: *Aeonium haworthii*, *A. tabuliforme*, *A. urbicum*, *Monanthes laxiflora*, *M. polyphylla*.
- Laurisilva of Monte del Agua: *Aeonium cuneatum*, *A. haworthii*, *A. tabuliforme*, *A. urbicum*, *Aichryson laxum*.
- Barranco de los Cochinos: *Aeonium cuneatum* (500m north of Pico de los Villanos, at an altitude of 800m, and at the bottom of the barranco, at around 600m), *A. haworthii*, *A. tabuliforme*, *Monanthes laxiflora*.

Santiago del Teide

- East of Santiago del Teide: *Aeonium arboreum* ssp. *holochrysum*, *A. spathulatum*, *A. urbicum*.
- Arguayo: *Aeonium arboreum* ssp. *holochrysum*, *A. smithii* (path west of Arguayo, at around 1000m), *A. urbicum*.

REVISION OF THE *ECHINOCEREUS ENGELMANNII* COMPLEX TAXONOMY (CACTACEAE) IN SOUTHERN CALIFORNIA (USA)

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Summary: The taxonomy of the *Echinocereus* genus native to southern California, is here investigated with focus on the taxa growing in San Bernardino mountains. *i.e.* *Echinocereus engelmannii* var. *munzii* (Parish) W. Pierce & Fosberg, *Echinocereus engelmannii* (Parry ex Engelm.) Lem. and *E. triglochidiatus* subsp. *mojavensis* (Engelm. & J.M.Bigelow) W. Blum & Mich. Lange. Field surveys were carried out in May 2014 and herbarium specimens were examined. The results obtained lead us to recognise two subspecies of *E. engelmannii* *i.e.* subsp. *chrysocentrus* *stat. nov.*, *E. engelmannii* subsp. *munzii* *stat. nov.*) and a new form (*E. engelmannii* subsp. *munzii* f. *stoughtonii*). A key to distinguish the recognised taxa is provided.

In 1926, Parish (1926: 48) described *Cereus munzii* from southern California, growing on stony slopes at 1400–2000m in the San Bernardino Mts., San Jacinto Mts. and northern Baja California (Mexico). Its type was designated as Riverside County, Thomas valley (San Jacinto Mts.), collected on 21 May 1922 by Munz & Johnson 5570, and considered to be a close relative of *C. mojavensis* Engelm. & J.M.Bigelow (1856: 281) [= *Echinocereus triglochidiatus* subsp. *mojavensis* (Engelm. & J.M.Bigelow) W. Blum & Mich. Lange (W. Blum *et al.* 2008: 9)].

A few years later, Pierce & Fosberg (1933: 123) combined Parish's taxon as *Echinocereus engelmannii* var. *munzii* (Parish) W. Pierce & Fosberg, justifying their nomenclatural change for the sharing of the same typical spine arrangement, and the flower colour variability with *E. engelmannii* Parry ex Engelm. (1852: 338) Lem. (1868: 56), pointing out also its distinctive characters as the very low and compact *habitus* and the long curving central

spines. Furthermore, Pierce & Fosberg (1933: 124) examined the type collection in San Jacinto Mts. (Munz & Johnson 5570) stating that the *habitus* is a weak character there, the coll. in Tecate, Baja California (Munz 9612) having the same *habitus* but with short, straight spines as in *E. engelmannii*, while the coll. in Baldwin Lake, San Bernardino Mts. (Munz 5759, Pierce & Fosberg 8552) is considered to be an extreme form with lower *habitus* and curved spines without intergradation in the same overlapping range with the typical species. Nevertheless, Benson (1941: 361) having accepted *Echinocereus* Engelm. (1848: 91) as a segregate from *Cereus* Mill. (1754: unpagged) *sensu lato* (Britton & Rose, 1922: 3–4) published the new combination *E. munzii* (Parish, 1926: 48) L.D.Benson (1941: 361), followed by Munz & Keck (1959: 317) in their treatment of the California flora where they recognise three distinct species [*i.e.* *E. engelmannii*, *E. mojavensis* (Engelm. & J.M.Bigelow) Rümpler (1885: 803), *E. munzii*], but later Benson (1969b: 187–188, 1982: 646) reconsidered his position and lowered the taxon to varietal rank of *E. engelmannii* as Taylor also did in his monograph *The genus Echinocereus* (1985: 42). Recently, Munz's taxon is accepted only as a synonym of *Echinocereus engelmannii* (Anderson, 2001: 234, Guzmán *et al.*, 2003:64, Zimmerman & Parfitt, 2003: 167, Hunt *et al.*, 2006: 290, Pilbeam, 2011: 45, Lange, 2013: 37). Due to this mixed treatment it is necessary to clarify the taxonomic relationships of this peculiar taxon in comparison with its presumed relatives *Echinocereus engelmannii* and *E. triglochidiatus* subsp. *mojavensis* [= var. *melanacanthus* (Engelm. in A.Gray, 1849: 51) L.D.Benson (1944: 254), see Zimmerman & Parfitt, 2003: 167] recorded as growing

sympatrically in the San Bernardino Mts. (see maps in Benson 1969b: 181, 183) and with the other varieties of *E. engelmannii* in southern California [*i.e.* var. *acicularis* L.D.Benson (1969a: 22), var. *armatus* L.D.Benson (1969b: 33), var. *chrysocentrus* (Engelm. & J.M.Bigelow 1856: 283) Rümpler (1885: 806), see map in Benson 1969b: 183].

Materials and methods

In 2014, the first author has had the opportunity during his period abroad at the Huntington Botanical Gardens in San Marino (California) while studying for the title of PhD researcher at Genoa University (see Guiggi, 2016, Guiggi & Mariotti, 2018a–b, Guiggi & Mariotti, 2019a–c) to visit the San Bernardino Mts., near the Baldwin Lake, at Cushenbury Canyon and at Mitsubishi Mine, and was able to gather morphological data, digital images and materials for the preservation of dried specimens at the Huntington's herbarium (HNT). The taxonomic relationships of the plants observed during their flowering time in May 2014 and collected in the San Bernardino Mts. were defined comparing a total of 34 *exsiccata* deposited at several US herbaria (*i.e.* ASU, BRY, DES, MO, NY, RSA, US, USU-UTC; codes according to Thiers, 2023+) with specialist literature and illustrations (Benson, 1941, 1969a–c, 1982, Berresford & Terry, 2019, Cota & Philbrick, 1994, Lange, 2013, Munz & Keck, 1959, Parish, 1926, Pierce & Fosberg, 1933, Pilbeam, 2011, Taylor, 1985, Zimmerman & Parfitt, 2003). Cited articles follow the Shenzhen Code (Turland *et al.*, 2018).

Revised taxonomy

1. *Echinocereus engelmannii* (Parry *ex* Engelm.) Lem., Cactées: 56. 1868.

Figure 1.

Basionym: *Cereus engelmannii* Parry *ex* Engelm. ('*Cereus engelmannii*') in *Amer. J. Sci. Art.: ser. 2* 14(42): 338. 1852.

Type: USA, California, mountains about San Felipe, 1849/1850, Parry s.n., *non servatus*.

Neotype (designated here): USA, California, San Diego Co., San Felipe Valley, below the Laguna Mts., hill 1 mile W of Scissors Crossing, granitic soil, 2400ft (732m), 13 Jul. 1963, L. Benson 16386B (POM in RSA! lecto., corp, ar, sp, Figure 2; isolectotype here



Figure 1. A typical plant of *Echinocereus engelmannii* subsp. *engelmannii* with stiff and straight central spines from Santa Rosa Mts., Cactus Spring Trail.

Photograph: T.R.Stoughton.

designated as Benson 16386A POM in RSA!, corp, ar, sp).

Etymology: dedicated to the German botanist George Engelmann (1809–1884), naturalised American in St. Louis, Missouri, specialised in *Echinocereus* and *Opuntia* (L.) Mill. genera (Eggl & Newton, 2004: 76).

Notes on the taxonomy of *Echinocereus engelmannii* complex: the type subspecies is characterised by cylindrical stems, to 25cm long, with central spines, stiff, normally straight, principally distributed in the Sonoran Desert in the sub-region of Colorado Desert, at intermediate altitudes, 600–1500m (see Benson, 1982: 640). The phylogenetic analysis (Sánchez *et al.*, 2014: 1187–1188, 2017: 6) and the almost identical morphology (Zimmerman & Parfitt, 2003: 165–166) support *E. fasciculatus* (Engelm. *ex* S.Watson, 1878: 402) L.D.Benson (1969a: 21) as a subspecies of *E. engelmannii* [*i.e.* subsp. *fasciculatus* (Engelm. *ex* S.Watson, 1878: 402) W.Blum & Mich. Lange in Blum *et al.* (1998: 2), incl. ssp. *boyce-thompsonii* (Orcutt 1926: 4) N.P.Taylor (1997: 3), see Pilbeam, 2011: 55] characterised by an eastern distribution with normally straight, terete and lesser stout spines with the inclusion of the var. *acicularis* L.D.Benson (1969a: 22) due to its intergradation with the former taxon and for the absence of a clearly distinguishable geographical distribution



Figure 2. The neotype of *Echinocereus engelmannii* subsp. *engelmannii* designated here from the two gatherings cited by Benson for his neotypification, that which possesses the typical cylindrical stem sections with stiff and straight spines, from California, San Felipe Valley, below the Laguna Mts., Benson 16386B (POM in RSA). Photograph: © Rancho Santa Ana Botanic Garden.

between them (Benson, 1969a: 138, 143, 1982: 632, 635, 643; Zimmerman & Parfitt, 2003: 165). However, this taxonomic position needs to be corroborated by new research. Furthermore field studies in Arizona, Nevada and Utah, are necessary to evaluate the status of the type subspecies and of the other described varieties [*i.e.* var. *decumbens* (Clover & Jotter, 1941: 417) L.D.Benson (1944: 258), var. *purpureus* L.D.Benson (1969: 126), var. *variegatus* (Engelm. & J.M.Bigelow 1856: 83) Rümpler in C.F.Förster (1885: 806)], in some cases already combined at the subspecies rank [ssp. *decumbens* (Clover & Jotter, 1941: 417) W.Blum & Mich.Lange in Blum *et al.* (1998: 2), ssp. *variegatus* (Engelm. & J.M.Bigelow) E.Lutz (2000: 97)].

Notes on the neotypification: Benson (1982: 943) cited two different collections from the *locus classicus* with the POM code catalogue n. 311501, 311502 that correspond respectively to Benson 16386A and 16386B for his neotypification, following the Art. 8.1 of ICN in Turland *et al.* (2018) the latter voucher is chosen here to be the neotype, which represents well the characters of the type subspecies with the stiff and straight central spines (see Benson, 1982: 640).

Flowering time: April–May (see Munz & Keck, 1959: 317).

Chorology: United States (Arizona, California, ?Nevada, ?Utah), Mexico (Sonora, Baja California).

Illustration examined: Benson (1974: 141 figs. 3.16–3.17, 1982: pl. 6.7 fig. 99), Berresford & Terry (2019: 113 fig. 21), Pilbeam (2011: 46 figs. 38–39).

Relevant literature: Benson (1969a–b, 1974a–b, 1982), Lange (2013: 35–36), Zimmerman & Parfitt (2003).

2. *Echinocereus engelmannii* subsp. *chrysocentrus* (Engelm. & J.M.Bigelow) Guiggi *stat. nov.* Figs. 3–4.

Basionym: *Cereus engelmannii* var. *chrysocentrus* Engelm. & J.M.Bigelow in *Proc. Amer. Acad.* Art. 3: 283. 1856.

= *Echinocereus engelmannii* var. *chrysocentrus* (Engelm. & J.M.Bigelow) Rümpler in C.F.Först, *Handb. Cacteenk.* (ed.2): 805. 1886.

= *Echinocereus chrysocentrus* Orcutt, *Cactography*: 4. 1926.

Type (Engelmann & Bigelow, 1856: 283): USA. N Bill William's Fork, *Bigelow*, not designated.

Lectotype (designated by Benson, 1982: 943): USA, Arizona, Mojave desert, Bill William (River), 13 Feb. 1854, *J.M. Bigelow* s.n. (MO! lecto. Figure 5).

= *Echinocereus engelmannii* var. *armatus* L.D.Benson in *Cact. Succ. J. (U.S.)* **41**: 33. 1969.

Type USA, California, San Bernardino Co., Mojave desert, Dead Man Point, E Victorville, (3000ft) 914m, 1 Apr. 1951, L. Benson 14767 (POM in RSA! holo., corp, ar, sp, fr; USU-UTC! iso., corp, ar, sp, fr).

= *Echinocereus engelmannii* var. *howei* L.D.Benson in *Cact. Succ. J. (U.S.)* **46**: 80. 1974.

Type USA, California, San Bernardino Co., Mojave desert, E Goffs, ca. 1400ft. (427m), D.F. Howe 4570 (POM in RSA! holo.).

Etymology: from the Greek words "*chrysos*" gold and "*kentron*" centre (Egglis & Newton, 2004: 47), referred to the colour of the central spines (Engelmann & Bigelow, 1856: 283)

Notes on the subspecies *chrysocentrus*: infra-specific taxon recognised here as an ecotype of the Mojavean Desert, at lower altitudes, frequently at 400–900(–1600)m, characterised by its largest dimensions, to 45 x 5–8.7cm, central spines yellowish or darker, stoutest, strongly recurved, 4–7 in number, the lower one, angular and dagger-like, to 5.6 x 0.2cm, flower largest, to 7.5cm in diameter. The varieties *armatus* (Benson, 1969b: 33) and *howei* (Benson, 1974: 80) are conspecific for their morphology with this subspecies and they are treated as synonyms as confirmed by Zimmerman & Parfitt (2003: 167). Previously, this infra-specific taxon was probably reported as *E. engelmannii* in San Bernardino Mts. (see map in Benson, 1969c: 183), or merely considered as synonym of the former species (see Zimmerman & Parfitt, 2003: 166–167). As the other recognised subspecies [*i.e.* *Echinocereus triglochidiatus* subsp. *mojavensis*, *Opuntia polyacantha* subsp. *erinacea* (Engelm. & J.M.Bigelow, 1856: 301) Guiggi (2012: 4)] characteristic of the Mojave ecological region, due to its more extreme conditions (Benson,



Figure 3. A caespitose plant of *Echinocereus engelmannii* subsp. *chrysocentrus* characterised by the central spines, which are yellowish-white, very long and curving with the immature spiny fruits, from Mitsubishi Mine, San Bernardino Mts. Photograph: A. Guiggi.



Figure 4 Detail of the apical stems of *Echinocereus engelmannii* subsp. *chrysocentrus* with stout and dagger-like central spines, from Mitsubishi Mine, San Bernardino Mts. Photograph: A. Guiggi.



Figure 5. The lectotype of *Echinocereus engelmannii* var. [subsp.] *chrysocentrus* designated by Benson distinguished by the longer, stouter and recurved central spines, from Arizona, Mojave Desert, Bill Williams (River), *Bigelow* sn. (MO).

Photograph: © Missouri Botanical Garden.

1982: 194), all these taxa have in common the long, stout or flexible, curving, twisting and very numerous spines. In contrast, in the eastern range of the *E. engelmannii* complex in the Sonoran Desert of Arizona the spines are fewer, more acicular and flexible (e.g. *E. engelmannii* var. *acicularis* L.D.Benson, 1969a: 22) and here considered as a synonym of *E. engelmannii* subsp. *fasciculatus* (see discussion sub *E. engelmannii*). In La Paz, Maricopa, Pinal and Yuma Co. of Arizona many herbarium specimens belonging to subsp. *fasciculatus* are misinterpreted as var. [i.e. subsp.] *chrysocentrus* (see swbiodiversity.org/seinet/collections/list.php).

Chorology: United States (Arizona, California, Nevada, Utah).

Specimens examined: USA. California, San Bernardino Co., N Ord Mt. about 1 mile N

Aztec Spring, Ord Mt. Rd. about 100m W section corner, 1256m, 11 Apr. 1987, B.D. Parfitt 3591 sub *E. engelmannii* (ASU, corp, ar, sp); San Bernardino Co., Mojave Desert, 780m, 4 Oct., 1987, M.A. Baker 7504 sub *E. engelmannii* var. *howei* (ASU, corp, ar, sp, fl); San Bernardino Co. between Searchlight Junction and Goffs, California (old high 40), 18 m, 4 Jan. 1974, W.H. Earle s.n. sub *E. engelmannii* var. *howei* (DES, corp, ar, sp, ico). Nevada: Clark Co., Dead Mts., W Davis Dam along Hwy. 77, 23 Mar. 1984, J.M. Miller 919 sub *E. engelmannii* var. *acicularis* (ASU, corp, ar, sp); Clark Co., Hill above mine, 0.8 mile S Hwy 68, 1 mile E of California-Nevada state line, 1311m, 25 May 1987, B.D. Parfitt 2209 sub *Echinocereus* sp. (ASU, corp, ar, sp, fl). Utah: Washington Co., ca. 5 mile SSW Leeds, above the Virgin River, 15 Sept. 1982, T. Ross 5 (BRY, corp, rad, ar, sp). Arizona: Mohave Co., along powerline past Keenan's Camp, Planet 2 NE 7.5', 670m, 6 Mar. 1979, Butterwick & Hillyard 4267 (DES, corp, ar, sp); Mohave Co., Whitmore Point, 0.1 mile N of junction of two jeep trails, Whitmore Quad, 1645m, W. Hodgson 4615 sub *E. engelmannii* var. *acicularis* (DES, corp, ar, sp, fl).

Illustration examined: Benson (1969a: pl. 14 figs. 1–2, pl. 6.7 figs 100–101, 643 fig. 680 sub *E. engelmannii*, 645 fig. 683, 647 figs. 685–686), Berresford & Terry (2019: 96 fig. 6 sub *E. engelmannii* ssp. *magnursensis*, 103–105, 108–112, figs. 11–20 sub *E. engelmannii*), Pilbeam (2011: 45 fig. 37 sub *E. engelmannii*, 47 fig. 40).

Relevant literature:—Benson (1969a–b, 1974a–b, 1982), Engelmann & Bigelow (1856), Zimmerman & Parfitt (2003).

3. *Echinocereus engelmannii* subsp. *munzii* (Parish) Guiggi *stat. nov.* Figures 6–8.

Basionym: *Cereus munzii* Parish in *Bull. S. Calif. Acad. Sci.* **25**: 48. 1926.

≡ *Echinocereus engelmannii* var. *munzii* (Parish) W. Pierce & Fosberg in *Bull. S. Calif. Acad. Sci.* **32**: 123. 1933.

≡ *Echinocereus munzii* (Parish) L.D. Benson in *Amer. J. Bot.* **28**: 361. 1941.

Type: USA, California, Riverside Co., San Jacinto Mountains, Hemet Valley [Thomas valley], 2 miles below Kenworthy, on dry

slopes, 4650ft (1417m), 21 May 1922, P.A. Munz & I.M. Johnston 5570 sub *Cereus munzii* Parish (UC holo., *non videmus*; CAS iso., *non videmus*; DS iso., *non videmus*; NY(2)! iso., corp, cost, sp, fl, ico, Fig. 9; RM iso., *non videmus*; POM in RSA(2)! iso., corp, cost, sp, fl, ico; US! iso, corp, cost, sp, ico; UC iso, *non videmus*].

Etymology: dedicated to the Prof. Philip A. Munz (1892–1974), US Botanist and past Director of the Rancho Santa Ana Botanic Gardens (Eggl & Newton, 2004: 160).

Notes on the subspecies *munzii*: ecotype of the peninsular mountains range of southern California (San Bernardino, San Jacinto, Santa Rosa, Laguna Mts. and Sierra Juarez in Baja California), at higher altitude, 1200–2000m, in the Pacific Montane Forest, Pine forest and Chapparal (Benson, 1969b: 187, 1982: 646), characterised by a compact and more proliferous *habitus*, stems lower, © 20 cm high, spines whitish, with only 1–2, normally recurved central spines, flower sometimes lighter, pinkish. This subspecies appears morphologically variable along its montane geographical range as initially discussed by Pierce & Fosberg (1933: 124) and as confirmed by the analysis of the here included herbarium specimens (*e.g.* Fosberg 8552, Munz & Johnson 5570, Munz 5759, Munz 9612, see Pierce & Fosberg, 1933: 124) and of the illustrations here included or from literature, nevertheless some characters are constant (*i.e.* low, caespitose, and compact *habitus*, stem subcylindrical or subconical, whitish spines, central ones ± curved).

Flowering time: May–June (see Munz & Keck, 1959: 317).

Chorology: United States (California), Mexico (Baja California).

Specimens examined: USA, California, San Bernardino Co., San Bernardino Mts., desert slopes, on road to Baldwin Lake, 4000ft (1219m), 25 Apr. 1953, V. Grant & A. Grant VG9199 sub *Cereus munzii* Parish (POM in RSA!, corp, sp, fl); California: Riverside Co., Vail Lake area, sedimentary hills, at NW end of lake at E end of Oak Mt., N of Wilson Creek, inland sage scrub and Chaparral, 7 May 1989, Boyd 3581 sub *Echinocereus engelmannii* var. *munzii* (Parish) W. Pierce & Fosberg (POM in RSA!, corp, ar, sp, fl, fr).



Figure 6. A group in flower with the whitish spines and the longer centrals of *Echinocereus engelmannii* subsp. *munzii* from San Jacinto Mts, Garner Valley.

Photograph: T.R.Stoughton.



Figure 7. A caespitose plant with the typical characters of *Echinocereus engelmannii* subsp. *munzii* from Santa Rosa Mts., Pinyon Trail.

Photograph: T.R.Stoughton.

MEXICO, Baja California, rocky slopes, about 47 miles SE of Tecate, 4500ft. (1370 m), 14 May 1925, *P.A. Munz* 9612 sub *Cereus munzii* (POM in RSA!, corp, sp, fl); Baja California, 3.7 miles S of the intersection of El Condor and Rte. 2 between Tecate and Mexicali, 27 May 1991, *J.P. Rebman* 1179 sub *Echinocereus engelmannii* var. *munzii* (ASU!, corp, sp, fl).

Illustration examined: Berresford & Terry (2019: 91–92 figs. 1–2), Lange (2013: 32–34, 36).



Figure 8. A flowering plant of *Echinocereus engelmannii* subsp. *munzii* with juvenile pinkish spines, at a lower altitude than *f. stoughtonii*, from the San Bernardino Mountains. just west of Whitewater on the PCT trail, Haugen-Lehmann area of Banning Pass.

Photograph: T.R.Stoughton.

Relevant literature: Benson (1941, 1969b, 1982), Lange (2013), Munz & Keck (1959), Parish (1926), Pierce & Fosberg (1933), Zimmerman & Parfitt (2003).

4. *Echinocereus engelmannii* subsp. *munzii* f. *stoughtonii* Guiggi *forma nova*. Figs. 10–12.

Type: USA, California, San Bernardino Co., San Bernardino Mts., Big Bear Valley, Baldwin Lake Ecological Reserve, exp. SW, 6729ft (2051m), 16 May 2014, *A. Guiggi* USA25 (HNT holo., corp, sp, fl, Fig. 13).

= *Echinocereus engelmannii* subsp. *magnursensis* Berresf. & M.Terry in *Echinocereenfreund* 32(4): 103. 2019.

Type: USA. California, San Bernardino Co., San Bernardino Mts., NE of Big Bear City, 2059 m, 19 Jul. 2017, *Berresford & Terry* PB 7479 (SRSC! holo., corp, sp).

Description: low, cespitose, forming groups to 30 heads; stem depressed–globose to subconical, 10–14 x 5–9(–16) cm; ribs tuberculate, 11–13, 0.5–2.1 cm high; areoles



Figure 9. An isotype of *Cereus munzii* (\equiv *Echinocereus engelmannii* subsp. *munzii*) including a longitudinal section of a subconical stem, three transversal sections of the spiny stem, one flower and two illustrations with the characteristically low, cespitose *habitus*, from San Jacinto Mountains, Hemet Valley [Thomas valley], *Munz & Johnston 5570* (NY).

Photograph: © New York Botanical Garden.



Figure 10. A three headed plant with the very long, whitish, twisting spines and some flower buds of *Echinocereus engelmannii* subsp. *munzii* f. *stoughtonii* from San Bernardino Mts., Big Bear Valley, Baldwin Lake Ecological Reserve, over 2000m. Photograph: A. Guiggi.



Figure 11. Details of the stem-heads with one flowering of *Echinocereus engelmannii* subsp. *munzii* f. *stoughtonii* from the San Bernardino Mts., Big Bear Valley, Baldwin Lake Ecological Reserve, over 2000m. Photograph: A. Guiggi.

at top of podarias, 1–2.5 cm apart; spines initially pinkish, later white, greyish in age, normally stout, 8–12, 0.2–(3.5)5.5(8) x 0.03–0.3 cm, centrals 1–2, strongly recurved or twisted, to 8 cm long, radials ± straight, 4–10, to 1.5 cm long; flower pinkish to deep purplish, 1.8–4 x 1–1.8 cm; fruit red, 1.6–4 x 0.7–1.4 cm; seeds black, shiny, verrucose and rough, 1.5 x 1.3 mm; distributed in USA, S California, San Bernardino Mts., Pacific Montane Forest, dry grass slopes, 2000–2500 m.

Etymology: dedicated to Thomas R. Stoughton,



Figure 12. An opening purplish flower of *Echinocereus engelmannii* subsp. *munzii* f. *stoughtonii* from San Bernardino Mts., Big Bear Valley, Baldwin Lake Ecological Reserve, over 2000m. Photograph: A. Guiggi.

US botanist and naturalist, who led to the discovery and study of this new taxon in the field.

Notes on the *stoughtonii* form: this is an extreme form from the higher altitudinal range, 2000–2500m, in the San Bernardino Mts., characterised by the *habitus* lower and more compressed, the central spines, longer, curving and twisting, to 8 cm long, but clearly conspecific with the subspecies *munzii* based on its morphology (see above) in the original description (Parish 1926: 48) and with the elements (*i.e. corpus* and *icons*) included in the *munzii* isotypes from San Jacinto Mts. (Munz & Johnston 5570) deposited at POM, NY & US. The diploid *Echinocereus triglochidiatus* subsp. *mojavensis* (Cota & Philbrick 1944: 1055, Fig. 14) that sometimes grow sympatrically with this form, it is easily distinguished by the yellowish-red flowers and for its spines which are all strongly recurved, with the central spine sometimes absent (Zimmerman & Parfitt 2003: 168).



Figure 13. The holotype of *Echinocereus engelmannii* subsp. *munzii* f. *stoughtonii* including two flowering stem sections, from San Bernardino Mts., Big Bear Valley, Baldwin Lake Ecological Reserve, at 2051m, *Guiggi* USA25 (HNT). Photograph: S. Lahmeyer.



Figure 14. A caespitose plant of *Echinocereus triglochidiatus* subsp. *mojavensis* with the characteristic yellowish-red flowers and the curved spines, from San Bernardino Mts., Cushenbury Canyon. Photograph: A. Guiggi.

Flowering time: May–June (see Munz & Keck, 1959: 317).

Chorology: United States (California).

Specimens examined: USA, California, San Bernardino Co., San Bernardino Mts., Bear Valley, locally abundant on dry slopes along the N side of Baldwin Lake, 7000ft (2130m), 13 Jun. 1922, P.A. Munz 5759 sub *Cereus munzii* Parish (POM in RSA!, corp, sp); San Bernardino Mts., near dry bed of creek leading up to a divide above Holcomb Creek, 8000ft (2438m), 23 Jun. 1922, F.W. Peirson 3146 sub *Echinocereus munzii* (Parish) L.D.Benson (POM in RSA!, corp, sp, fl); San Bernardino Mts., Gold Mt. above Baldwin Lake, bare stony and slopes, 19 Jun. 1932, 7200ft. (2200m), F.R. Fosberg 8552 sub *Echinocereus engelmannii* var. *munzii* (Parish) W. Pierce & Fosberg (POM in RSA!, corp, sp, fl); San Bernardino Mts., rocky.....summit between Johnson Grade and Baldwin Lake, 6900 ft (2100 m), 28 May 1933, B.D. Stark s.n. sub *Cereus engelmannii* Parry ex Engelm. (RSA!, corp, sp); San Bernardino Mts., Baldwin Lake, 20 May 1934, Jones s.n. sub *Cereus munzii* (POM in RSA!, corp, rad, sp, fl); California, San Bernardino Mts., N. end of Baldwin Lake, 6900ft (2100m), 13 Feb.

1941, C.B. Wolf 9911 sub *Cereus munzii* (POM in RSA!, corp, rad, sp); San Bernardino Mts., desert side of Johnson Grade, 3 1/0 mile below the summit, ca. 6500ft (1980m), 13 Feb. 1941, C.B. Wolf 9914 sub *Cereus munzii* (POM in RSA!, corp, rad, sp); San Bernardino Mts., Mojave desert drainage, Sierra Montane forest, N side of Baldwin Lake, gravelly soil, S slope, 7000ft (2130m), 1 Apr. 1951, L. Benson 14765 sub *Echinocereus* sp. (POM in RSA!, corp, sp); San Bernardino Mts., Mojave desert, N side of Baldwin Lake, Sierran Montane Forest, gravelly soil, S slope, 6800ft (2073m), 6 May 1956, L. Benson 15634 sub *Echinocereus engelmannii* var. *munzii* (POM in RSA!, corp, sp, fl); San Bernardino Mts., Colorado River drainage, Johnson Grade, about 1/2 mi down the grade, upper part of desert edge chaparral, granitic soil, S slope, 6700ft (2042m), 25 May 1966, L. Benson 16652 sub *Echinocereus engelmannii* var. *munzii* (POM in RSA!, corp, sp, fl).

Illustration examined: Benson (1969b: 187 fig. 66, 1982: 646 fig. 684), Berresford & Terry (2019: 93–95 figs. 3–5, 97–100 figs. 7–9, 102 fig. 10, 106–107, 115–116 figs. 23–24, 120 figs. 25–26), Pilbeam (2011: 47 fig. 41).

Key for identification of the *Echinocereus* taxa in southern California.

1. Stems not forming a very dense group, stems 5–45cm long; spines yellowish, pinkish to dark reddish, central ones normally straight or recurved; flower purple to magenta; Sonoran and Mojavean desert.....2.
- Stems densely aggregated, stems to 5–60, low and caespitose, <20cm long; spines whitish, greyish in age, central ones curving or twisting3.
2. Central spines normally straight, stiff, 1–4, to 4.4 x to 0.1cm; stem to 25 x to 5cm; flower to 6.2cm; normally in Sonoran desert, at 600–1500m
.....*E. engelmannii* subsp. *engelmannii*
- Central spines strongly recurved, very stout, 4–7, to 5.6 x to 0.2cm; stem to 45 x 8.7cm; flower to 7.5cm; Mojave desert, frequently at 400–900m
.....*E. engelmannii* subsp. *chrysoctrus*
3. Flower pinkish to deep purplish, to 4–6cm long; areoles to 2.5cm apart; central spines 1–2, to 8cm long; Pacific Montane Forest and California Chaparral, 1200–2500m
.....*E. engelmannii* subsp. *munzii*
- Flower yellowish-red, to 7cm long; areoles to 1.5cm apart; central spines 0–4, to 5cm long; Rocky Montane Forest, California Chaparral and Mojave desert, 900–2500m
.....*E. triglochidiatus* subsp. *mojavensis*

Relevant literature: Benson (1941, 1969b, 1982), Berresford & Terry (2019), Munz & Keck (1959), Parish (1926), Pierce & Fosberg (1933), Zimmerman & Parfitt (2003).

Conclusions

A new revised taxonomy of the genus *Echinocereus* distributed in southern California has been here proposed based mainly on field studies in the San Bernardino Mts. The morphological data, herbarium specimens and illustrations suggest the recognition of three infra-specific ecotypes of *Echinocereus engelmannii*, two from the peninsular mountain range, at 1200–2500m, characterised by a lower and compact *habitus*, with sometimes twisting spines [*i.e.* *E. engelmannii* subsp. *munzii* (Parish) Guiggi, *E. engelmannii* subsp. *munzii* f. *stoughtonii* Guiggi] and one from the Mojave Desert region, principally at 400–900m, distinguished by its larger dimensions, longer and stouter spines [*Echinocereus engelmannii* subsp. *chrysoctrus* (Engelm. & J.M. Bigelow) Guiggi]. All these diagnostic characters are fixed in the anatomy of their relative types (see Figures. 2, 5, 9 & 13).

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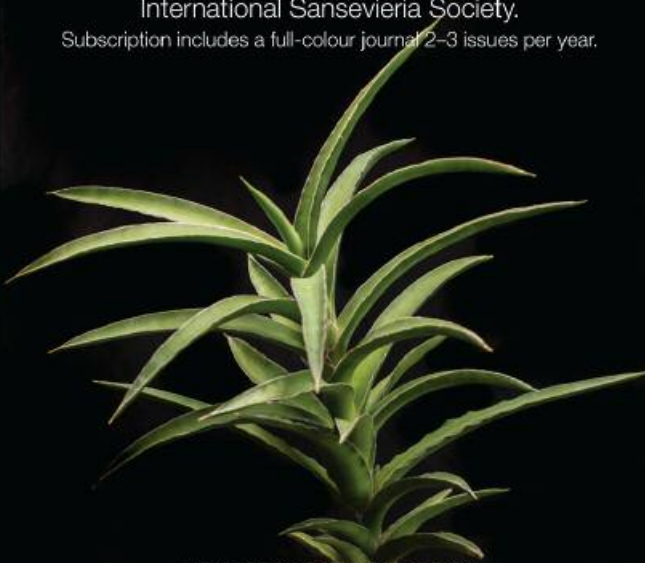
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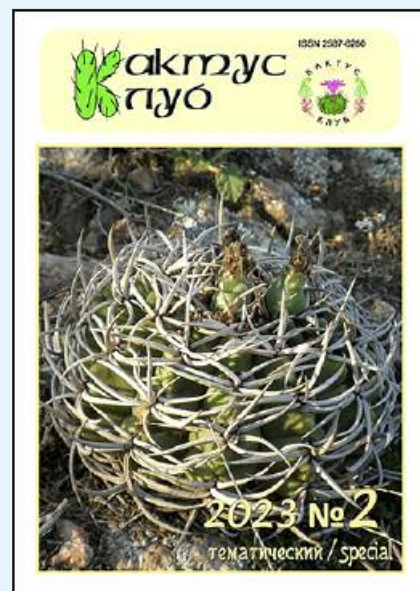
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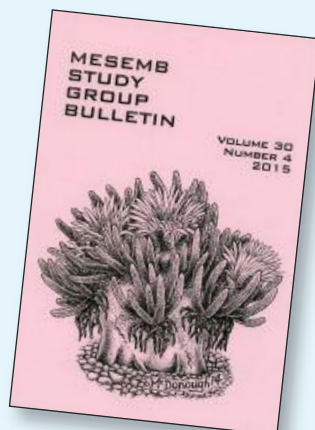
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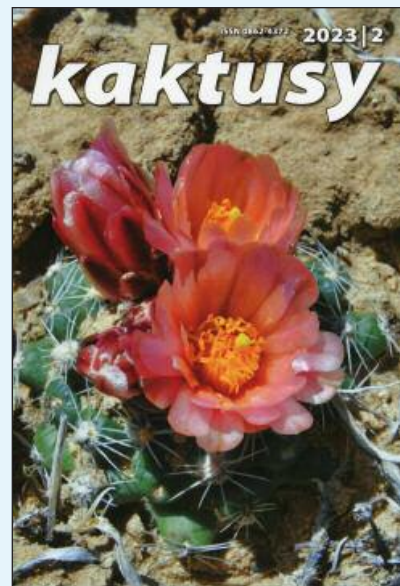


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 A well-produced journal published 4 times per year since 1980.
 Website with useful data for members.
<http://www.internoto.de>



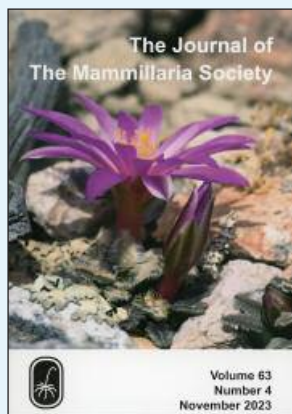
The Mammillaria Society

The UK-based specialist society for the study of *Mammillaria* and allied genera.

[Back issues on DVD](#)

4 issues per year, seed list and meetings.

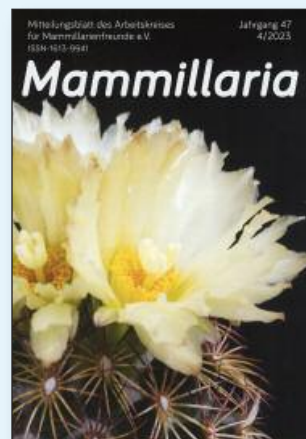
<http://www.mammillaria.net>



The German Mammillaria Society

Produced to a high standard and published 4 times per year since 1977.

Articles in English as well as German.



http://www.mammillaria.eu/en_index.html

Succulenta



First published in 1919, this is the journal of the Dutch Cactus Society, *Succulenta*.
 Now published 6 times a year, this journal has a long distinguished history.
 Dutch with English summaries.

<http://www.succulenta.nl>

Kaktusy i Inne

Polish and European cactus journal *Kaktusy i Inne* 12(2) has been published, with four articles in English.



In this issue among others: a new subspecies of *Espostoa huanucoensis*, about *Echinofossulocactus crispatus*, a new nothogenus *Arthronopsis*, about uncommon grafting methods.

To subscribe, visit the new subscription page, for *Kaktusy i Inne* in both PRINTED or DIGITAL form at a reasonable price of 4€ per year.

Usually half of its contents also in English (occasionally Spanish).

Older issues of the journal are available at https://www.cactuspro.com/biblio/en:kaktusy_i_inne.

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- **Seed exchange** provides a substantial seed offer from member donations to members. The seed list will be sent to the members at the beginning of the year. Further information about the FGaS and its facilities can also be found on the Internet at www.fgas-sukkulenten.de.

Request sample issue of Avonia for free!

Contact person:

Office: Eberhard Seiler, D-04626 Thonhausen, Dorfstr. 73, Tel. +49 3762 47985, E-Mail: geschaefsstelle@fgas-sukkulenten.de

President: Dr. Jörg Ettelt, Mozartstraße 44, D-59423 Unna, Tel. +49 2303 968196, E-Mail: praesident@fgas-sukkulenten.de

The Tephrocactus Study Group

Set up to study the smaller South American Opuntias, including such genera as *Punotia*, *Cumulopuntia*, *Maihueniopsis*, *Tephrocactus* and *Pterocactus*. The smaller North American Opuntias are also sometimes included.

Since 2013, the journal has no longer been printed but all the journals are available as free PDF downloads at the Cactus Explorers website

Everyone is welcome to attend the annual meeting to enjoy talks and buy plants:

21st May 2023 at Coddington Village Hall, Secretary: John Betteley, 25, Old Hall Gardens, Coddington, Newark, Notts. NG24 2QJ U.K. Tel: +44(0)1636 707649

johnbetteley4@gmail.com

Opuntia Web



This website about the opuntias of the USA has been redone and is better than ever. There are 1,500 photographs of the various species in habitat.

Opuntia and related species (= opuntiads) are unique cacti with unusual shapes and beautiful flowers. Common in parts of the United States and Mexico; they also occur throughout most of the Americas. There are over 50 species of opuntiads in the United States and many more in Mexico. Opuntia Web describes opuntias of the United States.

www.opuntiads.com

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It's time to buy seeds!

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Mondocactus is the virtual store of De Rerum Natura Nursery, for the sale of rare and not so rare succulent plants since 2013 in San Lazzaro di Savena (Bologna, Italy). See the website, also in English:

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Echinocereus pectinatus www.pectinatus.de
Flower galleries of *Echinocereus pectinatus*



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Pavel Pavlicek

New seed list for 2022/23

<http://www.cact.cz/semena-seeds-prodej-a15>

Plants offer: <http://www.cact.cz/nabidka-ros-tlin-jaro-2014-a16>

Piccolo Plants



Piccolo Plants Nursery is a specialist succulent nursery located in the village of Branscombe, in South East Devon (UK). The nursery offers a wide variety of indoor and outdoor succulents for sale. Open during the week and mail order via our website.

www.piccoloplantsnursery.co.uk

Seeds from Ralf Hillmann



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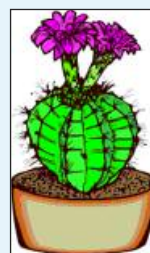
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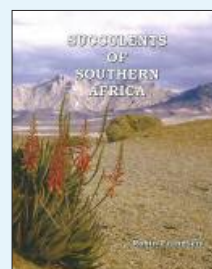
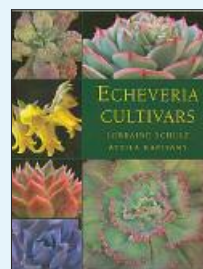
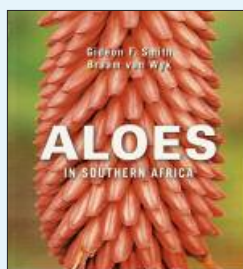
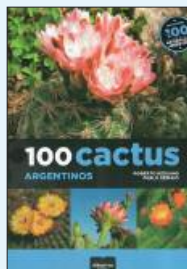
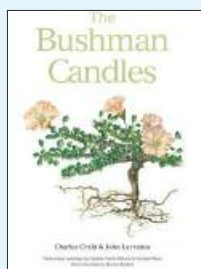
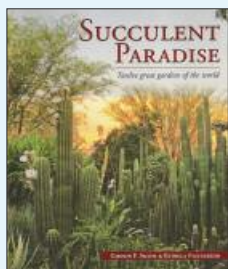
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