The Cactus Explorer

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

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In this Edition

Regular Features

Articles

Cover Picture: *Sclerocactus parviflorus* in full flower, S.E. of Moab, La Sal Mountain Loop (1880m), Utah. Photograph: Zlatko Janeba. See page 42.

Bradleya 33 is now available from the BCSS: 184 pages of well-illustrated articles including many descriptions of new taxa. See page 40 for information about this important publication.

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

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.

A major advantage of this on-line format is the possibility of publishing contributions quickly and any issue is never full! We aim to publish your article quickly and the copy deadline is just a few days before the publication date. There will usually be three issues per year, published 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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The Cactus Explorer is available as a PDF file downloadable from www.cactusexplorers.org.uk

This issue published on
12th February 2016

New combinations on Pages 30 & 70–72

Introduction

Another New Year

As 2016 starts, I look back on another busy year and find myself again apologising to you for the late arrival of this edition of the **Cactus Explorer**. As in previous years, the job of editing and producing *Bradleya* for the BCSS has proven to be very time consuming. The problem is further exacerbated by the recent lack of cactus papers being submitted to *Bradleya* since, in order to help the situation, I have spent more time on writing material.

I hope you will understand that the consequence is that I shall only be able to publish the **Cactus Explorer** when I have time and enough material.

Having published *Bradleya* on the 20th October 2014, I was able to enjoy a three week trip to Peru with Chris Pugh, Rob Underwood and John Arnold. My main objective was to study the distribution of *Oroya borchersii* and various *Matucana* species. The availability of more detailed digital maps and Google Earth made the investigation of back roads much easier and we were able to find many matucana populations that were new to us.

The vast expanses of unexplored land far from any roads must mean that there are many more populations which have never been seen by any visitors to Peru. As it usually appears to be the case, when one finds plants in between known populations, their characters can be somewhat intermediate and the question arises as to how different they have to be before they can be considered as a new taxon.

Matucana ritteri is an example where the appearance of plants from near to Otuzco is well known. When you travel some way away from its type locality, however, you can find rather different plants, such as the dwarf form in the picture opposite. In other places the species makes clusters of large heads.

Matucanas, like many other cacti, are very variable in appearance as well as sometimes

A dwarf form of *Matucana ritteri*, GC1230.01, photographed in the rain at 3350m.

changing over their distribution range to make a cline. Then, to complicate the situation, there are hybrids that could explain the extremely variable nature of some populations.

The problem of what constitutes a species is the subject of endless discussion. The article about sulcorebutias by Willi Gertel in this issue illustrates the dilemma. There is so much variability in a single population that it is difficult to know how many taxa are involved. My preference is to take a broad view of a species rather than make lots of names for local variants, but it can still be difficult to decide to which species some populations belong.

At this time of year, I am looking forward to warmer weather and the beginning of the growing season. It has been a mild winter in England and the heating oil I use for my glasshouse has been the cheapest price for years. Seed raising is one of the most enjoyable activities so do go to the adverts in this issue and look at the on-line lists to see what new species you can add to your collection!

Graham Charles

If you have not already told me and would like to be advised when the next issue of the **Cactus Explorer** is available for down-load, please send me your E-mail address to be added to the distribution list.

News and Events

Succulent Explorers Club

Although this online journal includes succulents in its scope, the annual meeting of the Cactus Explorers Club has talks only about cacti, even if speakers do sometimes include the occasional succulent.

It has been suggested that succulent lovers should also hold a similar meeting, and this year it will happen on Saturday April 9th at St Thomas More Church Hall, Kirkway, Alkrington, Middleton, Manchester M24 1PP (The usual meeting place for Manchester Branch events.)

It is intended to have many talks alternating between one hour and half an hour through the day. For this first venture the day will be from 10am to 5pm with a short discussion after to decide on the future format of the event. The hall will be open from 9am for early arrivals.

Thus far there are 3 speakers arranged, Ray Stephenson, Derek Tribble and Andy Young, all inveterate travellers with a wealth of experience and the expectation of a fourth speaker for the day.

The organisers anticipate the cost of the day will not exceed £15 which will include all refreshments and a warm lunch.

Please contact Peter Bint to reserve your place in good time and help the organisers plan the event.

BCSS Annual General Meeting

Saturday 9th April

Winstanley High School and Community College, Braunstone, Leicester.

A chance to participate in the management of the BCSS. There are plant sales and the

Hampshire/Dunn Lecture

'BOLIVIA' *presented by Martin Lowry.*

An opportunity to catch up with friends!

BCSS National Show

Only every 4 years do you get the chance to see the best display of exhibition quality plants and the largest succulent plant sale held in the UK.

This year, 2016, the event will take place on August 20th at the same venue as last time, Wood Green Animal Shelter, London Road, Godmanchester PE29 2NH. There are longer opening hours: Sales from 9:00am to 6:00pm Show opens from: 11:30am – 6:00pm This should give everyone more chance to get around the show and spend time with the sales stands.

Staging of exhibits will be possible on Friday 19th 12:30pm – 6:00pm as well as on Saturday morning 7:00am –10:00am. As an added incentive to exhibit, there will be a special opening of the sales area on Friday 4:00pm – 6:00pm for exhibitors only. There is also the prize money to help offset your expenses.

The illustrated Show Schedule will be available from the BCSS soon.

The Cactus Explorers Weekend

September 16th to 18th 2016.

Beaumont Hall, Leicester.

£215 includes 2 nights in en-suite rooms, all meals and wine with dinners.

Lots of talks, plant and book sales.

Details from Graham Charles

BCSS Zone 6 Convention

Saturday April 2nd 2016

Pirton Village Hall, High Street, Pirton, Nr. Hitchin, Herts. SG5 3PS

Ticket Price: £15 including lunch and all drinks and snacks at breaks.

Speakers

Zlatko Janeba: Flora of the Peruvian Coast Rare plants and most recent discoveries.

John Ellis: Through the lens.

Plant and Book sales.

Tickets from Carolyn Clayton.

Tephrocactus Study Group

Annual Meeting

Sunday 8th May 2016

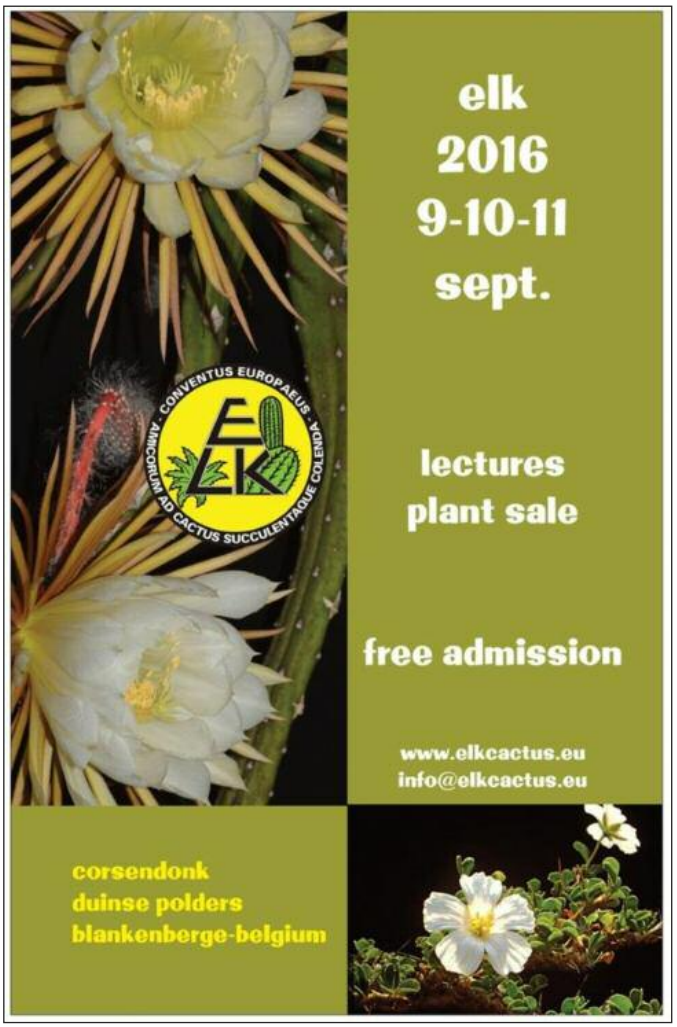
Coddington Village Hall, Main Street, Coddington, Newark NG24 2PN

Free Admission. 10:30 for 11.00am start

Plant Sales and talks from Paul Klaassen, John Arnold and John Betteley.

Tea/Coffee provided. Pub lunch nearby.

www.tephro.com



BCSS Oxford Branch Show

with the Mammillaria Society

(Bill Maddams Memorial)


Photo by Jonathan Clark

Saturday 23rd July 2016

Old Mill Hall, Grove nr. Wantage OX12 7LB

Plant sales and light refreshments.

Followed by Wolter ten Hoeve lecture:

"**Recent Explorations in Mexico**"

Download the schedule here.

Organiser: Bill Darbon

18th Havering Cactus Mart

Saturday 14th May 2016

Open from 10am to 3pm

North Romford Community Centre,
Clockhouse Lane, Collier Row,
North Romford RM5 3QJ

At least 12 leading nurseries.

Refreshments and snacks available all day.

Admission £1.

Details from Eddy Harris

Cactáceas y Suculentas Mexicanas

The Mexican journal has been published since 1955 with the aim of sharing knowledge about succulent plant families, especially the Cactaceae, and to promote interest and research on different aspects of these amazing plants.

The journal is available on line and free at: web.ecologia.unam.mx/cactsucmex/

Any comments please contact: Dra. Mariana Rojas-Aréchiga (mrojas@ecologia.unam.mx)

South East England Cactus Mart

Saturday April 16th 2016

Swalecliffe Community Centre
19, St Johns Road, Whitstable CT5 2QU

Open 10:00am – 3:00pm

A new Cactus Mart just 45 minutes from the Dartford crossing and 40 minutes from Dover. Entrance £1.

Two halls of plant sellers.
Refreshments available all day.
Organised by the Herne Bay BCSS branch.
Details from Dave J. Appleton.

Invitation

National Turbinicarpus Collection

Open by appointment, please email or tel: 01472 859572 to book and for directions. Some plant sales. Located in Caistor, Lincolnshire, U.K.

Rob and Alison Stevenson

Invitation

to the

28th International Gymnoday
1st – 3rd April 2016

Eugendorf, Austria
Landgasthof Holznerwirt

Theme: *Gymnocalycium ferrarii* and related species

For bookings and room reservations:
Helmut Amerhauser,
Bahnweg 12, A-5301 Eugendorf
Tel .: ++43 (0) 6225/7222
E-mail: dha.gymno@aon.at

In The Glasshouse

Graham Charles introduces us to *Arthrocereus spinosissimus*, a rare cereoid cactus from Brazil which will flower at a manageable size in our glasshouses.

Photograph by Paul Hoxey

When Paul Hoxey sent me this picture, it reminded me how much I like *Arthrocereus*, a genus of small-growing cereoid cacti from Brazil. It is not difficult to flower any the species in your glasshouse since none of them get very large but you will need to maintain a minimum temperature of 10°C.

The taxonomy of this species has not been straightforward. It was first described in 1977 by Buining and Brederoo in *Kakteen und andere Sukkulenten* as a species of the genus *Eriocereus*. Buining and Horst had found the plant (HU328) in 1972 and in 1974 they were at the habitat again and found fruits. It grows far to the west of other *Arthrocereus* species, on vertical cliffs in the Chapada dos Guimarães, Mato Grosso, Brazil at 450m [Braun & Esteves (1990) stated 1000m]. It is said to be very rare in habitat and is only known from the type locality [see the habitat illustration in Braun & Esteves (1990).

Buining sought advice from Buxbaum and Leuenberger as to which genus to choose and then followed their suggestion to describe it as an *Eriocereus*, although it looks different from other species of that genus.

Ritter (1979), believing that the placement in *Eriocactus* was not correct because of a number of its characters, transfered the species to *Arthrocereus*. Then, in 1995, Braun and Esteves created the subgenus *Chapadocereus* for just this one species on the grounds of geographic separation.

In cultivation, it is best grown grafted, when it can be expected to flower at about 30cm tall. It is rarely offered for sale but grafted plants are sometimes offered. I have never seen seeds

Photo: G. Charles

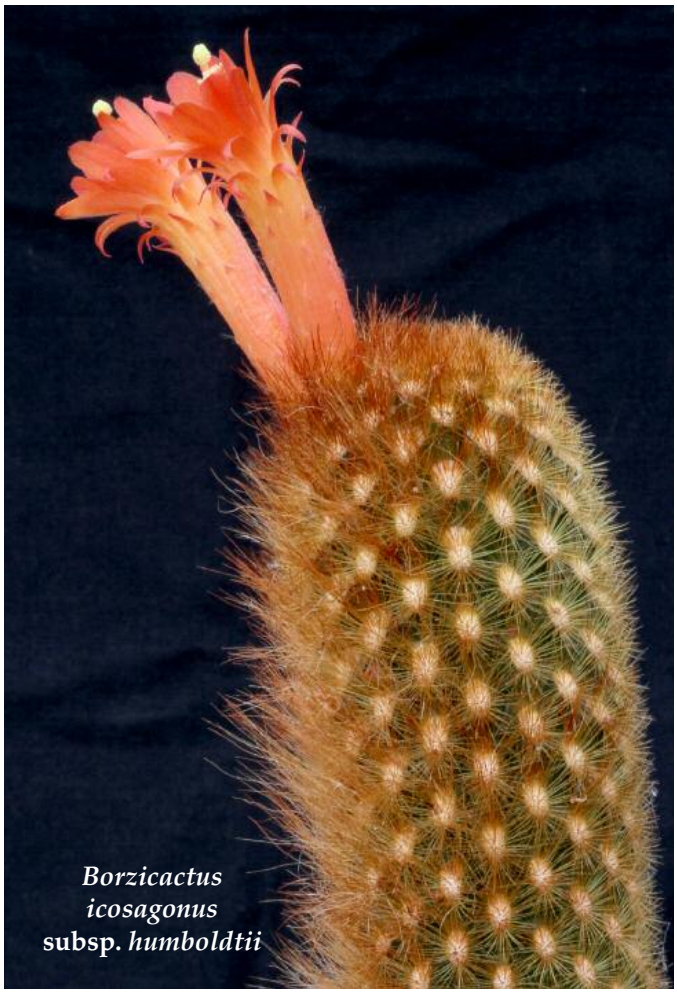


Photo: G. Charles

for sale in any seed list. GC

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BRAUN, P.J. & ESTEVES, E. (1990) *Arthrocereus spinosissimus* (Buining & Brederoo) Ritter. *KuaS Karteikarte* 1990/5.

BRAUN, P.J. & ESTEVES, E. (1995) Nieuwe combinaties en namen. *Succulenta* **74**(2): 81–85.

RITTER, F. (1979) *Kakteen in Südamerika* Band 1: 244.

THEUNISSEN, J. (1977) *Eriocereus spinosissimus* Buining et Brederoo spec. nov. *Kakteen und andere Sukkulenten* **28**(3): 49–51.

The type form of *Borzicactus icosagonus*

You can read the full story of this lovely plant in the article I wrote in Bradleya 30. The familiar name *icosagonus* dates back to 1823 when Kunth described *Cactus* (*Cereus*) *Icosagonus* from near a village called Narbon in Ecuador. The name, often associated with Backeberg's genus *Seticereus*, is today applied to a golden-spined plant with stems that tend to hang down if not supported and orange flowers.

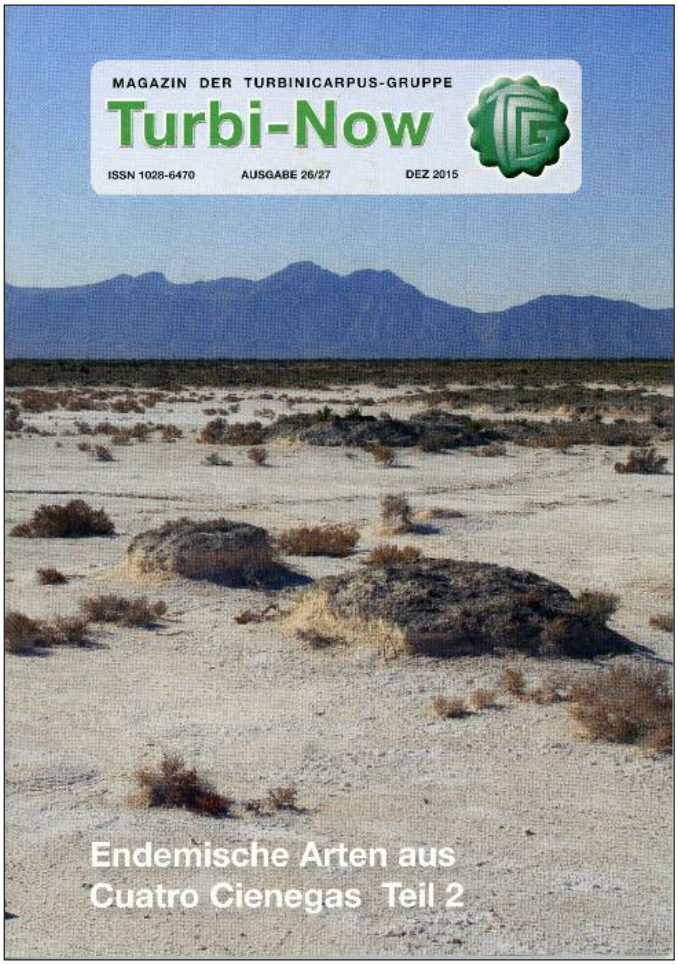
This golden-spined plant is from the southern end of the species' distribution, in northern Peru, and is actually *B. icosagonus* subsp. *humboldtii* {left illn.]. The type form, *B. icosagonus* subsp. *icosagonus* [right illn.], is from the northern end of the distribution in Ecuador and near the town of Narbon. It is quite different in appearance, with paler yellow spines, upright growing and with wider-opening pink flowers. It is a very beautiful plant and flowers readily in cultivation. GC

References

CHARLES, G. (2012) Observations on *Borzicactus icosagonus* (Kunth) Br. & R. and *Borzicactus humboldtii* (Kunth) Br. & R. *Bradleya* **30**: 93–102.

KUNTH, C.S. (1823) Opuntiaceae in HUMBOLDT, A. DE, BONPLAND, A. & KUNTH, C.S. *Nova Genera et Species Plantarum* **6**: 66–67.

Journal Roundup

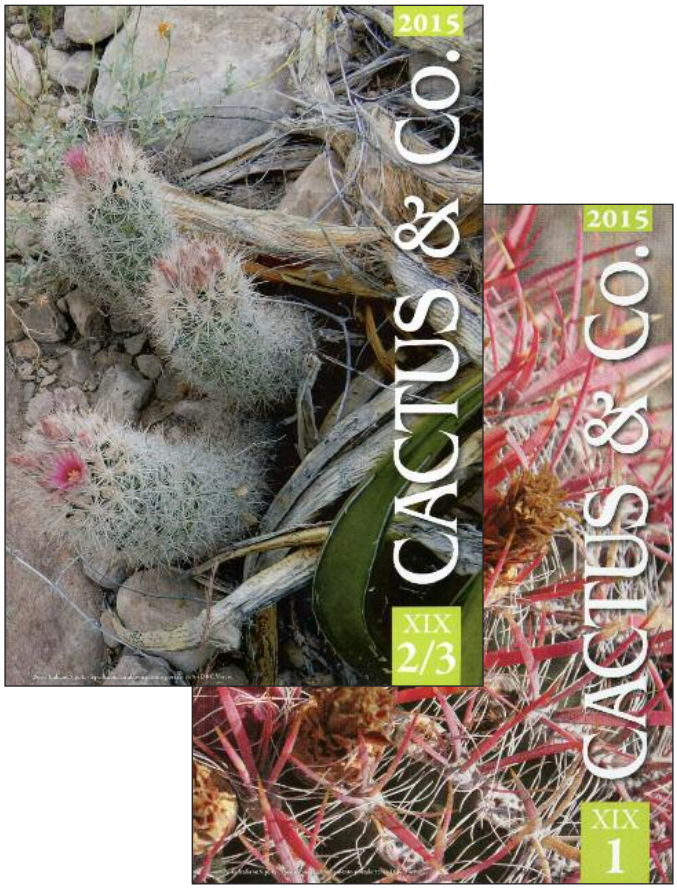


Turbi-Now

Journal of the Turbinicarpus Group

It is inevitable that a journal set up with a limited remit, like Turbinicarpus, will eventually need to expand its horizons. Once the original topic has been covered in detail, where should it go? *Turbi-Now* has now started to publish well-illustrated articles about Mexican cacti in general, a welcome move since these plants are amongst the most popular of all with enthusiasts. Many people go to Mexico to look for cacti and here is a place for them to publish their findings.

Since spring 2015, their new website is at www.turbinicarpus.org. On the home page you will find the latest edition of the TCG with contents. In the first menu you can see information about the board and the founding history of the Turbinicarpus group. From another menu you can find everything about the magazine TCG and the already published editions. All previous editions are still available and can be purchased. German text. GC



Cactus & Co.

As it prepares for its 20th year, *Cactus & Co.*, like so many other journals, faces a reducing number of subscribers. It would be a great shame if this lavishly-illustrated large format publication was unable to continue, so please give it your support. The articles are in English as well as Italian and the large pictures are very well produced.

2015 has two issues, a total of 256 pages, good value at 50€.

No.1 has the articles: *Ferocactus* in Baja California; *Echinocereus* - the species of Orogrande; *Tulista* and the 'partridge-breasted' aloe; Cole C-numbers: problems and queries concerning them.

No.2 has a comprehensive account of the genus *Escobaria*; The disastrous effect of the climate on the succulent flora of the Big Bend region (Texas); and Searching for succulents in Lanzarote (Canary Islands).

If you are a new subscriber, you can order Volume XX (2016) for just 30€. The normal subscription is 50€. See the web site for how to join.

GC

On-line Journals

On-line Journals for you to download free

Publishing journals on the web is becoming more popular and the number is increasing. Here are some links for you to download and enjoy.

Xerophilia

The fifteenth issue of Xerophilia appeared in December 2015. It is published in Romania but most of the content is in English as well as Romanian. It is intended to focus on cultivation with articles about growing and propagating our plants.

Contents include: From Santa Cruz to Puerto Suarez eastward; Some plants in my collection; The Holy Week in Mexico - part 2; Mammillaria paulii on rocks... and on grass | Pedro Nájera Quezada; Myrmecodia beccarii - a pictorial appraisal including epiphytic companion species Part 2; Mangrove Boardwalk - part 2; The joy of hunting and shooting Pterocactus in habitat; Shades of dry: Tongariro National Park; This time we talk about the genus Aichryson.

The magazine may be downloaded as a pdf from

http://xerophilia.ro Contact: xerophilia@xerophilia.ro

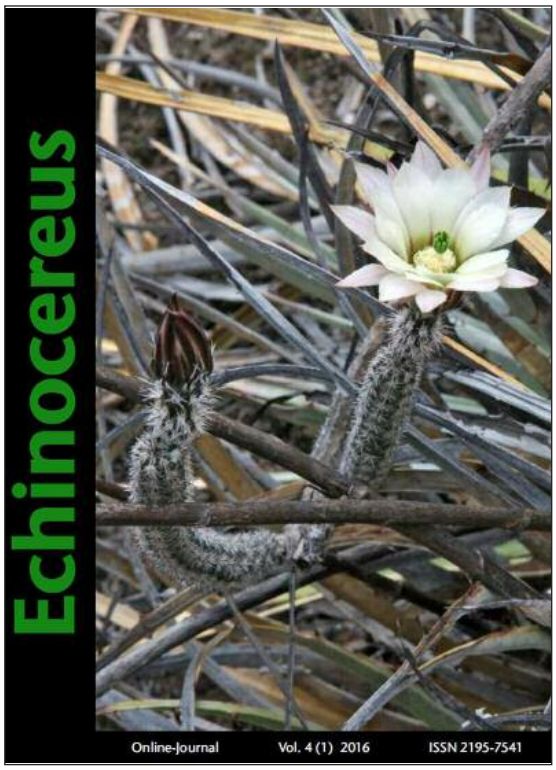
ECHINOCEREUS Online-Journal

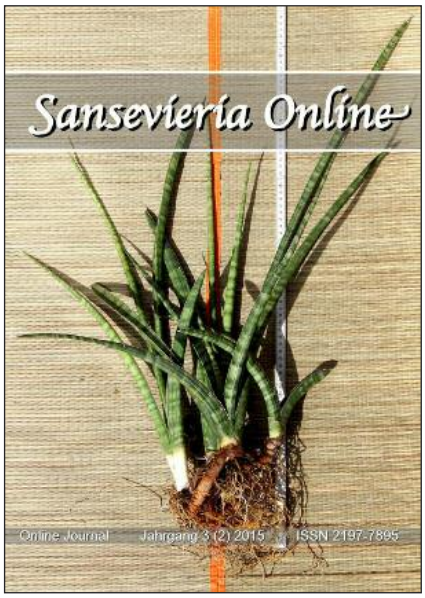
The German language on-line journal for Echinocereus lovers. The goals of this journal are to study the genus *Echinocereus*, to publish articles about the continuous research on these plants (classification, morphology, evolution) as well as to protect the genus *Echinocereus* by reproduction from seeds and distribution of the seedlings.

In this issue there are well-illustrated articles: New distribution of *Echinocereus koehresianus*; *Wilcoxia* - a name and a lot of questions; *Echinocereus* - The section *Wilcoxia*; New Publications - The *Echinocereus triglochidiatus* group.

The downloaded pdf file allows printing, but does not permit copying of the content. For those of us who do not understand German very well, the publishers also provide a downloadable an MS Word document of the text making it possible to copy and paste it into a translation program. This is a major benefit of online journals and I thank them for this useful feature.

See website: www.echinocereus.eu





Sansevieria Online

The online journal for the growing number of enthusiasts for this genus. A small group of *Sansevieria* enthusiasts have published the first *Sansevieria* online journal in German. They welcome contributions (systematics, morphology, physiology, evolution).

This special issue includes an article about Nicholas Edward Brown and a German translation of his 'Monograph of all known species of *Sansevieria*' from 1915

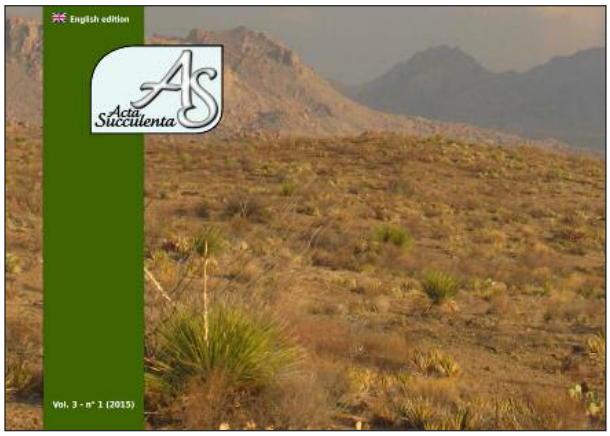
The publisher of this online journal have set themselves the goal of contributing more to clarify this wonderful genus.

Download the PDF from www.sansevieria-online.de where you can also find a special issue containing field number lists and an index to the journal.

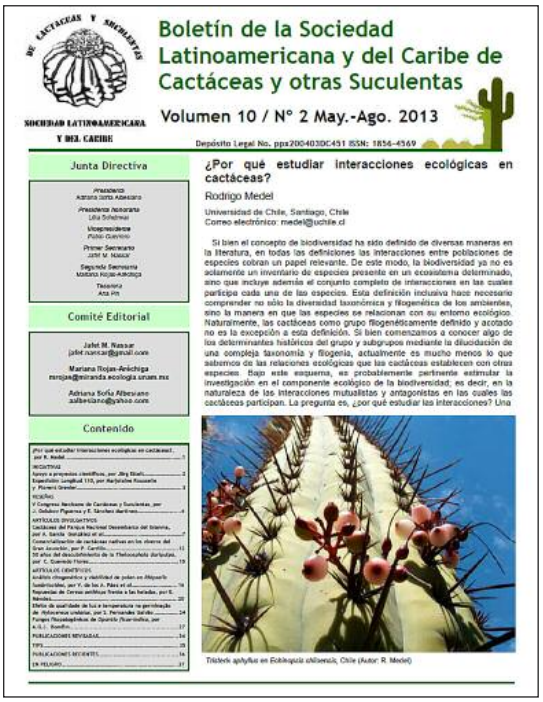
Acta Succulenta

The most recent issue of this online journal that differs from others by its landscape format and notable for its professional page designs. It has really valuable content and is an entertaining read with good pictures.

In this edition: A Kenyan Succulent Adventure; *Carpobrotus*, the carpet of death; *Mammillaria paulii*, a poorly known gem; *Saxifraga longifolia*, the queen of the saxifrages; *Sedum sediforme* subsp. *dianium*, a Mediterranean endemic; Selective weeding on some succulent plants.



Download the PDF in English, Italian or French from http://www.acta-succulenta.eu



Bulletin of S.L.C.C.

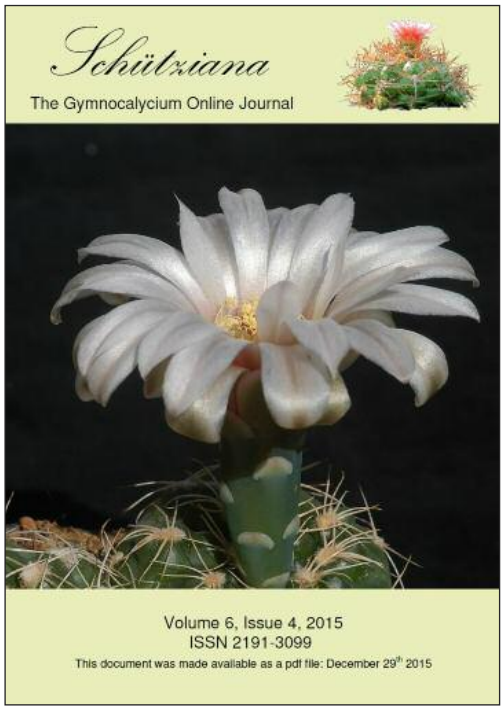
This long-running Spanish language journal has been a mine of information about cacti and succulents of the Caribbean, Mexico and South America.

Each issue contains details about events taking place in the region. There are reports of meetings and field trips. Scientific papers are published and illustrated with interesting pictures, often of cacti we rarely see in print.

A very useful regular feature is the list of recent articles about succulents that have been published in scientific journals. These studies can be difficult to find out about, but this listing often reveals fascinating insights into little-known plants.

I have not been able to find any issues since 2013 but free PDF downloads of all the existing issues are at:

http://www.ibiologia.unam.mx/slccs/www/boletin.htm



Schütziana

The latest issue of Schütziana, the specialist on-line journal for *Gymnocalycium* enthusiasts, features articles from Wolfgang Papsch:

Ideas occurring when reading the literature about *Gymnocalycium leptanthum* and *G. parvulum*.

Addendum to *Gymnocalycium schmidianum*.

The text of this valuable publication is available in English and the pictures and distribution maps give a clear insight into the plants found in habitat and culture.

You can download free all the issues from:

www.schuetziana.org

Sukkulenten (formerly Avonia News)

Free German language on-line newsletter of "Avonia", the quarterly journal of the German Society for other Succulents.

From 2015, the on-line journal has been called "Sukkulenten"

See website: www.fgas-sukkulenten.de

Annual seed list for members and much more.

Special interest groups for *Aloe* (incl. *Haworthia* etc.), Ascleps, *Euphorbia*, *Mesembs* and *Yucca*/winter-hardy Succulents.

For membership and further information contact:

Dr. Jörg Ettelt: Morgenstr. 72, D-59423 Unna, praesident@fgas.sukkulenten.de or

Wilfried Burwitz: Postfach 100206, D-03002 Cottbus, geschaeftsstelle@fgas.sukkulenten.de

Succulentopi@

The 13th issue of this free online journal has recently appeared. This was the first online journal published in French. The quality is excellent in every respect.

It is available as a free PDF download from:

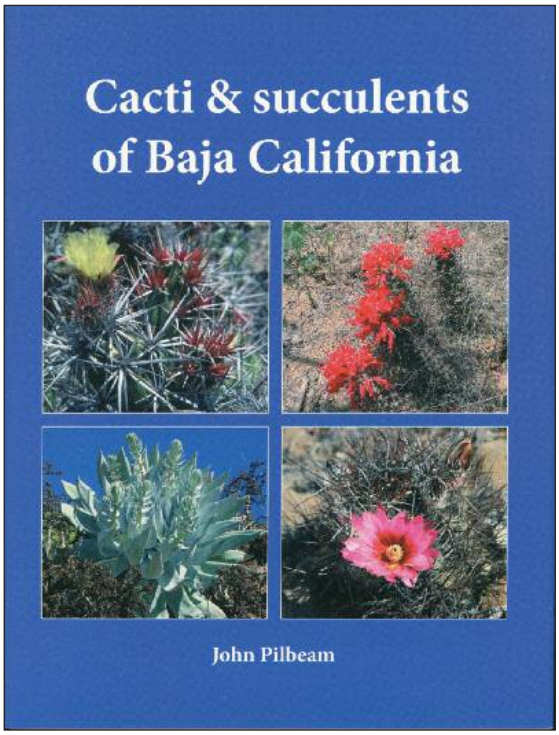
http://www.cactuspro.com/succulentopia

This issue includes Editorial; Philately; The cultivation of Lithops N. E. Brown; The genus Aztekium; What water for our cactus? Picture gallery; Digital Library CactusPro; Preview discussions on the forum; Agenda.

The Love of Books

News of Recent Publications. A Reminder of Old Favourites.

Many cactophiles enjoy reading about their plants, particularly in the winter when our collections are less demanding. This feature aims to provide you with inspiration.



Cacti and succulents of Baja California

The latest title from Britain's most prolific writer was published by the BCSS in 2015. John Pilbeam has had a special affection for Baja ever since his first visit there in 1981 when he went to see some plants of his favourite mammillarias in a spectacular setting.

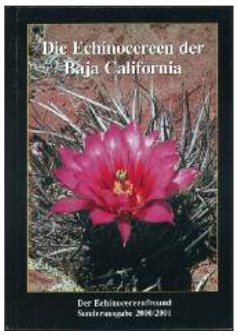
It is the home of a large number of species of cacti and succulents, including many of the most popular in cultivation. Whether you enjoy seeing the majesty of huge columnar cacti or searching for the illusive miniature mammillarias, then Baja is a great place to visit. There are also super succulents such as the many dudleyas, agaves and some pachycaul species. Cacti that exhibit true individuality are always a treat to see and the creeping *Stenocereus eruca* takes some beating.

John has assembled an impressive collection of pictures from his wide circle of contacts that amply illustrate the diversity and attraction of the peninsula's succulent flora. It is pleasing that the pictures have been reproduced at a good size, many being full or half-page. There is something magical about the species that are only found on the islands of Baja and these are well represented.

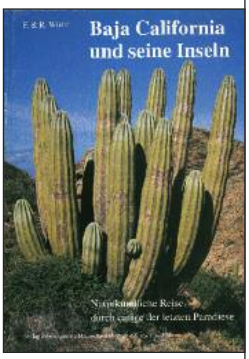
After a brief introduction, the book takes us through the succulent genera found in Baja. The next chapter provides some basic information about the peninsula then the text and pictures of the plants are arranged into ten geographically based groups from north to south. There are no detailed descriptions of the plants but the text is interesting, entertaining and an easy read, characteristic of John's writing.

Hardback with colour dust jacket, 233 pages, 425 colour pictures, 280 × 216mm. £43 plus carriage from the BCSS. Available for £40 from Keith's Cactus Books.

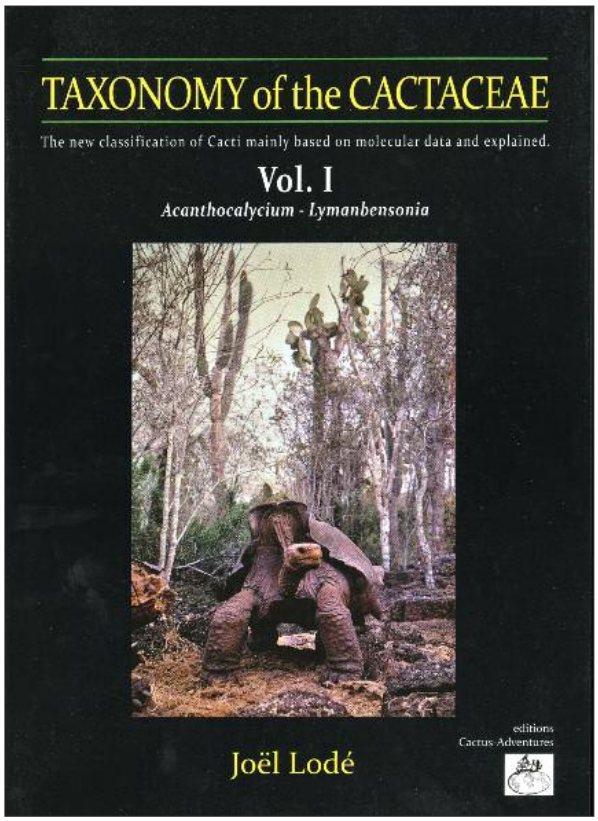
For more specialist information about Baja succulents, here are some other books you may find useful:

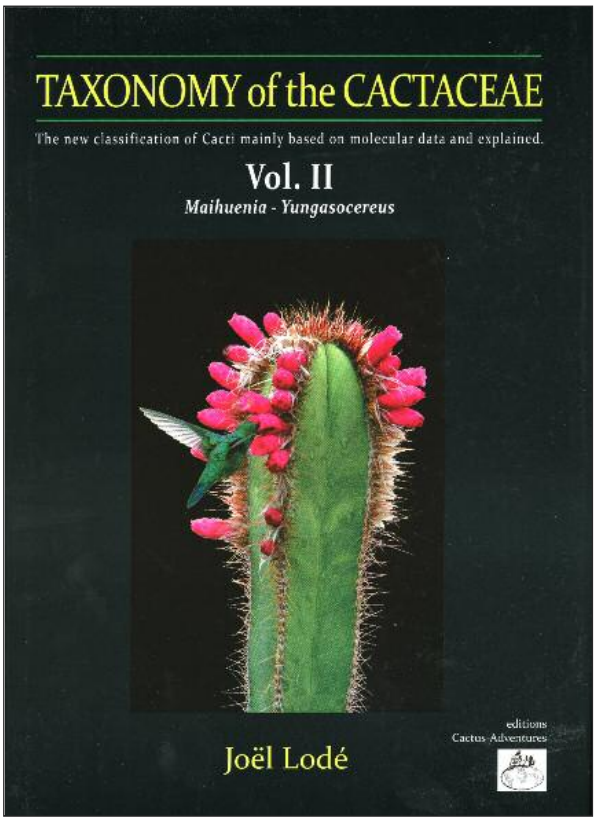


The Echinocerei of Baja
German/ English, well-illustrated detailed guide the the echinocerei of Baja California.
Keith's Cactus Books: £27.50



Baja California and its Islands
Monumental volume of 400+ large pages of excellent pictures and detailed German text.
Keith's Cactus Books: £120.00





Taxonomy of the Cactaceae

Joël Lodé

I thought that, with the advance of electronic publishing, the *New Cactus Lexicon* would be the last comprehensive guide to the Cactaceae to be printed as a book. But not so, as last year saw the publication of another two-volume tome covering the family.

However, this is not just another Lexicon. In fact, it is quite a different approach. First of all, there is the taxonomic treatment which is largely based on molecular studies, many of which were not available when the NCL was written. Lodé has chosen to take a splitter's view of genera, recognizing 177, compared to the 124 of the NCL.

This approach will be welcomed by many cactophiles, some of whom thought the lumping of a number of familiar genera went too far in the NCL. Indeed, it has been shown by molecular studies that in some cases, such as the inclusion of *Borzicactus* in *Cleistocactus*, this lumping was wrong, the morphological similarities being the result of convergence rather than a close relationship.

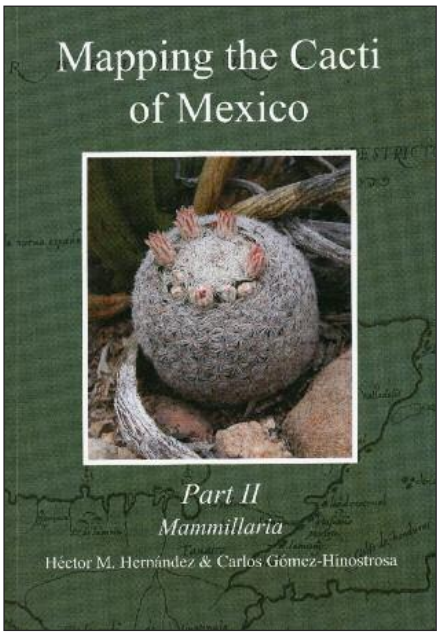
This is a book largely about genera, rather than species, the latter being listed and illustrated but not described. The accepted genera are listed alphabetically across the two volumes with most of the associated pictures grouped at the rear of each volume.

For each genus, there is a distribution map and pictures of key generic characters such as the flower, fruit and seed. A diagrammatic representation of altitudinal distribution is also provided.

The compilation of this reference must have been an immense amount of work. I have to admit that I have not read it all yet but from my limited browsing it appears to be factually accurate whether you accept the conclusions or not. Of course, there are parts of the Cactaceae for which molecular evidence of relationships was not available to the author, so those of you who are looking for the stability of names will probably see more changes proposed in the future.

The two-volume book is available in English, France or Spanish. Hardbound with printed dust jackets, 1386 pages, 300 × 218mm, more than 9,000 photographs and 177 maps (one per genus). It weighs more than 7kg. There is also a 44 page plant name index printed separately.

Keith's Cactus Books: £135.00 plus carriage.
GC



Mapping the Cacti of Mexico Part II Mammillaria

Héctor M. Hernández & Carlos Gómez-Hinostrosa

This is not just a series of 54 distribution maps, but a rich source of information about *Mammillaria*. The mapping is based on more than 4,000 herbarium specimens. It follows a similar approach to Part I and indeed has an appendix listing the herbarium specimens used in that earlier volume.

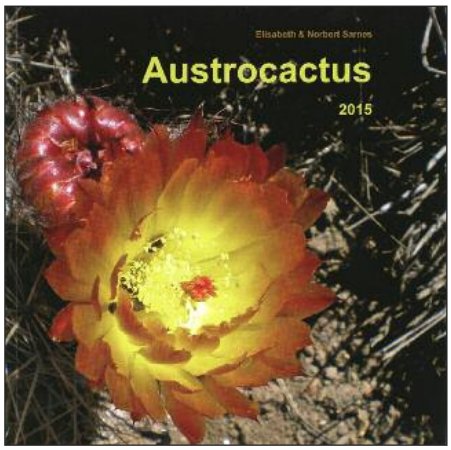
The records are organised by series and follow the taxonomy of the New Cactus Lexicon. As well as the clear maps, there are good quality pictures of some of the species and the whole book is expertly printed on heavy paper.

Softbound with printed covers, 189 pages, 245 × 160mm, 34 colour photographs and 54 maps. Good value at £25 from Keith's Cactus Books.

Austrocactus

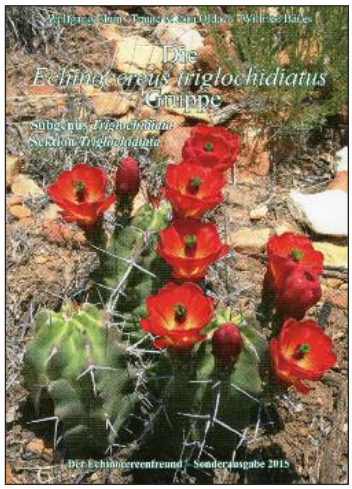
Elisabeth & Norbert Sarnes

The genus *Austrocactus* is not often seen in collections, perhaps because its cultivation requirements are different from most cacti. There has long been confusion over the application of the available names so the clarity provided by this book is very welcome. It also tells you how to grow them so you can



enjoy the unusually-coloured flowers often produced by these plants. The book is well printed and very good value.

Text in German and English. Softbound with illustrated covers, 124 pages, 210 × 210mm, 148 colour pictures, 10 distribution maps and seed images. £12 from Keith's Cactus Books.



Echinocereus trichochidiatus

Die Echinocereenfreund

Another detailed book for *Echinocereus* enthusiasts. It is beautifully illustrated with high quality images and the comprehensive German text tells you all you would ever want to know about the *E. triglochidiatus* group.

As well as distribution maps, there are SEMs of spines and seeds, pictures of fruits and good images of herbarium sheets.

German text. Softbound with illustrated covers, 262 pages, 233 × 168mm, 465 colour photographs, many images of herbarium sheets and SEMs.

24.50€ from the Echinocereenfreund.

The History of ELK

Kamiel Neirinck, François Beugnies and Ronald Fonteyne recount the history of ELK, the best-know pan-European cactus meeting that has just celebrated its 50th anniversary.

Translation: Wolfgang Borgmann & David Rushforth

In the beginning …

In the programme of the first 3LK in 1966, the president of the organisation committee, W. Ewals, wrote: "We live in a time of international collaboration. Also in our hobby this collaboration will manifest itself even more than before." It had taken four years of discussions between hobbyists from Belgium, Germany and the Netherlands before all organizational problems were solved. The pioneers Frank (NL), Wilhelm Fricke (D), Wilhelm Fricke (D), Wilhelm Simon (D) and Gerard Linsen (NL) took the initiative for the organisation of this cactus and succulent event.

The aim was to bring together hobbyists from these three countries each year in a large organisation with lectures, discussion groups and an exchange mart. The Dutch Succulenta branch "Noord Limburg" had close contacts with Belgian and German hobbyists. It was obvious that this branch would suit the action to the letter. The plan was discussed and worked out in collaboration with the Belgian cactus society "Dodonaeus Lier" and branches of the Deutsche Kakteen Gesellschaft. The national committee of Succulenta agreed. Thus started an annual recurring cactus fest, which it was hoped would stand for a number of years. The event got the name "Drei Länder Konferenz / Drie Landen Conferentie", abbreviated 3LK, and took place in each of the founding countries in turn. The Netherlands acted as the first guest country.

The first years

The first 3LK was organised on 17-18th September 1966 in Castle Well close to Venlo in the Netherlands. The conference was opened by the representatives of the three organizing countries and introduced by president W. Ewals (NL). On the programme were six lectures and on Sunday afternoon, an exchange mart took place followed by a plant sale.

On the Saturday 160 visitors were counted, a good 200 on Sunday morning, increasing to nearly 300 during the plant sale. In 1967 the Federal Republic of Germany took its turn. This second 3LK took place on 24-25th June in the youth hostel Hargart in Monschau. Wilhelm Simon (D) welcomed participants from Germany, Austria, Belgium, the Netherlands and even Czechoslovakia. Walter Rausch (D), Albert Buining (NL) and Willy De Cocker (B) presented the lectures. The Sunday afternoon finished with the plant exchange.

The third 3LK took place in Domain Hengelhoef in Houthalen in Belgium and was officially opened by Raymond Blomme (B). On Saturday evening lectures were given by W. De Cocker and W. Simon, and on Sunday morning one by Albert Blanc from Lausanne (CH) and one by W. Sterk (D). In the afternoon there was an "overwhelming" plant exchange and sale. There were more than 200 overnight stays in the marvellous bungalows. The next 3LKs were successively organised in the Netherlands in Caste Well on 6-7th September 1969; in Germany on 12-13th September 1970 in Monschau; and on 18-19th September 1971 in Domain Hengelhoef in Houthalen, Belgium. The 3LK took place for the last time in the Netherlands in Valkenburg on 2nd-3rd September 1972 and a last time in Germany on 6-7th October 1973 in Duisburg.

Period Hengelhoef, Houthalen (1974-1988)

On 5th and 6th October 1974 the Belgian representatives organized the conference once again in Domain Hengelhoef in Houthalen. It was then decided to hold all 3LKs in Houthalen, alternatively organized by one of the three countries. There was, however, one exception. In 1976 the 3LK – according to some already the 5LK – took place in Monaco on 16–18th October, at the invitation of Marcel Kroenlein (MC), at the time director of the Jardin Exotique. About 500 participants arrived by plane at the airport of Nice.

As a result of a substantial increase in the accommodation costs, the last ELK at Domain Hengelhoef took place on 17-18th September 1988. This Domain was nevertheless an excellent venue, visited with pleasure by all participants. The nice spacious bungalows guaranteed an agreeable stay, the meeting rooms were up to expectations and there were good parking facilities. The plant exchange and sale took place in and around the so-called pyramid building. This location was excellent for the neighbours from the Netherlands and Germany.

Period Duinse Polders, Blankenberge (1989–)

On 30 September and 1 October 1989, the ELK was organized for the first time in holiday centre "Duinse Polders" in Blankenberge, Belgium. This was quite a way further for the Dutch and German hobbyists, but much closer to home for the British and French. In comparison with Hengelhoef, all links to the bedrooms, restaurant, cafeteria, plant sales and conference room took place under one roof. Until 2006 the place for the plant sale was limited to about 300 linear metres. From 2007 onwards, a large marquee was set up to meet the increasing demand for more plant space. Today, the plant sale has grown to almost 600 metres. At first only the rooms needed were booked. However, now the whole building complex of Duinse Polders is at the disposal of ELK. Consequently, everyone you meet is a succulent plant enthusiast. In addition to the sales places in the large room and the marquee, the cafeteria, the terraces and the wide corridors are meeting places par excellence.

Lecturers, professional and amateur growers and buyers come from all over Europe and even from other countries of which Japan, India, Argentina, the USA, Chile and South Africa are the most remarkable. The lectures are presented in the marvellous conference room. Smaller meeting rooms are also available. Throughout the years modernization works have been carried out. This year the restaurant has been rearranged to serve all meals in buffet style.

Moreover, the ELK has evolved from a two-day to a three-day event. This allows opening the plant sales on Friday afternoon with the official opening and a first lecture on Friday evening. The ELK closes on Sunday morning so that all can travel home in good time.

2015 was a celebration year!

On 11, 12 and 13th September 2015, the 3LK/ELK was held for the 50th time. For this occasion the committee provided an appropriate programme. Besides a reception in the cafeteria, a banquet with musical accompaniment, a tombola of exceptional plants, the issue of a jubilee postage stamp and an exhibition about the hobby, a small present was offered to the participants. Of course, special attention was given to the lectures.

The organisation committee

After the starting years, an organisation committee was founded in 1979 with representatives from Belgium, the Netherlands and Germany. The German Wilhelm Simon was the first president. Furthermore, the committee existed of secretary Piet Froberg (B), treasurer Marcel De Munter (B) and committee members Grivel (NL), Dr Med. Paul Rosenberger (D) and Paul Bourdoux (B). In 1983 Gustaaf Cools (B) replaced P. Froberg as secretary. In the early eighties François Falco joined the committee on behalf of France. During a preparatory meeting for the 3LK 1984, following a proposal by P. Rosenberger, the 3LK was renamed

ELK: Europäische Länder Konferenz / Europese Landen Konferentie – Conventus Europaeus Amicorum ad Cactus Succulentaque Colenda. Rosenberger also designed the new ELK logo. President P. Bourdoux passed away on the 10th October 1985 and was succeeded by P. Rosenberger. Secretary G. Cools also became the treasurer. In 1986 the married couple Ines and Werner Läbe (D) joined the committee. F. Falco and Etienne Lanssens (B) were appointed vice-presidents. The other members of the committee were Maria De Ridder (B), Paul Dekker (NL), Kamiel Neirinck (B) and Gilbert D'Eer (B).

Until 1988 the ELK was a "de facto association" according to Belgian law. In 1988 the regulations of the non-profit organisation "Conventus Europaeus Amicorum ad Cactus Succulentaque Colenda", abbreviated "E.L.K.- Europese Landen Konferentie" were published in the Belgian official journal under nr 11311/88. The administrators were P. Rosenberger, F. Falco, G. Cools, G. D'Eer and K. Neirinck.

In this way the ELK acquired corporate rights in accordance with Belgian law. Also in 1988, Anny and Jan Linden (NL) and Daphne Pritchard (UK) joined the committee. F. Falco resigned in 1990 and was replaced by Jean Vigneron (F). K. Neirinck succeeded P. Rosenberger, who resigned in 1991. G. D'Eer passed away in 1995 and was replaced by François Beugnies (B). Rob van der Elst (NL) entered onto the committee in 1997 in place of P. Dekker who resigned. W. Läbe died in 1998 and Wilfried Müller (D) replaced the Läbes. In 2005, Wim Alsemgeest (NL) took over from R. van der Elst, while Marc Bostoen (B) completed the committee as vice-secretary-treasurer. François Beugnies (B) replaced M. De Ridder as vice-president and Monique Vandervelpen (B) and Georgette Geets (B) became committee members.

In 2006, M. Bostoen passed away, G. Cools resigned and Ronald Fonteyne (B) was appointed secretary-treasurer. In 2007 also the married couple Ludo Serneels and Danielle Vermant (B), Magda Verbeeren (B), Albert Pritchard (UK) and Ave Vigneron (F) joined the committee. Wolfgang Borgmann (D) became a committee member when W. Müller passed away in 2008. After the death of A. Pritchard, Doug Donaldson replaced the Pritchards. D. Donaldson passed away in 2010; his place was taken by David Rushforth (UK). Jean-Marie Callens (B) joined the committee in 2012.

Word of thanks

On behalf of the organisation committee, we wish to thank everyone who has contributed in one way or another to the success of this cactus and succulent happening, unique in Europe and maybe far out there. We think of all those who cannot be with us anymore, the pioneers who made this event possible, the administrators and members of the organising committee, the lecturers, sellers, stewards and collaborators. We also thank the former and present staff of Corsendonk Duinse Polders for years of willing collaboration. Our gratitude and praise goes especially to all those who have ever participated.

The 51st ELK is 9–11th September 2016. Admission is free and there is plenty of good accommodation in nearby Blankenberge.

Sulcorebutia cantargalloensis Gertel, Jucker & de Vries and S. luteiflora de Vries – two different species?

Willi Gertel and Hansjörg Jucker review two recently described species of sulcorebutia and with the aid of extensive fieldwork, conclude that they are actually just one species.

Since the discovery of sulcorebutias in the valley of Torre Pampa, which runs in an east-west direction from San Pedro all the way up to heights of the Cordillera Mandinga, there is a discussion of whether the plants found there are something independent or if they are closely related to *Sulcorebutia cantargalloensis*. San Pedro is situated about 35km north of Tarvita beside the main road from Azurduy to Sopachuy and Tomina. De Vries (2014) created precedents by describing *Sulcorebutia luteiflora* as a new species. The type locations of the two taxa are exactly 15km apart, *S. cantargalloensis* in the Cordillera Mandinga at 3600m and *S. luteiflora* in the aforementioned valley at about 2600m. Before we start the discussion, we would like to introduce in detail the two protagonists.

Sulcorebutia cantargalloensis

When the Swiss adventurer Hansjörg Jucker in 1993 for the first time crossed the Cordillera Mandinga, a massive range of mountains south-west of Zudañez, he discovered at the foot of one of the highest elevations of the cordillera called Cerro Cantar Gallo, *Sulcorebutia* (HJ407). Cerro Cantar Gallo (4130m) is a more southerly situated summit of the even higher Cerro Photulo Punta (4284m). The newly discovered sulcorebutias were reported to flower exclusively yellow. Also when Elizabeth and Johan de Vries came back from this mountain ridge they told us of black-spined sulcorebutias with yellow flowers. This error was revealed when Willi Gertel with his wife Renate in 2001 visited the Cerro

Fig.1. The distribution area of *S. cantargalloensis* and *S. luteiflora* – Distance type locality – Torre Pampa about 17km.

Photo: W. Gertel

Fig.2. At the location of *S. cantargalloensis* G269 with different flower colours.

Photo: W. Gertel

Fig.3. *S. cantargalloensis* G269 with yellow flowers.

Cantargallo and found the whole population in flower.

Besides countless plants with yellow flowers they saw sulcorebutias with light violet and also different red flowering ones. Some years later (Gertel, Jucker & de Vries 2006) the new discovery was described as *Sulcorebutia cantargalloensis*.

During the following years, a veritable

Photo: W. Gertel

Fig.4. *S. cantargalloensis* G269 – a violet flowering form.

Photo: W. Gertel

Fig.5. *S. cantargalloensis* G269 – a plant with a brick-red flower.

Photo: W. Gertel

Fig.6. *S. cantargalloensis* G326 – very dark plant with completely black spines.

stampede to the Cord. Mandinga started, with the consequence that in the close surroundings of Cerro Cantar Gallo different locations of this new species were found. Besides the different colours of the flowers, all plants were quite uniform, rarely offsetting bodies, having a dark green to almost black epidermis and dark, mostly black spines, more or less bend to the body. There are very few exceptions to this short description.

Photo: W. Gertel

Fig.7. *S. tarabucoensis* fa. VZ253/7 with yellow flowers.

Photo: W. Gertel

Fig.8. *S. tarabucoensis* fa. VZ253/9 with beautiful light violet flowers.

Photo: W. Gertel

Fig.9. *S. luteiflora* RMR0921/1 from above the petrol station of Torre Pampa.

Photo: W. Gertel

Fig.10. *S. luteiflora* KB622/Ge1 found by Klaus Beckert only about 1km from the petrol station of Torre Pampa.

As far as we know today the population found directly on the south-eastern slope of Cerro Cantar Gallo is the one with the most colourful flowers, while those found more to the north almost exclusively display yellow flowers. Remarkably, no really bicoloured flowers are to be seen although the distribution area of *S. cantargalloensis* overlaps with that of forms of *S. tarabucoensis* Rausch, most of which flower red with a yellow throat. Interesting in this connection is a population discovered by de Vries (VZ253) only a few kilometres north of Cerro Cantar Gallo. They have a spectrum of flower colours just like *S. cantargalloensis*, but their habit is rather that of a form of *S. tarabucoensis*. At almost the same place (according to GPS-data) Rainer Wahl also found *S. cantargalloensis* (RW638). From all we know today *S. cantargalloensis* as described above and without any deviant forms can only be found in the immediate surroundings of Cerro Cantar Gallo.

Sulcorebutia luteiflora

More or less by accident Johan de Vries and Roland Müller, during their trip 2009 near San Pedro, got to a side valley where a rather bad road beside a pipeline led them up to the heights of the Cordillera Mandinga. In very bad weather they found, at about 2600m, sulcorebutias (VZ632 and RMR0921) and later again at 3400m (VZ633 and RMR0922). Due to the weather conditions they were only able to take a few rather bad pictures. They showed some rather difficult to identify sulcorebutias with yellow flowers bearing red scales. Because of this some people immediately thought of *Sulcorebutia cantargalloensis*.

Two years later, the two travellers had better luck and thus were able to study these plants in tranquillity in better weather. They were surprised that some of the plants there had an incredible similarity with certain forms of *Sulcorebutia crispata* Rausch growing not far away. In contrast to those, they all flowered yellow which has never been seen in *S. crispata*. Besides this flower, it is rather difficult to define a typical *S. luteiflora* because almost

Photo: W. Gertel

Fig.11. *S. luteiflora* KB628 from a place high above Torre Pampa at 2900m.

Photo: W. Gertel

Fig.12. A rather large plant of *S. luteiflora* KB628.

Photo: W. Gertel

Fig.13. *S. cantargalloensis* VZ254/1 has been found in the middle of 'totally normal' *S. cantargalloensis*.

Photo: W. Gertel

Fig.14. Also a rather special *S. cantargalloensis* G327/3.

every plant looks somewhat different from another. According to the first description, *S. luteiflora* has bodies up to 5cm in diameter, rarely offsetting with a light green epidermis. The spines are coloured whitish-yellow to brownish-yellow. This description resembles quite well the RMR0921 shown above. But it could also be seen from the pictures within the article of the first description that these plants are very variable.

As always in cases like this, there was a rush to this valley and alongside the road comparable plants have been found in almost every altitude – all of them with yellow flowers.

This induced de Vries, as already mentioned in the first paragraph above, to describe these plants as *S. luteiflora*. Unfortunately, the article was drawn up in a great hurry and he completely ignored the new findings by Peter Lechner and Hansjörg Jucker, who in the meantime had explored the surroundings of this valley and wanted to communicate their information to the describer.

One point of criticism concerning this first description was the choice of the name because then, as well as today, it was known that *S. cantargalloensis*, definitely the closest relative, also has yellow flowers on the majority of the plants. It is certainly wrong when de Vries writes in the first description that the frequency of occurrence of the colours is violet, red and then yellow. Jucker estimates that more than 70% of the flowers of *S. cantargalloensis* are yellow. Also the statement that *S. cantargalloensis* in contrast to *S. luteiflora* would be strongly offsetting is highly questionable. No observations in the wild, nor on cultivated plants, support this. According to our knowledge there are only two clones of *S. cantargalloensis* in cultivation which are quite different from all the others (VZ254/1 and G327/3) having relatively light spines but only VZ254/1 is strongly offsetting.

Probably nobody would recognize one of these two plants, looking at them individually, as *S. cantargalloensis*, but they give us a hint for a close relationship with *S. luteiflora*.

Photo: H. Jucker

Fig.15. *Sulcorebutia* spec. HJ1307 at its habitat location.

Photo: H. Jucker

Fig.16. Adorable *Sulcorebutia* spec. HJ1307 completely trapped by stones.

Photo: H. Jucker

Fig.17. *Sulcorebutia* spec. HJ1307 with reddish brown spines in the crown.

Photo: W. Gertel

Fig.18. A beautiful plant grown from seed of *Sulcorebutia* spec. HJ1307 with a green body and purely white spines.

S. cantargalloensis and *S. luteiflora* – one or two separate species?

How can it happen that because of such obviously different sulcorebutias this difficult discussion has erupted? One reason is that *S. luteiflora*, in contrast to *S. cantargalloensis*, is very variable in habit. This is shown by the findings of de Vries and Müller as well as those of other collectors. Another reason is the large altitude distribution of *S. luteiflora*. Already down in the valley of Torre Pampa, one can see a strong variability which increases when going to higher localities. But also the research in the field by Lechner and mainly Hansjörg Jucker shows that the eastern slopes of the Cord. Mandinga are populated by an incredibly variable swarm of sulcorebutias. *S. cantargalloensis* and *S. luteiflora* are within this swarm only at the two extremes; the beginning and the end of a cline. Strictly speaking, out of this area only *S. cantargalloensis* is standing out as a well-defined and easy recognizable species, while for *S. luteiflora*, apart from the yellow flower, no uniform picture can be formed. The problem here might be that many observers only have in mind those magnificent, purely white-coloured forms, ignoring the multitude of other forms.

To illustrate this we would like to show the findings of three walks by Jucker in this area. During his first trip (2011) he hiked along the valley of Torre Pampa where he found for several kilometres to the south-west of the road probably the most beautiful population of these plants (HJ1307), which very well corresponds with the above mentioned ideal.

The plants sometimes have greenish, but mostly dark bodies and they are covered by white, tangled, hair-like spines. Sometimes there are some reddish-brown spines at the top of the plants. After some time these colours becomes pale and later on disappear so that most plants of this population appear more or less white. As we already mentioned above, some of the plants from the Torre Pampa Valley show this fascinating similarity with certain *S. crispata*. This is especially true for

Photo: H. Jucker

Fig.19. *Sulcorebutia* spec. HJ1308 coming from higher altitudes of the valley of Torre Pampa.

Photo: H. Jucker

Fig.20. *Sulcorebutia* spec. HJ1308a from the highest areas of the Torre Pampa Valley.

Photo: H. Jucker

Fig.21. Found near "Huayllas" *S. cantargalloensis* HJ1324.

Photo: H. Jucker

Fig.22. Above "Huayllas" – *S. cantargalloensis* HJ1324b with a rare violet flower.

HJ1307, because from the habit they can hardly be distinguished from the holotype of *S. crispata* R288 – but the flowers are yellow!

On his way up the slopes of the valley Jucker found some other sulcorebutias with light green bodies and white, more or less adpressed spines (HJ1308).

Still some 300m higher he came across some tiny, light green plantlets with white spines. Both populations consist of many large, multi-headed groups flowering exclusively yellow. They hardly correlate with the first description of *S. luteiflora* although one can see the type location of *S. luteiflora* from the places of the two field-numbers when the weather is good. It is only a distance of 4–5km as the crow flies.

During his next walk (2012), Jucker explored the area to the north and to the northeast of Cerro Cantar Gallo, as well as the eastern slopes of the Cord. Mandinga until he came to Torre Pampa. Because of the very many locations where he found sulcorebutias and the vast amount of pictures, we really have problems to pick a representative selection.

Hansjörg Jucker started his hike near the small "village" of Huayllas, about 4km as the crow flies north of Cerro Cantar Gallo. We deliberately put village in quotes because there is no settlement as far as one can see, but there is an Estancia Huayllas to be located on the map. Probably 40 years ago when the military maps were printed there might have been a small town which has now disappeared.

As one could expect he found above this place *S. cantargalloensis*, most of them with yellow flowers and a few with magenta ones. As we already mentioned above, also near Huayllas, forms of *S. tarabucoensis* (VZ253 and others) have been found (see above).

Therefore, it is not surprising that the walker also found plants which can hardly be identified as *S. cantargalloensis*. These deviations became more numerous the further he walked to the east, and if they did not grow in between many *S. cantargalloensis*, one would be completely perplexed.

Photo: H. Jucker

Fig.23. *S. cantargalloensis* HJ1325b a typical plant from east of "Huayllas".

Photo: H. Jucker

Fig.24. Also a HJ1325b, but no one would identify it as *S. cantargalloensis.*

Photo: H. Jucker

Fig.25. *S. cantargalloensis* HJ1325c from east of "Huayllas".

Photo: H. Jucker

Fig.26. *Sulcorebutia* spec.HJ1325c from the same location as the plant in Fig.25, but clearly different.

Photo: H. Jucker

Fig.27. *Sulcorebutia* spec. HJ1326 only a few kilometres further on – S. luteiflora?

Photo: H. Jucker

Fig.28. *Sulcorebutia* spec. HJ1326 with a green body and yellow flowers.

All flowers seemed to be yellow. Going further to the east the plants became even more atypical for *S. cantargalloensis*.

About 5-6km southeast of Huayllas and only slightly lower one hardly finds any similarities with *S. cantargalloensis*. The light green *Sulcorebutias* (HJ1326) are openly white spined and they strikingly resemble the plants from the Torre Pampa Valley. Only yellow flowers could be seen. An almost identical plant has been shown in Picture No. 3 of the first description of *S. luteiflora*.

Jucker´s next discoveries (HJ1327 and HJ1327a) are quite different from the former populations. Besides plants which we would call *S. luteiflora* or others which are close to young plants of *S. cantargalloensis*, there were rather big, light green sulcorebutias with violet flowers which show us that Jucker was now close to the distribution area of *S. crispata*.

Photo: H. Jucker

Fig.29. Different forms of *Sulcorebutia* spec.HJ1327 – small, not offseting plants – *S. cantargalloensis*?

Photo: H. Jucker

Fig.30. *S. luteiflora* or maybe *S. cantargalloensis*?

Photo: H. Jucker

Fig.31. *Sulcorebutia* spec. HJ1327a with yellow flowers.

Photo: H. Jucker

Fig.32. Also HJ1327a – but this one will probably flower magenta.

Photo: H. Jucker

Fig.33. *Sulcorebutia* spec. HJ1330 alongside the path north of Torre Pampa.

Photo: H. Jucker

Fig.34. Just about north of the petrol station at Torre Pampa HJ1331.

It seems that he found there, besides different forms of *S. cantargalloensis*, also plants that might be near *S. crispata*. We skip the next two finds (HJ1328 & HJ1329) because those indeed can be called *S. crispata* without reasonable doubt. He found them on the most easterly slopes of the Cord. Mandinga at lower altitudes of about 2200m, which is typical for the latter species.

Afterwards, his further path led him more to the west and to the south where he found, somewhat higher again, yellow flowering sulcorebutias (HJ1330 & HJ1331).

These plants are a little bit similar to HJ1326 and of course to those described by de Vries as *S. luteiflora*. When he came across HJ1332 and HJ1333 the Swiss walker was already directly north of Torre Pampa.

Photo: H. Jucker

Fig.35. *S. luteiflora* HJ1332a from Torre Pampa – a dark form.

Photo: H. Jucker

Fig.36. *S. luteiflora* HJ1333 from Torre Pampa – with a green body.

HJ1334 finally comes from the southern side of the Torre Pampa Valley even a little bit higher than the finding-place of HJ1308. This appears to be the southern border of the complex *S. cantargalloensis/luteiflora*. These plants grow at an altitude of more than 3000m about 11km southeast of Torre Pampa.

Already after this trip it was clear to us that there is no sense at all in maintaining two taxa at specific rank in that area. In contrast to other statements (Lechner, 2015), the distribution area of *S. luteiflora* extends far beyond the valley of Torre Pampa and it overlaps in the north with that of *S. cantargalloensis*. There are countless intermediate forms between the two "species" all over the region.

In spite of this, Hansjörg Jucker undertook another hike starting from Huayllas again to explore this area even better. This time he did not walk directly to the east but followed a path to the north. Also there he found sulcorebutias similar to those of his last trip near Huayllas. Again, some plants could be classified as *S. cantargalloensis*, others as *S. luteiflora*.

Photo: H. Jucker

Fig.37. At the location of *S. luteiflora* HJ1333 looking down to Estancia Torre Pampa.

Photo: H. Jucker

Fig.38. *S. luteiflora* HJ1334 at almost 3100m, 11km southwest of Torre Pampa.

Photo: H. Jucker

Fig.39. Hansjörg Jucker's campsite near "Huayllas".

Photo: H. Jucker

Fig.40. *S. cantargalloensis* HJ1362.

Photo: H. Jucker

Fig.41. *Sulcorebutia* spec. HJ1364, 4km east of "Huayllas" – *S. luteiflora*?

Photo: H. Jucker

Fig.42. *Sulcorebutia* spec. HJ1368 – far to the northeast of "Huayllas" – aff. *S. cantargalloensis*.

Photo: H. Jucker

Fig.43. *Sulcorebutia* spec. HJ1368a – completely different

Further to the east and at lower altitudes the swarm of forms again became unmanageable. To try to classify these plants would be a wild guess, especially because there were no buds nor flowers, nothing.

Later, he again turned to the south and also in a more easterly direction. He followed a mountain ridge about 6–7km south of his route of two year ago. Also here it is not possible to classify the plants he found, mainly because of the lack of flowers or remains of flowers. Looking at them, one may speculate that the more westerly ones from higher altitudes might flower yellow and therefore belong to the *S. cantargalloensis* complex while the other ones from lower areas could be *S. crispata* (aff. *S. viridis*) if they really have violet flowers.

What is our conclusion now? The distribution area of the complex of *S. cantargalloensis/luteiflora* extends over an area

Photo: H. Jucker

Fig.44. On the way over the slopes of the Cord. Mandinga at 2900m – *S.* aff. *cantargalloensis* HJ1369.

Photo: H. Jucker

Fig.45. 2.5km further on and still near 2900m – HJ1370a – a slight suggestion of *S. viridis*.

between 10 to 15km north-east and south-east as the crow flies from the type location of *S. cantargalloensis*. Throughout the entire area grow sulcorebutias in a boundless variability. *S. cantargalloensis* represents one end of this swarm growing at the highest altitudes while *S. luteiflora* is at the other end growing at more moderate altitudes. In contrast to the easily recognizable *S. cantargalloensis*, it is difficult to find an appropriate counterpart for *S. luteiflora*. (It is completely clear that we must orient ourselves on the type plant).

Starting from the originally known plants from Torre Pampa Valley we find all over this area the above mentioned multitude of different forms. Depending on how we look at them we will want to allocate a certain plant to either species. Apart from the clearly limited population from the slopes of Cerro Cantar Gallo, there is no way to find any border either geographical or morphological. For this reason, we consider both taxa as belonging to one species and therefore we put *S. luteiflora* as a variety to *S. cantargalloensis*.

Of course, the name “luteiflora = yellow flowering” does not make much sense as a variety of a mostly yellow flowering species. Therefore we chose a name for our combination which fits this new variety very well since it was first found in the valley of Torre Pampa.

Sulcorebutia cantargalloensis Gertel, Jucker & de Vries var. ***torrepampensis*** Gertel & Jucker. **comb. et nom. nov**.

Basionym: *Sulcorebutia luteiflora* de Vries. *Succulenta* **93**(1): 14 (2014). Type: de Vries 732.

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Following Friedrich Ritter's footsteps in Inquisivi, Bolivia

Holger Kelsch describes his adventure in pursuit of *Cephalocleistocactus chrysocephalus* in its native habitat near to Inquisivi, Bolivia.

Photographs by the author.

I started collecting cacti at the age of twelve and specialized in columnar und cephalium-bearing cacti which are frequently to be found in my collection; especially all forms of *Cleistocactus*. Unfortunately, one *Cleistocactus* had proven impossible to find or to acquire: *Cephalocleistocactus chrysocephalus*. No seeds, no plants, nothing! So I started my own research and it seemed that since Friedrich Ritter's discovery of this species in 1954, nobody has claimed to find this plant again growing in the wild. All the cultured plants that still exist in collections must therefore be descendents of the plant first discovered by Friedrich Ritter and hence it is difficult to acquire.

After finishing my studies in 2012, I had the possibility to go on a 5 week journey to South America in December of that year. As I had planned to stay a couple of weeks in Bolivia, I had the idea to try to rediscover this species in the canyon of Inquisivi. Thus, I borrowed the Ritter book (1980) describing this cleistocactus from the library of our regional cactus club and took it along on my trip to South America.

Adventure Tour to Irupana

After spending two beautiful days in Coroico, in the north of La Paz, I took a taxi to Coripata and then travelled by minibus further to Chulumani (Fig. 1). Unfortunately, the next minibus to Irupana would not leave that village until the following day, so the only alternative was a taxi for about 200 Bolivianos. As there was no taxi to be seen, I asked the other waiting people, with my meager Spanish, at what time they expected the next taxi and got the answer: "Soon!" Thirsty, I meanwhile bought a cold drink in a grocery shop around the corner, only to discover a taxi by some miracle as I left the shop. The bored

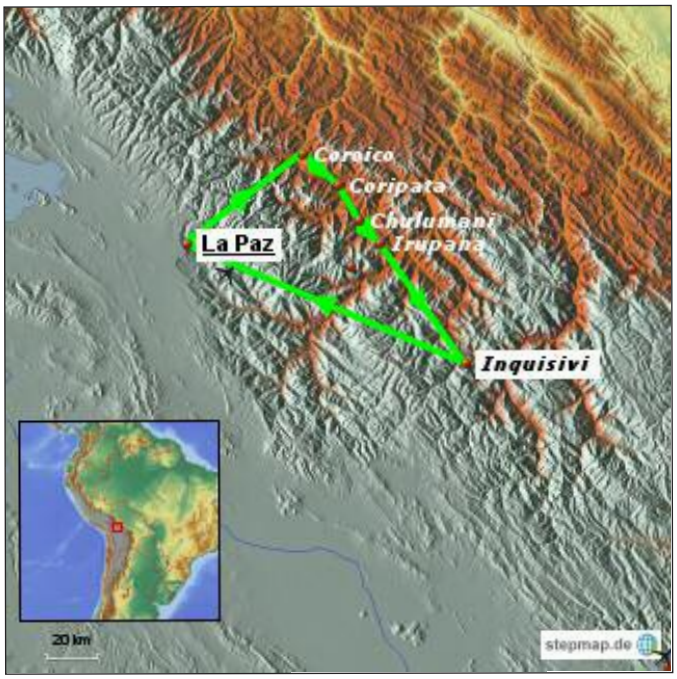

Fig.1 Map showing the route to Inquisivi.

driver wanted 300 Bolivianos for the lengthy route and, asking whether he knew the track, I got only a ridiculing "Si, claro!". With a lack of alternatives and eager to leave Chulumani as soon as possible, I agreed and off we went to Irupana. His predicted three-hour drive became five hours, whilst his driving style tended towards that of a rally-driver as dusk approached, which moved me to fasten the seat belt after all. When my driver finally began to ask locals on the roadside for directions, I allowed myself to ask him if he did in fact not know the way. His response was "Yes, yes, I know it, but I have just never been there."

Finally we reached Irupana late in the evening where I was welcomed by a room in the style of the previous century. Discussing extensively with the village youth in the domestic Internet café later that evening, I then understood the distant and reserved reaction

Fig.2 *Winterocereus colademononis* cultivated on a window ledge in Irupana.

Fig.3 *Yungasocereus inquisiviensis* in bud near to Inquisivi.

of the local elderly population to my appearance. It appeared that I was the first 'Gringo' for several decades to spend a night in the village. After a less relaxing night due to the unhygienic conditions of my bed (which prompted me for the first time on this holiday to unpack my sleeping bag), I took the Flota, the local bus service, to Inquisivi early the next morning.

One highlight Irupana had however saved for me: Just before the departure, I discovered a magnificent hanging monkey's tail, cola de mono (*Winterocereus colademononis*) (Fig. 2) at a window on the second floor of a house. The locals explained that there is often a seller here on the market with this plant. A cute farewell!

Helpful Friends in Inquisivi.

Finally, at lunchtime, I arrived in Inquisivi where the people eyed me strangely. After some questions, I was led to the only hostel in the village where the owner, Grandma Nora, immediately welcomed me warmly as Gringo.

When asked how long I had planned to stay, I answered 'until I have discovered the plant for which I had been searching since many years'. Grandma Nora immediately sent for some friends of hers who might know where the coveted *Cephalocleistocactus chrysocephalus* could be situated. I passed the time descending into the canyon, as I had spotted many cacti when passing on the bus ride earlier on. Outside the village, I was greeted by a flowering *Agave americana*, which in turn led to further discoveries. Some meters below, I found large stands of *Yungasocereus inquisiviensis* (Fig. 3) and a Cereus which I could not determine in more detail. In the branches of the trees, I saw *Rhipsalis tucumanensis*. The closer I got to the river in the depths of the canyon, the more my dreams perished to find the desired plant so soon since, with the exception of these three species, no other cacti were to be spotted.

Back in Inquisivi, Grandma Nora was waiting for me with a friend who sent me to the local cemetery area where they suspected the plant could be situated. Right next to the cemetery on the hillside, I found a cleistocactus in bloom, probably *C. reae* (Fig. 4), but not the desired species. On closer inspection of the slope, I also came across *Echinopsis ayopayana* (Fig. 5) with buds that should open in the

Fig.4 *Cleistocactus reae* in flower near to Inquisivi.

coming days. Even fruits were starting to appear.

The goal is in the gorge of Inquisivi.

At twilight I finally went back, drank some Pacena (Bolivian beer) with new friends, listening to their stories, because everyone knew something about the plant I was looking for. The next day I asked more locals who led me to the courthouse as this cactus should have previously been standing here. Too bad it was not there, but I got in touch with the brother of the judge, the technical mayor Carlos, who introduced me to his wife, who probably knew all plants in this environment. She showed me a place on the edge of the great gorge of Inquisivi on my own hand-drawn map where the cactus was to be found. Relieved, I asked if it would be easy to get there, and then the mayor confirmed that with a guide it is no problem — just along the river to the said site. After a request to Kevin, the grandson of Grandma Nora, one of his friends Gualtico agreed to accompany me the next day to the canyon of Inquisivi. Full of anticipation, I enjoyed the balmy evening and visited the echinopsis at the cemetery again - the buds were now bulging, but still firmly closed.

Fig.5 *Echinopsis ayopayana* near to Inquisivi.

Fall and injury: The failed first attempt.

The next morning Gualtico stood ready on time and with a machete and a camera we went down into the canyon (Fig. 6). Having arrived in the gorge, we walked a bit along the river before we realized that no further progress could be made due to the swollen river that had flooded the paths on the edge. Following an unsuccessful attempt to cross the river, we decided to climb along its side.

After the first few meters, it was clear that this would be no picnic for me. While climbing along the river, rocks repeatedly broke into rubble. While Gualtico climbed loosely from one rock wall to the other, I quickly paid tribute to the terrain and landed in the river flowing beneath. After a few moments in the water, I grabbed a rock and pulled myself dripping wet onto land. My camera was still dry, but my right middle finger was sprained. Any advancement was no longer possible with my injured finger and I had to go back with a heavy heart.

After our return to the village, Grandma Nora first bandaged my middle finger. The finger was a little swollen and hurt, so returning to climb along the river was impossible. The next day I took advantage of exploring the surrounding area and slopes above Inquisivi. Just above Inquisivi, I found a few more examples of *Cleistocactus reae*, otherwise there were no other cacti to be found. However, as a consolation, there was still the *Echinopsis ayopayana* at the cemetery on the way back to the hostel. Its buds were just

Fig.6 The gorge of Inquisivi.

about to burst and that evening I was at last able to capture the long-awaited display, accompanied by a sweet floral scent (Fig. 7). The next morning the flowers had already disappeared — obviously I was not the only one who had expected her blossoming.

A new track leads to the discovery of the century.

The next day I decided to continue my onward journey because there appeared to be little chance to discover the desired plant. I bought a bus ticket for the next day back to La Paz and spent the rest of the day backing up my photos and packing. In the afternoon, I made a final walk around Inquisivi to say goodbye to everyone I met in the Plaza de Armas, the main square, including my friends from the first evening again, who immediately inquired whether I had discovered the plant as well as what had happened to my now bandaged finger.

In addition to the familiar faces, there was also an unknown face, Alberto. He inquired promptly after this plant, whereupon I passed him a picture of the plant. He looked at it and said that this plant would be on his land, in the gorge of Inquisivi. Incredulously, he recounted that some time ago when he and his field workers recovered a trapped cow out of the canyon, he had it seen exactly this plant. Immediately, new hope rose in me and Alberto referred me to his father, Don Alphonso, who would know for sure. Unfortunately, he was not available again until the next morning.

With little hesitation, I postponed my departure and met Alphonso the next morning at seven o'clock. He suggested sending down one of his field workers into the gorge to bring me parts of the plant for verification. Of course, I wanted to accompany him, but decided not to go, thinking of my injury and probably the inaccessible terrain in which the plant would be located. Instead, I was

Fig.7 The nocturnal flower of *Echinopsis ayopayana* growing near to Inquisivi.

informed to return in the early evening to inspect the plants.

After a long day of waiting, it was finally time. Don Alphonso came back from the field with packet. After a short comparison of the plants with Ritter's description (Ritter, 1980) it was clear that it was in fact *Cephalocleistocactus chrysocephalus*, since the characteristics of stem, flower and fruit all coincided. My luck was incredible; I had the plant of my dreams in the palm of my hands! (Figs. 8&9) After numerous photos and hymns of gratitude, I returned to Grandma Nora's hostel where the birthday party of one of her granddaughters was already in full swing. Immediately, I was seated at a table and got to know the parents of the birthday girl, whom had travelled from La Paz. Soon we were on the subject of cacti and the mother, Jacqueline, told me that they know someone in La Paz who is also very interested in cacti - Juan Ramirez. Strangely, the name meant something to me. So a short time later I phoned Juan Ramirez who kindly invited me to visit his collection sometime during the next few days. A coincidence or twist of fate?

With Juan Ramirez in La Paz we come full circle.

The next day I travelled from Inquisivi to La Paz with a few pieces of *Cephalocleistocactus chrysocephalus* in my luggage. After arriving in La Paz, I immediately arranged a visit to Juan

Fig.8 The author with Don Alphonso and the cutting of *C. chrysocephalus*.

Fig.8 The precious cuttings. *Yungasocereus inquisivien-sis* on the left and three pieces of *Cephalocleistocactus chrysocephalus*.

Ramirez' collection. There my eyes immediately set sight on several plants that I had previously not known whilst Juan's attention was clearly directed to the cardboard box I was carrying. I told him where I came from and then inquired after his brother Alberto. After a short pause, he told me that his brother had died during an expedition last year to the Southyungas with a friend — in

search of *Cephalocleistocactus chrysocephalus*.

After my condolences, Juan inquired again, what was in the box? The astonishment on his face was hard to put into words, as I gradually took one plant piece after the other out of the box and displayed them in front of him. The circle had closed and after several hours in Juan's collection and several unknown species, which could easily fill another report, I said goodbye and left him the plant pieces as a souvenir and in respect of the species protection rules, which anyway prohibit them being removed from their country of origin. I could take only seeds. Full of satisfaction, I returned to my hostel.

My Conclusion

Bolivia is more than worth the trip and I will certainly try to return next summer in the local dry season to document the location of this rare plant completely. For me, a number of dreams came true during my first trip to South America. I can only recommend each cactus friend to visit these countries and experience the plants in their natural habitat as well as the landscape and its people. For me, this was an unforgettable adventure.

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A new location for *Rhipsalis micrantha* (Kunth) A.P. de Candolle in Peru

Jorge Romero tells us about *Rhipsalis micrantha* and records a new location in Peru for this interesting epiphytic cactus.

Photographs by the author.

The genus *Rhipsalis* includes epiphytic cacti that grow on trees in humid tropical rain forests and seasonal forests. They are cacti which have special adaptations to grow in those places, and cause surprise in people who believe that cacti only grows in deserts (Anderson, 2001).

In Peru the genus *Rhipsalis* is represented by five widespread species: *R. baccifera* ssp. *baccifera* (J.S. Miller) Stearn, *R. cuneata* Britton & Rose, *R. floccosa* ssp. *tucumanensis* (F.A.C. Weber) Barthlott & N.P. Taylor, *R. micrantha* (Kunth) A.P. de Candolle and *R. occidentalis* Barthlott & Rauh. This genus has been reported in Piura, Cajamarca, La Libertad, Amazonas, San Martin, Huanuco, Junin, Cusco, Madre de Dios and Puno regions (Ostolaza, 2014) and is probably distributed in Loreto and Ucayali regions (Barthlott, 2015).

This article is about *Rhipsalis micrantha*, a widespread tropical species that grows in the forests of Costa Rica, Venezuela, Colombia, Ecuador and northern Peru. In Peru, it had been reported in isolated areas in northwestern regions such as Olleros - Piura Region (Ostolaza, 2005) and Cascas - La Libertad Region (Ritter, 1981). Field work has resulted in a new area of distribution for this species in the Incahuasi District – Ferreñafe Province - Lambayeque Region.

In this new location, this species grows in "dry equatorial high forest" between 1300–1600m at temperatures between 15–25°C. Plants grow as epiphytes on trees of *Acnistus arborescens* (Fig.3) which provide shade, and they are accompanied by succulent plants such as *Peperomia galioides* (Fig.1), and an orchid of the genus *Cyrtochilum* (Fig.2) as well as various species of moss. Its seeds are spread by small birds from the area which feed on the fruit. The phenology of the species is: Flowering from September to November and fruiting from October to December.

At this new location, *R. micrantha* has the following characteristics: The young plant has branches of 4 spirally disposed ribs and numerous spine-like bristles ca. 5mm long (Fig.4). The adult plant has an epiphytic habit and acrotonic division; cylindrical basal branches and secondary branches are pendulous with 3 to 4 ribs or flattened formed by segments of 11 to 16cm long and 0.8 to

Fig.1. Companion plant: *Peperomia galioides*.

Fig.2. Companion plant: *Cyrtochilum* sp.

Fig.3. *Rhipsalis micrantha* in habitat

Fig.4. Young branches of *Rhipsalis micrantha*.

Fig.5. Flower of *Rhipsalis micrantha* in habitat.

Fig.6. *Rhipsalis micrantha* in culture.

Fig.7. Mature fruit of *Rhipsalis micrantha*.

Fig.8. Mature fruits of *Rhipsalis micrantha* from fertilized flowers and unfertilized flowers.

1.5mm wide, and a total length of 2m; areoles small, with 1 to 4 small spines as bristles; creamy white flowers, 7mm long, petals cream (Fig.5); fleshy fruits of 8–10mm in diameter, globular, naked and white, indehiscent (Fig.7); elongated black seeds.

This cactus grows easily in warm climates between 15 and 25°C, requiring filtered light and location outside (Fig.6). A very porous and aerated soil with organic material suits the plant. Asexual reproduction from cuttings about 15cm long or more achieves 90% success

in rooting. To demonstrate the plant's sexual reproduction, the author conducted artificial fertilization with individuals of the same species to obtain fruit but they were confused as a result of production of fruits by two kinds of flowers, artificially fertilized flowers and unfertilized flowers (Fig.8).

Acknowledgements

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Travel with the cactus expert (14)

Zlatko Janeba brings us more wonderful pictures of spectacular scenery and flowering cacti. He shows us how much fun it can be to find beautiful plants in amazing places.

Photographs Zlatko Janeba, desert-flora@seznam.cz.

After breakfast we said goodbye to our friends from Castle Valley and headed back to La Sal Mountain Loop. Our goal for that morning was to see plants that Josef Busek had seen many years before (probably in 1982). The same plants were found by Fritz Hochstätter some 15 years later (in 1997) and in 1998 they were described by him as *Yucca nana*. At the beginning of our drive we saw other types of yuccas, while we enjoyed some more beautiful views of the Castle Valley below us [Fig.1].

At an elevation of over 2000m we passed beautiful aspen forest and when we started to descend we could see the first plants of *Sclerocactus parviflorus* and *Yucca baccata*. We stopped at the elevation of 2000m and on low hills with some juniper and pine trees we saw our first plants of *Yucca nana* [Figs.2 & 3]. This dwarf yucca was quite common there, sparsely distributed over the hills, growing also with *Y. baccata* and *S. parviflorus*. *Y. nana* is actually considered to be a very nice and compact form of Y. *harrimaniae* (more exactly of *Y. harrimaniae* var. *harrimaniae*). *Yucca harrimaniae* is quite a variable species with a large distribution range in the SW of the USA, including Arizona, Colorado, Nevada, New Mexico and Utah. The distribution range of *Y. nana* in the La Sal Mountains seems to be quite limited, but similar plants, with even smaller and more compact rosettes, can be seen in other locations at similar elevations (over 2000m). Thus, *Y.*

Fig.1. One more splendid view of the Castle Valley, near the La Sal Mountains, Utah.

Fig.2. A habitat of *Yucca nana* (= *Y. harrimaniae*) with juniper trees along the La Sal Mtns Loop at elevation of some 2000m. This place is considered to be the type locality for *Yucca nana* Hochstätter.

Fig.3. A magnificent specimen of *Yucca nana* (= *Y. harrimaniae*), 2000m, La Sal Mountains, Utah.

Fig.4. *Sclerocactus parviflorus* in full flower, S.E. of Moab, La Sal Mountain Loop (1880m), Utah.

nana probably represents only a montane form of the generally more widespread *Y. harrimaniae*.

We continued in our descent towards Moab and at an elevation of some 1880m we made another stop. There, among the sagebrush shrub, and with splendid views of the La Sal

Fig.5. A nice form of *Sclerocactus glaucus* from White Water (1420m), Colorado. This form is what used to be called *Sclerocactus franklinii*.

Mountains still decorated with the residues of snow, we could observe flowering clumps of *Echinocereus triglochidiatus* ssp. *mojavensis* [Fig.6] and large columnar specimens of *Sclerocactus parviflorus* [Fig.4]. This was an area from were the form *inermis* had been reported before. Unfortunately, we could not see any plants of this less spiny form of *E. triglochidiatus* there.

We passed Moab, hit the interstate highway I-70, and headed eastwards towards Colorado. We stopped near Westwater (UT, exit 227), where we saw flowering *Sclerocactus parviflorus*, *Echinocereus triglochidiatus* ssp. *mojavensis* and *Opuntia polyacantha* (pink flowers), growing among ephedra and juniperus trees at the elevation of some 1450m.

Later we entered the state of Colorado, in Grand Junction (CO) we took US50 (or SH141) to the south, passing Whitewater (CO) and

Fig.6. A habitat of *Echinocereus triglochidiatus* ssp. *mojavensis* with La Sal Mountains in the background, SE of Moab, La Sal Mountain Loop (1880m), Utah.

Fig.7. *Opuntia polyacantha* with a magenta flower, Whitewater (1420m), Colorado.

Fig.8. *Opuntia polyacantha* with a gorgeous cream flower, Whitewater (1420m), Colorado.

Fig.9. Young specimen of *Sclerocactus glaucus*, Delta County, Colorado.

Fig.10. *Escobaria* (*Neobesseya*) *missouriensis* with flower and fruit, Delta County, Colorado.

turned westwards onto road SH141 (SH for state highway). We saw many flowering *Calochortus* sp. from the car. Then we made quite an interesting stop about 1 mile from the US50-SH141 intersection (still near Whitewater, N 38.58.263 W 108.27.955, 1420m elevation). A nice population of *Sclerocactus glaucus* was residing on low hills of an evidently private property (the question is what this location looks like today and whether the plants are still there). The plants were quite numerous and in full flower [Fig.5]. The distinctive spination was straight with hooks at the end of the central spines and I believe this local form represents what was described in 1939 as *Sclerocactus franklinii* J. W. Evans (type location given as south rim of Gunnison Valley, one or two miles east of Delta, Delta County, Colorado). Nevertheless, this name is considered only as a synonym of the more widespread *Sclerocactus glaucus* (K. Schumann) L. Benson. We could also admire beautiful flowers of *Opuntia polyacantha* at the same spot. The flowers had either the more typical magenta colour [Fig.7] or much rarer and (from the collectors' viewpoint) very attractive, cream colour [Fig.8].

Some 6 miles from the junction (N 38.54.618 W 108.30.955, 1700m), just next to the road, we found flowering clumps of *Echinocereus triglochidiatus* ssp. *mojavensis*, young plants (up to 6-7cm in diameter) of more or less typical *Sclerocactus glaucus* with buds [Fig.9], numerous *Escobaria missouriensis* decorated with both yellowish flowers and red fruits [Fig.10], *Opuntia phaeacantha*, *O. hystricina*, and *Yucca* sp. All the cacti were growing on western grassy slopes with sparse juniper

Fig.11. A habitat of *Echinocereus triglochidiatus* ssp. *mojavensis* in sparse pine and juniper forest, South of Grand Junction, Colorado.

Fig.12. A clump of *Echinocereus triglochidiatus* ssp. *mojavensis* f. *inermis* with a very short spination, South of Grand Junction, Colorado.

trees. The *Escobaria missouriensis* plants (often treated as members of *Coryphantha* or *Neobesseya* by others) had flat bodies up to 8cm in diameter, almost sunken in the soil. Their spines are more stiff and prickly compared to previously seen *Escobaria marstonii* from the Mount Trumbull Loop in Arizona.

The next stop was about 11 miles from the above junction, still on SH141, just over the bridge, near milestone 143. We were walking through the juniper – pine forest with *Echinocereus triglochidiatus* ssp. *mojavensis* growing either in open rocky places or under the trees [Fig.11]. Many of them were in full flower. The echinocerei were also quite variable in their spination and one could see typical plants of ssp. *mojavensis*, a beautiful almost spineless form [Fig.12], and almost everything possible in between those two. Depending on the viewpoint, the plants without spines are known as *Echinocereus triglochidiatus* var. *inermis* or *Echinocereus triglochidiatus* var. (or ssp.) *mojavensis* f. *inermis*. Since the spineless specimens do not grow isolated, it seems best to use the rank of form. Compared to f. *inermis* from La Sal Mtns. in Utah, where completely spineless plants were reported, at this place in Colorado we observed almost spineless plants, but they always were bearing at least some tiny spines (of 1–2mm in length) [Fig.12]. And although the echinocerei often grew in the shade of pine or *juniper* trees, it did not seem to be the primary factor affecting the spine length. At least I did not observe any correlation between

Fig.13. A view of the habitat of *Sclerocactus glaucus* near Cactus Park, South of Grand Junction, Colorado.

Fig.14. A flowering seedling of *Sclerocactus glaucus* near Cactus Park, South of Grand Junction, Colorado.

the length of the spines and exposure of the plants to sun. We could also see there *Opuntia phaeacantha*, *O. fragilis* and *O.* aff. *trichophora* (or *O. polyacantha* var. *trichophora*).

Then we returned back some 2 miles and took a dirt road eastwards, going towards Cactus Park, a popular hiking destination in Colorado, maybe 20 miles South of Grand Junction. About 0.5 mile from the road SH141 we searched for more *Sclerocactus glaucus* in the wonderful Coloradoan scenery [Fig.13]. There, on low hills and slopes we were able to

Fig.15. A typical specimen of *Sclerocactus glaucus* in full flower, near Cactus Park, South of Grand Junction, Colorado.

find about 10 plants of *S. glaucus* of various sizes and ages. There were juvenile plants bearing a single pink to magenta flower [Fig.14], or adults with many flowers in different stages of development [Fig.15]. A little bit further, about 1.2 miles from SH141 at elevation of some 1870m we saw more flowering sclerocacti (although not very common), as well as yuccas and flowering *Echinocereus triglochidiatus* ssp. *mojavensis*. It was a very beautiful area. What a pity we did not have enough time to spend there.

We had to head back to Grand Junction (CO) and then along I-70 (or US-6) in a north-easterly direction towards De Beque (CO), our next cactus destination. We reached the place in the evening and after two comfortable nights in the house of our friends in Castle Valley (UT), we had another opportunity to camp outdoors.

Zlatko Janeba

On the origin and deeds of Sedum morganianum

Everything you ever wanted to know about *Sedum morganianum*.

Article by Marco Cristini

Photographs by the author except where stated.

> *We work in the dark –*
> *we do what we can –*
> *we give what we have.*
> *Our doubt is our passion*
> *and our passion is our task.*
> *The rest is the madness of art.*
> **(H. James, The Middle Years)**

Sedum morganianum is a popular succulent with a fascinating history. It entered into cultivation in the late nineteen thirties and quickly became one of the most beloved sedums, but its habitat was shrouded in mystery until 2008, when a group of brave (and lucky) mexican botanists found its home. This important discovery has been described both in Spanish (Jimeno-Sevilla *et al.*, 2010; Cházaro *et al.*, 2011b) and in English (Cházaro *et al.*, 2011a), but these papers are botanically minded and lack advice about cultivation

Fig.1. Zürich, Sukkulentensammlung, *Sedum morganianum* in a hanging basket

which I hope to provide here, together with a brief history of this wonderful succulent.

Commonly known as "Cola de borrego" or "Cola de burro" in Mexico, *Sedum morganianum* in the English speaking world is called "Burro's tail" or "Donkey's tail", because its long stems are said to be similar to a donkey's tail.

Sedum morganianum was first found by Eric Walther in 1935 in a small plant nursery in Coatepec (Veracruz, Mexico). He relates his fortunate discovery in an article published on the *Cactus and Succulent Journal of America* in 1936: "While waiting for a most ineffective guide, a local street urchin literally dragged us into a small nursery or plant emporium on the main street. He was the oldest son of the owner of the "Jardin Flotante", which turned out to be one of the highlights of our entire trip. Imagine our surprise too when we found a wall literally covered with a trailing succulent which even the genus escapes us to this day. This passes locally under the name "Cola de burro," meaning "tail of the donkey"" (Walther, 1936, see also Walther, 1938).

At first the mystery plant was identified as *Sedum clavifolium*, but further investigation showed that the guess was wrong. This short narration enables us to do a little philological work. The discovery of *Sedum morganianum*, as a matter of fact, is described also by Larry W. Mitich, who writes that "a very aggressive lad literally dragged him [Walther] into the sales yard of "Jardin Flotante"" (Mitich, 1993). Beware, here the "urchin" has become a "lad". Miguel Cházaro in 2011 wrote about the habitat of *Sedum morganianum* in CactusWorld. He summarizes Walther's discovery (according to Mitich) as follows: "A very aggressive lady literally dragged him [Walther] into the sales yard of Jardin Flotante" (Cházaro *et al*.,2011a). Also in Spanish there is "una muy agresiva señorita" (Cházaro *et al*., 2011b). Mitich's "lad" has gained a "y", turning himself into a lady...

But this is not the only peculiar thing connected with the discovery of *S. morganianum*. In fact, Walther relates a funny episode which happened not long after the stop at the nursery. While waiting for a train, he decided to have a little coffee break, but "on draining our cup we found this to have been flavoured with a deceased cockroach" (Walther, 1936). Succulent seeking can be a dangerous job...

Once returned in California, Walther tried to find out what the mystery plant was. Without flowers, a description was impossible so he had to wait. After three years a plant he had given to Dr. Meredith Morgan flowered and showed that the mystery succulent was an unknown sedum. So, in 1938, he published the description of this species in the Cactus and Succulent Journal (US) (Walther, 1938, the description in both Latin and English is transcribed in Table 1), naming the plant after his friend Dr. Meredith Morgan. *Sedum morganianum* thus began, at the eve of the Second World War, its "official" life.

But who were the two men that made the *S. morganianum* scientific description possible?

Eric Walther (Dresden, 14 August 1892 – San Francisco, 1 July 1959) was born in Germany and in 1909 emigrated with his parents in the USA. From 1918 he was a gardener in the Golden Gate Park (San Francisco), where he later became director of the Strybing Arboretum and Botanical Garden. In 1935, he began to study the genus *Echeveria* (hence his expedition to Mexico, where he incidentally found *S. morganianum*). In 1957, he retired and started working full-time on his monograph about echeverias, but he died suddenly of a heart attack two years later.

His work was finally published in 1972 thanks to John Thomas Howell and Reid Moran. G.E. Lindsay (California Academy of Sciences), in the first pages of the book, remembers the deceased botanist using these words: "Eric Walther was unassuming, sincere, and kind. He tended to conceal his shyness and modesty with artificial gruffness, but he was always ready to communicate his knowledge and to learn from others. He published about two hundred notes, articles, and scientific papers" (Walther, 1972: p.viii; for a short biography see also Carruthers & Ginns, 1973).

Fig.2 Three young *Sedum morganianum* stems

Fig.3 Rome, Piazza di S. Ignazio, a close-up of the balcony with *Sedum morganianum*

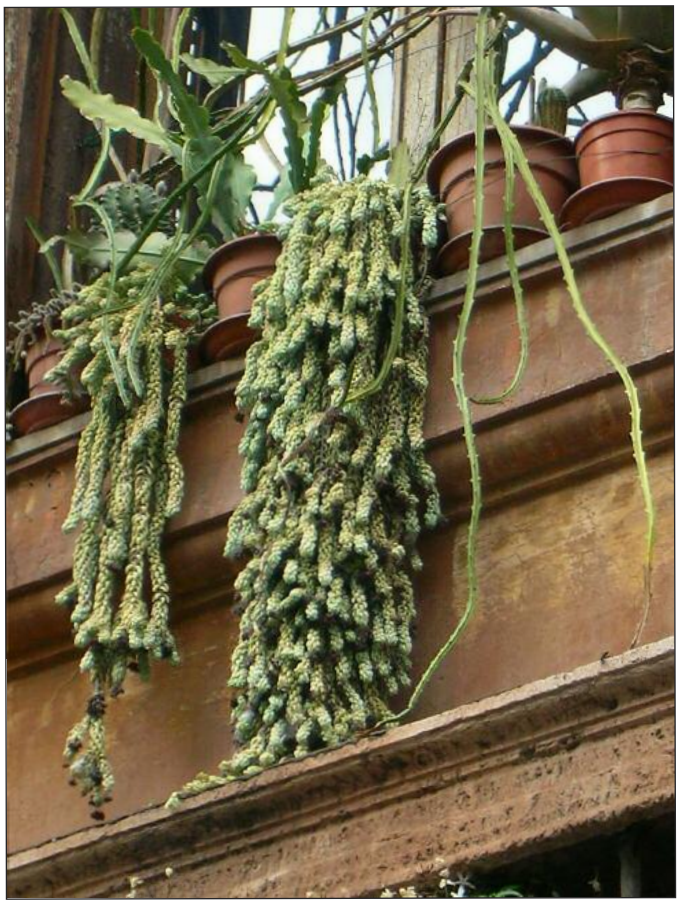

Fig.4 Rome, Piazza di Campitelli, *Sedum morganianum* is cultivated also in the city of the popes!

Dr. Meredith Walther Morgan (25 April 1887 – 3 August 1957), on the other hand, was neither a botanist nor a gardener, but an optometrist who developed an interest in cacti and succulents. He liked cristate plants and made a few hybrids, among them the Giant Burro's Tail (more about it later on) and Crassula 'Morgan's Beauty' (Mitich, 1993). Also his only son, Meredith Walther Morgan jr. (1912-1999), became a leading optometrist and had been professor for 33 years and dean of the School of Optometry for 13 years at the University of California, Berkeley.

Turning back to *Sedum morganianum*, Charles Uhl guessed that it entered cultivation between 1910 and 1935 when Mexico was torn apart by the Civil War and its aftermath and was closed to American botanists: "This species is so conspicuous that the earlier collectors like Rose, Purpus, and others, could hardly have missed it, if it had been in cultivation in their time" (Uhl, 1992). This is true, though, only if *S. morganianum* was widely cultivated. What if it was grown only in Coatepec and nearby villages? Walther didn't ask the nurseryman how long he had been growing the stonecrop, so now we can only guess. This sedum grows in a remote area, but it is very peculiar, therefore it does not seem impossible to me that the people of Coatepec have been growing it for longer than we imagine.

However, its first record in cultivation in the USA (except for Morgan and Walther) dates back to 1940, when it was "listed by a nurseryman in southern California" (Clausen, 1975). Its success was immediate. "When it reached the United States, it was easily and eagerly propagated from the detached leaves and spread from gardener to gardener like wild fire" (Jankalski, 1991). By now it has become "without doubt, the best known and most widespread [sedum] in cultivation" (Cházaro, 2011a). Brent Horvath agrees: *Sedum*

Fig.5 Freiburg, Botanischer Garten, some snake-like *Sedum morganianum*

morganianum is "probably the most common houseplant sedum since its introduction" (Horvath, 2014). Also Larry W. Mitich praises this succulent in a similar way: "Of the 500 or so species of sedum, *Sedum morganianum* is perhaps the most popular, interesting, unusual and ornamental one" (Mitich, 1993). This is true not only in the USA and Europe, but also in Mexico. Robert T. Clausen writes that: "This species […] is particularly common in cultivation in Vera Cruz, in the region from Jalapa to Coscomatepec and Orizaba" (Clausen, 1959). Until now the situation has not changed, *Sedum morganianum* is widely cultivated in Mexico and frequently escapes (Stephenson, 1994, Cházaro, 2011b).

All this popularity stimulated the quest for its habitat, but until 2008 the results were poor. R.T. Clausen flatly admits that "search in the wild […] was unsuccessful" (Clausen, 1959) and these words are the refrain of every article about *S. morganianum* published in the 20th Century. With one important exception: Charles Uhl reports a very interesting notice. "Rumors of possible wild populations near the eastern slopes of the peak of Orizaba have not yet been confirmed (Moran, 1977)" (Uhl, 1980). The same author also writes: "I have heard that a nurseryman claims to have seen the species hanging from cliffs in a canyon somewhere near the flanks of the immense peak of Orizaba" (Uhl, 1992). Two years later Ray Stephenson follows this clue and writes "lt is assumed it [*S. morganianum*] may be wild near the peak of Orizaba" (Stephenson, 1994). What led to this? Who is the myserious nurseryman?

Answering this is not easy but in 1977 Reid Moran, describing *Sedum burrito* (an ally of *Sedum morganianum* whose habitat is still unknown), states: "Gilbert Tegelberg Sr. told Paul Hutchison a few years ago that he had

Fig.6 *Sedum morganianum* growing in habitat Photograph by David Jimeno-Sevilla

seen Burro Tail growing with orchids and bromeliads on the vertical walls of a deep barranca some place south of the highway from Orizaba to Veracruz" (Moran, 1977). Well, in California there were a few Gilbert Tegelberg's, but Gilbert Tegelberg (1896-1983) of Lucerne Valley, San Bernardino Country, had a son also called Gilbert Tegelberg (1924-1997), hence (possibly) the "Sr.". On the net I've found an article by Gilbert Tegelberg Jr., who recounts the history of the Tegelberg Cactus Gardens, started by his father in 1921. Here he writes that "in 1953 he [Tegelberg Sr.] and Howard Gates went to Mexico to collect seed and any new plants they could find. This is when my father found *Mammillaria tegelbergiana* in southern Mexico" (Tegelberg, 1997). So I dare to conclude that the information about *Sedum morganianum* cited by Uhl comes from Gilbert Tegelberg Sr. of Lucerne Valley and that he probably saw the stonecrop during his trip to Mexico in 1953.

I found no other mentions concerning observations of *S. morganianum* in the wild until February 2008 when David Jimeno and Amparo Albalat, while doing a floristic study at Bellreguard Ranch (a deer-hunters ranch), were approached by Carlos Ros Torres, the owner of the place, who "told them that a rare plant grew here on his 1200-acre property and pointed out the Burro's Tail on the huge cliffs. Carlos Ros had himself had this plant pointed out when a zoologist [Jorge García Burgos] had visited his ranch some months earlier and spotted the plants" (Cházaro *et al*., 2011a). I agree with the botanists' comment: "La suerte también cuenta" (Also luck is important, Cházaro *et al*., 2011b), to say it in Latin, *Audentis fortuna iuvat* (Fortune favours the bold, Virgil, Aeneis, X, 284).

Mr. Ros notes that "the Burro's Tail grows only in an altitudinal range of 600 to 700m along the cliffs of the two ravines in which it occurs", that is Mayatla and Ixcacotitla ravine at Bellreguard of Sochiapa Ranch, Municipio de Tenampa (Cházaro *et al*., 2011a). *Sedum morganianum* grows together with other succulents, such as *Echeveria carnicolor*, *Sedum*

Fig.7 *Sedum morganianum* growing in habitat Photograph by David Jimeno-Sevilla

Fig.8 A flower of *Sedum morganianum* photographed in the Botanical Garden of Bergamo (Italy)

Fig.9 An inflorescence of *Sedum morganianum* photographed in the Botanical Garden of Bergamo (Italy)

nussbaumerianum and *Sedum hemsleyanum*. *S. morganianum* doesn't seem to be in danger of extinction: the population of the two ravines amounts to thousands of specimens (Cházaro *et al*., 2011b).

This area is near the road from Orizaba to Veracruz, where Gilbert Tegelberg saw the plant, but (and that's interesting) the nurseryman said he had seen the stonecrop "some place south of the highway", whereas, if I've understood correctly, Bellreguard Ranch is north of the Orizaba-Veracruz Highway. So maybe *Sedum morganianum* doesn't grow only in the Mayatla and Ixcacotitla ravines. If someone is going to Mexico and decides to visit this area, he could make an interesting discovery...

After this long history, the reader will be curious to know the appearance of our main character. *Sedum morganianum* E. Walther is a perennial thick Mexican sedum with long pendulous stems, covered with glaucous-pruinose, overlapping, subterete, curved leaves with acuminate apices, 15–30 x 5–8mm ('t Hart & Bleij, 2003, 'my plant has leaves 14–17 x 4–6mm'). The inflorescences are terminal, consisting of 6–12 flowers on long pedicels, with 5 deep-pink petals 10–12mm long, 10 stamens 6–7mm long having yellow anthers and 5 erect pink carpels 7mm long. If somebody is interested in a more accurate description, he can see Tables 1 & 2.

Charles Uhl argues that all plants in cultivation have been propagated from the same clone (Uhl, 1980), but this doesn't mean that the plants of *S. morganianum* all look alike. Cultivation, light and soil can change their aspect. Moreover, I don't know whether some specimens have been grown from seed and then sold in nurseries. Finally, Burro's Tail hybridizes very easily with other Crassulaceae, so I wouldn't rule out the possibility that a few of our plants have some alien genes.

Returning to its flowers, I cannot compare the data about blooming with my personal experience, because my plant has so far stubbornly refused to flower. Reading the literature about *S. morganianum* I note that there is a certain confusion about the flowering habits of this succulent, probably due to its reluctance to blooming. Let's begin with a simple question: when does *S. morganianum* usually flower? Here there are a few answers: "Flowers irregularly, in June and December" (Clausen, 1959), "AprIl – May, or later" (Evans, 1983), "in spring" (Hewitt, 2006), "in late spring" (Horvath, 2014), "in summer" (Della Beffa, 2000), "from February to July" (Jimeno-Sevilla et al., 2010). Well, I think that flowering depends on the place, amount of sunlight and cultivation, so the dates can vary. I'd say that spring is the most probable season, but this is not a Nobel-Prize discovery...

Evans notes that: "*S. morganianum* is a rather shy flowerer, but once it starts it seems to get the habit. Proper cultivation and sunlight are essential for this" (Evans, 1983). Joyce Descloux reported that her plant flowered only

when it was ten years old (Descloux, 1988). The stems, moreover, have to be no less than 25cm (Stephenson, 1994) or 30cm (Horvath, 2014) long. A cool winter seems to be important for developing inflorescences, but frost must be avoided (more about this topic later on). I've also read that "it is not uncommon for plants suffering or about to die to flower abundantly" (Schulz, R. & Kapitany, 2003). Well, my plant is in pretty good health, maybe this is the reason why it is not very eager to bloom. Until now I've seen only once *S. morganianum* flowers face to face (face to petals, if you prefer), in the Botanical Garden of Bergamo (Italy, in April), where all plants were very thirsty.

I've read that the flowers produce much nectar and that it can drip down on plants standing under *S. morganianum*. This has to be avoided, lest the other succulents become sticky and can be attacked by a black mould (Ginns & Hart, 1971).

Another question that can easily arise when seeing this stonecrop is: "How long can the stems grow?". The answers, again, are very different: 61cm (24 in, Evans, 1983), 90cm (Dortort, 2011, Horvath, 2014), a meter (Stephenson, 1994), more than a meter (Jeiek & Kunte, 2006), 1.2m (4 ft, Mitich 1993), 1.5m (5 ft, Descloux, 1988), more than 2m (Kapitany & Schulz, 2007), 2.7m (Hewitt, 2006). Kapitany & Schulz show in their book a magnificent *S. morganianum* plant well over 2m long saying: "Even the experts and their books do not always know how a plant will grow". Well, I agree! When I write this article (January 2016) the longest stem of my plant is 155cm and it's still growing.

It has been written that *Sedum morganianum* can produce 0.9–1.2 m (3–4 ft) of stems in 6–8 years (more or less 15cm every year, Mitich, 1993), but in good conditions the growth can be faster (30cm, 1 ft, every year, Glass & Foster, 1974). Here I can add my experience. I bought my second plant of *S. morganianum* (about the first later on) in May 2010. In January 2011 the longest stem was 26cm, in August 2011 it was 41cm, in July 2012 it was 58cm, in June 2013 it was 68 cm, in October 2013 it was 90cm, in June 2014 it was 97cm, in January 2015 it was 130cm, and in January 2016 it was 155cm, hence a growth of 20–30cm a year. These are only empirical observations without any claim of scientific value, I can only say that my plant has been almost always in the same place and under the same conditions.

As far as cultivation is concerned, I find this plant very easy. My *S. morganianum* grows almost all year round inside, in an East facing position. I water it once a week in autumn and winter, twice a week in spring and summer. I fertilize it lightly in March and, since I bought it, I have repotted the succulent once (not spontaneously, but because the former pot was literally collapsing under the weight of ever-increasing stems).

In lots of books it is written that *S. morganianum* likes abundant waterings ("never allow [...] to dry out completely", Glass & Foster, 1974; the soil should be "not soggy and not dry", Mitich, 1993, etc.) and I can confirm that. If you keep the plant inside in winter, watering every fortnight can prevent leaves from dropping. This happens when the soil is too dry. I suggest a rich, well-drained soil and a light but shaded location (following Glass & Foster, 1974 and others). Ray Stephenson writes that he "does not water at all in winter, and there is no loss of leaf" (Stephenson, 1994) and Brent Horvath states that the plant can be "extremely drought-tolerant" (Horvath, 2014). Well, in August 2013, I did not water my plant for three weeks and no leaves fell off, but normally I prefer to keep the soil always a little damp. Extreme heat can be a problem for *Sedum morganianum*, as in July 2015 my plant lost many leaves due to high temperatures (during the day always above 30°C) and lack of wind. It's the first and only occasion I witnessed such an heat shock on *S. morganianum*. During the same period a nearby plant of *Sedum burrito* thrived undamaged.

As far as propagation is concerned, *S. morganianum* grows easily from stem and leaf cuttings. As for other pachysedums, it's often said that any detached leaf will grow spontaneously once put on the ground. I suggest burying lightly (1–3mm) the part once

Fig.10 Close-up of *Sedum morganianum*

Fig.11 Close-up of three *Sedum morganianum* stems

Fig.12 *Sedum morganianum* in winter

Fig.13 A plant similar to *Sedeveria* 'Harry Butterfield' growing in Heidelberg Botanischer Garten

linked to the stem in the soil. Then the pot should be put in a shady place and watered only after 5–7 days. If you're lucky, in a few weeks you'll have a mini *Sedum morganianum*. I've never tried to grow this succulent from seeds, but it can be an interesting experience for someone skilled in sowing Crassulaceae.

Joyce Descloux writes that "if a stem is broken off and becomes dried out, it can be easily revived by placing in a dark-colored glass bottle in a shaded window". Then she remarks that the stonecrop "seems adaptable to growing in water" (Descloux, 1988). Once I grew for a month a *Sedum palmeri* plant in hydroculture: it was early spring and the succulent, which had an inflorescence, flowered regularly. But I've never tried with *S. morganianum*.

If you're going to grow this succulent outside, you should watch out for dangers coming from the sky. Firstly, "Birds are a constant problem with *Sedum morganianum* as they seem to delight in pecking at the fragile, succulent leaves" (Glass & Foster, 1974). I've never grown the stonecrop outside for long, so I cannot relate my experience, but I grow sempervivums and other sedums outdoors: from time to time a blackbird takes a liking to them... The article by Glass and Foster shows an ingenious device to minimize bird-related problems using "broad conical covers of green screen suspended over each of the baskets" (Glass & Foster, 1974). This also keeps falling leaves away. In Italy, a light net is often used over pelargonium pots in order to protect them against hail, maybe it could also be employed over *S. morganianum* pots.

Another danger is wind. This is the main reason why I don't like growing Burro's Tail outdoors. Its long stems are easily broken or damaged by storms. Besides, leaves break off at the slightest touch and bare plants are an unpleasant sight.

But the most formidable enemy of *S. morganianum* is frost. I learnt that the hard way. During the 2009–2010 winter, as a matter of fact, I left my first plant of Burro's Tail outside and I stopped watering it in November. I hoped that dry soil and a sheltered location would avoid any damage, but, alas, I was wrong! The winter was very cold and in February I noticed that the plant was suffering. But I also observed that lots of leaves seemed undamaged and thus hoped to save a few stems. As I inspected the plant, though, I had a sad surprise. The leaves were flaccid, like over-mature grapes, when I touched them they poured out water and collapsed. Reflecting over this, I conjectured that the cell membrane exploded because of the frost (frozen water takes up more volume than liquid water), so the leaves became only little bags of liquid. However, I did not press the matter further, it was too depressing.

After this sad story, let's see the opinions of the experts about the hardiness of *S. morganianum*. All of them point out that Burro's Tail cannot withstand a harsh winter: The plant is "easily damaged by frost" (Mitich, 1993) and should be kept indoor in winter (Descloux, 1988). It can withstand up to 7° (Hewitt, 2006) or 5° if kept dry (Della Beffa, 2000), so can be labelled as tender (Evans, 1971 & 1983, Payne, 1972). To sum up, if you live in an area where in winter the temperature falls below 0°, it's better to give this sedum some protection.

Apart from frost, I've never had problems with *S. morganianum*. Aphids and mealy bugs seem to dislike its pruinose leaves and any minimum well-drained substrate will avoid root rot.

Burro's Tail is deservedly famous, but we shouldn't forget its numerous hybrids, which in the last years have been been spreading in nurseries and collections.

Sedeveria 'Harry Butterfield' is perhaps the most beloved. It's a cross with *Echeveria derenbergii* and it's often called 'Super Burro's Tail' (Stephenson, 1994, Horvath, 2014). In 2003, Ray Horton tried a bold experiment and crossed this hybrid with *Pachyphytum oviferum*. He obtained a new plant, called *Pachevedum* 'Ray's Comfit', a succulent which has genes from three genera: *Echeveria*, *Pachyphytum* and *Sedum*. Another hybrid involving three different genera was reported in 1971, but its fate is unknown: "A very interesting

intergeneric hybrid is the one reputed to be *S. morganianum* × *Pachyveria* […]. This is a handsome-looking plant, like a giant greenish *S. morganianum*, with prolific pinkish flowers terminally produced" (Pearson, 1971).

Another popular hybrid is Giant Burro's Tail (also called *Sedum* 'E.O. Orpet'), a cross between *S. morganianum* and *S. treleasei* (or *S. stahlii*) made by Dr. Meredith Morgan (Mitich, 1993; Stephenson, 1994; Horvath, 2014).

Also *Sedum* 'Brazil' (*S. morganianum* × *S. pachyphyllum*) is worth a mention. It's a good-looking plant, but has a troubled taxonomical history (Stephenson, 2003, Springate, 2004). *Sedeveria* 'Morganden' is said to be another hybrid between *S. morganianum* and *E. derenbergii*, but this is not sure (Bischofberger, 2011). *Sedum* 'Soft Rime' (alias *Sedeveria* 'Subing', 'Juhyo' or 'Robert Cream') is a hybrid between *Sedum morganianum* and an unknown *Echeveria* (could it be *Echeveria cuspidata*?). It's widespread in Japan and Korea.

Moreover, *S. morganianum* has been crossed by Charles Uhl with *Sedum burrito*, *Sedum platyphyllum*, *Echeveria setosa* var. *ciliata*, *Echeveria cuspidata*, *Echeveria walpoleana*, *Graptopetalum amethystinum*, *Graptopetalum fruticosum*, *Pachyphytum compactum*, *Pachyphytum hookeri*, *Pachyphytum kimnachii*, and *Pachyphytum viride* (Uhl, 1980 & 2003). Ben J.M. Zonneveld crossed it with *Sedum burrito*, *Sedum allantoides* 'Goldii', *Sedum chontalense* (*S. versadense*), *Graptopetalum rusbyi* and *G. paraguayense*. Then he writes that he received from Charles Uhl a hybrid between *S. morganianum* and *Graptopetalum amethystinum*.

I don't know how many of these hybrids have made their way into commerce, but in Italy I've seen a few unidentified sedums that look similar to Burro's Tail, probably hybrids. At times it's not easy to distinguish between the 'real' *S. morganianum* and its crosses, almost all hybrids look much more like *S. morganianum* than their other parent.

Concluding, these are the origin and deeds of *Sedum morganianum* (title borrowed from C.C. Mierow's translation of Jordanes' De origine actibusque Getarum, I hope the authors, both of blessed memory, will forgive me...). Burro's Tail, as it has been shown, is a sedum rich in beauty and in mystery. Accidentally found in 1935 in a small nursery, it was (again accidentally) discovered in the wild in 2008; meanwhile it was observed, cultivated, spotted and propagated. In this little survey I tried to show that *Sedum morganianum*, like other succulents, is not only a mass of cells, but an object for the investigation of the human mind. This good looking stonecrop, which stands out in our collections, is a little marvel of nature which would be unknown without the toil of botanists, nurserymen and simple succulent enthusiasts. In fact, botany is also the history of those men and women who studied plants, of their discoveries and errors, of their unending attempt to move the borders of knowledge a bit further.

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Marco Cristini

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Au Cactus Francophone (http://www.cactuspro.com/photos/Crassulaceae/Sedum/morganianum/3836.html): beautiful photo of a big specimen.

The Crassulaceae Database: (http://www.crassulaceae.com/botanik/pflanzen/botspezies_seite_en.asp?main=182350&menu=1&bgt=cm&genus=SEDUM&gnr=1340): no data, links with two article about the discovery of *S. morganianum* habitat.

The Flora of Baja California (http://bajaflora.org/(S(nppu2w55tc21tk2aoyodld45))/BajaSelectedPhotoDisplay.aspx?n=1653): wonderful photos of *S. morganianum* flowers.

International Crassulaceae Network (http://www.crassulaceae.ch/de/artikel?akID=182&aaID=2&aiID=M&aID=2011): brief description based upon 't Hart & Bleij with some photos and the article in PDF about the discovery of the plant. Worth visiting are also the pages of *S. morganianum* hybrids

Wikipedia (http://en.wikipedia.org/wiki/Sedum_morganianum, also in spanish and polish): there is a little confusion with *Sedum burrito*, but a few remarks about cultivation are worth reading.

Nicaraguan Field Notes (5)
Cerro Tisey

Leland Smith tells us about another one of his favourite places in Nicaragua and the succulents he found there.

Photographs by the author.

Fig.1 The peak of Cerro Tisey rising above a corn field.

Fig.2 Small *Epiphyllum crenatum* growing on a branch.

Fig.3 Large *E. crenatum* growing high in a tree.

Cerro Tisey (Fig.1) is no stranger to me. I make it up there at least once a year for the pleasant view from the top and the little restaurant at the base. On a clear day looking west one can see the line of volcanoes and just barely make out the Pacific Ocean at the Gulf of Fonseca. In the other direction one can see the Esteli Valley and surrounding hills. It is the continental divide in this area: rain falling on the west side of the peak goes to the Pacific and rain falling on the east side goes to the Atlantic. It is easy to reach by an all-year but bumpy road from the Pan-American Highway near the small city of Esteli. It is also one of the few places in the north with a well maintained trail which makes the going easier, especially for family outings.

Tisey Peak is a little patch of remnant cloud forest surrounded by sunny rocky cliffs on the west and farmland on the other three sides. It is located within the El Tisey/ La Estanzuela Nature Reserve which is a patchwork of forest, farms, and pastures managed to preserve the remaining forest and watershed while accommodating existing agriculture and promoting nature tourism. It reaches about 1550 metres above sea level and the peak is mostly covered in pine forest, with pockets of oak and mixed broadleaf trees. With its exposed location it can be quite windblown, but there are hidden pockets of shade and moss, including the hollow that has the epiphytes.

As a cactus site it is limited, but important to me as the first site where I found *Epiphyllum crenatum*. The first plants I found were arboreal. (Figs.2–4) There are small and large clumps

Fig.4 A well-formed stem showing the crenate margins. There can be much variation in stem shape, even within the same plant. Many stems are long and thin without the semi-circular pattern.

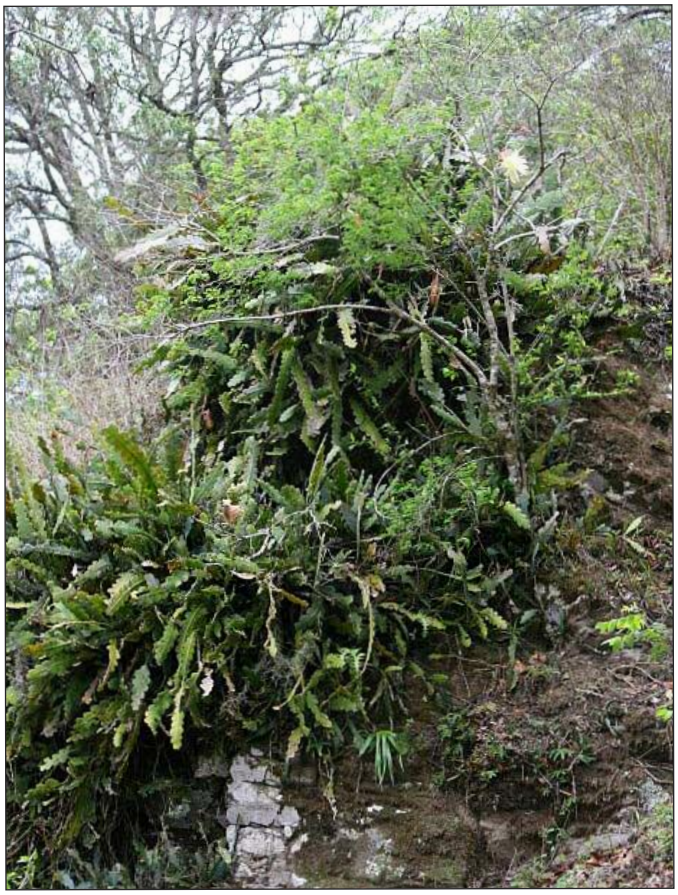

Fig.5 The second site located in a drier area.

Fig.6 The third location in sun near a small stream.

Fig 7 This flower was still open when I came upon it after 10 a.m.

growing in the trees, many of them quite high up. Since then I have found another site about 1km away that has plants growing in rocky soil with some shade from oak trees. (Fig.5) In yet another site, about 2km away, I found some very handsome plants growing on a rock outcropping in nearly full sun. (Figs.6–8) A nearby stream may be providing them with some additional water or humidity.

One of the interesting things about *E. crenatum* from a horticultural perspective is that the blooms will stay open during the day after their night-time flowering. The downside is that the plants in my garden have not flowered after more than five years. With *E. phyllanthus* and *E. thomasianum* I usually get blooms in 3 years from cuttings, so the *E. crenatum* plants have been a little bit of a disappointment.

With the exception of some small plants of *Furcraea cabuya*, that is about all the succulents I have found on the peak, although there is an abundance of the common bromeliads, ferns, and peperomias.

Leland Smith

A new look at Gymnocalycium achirasense H. Till & Schatzl ex H. Till

Victor Gapon and Gert Neuhuber discuss the *Gymnocalycium achirasense-orientale* complex and propose new names.

Photographs 5, 18, 21–23, 36 are by G. Neuhuber. All other photographs are by V. Gapon except where stated.

Gymnocalycium achirasense var. *orientale* (Neuhuber) Gapon is considered in this revision as a separate species. *G. orientale* Neuhuber & Gapon differs from *G. achirasense* H.Till & Schatzl ex H. Till by the dark green colour of the stem, lower (5–7) number of spines, which are shorter, thicker, dark brown to black, later grey.

Two new combinations for the *Gymnocalycium* complex *achirasense-orientale* are proposed:

Gymnocalycium orientale Neuhuber & Gapon subspec. *kainradliae* (Neuhuber) Neuhuber & Gapon;

Gymnocalycium achirasense H. Till & Schatzl ex H. Till subspec. *chacrasense* (Neuhuber) Gapon & Neuhuber.

A new variety of *G. orientale* is described from the eastern slopes of the Sierra de Comechingones in the Argentinean Province of Córdoba. The authors found these plants in December of 2007 moving along the road Lutti–Merlo at an altitude of 1400–1600m above sea level.

G. orientale var. *vikulovii* Gapon & Neuhuber differs from the typical variety by a larger

Fig.1 Terrain in locality VG-1168 on the way Lutti–Merlo, Córdoba, 1636m above sea level.

Fig.2. *Gymnocalycium* spec. VG-475, 1552m.

Fig.3. *Gymnocalycium* spec. VG-475, 1552m.

Fig.4. *Gymnocalycium* spec. VG-476, 1345m.

Fig.5. *Gymnocalycium* spec. GN-1594 in culture.

Fig.6. *G. achirasense* subspec. *kainradliae* VG-019, Presa Rio Grande, San Luis, 950m.

Fig.7. G. *achirasense* subspec. *kainradliae* VG-019, Presa Rio Grande, San Luis, 950m.

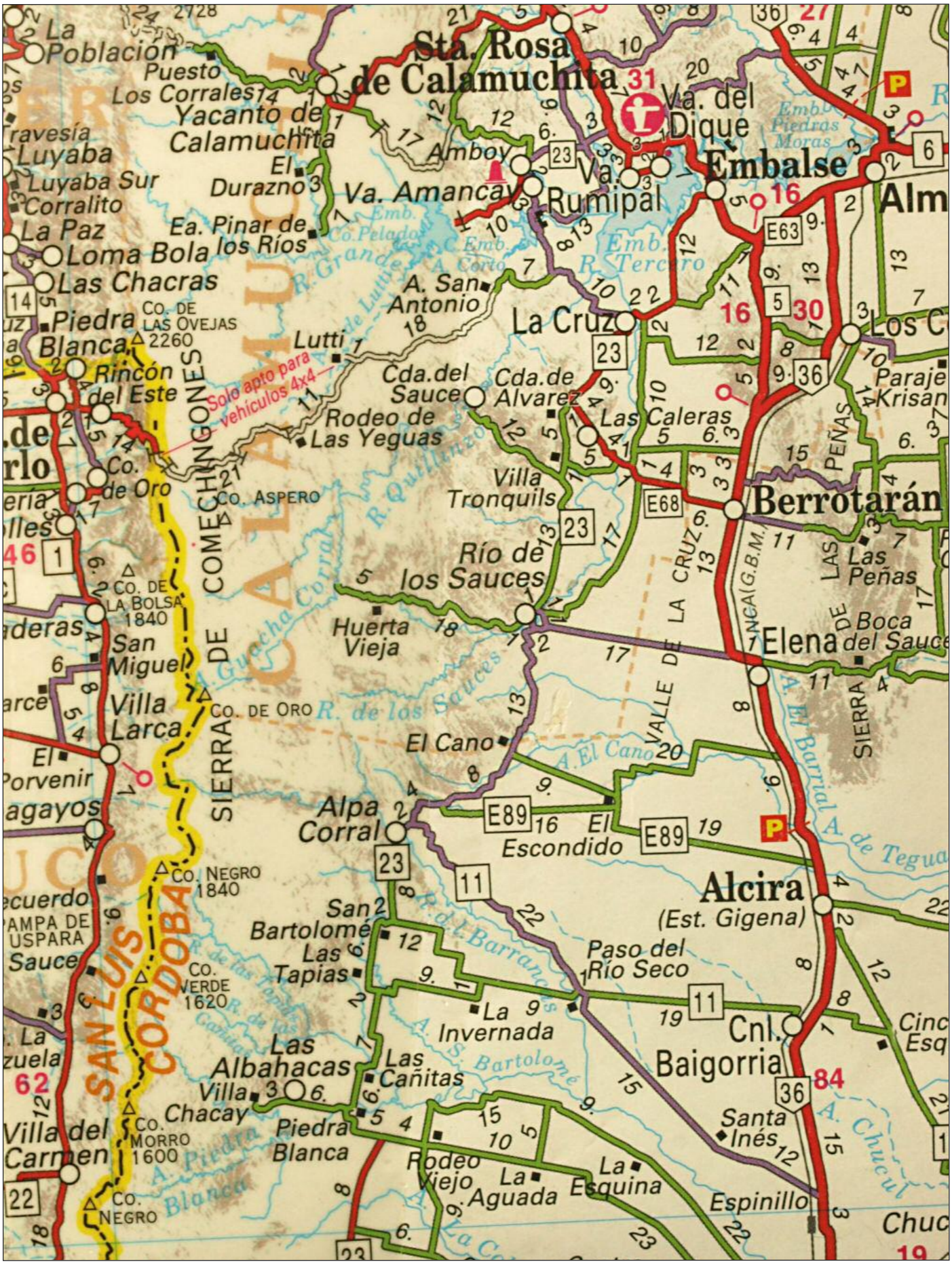

Fig.8. Eastern slopes of Sa. de Comechingones, a part of an Automobile Club Argentina map.

Fig.9. Terrain in locality VG-1257 near San Antonio Padua, Córdoba, 752m.

Fig.10. *G. achirasense* var. *orientale* VG-285, Rio de los Sauces, Córdoba, 718m.

Fig.11. *G. achirasense* var. *orientale* VG-1250, Cañada del Sauce, Córdoba, 912m.

Fig.12. Seedling of *G. achirasense* var. *orientale* GN-164.

Fig.13. *G. achirasense* var. *orientale* VG-1251 in culture.

Fig 14. *G. achirasense* var. *orientale* VG-1251, Cañada del Sauce, Córdoba, 997m.

Figs.15 & 16. Russian expedition-2012 with *G. achirasense* var. *orientale* VG-1256, Huerta Vieja, Córdoba, 1145m.

Fig.17. *Gymnocalycium* spec. VG-477, Lutti, Córdoba, 1251m.

Fig.18. *G. achirasense* subspec. *kainradliae* GN-1608 in culture.

glossy stem, more numerous central (1–4) and radial spines (9), lighter (from light grey to light brown and ivory) colour of stronger spines. It grows at higher altitudes, 1200–1700m versus 600–900m for the typical variety.

Plants of the species *Gymnocalycium achirasense* H. Till & Schatzl ex H. Till are quite large, more than 10cm in diameter, with huge, up to 10cm diameter pale pink flowers, the largest flowers in the genus *Gymnocalycium*! Moreover, they are "long-lasting" — every flower will bloom for a week. Plants grow in well-studied areas in the Argentinean provinces of Córdoba and San Luis. Thanks to their merits, these cacti are popular with collectors, the experts also do not disregard them (see publications Till & Schatzl, 1979; Neuhuber & Till, 1993; Charles, 2009; and Gapon, 2010).

But in 2007, along the road from the village of Lutti to Merlo, a new interesting form of this complex was discovered [see Figs.1–5]. (We have already told you about this little-known country road right through the mountain range of the Sierra de Comechingones, see Gapon & Neuhuber, 2012). At first glance, the new finding is reminiscent of *G. achirasense* subspec. *kainradliae* var. *kainradliae* (Neuhuber) Gapon, growing at 110km to the west, in the Sierra de San Luis. But newly discovered plants ("Lutti form") are larger, often columnar and the colour of the spines is predominantly light [compare with Figs.6 & 7].

For a detailed analysis of the "Lutti form" we visited this area for several years running, in 2007–2008 (field numbers VG-474, VG-475, VG-476, VG-477, VG-478, VG-714, VG-715, VG-716), 2009 (GN-1535, GN-1536, GN-1538, GN-1654), 2010 (VG-965); 2011 (VG-1167, VG-

Figs.19 & 20. *G. achirasense* subspec. *kainradliae* var. *chacrasense* VG-1310, El Divisadero, San Luis, 1307m.

Fig.21. *G. orientale* GN-164, El Chacay, Córdoba, 700m: plant in culture.

Fig.22. *G. orientale* GN-164, El Chacay, Córdoba, 700m: flower section.

1168, GN-1595, GN-1596). Nevertheless, a consistent view of the relationship of this form with other taxa of *G. achirasense* by no means took shape. Plants were found everywhere along the road Lutti–Merlo at altitudes 1200–1700m above sea level, but the issue of their expansion to the north and the south remained unsolved. At last in 2012 (VG-285, VG-1250, VG-1251, VG-1252, VG-1253, VG-1254, VG-1255, VG-1256, VG-1257, VG-1264, GN 1651, GN 1652 a-d, GN 1653, GN 1654), 2013 (VG-1316, VG-1317, VG-1319) and 2014 (GN 1674) we succeeded in exploring the mountainous terrain to the south (region Cañada del Sauce – Rio de los Sauces, see map in Fig.8) and to the north of Lutti.

As a result we have got an interesting picture. The plants of *G. achirasense* var. *orientale* (Neuhuber) Gapon growing in the foothills of the Sierra de Comechingones according to the description (Neuhuber, 1993) usually have 5–7 brown to black radial spines and up to 1 central (Figs.9–13). "It is interesting that in El Chacay not only the young but the large and adult plants are mostly without a central spine" (Neuhuber & Till, 1993). But as we move into the mountains, with an increase of altitude, the number of spines also increases and their colour changes from predominantly black to light brown up to light yellow (Figs.14–17). Variability vector can be marked from Villa Tronquils to the north-western direction towards Lutti. In the area of Lutti – El Vallecito it is impossible to find specimens with spination typical for *G. achirasense* var. *orientale*, but plants of this undescribed gymnocalycium form abound.

The results of field research and the study of cultivated plants clearly indicate the closeness of the new variety with *G. achirasense* var. *orientale*. However, some morphological

Figs.23 & 24. *G. orientale* GN-251, Sta Ana, Córdoba, 600m, in culture and seed photo by the late F. Fuschillo (UK)

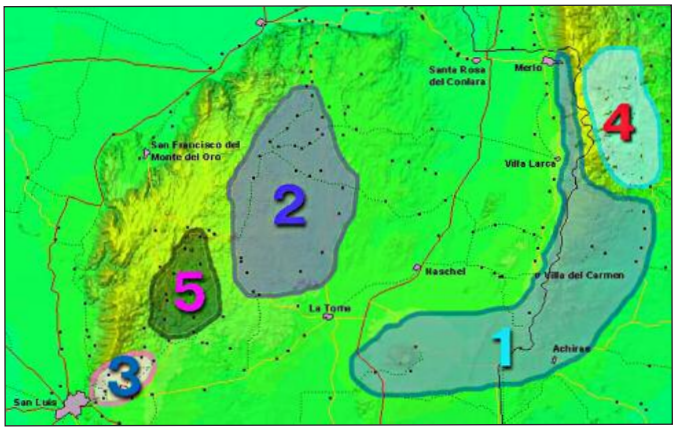

Fig.25. Approximate distribution areas of the taxa of the «*achirasense–orientale*» complex. Map is prepared with the help of M. Wick (Germany). 1 – *G. achirasense* subspec. *achirasense*; 2 – *G. achirasense* subspec. *chacrasense*; 3 – *G. achirasense* subspec. *echinatum*; 4 – *G. orientale*; 5 – *G. orientale* subspec. *kainradliae*.

Fig.26. Mature specimen of *G. orientale* var. *vikulovii* VG-1253, Cañada del Sauce, Córdoba, 950m.

Taxon	*G. achirasense var. achirasense*	*G. achirasense var. orientale*	*G. achirasense* var. *orientale* "Lutti form"	*G. achirasense subsp. kainradliae var. chacrasense*	*G. achirasense subsp. kainradliae var. kainradliae*
Stem	grassy- green	dark green	dark green	grassy- to dark green	olive- to dark green
Number of radials	10(–12)	(3–)5–7(-9)	(7–)9	10	(7–)9
Radials	thin, flexible	hard, rigid	hard, rigid	thin, flexible	hard, rigid
Colour of radials	ivory to straw with dark base	dark brown to black	ivory to light brown	straw to light brown	from ivory to mostly black
Number of centrals	1	(0–)1	up to 4	1(–3)	up to 4
Shape of centrals	awl-shaped, sometimes curved	awl-shaped,	awl-shaped	awl-shaped, a little bit curved	awl-shaped
Colour of centrals	dark brown to black	the same as radials	the same as radials	brown to black	the same as radials
Colour of flowers	white to pale pink	pale- to saturated pink	pale- to saturated pink	white to pale pink	white to pale pink
Altitude asl	800–1200m	600–1200m	900-1700m	900–1300m	1250–1400m

Table 1. Comparison of the morphological characters of the taxa discussed in this article.

Fig.27. *G. orientale* var. *vikulovii* VG-476.

Fig.29. *G. orientale* var. *vikulovii* VG-1255, Rodeo de los Caballos, Córdoba, 1472m.

features indicate their obvious similarity with *G. achirasense* subspec. *kainradliae* var. *kainradliae* (Figs.6, 7, & 18), see Table 1.

As we can see, var. *orientale* (in a new quality) and subspec. *kainradliae* differ from other intraspecific taxa of *G. achirasense* by a more rigid dark-coloured spines, larger number of central spines (up to 4), similar colour of radial and central spines, and a matt, dark green body. These features give them some similarity to the species of *G. horridispinum* Frank ex H. Till. In addition, the analysis of the table shows some merit in merging subspec. *kainradliae* and subspec. *chacrasense* taxa into a subspecies (compare Figs.6–7, 19–20).

New insights and discoveries of *G. achirasense* and its subspecies on the Sa. de Comechingones / Sa. Grande in Córdoba

Fig.28. Spination of *G. orientale* var. *vikulovii* VG-475.

require a new perspective. It is therefore necessary to re-evaluate *G. achirasense* var. *orientale*. Just from the description in *Gymnocalycium* **6**(3) (1993), it was difficult to decide the correct relationship of a plant that grows so close to, almost together with *G. achirasense*. From 26 years experience and involvement with this, it is proposed as a separate species.

Gymnocalycium orientale (Neuhuber) Neuhuber & Gapon **comb. et stat. nov.**

Basionym: *Gymnocalycium monvillei* (Lemaire) Br. & Rose var. *orientale* Neuhuber, *Gymnocalycium* **6**(3): 103 (1993).

Typus: Argentina, Provincia Córdoba, prope Alpa Coral, 850 m s.m., leg. *G. Neuhuber* GN91-341/1157, 4.12.1991 (Holotypus WU).

Diagnosis: differs from *G. achirasense* H.Till & Schatzl ex H. Till by the dark green colour of the stem, lower (5–7) number of spines, which are shorter, thicker (thickness up to 2.5mm), dark brown to black, later grey.

Body solitary, rarely offsetting, globular, in age also cereoid to 130mm diam., greatly

developed fibrous roots. **Epidermis** dark green, matt to slightly silky sheen. **Ribs** straight decurrent, deeply incised, usually up to 14(–19), Cuneate tubercles, prominent, strongly delineated by transverse notches. **Areoles** slightly white woolly, elongated and slightly depressed. **Spines** (3–)5–7(–9), rarely a central spine, round to flattened, black, spine tip dark brown, soon becoming grey, almost interlacing, subulate, stiff, the central spine standing straight up and round. **Flowers** from areoles near the apex, shortly funnelform, 65–75mm long and 65– 75mm in diameter. **Tepals** lanceolate, white with light pink tips or bright pink to pink with mostly darker central stripe, **Pericarpel** short, dull green, scales light green, dark at the top and pink margins. **Receptacle** white, **Filaments** white, **Anthers** white, the lowest grouped in a ring around the base of the stigma, the next group adjacent to the wall, **Style** white, 19–23mm high, 3.5mm diam; **Stigma** pale yellow with 9 stigma lobes, 9-13 mm long detached, the upper edge of the stigma is level with the upper edge of the uppermost anther ring; **Ovary** white-walled, 6–11mm long, 5–7 mm diam.; **Fruit** round, orange when ripe, vertically dehiscent; **Seed** black, narrow, tapering to the hilum-micropylar region, hilum-micropylar region straight, narrow, compressed, forming an '8', (subgenus Scabrosemineum) [Figs.21–24].

Distribution: Argentina, Province Cordoba, on the east side of the Sierra Comechingones, between Villa El Chacay / Las Albahacas and Río de los Sauces, at altitudes up to 900m

Discussion: Differs from *G. achirasense* H.Till & Schatzl ex H. Till through the dark green body, shorter, black, strong and also less spines, which later turn grey and the black seeds, those of *G. achirasense* are red-brown.

Etymology: The name orientale derives from the eastern side of the Sierra Grande

All the aforesaid gives us grounds to reconsider relationships of the *G. achirasense* complex and offer the following combinations:

Gymnocalycium orientale (Neuhuber) Neuhuber et Gapon subspec. ***kainradliae*** Neuhuber & Gapon **comb. nov.**

Figs.30 & 31. *G. orientale* var. *vikulovii* VG-1255 flowering in culture.

Fig.32. Seeds of *G. orientale* var. *vikulovii* VG-476. Photograph by V. Schaedlich (Germany).

Fig.33. *G. orientale* VG-1257 (left) and *G. orientale* var. *vikulovii* VG-476 (right) of the same age.

Fig.35. *G. carolinense* subspec. *fedjukinii* VG-1255.

Basionym: *Gymnocalycium monvillei* subsp. *achirasense* var. *kainradliae* Neuhuber, *Gymnocalycium* **6**(4): 107 (1993). Type: *G. Neuhuber & A. Kainradl* 88-29/47, 28.4.1988, Argentina, Prov. San Luis, Sierra de San Luis, prope Cln. Pringles, 1300m (WU).

Gymnocalycium achirasense H. Till & Schatzl ex H. Till subspec. ***chacrasense*** (Neuhuber) Gapon & Neuhuber **comb. et stat. nov**.

Basionym: *Gymnocalycium monvillei* subsp. *achirasense* var. *chacrasense* Neuhuber, *Gymnocalycium* **6**(3): 105 (1993). Type: *G. Neuhuber* 90-269/859, 8.12.1990, Argentina, Prov. San Luis, Las Vertientes, 1050m (WU).

Approximate areas of the above mentioned taxa are shown on the map [Fig.25].

The plants common in the northern part of the *G. orientale* area differ from the typical variety (see table) and deserve a separate description.

Fig.34.Vladimir Vikulov at the top of Sa. de Comechingones, Co. los Linderos – 2809m, the highest point of Province de Córdoba.

Fig.36. *G. orientale* var. *vikulovii* together with *G. monvillei* var. *confusa* at the place GN-1654, north of Río de los Sauces, Córdoba, 1411 m.

Gymnocalycium orientale (Neuhuber) Neuhuber & Gapon var. ***vikulovii*** Gapon & Neuhuber **var. nov.**

Diagnosis: differs from typical variety *G. orientale* var. *orientale* by a larger glossy stem, more numerous central (1–4) and radial spines (9), lighter (from light grey to light brown and ivory) colour of stronger spines. It grows at higher altitudes, 1200–1700m versus 600–900m for the typical variety [see Figs.26–33].

Typus: Argentina, Provincia de Córdoba, Sierra de Comechingones, itinere Lutti-Merlo, 1345m s. m., leg. *V. Gapon* VG07-476, 3 December 2007, **Holotypus:** CORD (planta in liquore alcoholico); **Isotypus:** WU (Inventar Nr. 3809, planta in liquore alcoholico (VG07-476); **Paratypus:** WU (Inventar Nr. 3196, planta in liquore alcoholico (VG10-716).

Fig.37. *G. monvillei* var. *confusa* VG-1255.

Fig.38. Flower sections of *G. orientale* var. *vikulovii* VG-1255 (left) and *G. monvillei* var. *confusa* VG-1255.

Fig.39. *Gymnocalycium sutterianum* VG-1252, Cañada del Sauce, Córdoba, 1018m.

Fig.40. *G. stellatum* VG-1253, Cañada del Sauce, Córdoba, 950m.

Distribution: Argentina, Prov. Cordoba, the eastern slopes of the Sierra de Comechingones, Lutti–Merlo road, 1200–1700m above sea level.

Etymology: New variety is named in honour of Vladimir Vikulov (Moscow) – the member of the 2007 expedition, the well-known Russian collector of cacti, who visited with expeditions to Argentina, Uruguay and Chile [Fig.34].

Comparative discussion. The typical variety of *G. orientale* tends to grow at lower altitudes (600–900m above sea level). The new variety significantly expands the range of the species to the north-west, reaching the altitude of 1700m above sea level. At altitudes of 900–1200m you can find plants of both varieties in

Fig.41. *Lobivia aurea* VG-1253.

different proportions. There is no gap in the distribution of varieties and the presence of transitional forms dictates the choice of the rank for the described gymnocalyciums – variety, but not subspecies or species.

At altitudes of 1450–1650m the new variety grows together with *G. carolinense* subspec. *fedjukinii* Gapon & Neuhuber [Fig.35], in places VG-1255 (1472m), VG-475 (1552m), VG-1168 (1636m), GN-1654 (1411m) — together with *G. monvillei* var. *confusa* Neuhuber [Figs.36–38] too.

At lower altitudes *G. orientale* grows sympatrically with *G. sutterianum* (up to 1250m above sea level, Fig.39), *G. stellatum* (up to 1000m, Fig.40), *Notocactus submammulosus* (up to 1250m) and *Lobivia aurea* (up to 1200m, Fig.41).

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As a result we have the following conspectus of the «*monvillei–horridispinum–achirasense–orientale*» complex.

Gymnocalycium monvillei (Lemaire) Britton & Rose (1922).
- subspec. *monvillei.*
  - var. *monvillei.*
  - var. *grandiflorum* (Backeberg) H. Till (1990).
  - var. *steineri* H. Till (1990) emend. Gapon (2009).
  - var. *coloratum* Neuhuber (1999).
  - var. *safronovii* Gapon (2009).
- subspec. *gertrudae* (Neuhuber) Neuhuber, (1999).
  - var. *gertrudae*.
  - var. *confusa* Neuhuber (1999).

Gymnocalycium horridispinum G. Frank ex H. Till (1987).

Gymnocalycium achirasense H. Till & Schatzl ex H. Till (1987).
- subspec. *achirasense*.
  - var. *achirasense*.
  - var. *villamercedense* (H. Till & Neuhuber) Gapon (2010).
- subspec. *chacrasense* (Neuhuber) Gapon & Neuhuber, 2016).
- subspec. *echinatum* (Neuhuber) Gapon (2010).

Gymnocalycium orientale (Neuhuber) Neuhuber & Gapon (2016).
- subspec. *orientale*.
  - var. *orientale*.
  - var. *vikulovii* Gapon & Neuhuber (2016).
- subspec. *kainradliae* (Neuhuber) Neuhuber & Gapon (2016).

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Gert Neuhuber,
neuhuber@gymnocalycium.info

Literature

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NEUHUBER, G. & TILL, H. (1993), Das *Gymnocalycium monvillei* Aggregat, 2 Teil. *Gymnocalycium* **6**(4): 107–111.

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TILL, H. & SCHATZL, S. (1979), *Gymnocalycium achirasense* H. Till & Schatzl. *KuaS* **30**(2): 25–28.

Some Ferocactus fruits

Gottfried Unger provides pictures of some *Ferocactus* fruits and suggests a different view of their relationships.

Photographs by the author.

Fig.1. *Ferocactus reppenhagenii* with fruits

Fig.2. *Ferocactus alamosanus* with fruits

Fig.3. Dehiscence of *F. reppenhagenii* (left) and *F. alamosanus* (right).

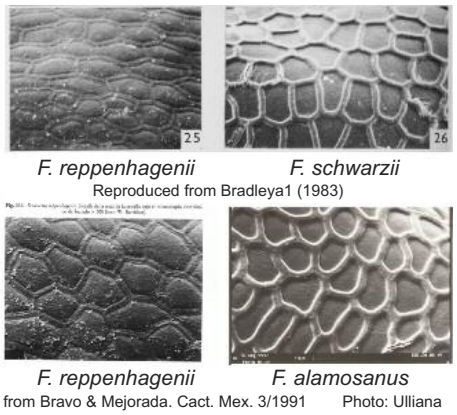

Fig.5. The surface of the seeds

Gottfried Unger has made some photos of fruits in the genus *Ferocactus*. He suggests that they illustrate, contrary to the statement of N.P. Taylor in *Cact. Cons. Init.* **6**:15 (1998), that *Ferocactus alamosanus* (B. & R.) B. & R. and *F. schwarzii* G. Lindsay are indeedthe most closely allied species.

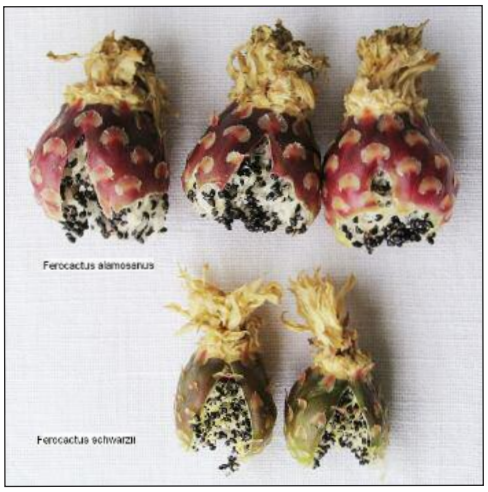

Fig.4. Dehiscence of *F. alamosanus* (above) and *F. schwarzii* (below).

The fruits of *Ferocactus alamosanus* and *F. schwarzii* are both almost globular, green to dull red, splitting when ripe, their withered perianth-remains short, open and flattened. In addition both species have the same cellular testa-sculpturing of the seed.

Whilst the fruit of *Ferocactus reppenhagenii* is elongated, bright red, not splitting when ripe, its withered perianth-remains are long, closed and stiff upright. The cellular testa-sculpturing here is different with a somewhat similarity to *Ferocactus glaucescens*. So this suggests that the nearest ally of this species seems to be *Ferocactus glaucescens*.

I have published these interesting pictures to let you consider the proposal. Of course, the plant bodies also need to be considered in deciding relationships. GC

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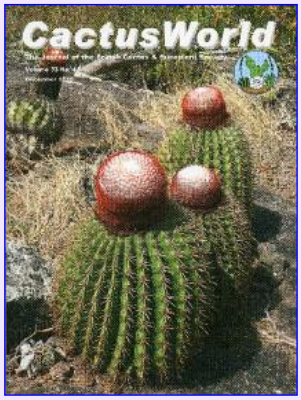

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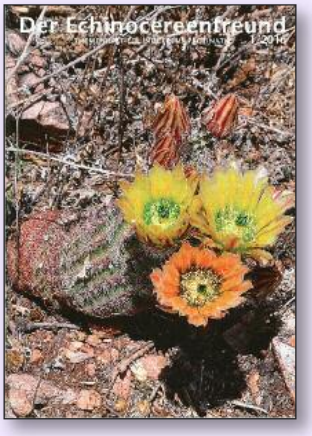

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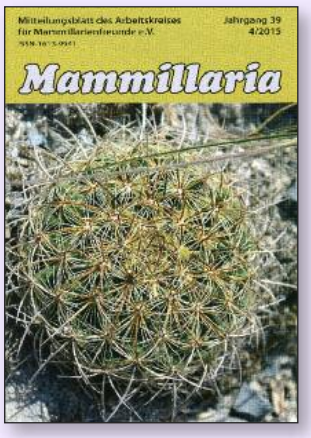

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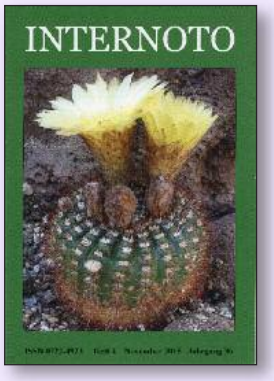

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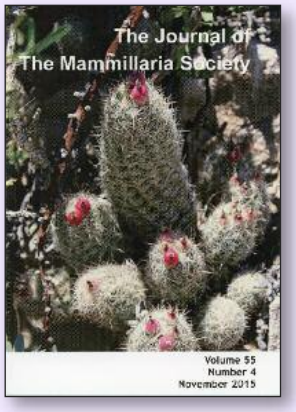

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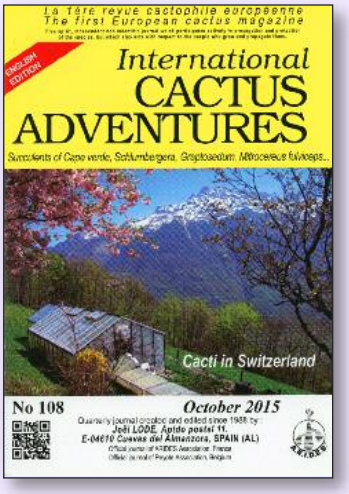

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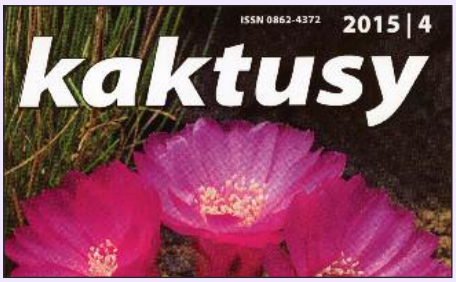

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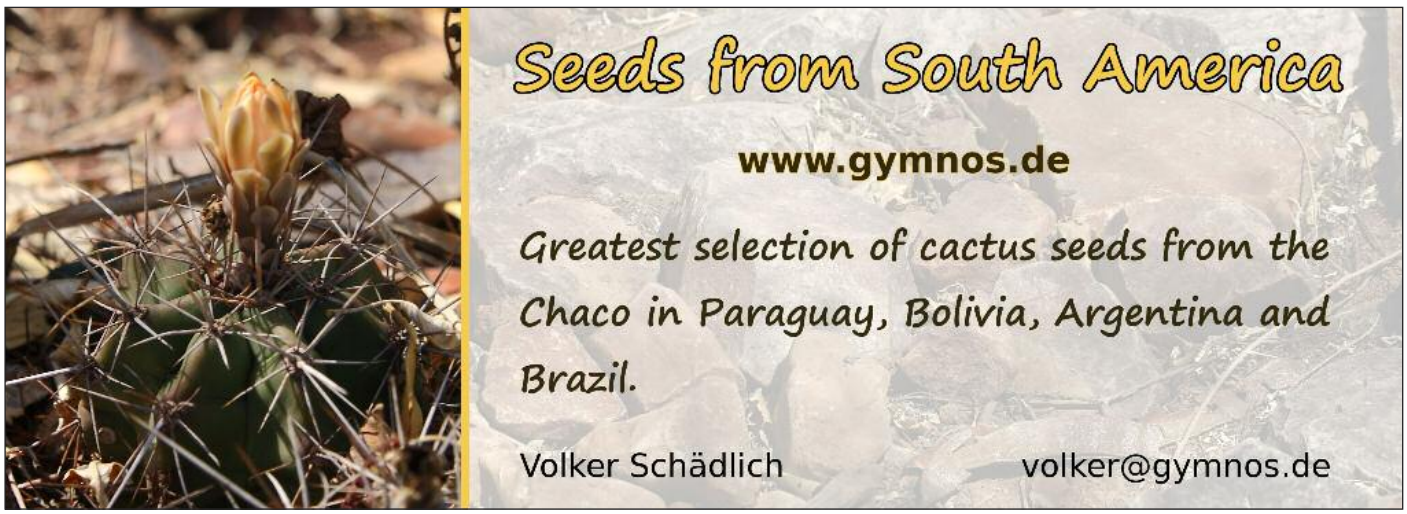

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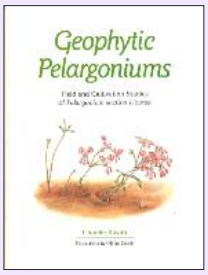

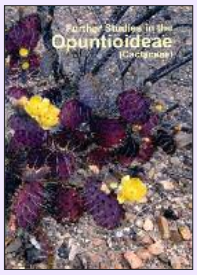

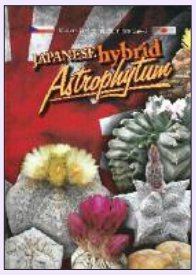

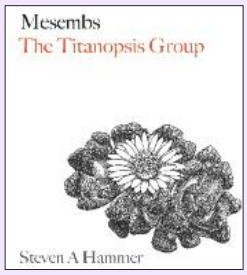

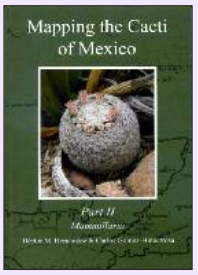

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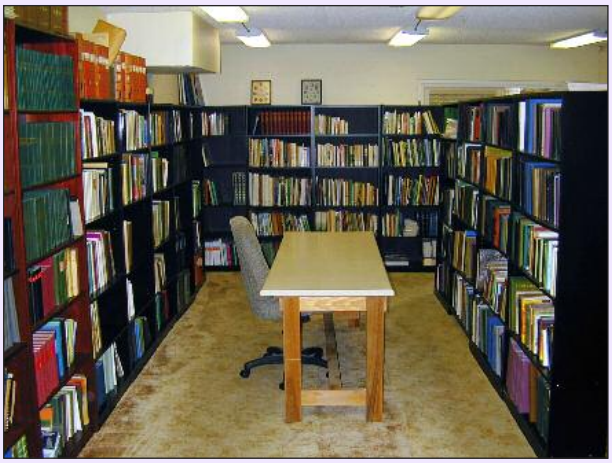

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