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Content

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Cover picture: *Gymnocalycium marekiorum* VoS 47 in Culture (photo: V. Schädlich).

Editorial

Dear Gymnocalycium Friends

36. International *Gymnocalycium*-Meeting - 3rd to 5th September, 2021, in Radebeul (Germany) Topic: „Gymnocalycia from the subgenus *Muscosemineum* in eastern Bolivia"

Holger Lunau

Radebeul called and the cacti lovers came. As always, the 36th International Gymnocalycium conference in Dresden's pretty suburb proved to be a magnet for people loving and interested in Gymnocalycium. And yet, it had been unclear for a long time whether the long-established event would take place at all in the face of the Covid-19 Pandemic in Europe, as in 2020 the meeting was cancelled due to travelling restrictions caused by the pandemic. Thus, the joy at meeting again after two years was even greater for all the participants and it was celebrated with a boozy reunion in a beer garden. The surprising number of around 40 guests from Germany, Italy, Poland, Austria, the Czech Republic and Switzerland came to listen to presentations, exchange information and stay in touch.

However, mourning resonated throughout the meeting as Ludwig Bercht (Netherlands), who died of Covid-19 this year, was sadly missed. The internationally esteemed cactus specialist and long-term presenter of the Gymnocalycium meeting was commemorated with a minute's silence at the beginning of the meeting on Friday night. Rainer Sperling (Salzkotten, Germany) proved to be a worthy successor to Ludwig Bercht. He was leading through the programme factually, with competence and a good dose of humour, summarizing results, giving new impulse for thought and thus gave the meeting his individual mark.


With regard to contents, the conference opened with an entertaining, but at the same time also thought-provoking report by Holger Lunau (Berlin, Germany) “Brazil – from Pantanal to Rio Grande do Sul”. He portrayed experiences during his journey together with Volker Schädlich (Spremberg, Germany) in 2019. It took them from Campo Grande (Mato Grosso do Sul) via Corumba and Porto Murtinho, São Francisco de Assis further and further south, as far as Uruguaiana (Rio Grande do Sul), with detours to Argentina and Uruguay. Photographs, especially of many Fraileas, Gymnocalyiciums and Notocacti were shown, but also of fires stretching over more than 100 kilometres in Pantanal as well as of cacti having disappeared due to climate change, agriculture, forestry and urbanisation. The obligatory glass of beer afterwards provided an opportunity for everybody to tell their own stories.

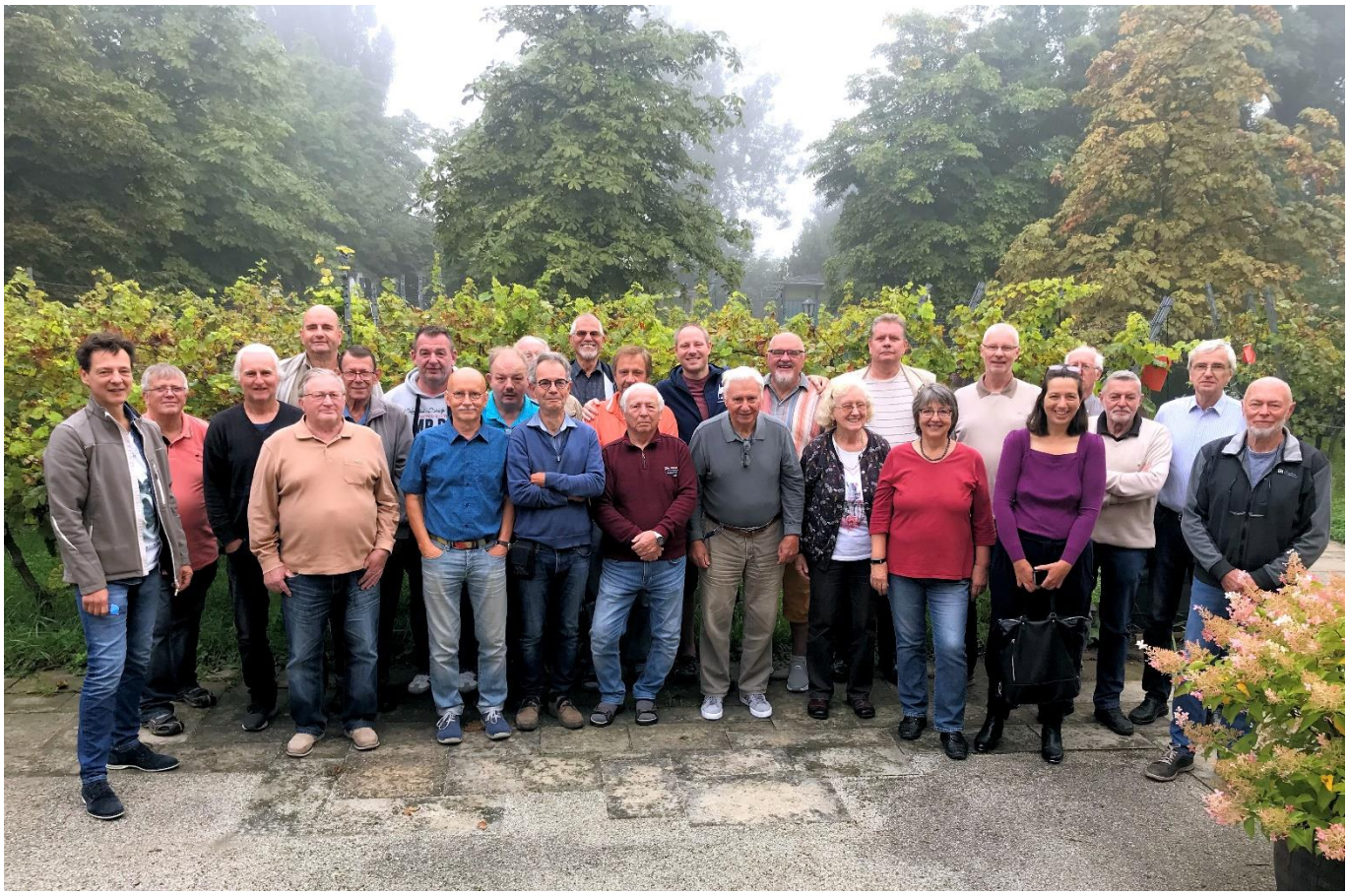
As an overture and an introduction to the meeting’s topic, Volker Schädlich offered a tasty morsel in the form of pictures of cacti localities in eastern Bolivia on Saturday morning. Amongst others he presented habitats of *Frailea*, *Gymnocalycium* and *Discocactus*. Then it was Wolfgang Papsch’s (Kalsdorf, Austria) turn to give an account of eastern Bolivian Gymnocalycium species from the subgenus *Muscosemineum*. In his usual, meticulous way he listed taxa, backing up his statements with extensively investigated literature, confirming Volker Schädlich’s approach that *Gymnocalycium anisitsii* and *Gymnocalycium damsii a*re a double description and thus the former species has priority.


In his main contribution Volker Schädlich dealt with nomenclature connected with *Gymnocalycium anisitsii* and *Gymnocalycium “damsii”*. He presented a rearrangement with regard to nomenclature of the Gymnocalycia from the subgenus *Muscosemineum* which grow west of

Santa Cruz. This reshaping is the result of meticulous work in greenhouses over years, extensive literature studies and a constant exchange of thoughts with other Gymno specialists. The results can be found in detail in this issue of Schütziana. Certainly, many cacti lovers must get used to the “loss” of the name *Gymnocalycium damsii* and the new nomenclature, but it was absolutely necessary to end the jumble of invalid descriptions and randomly chosen relationships.

Further speakers led the audience through the range of Latin American cacti until the evening. Hubert Pfadenhauer (Ebensfeld, Germany) presented “Impressions from a journey in Argentina 2019”, Uwe Lindner (Erlau, Germany) gave an inspiring talk on “Gymnocalycia at their locality and in greenhouses” and Thomas Strub (Binningen, Switzerland) took his listeners “On the way along Cerro Uritorco” in the Argentinian province Córdoba. After dinner the day was perfected by Wolfgang Papsch’s experiences in Argentina, excellently implemented with photographs and accompanied by music.

On Sunday morning it was Tomáš Kulhánek’s (Moravsky Krumlov, Czech Republic) turn to mark the end of the meeting with his travelogue “Argentina 2020”. After the summery of the meeting’s results, given by Reiner Sperling, the participants agreed that it had once more been a successful get-together with a lot of new information. Therefore, most guests will surely return to Radebeul for the next “edition” of the Gymno conference from September 2nd to 4th, 2022.



CORRECTION

When recombining *Gymnocalycium anisitsii* subsp. *tucavocense* in Schütziana 12 (2): 25 (2021) an incorrect literature reference was erroneously cited for the basionym. The correction is made here:

Gymnocalycium anisitsii (K. Schum.) Britton & Rose subsp. ***tucavocense*** (H. Till & Amerh.) Schädlich comb. et stat. nov.

Basionym: *Gymnocalycium anisitsii* (K. Schum.) Britton & Rose subsp. *holdii* Amerh. var. *tucavocense* Backeb. ex H. Till & Amerh., Gymnocalycium 17(1): 559, Abb. 27, 30-32 (2004).

Synonym: *G. damsii* var. *tucavocense* Backeb., nom. illeg.
G. damsii subsp. *evae* Halda, Horácek & Milt, nom. illeg.

We would like to express our warmest thanks to Mrs Iris Blanz (Austria) who supports us with the translation into English, to Mrs Larisa Zaitseva (Russia) for the translation into Russian, to Mr Victor Gapon (Russia) for the content corrections of the Russian edition, to Mr Takashi Shimada (Japan) for the translation into Japanese, to Mr Jiahui Lin (China) for the translation into Chinese, to Mr Václav Johanna (Czech Republic) for the translation into Czech and to Mr Daniel Schweich (France), who has mirrored our publications under http://www.cactuspro.com/biblio/.

A Well-known Taxon from Bolivia's Lowlands Reconsidered

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ABSTRACT

The first plants of this taxonomic unit from eastern Bolivia were discovered by Father Hammerschmid at the beginning of the 1960s. PhD Martin Cárdenas encouraged him to continue looking for cacti in the provinces José Miguel de Velasco and Chiquitos in the northeastern part of Departemento Santa Cruz. As Father Hammerschmid's mission area was located within this territory he used his contacts with the local population to obtain information as to cacti localities. He dispatched plants found by himself to the German company Uhlig. In 1963 these plants were described as varieties of *G. damsii* by Curt Backeberg. As locality of var. *rotundulum* he refers to Roboré, for var. *centrispinum* he only mentions Bolivia, for var. *tucavocense* he specifies near Tucavoca and for var. *torulosum* San José. At the time of *Echinocactus Damsii's* first description by Karl Schumann in 1903 a valid publication of this plant already existed in the description of *Echinocactus Anisitsii* Schumann 1900. Thus, all descriptions of *G. damsii* are regarded as nomen illegitimum according to article 52.1 of ICN by the author.

KEYWORDS

Cactaceae, Gymnocalycium, anisitsii, damsii, marekiorum

INTRODUCTION

Regrettably, nowadays it is no longer possible to establish when the first plants of the genus *Gymnocalycium*, subgenus *Muscosemineum*, originating from the province Santa Cruz in Bolivia arrived in Europe. In 1918 Franz Bödecker described an *Echinocactus joossensianus* in "Monatsschrift für Kakteenkunde". He had got the seed from Berlin Botanical Gardens in 1905. The first description specifies as the locality of the species "according to morphogenetic features from Paraguay or northern Argentina." This phrasing of the locality does not leave any doubt that the initial origin of the stock plant was unknown. Consequently, it is no use sticking to old names whose correlation to plants was no longer unambiguously possible, even shortly after the first description.

It was Father Hammerschmid, a missionary working in San Ignacio de Velasco, who sent many new findings from eastern Bolivia to Europe in the 1950s. Owing to his publications in "Kakteen und andere Sukkulenten" (KuaS) these plants became known in Europe (Hammerschmid 1962). Backeberg described these plants with the help of material he had seen at the Uhlig Rommelshausen company (Frank 1966). He established four varieties and assigned them all to *G. damsii* (Backeberg 1963). Today we know for sure that the plants for the first description of *E. Anisitsii* and *E. Damsii* were collected on Rio Tagatiya-mi in Paraguay on January 25th, 1898, by Prof Anisits. This fact is sufficiently documented in several publications and in Anisits's list of field data (Nemes 1999). All the plants for both descriptions originate from a collection at the same place. In 2012 the author could rediscover the plants in the close vicinity of the mentioned type

locality. He found plants which completely correspond with the plants described by Schumann as *E. Anisitsii* and *E. Damsii*.

Due to the fact that at the time of its first description a valid publication of *E. Damsii* already existed in form of the description of *E. Anisitsii* by Schumann in 1900, it became necessary to reconsider all plants assigned to this species. The name *G. anisitsii* (K. Schum.) Britton & Rose has priority. Even though it may often be difficult for us to accept new developments, taxonomy and nomenclature should always be kept up-to date with regard to the topical state of knowledge. Consequently, plants which have been called *G. damsii* and cultivated in our collections under this name for many decades must be reassessed.

1. Localities southeast of Roboré

Plants from this locality were first collected by Father Hammerschmid. He sent the plants to the Uhlig Company in Germany. From there plants also reached Backeberg. In 1963 Backeberg described two plants from this area, *G. damsii* var. *centrispinum* and *G. damsii* var. *rotundulum*.

The plants which I found southeast of Roboré in 2003 were described as *G. marekiorum* by Ivan Milt (Czech Republic) in the Slovakian magazine CACTACEAE etc. in 2017. Here is the rendering of the first description in the original version:

Gymnocalycium marekiorum Ivan Milt species nova

Ivan Milt (Nasobůrky 51, 783 51 Chudobín, Česká republika, e-mail: gymno.miltii@volny.cz)

Stonek jednotlivý, 5-10 cm v průměru, 4-5 cm vysoký, ve stáří více, zploštěle kulovitý s prohloubeným temenem, temeno hned zpočátku vytrněné, jedinci někdy odnožující, stonky zelené až šedozelené, někdy s hnědofialovým nádechem, zvláště na slunci. Kořeny vlásčité.

Žebra 6-9 v počtu, přímo svisel probíhající, u temene asi 5 mm široká, u základny stonku až 2 cm široká, velmi plochá, pouze málokdy s vystouplými bradami, na jejichž vrcholech jsou areoly, mezi areolami jen nepatrné mělké zářezy. Svislé zářezy mezi žebry rovné, před základnou stonku splývající s tělem a již nepatrné.

Areoly kulaté až pouze mírně oválné, 2-3 mm v průměru, s šedou plstí. Okrajové trny paprskovitě nepravidelně rozprostřené, velmi odstávající, v počtu 5-7, z toho 1 nejdelší směřující dolů, až 1,5 cm dlouhé, jehlovité, přímé nebo velmi nepravidelně zakřivené, 0,8-1,5 cm dlouhé, 1 střední trn nepravidelně pokřivený nebo přímý. Všechny trny rohové barvy s hnědou špičkou. Všechny trny nestejného průměru.

Poupata tenká (typ květu ***Gymnocalycium anisitsii***), šupiny s bělavými okraji a nahnědlými špičkami. Květ 4-5,5 cm vysoká, při anthesi asi 3,5 cm široký, pastelově růžový. Trubka asi 2 cm dlouhá, postupně se jen mírně rozšiřující na základně asi 5 mm v průměru, pak až 6,5 mm v průměru. Trubka zevně leskle zelená, s 12-18 šupinami o rozměrech šířka 2-3 mm, výška 2-4 mm, šupiny s nazelenalou základnou, bělavým okrajem a nahnědlou skvrnou pod vrcholem šupin. Ovarium bílé, 1,5 cm (hic!, mm) vysoké, 2 mm široké. Stěny ovaria 2-3 mm silné, (smaragdově) zelené v řezu. Receptakulum úzké 2-5 mm, nahoru se mírně rozšiřující, stěny receptakula bílé. Vnější okvětní lístky: šupiny nad trubkou plynule přecházejí do okvětních lístků, které jsou nejprve zevně jasně zelené s hnědorůžovými špičkami, až 1,5 cm dlouhé, 3-5 mm široké, málo se rozšiřující k vrcholu, kopinaté. Vnitřní okvětní lístky pastelově růžové, kopinaté, 0,8-1,5 cm dlouhé a 0,2-0,4 cm široké. Čnělka velmi dlouhá, 14-17 mm vysoká, mírně krémová, 1,2 mm silná. Blizna krémová. Prašníky světlehnědé v několika sériích, naklánějící se dovnitř květu a nad bliznou, kterou přesahují. Nitky bílé, sklovité.

Plod zpočátku zelený, ve zralosti červený, 2-4 cm vysoký a 1-2,5 cm v průměru, se zaschlými zbytky okvětí a suchými šupinami. Plod praská podélně. Semena podrodu ***Muscosemineum***.

Domovina: Bolívie, Santa Cruz, Villa Esperanza. Taxon patří do příbuzenství ***Gymnocalycium anisitsii****,* od kterého se liší výrazně plochými žebry, velmi zakulaceným tělem, a pastelově růžovými květy, které mají velmi dlouhé ovarium a dlouhé a úzké receptakulum s dlouhou krémovou čnělkou. Beztrnný stonek svými plochými žebry bez ohledu na barevné tóny připomíná ve stáří ***Gymnocalycium eurypleurum*****.**

Holotyp: Materiál holotypu uložen v herbáři Krajského Vlastivědného muzea v Olomouci pod číslem B171.825. Typová kultura ve sbírce Ivan Milt, původní sběr VoS 49 (Volker Schädlich).

Etymologie: Taxon pojmenován na počest po Markovi Miltovi z Haňovic, Miroslavu Markovi z Litovle a taktéž po Markovi Greplovi, věhlasném gymnofilovi z Lutína.

The translation is as follows:

Gymnocalycium marekiorum Ivan Milt species nova

Ivan Milt (Nasobůrky 51, 783 51 Chudobín, Czeck Republic, E-Mail: gymno.miltii@volny.cz)

Body solitary, 5-10 cm in diameter, 4-5 cm in height, possibly more at older age, flat spherical with apex immersed, apex spinated from the beginning, some individuals offsetting, body green to greyish green, sometimes with brownish-violet hue, especially when exposed to the sun. Root fibrous.

Ribs 6-9, running straight vertically, 5 mm wide at the apex, very flat, only rarely with protruding chin on which areoles are positioned on the tips, beneath the areoles only slight, flat grooves. Vertical grooves between the ribs straight, at the base of the stem fusing with the body and hardly visible.

Circular areoles, sometimes just slightly oval, 2-3 mm on average, with grey hair. Spines radial at the edge and irregularly arranged, markedly sticking out, 5-7 in number, the longest one pointing downwards, up to 1.5 cm long and needle-shaped, straight or irregularly curved, 0.8-1.5 cm long, one middle spine irregularly curved or straight. All spines ivory coloured with a brown tip and variable in diameter.

Buds slim (flower type ***Gymnocalycium anisitsii***), scales with whitish edges and brownish tips. Flower 4-5.5 cm long, about 3.5 cm wide in anthesis, pastel pink. Flower tube around 2 cm long, only gradually widening at the base, about 5 mm in diameter, at the top up to 6.5 mm in diameter. Exterior of the tube shiny, green, with 12-18 scales measuring 2-3 mm in width and 2-4 mm in height, scales greenish with white edges and brownish spots beneath the tip of the scale. Ovary white, 1.5 mm long, 2 mm wide. Wall thickness of the ovary 2-3 mm, (emerald) green in section.

Receptacle narrow at 2-5 mm, somewhat widening further up, walls white.

Outer petals: Seamless transition of scales above the tube into petals, first light green outside with brownish-pink tips, up to 1.5 cm long, 3-5 mm wide, little widening towards the tip, lanceolate.

Inner petals: pastel pink, lanceolate, 0.8-1.5 cm long and 0.2-0.4 cm wide.

Style very long compared with the flower, 14-17 mm long colour slightly off-white, 1.2 mm in diameter.

Stigma off-white. Anthers light brown, arranged in several lines, bent across the stigma towards the inner part of the flower, protruding above the stigma, filaments white, hyaline.

Fruit green first, red when ripe, 2-4 cm long and 1-2.5 cm in diameter, with dry remains of the perianth and with dry scales. Fruit bursts open longitudinally. Seeds of the subgenus ***Muscosemineum***.

Origin: Bolivia, Santa Cruz, Villa Esperanza. The taxon is related to *Gymnocalycium anisitsii,* from which it differs markedly in its flat ribs, its very spherical body and pastel pink flowers. The flowers possess a very long ovary and a long, narrow receptacle with an off-white style.

At older age the unspinated body recalls, regardless of its colour, ***Gymnocalycium eurypleurum*** due to its flat ribs.

Holotype: The material of the holotype is kept in the herbarium of the district museum for local history and geography in Olmütz under the number B171.825. The type culture is in Ivan Milt's collection, original collection VoS 49 (Volker Schädlich).

Etymology: The taxon was named in honour of Marek Milt from Haňovice, Miroslav Marek from Litovel as well as Marek Grepl, a very renowned *Gymnocalycium* cultivator from Lutín.

The name has priority as the description was done according to nomenclature regulations. Regrettably, as is so often the case, a population of plants from the border region of the taxon's total distribution area was chosen. The description of *G. marekiorum* was carried out by means of culture material VoS 49, collected in 2003. As the author of the first description himself never travelled in Latin America, data referring to specific locality features are missing in the first description. The pictures attached to the description do not cover the whole variability of this population. Most pictures of the publication show the same plant. Thus, additional information is to be provided here.

In 2003 Helmut Amerhauser and I went on a journey to Bolivia. On September 28th, 2003, we drove from Roboré eastwards along Ruta 4, at that time still a dirt road. Our aim was to find a way to the south around Naranjo, which could take us close to the area of Cerro Chovoreca in Paraguay. At Naranjo railway station we continued in southern direction. After a two hours' drive, we reached the gas pipeline, which had been installed recently. The gates at the line were not locked so we decided on the spot to change our plans and drive along the pipeline, being aware of the fact that this opportunity to explore the Chaco might never come back. A 50 m wide swath had been cut through the Chaco. We first drove on it to the east (locality VoS 47 and VoS 48). Later we could also cover 100 km in western direction where we discovered further localities of *Gymnocalycium* (VoS 49 and VoS 50).

The Gymnocalycia discovered in localities VoS 47 and 48 do not differ from the plants from locality VoS 49, so they must be assigned to *G. marekiorum*.

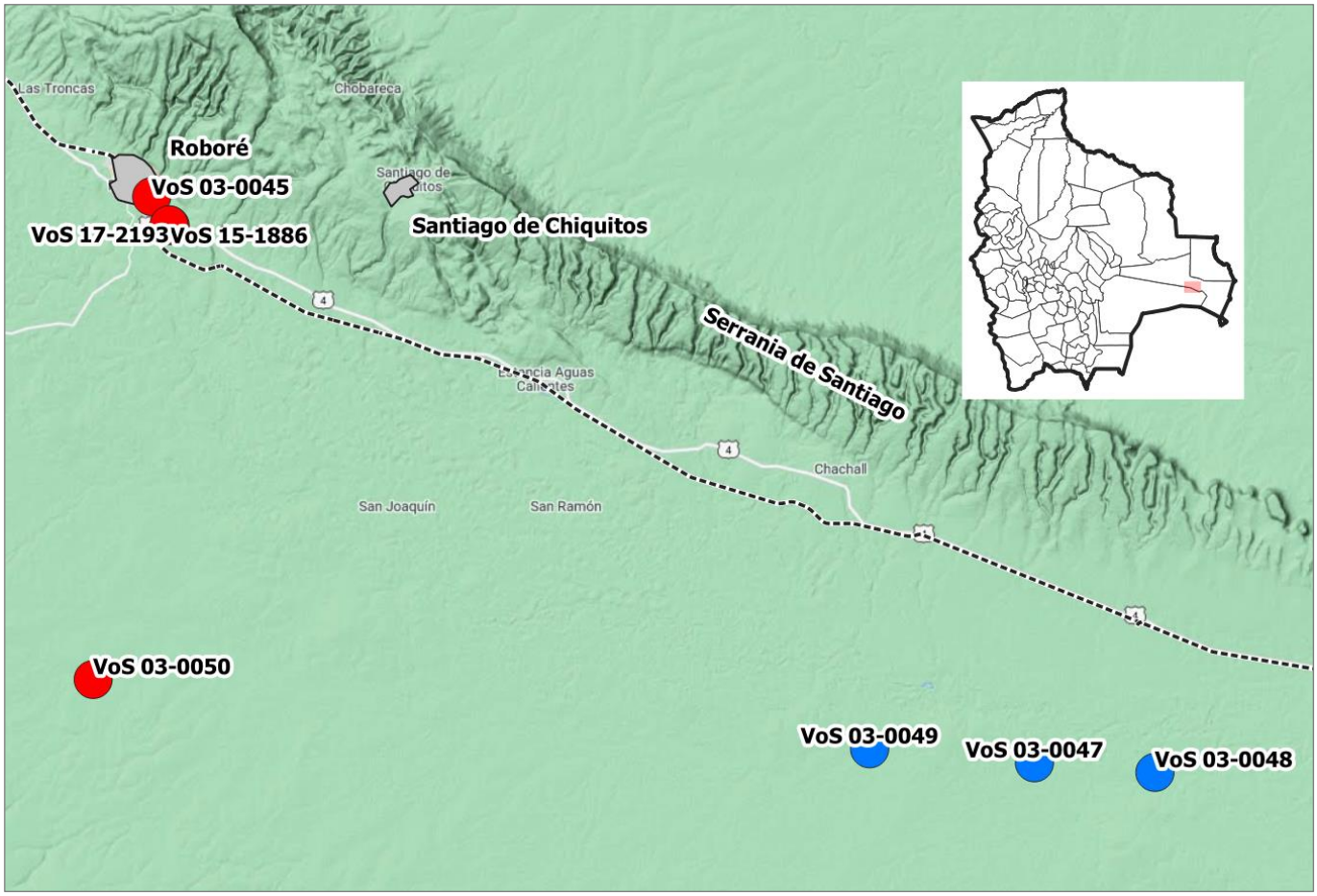

Fig. 1: Nowadays the localities VoS 47, 48, 49 and 50 can no longer be reached (map: M. Wick).

Fig. 2: *G. marekiorum* VoS 47, the plants grow in sandy soil in open places.

Fig. 3: The more or less spotted epidermis of *G. marekiorum* at locality VoS 47 can easily be recognized.

Fig. 4: The plants do not offset, so neither in locality VoS 48.

Fig. 5: Plants from the type locality (VoS 49).

Fig. 6: Within the population VoS 49 there are also plants with flat ribs.

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Fig. 7: *G. marekiorum* VoS 48.

Fig. 8: *G. marekiorum* VoS 49.

G. marekiorum's flower colour is always a vivid dusky pink. Often the style protrudes above the stamina.

Fig. 9: Flower of *G. marekiorum* VoS 47.

Fig. 10: Flower of *G. marekiorum* VoS 49.

Fig. 11: Flower section of *G. marekiorum* VoS 47.

Fig. 12: Flower section of *G. marekiorum* VoS 49.

Fig. 13: Flower section of *G. marekiorum* VoS 48.

Fig. 14: Two-year-old seedlings of *G. marekiorum* VoS 49.

Fig. 15: Two-year-old seedlings of *G. anisitsii* VoS 1200.

Fig. 16: Two-year-old seedlings of *G. marekiorum* VoS 49 in lateral view.

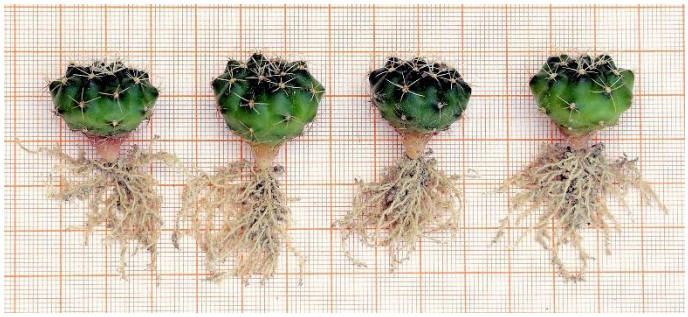

Fig. 17: Two-year- old seedlings of *G. anisitsii* VoS 1200 in lateral view.

It can be easily recognized from the seedling pictures that *G. anisitsii* and *G. marekiorum* differ distinctly even in their juvenile stages.

Fig. 18: Seeds of *G. marekiorum* locality VoS 49.

The seeds of *G. marekiorum* (length 0.88-1.20 M (30) = 1.062 mm, width 0.75-1.00 M (30) = 0.895 mm) are always larger than the seeds of *G. anisitsii* (length 0.68-0.92 M (30) = 0.834 mm, width 0.70-0.88 M (30) = 0.794 mm).

G. anisitsii seeds are in most cases curved outward slightly at the hilum-micropylar region (HMR), other than *G. marekiorum* seeds.

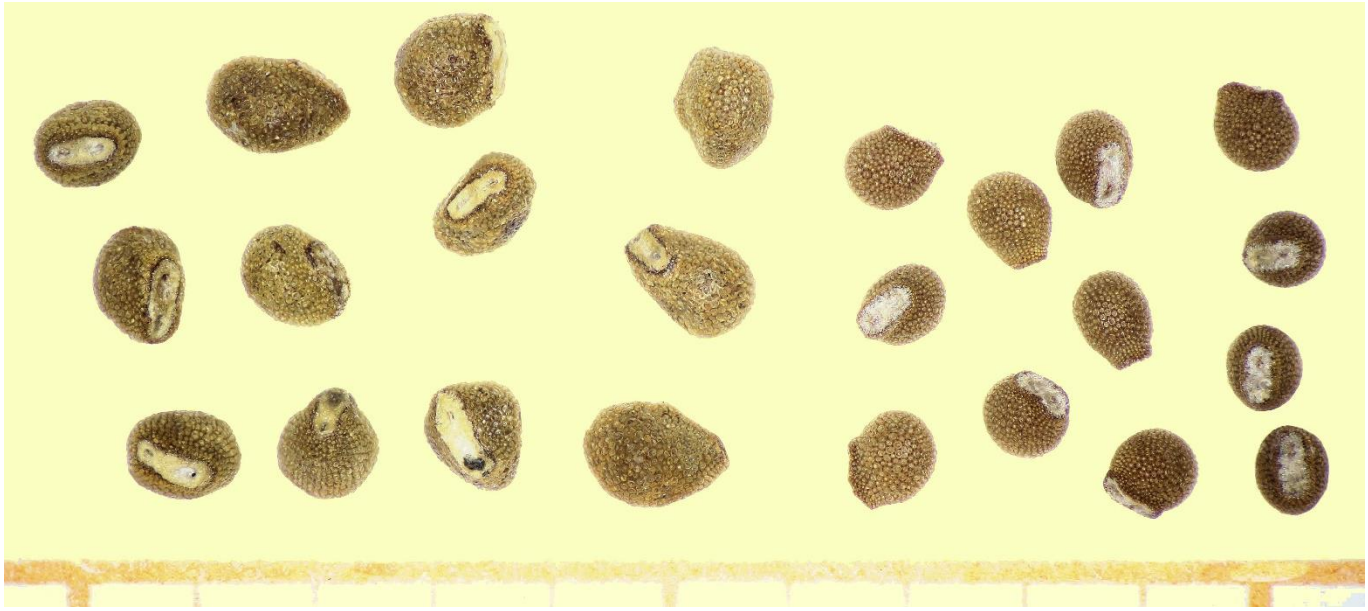

Fig. 19: Left seeds of *G. marekiorum* VoS 49, right seeds of *G. anisitsii* VoS 1200.

Differentiation criteria from *G. marekiorum* to *G. anisitsii*

G. marekiorum can be told apart from *G. anisitsii* as follows:

- seedlings are markedly different compared with *G. anisitsii*
- not offsetting in habitat
- spotted epidermis
- fewer and flatter ribs
- flower colour, slim flower tube
- larger seeds without perceptible bulge at the HMP edge, outer walls of the cupola-shaped testa cells larger.

2. Localities near Roboré

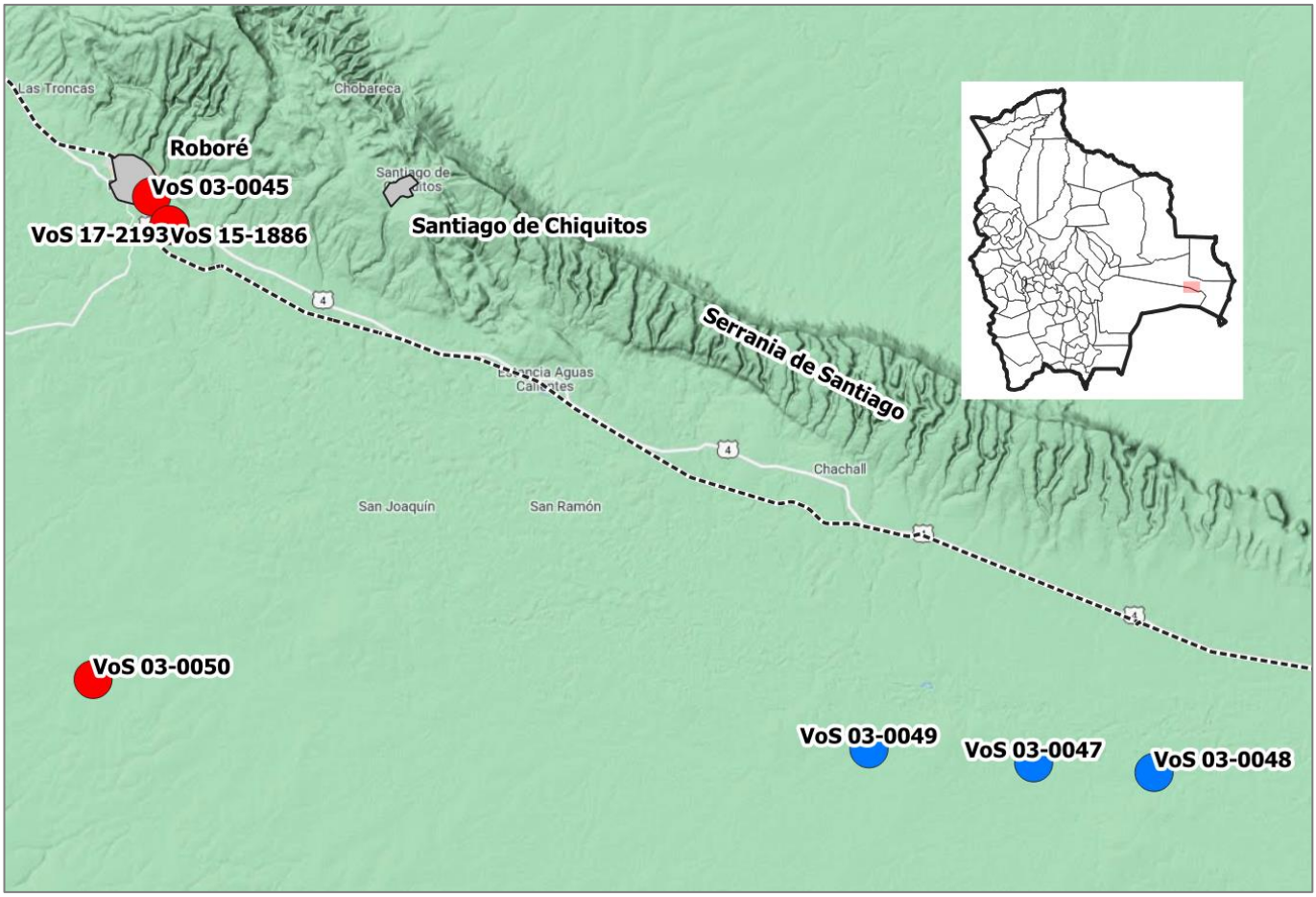

Fig. 20: Immediately at Roboré and south of it (red mark on the map) there grow plants which are similar to, though not identical with, *G. marekiorum* (map: Mario Wick).

Fig. 21: At locality VoS 45 the plants' flowers are always white to a delicate shade of pink.

Fig. 22: Adult plants at their localities near Roboré.

The plants at Roboré have light green, shining bodies and soft yellowish spination. Due to these features alone, the plants can be easily distinguished from *G. marekiorum's* seedling of the same age and also from the taxa still to be discussed in the following.

Fig. 23: Plant in cultivation: the style always protrudes above the stamina, a feature to be constantly taken into account.

Fig. 24: *G. marekiorum* VoS 49.
Seedlings from the sowing of April 15th, 2019.

Fig. 25: Locality VoS 50, south of Roboré.

Fig. 26: All seedlings of the taxon are reddish on the lower part of the body, other than those of *G. anisitsii*.

Fig. 27: Flower sections of plants at locality VoS 45.

Fig. 28: Flower section of plant at locality VoS 50.

Fig. 29: Seeds of plants at locality VoS 45.

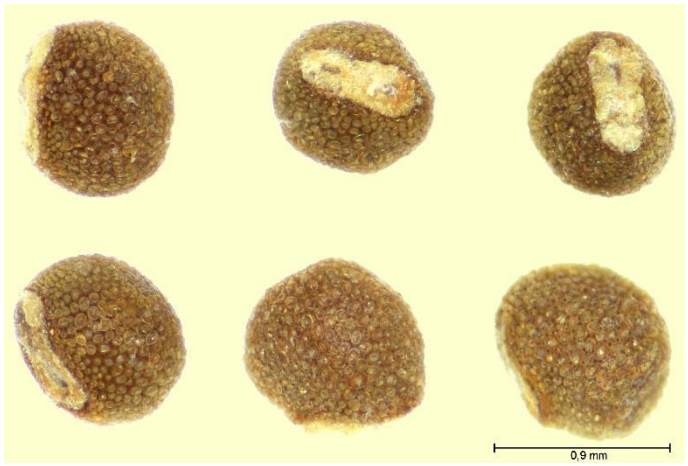

Fig. 30: Seed of plants at locality VoS 50.

The seeds have a length of 0.85-1.08 M (30) = 0.959 mm and a width of 0.75-0.98 M (30) = 0.820 mm.

Differentiation criteria from *G. marekiorum* to plants at Roboré

The Gymnocalycia from the surroundings of Roboré differ from *G. marekiorum* in:

- style always protrudes above the stamina

- soft, yellowish spination, later greying

- ribs distinctly broken up into tubercles

- different flower colour

For this reason, the plants are assigned to *G. marekiorum* as a variety.

G. marekiorum Milt **subsp. *marekiorum* var. *roboreanum*** Schädlich var. nov.

Diagnosis:

Stylus always protrudes above the stamens, soft yellowish spines, ribs clearly broken up into tubercles, darker shading below the tubercles.

Typification:

The plants grow in sandy soil near Roboré in the direction of Santiago, Santa Cruz Department, Chiquitos Province, in forests in clear places at an altitude of 288 meters above sea level. The date of the first find is September 26th, 2003.

Herbarium material:

Plant cultivated from habitat seeds.
Holotype: Schädlich VoS 03-45 (Herbarium WU 4140).

Etymology:

Named after the provincial town Roboré, the locality of the plants.

3. Localities east of El Chochis

The forests of the eastern Bolivian lowlands are located in a climate transition zone between the moist, indeciduous forests of the Amazon region and the deciduous brake vegetation of Gran Chaco. The forest situated between these two landscapes consists of plant species that can neither be attributed to the Chaco nor to the Amazon. They present a local variation of the seasonally dry tropical forest. The climatic transition is marked by a precipitation gradient of 500 to 1.500 mm average yearly rainfall, which runs in north-south direction. The whole region is characterized by seasonal fluctuation. During up to three month a year the average amount of precipitation is less than 100 mm in the north, whereas in the south it is up to more than seven months. In winter temperatures rarely drop below 10°C.

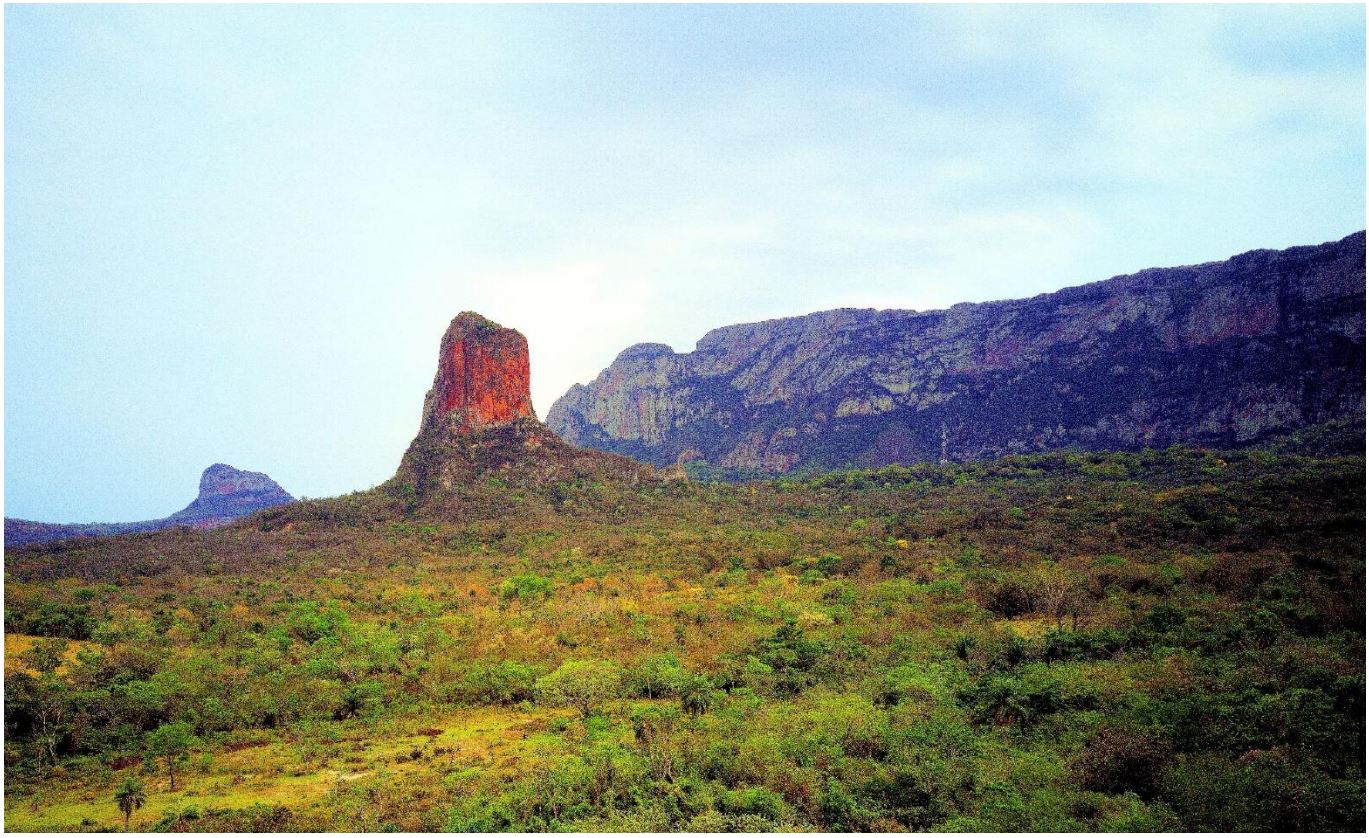

Fig. 31: The beautifully coloured rocks next to the village El Chochis are part of the Serrania de Chochís. It is a breath-taking landscape, which is captivating anew at every visit.

Fig. 32: We drive through an area of smaller hills along the road between El Chochis and Roboré in the zone ahead of the Serrania de Chochís.

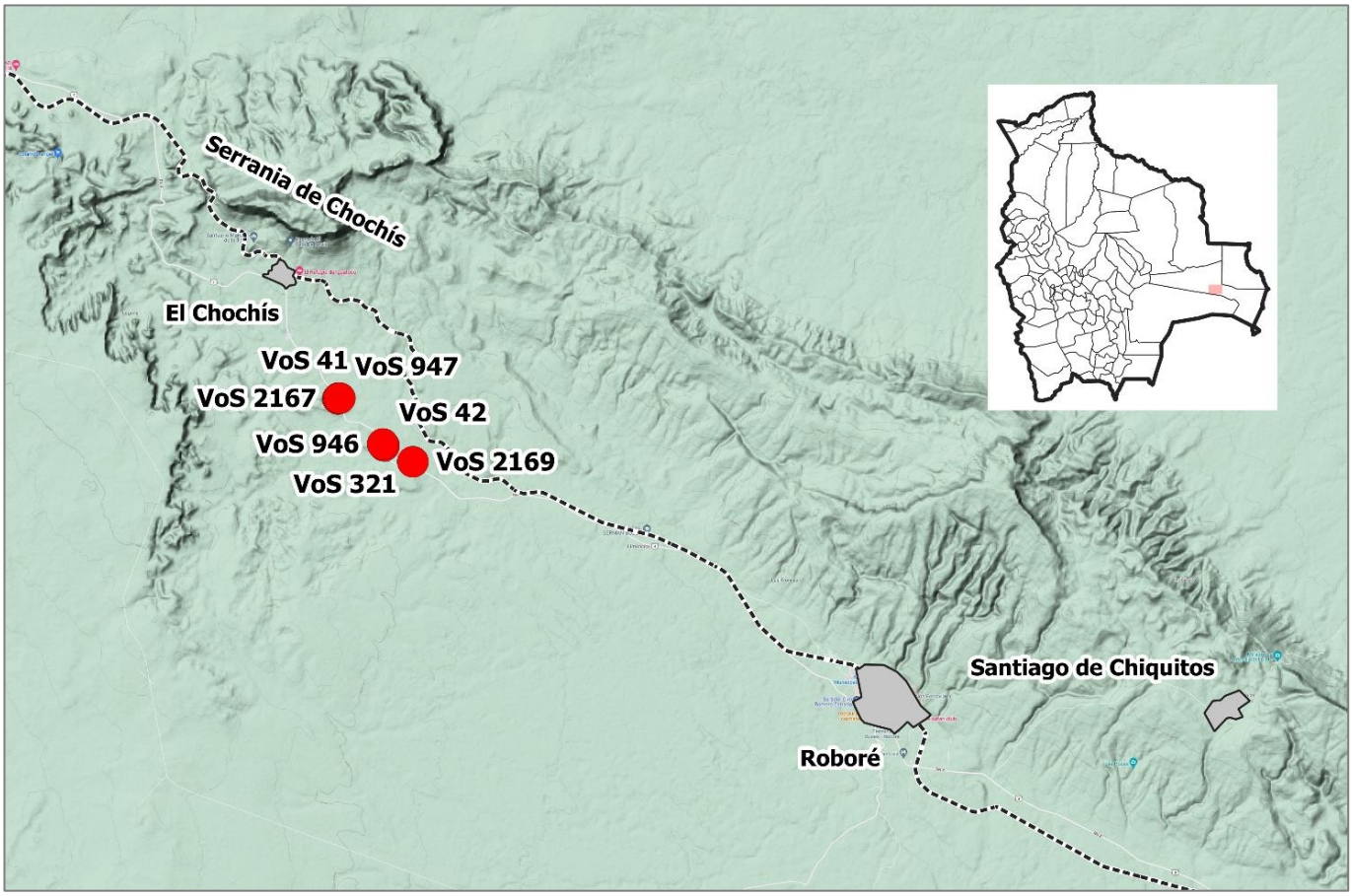

Fig. 33: Locality of Gymnocalycia southeast of El Chochis (map: M. Wick).

Fig. 34: The plants grow on rocky ground in clear places of the forest.

Fig. 35: The plants can be found in this forest rich in brushwood, which is a local variety of the seasonally dry tropical forest.

Fig. 36: The plants always grow solitarily in habitat and do not form any lateral offsets.

Fig. 37: Adult plant from the area east of Chochis with longer spination.

Fig. 38: Seedling plant from the area east of Chochis. The more or less existent dots of the epidermis is well visible.

Fig. 39 and 40: In plants VoS 41, 42, 321, 946, 947, 2167, 2169 the flower is always pink violet.

Fig. 41: Flower section of plants at the locality VoS 946.

Fig. 42: Longitudinal section of the flower, locality VoS 947.

Fig. 43: *G. marekiorum* VoS 49.

Fig. 44: Plants from the locality VoS 946 east of Chochis.

Seedlings of the April 15th, 2019, sowing.

Fig. 45: Two-year-old seedlings VoS 946 in lateral view.

Fig. 46: Seeds of plants at locality VoS 946.

The seeds have a length of 0.88-1.08 M (30) = 0.968 mm and a width of 0.70-1.00 M (30) = 0.798 mm.

Differentiation criteria from *G. marekiorum* to plants at El Chochis

The Gymnocalycia east of El Chochis differ from *G. marekiorum* in:

- larger bodies
- rough, non-shiny epidermis
- style always perceptibly shorter
- longer spines

The plants are assigned to *G. marekiorum* as a variety.

G. marekiorum Milt **subsp. *marekiorum* var. *guaraniorum*** Schädlich var. nov.

Diagnosis:

Differs from *G. marekiorum* in having larger bodies, rough, non-shiny epidermis, shorter stylus and the length of spines.

Typification:

The plants grow on rocky ground southeast of El Chochis, Santa Cruz Department, Chiquitos Province in forests in clear places at an altitude of 345 meters above sea level. The date of the first find is February 4th, 2011.

Herbarium material:

Cultivated plant grown from seeds collected in the habitat.
Holotype: Schädlich VoS 11-946/1543 (Herbarium WU 4038).

Etymology:

The name is dedicated to the Indian ethnic group of the Guarani. Their settlement area extends over parts of Argentina, Brazil, Bolivia, Paraguay and Uruguay.

4. Locations at San José de Chiquitos

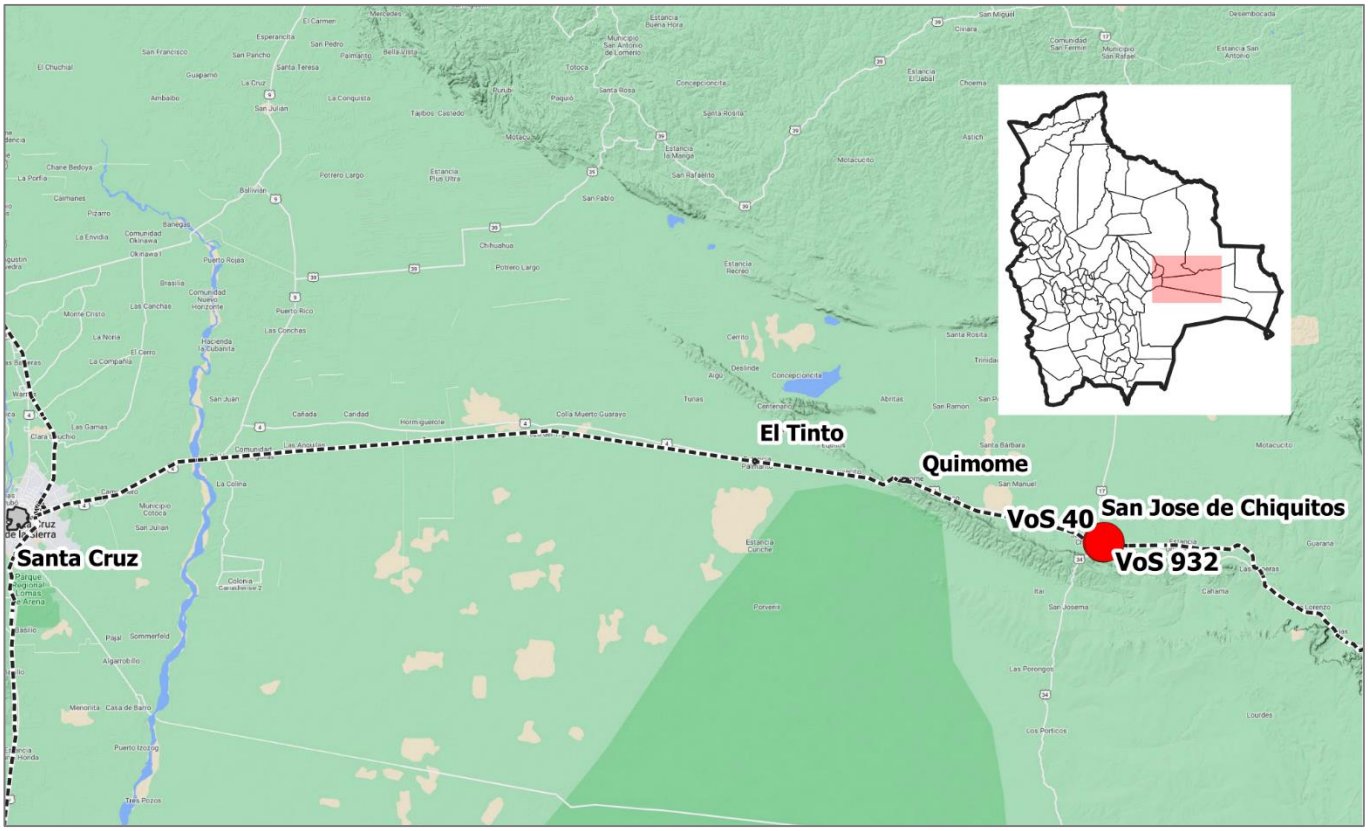

Fig. 47: Locality of Gymnocalycia from the subgenus *Muscosemineum* near San José de Chiquitos (map: M. Wick).

Fig. 48: Habitat VoS 932, near San José de Chiquitos.

Fig. 49: The flower colour of plants from locality VoS 40 is white to pale pink.

Fig. 50: The plants grow in sandy soil in open vegetation.

Fig. 51: The plants have large, rough tubercles, locality VoS 932.

Fig. 52: The solitarily growing plants can reach a diameter of up to 120 mm, habitat VoS 932.

Fig. 53: The plants in habitat form large, distinctive tubercles.

Fig. 54: The epidermis of these plants, too, is covered with dark dots, a feature missing in *G. anisitsii*.

Fig. 55: *G. marekiorum* VoS 49.
Seedlings from the April 15th, 2019, sowing.

Fig. 56: Locality VoS 40 near San José.

Fig. 57: Two-year-old seedling from locality VoS 40 in lateral view.

Fig. 58: Flower section of plants at locality VoS 40.

Fig. 59: Seeds of plants at locality VoS 40.

The seeds have a length of 0.95-1.15 M (30) = 1.019 mm and a width of 0.80-0.98 M (30) = 0.874 mm. On almost all investigated seeds of the populations from San José de Chiquitos the hilum-micropylar region is clearly set apart from the parts of the seeds towards the apex by an edge markedly bent outside. On the other seeds of the taxa previously discussed such an outside bent edge of the HMR is either missing or can only be found as an exception.

Differentiation criteria from *G. marekiorum* to plants at San José de Chiquitos

The Gymnocalycia from San José de Chiquitos differ from *G. marekiorum* in:

- large bodies, up to 120 mm in diameter

- large, rough tubercles, ribs arranged radially

- large white flowers

- little variation of the plants

- seeds differing

- habitat clearly separated from that of *G. marekiorum*

The plants are assigned to *G. marekiorum* as a subspecies.

G. marekiorum Milt **subsp. *sanjoseanum*** Schädlich subsp. nov.

Diagnosis:

Differs from *G. marekiorum* in having larger bodies, large, rough tubercles, large white flowers.

Typification:

The plants grow in sandy soil in the vicinity of San José de Chiquitos, Santa Cruz Department, Chiquitos Province, in forests in open places at an altitude of 310 meters above sea level. The date of the first find is September 24th, 2003.

Herbarium material:

Cultivated plant grown from seeds collected in the habitat.
Holotype: Schädlich VoS 03-40 (Herbarium WU 4141).

Etymology:

Named after the provincial town San José de Chiquitos.

Nomenclatory conspectus of *G. marekiorum*

1. ***G. marekiorum*** Milt subsp. *marekiorum* var. *marekiorum*
2. ***G. marekiorum*** Milt subsp. *marekiorum* var. ***roboreanum*** Schädlich
3. ***G. marekiorum*** Milt subsp. *marekiorum* var. ***guaraniorum*** Schädlich
4. ***G. marekiorum*** Milt subsp. ***sanjoseanum*** Schädlich

Fig 60: All plants depicted in the photograph were sowed in 2004 from seeds collected at their locality.

Top left: *G. anisitsii* VoS 28.

Top right: *G. marekiorum* subsp. *marekiorum* var. *guaraniorum* VoS 42.

Middle left: *G*. *marekiorum* subsp. *sanjoseanum* VoS 40.

Middle right: *G. marekiorum* subsp. *marekiorum* var. *roboreanum* VoS 45.

Bottom: *G. marekiorum* VoS 49.

Assignment of my localities' field numbers

G. marekiorum: VoS 47, 48, 49.

G. marekiorum subsp. *sanjoseanum*: VoS 40, 932, 1876, 2199.

G. marekiorum subsp. *marekiorum* var. *guaraniorum*: VoS 41, 42, 321, 578, 946, 947, 2167, 2169.

G. marekiorum subsp. *marekiorum* var. *roboreanum*: VoS 45, 50, 1886, 2193.

Assignment of other collectors' localities' field numbers

G. marekiorum: STO 03-1713 = VoS 47, STO 03-1714 = VoS 48, STO 03-1715 = VoS 49.

G. marekiorum subsp**.** *sanjoseanum*: GH 95-254/436, GH 98-313/550, GH 03-353/628, L 369, LB 3845 = VoS 932, STO 95-979, STO 03-1709 = VoS 40.

G. marekiorum subsp. *marekiorum* var. *guaraniorum*: GH 95-255/437, GH 98-303/532, GH 98-304/533, GH 03-360/638, LB 3862 = VoS 946, LB 3863 = VoS 947, STO 03-1710 = VoS 41.

G. marekiorum subsp**.** *marekiorum* var**.** *roboreanum*: GH 95-257/440, GH 03-357/633, GH 03-358/634, L 363, STO 95-980, STO 95-981 = VoS 45), STO 95-983, STO 03-1716 = VoS 50.

GH - Gerfried Hold, L - Alfred B. Lau, LB - Ludwig Bercht, STO - Helmut Amerhauser, Hans Till, Franz Strigl.

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