

# *Schütziana*

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**Cover picture:** *Gymnocalycium cardenasianum*, VoS 379, Bolivia, north of Carmen del Obispo  
(photo: Volker Schädlich)



## Editorial

### Dear *Gymnocalycium* Enthusiasts!



With this issue number 3 2014 we finish the fifth volume of our *Gymnocalycium* Online Journal SCHÜTZIANA. Fortunately, our example has caught on. There are already several online magazines that provide, without limits in the printing or postage costs, knowledge of our spiny favourites free of charge. Thereby there is certainly no difference in cost between the creation of an online- or a print version of a journal. Worthy of mention are for instance [The Cactus Explorer \(ISSN 2048-0482\)](#) or [Xerophila \(ISSN 2285-3987\)](#).

A particular challenge is, of course, the restriction to a single cactus genus: for us the *Gymnocalyciums*. Luckily there is for "our species" a solid group of dedicated enthusiasts who travel sometimes even several times a year in the Gymno regions of South America and provide us with many new details on our plants.

To publish this information, of course, represents an effort that is not to everybody's liking, or do not want to impose oneself. I am more pleased that the German-Swiss-Dutch "Working Group Gymnos" (in order of the number of members), will join SCHÜTZIANA and expand the staff. They will be responsible for the future preparation and publication of the German edition of SCHÜTZIANA and will publish their results in SCHÜTZIANA.

With a permanent German edition, we would take account of our large, German readership. Thus, 32% of our readers are from German speaking countries (Germany (22%), Austria (8%) and Switzerland (2%)). A strong Gymno-community also exists in the Czech Republic (16% of the readers) and Italy (9% of the readers). And who would have thought that from Romania and Argentina with 4% each there are as many readers as the English-speaking (in total also 4% of our readers). On average, each issue - so to speak our circulation - is downloaded about 2500 times. And this does not include the direct copies of the issues as a file. The Internet makes this statistic possible.

Our Gymnos are concealed. They only reveal their taxonomic secrets with considerable resistance. Sometimes, however, hints hide in obvious places. You just have to look carefully. Our Member of the "Working Group Gymnos" Reiner Sperling did so. He describes the amazing differences in the morphology of *Gymnocalycium* seedlings in this issue. Volker Schädlich, also a member of the "Working Group Gymnos", has repeatedly travelled to Bolivia for this purpose. He illuminates in this issue the localities and the family relationship of *Gymnocalycium cardenasianum* and *Gymnocalycium armatum*.



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In addition, Ludwig Bercht, the head of the "Working Group Gymnos", reports in this issue on the last *Gymnocalycium* meeting in early September in Radebeul, Germany. The main topic of the meeting were the plants belonging to *Gymnocalycium affine*.

Enjoy reading!

### Errata

In the description of *Gymnocalycium kroenleinii* subsp. *funettae* (SCHÜTZIANA issue 1, 2014) the type locality was indicated by mistake as "Sierra de Quintana" and "Cerro de los Condores".

The exact name of the locality is: **Sierra de los Quinteros** and **Quebrada del Cóndor**

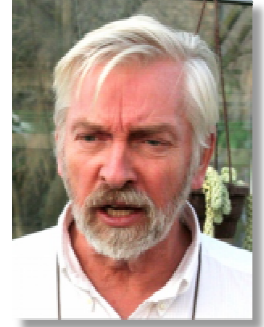
I am indebted to Horacio de la Fuente from La Rioja, Argentina, who very kindly pointed my mistake, due to a wrong transcription of the data during our research.

Massimo Meregalli

We would like to express our special thanks to Mrs Iris Blanz (Fernitz, Austria), to Mr Brian Bates (Bolivia) and to Mr Graham Charles (United Kingdom), who supports us with the English language and to Mr Daniel Schweich (France), who has mirrored our publication under: <http://www.cactuspro.com/biblio/>.



## Report on the 30<sup>th</sup> International Gymnocalycium Meeting, held in Radebeul (Germany) 6-8 September 2014.



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The International Gymnocalycium Meeting was held during the first weekend of September at 'Hotel Goldener Anker' in Radebeul, a small German city near Dresden. For the 30<sup>th</sup> time Gymno friends from several countries came together for this event.

In the afternoon of Friday September 6<sup>th</sup> approximately 40 Gymno enthusiasts from Austria, Czech Republic, Belgium, Netherlands, Switzerland and of course from Germany arrived to renew friendships, attend presentations and discuss the subjects presented. During the whole weekend the atmosphere was very friendly and open, which was a very good basis for fruitful discussions.

On Friday evening Ludwig Bercht opened the meeting and asked for a moment of silence in respect of the recent death of Francis Fuschillo.

Some additional points were given by Volker Schädlich, the technical organizer of the weekend. Ludwig Bercht presented slides about his recent trip through the mid and north of Argentina, which he had made in February this year accompanied by Herbert Thiele. After the presentation there was time enough to talk and to take some drinks before going to bed.

The central theme on Saturday was to understand *G. robustum* and its relatives, in particular *G. affine*. As usual, the first speaker was Wolfgang Papsch who gave an overview on the historical facts. For these species the historical data are very young; the oldest article about these plants was published in 1993 by Hans Till, where he tried to prove that the name *G. quehlianum* belongs to this taxon from around Quilino. The first description of that taxon as *G. robustum* appeared in 2002 (Kiesling, Ferrari & Metzing). *G. affine* was described in 2010. The author, Radomir Řepka, placed this species in the relationship of *G. robustum*. Surprisingly, in the first description of *G. affine* there are no pictures with a clear reference to the holotype.



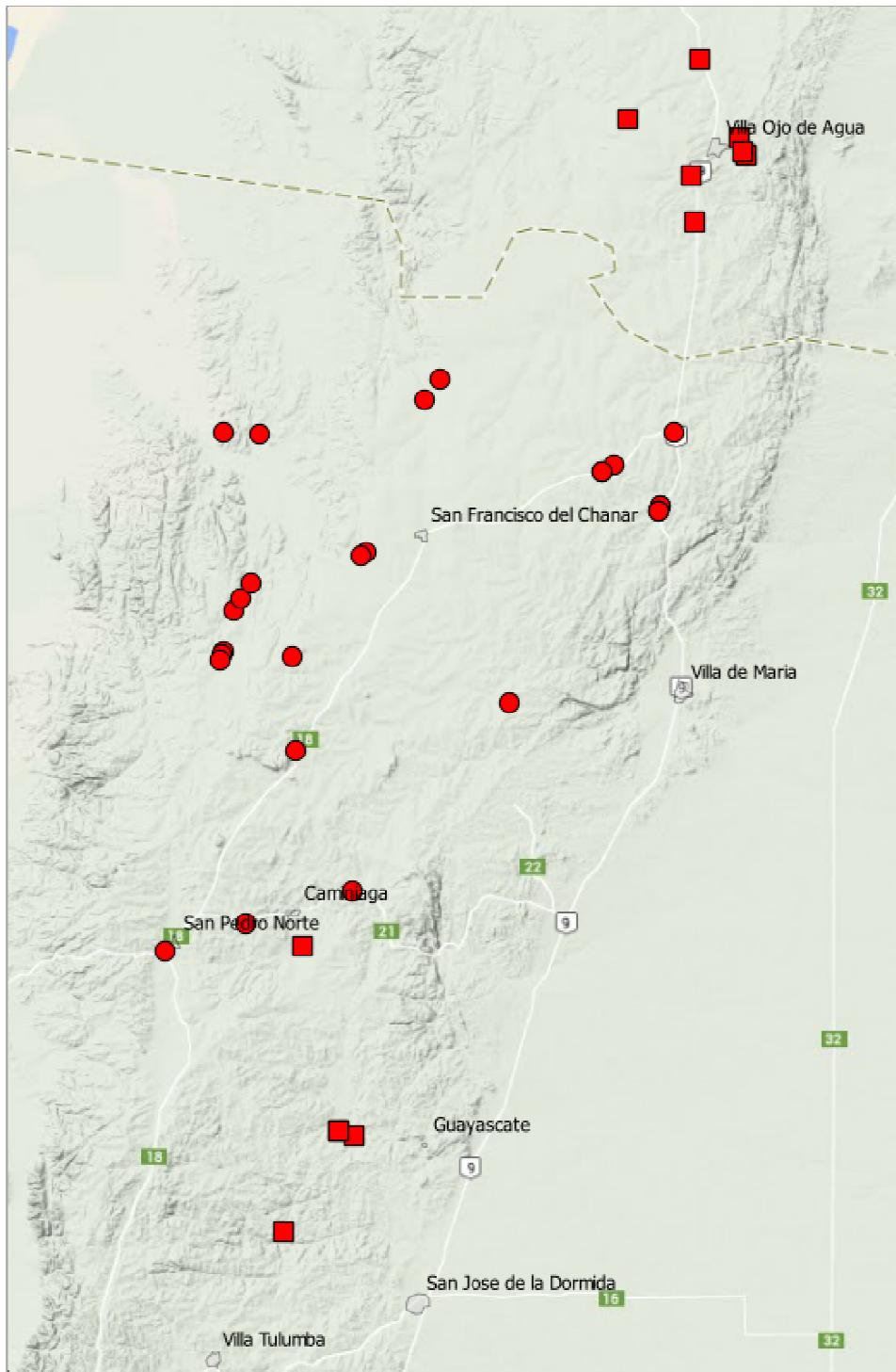


Fig. 1: distribution area of *Gymnocalycium affine*, north in the prov. Córdoba, Argentina

Thomas Strub, with the support of the members of the 'Arbeitsgruppe Gymnos', had prepared an extensively overview on *G. affine*. Firstly he gave an overview of all the species growing in the northern part of Córdoba and the southern part of Santiago del Estero as far as they belong to the subgenus *Gymnocalycium*. In particular he presented *G. robustum* for the reason that Řepka placed *G. affine* in the relationship to it. The species *G. robustum* will be reviewed and discussed in 2016.

Thomas Strub analysed the diagnosis and description of *G. affine* in detail. Then he presented pictures of well documented plants found at the localities indicated by Řepka to be growing places of *G. affine*. Comparison was made with the plants from the holotype location. To make

conclusions he compared the habitats, the characteristics of the plants, the seedlings, the seeds and the flowering periods. The conclusion was that the plants found around San Miguel, San Francisco del Chañar and Chuña Huasi / Caspi Cuchuna are *G. affine*. Plants from the south of Santiago del Estero do not directly belong to *G. affine* and tend more to *G. frankianum*. Also the plants from Caminiaga, Santa Cruz and La Toma do not belong to the typical *G. affine*. In nature the difference from *G. parvulum* ssp. *huettneri* is sometimes difficult. Differences are the far more offsetting character of the latter as well as the black seeds, where *G. affine* has seeds with a brownish shedding skin. A magnificent review of what is *G. affine*.





Fig. 2 + 3: *G. affine* from the finding location around San Francisco del Chañar, prov. Córdoba, Argentina

Three other persons also took the opportunity to present pictures on the subject of *G. affine*. Jaroslav Procházka gave a large overview of his findings in northern Cordoba and merely agreed with the opinion of Thomas Strub. Martin Tvrdik also presented pictures and expressed his view on the topic. He more sees *G. affine* and *G. robustum* as one species. Both presentations were in Czech, but well translated by Jiri Kolarik. The last speaker on this subject was again Wolfgang Papsch. He also had travelled this area and studied the plants. With this presentation the subject of *G. affine* was closed for this meeting.



Fig. 4 + 5: *G. esperanzae*

Based on field experience and research at home in growing and analysing seedlings, Reiner Sperling presented *G. esperanzae* together with the *Gymnocalycium* species found in the same area. First he extended the distribution area of the newly described *G. basiatrum* more to the west and also to the northern part of the province San Luis. Looking at the seeds, *G. esperanzae* clearly belongs to the aggregate of *G. castellanosii*. He could not find evidence that *G. esperanzae* is a natural hybrid between *G. castellanosii* var. *armillatum* and *G. basiatrum*, which has been postulated several times.





Fig. 6: *G. basiatrum*



Fig. 7: *G. castellanosi* var. *armillatum*

After a whole day discussing the ins and outs of Gymno's in the evening we went on a trip through the southern part of Peru. Konrad Müller was accompanied by his wife and it was to prove that they can make such trips together in the years after. In a splendid mix of cacti in habitat and cultural aspects of the country he showed us the highlights of that trip from the year 2005.

On Sunday morning Andreas Berthold presented many highlights of his trip through Mexico in 2013. Beautiful pictures of a large range of *Mammillarias* and other cacti were projected on the wall. Of course the splendid new *M. bertholdii* was also presented. The photos with cacti were interspersed several times by exterior and interior views of churches.

Finally, Ludwig Bercht summarized the meeting and informed us about the coming events in Eugendorf and Carmagnola and of course our next weekend in Radebeul from 4<sup>th</sup> to 6<sup>th</sup> September 2015 with then, as the central theme, the Gymno's of Uruguay.

With a warm farewell he closed the event.

The detailed agenda of the meetings will be published under 'Events' at the Homepage of SCHÜTZIANA ([www.schuetziana.org](http://www.schuetziana.org)) in time.

Thanks to Graham Charles, who has kindly corrected the English version.

All plant figures by Mario Wick, all pictures from the meeting by the author.



## Photographic impressions of the meeting in Radebeul











## Seedlings morphology of *Gymnocalycium*

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This article presents the early seedling development of the genus *Gymnocalycium*. The seedlings investigated were still in their embryonic development stage here. Thus the phenotype is still exclusively genetically determined. Features of this plant stage are considered as being rather conservative and are therefore interesting with respect to degrees of relationship within the genus *Gymnocalycium*. A striking feature, which stood out in the previous investigation, are the diverse shapes as well as the deviating number of cotyledons. The latter is unusual for cactuses in general, because, belonging to the Dicotyledoneae, they are plants with two cotyledons. The young seedlings have a bilateral symmetry, which is generally also true for the genus *Gymnocalycium*. Thus no deviation was found in the subgenera *Scabrosemineum*, *Muscosemineum* and *Microsemineum*. In the subgenera *Macrosemineum* and *Gymnocalycium*, however, there are interesting exceptions.

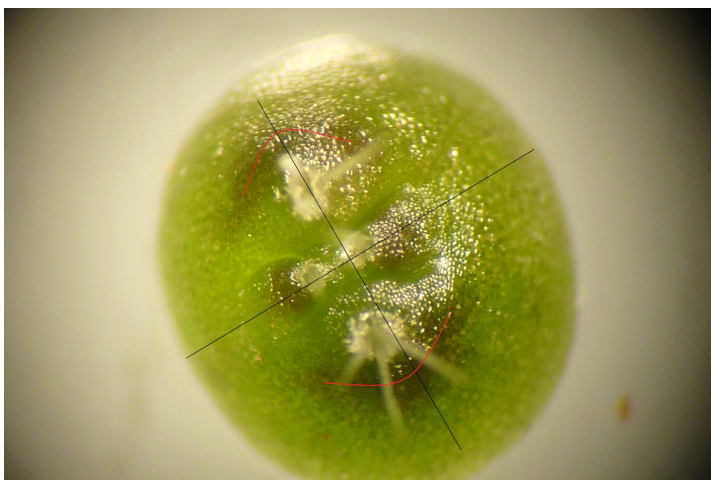


Fig. 1: View from above on a dicotyledonous *Gymnocalycium* seedling. The cotyledons are marked red. The new areoles grow in pairs, shifted by 90° compared with the previous ones (black axes of coordinates).

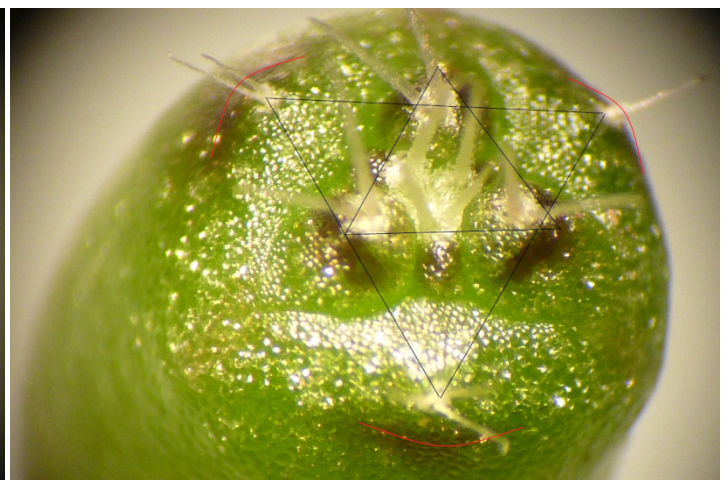


Fig. 2: View from above on a tricotyledonous seedling. The cotyledons are marked red. The new areoles appear three at a time and are shifted by 60° compared with the previous ones.

As many *Gymnocalycium* taxa cotyledons are partly reduced beyond recognition, their verification is often only possible by considerable magnification. Of help is the fact that young seedlings from the apex form the number of their new areoles according to the number of their cotyledons almost at the same time. Therefore, in seedlings with two cotyledons, the respective two new areoles appear facing each other and crosswise shifted by 90° as compared with the previous ones. On the other hand, the tricotyledonous plants form their respective three new areoles almost simultaneously, forming a triangle in top view (Fig. 1 and 2). The difference can partly be recognized even months after germination. Yet, this characteristic disappears later on, as considerable time intervals emerge in older seedlings between the formation of each new areole. This is due to the increase in volume of the older seedlings (Fig. 3 and 4). Now the simultaneous formation of two, three or four areoles cannot be discerned any more.



Fig. 3 and 4: Later only one new areole at a time is formed by the plants (red circles). On the left the dicotyledonous *G. morroense* (El Hinojito, San Luis) and on the right the tricotyledonous *G. angelae*.

Supported by these discoveries the observations demonstrated that all subgenus *Macrosemineum* taxa investigated often formed three or even four cotyledons instead of the usual two. It must be borne in mind that this is already determined in the seed and therefore genetically determined. Thus there were no more seedlings with only two cotyledons in the species (varieties included) *denudatum*, *uruguayense*, *mesopotamicum*, *horstii*, whereas the majority of *G. buenekeri* once again had two cotyledons.

In the subgenus *Gymnocalycium* the embryos are dicotyledonous as a general rule. However, those taxa which occur close to the distribution area of the subgenus *Macrosemineum* are interesting. *G. schroederianum* with the also documented subspecies *paucicostatum* and *G. erolesii* rank among them. They showed three, sometimes four cotyledons without exception.

However, it can also occur in other taxa of the subgenus *Gymnocalycium* (e. g. *G. reductum*, *baldianum*, *uebelmannianum*, *andreae*, *chubutense*, *gibbosum*), that there are one or two tricotyledonous plants among 100 seedlings.



### Subgenus Trichomosemineum



Fig. 5: The subgenus *Trichomosemineum* is characterized by very uniform dicotyledonous seedlings, like for example *G. bodenbenderianum* (synonymous: *G. riojense*), HV 1438, which is represented here.

### Subgenus Scabrosemineum

Although the seedlings are variable, they are always dicotyledonous.

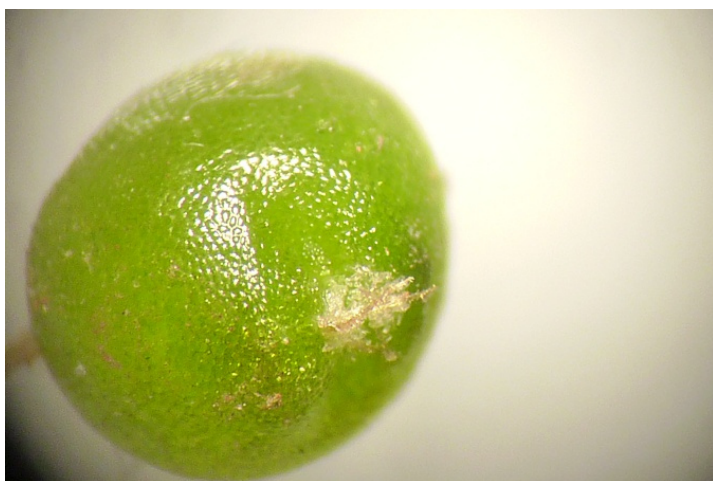


Fig. 6: *G. mucidum*, JO 33b



Fig. 7: *G. ritterianum* aff., STO 305





Fig. 8 and 9: *G. castellanosii* var. *rigidum*, Tom 445-1

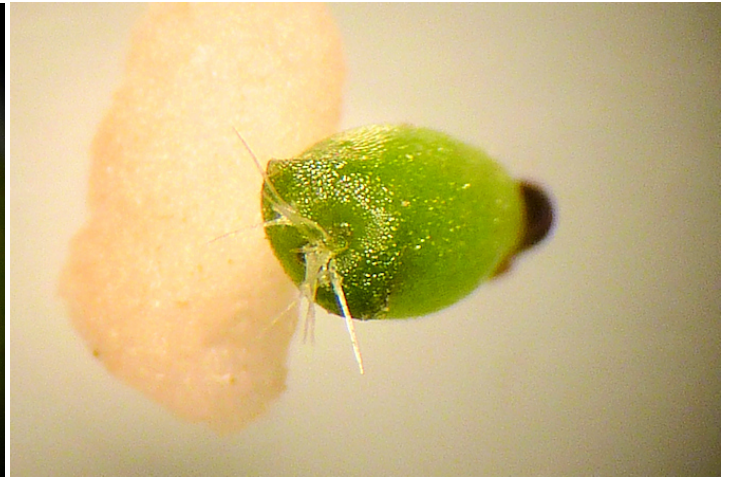
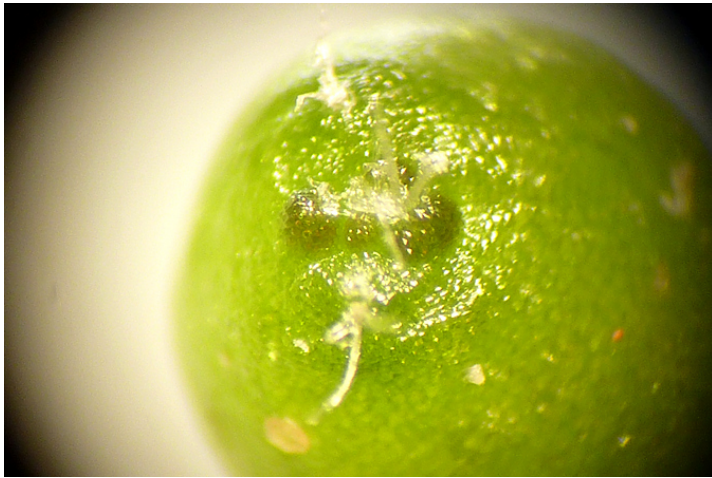


Fig. 10: *G. spegazzinii*, VS 108

Fig. 11: *G. brachyanthum* subsp. *getrudae*, LB 3218

### Subgenus Muscosemineum

The very small seedlings were dicotyledonous in all documented taxa.

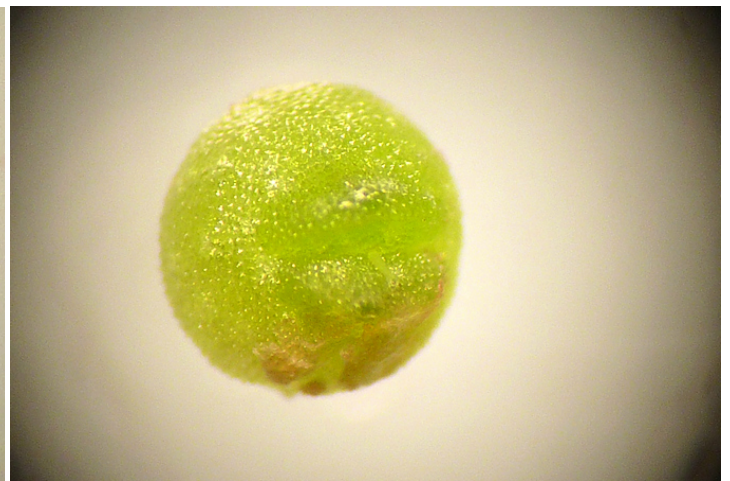


Fig. 12: *G. anisitsii*, VoS 523

Fig. 13: *G. eurypleurum*, LB 2233



Subgenus *Microsemineum*



Fig. 14: *G. saglionis*, VoS 842

Subgenus *Macrosemineum*

With the exception of *G. buenekeri* all taxa of this subgenus had (almost exclusively) more than two cotyledons.



Fig. 15: *G. horstii*, GF 105



Fig. 16: *G. rauschii*, di- and tricotyledonous





Fig. 17: *G. uruguayense*, Tambores, Uruguay



Fig. 18: *G. angelae*, SNE 8/158

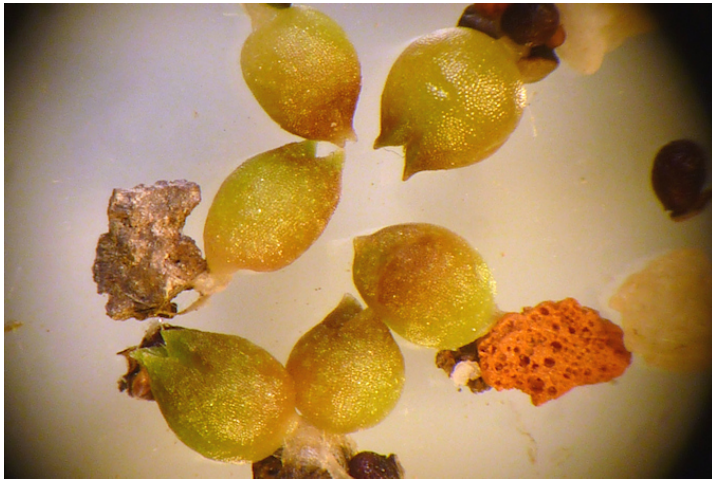


Fig. 19: *G. buenekeri*, LB 584



Fig. 20: *G. denudatum*, PR 28a

Subgenus *Gymnocalycium*

Most taxa of this subgenus have embryos with two cotyledons, although many exceptions have been documented.



Fig. 21: *G. andreae*, BKS 93, two seedlings out of 31 were tricotyledonous



Fig. 22: *G. baldianum*, LB 1248, two seedlings out of 70 were tricotyledonous





Fig. 23: *G. bruchii* var. *brigittae*, all seedlings were dicotyledonous without exception



Fig. 24: *G. erolesii*, SNE 15-167; seedlings with three or four cotyledons



Fig. 25: *G. erolesii*, here still in its embryonic stage



Fig. 26: *G. reductum*, WP 12/12; two out of 55 seedlings had three cotyledons



Fig. 27: *G. reductum*, P 94, dicotyledonous seedlings



Fig. 28: *G. reductum* subsp. *sibalii*, one out of 98 seedlings had three cotyledons





Fig. 29: *G. uebelmannianum*, WR 141, two out of 48 seedlings had three cotyledons



Fig. 30: *G. uebelmannianum*, WR 141, seedling with three cotyledons



Fig. 31: *G. schroederianum* subsp. *paucicostatum*, LB 960

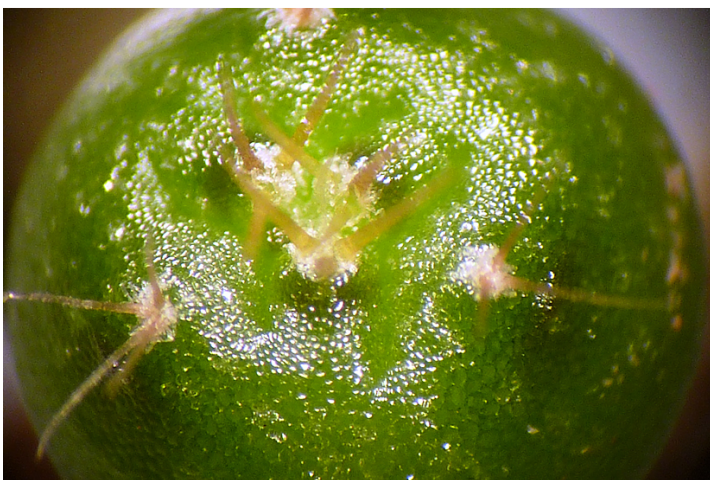


Fig. 32: *G. schroederianum* subsp. *paucicostatum*, LB 960, the majority of seedlings are tricotyledonous, some have four cotyledons



Fig. 33: *G. schroederianum* subsp. *paucicostatum*, LB 960, seedling with four cotyledons



Fig 34: *G. schroederianum*, WD 2, tricotyledonous (embryonic stage)





Fig. 35: *G. schroederianum*, WD 2, tricotyledonous (two weeks after germination)

On comparing *G. buenekeri* and *G. horstii* it occurs that the “embryonic seedlings” differ fundamentally. Those of *G. buenekeri* are mostly dicotyledonous, forming pointed, oblong cotyledons. In addition, they are smaller and not round when of the same age. Seedlings of *G. horstii* are, on the other hand, very similar to those of *G. uruguayense* and *G. denudatum*. (Fig. 36-39)



Fig. 36: *G. buenekeri*, LB 584, mostly dicotyledonous



Fig. 37: *G. horstii*, GF 105, tricotyledonous, with round seedlings



Fig. 38: *G. buenekeri*, LB 584, seedling oblong, here tricotyledonous

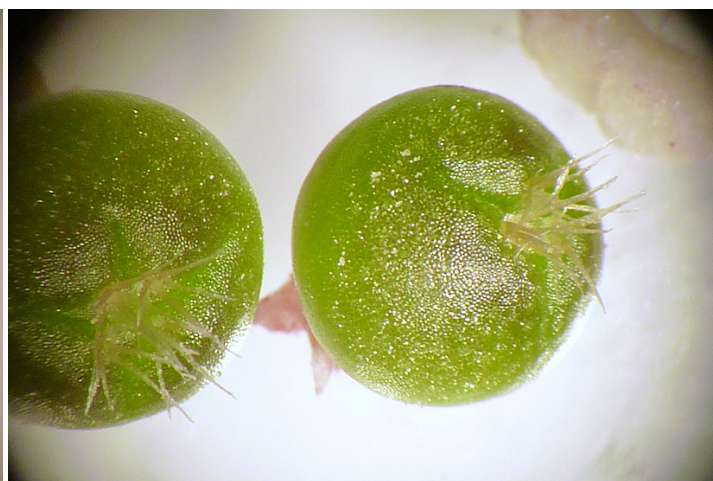


Fig. 39: *G. uruguayense* var. *roseiflorum*, MM 235, three or four cotyledons. *G. horstii* is more similar to these seedlings than to those of *G. buenekeri*.



The seedlings too of both taxa differ noticeably. Therefore *G. buenekeri* should be considered as a species and not as subspecies of *G. horstii*.



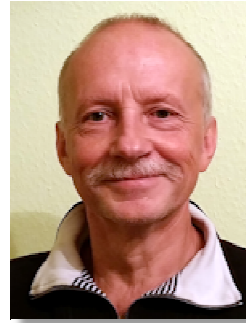
Fig. 40: *G. schroederianum*, WD 2; *G. erolesii* looks similar to these seedlings

The situation is different with *G. erolesii*. The embryos cannot be distinguished from those of *G. schroederianum*. Both have three, sometimes four cotyledons as well as the same shape and size (Fig. 40). The first description of this plant as *G. schroederianum*, *subsp. boosii* by R. Kiesling is thus appropriate.

All pictures by the author.



## ***Gymnocalycium cardenasianum* Ritter**



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In February 1953, Friedrich Ritter discovered the irregularly spined *G. cardenasianum* Ritter near the village of Carrizal in the north-western part of the department Tarija in the province Eustaquio Méndez, Bolivia. The first seeds reached his sister, Mrs Hildegard Winter, in Germany. Mrs Winter marketed the seeds under the field number FR 88 as *G. cardenasii* and, beginning in 1956, globally as *G. cardenasianum* spec. nov. in her cactus seed catalogue.

In 1964 the Latin diagnosis was published in *Taxon* 13(4):144.

The German description was effected in “Kakteen in Südamerika” Vol. 2, in 1980. In the same volume another species was described, which will be dealt with here as well, namely *Gymnocalycium armatum* Ritter.

In 1996 R. Kiesling and D. Metzinger described a new combination in *Darwiniana* 34:402-404 - *Gymnocalycium spegazzinii* subsp. *cardenasianum*.

D. Hunt aligned *G. armatum* with *G. cardenasianum* in 1999. In the same year H. Till and H. Amerhauser positioned *G. armatum* as a form close to *G. cardenasianum*.

J. Halda und V. Šorma described a new combination – *G. spegazzinii* subsp. *armatum* – in 2002 and in the year 2004 R. Slaba und V. Šorma made the combination *G. armatum* into *G. spegazzinii* subsp. *cardenasianum* var. *armatum*.



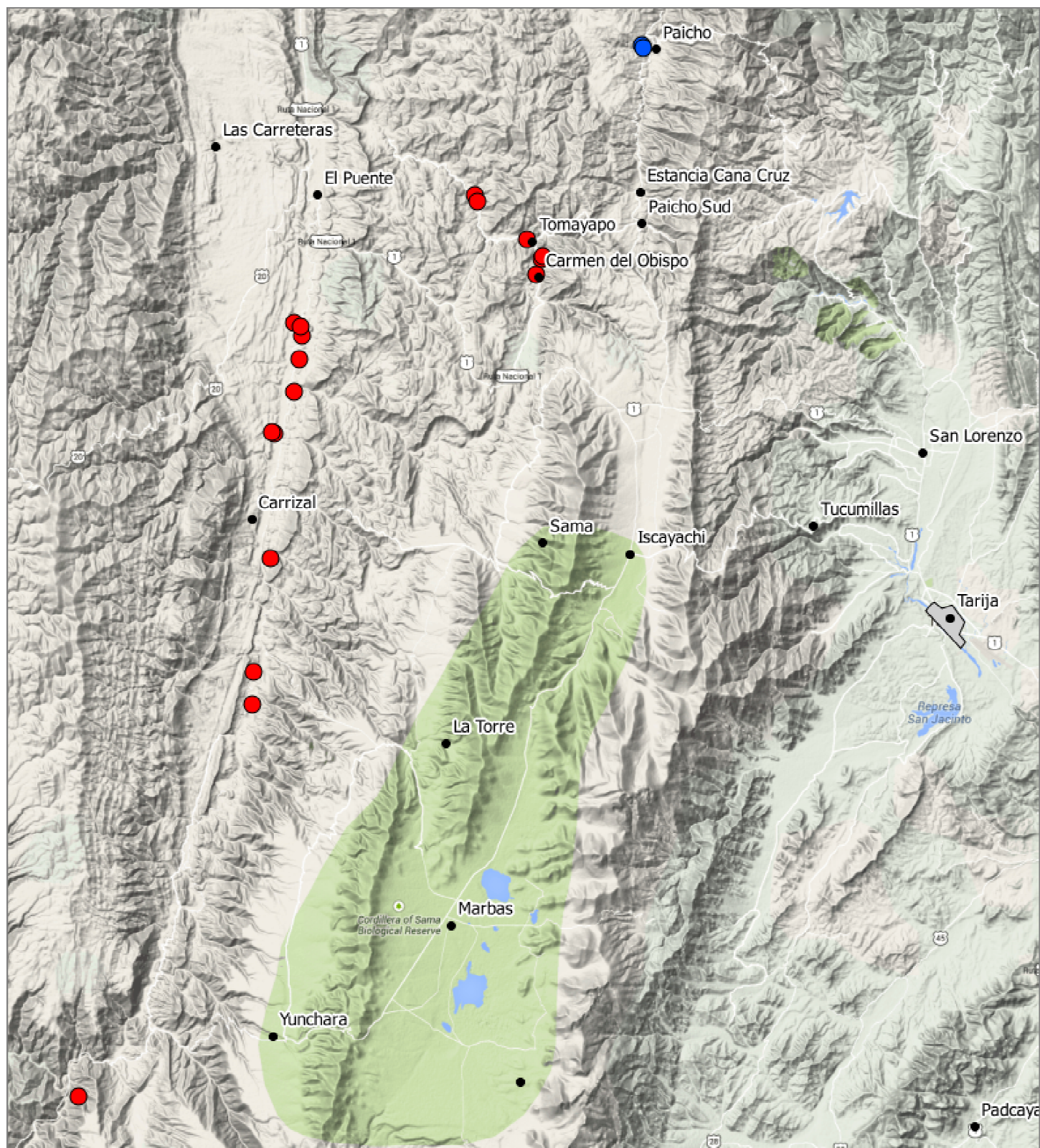


Fig. 1: Distribution area of *G. cardenasianum* (red) and *G. armatum* (blue) in Bolivia

According to present state of knowledge, the main distribution area of *G. cardenasianum* is relatively restricted, beginning in the north at El Puente and ending at Tojo in the south. This corresponds to a north-south extension of about 90 km. The northernmost population can be found about 30 km distance by air northeast of El Puente in the Rio Paicho Valley. This plant was described as *G. armatum* by Ritter. Further occurrences can be found in the vicinity of the villages Tomayapo and Carmen del Obispo.



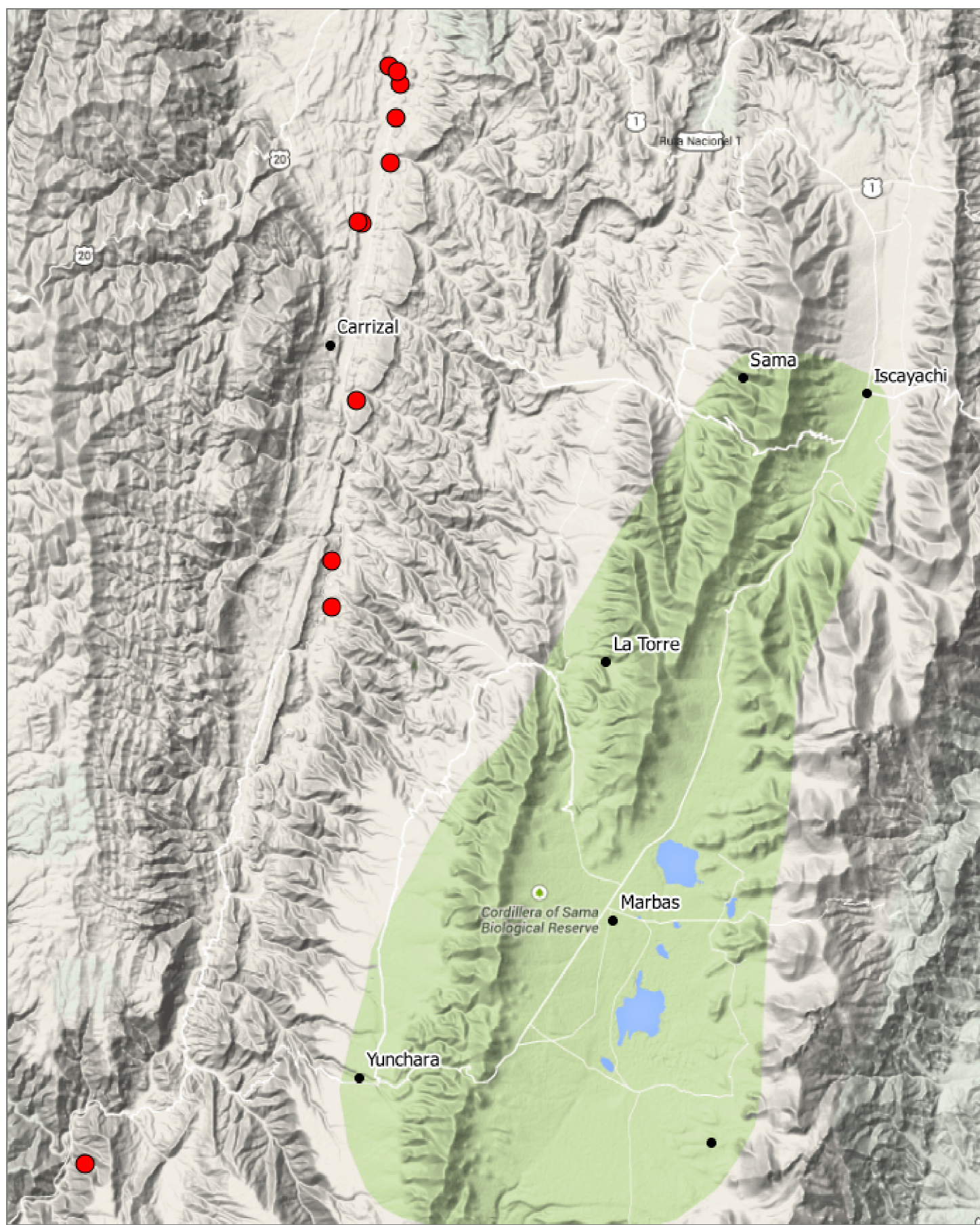


Fig. 2: Distribution area of *G. cardenasianum* at the Rio San Juan del Oro





Fig. 3: The main distribution area of *G. cardenasianum* is situated along the course of the river Rio San Juan del Oro south of El Puente and Tojo



Fig. 4: *G. cardenasianum* on slopes near Santa Ana de Belen, VoS 382





Fig. 5: *G. cardenasianum* north of Santa Ana de Belen, VoS 387



Fig. 6: *G. cardenasianum* north of Santa Ana de Belen, VoS 387





Fig.7: *G. cardenasianum* north of Chayaza, VoS 1003



Fig. 8: *G. cardenasianum* near Carrizal, VoS 390





Fig. 9: *G. cardenasianum* south of Belen, VoS 391



Fig. 10: *G. cardenasianum* south of Belen, VoS 391



## The localities near Carmen del Obispo and west of Tomayapo

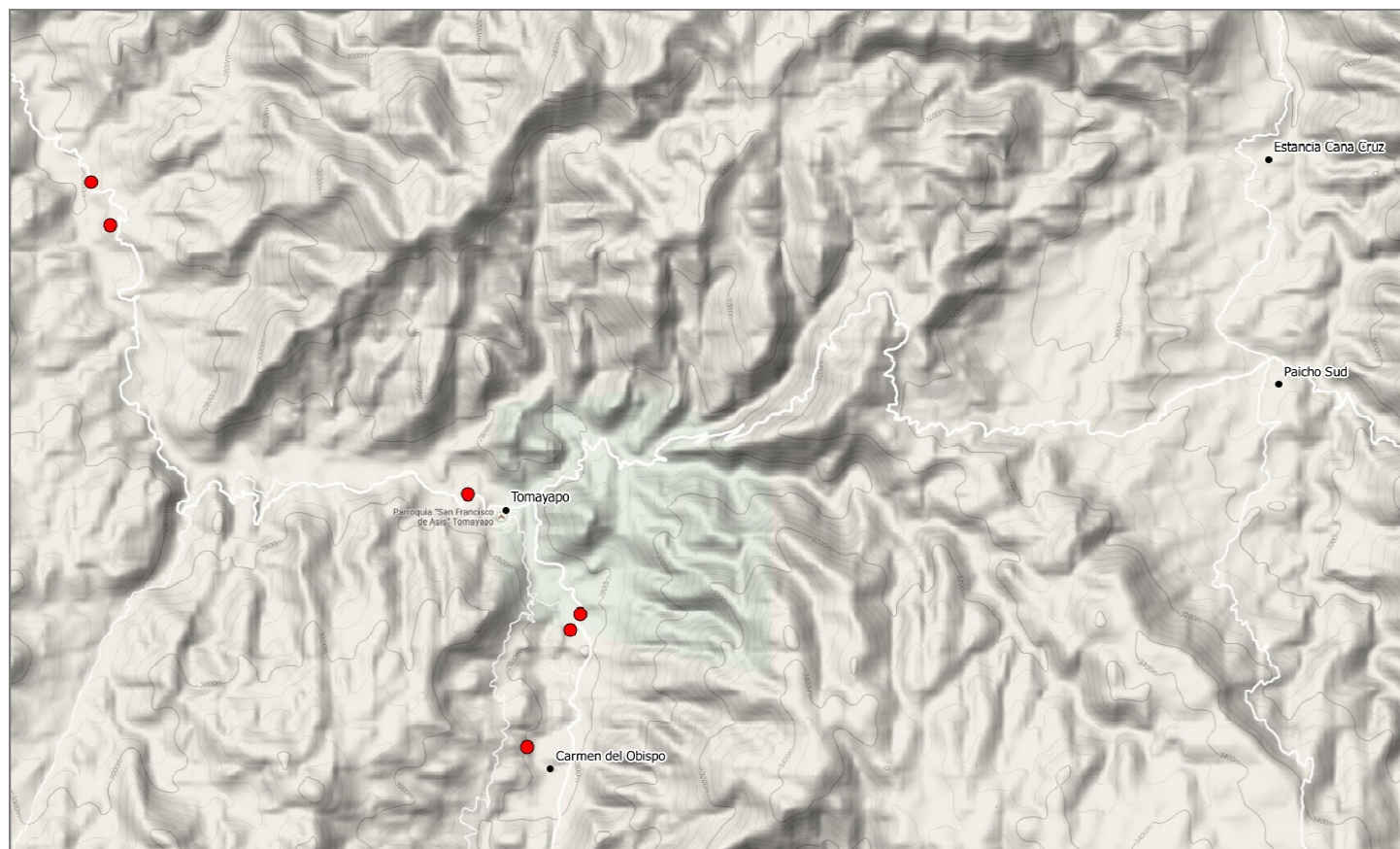


Fig. 11: The distribution area of *G. cardenasianum* near Carmen del Obispo and west of Tomayapo



Fig. 12: En route in the locality near Carmen del Obispo and west of Tomayapo





Fig. 13: *G. cardenasianum* west of Tomayapo, VoS 1002



Fig. 14: View of Parroquia





Fig. 15: *G. cardenasianum* west of Parroquia, VoS 1000



Fig. 16: *G. cardenasianum* south of Parroquia, VoS 999





Fig. 17: *G. cardenasianum* south of Parroquia, VoS 999



Fig. 18: Habitat west of Parroquia





Fig. 19: *G. cardenasianum* north of Carmen del Obispo, VoS 378



Fig. 20: Area north of Carmen del Obispo





Fig. 21: *G. cardenasianum* north of Carmen del Obispo, VoS 379



Fig. 22: *G. cardenasianum* north of Carmen del Obispo, VoS 379



## Locality in Rio Paicho Valley

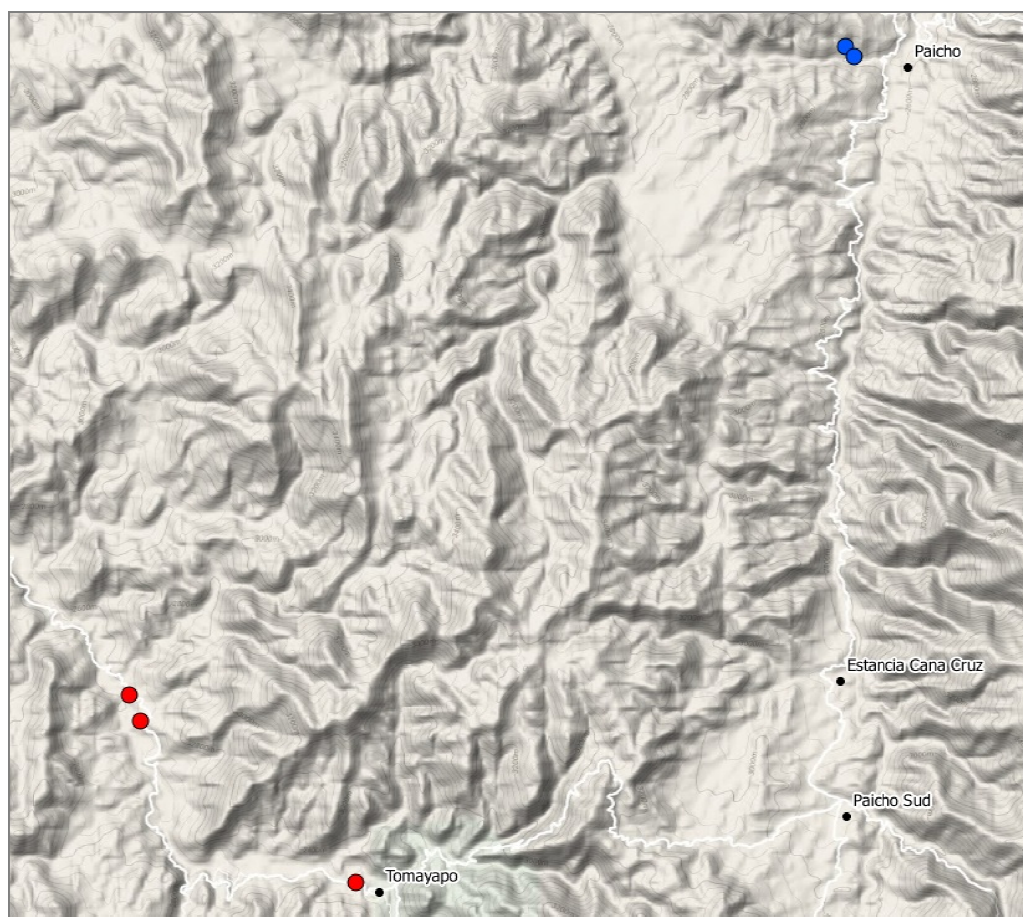


Fig. 23: Distribution area of *G. armatum* (blue) in Rio Paicho Valley



Fig. 24: At the type locality of *G. armatum*



During our investigations we asked ourselves how the plants from the Rio Paicho Valley, which were described as *G. armatum* by F. Ritter, can be distinguished from *G. cardenasianum*.

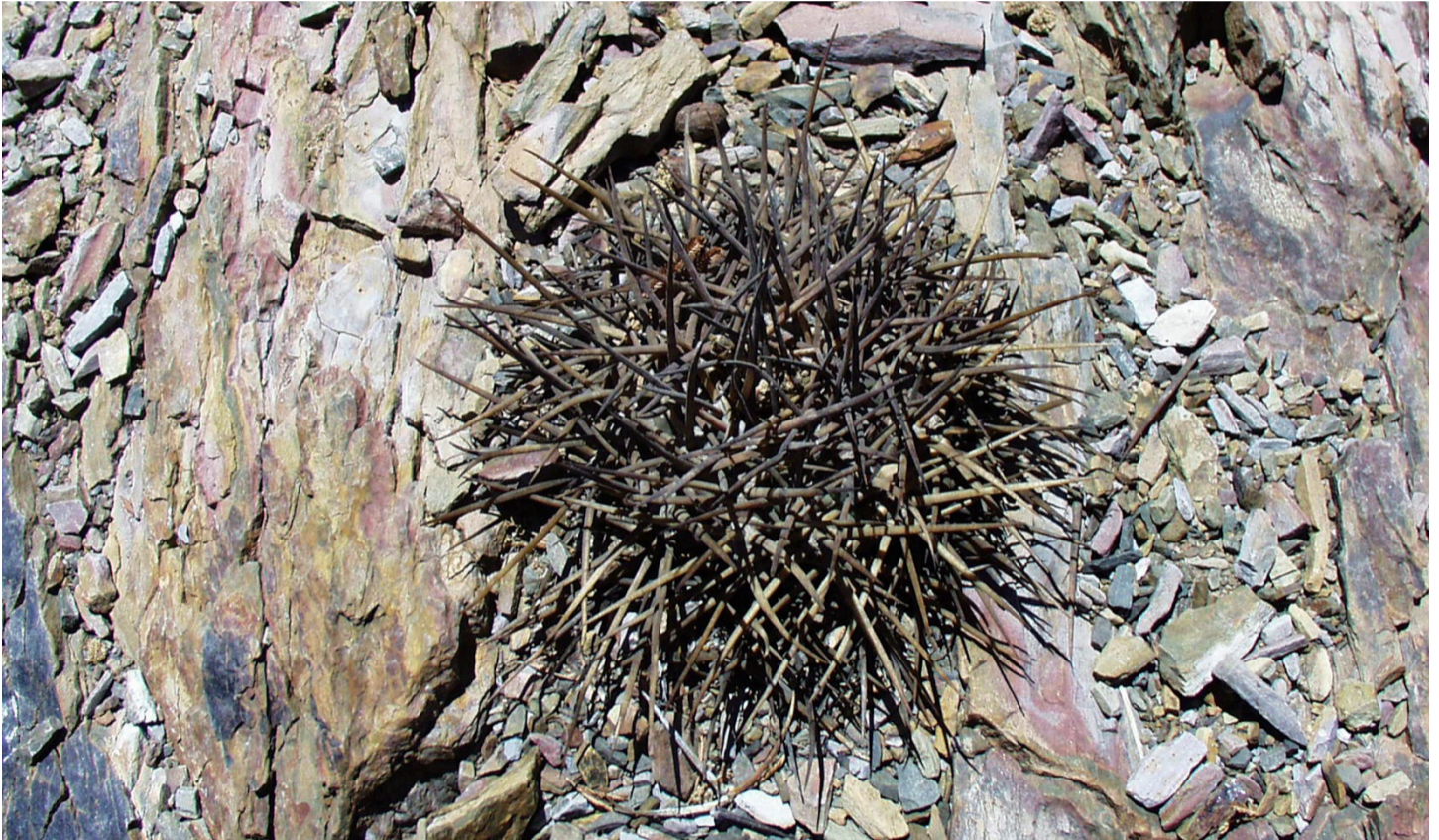


Fig. 25: *G. armatum* on the first visit on October 24<sup>th</sup>, 2003



Fig. 26: *G. armatum* on the first visit on October 24<sup>th</sup>, 2003, the plants had not yet absorbed much water





Fig. 27: *G. armatum* at discovery site in the Paicho Valley (February 13<sup>th</sup>, 2008)



Fig. 28: *G. armatum* at discovery site in the Paicho Valley (February 13<sup>th</sup>, 2008)





Abb. 29: *G. armatum* in habitat in the Paicho Valley (February 9<sup>th</sup>, 2011)



Fig. 30: *G. armatum* at discovery site in the Paicho Valley (February 9<sup>th</sup>, 2011), rarely with light spines





Fig. 31: *G. armatum* at discovery site in the Paicho Valley (February 9th, 2011)

As far as *G. armatum* Ritter and *G. cardenasianum* Ritter are concerned, we could not establish any substantial differences between the two taxa by means of first descriptions, observation of cultivated plants and plants at their discovery sites.

*G. armatum* Ritter grows in schistose soil and *G. cardenasianum* Ritter in gravelly, loamy soil. The spines of *G. armatum* Ritter often protrude straight from the plant, the spine colour is often darker than in *G. cardenasianum* Ritter.

The small size of bodies and flowers of *G. armatum* Ritter are striking.

The differences referring to size of seed established by various authors cannot be confirmed here on the basis of our observations.



Fig. 32 : *G. armatum* VoS 996



Fig. 33: *G. cardenasianum* VoS 1005



The habitats of *G. cardenasianum* are situated about 250 km distance by air more to the north than the northernmost *G. spegazzinii* populations in the Quebrada del Toro, Argentina.

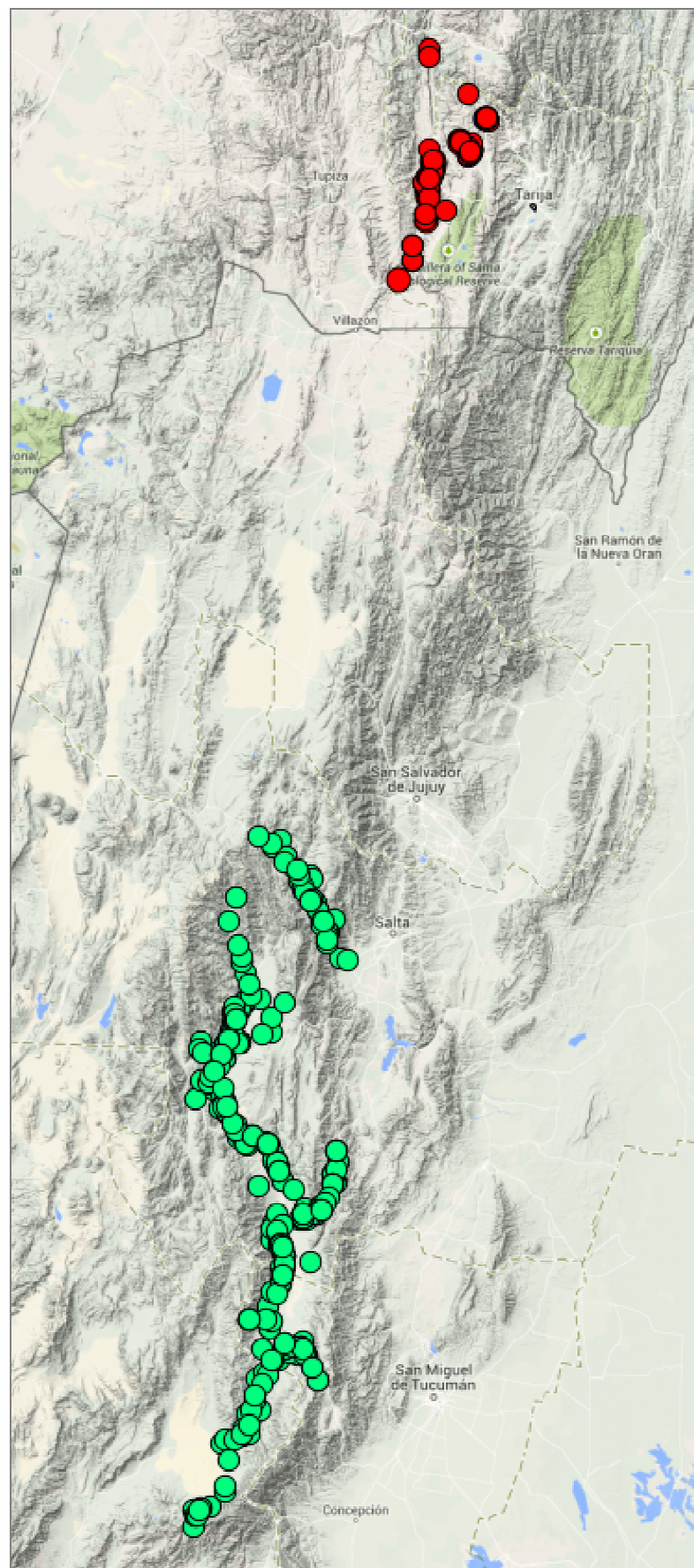


Fig. 34: Distribution area of *G. cardenasianum* (red) and *G. spegazzinii* (green) in Bolivia and Argentina



The distribution areas of *G. cardenasianum* Ritter and *G. spegazzinii* Britton & Rose are locally well-separated from each other.



Fig. 35: In Quebrada del Toro, Argentina



Fig. 36: *G. spegazzinii* VoS 95, Quebrada del Toro





Fig. 37: *G. spegazzinii* VoS 95, Quebrada del Toro



Fig. 38: Habitat of *G. spegazzinii*, area between Cachi and Molinos





Fig. 39: *G. spegazzinii* var. *major* VoS 98, south of Cachi

*G. spegazzinii* Britton & Rose is the species with the largest distribution area and the widest variability within this group.

*G. spegazzinii* subsp. *spegazzinii* has mostly non-protruding spines and no central spine. The two taxa *G. cardenasianum* und *G. spegazzinii* are very similar, but cannot be mistaken for one another.





Fig. 40: Seeds of *G. cardenasianum* VoS 999



Fig. 41: Seeds of *G. spegazzinii* VoS 843

The seeds of *G. cardenasianum* Ritter can be easily distinguished from those of *G. spegazzinii* Britton & Rose.



## CONCLUSION

The distribution areas of *G. cardenasianum* Ritter and *G. spegazzinii* Britton & Rose are well-separated locally. *G. spegazzinii* Britton & Rose is the species with the largest distribution area and the greatest variability within this group. The two taxa are very similar, but cannot be mistaken for one another. *G. cardenasianum* Ritter can be easily distinguished in habitus from *G. spegazzinii* Britton & Rose by its narrower ribs, more protruding spines, a shorter pericarpel and up to two central spines. It has its closest similarities with *G. spegazzinii* Britton & Rose from Quebrada del Toro, Province of Salta, Argentina. The seeds of both taxa are easily distinguishable. The seed of *G. cardenasianum* Ritter is very much arched dorsally and the hilum-micropylar area is elongated ventrally. *G. armatum* Ritter is regarded as a variety of *G. cardenasianum* Ritter due to only minor distinguishing features.

All plant figures by Volker Schädlich, all map figures by Mario Wick.

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