

— *John Pilbeam* —

Gymnocalycium

A Collector's Guide

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JOHN PILBEAM

Photography by

BILL WEIGHTMAN



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Preface

The genus *Gymnocalycium* has been popular with cactus fanciers for many years. It is widespread in the wild, with most species occurring in northern Argentina and southern Bolivia, and a handful in southern Brazil, south-western and northern Paraguay and Uruguay. New species or variants of species have been discovered steadily since the recognition by Britton and Rose in 1922 of Karl Pfeiffer's genus *Gymnocalycium*, proposed by him some 70 years before, and some of the earliest of cactus illustrations are of species of *Gymnocalycium*, then called under the umbrella name for ribbed, globular cacti, *Echinocactus*.

Britton and Rose recognized 23 species, as follows: *G. anisitsii*, *G. brachyanthum*, *G. damsii*, *G. denudatum*, *G. gibbosum*, *G. guerkeanum*, *G. hyptiacanthum*, *G. joossensianum*, *G. kurtzianum*, *G. leeanum*, *G. megalothelos*, *G. melanocarpum*, *G. mihanovichii*, *G. monvillei*, *G. mostii*, *G. multiflorum*, *G. netrelianum*, *G. platense*, *G. saglione*, *G. schickendantzii*, *G. spegazzinii*, *G. stuckertii*, *G. uruguayense*.

Backeberg in his monumental work, *Die Cactaceae*, expanded this considerably, listing 65 species, recognizing 58 of them, and included 27 recognized varieties. They were as follows: *G. albispinum*, *G. andreae* (& var. *grandiflorum*), *G. anisitsii*, *G. artigas*, *G. asterium*, *G. baldianum*, *G. bodenbenderianum*, *G. brachypetalum*, *G. bruchii*, *G. calochlorum* (& var. *proliferum*), *G. capillaense*, *G. cardenasianum*, *G. castellanosi*, *G. chubutense*, *G. damsii*, *G. deeszianum*, *G. denudatum*, *G. eytianum*, *G. fleischerianum*, *G. gibbosum* (& var. *leucodictyon*, var. *nigrum*, var. *nobile*), *G. grandiflorum*, *G. guerkeanum*, *G. hossei* (& var. *longispinum*), *G. hybopleurum* (& var. *euchlorum*), *G. hyptiacanthum* (& var. *citriflorum*), *G. joossensianum*, *G. knebelii*, *G. lagunillasense*, *G. leeanum* (& var. *brevispinum*, var. *netrelianum*), *G. leptanthum*, *G. marquezii*, *G. marsoneri*, *G. mazanense* (& var. *breviflorum*, var. *ferox*), *G. megalothelos*, *G. megatae*, *G. melanocarpum*, *G. michoga* (incl. *G. tortuga* Hort.), *G. mihanovichii* (& var. *friedrichii*, var. *melocactiforme*, var. *pirarettaense*, var. *stenogonum*), *G. monvillei*, *G. mostii* (& var. *kurtzianum*), *G. multiflorum*, *G. nidulans*, *G. nigriareolatum* (& var. *densispinum*), *G. ochoterenai* (& var. *cinereum*), *G. oenanthemum*, *G. onychacanthum*, *G. parvulum*, *G. pflanzii*, *G. platense*, *G. quehlianum* (& var. *albispinum*, var. *flavispinum*, var. *rolfianum*, var. *zantnerianum*), *G. ragonesei*, *G. riograndense*, *G. saglione*, *G. schickendantzii* (& var. *delaetii*), *G. sigelianum*, *G. schroederianum*, *G. spegazzinii* (& var. *major*), *G. stuckertii*, *G. triacanthum*, *G. tuda*, *G. uruguayense*, *G. valnicekianum*, *G. vatteri*, *G. weissianum* (& var. *atroroseum*, var. *cinerascens*), *G. zegarrae*; he also listed *G. saglione* var. *tilcareense*, but pulled it out of *Gymnocalycium* into a separate monotypic genus, viz. *Brachycalycium tilcareense*.

Bohumil Schütz of Czechoslovakia in a recent monograph lists over 100 species, with question-marks over some. But the most recent general pronouncement on the make-up of the genus is in the *CITES Cactaceae Checklist* compiled by David Hunt,

consulting three eminent students of this genus for the content on *Gymnocalycium*, Massimo Meregalli, Detlev Metzger and Geoffrey Swales. They recognize as accepted species 37, and as ‘provisionally accepted’ a further 42.

Accepted species are: *G. alboareolatum*, *G. andreae*, *G. anisitsii*, *G. baldianum*, *G. bodenbenderianum*, *G. bruchii*, *G. buenekeri*, *G. calochlorum*, *G. capillaense*, *G. cardenasiense*, *G. castellanosi*, *G. chiquitanum*, *G. deesziense*, *G. denudatum*, *G. fleischerianum*, *G. gibbosum*, *G. horstii*, *G. hossei*, *G. hybopleurum*, *G. leptanthum*, *G. marsoneri*, *G. mesopotarnicum*, *G. mihanovichii*, *G. monvillei*, *G. mostii*, *G. nigriarolatum*, *G. oenanthemum*, *G. paediophilum* (sic!), *G. paraguayense*, *G. pflanzii*, *G. quehlianum*, *G. ragonesei*, *G. saglionis*, *G. schickendantzii*, *G. schroederianum*, *G. spegazzinii*, *G. uruguayense*. Provisionally accepted species are: *G. acorrhagatum*, *G. ambatoense*, *G. bayrianum*, *G. bicolor*, *G. borthii*, *G. carminanthum*, *G. erinaceum*, *G. eurypleurum*, *G. ferrarii*, *G. friedrichii*, *G. glaucum*, *G. guanchinense*, *G. horridispinum*, *G. hyptiacanthum*, *G. intertextum*, *G. joossensianum*, *G. kieslingii*, *G. leeanum*, *G. mazanense*, *G. megalothelon* (sic!), *G. melanocarpum*, *G. multijflorum*, *G. netrelianum*, *G. obductum*, *G. occultum*, *G. ochoteranae* (sic!), *G. piltziorum*, *G. platense*, *G. pungens*, *G. rauschii*, *G. riojense*, *G. ritterianum*, *G. schatzlianum*, *G. stellatum* (in part), *G. striglianum*, *G. stuckertii*, *G. taningaense*, *G. tillianum*, *G. triacanthum*, *G. uebelmannianum*, *G. valnicekianum*, *G. vatteri*.

It is worth spelling out the definition of the category ‘provisionally accepted’, which is broad in its application, with no indication as to what category applies to the different species listed. It is as follows: ‘Correct’ names at specific rank (according to current generic usage, where combinations exist) of taxa treated as distinct species in one or more of the secondary sources consulted, or as distinct subspecies (or, exceptionally, varieties) in a primary source, together with names of taxa whose acceptance is disputed or awaits confirmation’. The primary source for *Gymnocalycium* was Massimo Meregalli’s publication ‘Il genere *Gymnocalycium*’ published in *Piante Grasse* 51:5-63 (1985); secondary sources were those mentioned above, and maybe others, e.g. Roberto Kiesling, who is keenly interested in this genus as it occurs in Argentina.

Since Britton and Rose’s classic base, *The Cactaceae*, the genus has been generally acknowledged, and the distinct appearance of the species has caused little confusion with other genera. The naked bud, for which the genus was named, the distinctive form with more or less prominent ‘chins’, as the humps on the ribs have come to be called from the resemblance to a human chin, and the often distinctive spination have few imitators, and most collectors can immediately identify most *Gymnocalycium* species as of that genus, and recognize the more common of them readily. Some species are very distinct, and can be confused with no other, while others merge in appearance, and are more or less closely related. Several are very variable, and this has led to a proliferation of infraspecific names to point up these differences, often poorly founded with no indication of their origins. Many such names are entirely unnecessary, have fallen by the wayside since their erection, and can largely be ignored.

The present most popular classification is based on seed structure, and is not wholly satisfactory, especially from the collector’s point of view, since seed is not available readily, and needs usually at least a $\times 10$ lens to determine the group it belongs to. But it gives a broad basis for groupings, which, together with other characters helps better to understand the species’ relationships and base further study. The similarities in the seeds’ shape and size, which more or less tie in with their geographical distribution have resulted in other schemes of classification, notably by Buxbaum, which has some strong followers, fined down further on body and spine characters – see Chapter 2. Few

species present any difficulty in cultivation, provided that basic requirements for cactus cultivation are followed, and in some 40 years cactus growing I cannot ever remember losing a *Gymnocalycium*, except to an acquisitive friend.

I hope that this book, intended for use by the enthusiast rather than to be taken too seriously as a monograph, which it is not, will show the collector what the range of species is, and help him identify or verify the plants he acquires, as well as presenting under one cover information scattered hitherto in various publications over a period of many years. In the course of its preparation I have swelled my collection of this genus from a modest 120 plants to over 800, and have travelled extensively to see various collections, or corresponded with enthusiasts in the UK, the USA, Canada, Australia, Germany, Belgium and Czechoslovakia. That *Gymnocalycium*s are widely popular is in no doubt; if this book helps a little to increase their popularity it will have achieved all I could hope for it.

John Pilbeam, 1994

Acknowledgements

Once again I have leaned heavily on Bill Weightman's excellent photography, to show the plants as they appear in collections rather than in the wild, and my thanks are due to him for his usual painstaking work, and his constant lack of objection to my demands on his time. I am grateful too to friends in Czechoslovakia, who have contributed some of the photographs, including Jan Říha, Rudolf Šubík, Vaclav Jiránek and Jan Kral, and to Janislav Egide also from that country for helpful correspondence. I am deeply indebted to Detlev Metzging of West Germany, who has also provided photographs included here, and in addition has provided the invaluable chapter on distribution and geography, for the benefit of those seeking answers to some of the finer points of species' relationships in the field. Ludwig Bercht, former editor of that excellent publication *Succulenta*, the journal of the Dutch and Belgian societies, has helped also. And Dr Meregali of Italy has kindly read the working text and offered useful suggestions for improvement.

My thanks are due to Bill Putnam too, whose invaluable booklet on the genus has been well thumbed during my explorations, and whose collection I have raided for photography. His advice and pragmatic approach to the taxonomy of the genus has been an invaluable cornerstone on which to build this guide, and I am indebted to his constructive and unfettered comments on the manuscript submitted to him for that purpose.

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I must also acknowledge the work of Gunther Moser, who some years ago made available to the Succulent Plant Institute seed from his extensive collection of this genus, which forms the basis of many collections in cultivation in the UK and elsewhere. And of course there are the many enthusiasts for this genus whose brains I picked and whose collections I raided for plants or for photography; a few I must name (I hope without giving offence to those who helped less extensively) are Jacques Lambert, Roberto Kiesling, Derek Bowdery, Gordon Foster, Graham Charles (who supplied most of the habitat photographs included in Chapter 6 as well as a few photographs of cultivated plants), Cok Grootscholten, Roy Keeler, Carl Volkers and Jim Kampwirth, Marion Hopson, Alain Sutton, Ray Scott, Will Tjaden and particularly Charlotte Walton and Jan Zawadski for unstinting help with German and Czech texts.

CHAPTER 1

Cultivation

Gymnocalycium plants in general present no problems in cultivation, and will respond well if potted on regularly every two or three years, to make flowering size plants fairly quickly, some within two years from seed, and will provide some of the finest spination in the Cactaceae.

Many stay solitary and will be content even after 20 years or so with a 10-12cm pot, provided that the soil is changed every so often. Others will make many-headed clusters to fill quickly a 30 cm pan. The really large-stemmed species can be numbered on one hand, and include *G. buenekerii*, *G. horstii*, *G. saglionis*, *G. pflanzii*, *G. castellanosii*, *G. horridispinum* and *G. gibbosum* (well, perhaps two hands). A few others will attain good-sized proportions as individuals, but are generally slower to get there, and more rarely seen.

POTTING MEDIUM

The balance of the potting medium should be sufficient to allow good drainage, so that the plants do not sit in soggy soil for more than a day or two after watering. A coarse grit should be incorporated at about the proportions of 1 to 3 parts potting medium, to achieve this. The popularity of soil-less composts (mainly peat-based) has waned in the last few years, although it seemed to suit *Gymnocalyciums* well enough. Problems arise after a few years when it compacts, is difficult to rewet after a dry winter rest, and clings tenaciously to the very good root system produced, making for difficulties when repotting.

After some years of almost unobtainable good commercial soil-based composts in the UK, there are some rewardingly good products on the market once more, and these are recommended, especially with the swell of opinion against the depletion of our peat-bogs.

Frequent repotting, however, whatever medium is used, seems to suit *Gymnocalyciums*, as they will often slow down in growth after a year or so in the same compost. This may be due to lack of nutrients, which can be supplied by suitable feeding (see below), or a change in the pH balance of the soil; a soil with a neutral or slightly acid reading seems to give best results. A layer of peat or similar water-retentive material at the bottom of the pot seems to prevent the fine roots from drying out too quickly, and certainly prevents the soil falling out of the pot through the drainage holes, which if you use a sandy mix, is sometimes a problem during the winter rest.

WATERING

With their drought resisting, chunky bodies and thick, wax-like epidermis, I think

Gymnocalyciums would last without water at all for some considerable time. Certainly root loss is most often caused by a too eager hand on the watering-can.

Watering in the summer months, while the plants are growing well can be frequent (weekly for small plants in small pots), but always allowing the compost nearly to dry out before rewatering. A gentle finger or label into the top inch or two of soil will tell you whether moisture is still present and available to the roots, or get to know the relative weight of the pots, dry and wet, to assess when it is right to tip the scales again.

Watering in the winter months at all is unwise, and certainly not necessary. The difficult times are spring and autumn. In spring in the UK I take the first day in March as my signal, but the second trigger I find necessary are a few fine days (all too rare sometimes in March), and until they are forecast I withhold water. Once I am sure the sun is to oblige I give a real drenching, and then leave well alone for several weeks. This encourages the dried-up roots to send out new fine hair roots to kick off the growing cycle. After about 2 or 3 weeks, when the compost has dried out somewhat, watering can be gradually increased in frequency, but you should still allow the soil almost to dry out between waterings.

In autumn watering should be gradually reduced in frequency, to encourage plants to stop growing, until, around the end of September to mid-October the larger pots should be dried off completely. Watering of the smaller pots (up to about 8 cm) can go on until nearly the end of October, but after this you risk them standing wet through November, and this is I am sure not a good idea.

LIGHT

Some species are shade-seeking in the wild, among shrubs or grasses, while others grow completely exposed. Some will therefore need a light shading from the sun in the hottest months, but to overdo this will result in loss of flowers. It is not necessary in the UK usually before June, and then only lightly, and it should be dispensed with in September.

TEMPERATURE

Most Gymnocalyciums come from fairly low elevations, at about 500-1000 m, and few I think will be really frost-hardy, but they will tolerate quite cold conditions. I have kept my plants at about a minimum of 4°C in the winter (dry at the root) for many years, and none have noticeably suffered. Perhaps some of the Paraguayan and Brazilian species would be happier with a higher temperature, but I do not think it is necessary, except perhaps for seedlings.

VEGETATIVE PROPAGATION

Those species which produce offsets can be readily propagated by cuttings. Dusting lightly with a fungicide powder (both cutting and parent) at the point of removal immediately will remove the risk of rotting either. Most hormone rooting powders contain such a fungicide. The cutting should be removed at the narrowest point and left to dry for a day or two before being placed on dry, sandy compost preferably with bottom heat. After a few weeks the beginnings of roots should show at the base of the cuttings, when a good soaking of the compost will encourage them to develop and to fill

the offset with moisture and start an independent existence. Late spring and summer is the best time for taking cuttings.

SEED RAISING

Gymnocalycium seed germinates well when fresh, and will keep for a few years if stored in cold conditions. I sow in small pots (5 cm), which are placed in a deeper-than-usual seedtray, so that there is about 2 cm space between the surface of the soil in the pots and the covering of thin plastic (clingfilm), which is sticky-taped tightly over the top of the tray. About one third of the soil, at the base of the pot, is peat, with the top two thirds a mixture of soil-based potting compost and silver sand in the proportions of two of compost to one of sand. I microwave the mixture to destroy any pests, particularly *Sciara* fly, their pupae or their larvae (often present in bought peat composts), and, once cool, sow the seed on the surface, pressing it lightly into the medium with a smooth, flat, square of wood cut to the size of the pots. The whole tray is then covered with plastic and sealed at the sides, as indicated above, after which it is half immersed in a solution of a fungicide, until the surface of the soil is seen to be wet. The tray is placed in a propagator (mine is a soil-warming cable in sand in a home-made frame), and a temperature of about 20°C is aimed at. The trays remain covered for about 6 months. Watering is necessary only when the condensation on the covering becomes patchy, indicating that some of the pots are drying out. Once the covering is removed, care must be taken to keep the soil moist; heavy spraying about once a week is better than too heavy-handed soaking. The seedlings should be kept all along in strong light, but not in direct sunlight. If they are large enough to handle, i.e. small pea-size, they can, with advantage, be pricked out into seedtrays at about 6 months old, and provided that they have been sown early in the year, in January or February, most species will have achieved this size in the first growing season. By late autumn they should have reached sufficient size to be dried off over the winter. In early spring the following year they can be potted up individually.

GRAFTING

It is not usually necessary to graft *Gymnocalyciums*, except for chlorophyll-less, or strongly variegated plants, but it may be resorted to in order to grow on seedlings of slow-growing species more quickly or to propagate more easily solitary or cristate plants.

Flat grafting seems to be the most commonly used these days, and it really is the easiest to do. The best time for grafting is when both the stock (the bottom part, usually a cereoid cactus) and the scion (the top part, i.e. the *Gymnocalycium* you are grafting) are actively growing, usually from about April to August in the UK. Choose a stock large enough to support the full size the scion is likely to attain, which is usually larger than you might think. Cut off the top centimetre or so, preferably within the current year's growth, and replace the cut off top to keep the stock's surface moist. Cut the bottom off the scion, placing the bottom of the cut surface immediately on to the uncovered cut surface of the stock, ensuring that the vascular bundles of each (the ring in the middle of the cut surfaces) are overlapping. Hold the scion in position with a rubber band, a size appropriate to exerting light pressure, only enough to keep the cut surfaces firmly in contact with each other. The band may be removed after about 10 days, and the stocks given a good watering to encourage growth of the scion. Within a

couple of weeks growth should show, as the scion takes up the moisture through the stock. And if at first you do not succeed, try, try and try again; it is a skill that comes with practice.

PESTS AND DISEASES

As much as any other cacti, *Gymnocalycium*s suffer from the persistent pest, mealy-bug, in both its forms. It is a small, meal-covered, slow-moving pest, about 3 to 5 mm long which surrounds itself with a cottonwool-like substance in which to lay its eggs, and it multiplies rapidly.

Fortunately, with their usually less densely spined habit, as well as their generally solitary form, *Gymnocalycium* plants can have these pests physically removed when they occur on the body of the plant. I have found a clean, well-worn, house paintbrush is the best tool for this job, conducted well away from other plants of course; be sure to remove the plant from the pot, and get the brush well into the crannies around the neck of the plant. If this is not possible, or in any case as a preventative measure, spraying with an insecticide containing dimethoate is advisable as well, thoroughly drenching the plant and compost, late in the evening for best effect, since cactus stomata open at night, which should allow passage of some of the insecticide into the plant.

For the much smaller root mealy-bug (about 2 mm long), which occurs on the root system of these plants, evidenced also by a white, cottonwool-like substance, the only really effective treatment is complete removal by washing, of the soil around the roots, followed by drenching in insecticide, and thorough drying before repotting in fresh compost and clean pots. A drenching once or twice a year with a dimethoate-based insecticide will act preventatively against this pest as well.

Because of their thick epidermis, *Gymnocalycium*s suffer little from another pest prevalent with some other cactus genera, the red spider mite, but young seedlings are sometimes attacked. Similar drenching to that mentioned above will clear them of this pest.

The *Sciara* fly will attack seedlings also, and sometimes mature plants, especially if peat is used in the potting mixture. Spraying the tiny, slow-moving, black flies with insecticide when seen will help control this pest, but it will occur sooner or later if peat-based composts are used. Drenching will bring to the surface any larvae not actually inside the roots or plant body, but I doubt whether it affects those which have already penetrated the plant.

*Gymnocalycium*s, like other cacti will suffer from fungal disorders if overwatered, but often only the root system will collapse, leaving you the job of cutting out any rot in the base of the plant, and dusting with a fungicide powder before rerooting. But there is a bacterial disorder which seems to single out this genus for its attacks, evidenced by brown and black mottling of the epidermis, usually spreading over the whole plant. In *Gymnos* 18 (1993) there is an article about this disorder, which is caused by *Agrobacterium tumefaciens*. It is said that fungicides seem to be ineffective, and cutting out the affected parts (sterilizing the blade between cuts) is recommended, followed by covering the cut parts with charcoal dust. There is said to be no multiplying by spores: It spreads only within the plant body and soil, also via wooden utensils if used. I would nevertheless recommend isolation of the plants affected, in case the infection could be carried by water leaching from the bottom of the pots to others.

CHAPTER 2

Classification

The classification of *Gymnocalycium* which most students of the genus seem to favour is that of Dr Bohumil Schütz, as most recently updated in his book, *Monografie rodu Gymnocalycium* (in Czech). But there is still strong support for Buxbaum's classification of 1968, published in Krainz's *Die Kakteen*. As authors of new species or combinations tend to follow either or both in their descriptions, both systems are expounded below, albeit in brief for Buxbaum. Both are based on seed characters.

SCHÜTZ'S CLASSIFICATION

Schütz defines 6 subgenera, which are broken down into 11 sections, although two of his subgenera are not so divided, making in effect 13 sections. With the even more recent finding by Detlev Metzinger (*Gymnos* 9:3-6 (1992)) that the type species was wrongly placed (i.e. *G. gibbosum* replacing *G. denudatum*) there has necessarily been some adjustment to the names of the subgenera and sections, since the type species of the genus necessitates the naming of the subgenus and section it is in as *Gymnocalycium*. The former subgenus *Macrosemineum* is therefore reinstated, and the subgenus *Ovatisemineum* becomes the subgenus *Gymnocalycium*. The subgenera, sections and species allocated to them are as follows:

Subgenus *Macrosemineum* – fruit berry-like, staying green, even when ripe; seed large, about 2-3 mm, hemispherical with wrinkled testa, black, a little shiny.

Type species: *G. denudatum*.

Geography: Uruguay, southern Brazil, eastern Paraguay, and north-western Argentina.

Section *Denudata* – seed averaging to 3 mm, black.

Geography: Uruguay and southern Brazil.

Type species: *G. denudatum*.

Species included:

<i>G. buenekeri?</i>	<i>G. melanocarpum</i>
<i>G. denudatum</i>	<i>G. mesopotamicum</i>
<i>G. horstii?</i>	<i>G. netrelianum</i>
<i>G. megalothelos</i>	<i>G. uruguayense</i>

(Schütz did not include here *G. horstii* or *G. buenekeri* from the same general area as this subgenus. The seed is similar to the other species here, but smaller and with raised tubercles on the testa in the manner of *Trichosemineum*, but not with that subgenus's prominent aril/hilum.

Section *Paraguayensia* – seed smaller than previous section, averaging to 2 mm, greyish.

Geography: Paraguay, east of Rio Paraguay.

Type species: *G. fleischerianum*.

Species included:

G. fleischerianum

G. paraguayense

Subgenus *Gymnocalycium* (syn. *Ovatisemineum*) – seed large, averaging 1 mm, round, or almost round, at the end as though cut off, either black, or coated light brown.

Type species: *G. gibbosum*.

Geography: Argentina (Patagonia, Cordoba).

Section *Gymnocalycium* (syn. *Ovatisemineum*).

Type species: *G. gibbosum*.

Geography: Argentina (Patagonia, Cordoba).

Species included:

G. alboareolatum *G. gibbosum* *G. schatzlianum*

G. andreae *G. hyptiacanthum* *G. schroederianum*

G. baldianum *G. kieslingii* *G. strigianum*

G. borthii *G. neuhuberi* *G. tanningaense*

G. deeszianum *G. platense* *G. uebelmannianum*

G. erinaceum *G. rauschii*

Section *Lafaldensia* – stems mostly about 2 cm in diameter, offsetting prolifically.

Type species: *G. (lafaldense) bruchii*.

Geography: Argentina (Cordoba).

Species included:

G. bruchii

Subgenus *Microsemineum* – plants very variable. Fruits splitting perpendicularly.

Seeds tiny, averaging about 1 mm.

Type species: *G. saglionis*.

Geography: north-west Argentina, southern Bolivia.

Section *Microsemineum* (syn. Sect. *Saglioni*) – plants variable, solitary stems getting to about 50 cm or more. Fruit large and round, splitting perpendicularly. Seed small, average 0.6 mm, testa tuberculate, dull, hilum with raised margin.

Type species: *G. saglionis*.

Geography: Argentina (Salta, Tucuman, Catamarca, La Rioja, San Juan, San Luis).

Species included:

G. saglionis

Section *Hybopleura* – plants mostly hemispherical, sometimes shortly columnar, to 15 cm in diameter. Flowers large. Fruit splitting perpendicularly. Seed smaller, about 0.5 mm, dull, dark brown.

Type species: *G. hybopleurum*.

Geography: Argentina (Cordoba, Mendoza, San Juan, Catamarca).

Species included:

G. acorrugatum *G. horridispinum* *G. oenanthemum*

G. achirasense *G. hybopleurum* *G. schuetzianum*

G. bicolor *G. monvillei* *G. tillianum*

G. cardenasianum *G. mostii* *G. valnicekianum*

G. carminanthum *G. multflorum*

Section *Calochlora* – smaller plants, about 8 cm in diameter, low growing, flattish,

offsetting prolifically. Fruit splitting perpendicularly. Seed larger than most in the subgenus, 0.5 to 1 mm, round, testa matt black.

Type species: *G. calochlorum*.

Geography: Argentina (Cordoba).

Species included:

G. calochlorum

G. capillaense

G. leptanthum

Section Loricata – plants flat-globular to globular, sometimes elongating a little in cultivation, to about 20 cm tall. Fruit splitting perpendicularly. Seed smaller, about 0.5 mm, roughly tuberculate, shiny.

Type species: *G. spegazzinii*.

Geography: Argentina (Salta, Tucuman, Jujuy), southern Bolivia.

Species included:

G. bayrianum

G. cardenasianum

G. spegazzinii

Section Mazanensia - plants middle-sized for the subgenus, about 15 cm in diameter, globular. Flowers smaller, about 4 cm. Fruit splitting perpendicularly. Seed smaller, about 0.5 mm, finely tuberculate, dull or shiny black.

Type species: *G. hossei*.

Geography: Argentina (La Rioja, Catamarca, Tucuman, Cordoba), Bolivia?, Paraguay?

Species included:

G. ambatoense

G. hossei

G. ritterianum

G. castellanosii

G. mazanense

G. weissianum

G. ferrarii

G. nidulans

G. chiquitanum

G. glaucum

G. nigriareolatum

G. paediophyllum

G. guanchinense

These last two species probably justify the erection of a separate section or even subgenus.

Subgenus *Trichomosemineum* – Plants smaller to middle size, to about 15 cm, mostly flat-growing, usually solitary. Seed about 1 mm, light to dark brown, very shiny, aril large, lighter coloured and very striking.

Type species: *G. quehlianum*.

Geography: Argentina (Cordoba, La Rioja, Catamarca, Tucuman, San Juan).

Species included:

G. bodenbenderianum

G. occultum

G. ragonesei

G. intertextum

G. ochoterenai

G. riojense

G. kozelskianum

G. piltziorum

G. stellatum

G. moserianum

G. platygonum

G. triacanthum

G. obductum

G. quehlianum

G. vatteri

Subgenus *Muscosemineum* – plants variable, some small, some large, to 30 cm in diameter, some flat, some with age columnar. Fruit splitting perpendicularly. Seed about 1 mm, globular, grey, matt, coated as though with cocoa, hilum small, aril drab.

Type species: *G. mihanovichii*.

Geography: Argentina (Cordoba, La Rioja, Catamarca, Tucuman, San Juan), northern Paraguay, Bolivia (Santa Cruz).

Section Muscosemineum - Flowers at top of plant on young areoles, except *G. mihanovichii* var. *stenogonum*, which flowers on older areoles and consequently towards the sides of the stem.

Type species: *G. mihanovichii*.

Geography: as for subgenus.

Species included:

<i>G. anisitsii</i>	<i>G. griseopallidum</i>	<i>G. pungens</i>
<i>G. antherostele</i>	<i>G. joossensianum</i>	<i>G. schickendantzii</i>
<i>G. damsii</i>	<i>G. mihanovichii</i>	<i>G. stenopleurum</i>
<i>G. eurypleurum</i>	<i>G. pseudomalacocarpus</i>	<i>G. stuckertii</i>
<i>G. friedrichii</i>		

Section Periferialia – plants flat and wide, with dark colouring. Flowers appearing at highest outlying areoles.

Type species: *G. megatae*.

Geography: SE Bolivia, Paraguay, SW Brazil (Mato Grosso), NE Argentina

Species included:

<i>G. eytianum</i>	<i>G. marsoneri</i>
<i>G. fricianum</i>	<i>G. matoense</i>
<i>G. hamatum</i>	<i>G. megatae</i>

Subgenus *Pirisemineum* (syn. former Subgenus *Microsemineum*).

Section *Saglionia*/Microsemineum (in part) – fruit nearly round, at first bluish, later, yellowish-green or golden yellow.

Type species: *G. (zegarrae) pflanzii*.

Geography: Bolivia, central and southern Andes, north-west Argentina, and extreme west of Paraguay.

Species included:

G. pflanzii

BUXBAUM'S CLASSIFICATION

(for full details see Buxbaum in Krainz, *Die Kakteen* 1.VII(1968) C VII)

Series Uruguayenses

Subseries Uruguayenses

Species included:

<i>G. artigas</i>	<i>G. melanocarpum</i>
<i>G. depressum</i>	<i>G. netrelianum</i>
<i>G. guerkeanum</i>	<i>G. uruguayense</i>
<i>G. leeanum</i>	

Subseries Denudata

Species included:

<i>G. buenekeri?</i>	<i>G. horstii?</i>
<i>G. denudatum</i>	<i>G. megalothelos</i>
<i>G. fleischerianum</i>	<i>G. mesopotamicum</i>
<i>G. heuschkelianum</i>	<i>G. paraguayense</i>

Series (Baldiana) *Gymnocalycium*

Species included:

<i>G. alboareolatum</i>	<i>G. erinaceum</i>	<i>G. platense</i>
<i>G. andreae</i>	<i>G. gibbosum</i>	<i>G. rauschii</i>
<i>G. baldianum</i>	<i>G. hyptiacanthum</i>	<i>G. schatzlianum</i>
<i>G. borthii</i>	<i>G. kieslingii</i>	<i>G. schroederianum</i>
<i>G. brachypetalum</i>	<i>G. leptanthum</i>	<i>G. strigianum</i>
<i>G. calochlorum</i>	<i>G. neuhuberi</i>	<i>G. stuckertii</i>
<i>G. capillaense</i>	<i>G. ourselianum</i>	<i>G. tanningaense</i>
<i>G. chubutense</i>	<i>G. parvulum</i>	<i>G. uebelmannianum</i>
<i>G. deeszianum</i>		

Series Lafaldenses

Species included:

G. bruchii

Series Mostiana

Species included:

<i>G. acorrugatum</i>	<i>G. guanchinense</i>	<i>G. nigriareolatum</i>
<i>G. ambatoense</i>	<i>G. hossei</i>	<i>G. oenanthemum</i>
<i>G. azureum</i>	<i>G. hybopleurum</i>	<i>G. pugionacanthum</i>
<i>G. bicolor</i>	<i>G. immemorum</i>	<i>G. rhodantherum</i>
<i>G. carminanthum</i>	<i>G. kurtzianum</i>	<i>G. ritterianum</i>
<i>G. curvispinum</i>	<i>G. mazanense</i>	<i>G. tillianum</i>
<i>G. ferrarii</i>	<i>G. mostii</i>	<i>G. tobuschianum</i>
<i>G. glaucum</i>	<i>G. mucidum</i>	<i>G. valnicekianum</i>
<i>G. grandiflorum</i>	<i>G. nidulans</i>	<i>G. weissianum</i>

Series Pileisperma

Species included:

G. tillianum

(Created for the subsequently described *G. tillianum*, this series must also embrace *G. ambatoense*, *G. carminanthum* and *G. oenanthemum*, if accepted, but better would be its amalgamation with the similar species in Series Mostiana).

Series Chiquitana

Species included:

G. chiquitanum
G. paediophyllum

Series Castellanosiana

Species included:

G. bozsingianum
G. castellanosi

Series Quehliana

Species included:

<i>G. bodenbenderianum</i>	<i>G. intertextum</i>	<i>G. moserianum</i>
<i>G. intermedium</i>	<i>G. kozelskianum</i>	<i>G. obductum</i>

<i>G. occultum</i>	<i>G. platygonum</i>	<i>G. riojense</i>
<i>G. ochoterenai</i>	<i>G. pseudoragonesei</i>	<i>G. stellatum</i>
<i>G. parvulum</i>	<i>G. quehlianum</i>	<i>G. triacanthum</i>
<i>G. piltziorum</i>	<i>G. ragonesei</i>	<i>G. vatteri</i>

Series Horridispina

Species included:

<i>G. achirasense</i>	<i>G. monvillei</i>
<i>G. brachyanthum</i>	<i>G. multiflorum</i>
<i>G. horridispinum</i>	<i>G. villamercedense</i>

Series Sagliones

Species included:

<i>G. armatum</i>	<i>G. saglionis</i>
<i>G. bayrianum</i>	<i>G. spegazzinii</i>
<i>G. cardenasianum</i>	<i>G. tilcarensis</i>
<i>G. pugionacanthum</i>	

Series Pflanziana

Species included:

G. pflanzii (sensu lato)

Series Schickendantzianae

Subseries Schickendantzianae

Species included:

<i>G. antherosacos</i>	<i>G. michoga</i>
<i>G. antherostele</i>	<i>G. pungens</i>
<i>G. joossensianum</i>	<i>G. schickendantzii</i>
<i>G. lumbrerasense</i>	<i>G. stuckertii</i>

Subseries Mihanovichiana

Species included:

<i>G. anisitsii</i>	<i>G. griseopallidum</i>
<i>G. damsii</i>	<i>G. mihanovichii</i>
<i>G. eurypleurum</i>	<i>G. stenopleurum</i>
<i>G. friedrichii</i>	

Subseries Marsoneriana

Species included:

<i>G. eytianum</i>	<i>G. marsoneri</i>	<i>G. piricarpum</i>
<i>G. fricianum</i>	<i>G. matoense</i>	<i>G. pseudomalacocarpus</i>
<i>G. hamatum</i>	<i>G. megatae</i>	<i>G. tortuga</i>
<i>G. knebelianum</i>	<i>G. onychacanthum</i>	<i>G. tudaе</i>

CHAPTER 3

Seed, fruit, flowers and spines

SEED

With classification based on seed character, the seed for each species will, of course, be of a shape consistent with the subgenus to which it belongs. Since this is sufficient information for most collectors I have not included individual seed descriptions with each and every species in Chapter 6, but have indicated in the text to which subgenus and series each belongs; this is enough for most collectors, with the aid of a 10× or better 20× magnifying glass to determine whether seed on their own plants is of the right subgenus. In recent years the original description has mostly included considerable detail of the seed, often including scanning electron microscope pictures of incredible magnification, revealing information not available hitherto. Where this detail was included in the original description I have included it in condensed form for the benefit of collectors wishing to have such information. As such detailed information was not included in descriptions more than 20 or so years old, I have not attempted to include such detail, as such detailed information could be misleading, compiled as it must be from what is essentially second-string information.

As most *Gymnocalycium* seed is 1 mm or more in diameter, magnification of the order indicated above gives a very good idea of whether it matches up with the required placing of that species. Remember that the seed produced by a plant will have the character of that plant's seed regardless of whether it has been produced by crossing with its own kind or another species. This means that if you wish to produce seed for such examination you can cross your plants willy-nilly with any other *Gymnocalycium* to produce characteristic seed of that plant. But such seed will of course produce hybrids if sown. And seed of hybrid plants will of course vary from the norm, according to what its parents were.

FRUIT

The fruit of *Gymnocalycium* species also is characteristic of that species, and of the subgenus to which it belongs to a certain extent, but it will vary in its shape and colouring in cultivation, according to the amount of sunlight the plants are receiving, and as it ages. All *Gymnocalycium* fruit splits vertically to expose the seed, except for subgenus *Pirisemineum*, which splits horizontally (see Plates 1 and 2). Some details of the fruit of each species as recorded in original descriptions is included in the text where known.

Figure 1.
Subgenus *Macro-*
semineum (*G.*
megalothelos)
(SEM $\times 35$). This
seed is about twice
the size of other
seed groups, and is
reproduced at only
 $\times 35$, compared
with the other SEM
photographs at
 $\times 70$.

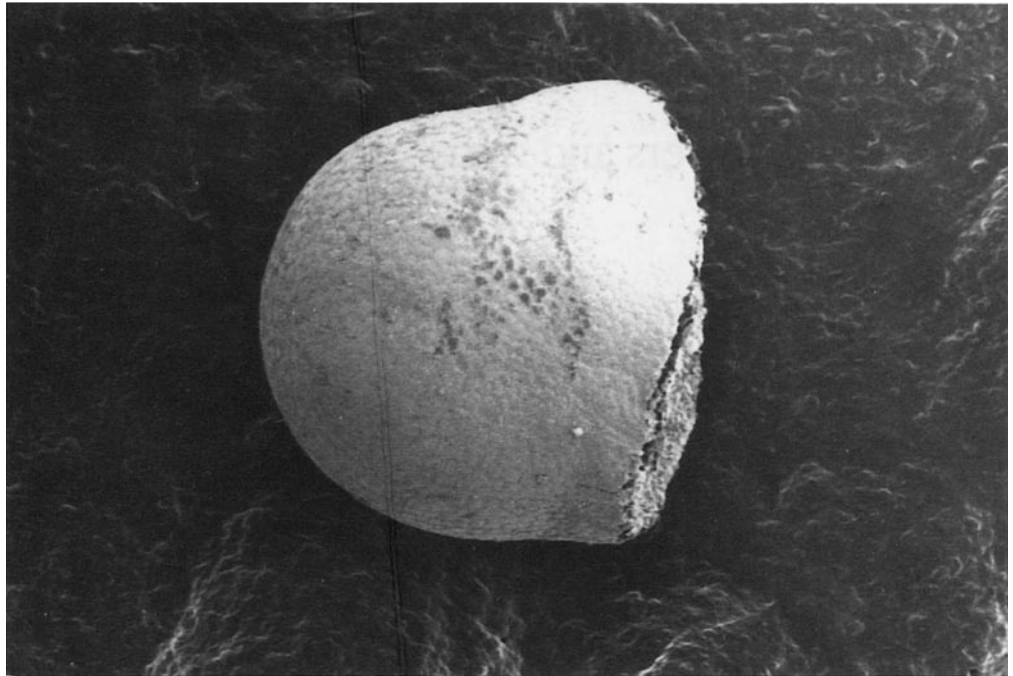
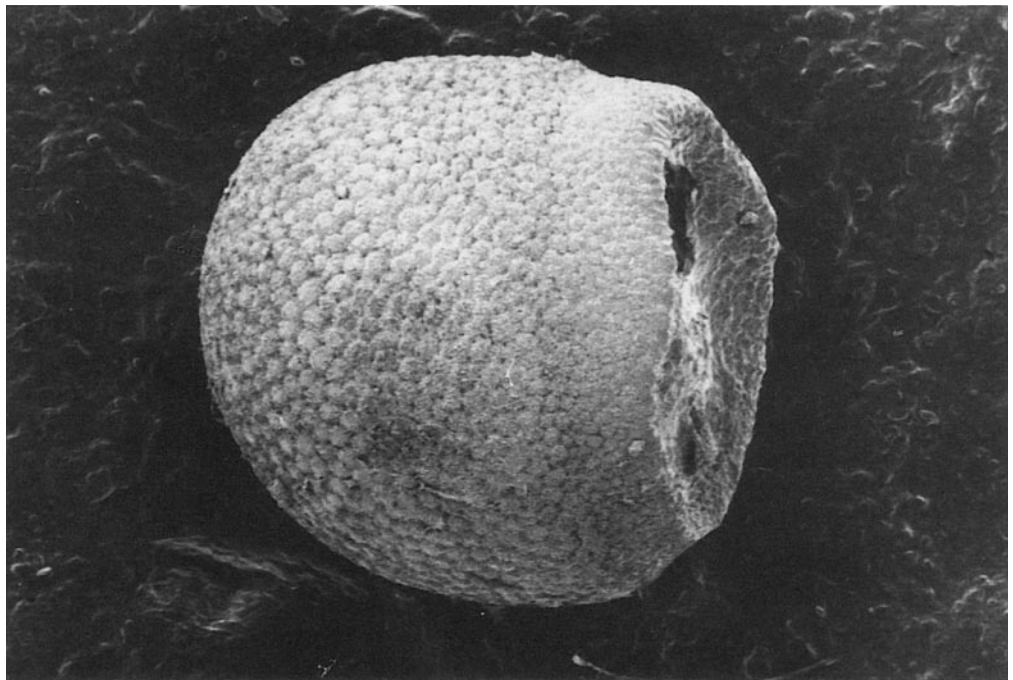


Figure 2.
Subgenus *Gymno-*
calycium (syn.
Ovatisemineum)
(*G. gibbosum*)
(SEM $\times 70$)



FLOWERS

The flowers are the crowning glory of *Gymnocalycium*s, and also have diagnostic value of course. Details are included in the text, but slight variation may be expected from plant to plant, for instance the colouring of the flowers of *G. pflanzii* in its various forms grades from palest pink to apricot. But by and large the flowers' shape, colour

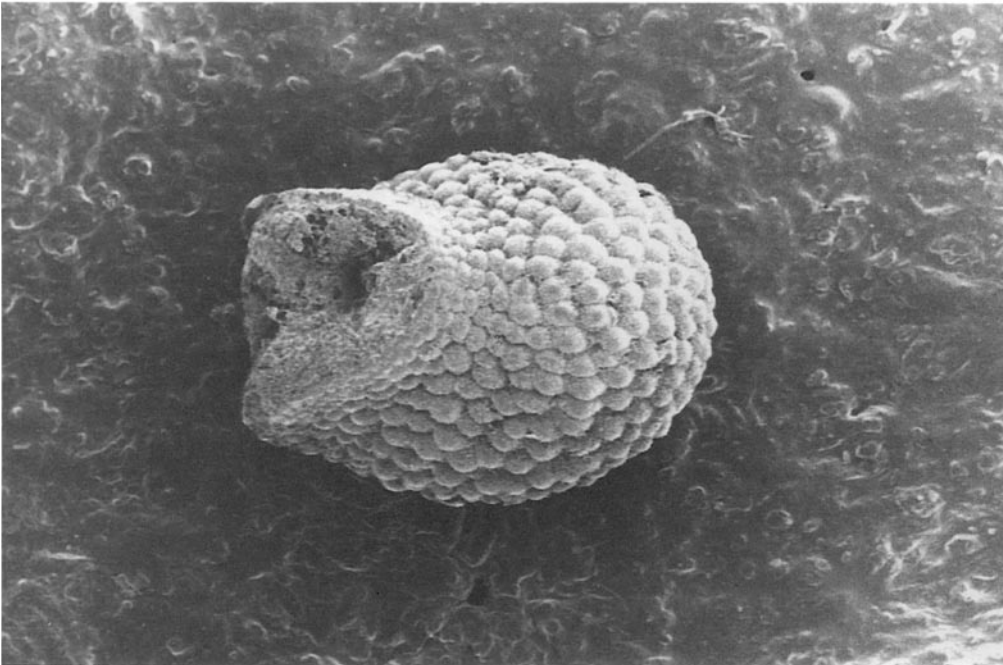


Figure 3.
Subgenus *Microsemineum* (*G. mostii*
var. *kurtzianum*)
(SEM $\times 70$)

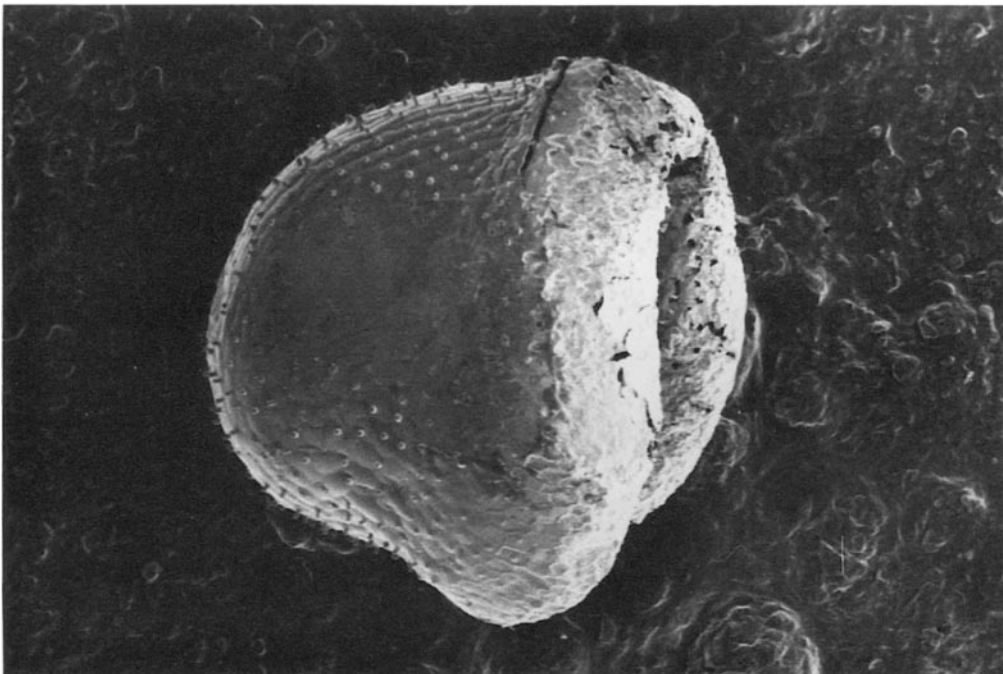


Figure 4.
Subgenus *Trichosemineum* (*G. stellatum*) (SEM
 $\times 70$)

and size are fairly constant, along with the other characteristics of the flower parts, e.g. the distinctive grey anthers of *G. anisitsii*.

SPINES

One of the most important characters of cacti is the spine formation on each areole. It is

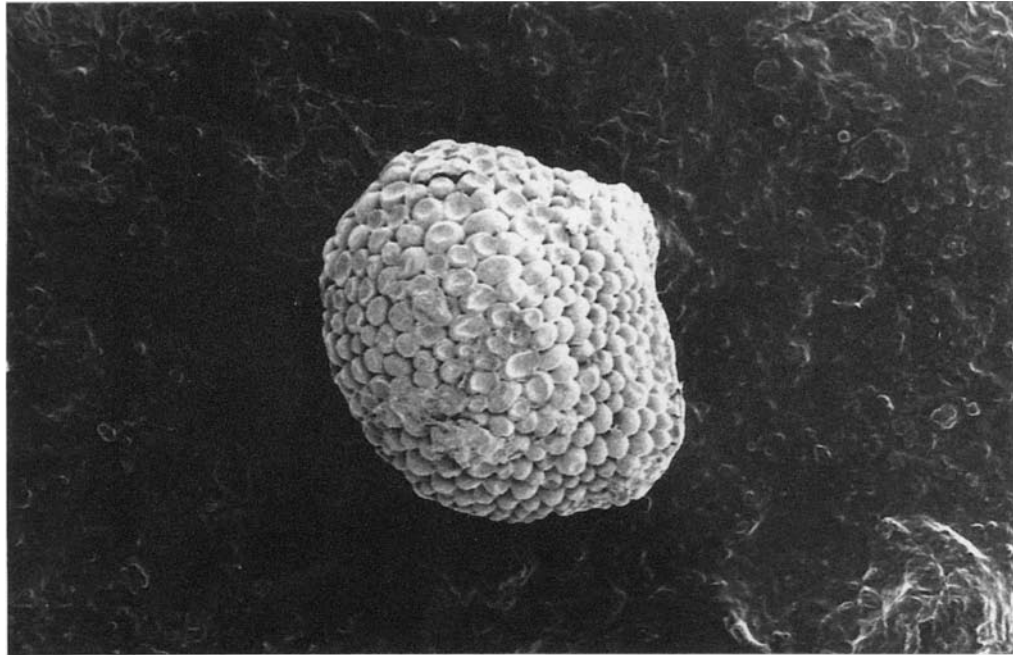


Figure 5.
Subgenus *Muscosemineum* (*G. michoga* = *schickendanzii*) (SEM $\times 70$)

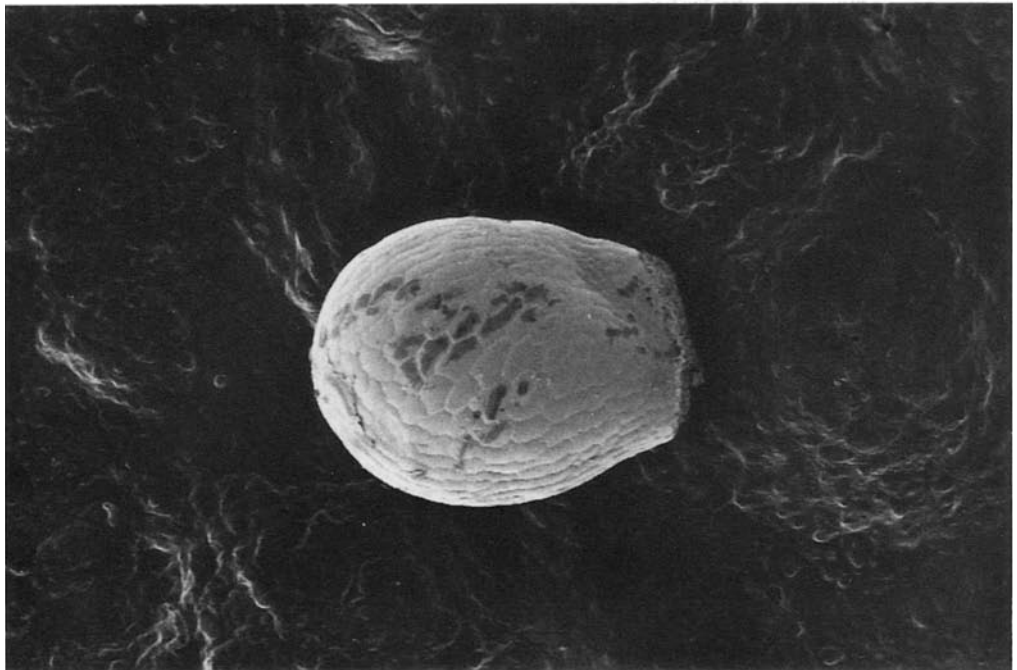


Figure 6.
Subgenus *Pirisemineum* (*G. pflanzii*) (SEM $\times 70$)

probably the first aspect which experienced growers take in when trying to assess the identity or relationships of a plant in this genus. As much as anything it is the lie of the spines which seems to be constant, regardless of length, which can vary, colour, which is also variable in some species, or even numbers of spines for each areole, which can also vary somewhat.

I have therefore included in Chapter 6 close-up photographs of spine-clusters to help readers with the identification or confirmation of identity of their plants.

As indicated above, the photographs should not be used too dogmatically, as, apart from the natural variation, length, strength and number may vary according to the age of the plant or the growing conditions, in particular strong, sunny conditions will result in stronger spine development, and conversely low light will result in weak spine growth.

The mature, often very strong spine development seen on plants imported from the wild has not been used either for these photographs, as it is untypical of what most growers will see on their seed-raised plants. Rather I have chosen plants of several years' mature growth in cultivation under moderately good sunny conditions. Three exceptions to this are the recently described *G. acorugatum*, *G. erinaceum* and *G. tanningaense*, seedlings of which have not as yet reached the age required; the spine clusters shown of these three species are of plants about 3-4 years old from seed.

All these characters add up to the sum total of what constitutes a particular species, and all must be taken into account when attempting such identification. It is best to start with material of known origin, or with seed conscientiously produced, rare I must say with some nurserymen, who too often allow the insect world to assist their efforts.

CHAPTER 4

Geography and distribution

Provided by: Detlev Metzling

Translated by: Charlotte Walton

The individual plants belonging to one species of *Gymnocalycium* are not haphazardly distributed in various geographical regions, but occur in definable areas. Each species' area is that in which the species naturally occurs. The position and size of these areas are determined by ecological constitution and the strength of the respective group, its expansion and history of evolution, as well as the existence of suitable habitats. Knowing about the species' areas is of great importance in order to understand the relationships between the individual groups. The area inhabited by the genus *Gymnocalycium* is entirely in south America, and extends roughly from 18°S in the north to 45°S in the south; the Andes form a barrier to the west (see Map 2).

The genus does not occupy a complete, unbroken area: there are several gaps in the distribution of the genus, so that they do not cover a continuous area. Some groups within the genus consist of several areas in disjunct locations. Because of the large overall distribution of the genus, and consequently the variable ecological conditions occurring, species often exist in quite different conditions from each other.

The most important biogeographical regions in the area of the genus are: Monte, Chaco, Espinal and Pampa. The extent of these regions is shown in Map 3 (see Plates 3, 4 and 5).

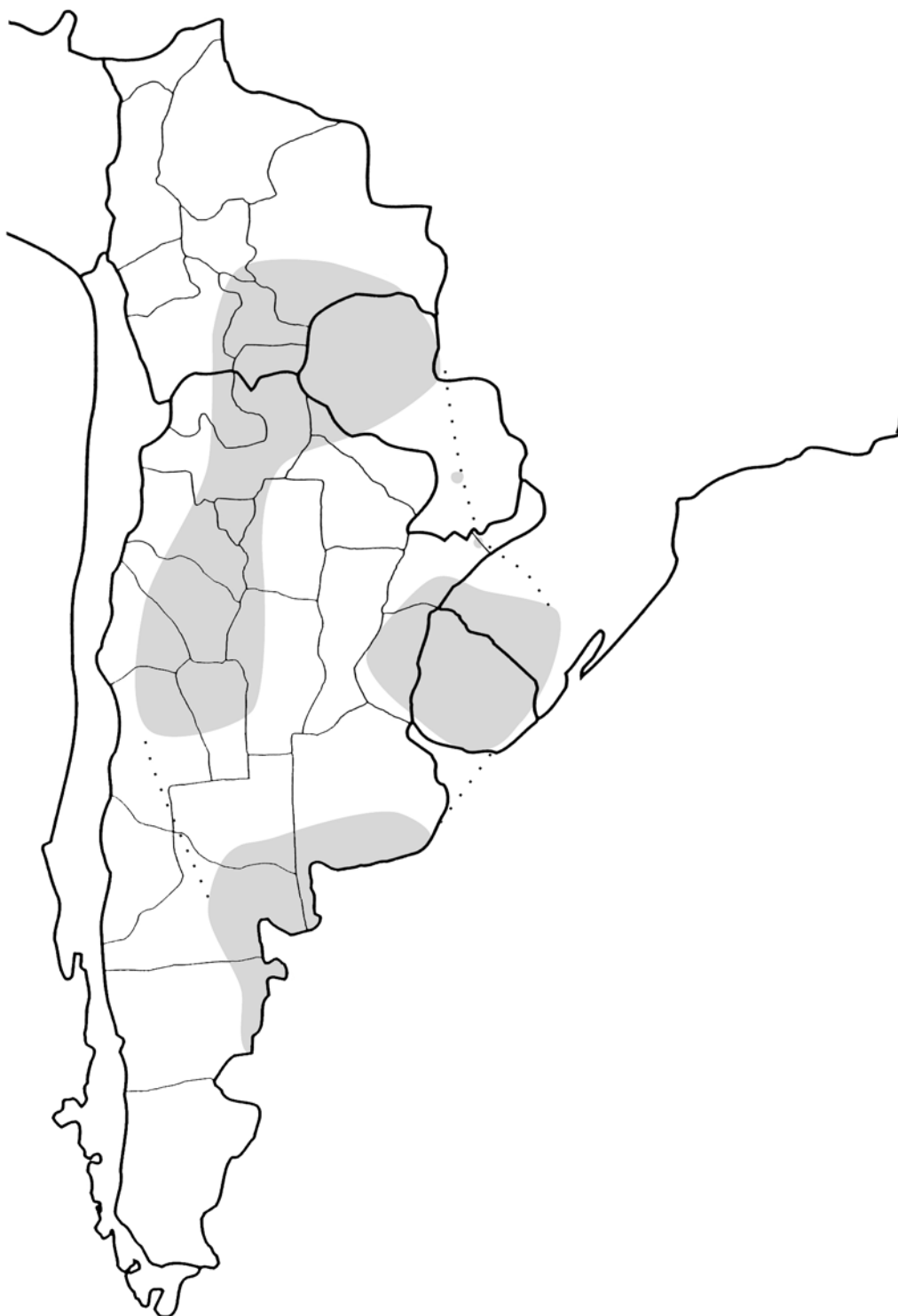
The 'Chaco' is in most part dry forest, and covers a vast expanse of South America; it is at the same time the main distribution area of the genus *Gymnocalycium*. Depending on its rainfall and temperature, the Chaco is either dry forest or thornbush or also a palm savannah on moister soils. Important taxa are *Prosopis* (Mimosaceae), *Schinopsis* (Anacardiaceae) and *Aspidosperma* (Apocynaceae). The amount of rainfall in the centre of this area is only about 500 mm per annum, increasing towards the outer boundaries. The rain falls mainly during the warm summer months. The central Chaco area is largely flat and rises only slightly from the east to the west. The soil consists of clay and sandy loess washed down from the Andes. At some places there are sandy soils and even dunes.

The wide grass steppes in the region of the Rio de la Plata are known as 'Pampa'. In the south-west (Province Buenos Aires) there is a largely flat, grass-covered area in which only the flat-topped mountain groups of the Sierra de Tandil and the Sierra Ventana carry a different vegetation. These are grass meadows and shrubs of the 'hill pampa', which occur in similar form also in Uruguay and in the southern Rio Grande do Sul.

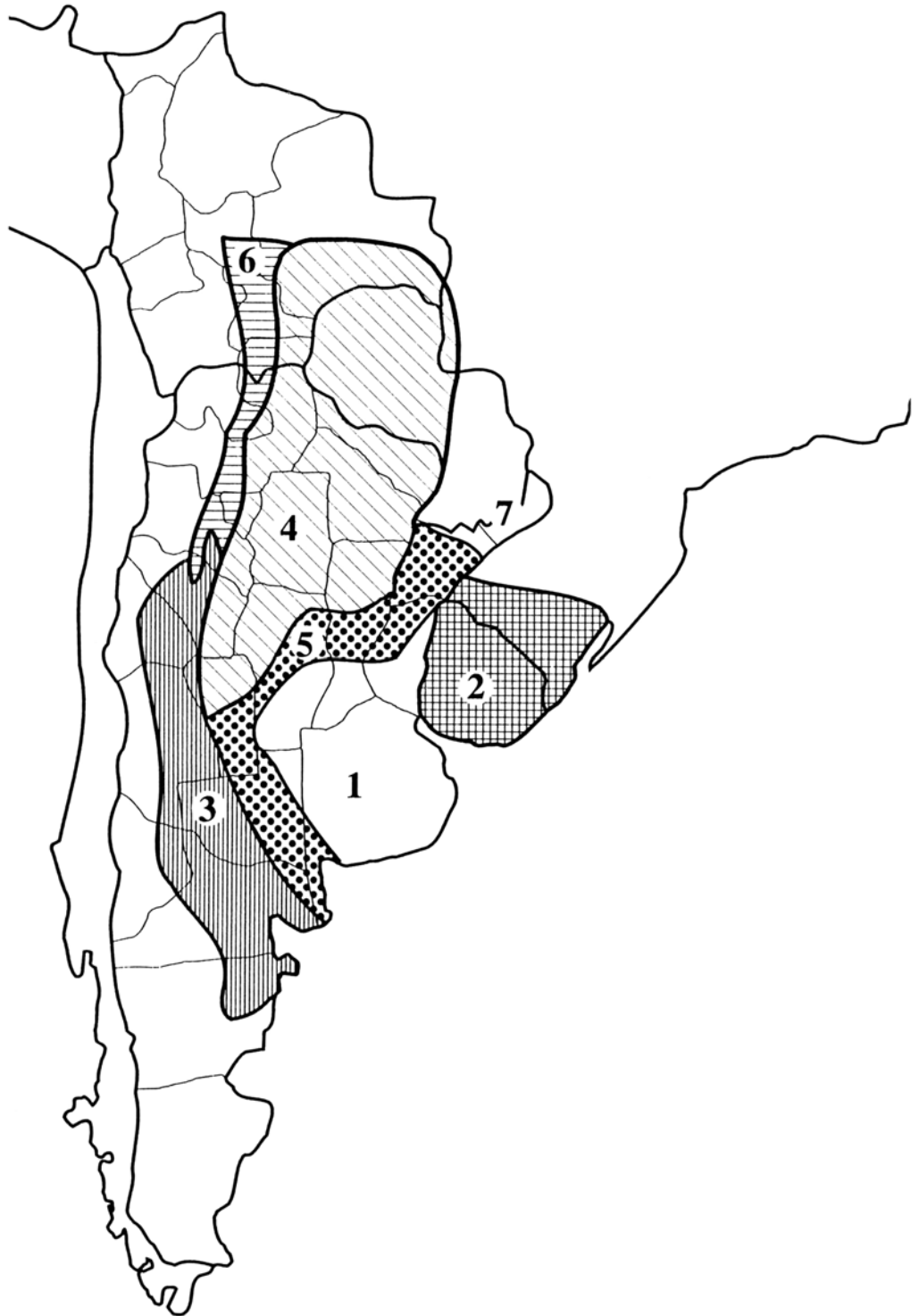
The xerophytic prairies are characteristic of the region of 'Monte'. These consist of shrubs of the genus *Larrea* (Zygophyllaceae), *Prosopis* (Mimosaceae) and other mainly small leaved and thorny species, which give this area its characteristic appearance. Depending on the regional climatic conditions and the topography the vegetation of the Monte can be very different. The hillsides can be dominated by *Trichocereus*,



Map 1.
Map of South America.



Map 2.
The shaded area is the complete known area of the genus *Gymnocalycium*.



Map 3.
Biogeographic regions of *Gymnocalycium* areas (according to Cabrera 1971, Hueck & Seibert 1981) simplified. 1. Pampa, 2. Hill pampa, 3. Monte, 4. Chaco, 5. Espinal, 6. Mixture of forest and scrub of the eastern Andes, 7. Subtropical, semi-evergreen forest.

which also occur in this region. Occasionally there are scattered tree species. The soil is of all types from clay to stony ground. The annual rainfall is about 100-350 mm.

The transition to the Pampa is formed by the 'Espinal'. Characteristic are the tree species of the genus *Prosopis* and several others which also occur in the Chaco region. The rainfall here is from 340 to over 1100 mm per annum. The Andean dry valleys should also be mentioned here, which can be very different, depending on the location. While the higher sites with good water supply carry thick forests, the valleys are fairly dry and carry only sparse forests or thorny scrub with many species of the Chaco or Monte vegetations (Cabrera 1971; Mares et al. 1985; Hueck & Seibert 1981).

Within these main formations there are further differentiations, so one finds different types of vegetation at particular heights of the mountains. Some *Gymnocalycium* taxa are found only at certain heights.

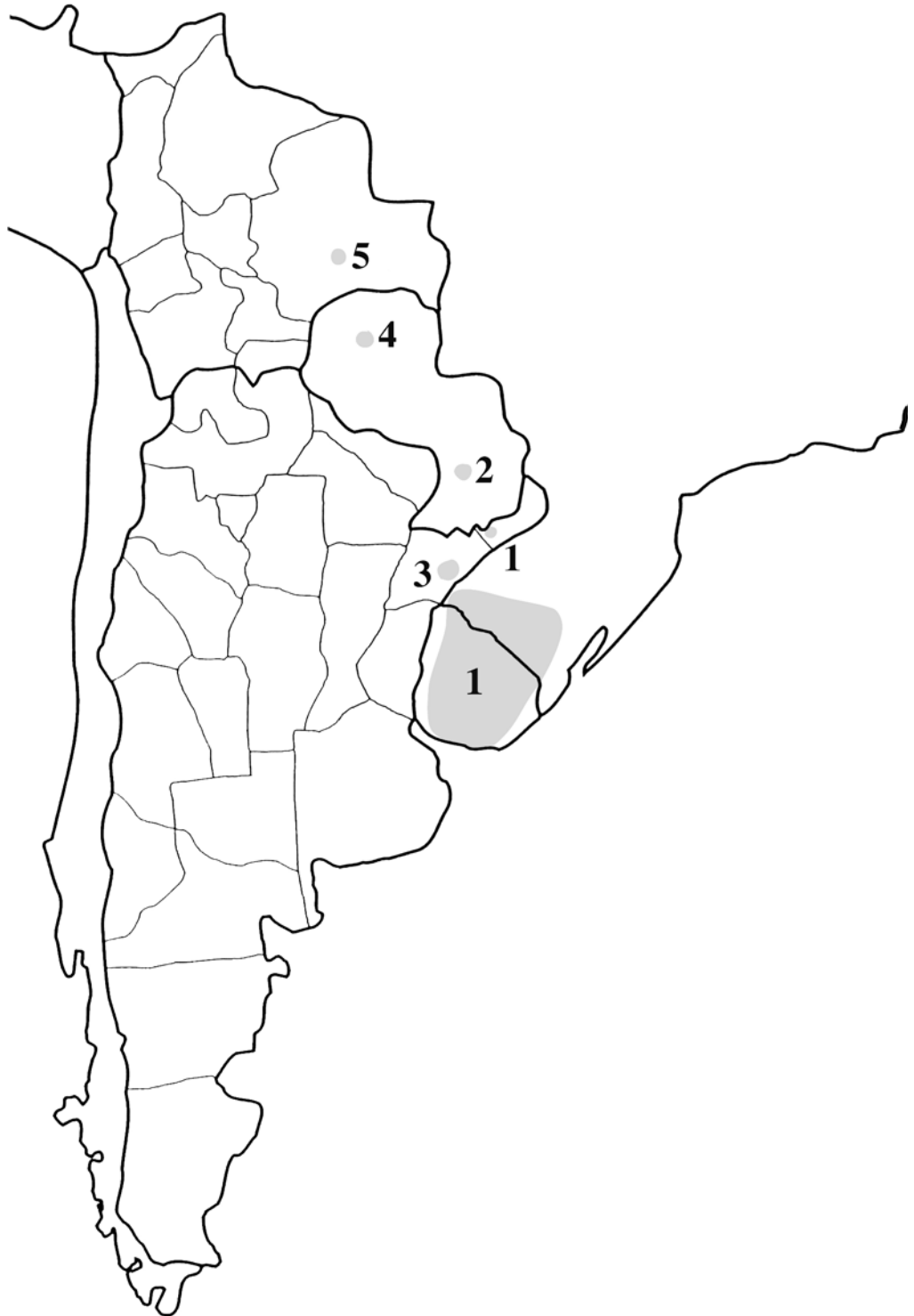
Of specific importance are special 'extra-zonal' locations. These consist of small separate localities, the ecological conditions of which differ from those of the surrounding main formations. These can be, for example, strips of woodland along the rivers or outcrops of rock in between dense vegetation. For some species these extra-zonal locations are relict habitats or retreat areas for species. Climatic and vegetation zones have changed during the history of the earth, ice ages alternating with warm periods, humid phases followed by dry periods, and vice versa. The plants have followed the shift of the climatic zones, they either adapted or died out. Others would 'retreat' to special locations which still offered suitable conditions. It is believed that species like *G. paediophyllum* and *G. chiquitanum* colonized such relict locations.

The areas of the subgenera or of some groups of the genus *Gymnocalycium* are shown in Maps 4-9. Of course the plants belonging to these species are not evenly distributed over the whole described area, but occur only, for example, in the valleys of the mountains, or at specific heights, or in interspersed special locations, with special ecological conditions. These area differentials can only be represented in a very large scale on the map.

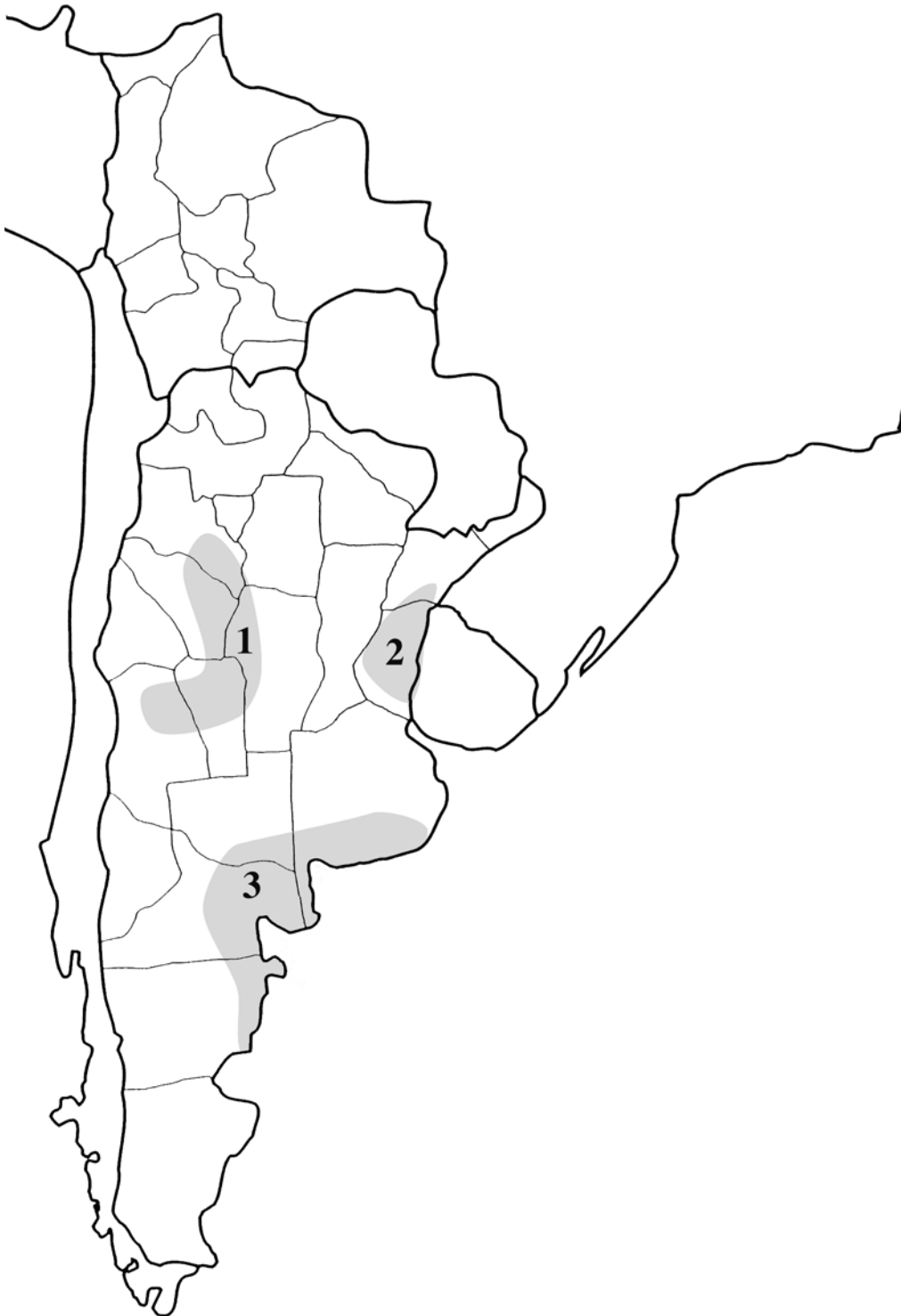
The maps here are based on a data-bank with about 2500 entries (locations) taken from field number lists and references in the literature, and show the spread of species in this genus known at the present time. When one looks in detail at the location data of many collectors, one will notice that they collected mainly along the roads and that wide areas have been explored only very thinly. It is probable, therefore, that future discoveries away from the main roads will lead to a better knowledge of particular individual areas.

The species of the subgenus *Macrosemineum* are spread along the eastern edge of the genus area (Map 4). The main area extends over nearly all Uruguay and the southern Rio Grande do Sul. Other small isolated occurrences are found in the Argentine provinces of Corrientes and Misiones as well as in south-eastern Paraguay. The climate of this region is humid, the rainfall between 1000 to 1300 mm per annum. Here *Gymnocalycium* species are to be found mostly at extra-zonal locations; these are small hills, rocky areas or stony meadows, from which the water drains away quickly and where there is periodically a dry period. There are not many other plants here and they are better protected from animals; these are probably relict locations from larger habitats, which formerly had drier climatic conditions. The grazing of animals and cultivation are, at the moment, certainly the biggest threat for these smaller locations.

The subgenus *Gymnocalycium* occupies a disjunct area. The area of *G. schroederianum* joins the area of the subgenus *Macrosemineum* on its west side. *G. gibbosum* (sensu lato) is the most southerly occurring species of the subgenus. It extends from the



Map 4.
Subgenus *Macrosemineum*: 1. *Gymnocalycium denudatum*, *G. buenekeri*, *G. horstii*, *G. netrelia-*
num, *G. uruguayense* (sensu lato); 2. *G. fleischerianum*, *G. paraguayense*; 3. *G. mesopotamicum*; 4.
G. paediophyllum; 5 *G. chiquitanum* (possibly these two species constitute a new subgenus, as yet
undetermined and as yet unnamed).

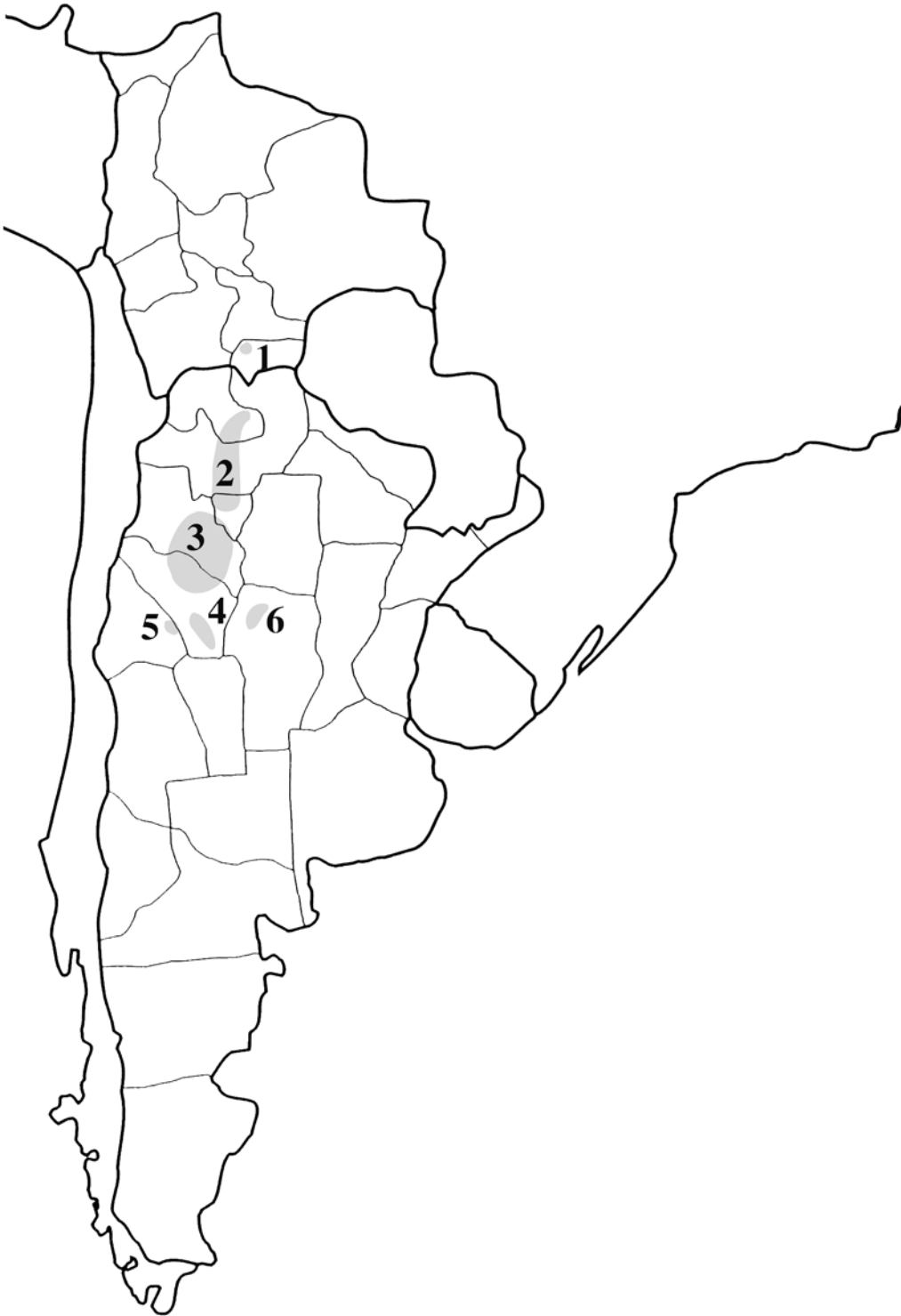


Map 5.

Subgenus *Gymnocalycium*: 1. *G. andreae*, *G. baldianum*, *G. borthii*, *G. bruchii*, *G. calochlorum*, *G. capillaense* (sensu lato), *G. erinaceum*, *G. kieslingii*, *G. neuhuberi*, *G. strigianum*, *G. tanningaense*, *G. uebelmannianum*; 2. *G. schroederianum*; 3. *G. gibbosum* (sensu lato), *G. hyptiacanthum* (sensu lato).

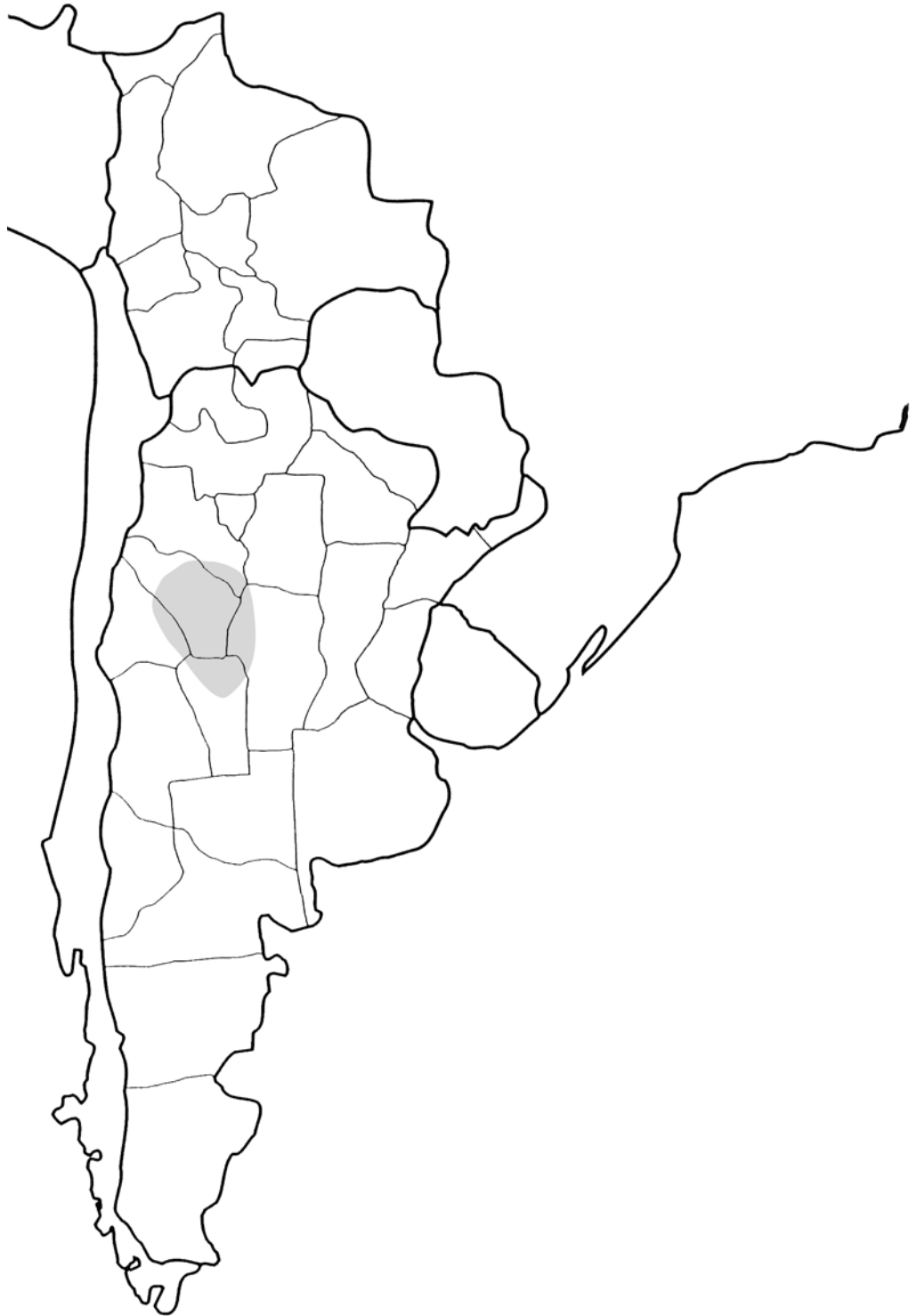


Map 6a.
Subgenus *Microsemineum* (in part): 1. *G. saglionis*; 2. *G. achirasense*, *G. horridispinum*, *G. monvillei*.

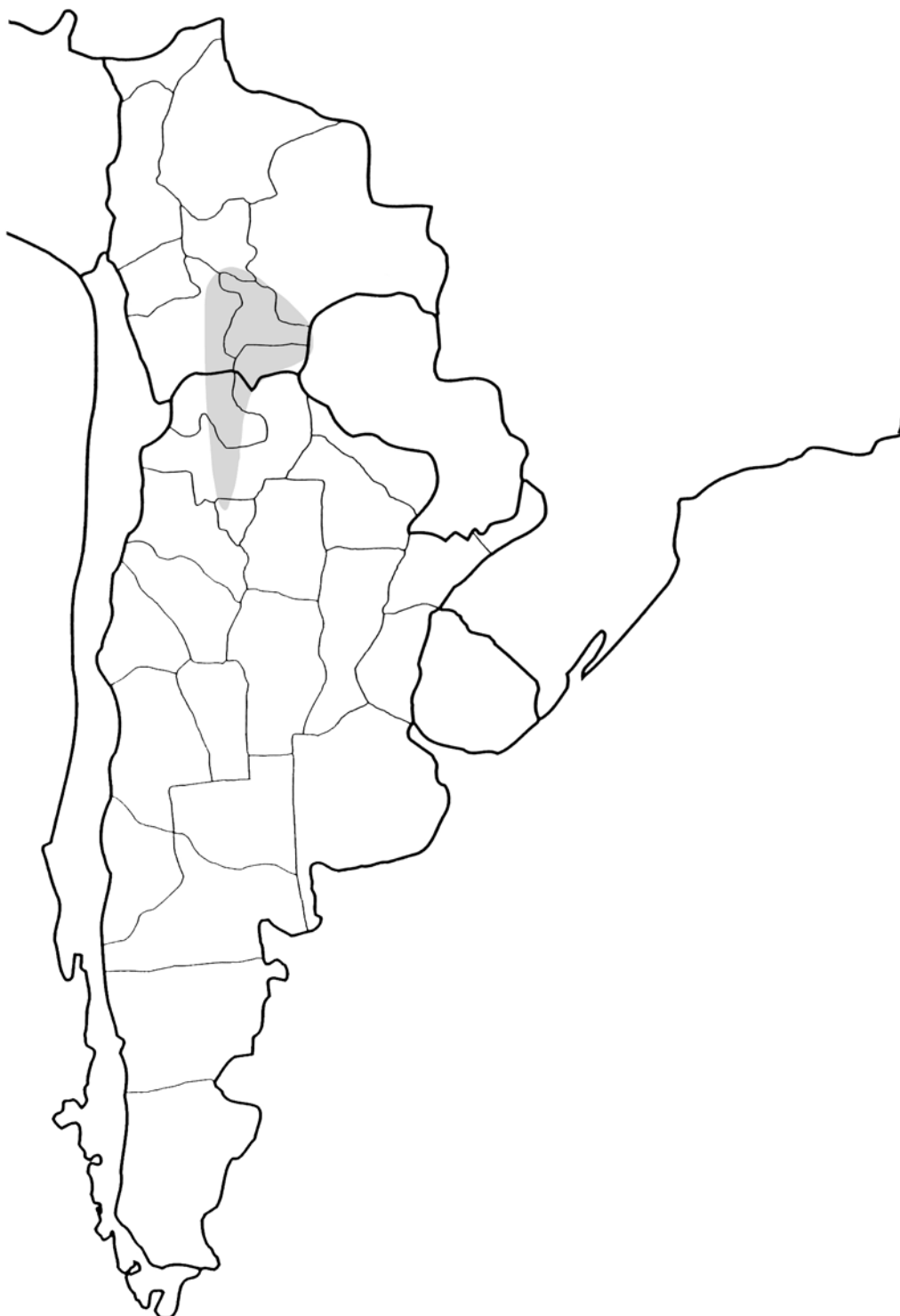


Map 6b.

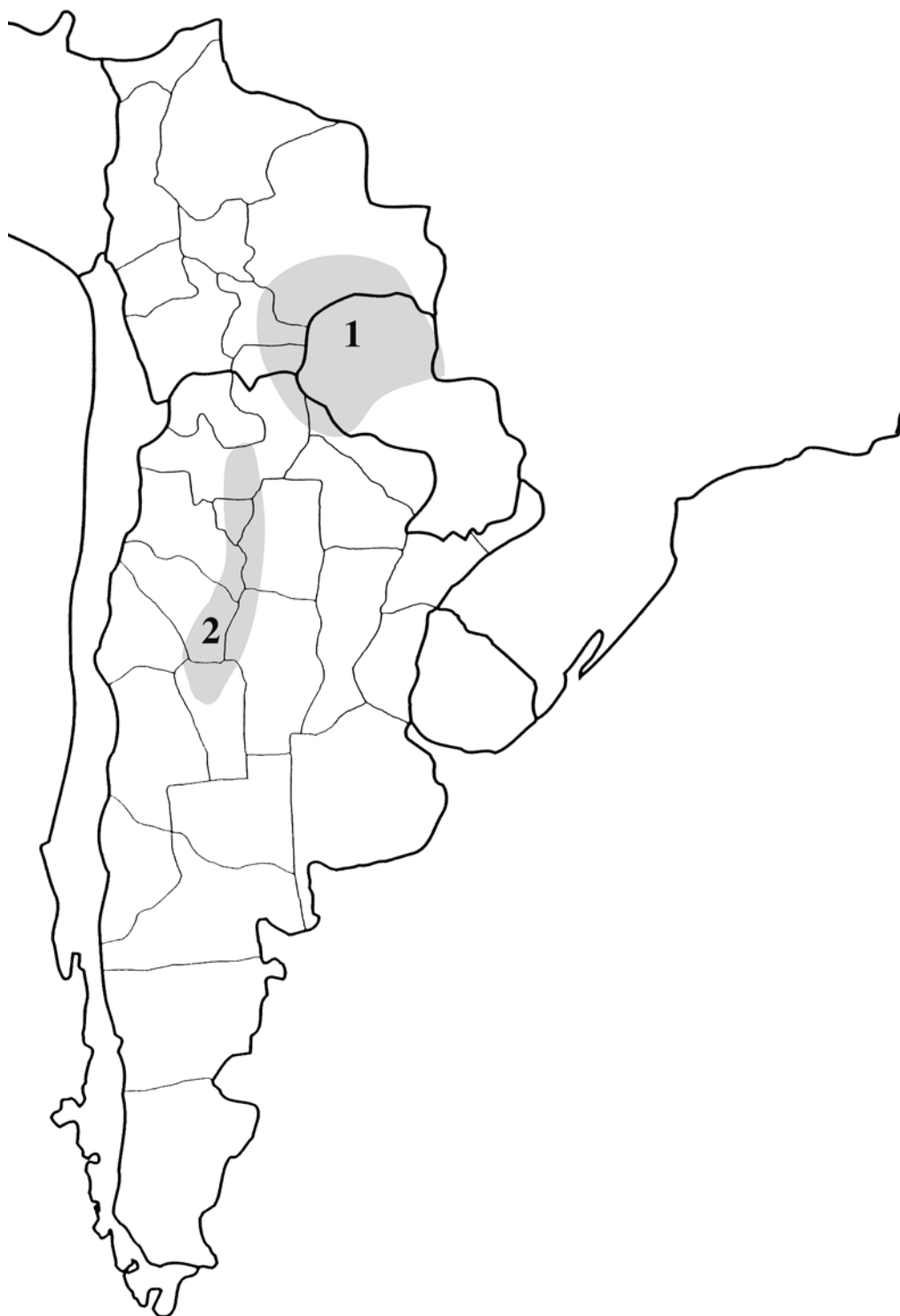
Subgenus *Microsemineum* (in part): 1. *G. cardenasianum*; 2. *G. bayrianum*, *G. spegazzinii*; 3. *G. ambatoense*, *G. ferrarii*, *G. glaucum*, *G. hossei* (sensu lato), *G. hybopleurum*, *G. nigriareolatum*, *G. ritterianum*, *G. tillianum* (sensu lato); 4. *G. castellanosii* (sensu lato); 5. *G. acorrugatum*; 6. *G. mostii* (sensu lato).



Map 7.
Subgenus *Trichosemium*: *G. bodenbenderianum*, *G. obductum*, *G. ochoterenai*, *G. quehlianum*, *G. ragonesei*, *G. riojense*.



Map 8.
Subgenus *Pirisemineum*: *G. pflanzii* (sensu lato).



Map 9.
Subgenus *Muscosemineum*: 1. *G. anisitsii* (sensu lato), *G. mihanovichii*, *G. stenopleurum*/
friedrichii; 2. *G. delaetii*, *G. marsoneri* (sensu lato), *G. schickendantzii*.

mountain systems of the Pampa over parts of the provinces of La Pampa and Rio Negro, to the eastern parts of the province Chubut and therefore extends over the biogeographical regions of the Pampa, Monte and up to the Patagonian shrub prairie. While in the northern part of this area the annual rainfall is around 600 to 750 mm per annum, in the south it is only 150 to 200 mm per annum. Without doubt *G. gibbosum* is closely related to *G. strigianum* and *G. borthii*, but between the known locations of these species are large gaps. A large number of species of this seed group have their distribution area in the mountain ranges of the Sierra de Cordoba, which stretches from San Luis to the north of the province Cordoba. The most northern species of this group is *G. uebelmannianum* from the Sierra de Velasco.

Most species in the genus are to be found in the foothills of the northern province of San Luis up to Salta, which is the southern part of the Chaco with transition to the Monte region. The centre of the greatest diversity of the genus is located here, in which species of all four subgenera (*Gymnocalycium*, *Microsemineum*, *Trichosemineum* and *Muscosemineum*) occur. The reason for this multitude is the complex and varied landscape with several mountain ranges, in which the taxa could develop separately from each other in more or less isolated locations.

The area of *G. saglionis* of the subgenus *Microsemineum* (Map 6a) stretches from La Rioja to Jujuy. The related species, *G. spegazzinii*, grows in higher dry valleys of the east Andes, on isolated northern slopes of the Monte region (Map 6b). *G. pflanzii* (sensu lato), for which a separate subgenus (*Pirisemineum*) was described, has a large distribution area, which extends from the Chaco districts in the north west of Paraguay to the inner Andean dry valleys in Bolivia to the Argentine province Tucuman (Map 8).

The altitude at which this species is found varies from 450 m in the Chaco of Paraguay to 3200 m in the Bolivian province Potosi. Because of the widespread occurrence of *G. pflanzii* it is found in various forms in the different habitats, on dry rocky locations as well as in relatively dense and damp forests.

The species of the subgenus *Muscosemineum* are found in the Chaco of Paraguay, Bolivia and northern Argentina (Map 9). The species like, for example, *G. mihanovichii*, *G. marsoneri* and *G. eurypleurum* are parts of the predominating vegetation of the dry forest. Although the ecological factors are fairly uniform in a large area, these species are mainly found in relatively small, local populations. The means of seed distribution is probably responsible for this.

Like *G. pflanzii* and *G. saglionis*, *G. schickendantzii* has a very large distribution area (Map 9). These species have red fruits with a juicy pulp, the seeds of which are spread by birds and so make possible the colonisation of a large area.

Also in the Chaco in north Paraguay and in the south-east of Bolivia are the species *G. paediophyllum* and *G. chiquitanum* (see Map 4). They occur in special locations within the Chaco, situated on isolated hills, and these are probably relict habitats, as indicated earlier.

Relatively little is known about the ecology of most species. In the literature one finds sparse, if any, notes about climate, soil or the accompanying vegetation. As an example, for some species the condition of some different locations are here briefly mentioned.

G. mihanovichii is a species that occurs in the dry forests of the central Chaco of Paraguay and northern Argentina. The rainfall here is around 700 to 900 mm per annum. To the west, an area of less rainfall, is the habitat of *G. stenopleurum* (*G. friedrichii*). The plants grow in the protection of shrubs, the leaves of which protect the

cacti especially during the warm, moist summer from the rays of the sun. The air is then very warm and sultry. During the dry and cooler winter months many trees shed their leaves and more light reaches the ground, and so the cacti have their resting period. When trees and shrubs are completely or partially removed through deforestation, the *Gymnocalycium* species start to grow stunted, because their moisture decreases and the sun's irradiation becomes too strong. They are especially suited to the specific microclimate of the Chaco forest. The soil is clay to fine sandy with little humus, the soil reaction is slightly acid, the pH value varying between 6 and 6.5. Because the dead plant material is very quickly broken down no noticeable humus layer develops (Esser 1982; Metzging 1989).

Although the conditions are relatively the same over large areas, *Gymnocalycium* species are found mainly in small defined populations. This has to be related to the spreading of the seed and the fruits, which is probably done by birds and ants. *G. riojense* and *G. bodenbenderianum* belong to the predominant vegetation of the Monte region (cf. Mares et al. 1985). Most species occurring in the lower regions grow in a clay-sandy soil. They are nearly always found in the shade of different shrubs (*Larrea* etc.). During the dry period the plants are completely withdrawn into the soil and often covered with leaves or sand. This reduces the size of the evaporating surface of the plant body. The seeds are mainly distributed by ants, which eat the sugar containing funicle.

While the above mentioned species belong to the predominating vegetation and therefore occupy relatively large habitats, species like *G. paraguayense* and *G. fleischerianum* are found only in special locations. These species' locations are small sandstone areas in the region covered with (potentially semi-evergreen) subtropical forests. There is plenty of rain in this area, about 1400 mm per annum, and small plants cannot compete with other plants of the forest. Yet where rocks come to the surface, the layer of soil is very thin or completely missing. Therefore the concurrence of the larger plants is also absent. Besides the thin layer of soil dries out very quickly and periodically arid conditions occur. For these reasons species settle here which can survive these temporary dry periods. These are, apart from annuals, some Bromeliaceae (*Dyckia*), *Selaginella* and cacti. The two species of *Gymnocalycium* grow often under the protection of smaller plants. The soil is, depending on the power of the water, sandy to clay, the pH value around 4.5 to 5.5 (cf. Metzging 1989). The knowledge of the ecological condition of the native location can give us useful hints for the culture of plants in the greenhouse. So, *G. mihanovichii* will grow much better in the shade, in dampish conditions during the summer.

But the conditions in the wild are not always really the best for optimal growth, because plants do not occur in nature where there exist optimal abiotical factors (temperature, moisture, food and light), but where they find sufficient conditions and are not squeezed out by the concurrence of stronger plants. Strong and fast growing *Gymnocalycium* species, as we can achieve with suitable cultivation, are scarcely ever found at their home localities.

CHAPTER 5

Discovery and collection of species in the wild

The information about *Gymnocalycium* species' occurrence in the wild has been in the past only vaguely recorded, with such references as 'northern Argentina' or even worse, just Argentina or Bolivia often followed by a question-mark. But more recent explorers for these wonderful plants have been far more meticulous in their recording of the whereabouts of plants they have discovered, and the species newly described nowadays have full details including often the altitude and information about the types of terrain in which they occur. Several such explorer enthusiasts have been prominent in their discovery, and the fortitude of such seekers of new species is to be applauded by the hobbyist and enthusiast for this genus among others, as without their dedication our collections would be considerably poorer. The more diligent of them have published lists, either privately or in cactus journals, with their collection numbers and their opinion as to the names applicable to them. The plants (or seeds) when first appearing in commercial growers catalogues often have only these collection numbers attached to them, and it is only subsequently that their identity becomes established, or indeed a new name is published for new discoveries. It is important therefore to keep a record of such numbers on plants, as they are a most valuable source of information. Those that are so published can be found in Chapter 8 insofar as they apply to *Gymnocalyciums*.

CHAPTER 6

Commentary on species

In the alphabetical listing below the font used for the first reference to a species or lower taxon indicates the author's opinion of its standing. Species and lower taxa accepted by the author are in **bold**. Taxa not accepted or doubtful are marked with an asterisk*. *Italics* indicates names of little consequence.

G. achirasense H. Till & Schatzl, Kakt. u.a. Sukk. 30(2):25 (1979), nom.inval.; H. Till, Kakt. u.a. Sukk. 38(8):191 (1987) – validation; Bercht, Succulenta 62(9):193-7 (1983); Meregalli, Piante Grasse 5(1):13 (1985); Schütz, Monogr. Gymno. 22(1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (provisionally accepted species); H. Till & Neuhuber, Arbeitsgr. Gymno. Osterreich. Kakteenfr. 6(3):99-106 (1993). Fig. 7, Plate 6.

Schütz's Subgenus *Microsemineum* Section *Hybopleura*;
Buxbaum's Series *Horridispina*

This is a beautifully flowered new species which has become available through the trade in the last few years. It clearly has a close relationship to *G. horridispinum*, which has led to its submergence in more conservative approaches beneath this species. But there are several differences, in sum making enough to warrant its continued recognition for collectors. Just before this book was due to go to press, Till and Neuhuber produced a paper reducing this species to subspecific level beneath *G. monvillei*, and furthermore describing four new varieties and one form beneath it, for details see under *G. monvillei*.

G. achirasense, as described before this last-mentioned paper, is globose, solitary, becoming elongated with age, about 5 or 6 cm wide, 7 cm tall, dull to grey-green, with 12 to 15 ribs having prominent chins (the projecting humps on the ribs between the areoles, with a chin-like shape). Radial spines number 10 to 12, less in younger plants, in two rows, lying flat to the body or barely lifted from it, with a similar central spine standing out straight or a little bent. The flowers are really a knockout, and are among the largest in the genus. They are funnel-shaped, about 6 cm long, 7 cm wide, white to pale pink with a lilac-pink middle stripe, and edged lilac at the tips of the spatulate petals. Fruit is green, globular. Seed is small, variable in size, about 1 mm in diameter, dark brown, roundish, a little elongated.

Reported from Argentina, in the San Luis province, near Achiras, at the boundary with the Cordoba province, at 1000 m (3280 ft) altitude, between grass and stones; by Piltz from Argentina, Va. del Carmen, 900 to 1100 m (2950 to 3610 ft) altitude, Mercedes at 1000 m, El Trapiche, 1100 m, Cordoba, Alpa Corral.

Collectors' numbers referred here are HT 462; P 104, 104a-c; B 21; JL 106, 107; LB



Figure 7.
G. achirasense

304, 330, 331, 332, 346, 349, 352, 354, 360, 362, 365; WP89-074/097, 075/097a, 075/097b, 076/097c, 078/097d, 079/097e?

G. acorrugatum Lambert, *Succulenta* 67(1):4-7 (1988); Hunt (ed.), CITES Cact. Checklist 66 (1992) (provisionally accepted species). Fig. 8, Plates 7 and 8.
Schütz's Subgenus *Microsemineum* Section *Hybopleura*;
Buxbaum's Series *Mostiana*

This is one of the most recently described species, and it is yet to be properly evaluated. It is described as solitary, flat-globose, with green to grey-green body colour, to 4.5 cm tall, and to 7.5 cm broad, with 10 ribs, straight to slightly sinuous, with rounded tubercles not divided by grooves and not chinned, except in young plants. Areoles are round, large, 6 to 8 mm in diameter, at first with white wool, later turning brown. Radial spines number 7 to 9, in 3 or 4 pairs, with one pointing downwards, strong, curved, interlacing, needle-like, round in section, to 3 cm long, at first chestnut-brown and yellow at the base, or greyish-brown with nearly red base, later all greyish-white with brown tips. Central spines number 1 or 2, to 3.5 cm long, strong, similar to the radials. Flowers are pale pink with reddish-pink midstripe to the petals, 6.5 cm long, 6 cm wide. Fruit is fusiform (spindle-shaped, i.e. a little swollen in the middle, and evenly tapering to either end) green with pinkish scales, to 23 mm long, 15 mm wide. Seed is red-brown, about 1.1 mm long, 0.8 mm broad, a little shining, hilum oval, oblique, nearly white.

Reported from Argentina, province San Juan, Sierra del Valle Fertil, at San Agustín de Valle Fertil, at 850 m (2790 ft) altitude.

Collectors' numbers referred here are JL 69; LB 438, 439.

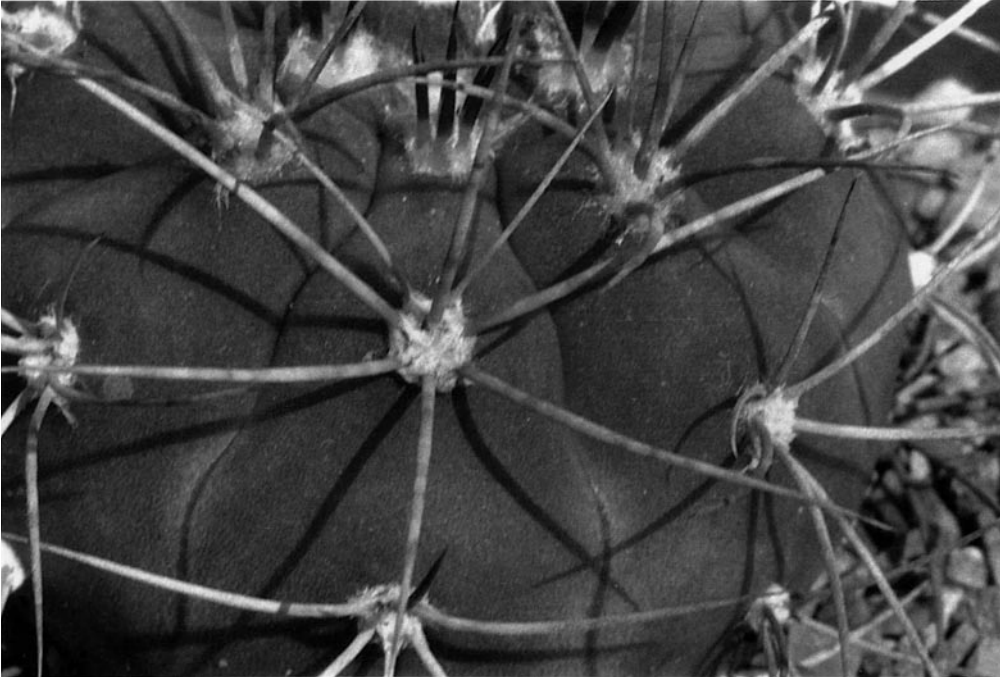


Figure 8.
G. acorrugatum

G. albiflorum Hort.

A catalogue name (Karel Knize, KK 161) reported from Brazil, Libramento, at 1200 m (3940 ft) altitude.

G. albispinum* Backeberg, *Kaktus ABC* 285, 416 (1935); Backeb., *Die Cact.* 3:1700, Fig. 1633 (1959); *Kakteenlex.* 164 (1966); *Cact. Lex. (Engl. ed.)* 183 (1978); Putnam, *Gymnocalyciums* 14 (1978); Neutelings, *Succulenta* 60(3):53-6 (1981); Bercht, *Succulenta* 62(4):72-8 (1983); Meregalli, *Piante Grasse* 5(1):13 (1985); Schütz, *Monogr. Gymno.* 23(1986); Hunt (ed.) *CITES Cact. Checklist* 66 (1992) (syn. *G. bruchii*)

This was differentiated from *G. bruchii*, which it closely resembles, by its more upstanding, white spines. Plants in circulation under this name at present have larger stems than typical *G. bruchii*, up to about twice the size or more (to about 5 or 6 cm tall and wide) and have white flowers, as well as the different spination called for above. With nothing known of its origins, this species must at best be regarded with suspicion, and having seen the considerable variation of collected plants of *G. bruchii* in Jorg Piltz's collection, it seems to me that it is probably no more than part of the natural variation of that species. The recently published *CITES Cactaceae Checklist* endorses this view.

Reported from Argentina, Cordoba.

G. alboareolatum Rausch, *Succulenta* 64(10):213-215 (1985); Meregalli, *Piante Grasse* 5(1):13 (1985); Schütz, *Monogr. Gymno.* 23 (1986); Lambert, *Succulenta* 65(11):241 (1986) & 66(7/8):146 (1987); H. Till, *Arbeitsgr. Gymno. Osterreich. Kakteenfr.* 1(3):25-28 (1990); Rausch, *Arbeitsgr. Gymno. Osterreich. Kakteenfr.*

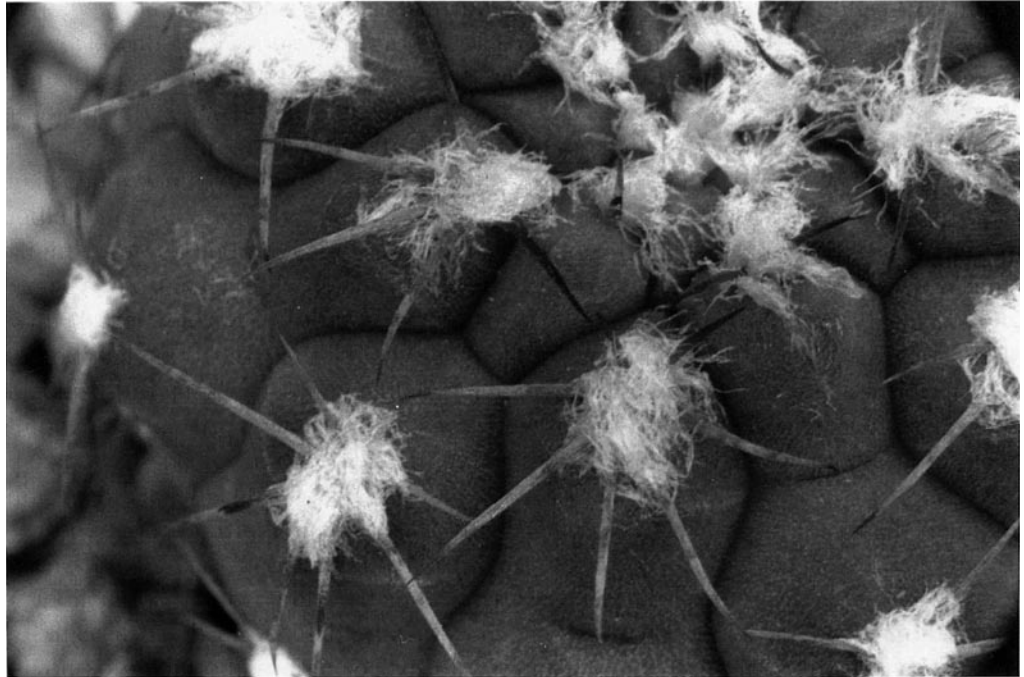


Figure 9.
G. alboareolatum
P221

2(3):29-31 (1990); H. Till, Arbeitsgr. Gymno. Osterreich. Kakteenfr. 3(2):29-32 (1990); Hunt (ed.) CITES Cact. Checklist 66 (1992) (accepted species). Fig. 9, Plate 9.

Schütz's Subgenus *Microsemineum* (ascribed to *Gymnocalycium/Ovatisemineum* in error);

Buxbaum's Series *Gymnocalycium* (Baldiana)

This comparatively recently described species has been ratified in the recently published *CITES Cactaceae Checklist* as a good species, which hopefully clears up in collectors' minds that it might be the same as Kiesling's (somewhat similar) *G. kieslingii* fa. *alboareolatum*.

It is finding its way into cultivation from commercial sources, principally from Piltz's collection number P221. Plants grown by the author are distinctive in their prominent white areoles, for which the species is named. It is solitary, flat-globose, to 6 cm wide, glaucous, often suffused with violet tones, with napiform roots. Ribs number 9 to 11, straight, divided into chins about 1 cm long. Areoles are round to oval, 5 mm long, strongly white woolled. Spines are all radial, numbering 6 to 7, curving back to the body, stiff, brown and strongly pruinose, to 10 mm long. Flowers are silvery white, striped green to pink, the outer petals whitish-pink, with green midstripe, 6.5 cm long, 4.5 cm wide, the flower tube long and thin, to 17 mm, receptacle dark green, stigma lobes whitish, numbering about 11. Fruit is oval to club shaped, 25 to 30 mm long, bluish-green, pruinose, with pinkish-edged scales, splitting perpendicularly. Seed is globose to mitre-shaped, 1 mm in diameter, black, rough with broad basal hilum.

Reported from Argentina, province La Rioja, near Villa Bustos, at 1000 m (3280 ft) altitude.

Collectors' numbers referred here are WR 716 (deposited at Zurich), P221.

Walter Rausch recently used the vehicle of Till's serial publication *Arbeitsgruppe*

Gymnocalycium Osterreichische Kakteenfreunde to describe a variety of this species as follows:

var. **ramosum** Rausch, *Arbeitsgr. Gymno.* 2(3):31 (1990). This was described as a smaller, caespitose variety, having stems only 5 cm in diameter, with 8 to 10 ribs, and 5 brown radial spines. Flowers are 5 cm long, 4 cm wide.

Reported from Argentina, La Rioja, in the area of Sanagasto.

Collector's number referred here is WR 716b.

G. altagraciense* nom. prov., Bozsing, *Kaktusy* 17(3):59 (1981); Meregalli, *Piante Grasse* 5(1):13 (1985); Schütz, *Monogr. Gymno.* 24 (1986). Fig. 10, Plate 10.

In spite of plants having been in circulation for some years under this name, it is still mysteriously not ratified nor commented upon to any extent. It is notably absent altogether from the recently published *CITES Cactaceae Checklist*. Schütz compares it with *G. leptanthum*.

Plants grown by the author are distinctive, with greyish-brown bodies growing almost flush with the soil-level, 12 to 14 ribs, 5 spines all radial and recurving to the plant body, 8 to 10 mm long, the lower longer, thin and flexible. Flowers are narrow tubed, and quite large, about 6 cm long and 4 cm wide. Fruit is long, spindle-shaped, splitting vertically.

It is reported from Argentina, Cordoba, Alta Gracia at 550 m (1800 ft). Villa de Maria at 500 m (1640 ft), Sierra Tulumba at 900 m (2950 ft), and La Rioja at 110 m (3610 ft).

Collector's number referred here is P119.

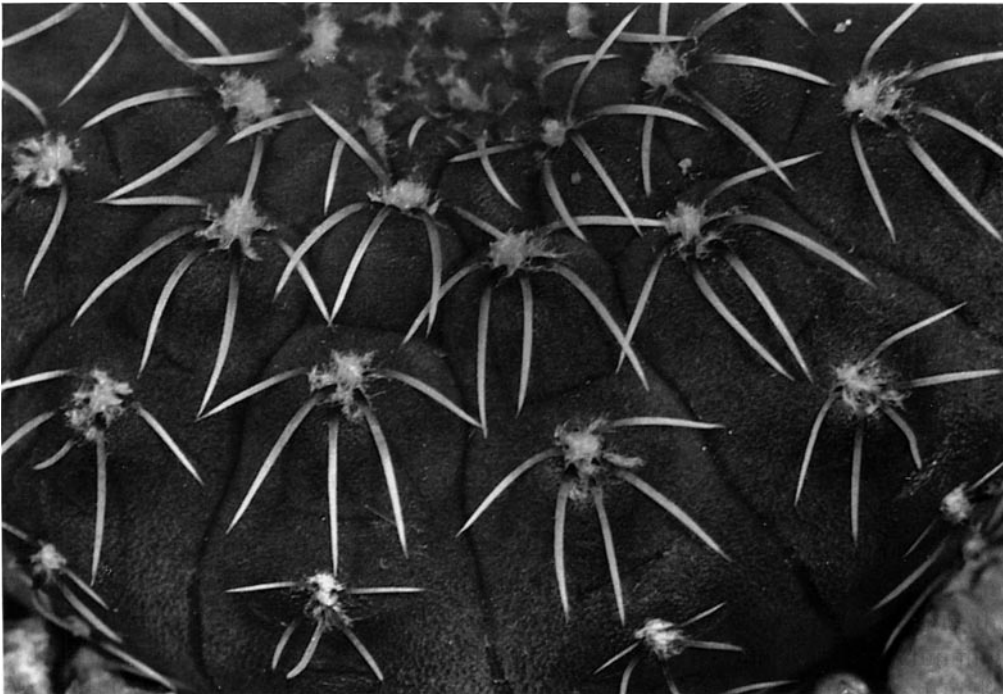


Figure 10.
G. altagraciense
nom. prov.

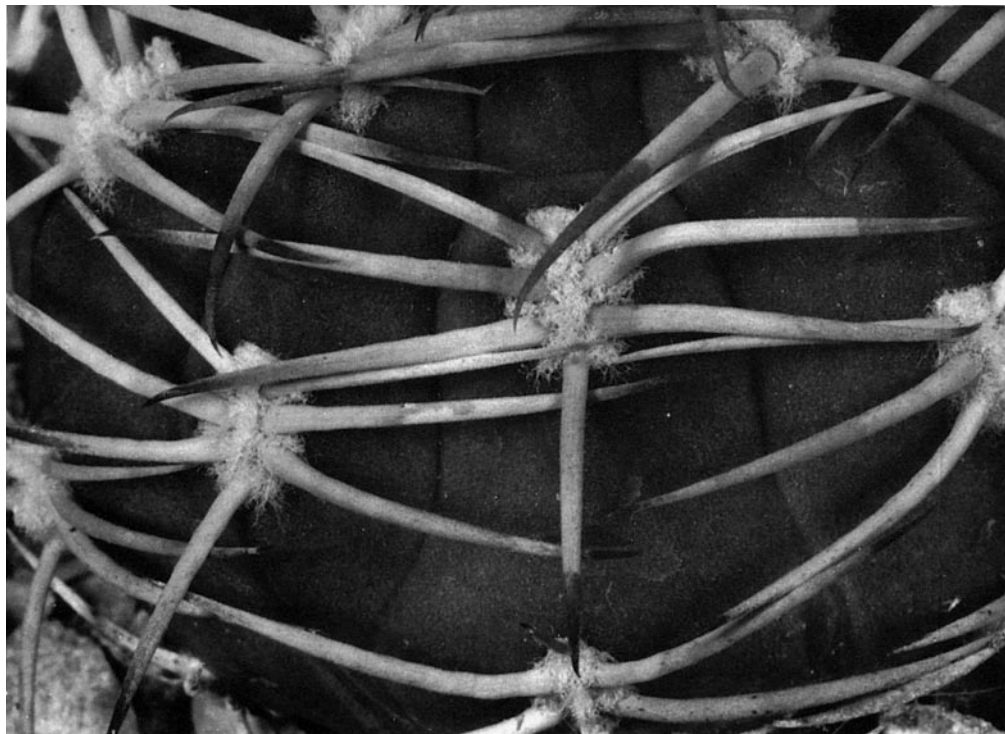


Figure 11.
G. ambatoense

G. ambatoense Piltz, Kakt. u.a. Sukk. 31(1):10-13 (1980); Meregalli, Piante Grasse 5(1):(1985); Schütz, Monogr. Gymno. 24(1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (provisionally accepted species). Fig. 11, Plate 11.

Schütz's Subgenus *Microsemineum* Section *Mazanense*;
Buxbaum's Series *Mostiana*

This species is getting into cultivation now after its fairly recent description. It has a flat-globular to globose habit, growing to about 7 cm wide, 5 cm tall, with about 10 ribs, chinned beneath the areoles. There are 9 to 11 strong, radial spines, slightly curved, yellowish-brown in youth, becoming pinkish-grey, to 2.5 cm long. The central spine, not always present, is straight or incurving towards the crown of the plant, similar to the radials in colouring and length. The flowers are 2.5 to 4.5 cm long, 3 to 4 cm wide, bell-shaped, silky-white, with pale pink midstripe. Fruit is flattish-globular, to 1.7 cm long, 2.3 cm wide, dark green. Seed is about 1 mm long, 0.7-0.8 mm broad, red-brown to nearly black, matt, the hilum deeply sunk with the edge strongly angled.

Reported from Argentina, in the Catamarca province, Sierra Ambato, Concepcion, Chumbicha, at 900 to 1100 m (2950 to 3610 ft) altitude.

Collectors' numbers referred here are P22, 29, 29a; JL 180, 328.

G. andreae (Bödeker) Werdermann & Backeberg, Neue Kakteen 89 (1931); Bödeker, Monatsschr. Deutsch. Kakt. Ges. 2:210-12 (1930) – as *Echinocactus andreae*; Backeb. & Knuth, Kaktus ABC 285 (1935); Backeb., Die Cact. 1737, Fig. 1672 (1959); Kakteenlex. 164 (1966); Cact. Lex. (Engl. ed.) 183 (1978); Putnam, Gymnocalyciums 14 (1978); Bercht, Succulenta 62(4):72- 8 (1983); Meregalli, Piante Grasse 5(1):13 (1985); Schütz, Monogr. Gymno. 27 (1986); H. Till, Arbeitsgr. Gymno. Osterreich.

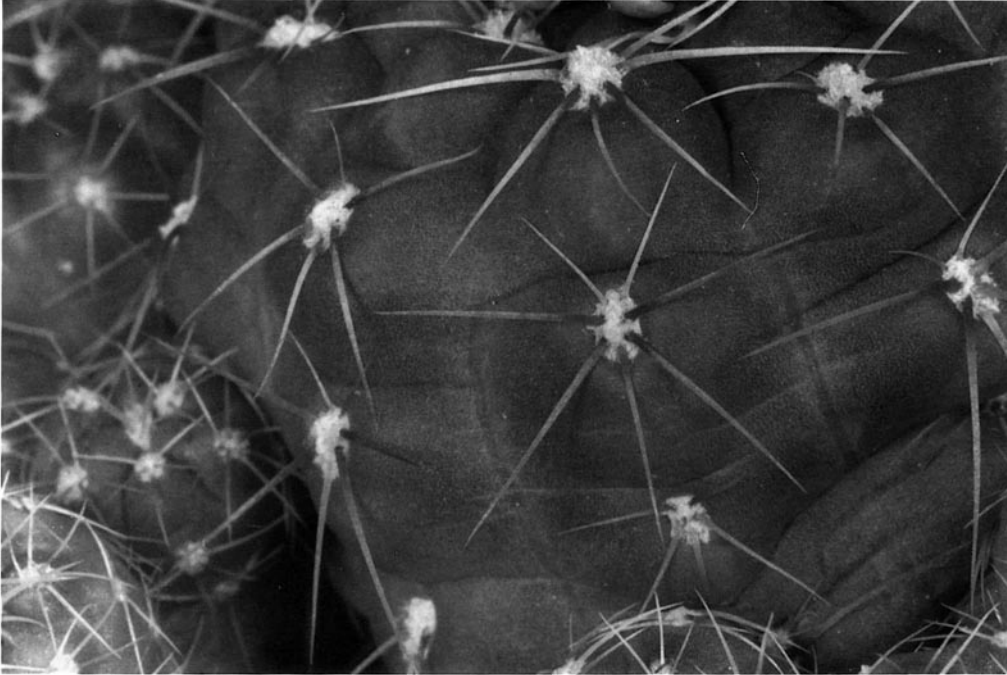


Figure 12.
G. andreae

Kakteenfr. 5(2): 61-66 (1992); Hunt (ed.), CITES Cact. Checklist 66 (1992) (accepted species). Fig. 12, Plates 4, 12 and 13.

Schütz's Subgenus *Gymnocalycium* (*Ovatisemineum*) Section *Gymnocalycium* (*Ovatisemineum*) (not as placed by Schütz in *Microsemineum* Section *Calochlorum*);
Buxbaum's Series *Gymnocalycium* (*Baldiana*)

This is a well-known, popular species with collectors, being easily grown and producing its attractive yellow flowers without trouble at any time and at an early age. It has usually dark, blue-green stems, though sometimes they are more dull, yellowish-green in full light, each to about 5 cm tall and wide, offsetting early in life to form eventually large clumps to 15 cms across or more. There are about 8 ribs, little defined, rounded, with little evidence of chinning but with a shallow cleft between the areoles. The spines are weak, straight to a little twisting, the 5 to 7 radials lying flat to the body, the 1 to 3 centrals similar in appearance, but standing out from the body and a little shorter; all spines are blackish-brown, whitish at the base, when they first emerge, becoming greyish later. Flowers are clear, pale yellow, opening to about 4 or 5 cm wide. Fruit is bluish green, cylindrical.

Reported from Argentina, Cordoba, El Condor at 2000 m (6560 ft) Cerro los Gigantes at 1500 to 2000 m (4920 to 6560 ft) altitude.

Collector's numbers referred here are P 199, 213.

Two varieties have been properly described and there are three others in circulation:

var. **grandiflorum*** Krainz & Andreae, Die Kakteen, C VIe, 1 (1957), which was described as differing in having 11 ribs, longer spines, usually curved, and a rounded rather than cylindrical bud, resulting in a larger flower, for which it was named. With no indication of its origins, this must be regarded as at most a form;

var. **svecianum*** Pazout, Pazout Valnicek & Subik, Kaktusy 1960:132 (1960), was described as having shorter, adpressed spines and smaller, externally brown, internally

pure yellow flowers, with very short tubes. It was grown by Svec of Prague from imported plants in the 1930s. As with the previous variety, this seems to be no more than a form at most;

var. *longispinum* nom. nud. (WR 108) is a name without description appearing in Walter Rausch's field list. Some young plants raised from seed certainly seem to have longer spines than the norm, whatever that is, but this is a minor difference;

var. *doppianum* Hort. – another catalogue name for distinctive, small headed, rapidly clustering plants, which have become available from commercial sources either as *G. doppianum* or more recently as *G. andreae* var. *doppianum*; the flower is typical of the species, and plants raised from commercial seed are very distinctive and, apart from the flower, not superficially like *G. andreae* at all; they compare with newly emerging offsets on standard *G. andreae*, but they retain their juvenile spination, and smaller size, offsetting freely;

var. *fechseri* nom. prov. H. Till, Arbeitsgr. Gymno. Osterreich. Kakteenfr. 2(5):65-66 (1992) – this is the same as the more usually seen *G. andreae* var. *doppianum*, see above.

G. anisitsii (K. Schumann) Britton & Rose, The Cact. 3:159, Fig. 168 (1922); K. Schum., Iconogr. Cactac. 1:t.4 (1900); Monatsschr. Kakteenk. 183 (1900) – as *Echinocactus anisitsii*; Krainz, Die Kakteen, 1.XI.CVIE (1956); Backeb., Die Cact. 3:1779, Fig. 1711(1959); Kakteenlex. 164 (1966); Moser, Kakt. u.a. Sukk. 20(2 & 4):38-9, 71-3 (1969); Cact. Lex. (Engl. ed.) 183 (1978); Putnam, Gymnocalyciums 14(1978); Bercht, Succulenta 63(2):43-5 (1984); Meregalli, Piante Grasse 5(1):15 (1985); Schütz, Monogr. Gymno. 28 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (accepted species). Fig. 13, Plate 14.

Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*;

Buxbaum's Series *Schickendantzianae* Subseries *Mihanovichiana*

This is a solitary or clustering species, growing shortly columnar in time, and noted for its flexuous, twisting spines. It makes a stem to about 8 cm wide, and to about 10 cm or more in time, with a pale green body colour with reddish tinges. There are about 11 ribs with acute tubercles. Spines are nearly always all radial, numbering 5 to 7, yellowish to brownish, slender, tortuous, variable in length from 1 to 6 cm. There is an occasional, similar central spine. Flowers are about 4 cm long, somewhat funnel shaped, white, greenish outside, anthers grey. Fruit is red, long cylindrical, 2.5 cm long, 1 cm wide.

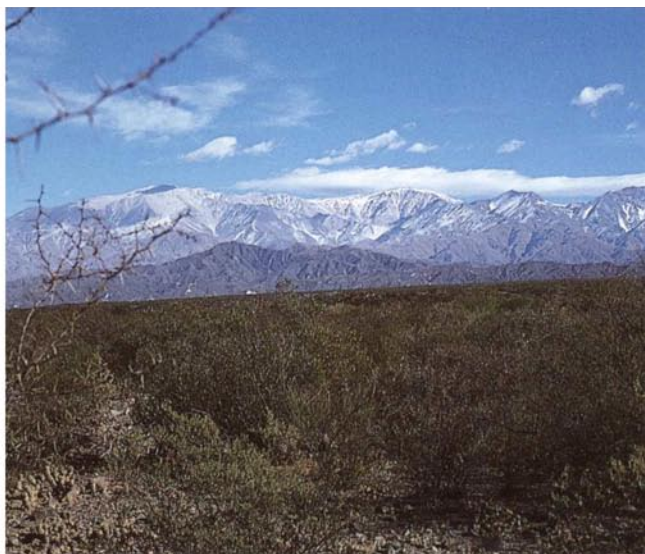
Reported from Paraguay, Rio Tigatigami, between Concepcion and Rio Paraguay.

Collectors' numbers referred here are KK 651; A 2.

According to the newly published *CITES Cactaceae Checklist*, after advice on this

Plates

1. Fruit of *G. gibbosum*, splitting lengthwise
 2. Fruit of *G. pflanzii*, splitting laterally
 3. Locality of *G. bodenbenderianum*: Monte landscape in province La Rioja, Argentina.
The Sierra de Famatima is in the background
 4. Locality of *G. andreae* and *G. monvillei*: high plateau in the Sierra de Cordoba with rocky grassland
 5. Locality of *G. spegazzinii*: rocky slopes in the Monte area, in province Salta, Argentina, growing along with *Trichocereus pasacana*
- | | |
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| 4 | 4 |
| 2 | 5 |





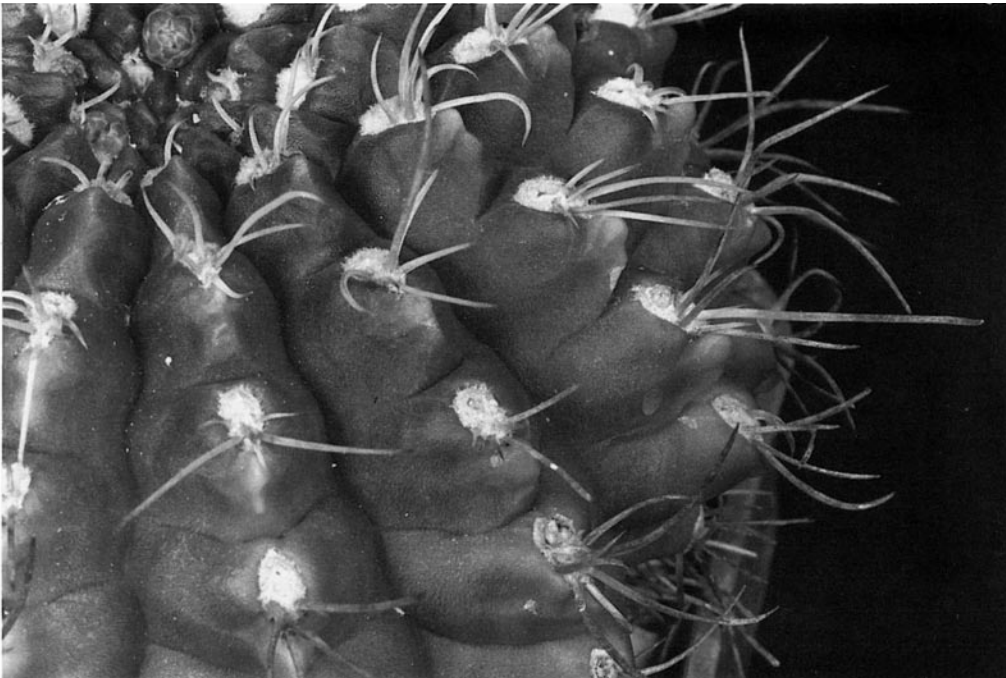


Figure 13.
G. anisitsii

genus from Detlev Metzging of Germany, Massimo Meregalli of Italy and Geoffrey Swales of the UK, this species is taken now to embrace the later described *G. damsii*, the type of which was reported from Paraguay. Later collections of *G. damsii* in Bolivia (and these are those commonly seen nowadays in collections labelled as *G. damsii* with various varietal suffixes) are regarded as good subspecies of *G. anisitsii*, although all Backeberg's varietal level names are invalid. The combination is not anticipated herein. See also *G. damsii*.

G. antherosacos Ritter, nom. nud. (FR 964), Kakt. Südamer. 2:476 (1980); Meregalli, Piante Grasse 5(1):15 (1985)

Referred by Ritter to *G. antherosteale*.

G. antherosteale* Ritter, Kakt. Südamer. 2:475 (1980); Meregalli, Piante Grasse 5(1):15 (1985); Schütz, Monogr. Gymno. 25(1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (syn. *G. schickendantzii*)

Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*;

Buxbaum's Series *Schickendantzianae* Subseries *Schickendantzianae*

Plates

- | | | |
|----|----|---|
| 6 | 7 | 6. <i>G. achirasense</i> P104 |
| 8 | 9 | 7. <i>G. acorrugatum</i> JL69, at San Agustin de Valle Fertil |
| 11 | 10 | 8. <i>G. acorrugatum</i> JL69 |
| | | 9. <i>G. alboareolatum</i> |
| | | 10. <i>G. altagraciense</i> nom. prov. |
| | | 11. <i>G. ambatoense</i> |

Although first discovered as long ago as 1959, it was over 20 years before Ritter described this species in his self-published 4 volume work. It has not appeared in cultivation under this name, although there is little doubt that it is synonymous with *G. schickendantzii*. For the record, it is described as solitary, fairly flat-globose, 8 to 12 cm wide, dark green with 13 to 21 ribs and very rounded tubercles, hardly chinned at all. Areoles are oblong, 4 to 6 mm long, placed in the upper part of the tubercles, about 2 cm apart. Spines are all radial, numbering 5, rarely 7, in one or two pairs, seldom three, with one spine pointing downwards, varying from 10 to 25 mm long, brown, thick awl-shaped, somewhat curved, mostly crescent shaped and very sharp. Flowers appear at the sides of the stem, 5 cm long, pale pink. Fruit is green, 25 to 35 mm long, 15 to 18 mm wide. Seed is 1 mm long, 0.7 mm wide, finely tuberculate, with narrow, lateral hilum.

Reported from Argentina, the province of Salta, General Moldes.

Collector's numbers referred here are FR 963, 964.

G. armatum* Ritter, Kakt. Südamer. 2:662, Fig. 645-647 (1980); Bercht, Succulenta 62:220-4 with pic. (1983); Meregalli, Piante Grasse 5(1):15(1985); Schütz, Monogr. Gymno. 29 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (syn. *G. cardenasianum*)

This is another of Ritter's discoveries of some 20 years ago, which waited until his major work was published for its formal description. It seems that it is no more than a redescription of *G. cardenasianum* from the same area. Certainly plants raised from commercial seed are identical to *G. cardenasianum*.

It was described as solitary, globular, 4 to 12 cm wide, grey-green, with thick roots and 8 to 15 ribs, with low tubercles, hardly apparent. Areoles are about 6 to 10 mm wide, 5 to 10 mm apart, with grey wool. Spines are very strong, projecting outwards, brown or black: radials number 3 to 6, curving, 4 to 7 mm long, centrals similar, numbering 1 or seldom 2, or absent altogether. Flowers appear at the top of the stem, 3 to 4 cm long, white or pink with purple midstripe. Fruit is 15 to 20 mm long, 7 to 10 mm wide, greenish. Seed is 1.2 mm long, 0.7 mm wide, reddish-black, finely tuberculate, with ventral hilum.

Reported from Bolivia, Department Tarija, province Mendez, at El Paicho.

Collector's number referred here is FR 1131.

G. artigas* Herter, Revista Sudamericana de Botanica 8(5) or 10?: 1 (1951); Backeb., Die Cact. 3:1720 (1959); Kakteenlex. 164(1966); Frank, Kakt. u.a. Sukk. 20(11):218-20(1969); & 21(4):62-4 (1970); Cact. Lex. (Engl. ed.) 183 (1978); Putnam, Gymnocalyciums 15 (1978); Schlosser & Schütz, Kakt. u.a. Sukk. 33:26 (1982); Meregalli, Piante Grasse 5(1):15 (1985); Schütz, Monogr. Gymno. 30(1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (syn. *G. uruguayense*)

Referred to *G. uruguayense*.

G. asterium* Y. Ito, Expl. Diagn. 191 (1957); R. Strong, Nat. Cact. Succ. J. 30:49 (1975); Hunt (ed.), CITES Cact. Checklist 66 (1992) (syn. *G. stellatum*)

Referred to *G. stellatum*.

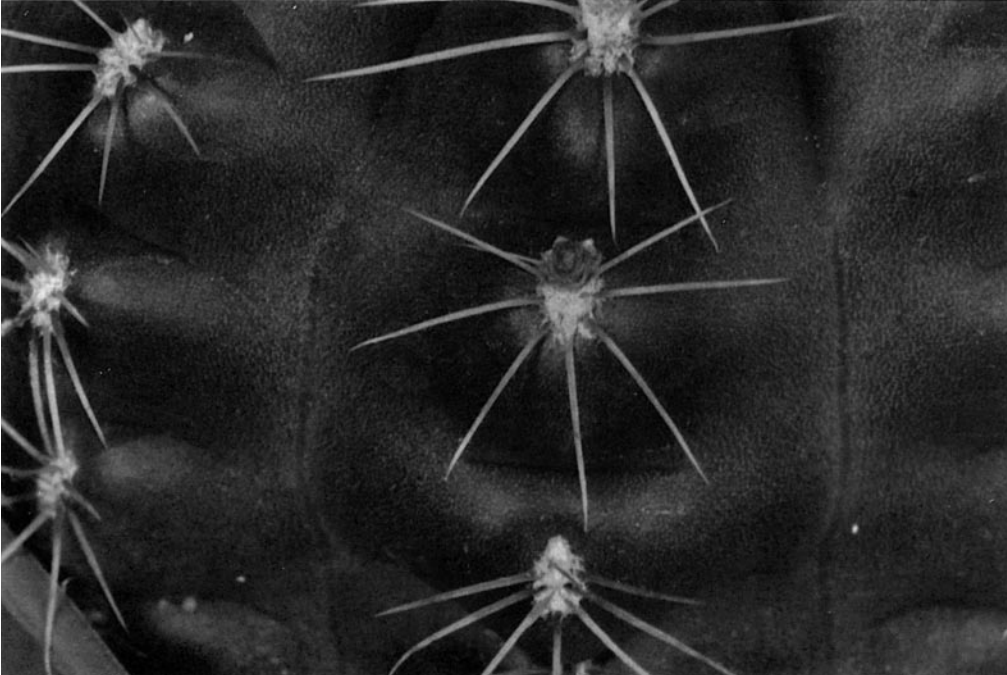


Figure 14.
G. baldianum

G. baldianum (Spegazzini) Spegazzini, Nuev. Not. Cactol. 55 (1925); Cact. Plat. Tent. 505 (1905); Backeb., Die Cact. 3:1731, Figs. 1667-8 (1959); Kakteenlex. 165 (1966); H. Till, Kakt. u.a. Sukk. 23(9):238-40 (1972); Backeb., Cact. Lex. (Engl. ed.) 183 (1978); Putnam, Gymnocalyciums 15 (1978); Bercht, Succulenta 62(4):72-8 (1983); Meregalli, Piante Grasse 5(1):15 (1985); Schütz, Monogr. Gymno. 31(1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (accepted species). Fig. 14, Plate 15.

Schütz's Subgenus *Gymnocalycium* Section *Gymnocalycium*;
Buxbaum's Series *Gymnocalycium* (*Baldiana*)

This is a well-known, rightly popular species, with dark grey-green or blue-green body colouring, weak spines and variably coloured red flowers. It is easy to grow and flowers easily and freely. In time it will cluster, but will often stay solitary for some years, making stems to about 6 or 7 cm wide and about 9 or 10 cm tall. The rib count increases with age to about 10 or 11, often about 5 or 6 in youth, with low rounded ribs, little chinning and a shallow cleft between tubercles. The spines are all radial, wispy, flexible, twisting sometimes, to about 7 in number, grey or brownish, dark brown in youth, lighter at the bases of the spines, flowers are pinkish-red to deep red, variable from plant to plant, although this is sometimes due I suspect to hybridising in cultivation rather than from natural differentiation. Fruit is elongated, dark green.

Reported from Argentina, Catamarca, Andalgalá, Hualfin; by Piltz from Sierra Ancasti at 900 m (2950 ft) altitude, Cuesta de Portezuelo at 1700 m (5580 ft), Cuesta de Totoral at 1100 m (3610 ft).

Collectors' numbers referred here are FR 443; WR 126, 150; Lau 501; P 127, 127a, 165.

The name *G. venturianum* or *G. baldianum* var. *venturianum* persists, particularly for a larger bodied form of this species, but it is not justified.

The varietal name, *G. baldianum* var. *albiflorum*, is occasionally seen. In the early

1970s it was applied to what was subsequently named *G. uebelmannianum*, but plants raised in recent years from seed offered under this name have nothing to do with this species nor with *G. baldianum*.

G. bayrianum H. Till, Kakt. u.a. Sukk. 18(12):222 (1967) nom. inval.; & Kakt. u.a. Sukk. 38(8):191(1987) – validation; Haage in Backeb., Cact. Lex. (Engl. ed.) 183 (1978); Bercht, Succulenta 62(10):220-4 (1983); Putnam, Gymnocalyciums 16 (1978); Meregalli, Piante Grasse 5(1):15 (1985); Schütz, Monogr. Gymno. 33 (1986); Metzing, Arbeitsgr. Gymno. Osterreich. Kakteenfr. 2(4):21-24 (1989); Hunt (ed.), CITES Cact. Checklist 66 (1992) (provisionally accepted species). Fig. 15, Plate 16. Schütz's Subgenus *Microsemineum* Section Loricata; Buxbaum's Series Sagliones

A comparatively recently described species, this is now fairly common in collections, and makes a handsome, flattish, matt green flushed red plant with a few strongly curved spines. The body is flat-globular, solitary, to about 10 cm or more in cultivation, and 4 or 5 cm tall, with 6 to 10 flattish ribs. The body colour is bluish green to dull mid green tinged with red when exposed to full light. Areoles have yellowish wool, later grey. There are usually 5 radial spines (with an occasional similar central) to about 3 cm long, curving back into the body, light brown, darker tipped becoming grey. Flowers are creamy-white, with a reddish-pink throat, about 6 cm long and 4 cm wide when fully open. The fruit is elongated, grey-green with blue bloom and lilac-pink-edged scales.

Reported from Argentina, Tucuman and Salta, Sierra Medina, at 1000 to 1500 m (3280 to 4920 ft) altitude, Tucuman/Salta border.

Collectors' numbers referred here are HT 473 (deposited at Vienna), Lau 447, 447a, 472a; JL 250.

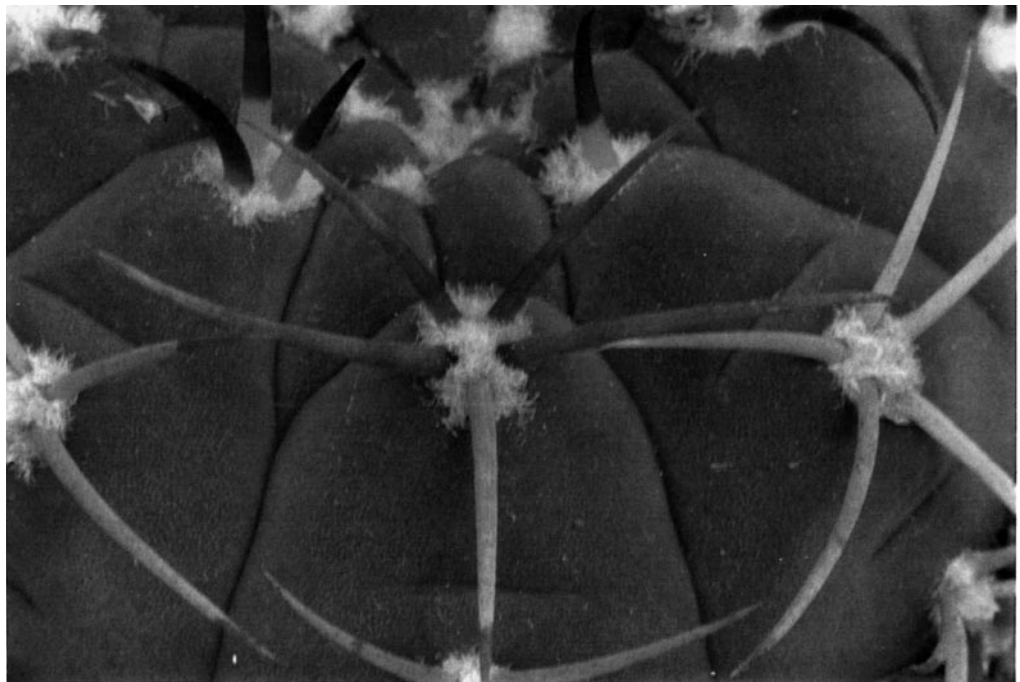


Figure 15.
G. bayrianum

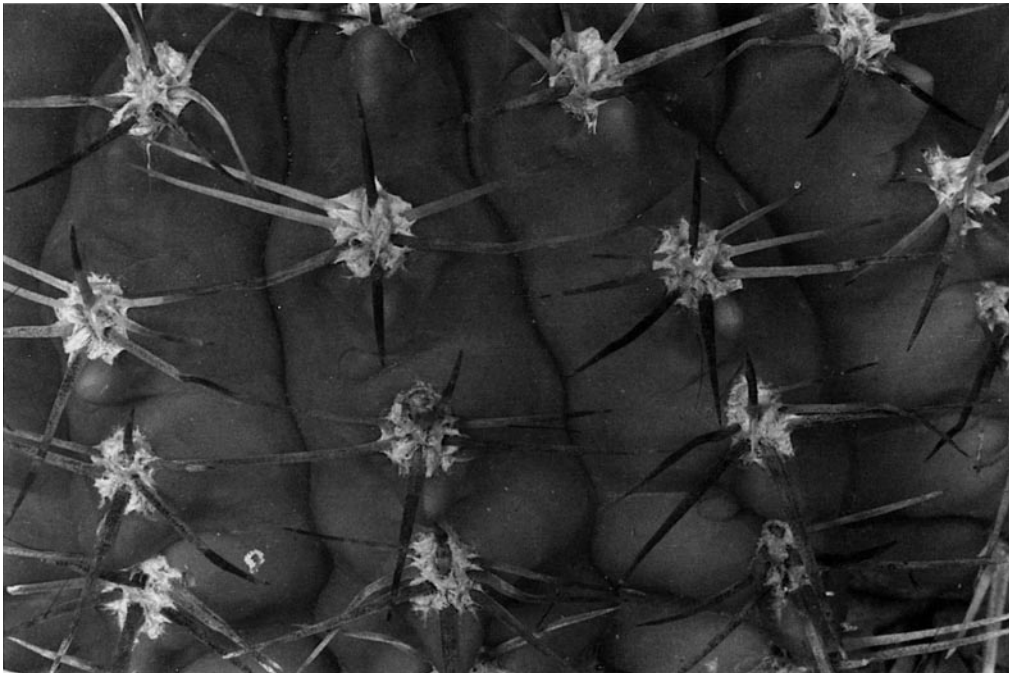


Figure 16.
G. bicolor

G. bicolor Schütz, *Friciana* 7:2, 8 (1962); Frank, *Kakt. u.a. Sukk.* 14:221 (1963); Backeb., *Kakteenlex.* 165 (1966); Andreae, *Kakt. u.a. Sukk.* 21(3):41 (1970); *Cact. Lex. (Engl. ed.)* 183 (1978); Putnam, *Gymnocalyciums* 17(1978); Meregalli, *Piante Grasse* 5(1):15 (1985); Schütz, *Monogr. Gymno.* 34 (1986); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (provisionally accepted species). Fig. 16, Plate 17.

Schütz's Subgenus *Microsemineum* Section *Hybopleura*;
Buxbaum's Series *Mostiana*

This species has become increasingly available to collectors through commercial sources since its description, and some handsomely spined plants are seen in cultivation getting near to the size reported when originally described from wild collected plants. The solitary body is flat-globular, dark green, up to 15 cm wide and to about 8 or 9 cm tall, with up to about 17 ribs. Radial spines are in two colours, the three lower dark blue-grey, thicker than the upper spines, which number about 8 and are thinner and whitish, lying closer to the plant body; all are straight to slightly curving. The one central is similar to the thicker, darker radials in appearance. Although the flower was described as white, it is usually pale pink with darker throat in most plants seen in cultivation, and beautifully shaped, the centre petals standing separate from the more spreading outer petals in a most attractive arrangement; the flowers are about 5 cm long and wide when fully open. Fruit is green, globular.

Reported from Argentina, the province of Cordoba at 500 m (1640 ft) altitude without further more detailed locality; by Piltz in this province north of Cruz del Eje.

Collectors' numbers referred here are P 116; B 44, 169, 197b; JL 172; WP89-100/123?

According to Metzging (in letters) this species can be seen as an infraspecific taxon of *G. mostii*, but the combination (as subspecies or variety) has not yet been made.

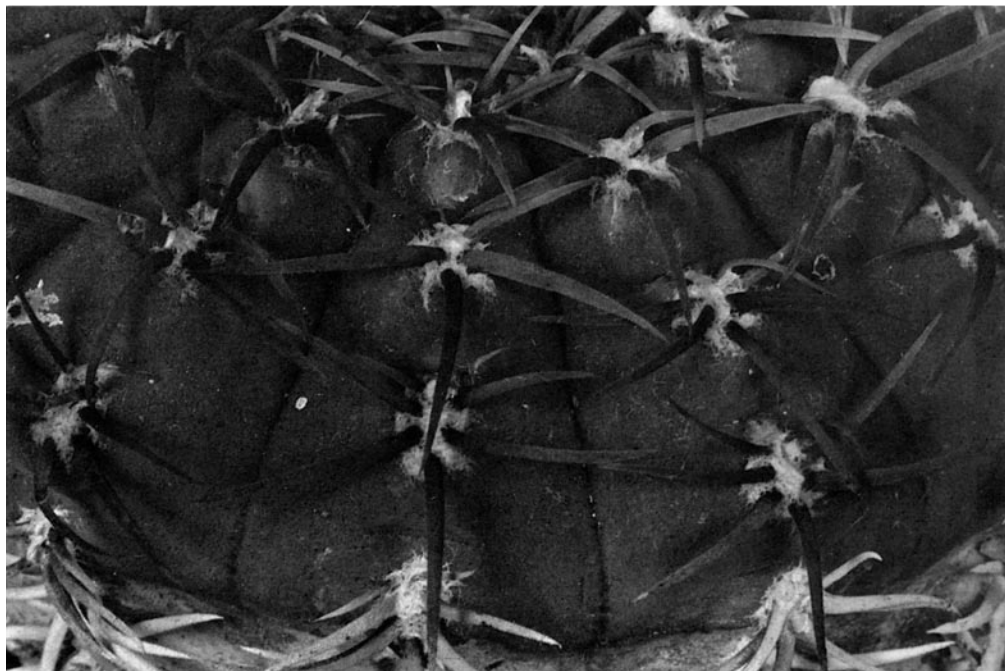


Figure 17.
G. bodenbendrianum

G. bodenbendrianum (Hosseus ex Berger) Backeb. in Backeb & Knuth, Kaktus ABC 286 (1935); Hosseus ex Berger, Kakteen 221, Fig. 58 (1929) – as *Echinocactus bodenbendrianus*; Hosseus ex Haage jr. Cat. 1928: 14 (1928) n.n.; Backeb., Die Cact. 3:1725, Fig. 1660 (1959); Kakteenlex. 165 (1966); Cact. Lex. (Engl. ed.) 184 (1978); Putnam, Gymnocalyciums 18 (1978); Meregalli, Pianta Grasse 5(1):17 (1985); Schütz, Monogr. Gymno. 34 (1986); H. Till & Neuhuber, Arbeitsgr. Gymno. Österreich. Kakteenfr. 5(3) & 5(4):67-76 (1992); Hunt (ed.), CITES Cact. Checklist 66 (1992) (accepted species); H. Till, Arbeitsgr. Gymno. Österreich. Kakteenfr. 6(1):83-4 (1993). Fig. 17, Plates 3 and 18.

Schütz's Subgenus *Trichomosemineum*;

Buxbaum's Series Quehliana

As well as a resonant specific name this species is one of the most attractive in this subgenus. With its ground-hugging, brownish grey-green body, about 8 cm broad, and barely getting to more than 2 or 3 cm above soil level, it is typical of this subgenus, and it clearly has a tough time in nature, resorting to burying itself below ground in hard times. Like related species it is slow growing, taking many years to get to its maximum size, but it will grow in a pot just big enough to take its large underground stem and roots, content with an occasional change of compost, and imperceptibly increasing its girth year by year, as we all tend to do in middle-age. It has 11 to 14 low and rounded ribs, with trapezium shaped, greyish-white woolled areoles. The 3 to 5 spines are thin but strong and usually recurving, blackish-brown in youth, becoming brown or greyish-brown, about 1 cm long. Flowers are pale pink, with brownish midstripe, 3.5 cm to 6 cm long with a narrow tube. Fruit is ovoid, bluish-green, to over 2 cm long, about 1 cm wide. Seed is typical of the subgenus, blackish-brown, shining with small papillae, the hilum is horseshoe shaped, yellowish-white.

Reported from Argentina, Cordoba, and La Rioja, Los Colorados at 800 m (2625 ft)

altitude, between Sierra de Abajo and Sierra de Ulapes.

Collectors' numbers referred here are FR 23, Lau 531, (P 206?).

Till has recently combined *G. intertextum* at subspecific level here, also acknowledging beneath it Jorg Piltz's provisional name for his collection number P 113 ('intermedium'), apparently at varietal level, although the combination is not actually made. This is as well, since the name has been used earlier for a different taxon, see remarks under *G. intermedium*.

In view of the complexity of the articles on this group in the aforementioned publication, the combination is not here acknowledged.

G. bolivianum Ritter, nom. nud., Kakt. Südamer. 2: 661 (1980)

Referred to *G. pflanzii*.

G. borthii Koop, Kakt. u.a. Sukk. 27(2):25 (1976) nom. inval; H. Till, Kakt. u.a. Sukk. 38(8):191 (1987) – validation; Putnam, *Gymnocalycium* 18 (1978); Meregalli, *Piante Grasse* 5(1):17 (1985); Schütz, *Monogr. Gymno.* 35 (1986); Piltz, *Gymnos* 7(14):36-39 (1990); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (provisionally accepted species). Fig. 18, Plate 19.

Schütz's Subgenus *Gymnocalycium* Section *Gymnocalycium*;

Buxbaum's Series *Gymnocalycium* (*Baldiana*)

One of the few new species appearing in the last 10 years or so, this is regarded by Jorg Piltz as part of the *G. gibbosum* complex. It is provisionally upheld in the *CITES Cactaceae Checklist*.

It is described as flat-globular to elongated-globose, the body coloured grey-green to

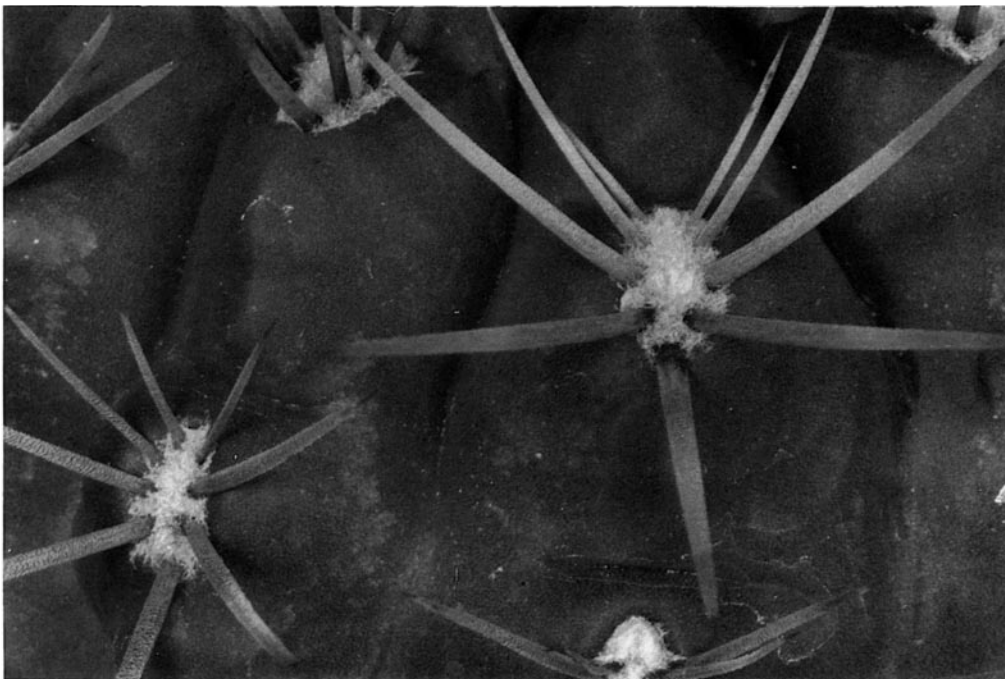


Figure 18.
G. borthii

violet-brown, to 10 cm tall and about 9 cm wide, with 9 to 16 ribs, vertical, and with rounded chins. Areoles are oval, to 5 mm long, 3 mm wide, with yellow-brown wool. The spines are all radial, usually numbering 5, but rarely there are up to 9, flexible to rigid, usually straight, radiating sideways with one pointing downwards, to about 2 cm long, the downward pointing one longer, to about 2.5 cm, varying in colour from whitish to yellowish to grey, at the base dark grey to brown. Flowers are funnel-shaped, about 4.5 cm long, 5 cm wide, white with pink throat. Fruit is long, spindle-shaped, to 15 mm wide. Seed is about 1 mm long and wide, egg-shaped, almost black, with acuminate oval, dark brown, basal hilum.

Reported from Argentina, province San Luis, near Quines, at 600 to 800 m (1970 to 2625 ft) altitude.

Collectors' numbers referred here are HT 146 (deposited at Vienna); P 178; LB 268, 270, 296, 314, 317, 343; WP89-063/078?.

G. bozsingianum* Schütz, *Kaktusy* 16:124-6 (1977); Putnam, *Gymnocalyciums* 18 (1978); Antesberger, *Kakt. u.a. Sukk.* 33(7):142-3 (1982); Bercht, *Succulenta* 62(6):118-20 (1983); Meregalli, *Piante Grasse* 5(1):17 (1985); Schütz, *Monogr. Gymno.* 36 (1986); Piltz, *Gymnos* 9(18):33-52 (1993); B. Schweitzer, *Gymnos* 9(18):52-3(1993); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (syn. *G. castellanosii*)

Seed and seedlings of this fairly recently described species have already been available through commercial sources, and the young plants are already showing the sort of strong growth expected in this section. In the *CITES Cactaceae Checklist* it is referred to synonymy with *G. castellanosii*; this endorses Piltz's treatment of the species in his paper on *G. castellanosii* (ref. above) as a variety of that species, and it is here so regarded – see *G. castellanosii* var. *bozsingianum*.

G. brachyanthum* (Gürke) Britton & Rose, *The Cact.* 3:159 (1922); Gürke, *Monatsschr. Kakteenk.* 123 (1907) – as *Echinocactus brachyanthus*; Krainz, *Die Kakteen* 1, XI.C.VIe (1956); Backeb., *Die Cact.* 3:1770 (1959); *Kakteenlex.* 165(1966); *Cact. Lex. (Engl. ed.)* 184 (1978); Putnam, *Gymnocalyciums* 18 (1978); Meregalli, *Piante Grasse* 5(1):17 (1985); Schütz, *Monogr. Gymno.* 37 (1986); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (syn. *G. monvillei*); H. Till & Neuhuber, *Arbeitsgr. Osterreich. Kakteenfr.* 6(3):99-106 (1993)

Regarded even by Backeberg as merely a form of *G. monvillei*. In a recent paper Till and Neuhuber have resurrected this name at subspecific level beneath *G. monvillei*, see under *G. monvillei*.

Plates

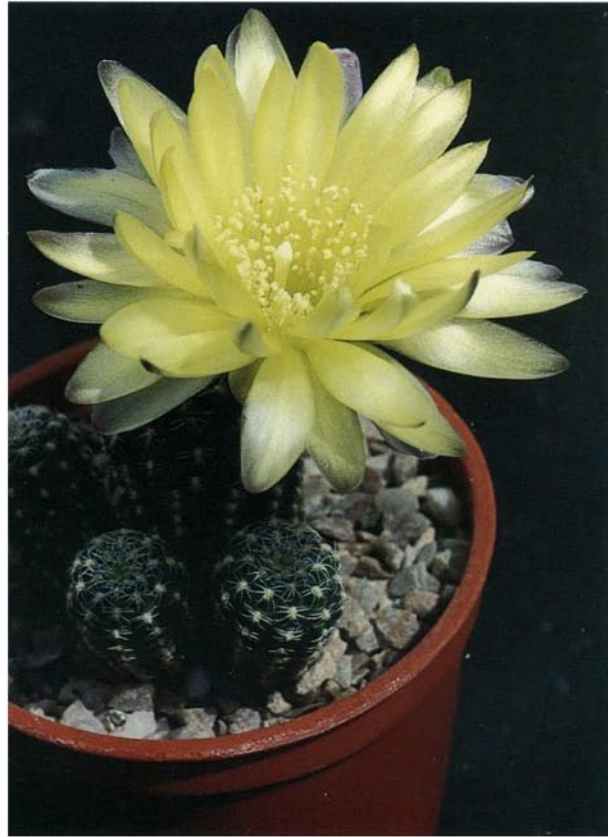
12. *G. andreae* Pl99

13. *G. andreae* (*doppianum* nom. nud.)

14. *G. anisitsii*

15. *G. baldianum* Lau 501

12	13
14	15





G. brachypetalum* Spegazzini, Nuev. Not. Cactol. 55 (1925); Backeb., Die Cact. 3:1758, Fig. 1689 (1959); Kakteenlex. 165 (1966); Cact. Lex. (Engl. ed.) 184 (1978); Putnam, Gymnocalyciums 18 (1978); Meregalli, Piante Grasse 5(1):17 (1985); Schütz, Monogr. Gymno. 38 (1986); Piltz, Gymnos 7(14):36-39 (1990); Hunt (ed.), CITES Cact. Checklist 66 (1992) (syn. *G. gibbosum*)

Referred to *G. gibbosum*.

G. brevistylum Ritter, nom. nud., Kakt. Südamer. 2:663 (1980); Hunt (ed.), CITES Cact. Checklist 66 (1992) (syn. *G. marsoneri*)

Referred by Ritter to *G. tuda* var. *bolivianum*, and thence to *G. megatae* – see under that name. (The *CITES Cactaceae Checklist* refers *G. megatae* to *G. marsoneri*).

Collector's number pertaining here is FR 1133.

G. bruchii (Spegazzini) Hosseus, Apunt. sobre Cact. Cordoba 22(1926); Speg., Brev. Not. Cactol. 15, 73 (1923) – as *Frailea bruchii*; Oehme, Cact. DKG (2):26-30 (1941); Backeb., Die Cact. 3:1698, Fig. 1631 (1959); Kakteenlex. 165 (1966); Cact. Lex. (Engl. ed.) 184 (1978); Putnam, Gymnocalyciums 19 (1978); Bercht, Succulenta 62(4):72-8 (1983); Meregalli, Piante Grasse 5(1):18 (1985); Schütz, Monogr. Gymno. 39(1986); Becker, Gymnos 7(14):61-65 (1990); Hunt (ed.), CITES Cact. Checklist 66 (1992) (accepted species). Fig. 19, Plates 20-23.

Schütz's Subgenus *Gymnocalycium* Section Lafaldensia;
Buxbaum's Series Lafaldenses

This very popular well-known species is immediately identifiable by the unusually small bodies, which are heavily offsetting, and usually barely more than 2 or 3 cm tall and wide, although stems up to 6 cm wide and to 3.5 cm tall are also recorded. It has many bristly spines often densely covering the stems, white sometimes brown at the base, often with a pinkish-brown tinge. Areoles have short white wool. There are about 10 thin radial spines, glassy white, with up to 3 centrals, white or brownish, as indicated above giving a pinkish brown tinge to the plant; the centrals are sometimes not present at all. Flowers are freely produced, variable in colour from palest, whitish-pink to deeper shell pink, with sometimes a darker stripe or throat; they are 3.5 to 5 cm long and wide when fully open. Fruit is bluish, spherical, small, about 5 mm in diameter. The plant commonly seen as *G. albispinum* may well be just a larger growing form of this species.

Reported from western Argentina, the Sierra de Cordoba, at 1300 m and 1600 m (4260 and 5250 ft) altitude, near Alta Gracia, and from the Sierra La Falda.

Collectors' numbers referred here are FR 441; WR 104, 727; P 174; WO 54; LB 328, 335; JL 342, 343; WP89-076/100, 087/118, 088/121, 090/124.

Plates

16. *G. bayrianum*

17. *G. bicolor*

18. *G. bodenbenderianum* SPI 26/70

19. *G. borthii*

16 | 18 | 19
17

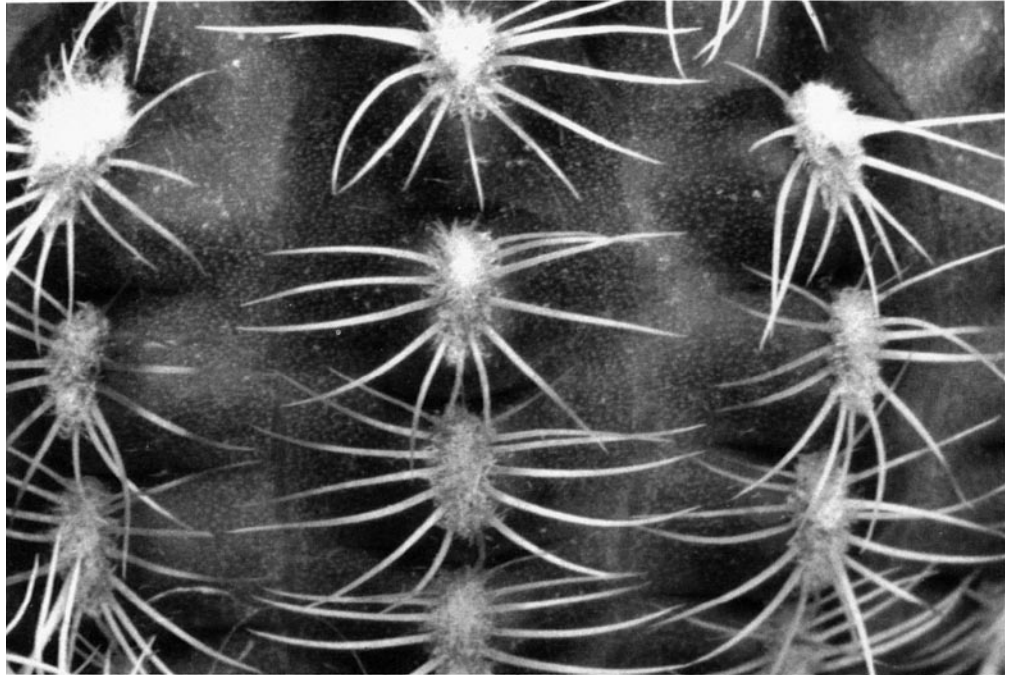


Figure 19.
G. bruchii

Backeberg described a variety of this species:

var. **hossei*** Backeberg, *Kaktus ABC* 286 (1935); *Die Cact.* 3:1699, Fig. 1632 (1959); *Kakteenlex.* 165 (1966); *Cact. Lex. (Engl. ed.)* 184 (1978).

With the wide variation in spination and flower colour recognized already in this species, this variety, described as having somewhat laxly-arranged petals, sometimes contorted and with a cuspidate tip, is no more than a minor flower variant of the type. It was reported vaguely from northern Argentina.

Recently Jorg Piltz has erected a variety of this species found by Brigitte Piltz:

var. **brigittae** (*Succulenta* 66(10):213-216 (1987)), which differs in its darker epidermis, smaller ribs, smaller and shorter radial spines (the most apparent difference), and with, nearly always, more compressed floral pericarp.

Reported from Argentina, Cordoba, Tanninga, at 1850 m (6070 ft) altitude.

Collector's number referred here is P214.

A further variety was recently described by Walter Rausch:

var. **niveum** *Succulenta* 68(9):177, 179-181 (1989), forming small heads to only 2 cm wide, sparingly clustering to form small groups. The stems have 14-15 ribs, 22 to 24 white, radial spines, bristle-like, interlacing, seldom with one central spine. Flowers are 2 to 2.5 cm long and wide, whitish-pink with pink midstripe.

Reported from Argentina, Cordoba, near Capilla del Monte.

Collector's number referred here is WR 727.

Also referred to this species without separate recognition are *G. albispinum*, mentioned above, described as having more upstanding and longer spines, and *G. lafaldense*, a later, invalid name, with no differentiation.

There were too a number of forms attached to *G. lafaldense* by Oehme (*Cact. DKG* (2):26-30, May 1941), emphasising more than anything the variability of the species in size of stem and spine count. They were:

- fa. *albispinum* (see comment above on *G. albispinum*);
 fa. *deviatum*, with stronger growth and more upstanding spines;
 fa. *enorme*, with stems to 5 cm wide and flowers 5.5 cm long and wide;
 fa. *evolvens*, also a large form with prominent centrals, flower to 4 cm long and wide;
 fa. *fraternum*, with central spines, ‘possibly solitary’ (but not likely I think), spines described imaginatively as dirty ivory coloured;
 fa. *hossei* (see var. *hossei* above).

G. buenekeri (Buining) Swales, Cact. GB 40:97 (1978); Buining, Kakt. u.a. Sukk. 21(9):162 (1970) – as *G. horstii* var. *buenekeri*; Haage in Backeb., Cact. Lex. (Engl. ed.) 187 (1978) – as *G. horstii* var. *buenekeri*; Putnam, Gymnocalyciums 20 (1978); Bercht, Succulenta 62(10):220-4 (1983); Meregalli, Piante Grasse 5(1):18 (1985); Schütz, Monogr. Gymno. 40 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (accepted species). Fig. 20, Plate 24.

Schütz’s Subgenus *Macrosemineum* Section *Denudata*?;

Buxbaum’s Series *Uruguayenses* Subseries *Denudata*? (see Chapter 2 for comments on the anomaly of the placing of this species)

This species started life as *G. horstii* var. *buenekeri*, and was raised to specific level by Geoff Swales, *Gymnocalycium* enthusiast from Sunderland in the north of England. He set out in the first place merely to validate the variety since it had been described invalidly because no type specimen had been deposited, although a deposition was made of the type, *G. horstii* var. *horstii*. However on looking deeper into the question of its standing, he concluded that the differences in sum were sufficient to warrant separate specific recognition; and this he did.



Figure 20.
G. buenekeri

It is a clustering species early in life (*G. horstii* tends to stay solitary for much longer), with stems at first flat-globose, later short-cylindrical, to 10 cm or more wide, and to about 15 cm tall in age, dark green to mid green, unshining (the most immediately apparent difference from *G. horstii*, which has a shining epidermis), with usually 5 ribs, broadly rounded with areoles in shallow notches, shallower or non-existent in youth. Areoles are round, with white to pale yellow wool. The spines are all radial, 3 or occasionally 5, up to 2.5 cm on older plants, shorter when younger, stiff, slightly curved and projecting a little, pale yellow, later dark brown. Flowers appear near the apex, and are about 4.5 cm long, 6.5 cm wide when fully open, pale peach-pink with darker midstripe, to uniform rose-pink, and darker in the throat. Fruit is sub-cylindrical to ovoid later, mid-green with paler scales, little waxed. Seed is dark blackish-brown, about 1 mm in diameter, more or less the same shape as species in the Subgenus *Macrosemineum* from the same broad area, but with tubercles on the testa in the style of species in the Subgenus *Trichosemineum*, but not with the prominent hilum of that subgenus.

Reported from Brazil, in the state of the Rio Grande do Sul, very localised, near Sao Francisco de Assis, about 200 km north-west of Cacapava, where *G. horstii* is found.

Collectors' numbers referred here are HU363; LB 583, 586.

Since it has been available this species has proved popular at shows, competing favourably with other large species of *Gymnocalycium*, with its comparatively quick growth and good looks, especially when in flower; it will fill a 9 or 10 in (25 cm) pan in very few years.

G. calochlorum (Bödeker) Y. Ito, Expl. Diagr. 197 (1957); Böd. Monatsschr. Deutsch. Kakt. 260(1932) – as *Echinocactus calochlorus*; Backeb., Die Cact. 3:1717, Fig. 1648 r.h.pic. (1959); Backeb., Kakteenlex. 165 (1966); Cact. Lex. (Engl. ed.) 184 (1978); Putnam, *Gymnocalyciums* 20(1978); Bercht, *Succulenta* 62(4) :72-8 (1983); Meregalli, *Piante Grasse* 5(1):18 (1985); Schütz, *Monogr. Gymno.* 41(1986); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (accepted species). Fig. 21, Plates 25 and 26.

Schütz's Subgenus *Gymnocalycium* Section *Lafaldensia* (not *Microsemineum* as classified by Schütz);

Buxbaum's Series *Gymnocalycium* (*Baldiana*)

This species resembles *G. bruchii* in its clustering habit and spination, but it has much larger, somewhat less prolifically clustering stems, each to about 6 cm wide and to 4 cm tall. The stems are grey-green to blue-green, with about 11 ribs. Areoles are round, with creamy-white wool. Radial spines are usually curving back on to the body, about 9 in number, to 10 mm long, thin, wispy, whitish to pale pinkish-brown. There are no central spines. Flowers are pale pink, to 6 cm long, not opening very widely, with a long, bluish tube. Fruit is long-ovoid, blue to bluish-green.

Reported from Argentina, with no precise locality originally but Rausch reports its occurrence in Cordoba, Sierra Grande; Piltz reports it from Argentina, Nono at 1000 m (3280 ft), Las Rabonas at 900 m (295011), Villa Bura Brochero at 1000 m (3280 ft), and Cordoba, La Mudana at 1000 m (328011) altitude.

Collectors' numbers referred here are FR 440; WR 107; P 109, 109a & b, 211; WO 62; B 5, 6, 7, 12, 184; JL 2, 39, 109, 177.

Backeberg described one variety as follows:

var. **proliferum*** Backeberg, *Deutsch. Kakteenfr.* 132 (1932); *Kaktus ABC* 295 (1935); *Die Cact.* 3:1718, Fig. 1648 l.h.pic. (1959); *Kakteenlex.* 165 (1966); *Cact. Lex.*

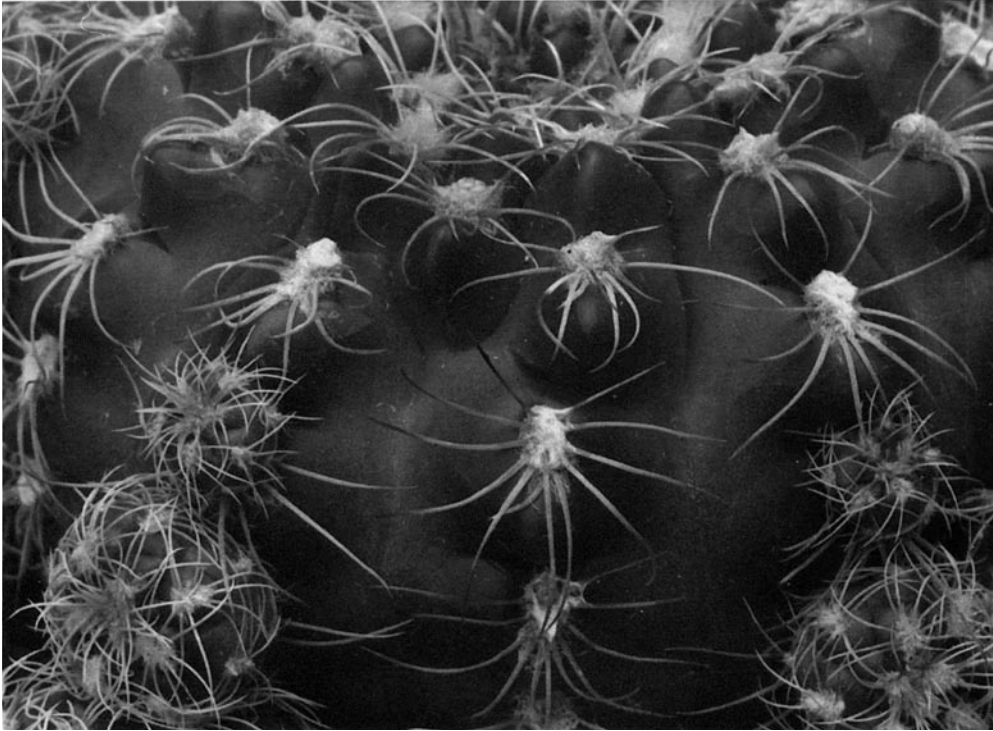


Figure 21.
G. calochlorum

(Engl. ed.) 184(1978); Bercht, *Succulenta* 62(4):72-8 (1983) – differentiated by larger, more blue coloured bodies and larger flowers, which open more widely, and have longer, recurved petals. This is little different from the type, and is here regarded as merely a variant.

Reported by Piltz from Argentina, Cordoba, Villa Carlos Paz, at 700 m (2300 ft) altitude.

Collectors' numbers referred here are FR 440; P 203; WP89-106/141, 107/142.

G. capillaense (Schick) Backeberg, Backeb. & Knuth, *Kaktus ABC* 287(1935); Schick in Möller's *Deutsche Gärtn.* 38:26, 201 (1923) – as *Echinocactus capillensis*; *Die Cact.* 3:1716, Fig. 1647 (1959); *Kakteenlex.* 165 (1966); *Cact. Lex.* (Engl. ed.) 184 (1978); Putnam, *Gymnocalycium* 20(1978); Meregalli, *Piante Grasse* 5(1):18 (1985); Schütz, *Monogr. Gymno.* 42 (1986); Hunt (ed.), *CITES Cact. Checklist* 66, 68 (1992) (accepted species); W. Schmidt, *Gymnos* 10(19):7-8 (1993); Metzinger, *Gymnos* 10(19):9-10(1993). Fig. 22, Plate 27.

Schütz's Subgenus *Gymnocalycium* Section *Lafaldensia* (not as classified by Schütz in *Microsemineum*);

Buxbaum's Series *Gymnocalycium* (*Baldiana*)

This species (which is generally regarded as including *G. sigelianum* and *G. sutterianum*) has recently become more readily available to collectors from commercial sources. It clusters quite heavily, with stems flat-globular, and to 8 cm tall and wide, the body colour dull bluish-green, with up to 13 ribs, somewhat flat with low chinning. Areoles are sunken, with creamy-white wool. Spines are all radial, numbering usually

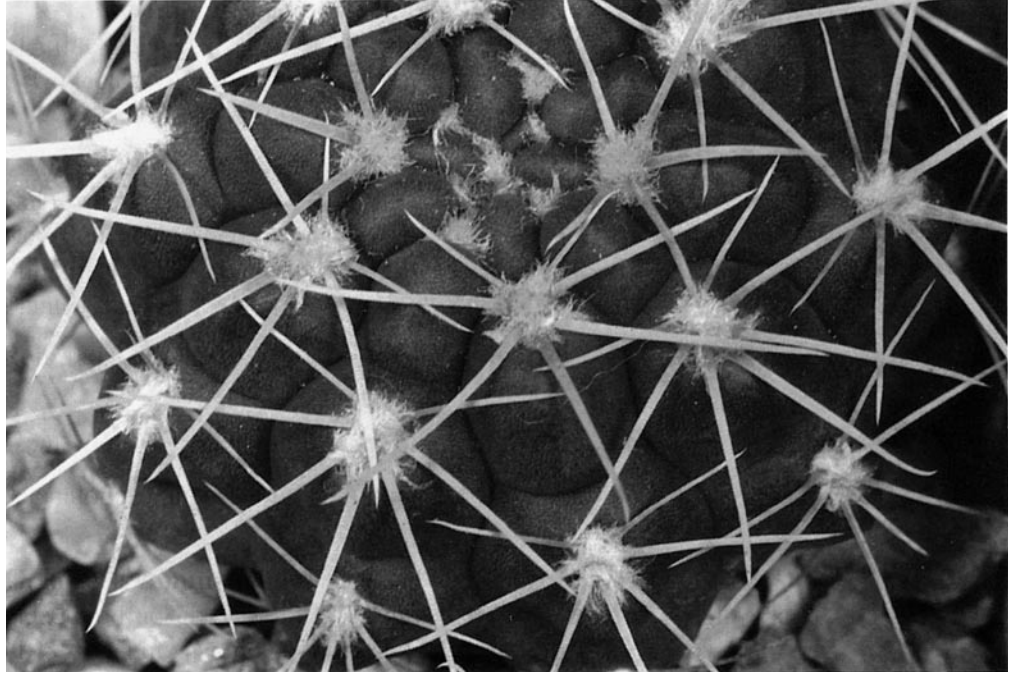


Figure 22.
G. capillaense

5, to about 12 mm long, yellowish-white. Flowers are large, to 7 cm long, and 6 cm wide, pale pinkish-white. Fruit is clear blue, club shaped.

Reported from Argentina, Cordoba at 1300 m (4260 ft) altitude, Sierra Chica, Rio Tercera, Capilla del Monte at 1100 m (3610 ft), Cosquin at 1100 m (3610 ft), Province San Luis at 1000 to 1100 m (3280 to 3610 ft) altitude.

Collectors' numbers referred here are FR 434, WR 106, 726 (*G. sutterianum*); P 5, 5a, 82, 82a, 103, 103a-c ; WO 57; B 41, 93, 194; DV 45; LB 287 (*G. sutterianum*); JL 42, 105 (*G. sutterianum*), 175, 341 (*G. sutterianum*); WP89-094/126, 109/145, 110/146.

G. cardenasianum Ritter, *Taxon* 13(4):144 (1964); Backeb., *Die Cact.* 3:1747, fig. 1676 (1959); *Kakteenlex.* 165 (1966); Szemjonnek, *Kakt. u.a. Sukk.* 23(9):244 (1972); Backeb., *Cact. Lex. (Engl. ed.)* 184 (1978); Putnam, *Gymnocalyciums* 20-21 (1978); Ritter, *Kakt. in Südamer.* 661-2, Fig. 643 (1980); Bercht, *Succulenta* 62(10):220-4 (1983); Meregalli, *Piante Grasse* 5(1):18, 20 (1985); Schütz, *Monogr. Gymno* 43 (1986); Metzinger, *Kakt. u.a. Sukk.* 43(8):24-25 (1992); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (accepted species). Fig. 23, Plate 28.

Schütz's Subgenus *Microsemineum* Section *Loricata*;

Buxbaum's Series *Sagliones*

This is a well-known, heavily-spined species making large, solitary, flat-globose stems, 12 to 23 cm wide, 5 to 20 cm tall. The body is bluish-green or dark grey-green, with usually 8 to 12 ribs, but up to 21 are reported. Areoles are oval, about 5 to 10 mm long, 3 to 7 mm wide, with grey wool, yellowish-brown in youth. Radial spines number 3 to 6 in young plants, increasing in maturity, blackish-brown to light brown or pale yellowish-brown with darker tips, becoming grey in age, curved or straight, 3 to 6 cm

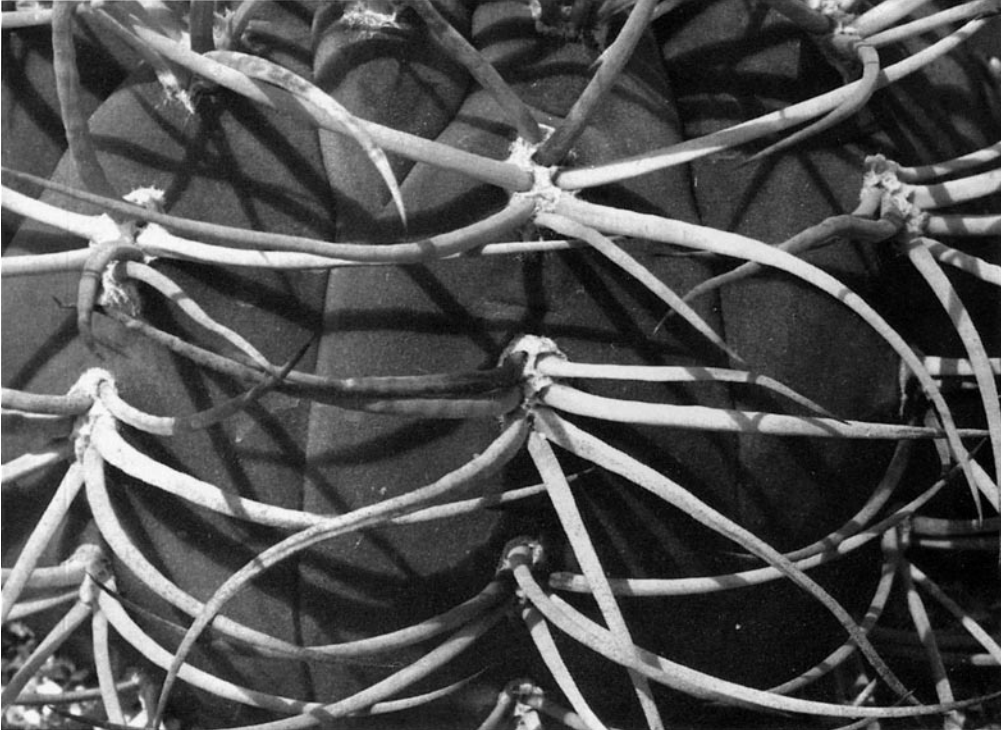


Figure 23.
G. cardenasianum

long. Central spines are absent at first, later there are 1 or 2, 5 to 8 cm long, similar to the radial spines. Flowers are pink to white, with reddish midstripe to the petals and greenish throat, 5 cm long, 8 to 9 cm wide (but usually smaller), short tubed. Fruit is grey-green, with bluish bloom, and with pinkish-brown scales, about 20 mm long, 17 mm wide. Seed is about 1 mm in diameter, strongly arched, reddish with black, shiny, fine tubercles, and white, basal hilum.

Reported from Bolivia, Department Tarija, Mendez, at Carrizal, and in Argentina, at Catamarca, and more widely in the province of Jujuy.

Collectors' numbers referred here are FR 88, 88a, 1131 (*G. armatum*); Lau 929; KK 676, 715 (var. *horridispinum* n.n.).

Ritter's *G. armatum* seems to be a redescription of this species.

G. carminanthum Borth & Koop, Kakt. u.a. Sukk. 27(4):73-6 (1976); Putnam, *Gymnocalycium* 21(1978); Meregalli, *Piante Grasse* 5(1):20 (1985); Schütz, *Monogr. Gymno.* 45 (1986); Milt, *Gymnos* 8(15):26-32 (1991); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (provisionally accepted species). Fig. 24, Plate 29.

Schütz's Subgenus *Microsemineum* Section *Hybopleura*;

Buxbaum's Series *Mostiana*

Only comparatively recently described, and appearing in collections as yet mainly as seedling plants, this species has yet to prove its differences from a similar species from the same area, *G. tillianum*, described by Rausch in 1970, and both of them from *G. oenanthemum*, described in 1934. In the *CITES Cactaceae Checklist* the two later names are shown as provisional, which may indicate some disagreement among the experts.

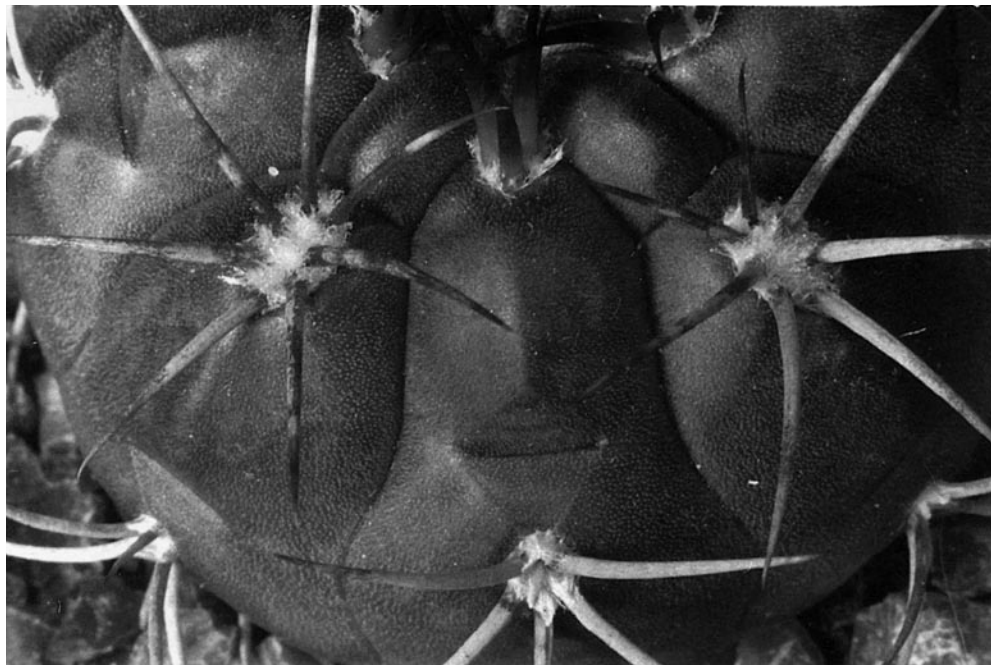


Figure 24.
G. carminanthum

G. carminanthum is described as solitary, flat-globose with depressed crown, up to 10 cm wide and 5.5 cm tall, the body colour dull blue-green to grey-green, with 6 to 11 ribs, flattened except at the apex, where there are somewhat angular tubercles. Areoles are slightly depressed, oval, about 7 mm long, 5 mm wide, with yellowish wool becoming grey later. Radial spines are usually 7 in number, but 5 or 9 are seen, thick, awl-shaped, angular surfaced, arranged in pairs with the lowermost odd one pointing downwards, lying almost flat to the body, grey pinkish-brown to light grey, the new spines orange at base, red-brown above, 15 mm long, or up to 25 mm. Occasionally there are 1 or 2 central spines, similar to the radials, strongly curved upwards, 8 to 12 mm long or longer. Flowers are bell shaped, appearing at the centre, nearly 6 cm wide, 4.5 cm long, clear carmine. Fruit is pear-shaped, dark to olive-green, to 11 mm wide and 15 mm long. Seed is blackish, to 1 mm long, globose, tuberculate, with sunken hilum.

Reported from Argentina, province Catamarca, Sierra de Ambato, at 1600 m (5250 ft) altitude.

Collectors' numbers referred here are FR 437; WR 721; P 133; BO 130.

Plates

- 20. *G. bruchii*
- 21. *G. bruchii* var. *hossei*
- 22. *G. bruchii* var. *brigittae* P214
- 23. *G. bruchii* var. *niveum*
- 24. *G. buenekeri*

20	22
21	22
23	24
24	23





G. carrizalensis Hort. This is a catalogue name (Karel Knize's, his KK715), later referred to as *G. cardenasianum* var. *horridispinum* nom. nud.

G. castellanosii Backeberg, Backeb. & Knuth, Kaktus ABC 287, 416 (1935); Backeb., Die Cact. 3:1762, Fig. 1695 (1959); Kakteenlex. 165 (1966); Cact. Lex. (Engl. ed.) 184 (1978); Putnam, Gymnocalyciums 22 (1978); Meregalli, Piante Grasse 5(1):20 (1985); Schütz, Monogr. Gymno. 46 (1986); Bercht, Gymnos 8(15):36-37 (1991); Piltz, Gymnos 9(17):17-20 (1992) & 9(18):33-52 (1993); Hunt (ed.), CITES Cact. Checklist 66 (1992) (accepted species). Figs 25 and 26, Plates 30-32.

Schütz's Subgenus *Microsemineum* Section Mazanensia;
Buxbaum's Series Sagliones

This is a widespread species in cultivation now, from regular offerings of seed and plants from commercial sources. It is a large growing, solitary, globular species, becoming taller than broad in age, to 15 cm tall, 10 cm wide, with 10 to 12 ribs, very wide and flattened, with round-ended, slight tubercles. Areoles are oval to oblong, to 10 mm long, 6 or 7 mm wide, with thick, yellowish wool. Radial spines number 5 to 7, strong, straight, to 2.5 cm long, white with brown tips. There is one similar central spine. Flowers are about 4.5 cm wide, white flushed with pink. Fruit is more or less spherical, green.

Reported from Argentina, without locality, but from the section it is placed in, it would be expected to occur in northern Argentina; Piltz reports it recently from Argentina, Sierra de los Colorados, S. Malanzan at 800 m (2620 ft), La Rioja, Ambil at 750 m (2460 ft), and Ulapes at 500 m (1640 ft) altitude.

Collectors' numbers referred here are WR 715, 715a; P 80, 80a-c, 209, 217; B 73, 79; LB 398, 437, 440, 445, 447, 450, 453, 456, 459; JL 4, 63, 65, 68.

Also referred here now is the former species *G. bozsingianum*, which Piltz has reduced to varietal status beneath *G. castellanosii*.

var. **bozsingianum** (Schütz) Piltz, Gymnos 9(18):43 (1993); B Schweitzer, Gymnos 9(18):52-3 (1993), is more or less globose, solitary and getting to about 20 cm wide eventually. The body is grey-green, with 8 to 15 ribs. Areoles are round at first with greyish-white wool. Younger plants have only radial spines, 5 seldom 3 in number, to 20 mm long, yellow to dark brown, older plant sometimes develop a central spine. Flowers are shining pink to yellow with wine-red throat, to about 5 cm long and wide. Fruit is 20 mm long, 15 mm wide, grey-blue with grey, pink-edged scales.

Reported from Argentina, La Rioja, from near the town of Chepes Viejo at 700 m (2300 ft) altitude.

Collectors' numbers referred here are WR 713; P 205; LB 399, 461.

Piltz also erected in this same issue of Gymnos a new variety:

var. **armillatum** Piltz, Gymnos (9)18:48 (1993).

Plates

25	26	25. <i>G. calochlorum</i>
27	29	26. <i>G. calochlorum</i> in habitat, 10 km north of Villa Cura Brochera, Argentina
28		27. <i>G. capillaense</i>
		28. <i>G. cardenasianum</i>
		29. <i>G. carminanthum</i> P133

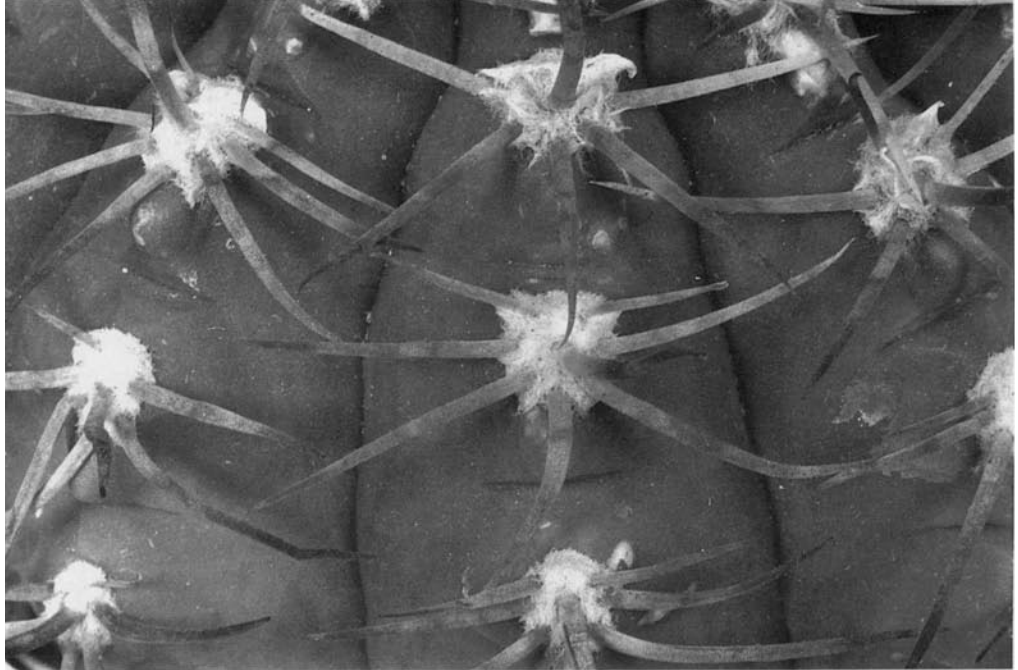


Figure 25.
G. castellanosii

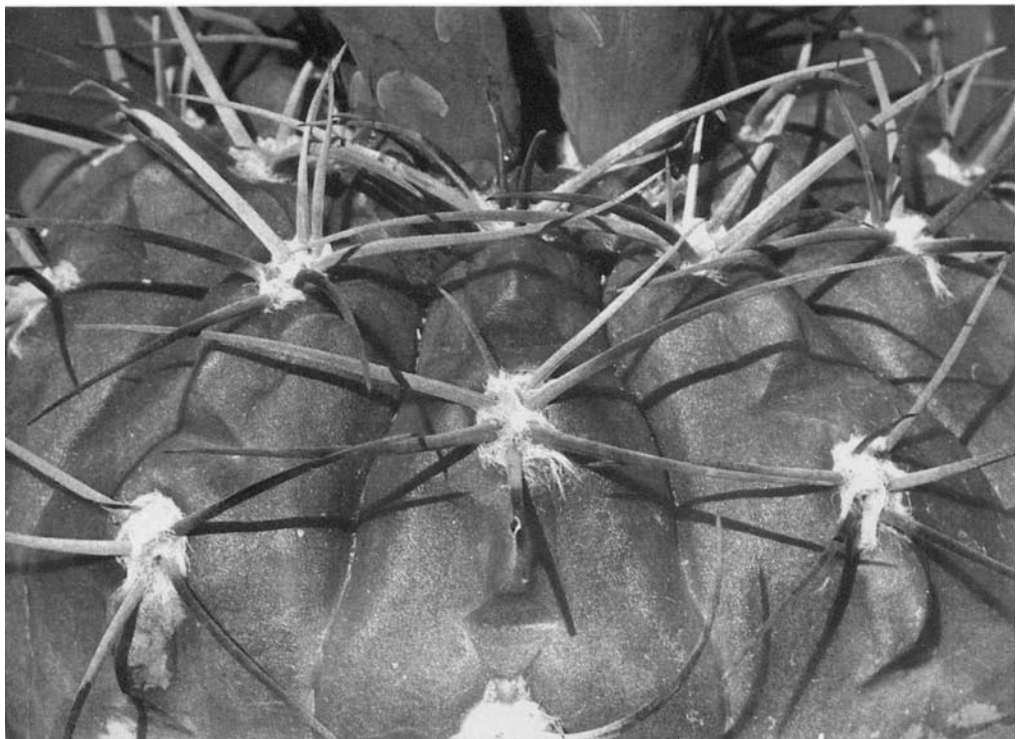


Figure 26.
G. castellanosii var.
bozsingianum

He described this variety as differing from the type in its glaucous body, with more and thinner ribs.

Reported from Argentina, La Rioja, Sierra de Ulapes, at more or less 500 m altitude.

Collector's number referred here is P217.

G. centeterium* (Lehm.) Hosseus, Not. Cact. Arg. 115 (1939); Backeb., Kakteenlex. 166 (1966); Cact. Lex. (Engl. ed.) 185 (1978)

This poorly identified species is not positively a *Gymnocalycium*, and its identity is likely to remain a mystery. It was reported from Brazil, at Minas Gerais, and described as dark green, globular, about 3 ins (7.5 cm) in diameter, with 15 ribs. Areoles are oval with grey wool. Radial spines number 10 to 12, fine, somewhat curving. Central spines 4, stronger, blackish, later brownish-grey. Flowers were described as dirty yellow, the inner petals reddish. In view of its poor identification its standing in or even combination with this genus is doubtful.

Backeberg refers it to *G. valnicekianum*, without explanation.

G. chiquitanum Cardenas, Cactus (France) 18:78, 95 (1963); Frank, Kakt. u.a. Sukk. 17:167-8 (1966); Backeb., Kakteenlex. 166 (1966); Cact. Lex. (Engl. ed.) 185 (1978); Putnam, *Gymnocalyciums* 22-4 (1978); Bercht, *Succulenta* 62(6):118-20 (1983); Meregalli, *Piante Grasse* 5(1):20 (1985); Schütz, *Monogr. Gymno.* 46 (1986); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (accepted species). Fig. 27, Plate 33.

Schütz's Subgenus *Microsemineum* Section *Mazanensia* [probably warrants a new Section or even Subgenus];

Buxbaum's Series *Chiquitana*

Seen sometimes under the synonym *G. hammerschmidii*, this is a handsomely spined species, usually solitary, flat-globular, 2 to 4 cm or more tall, 6 to 9 cm or more wide (to 15 cm in the wild is reported), greyish-green to light green, flushed red in full light, with about 6 or 7 ribs, and prominent chins. Areoles have creamy-white wool. Radial spines vary from 5 to 9 in number, recurving, 10 to 25 mm long, pale yellowish-brown to brownish-grey tipped dark brown or nearly black. There are usually no central

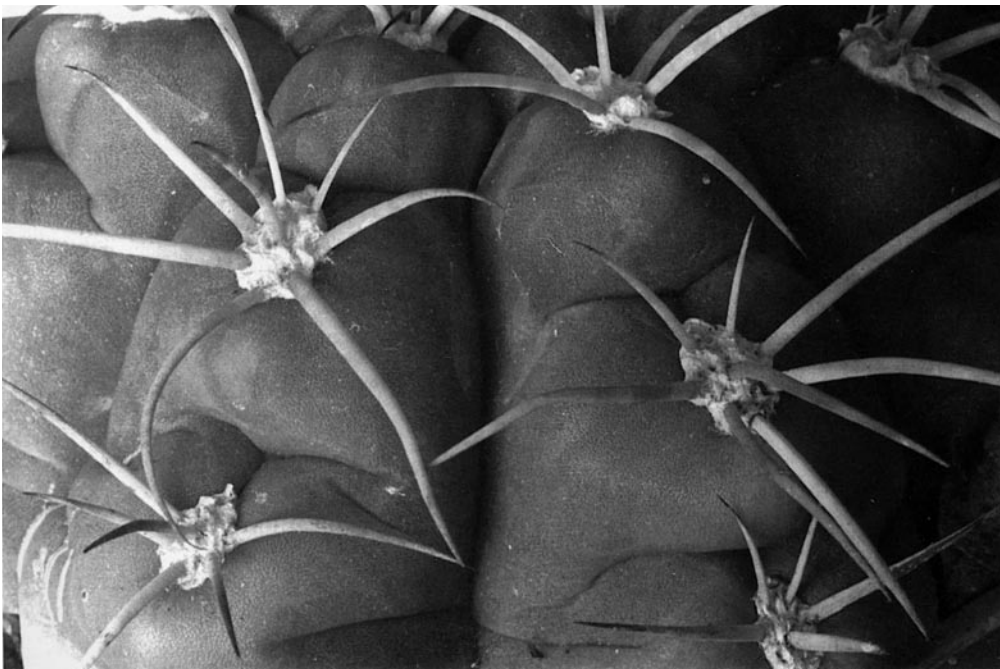


Figure 27.
G. chiquitanum

spines, but sometimes there is one, similar to the radials, 15 to 20 mm long. Flowers are large, 5 to 7 cm long and wide, salmon to lilac-pink or white, with reddish throat. Fruit is spindle-shaped, about 2 cm long, dark bluish-purple. Seed is shining, brownish-black, with large round tubercles, hilum is basal, somewhat sunken, oval without a raised edge.

It is closely related to *G. paediophyllum* from the same area.

Reported from Bolivia, Department Santa Cruz, Chiquitas south of San Jose, at 650 m (2135 ft), and Santa Anna at 400 m (1310 ft) altitude. The *CITES Cactaceae Checklist* ratifies it as a good species.

Collectors' numbers referred here are Lau 366, KK 511, 821.

G. chlorostictum Hort.

Referred by Ritter to *G. mihanovichii* var. *filadelfiense*.

Collector's number relevant here is FR 1181.

G. chubutense* Spegazzini, Nuev. Not. Cactol. 57 (1925); Speg., Nov. Add. Fl. Plat. 285 (1902) – as *Echinocactus gibbosus* var. *chubutensis*; Backeb., Kakteenlex. 166 (1966); Cact. Lex. (Engl. ed.) 185 (1978); Putnam, Gymnocalyciums 24 (1978); Meregalli, Piante Grasse 5(1):21 (1985); Schütz, Monogr. Gymno. 47 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (syn. *G. gibbosum*)

Referred to *G. gibbosum*.

G. chuquisacanum* Cardenas, Cact. Amer. 38:146 (1966); Haage in Backeb., Cact. Lex. (Engl. ed.) 185 (1978); Meregalli, Piante Grasse 5(1):21 (1985); Schütz, Monogr. Gymno. 48 (1986); Hunt (ed.) CITES Cact. Checklist 66 (1992) (syn. *G. pflanzii*)

Referred to *G. pflanzii*.

G. cintiensis (Cardenas) P.C. Hutchison, Cact. Amer. 14:38 (1959)

This was a short-lived attempt to amalgamate Weingartia with this genus. Although the closeness of the two genera is acknowledged, general opinion has kept them separate. This species and others mentioned later in this book are referred back to Weingartia.

G. comarapense Backeberg, nom. nud., Die Cact. 3:1775 (1959); Kakteenlex. 166 (1966); Cact. Lex. (Engl. ed.) 185 (1978); Meregalli, Piante Grasse 5(1):21 (1985); Schütz, Monogr. Gymno. 49 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (syn. *G. pflanzii*). Plate 89.

Referred to *G. pflanzii*.

G. curvispinum Fric, nom. nud., Putnam, Gymnocalyciums 24 (1978); Meregalli, Piante Grasse 5(1):21 (1985); Schütz, Monogr. Gymno. 49 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (syn. *G. nigriareolatum*)

The application of this name is in some doubt, and, while some have given the opinion that it is synonymous with *G. valnicekianum*, Schütz in his monograph on this genus

places it in Subgenus *Microsemineum* Section *Mazanensia*, which conflicts with this view. In the *CITES Cactaceae Checklist* Schütz's view is endorsed, since it is referred to *G. nigriareolatum*.

G. damsii (K. Schumann) Britton & Rose, *The Cact.* 3:163, Fig. 175 (1922); K. Schumann, *Gesamt. der Kakt. (Nachtr.)* 119 Fig. 27 (1903) – as *Echinocactus damsii*; Backeb., *Die Cact.* 3:1780, Fig. 1712 (1959); *Kakteenlex.* 166 (1966); Frank, *Kakt. u.a. Sukk.* 17(0):155 (1966); & *Succulenta* 46(1):6-8 & (2):20-23 (1967); Moser, *Kakt. u.a. Sukk.* 20(2):38-9 (1969); *Cact. Lex. (Engl. ed)* 185 (1978); Putnam, *Gymnocalyciums* 24-5 (1978); Bercht, *Succulenta* 63(2):43-5 (1984); Meregalli, *Piante Grasse* 5(1):21 (1985); Schütz, *Monogr. Gymno.* 50 (1986); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (syn. *G. anisitsii*). Fig. 28, Plate 34.

Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*;
Buxbaum's Series *Schickendantzianae* Subseries *Mihanovichiana*

This species is one of the most delightful of the genus, with shining, small, brownish, low growing stems, with distinctive V-shaped markings on the tubercles, and with freely produced usually white flowers with unusual grey anthers and pollen. But it seems doomed to be submerged beneath *G. anisitsii* very shortly.

Several dubiously distinct varieties have been erected on the basis of minor variations; they are not recognised here, but for interest are listed below. It is low growing, often solitary for some time before clustering, but sometimes clustering heavily at an early stage (see var. *multiproliferum* below). Stems are to about 7 or 8 cm wide (commonly about 5 cm) and 2 or 3 cm tall, shining, with green to brownish-green stem colouring. There are up to about 10 ribs, more often 5 or 6, low and soft angled. Spines number 2 to 8, to about 10 or 15 mm long, weak and flexible, whitish, tipped brown,



Figure 28.
G. damsii

becoming grey, all radial, except for an occasional similar central spine.

Flowers are white, pale pink, pink or deep reddish-violet, darker in the throat, with distinct, light grey anthers. Fruit is red, cylindrical.

Reported from northern Paraguay, with no further detail, but collections by Backeberg (see varieties below) and Alfred Lau since the original description give its locality as Bolivia, Department Santa Cruz, Robore and San Jose, in the Sierra de Santiago, to Serrania San Jorge in northern Paraguay; Karel Knize reports it from Paraguay, Bahia Negra, at 400 to 500 m (1310 to 1640 ft), and from Bolivia, San Jose, Tucavoca San Jose at 600 m (1970 ft) altitude.

Collectors' numbers referred here are Lau 363, 369; FR 1179; KK 497, 503, 504, 506, 512, 651.

The following varieties were invalidly described, but are really only indicators of a variable species, and are here discounted for want of more information on the variation of the whole species in the field, and their discrete occurrence:

var. *centrispinum* Backeberg, Descr. Cact. Nov. & Comb. Nov. 3:6 (1963) – distinguished by having entirely white flowers, 7 radial spines, one central spine to 2 cm long, coloured yellowish-brown to brown. Reported from Bolivia, near Robore;

var. *rotundulum* Backeberg, l.c., – from the same area as the previous variety, and not easily distinguishable from it or the type; described as having all white flowers and no central spines;

var. *torulosum* Backeberg, l.c., – little distinguishable difference is offered; reported from Bolivia, San Jose;

var. *tucavocense* Backeberg, l.c., – from the same area as the immediately previous variety, and by Lau from Bolivia, Aguas Sucias, flatter in habit, and with pale pink flowers.

It is apparent from the common locality for these varieties that their standing is to say the least questionable. The minor differences should be regarded as merely indicators of the variation of the species.

More recently P.J. Braun has described a variety which has been in cultivation for some time, masquerading as *G. damsii* var. *tucavocense*, but with its plain, unbanded body and heavily proliferating, almost monstrose habit, not really fitting the description of that variety well:

var. *multiproliferum* P.J. Braun, Kakt. u.a. Sukk.42(10):228-231 (1991). Its standing is questionable.

G. deeszianum* Dölz, Kakteenk. 1943:54, 9 (1943); Backeb., Die Cact. 3:1716, Fig. 1646 (1959); Kakteenlex. 166 (1966); Cact. Lex. (Engl. ed.) 186 (1978); Putnam, Gymnocalyciums 25 (1978); Meregalli, Piante Grasse 5(1):21 (1985); Schütz, Monogr. Gymno. 52 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (accepted species)

This species was imported without precise locality from De Laet as *G. sigelianum*, and propagated and distributed subsequently by Andreae. Backeberg in Die Cactaceae gave the opinion that it was no more than a form of *G. sigelianum*, and consequently on current thinking referable to *G. capillaense*. It is significant that no subsequent field collector has equated any of his or her finds to *G. deeszianum*. Metzinger (in letters) is of the opinion that without further knowledge of its origin (impossible to discover now I would think) it should not be accepted.

It is here regarded therefore as a dubious species, probably referable to *G. capillaense*.

G. delaetii* (K. Schumann) Y. Ito, Expl. Diagr. 174 (1975); Schumann, Monatsschr. f. Kakteenfr. 11: 186 (1901) – as *Echinocactus delaetii*; Meregalli, Piante Grasse 5(1):21 (1985); Schütz, Monogr. Gymno. 53 (1986)

Referred to *G. schickendantzii*.

G. denudatum (Link & Otto) Pfeiffer, Abbild. u. Beschr. bluh. Cact. 2, Plate 1 (1845); Link & Otto, Icon. Plant. Rar. 17 (1828) – as *Echinocactus denudatus*; K. Schumann, Blüh. Kakt. 1, Fig. 59 (1904) – as *Echinocactus denudatus*; Backeberg, Die Cact. 3: 1701 Fig. 1634 (1959); Kakteenlex. 166 (1966); Cact. Lex. (Engl. ed.) 186 (1978); Putnam, Gymnocalyciums 25 & 64 (1978); Bercht, Succulenta 62(3):51-4 (1983); Meregalli, Piante Grasse 5(1):21 (1985); Schütz, Monogr. Gymno. 54 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (accepted species); Gerloff, Gymnos 10(19):11-19 (1993). Fig. 29, Plates 35 and 36.

Schütz's Subgenus *Macrosemineum* Section Denudata;

Buxbaum's Series Uruguayenses Subseries Denudata

This species was described originally by Link & Otto in 1828 as an *Echinocactus*.

Putnam lists 16 varieties in his *Synonymy of the Genus Gymnocalycium* (1969), and talks of 26 in his later booklet, none of which he considers worthy of recognition. And *Overzichts en Synonymie-List van het Geslacht Gymnocalycium* edited by Edmond Crombez and produced by the *Gymnocalycium* work group 'Gymnovriend', a study group within 'Grusonia', the Belgian Society, lists no less than 31 subsidiary names, many merely catalogue names. None are worth consideration here. Certainly the differences seen in cultivated plants are insignificant, and the real determination of what was described under these varietal names is mostly lost in the mists of time. Even Backeberg talks of only one variety in his major work, *Die Cactaceae*, viz.



Figure 29
G. denudatum

G. denudatum var. *backebergii* (Pazout, Friciana Rada 3:15.1963), which he dismisses as merely a juvenile form; he also talks of numerous hybrids in cultivation, also in a dismissive manner. One seems now to be recognized as a separate species however (*G. denudatum* var. *paraguayense*), see under *G. paraguayense*.

As might be inferred from the above this is a variable species, and it has been in cultivation for many, many years. Wild collected seed or seedlings raised from such should be sought by the purist or the serious collector, who wishes to have authentic plants in his collection, as many offered in cultivation are so many generations removed from their wild origins that they may bear little resemblance to those in habitat. Having said that this is really a very distinct species, with low-growing, dark green, shining stems, to about 6 or 8 cm wide, 2 or 3 cm tall, or a little taller in cultivation, with usually a low rib-count of often 5, but up to about 8, sometimes the ribs a little rounded, but usually flat, barely projecting at all. Areoles are well spaced, round, with sparse, creamy-white wool. Spines are all radial, ivory white to pale cream-yellow, usually about 3-5 in number, each to about 15 to 20 mm long, curling this way and that, but usually to the side and downwards, often hugging the body contour, and looking like long legged, whitish spiders. Flowers are pure, shining white, to about 5 cm long, 7 cm wide. Fruit is oblong, green.

Reported from southern Brazil, Rio Grande do Sul, through northern Uruguay, near Tacuarembó, Cacapava do Sul, to Argentina province Misiones, Santa Ana, and into southern Paraguay. But the Argentinian and Paraguayan reported localities for this species are in doubt.

Collectors' numbers referred here are FR 1372, 1373; Schl. 117, 137; DV 44; HU 7, 28; LB 804, 805, 811, 814, 817, 877, 880, 888, 891, 896, 897, 921, 930; OF 18, 32, 54, 65, 86, 105, 240.

The hybrid usually labelled *G. denudatum* cv. Jan Suba, or just *G. Jan Suba* is a cross produced many years ago in Czechoslovakia by Frantisek Pazout, crossing *G. denudatum* var. *backebergii* with *G. baldianum*. The flowers are large and a clear pink.

G. doppianum Hort. (a recently appearing catalogue name), which has produced some interesting looking seedlings, elongated, with weak spination and near vertical ribs. It is referred to *G. andreae*, as its flowers are identical to that species, and are produced at the same time of year in cultivation at least. See under *G. andreae*.

G. ehuhilton or *G. eluhilton* Hort., Putnam, *Gymnocalycium* 25(1978)

This name which is found on plants in cultivation fairly often is usually found to be a mis-spelling for *G. euchlorum*.

Plates

30. *G. castellanosii*

31. *G. castellanosii* var. *armillatum* P217

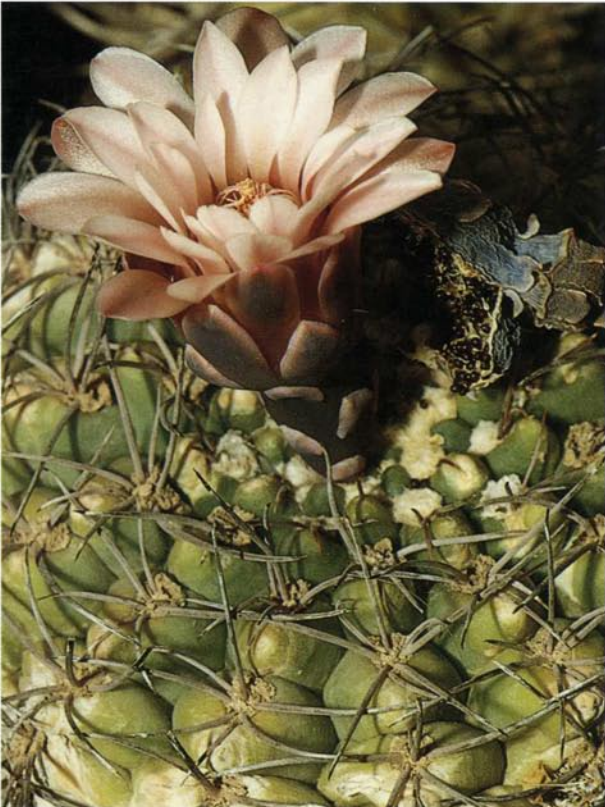
32. *G. castellanosii* var. *bozsingianum*

33. *G. chiquitanum*

34. *G. damsii* SPI 29/70 (GM 7.8)

30	31
32	32
34	33





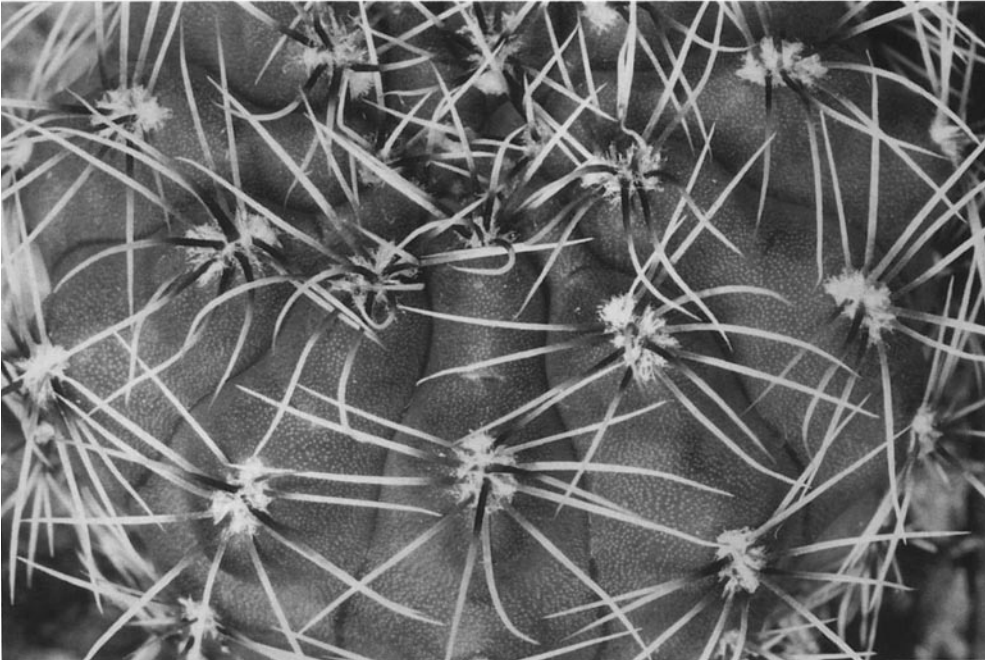


Figure 30.
G. erinaceum

G. erinaceum Lambert, Succulenta 64(3):64-66 (1985); Schütz, Monogr. Gymno. 55 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (provisionally accepted species). Fig. 30, Plates 37 and 38.

Schütz's Subgenus *Gymnocalycium* Section *Gymnocalycium*;
Buxbaum's Series *Gymnocalycium* (*Baldiana*)

Described only a few years ago this species has appeared in cultivation in the last year or two from seed.

It was described as solitary, flat-globose to globose, with depressed growing point, a shaggy appearance, glaucous, to 5 cm tall, 5.5 cm wide, and with 12 ribs. Areoles at first have white wool, later they are bare. Radial spines number 7 to 9, 6 to 8 mm long, straight, arranged in sideways pointing pairs, and with one pointing downwards; at first they are dark brown, later greyish-white with brown tips and dark red to black bases. Central spines are one or two in number, to 10 mm long, similar to the radials. Flowers are white, funnel-shaped, 5.5 cm long, 4.8 cm wide. Fruit is fusiform, bluish-pruinose, to 16 mm long and 13 mm wide. Seed is about 1.3 mm long, 1 mm wide, black verrucose with a strong, pale brown aril.

Plates

- | | | |
|----|-----|--|
| | 35. | <i>G. denudatum</i> |
| | 36. | <i>G. denudatum</i> cv. Jan Suba (<i>G. denudatum</i> var. <i>backebergii</i> × <i>G. baldianum</i>) |
| 35 | 37. | <i>G. erinaceum</i> |
| 36 | 38. | <i>G. erinaceum</i> JL40 at Sauce Punco, Argentina |
| 39 | 39. | <i>G. eurypleurum</i> |
| | 40. | <i>G. ferrarii</i> PI36 |

Reported from Argentina, Cordoba, Sauce Punco in the Sierra de Tulumba, at 1050 m (3440 ft).

Collectors' numbers referred here are JL 40; WP89-105/139, 108/143.

G. espostea or *G. esposteo* Hort. This is a catalogue name, which usually turns out to refer to plants of *G. gibbosum* or *G. saglionis*.

G. euchlorum Backeberg, nom. nud., Putnam, *Gymnocalyciums* 26 (1978)

Referred to *G. hybopleurum*.

G. eurypleurum Ritter, *Kakt. Südamer.* 1:268 (1979); Ritter ex Plesnik, *Kaktusy* 8:70 (1972) nom. inval.; Haage in Backeb., *Cact. Lex.* (Engl. ed.) 186 (1978); Bercht, *Succulenta* 63(2):43-5(1984); Meregalli, *Piante Grasse* 5(1):23 (1985); Metzinger, *Kakt. u.a. Sukk.* 37(5):13-14 (1986); Schütz, *Monogr. Gymno.* 56 (1986); Metzinger, *Gymnos* 6:23 (1989); Metzinger, *Arbeitsgr. Gymno. Österreich. Kakteenfr.* 2(2):13-18 (1989); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (provisionally accepted species). Fig. 31, Plate 39.

Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*;
Buxbaum's Series *Schickendantzianae* Subseries *Mihanovichiana*

This is a very distinct small species, which has affinities with both *G. mihanovichii* and *G. anisitsii*. It has become available from commercial sources fairly freely in recent years.

It is solitary, low-growing, 8 to 12 cm wide, dull olive green or brownish in full light,

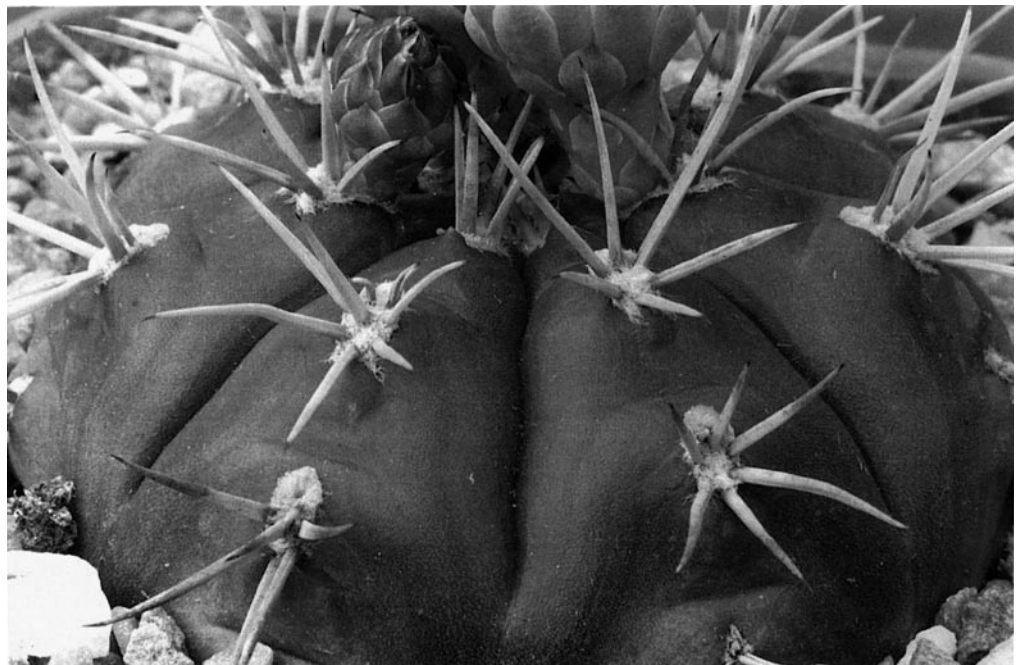


Figure 31.
G. eurypleurum

with 7 to 12 low ribs, somewhat tubercled with rounded ends to the tubercles and little disturbance to the continuity of the ribs. Areoles at the upper part of the tubercle, are longer than broad, with brownish wool. Radial spines number 4 to 7, 1 to 3 cm long, awl shaped, straight to somewhat curved, clear brown. Central spines are usually absent, but there are occasionally 1 or 2 present, similar to the radials. Flowers appear near the centre, 3 cm long, white, flushed pale pink. Fruit is barrel shaped, whitish to somewhat purple. In cultivation it is slow growing, and makes a good candidate for an exhibit in shows for small pot classes.

Reported from Paraguay, at Cerro Leon.

Collectors' numbers referred here are FR 1178; M 20, 22; P 431, 434; LB 69, 76.

G. eytianum* Cardenas, Kakt. u.a. Sukk. 9(2):25 (1958); Backeb., Kakteenlex. 167 (1966); Cact. Lex. (Engl. ed.) 186 (1978); Donald, Nat. Cact. Succ. J. 26:96-100 (1971); Meregalli, Piante Grasse 5(1):23 (1985); Schütz, Monogr. Gymno. 57 (1986); Hunt (ed.), CITES Cact. checklist 66 (1992) (syn. *G. marsoneri*)

Plants in cultivation under this name are usually referable to *G. pflanzii*, and do not really tie up at all with the original description of *G. eytianum*.

Donald referred this species to *G. pflanzii*, but Schütz maintains that Donald was incorrect in doing this. This species as described had more sharply defined ribs than *G. pflanzii* in any of its forms, and smaller, white flowers compared with the larger, varying shades of pink of the others ascribed to synonymy with *G. pflanzii*, and the photograph in the original description gives distinctly the impression of what I would call *G. megatae*, and this is where I think it belongs in synonymy. In the *CITES Cactaceae Checklist* this species (along with *G. megatae*) is referred to synonymy with *G. marsoneri*.

Reported from Bolivia, Eyti, at 1200 m (3940 ft) altitude.

Collectors' numbers referred here are Lau 944; KK 520.

G. ferocior Hort.

Plants appearing under this name are usually referable to *G. hybopleurum*.

G. ferox* (Backeberg) Slaba, Kaktusy, 80 (1984); Meregalli, Piante Grasse 5(1): (1985); Schütz, Monogr. Gymno. 58 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (syn. *G. hybopleurum*)

Referred to *G. hybopleurum*.

G. ferrarii Rausch, Kakt. u.a. Sukk. 32(1):6-7 (1981); The Chileans 12(42):98-105 (1983); Meregalli, Piante Grasse 5(1):23 (1985); Schütz, Monogr. Gymno. 59 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (provisionally accepted species). Fig. 32, Plate 40.

Schütz's Subgenus *Microsemineum* Section Mazanensia;

Buxbaum's Series Mostiana

This species has always been closely associated with *G. glaucum*, and its separate standing has been more than once questioned. It was described by Rausch as growing solitary, with a depressed-globular, greenish-grey stem, 3 to 4 cm tall and 9 cm wide,

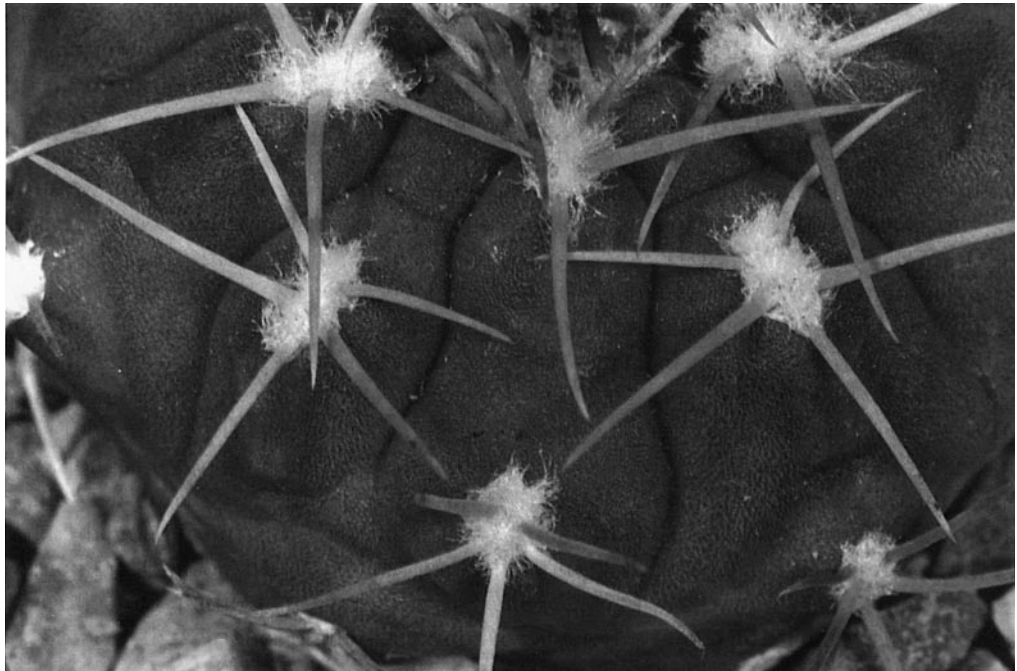


Figure 32.
G. ferrarii

with 10 to 14 vertical ribs, sinuously tuberculate. Areoles are sunken, oval, grey felted, up to 7 mm long, later naked. Radial spines number 6, in three pairs, standing out from the body, straight to slightly curved, up to 3 cm long, stiff, with thickened base, brown to black at first, later grey. Flowers are pinkish-white with darker pink midstripe and throat, 4.5 cm long, 3.5 cm wide, with broad pinkish-white scales on the tube. Fruit is glaucous green, short club-shaped.

Reported from Argentina, Catamarca province, close to Santa Theresa, buried in sandy scree slopes, but also from flat areas of sand and rock.

Collectors' numbers referred here are WR 718; P 136, 385.

G. fidaianum (Backeberg) PC. Hutchison, Cact. Amer. 29(1):11(1957)

A combination made with several other species of Weingartia by Paul Hutchison, but not accepted by any other authorities or the cactus fraternity.

G. fleischerianum Backeberg, Die Cact. 3:1703, Figs. 1636-8(1959); Kakteenlex. 167 (1966); Cact. Lex. (Engl. ed.) 186 (1978); Y. Ito, Expl. Diagr. 171 (1957); Jajo, Kaktusar, 70 (1934) – as *G. denudatum* var. *anisitsii*; Succulenta 49 (5):65-7 (1970); Moser, Succulenta 51(5):94-6 & (6):110-5 & (7):124-8 (1972); Putnam, Gymnocalycium 26 (1978); Bercht, Succulenta 62(3):51-4 (1983); Meregalli, Piante Grasse 5(1):23 (1985); Schütz, Monogr. Gymno. 59 (1986); Metzinger, Gymnos 5:72-75 (1988); Metzinger, Arbeitsgr. Gymno. Österreich. Kakteenfr. 2(2):13-18 (1989; Hunt (ed.), CITES Cact. Checklist 66 (1992) (accepted species). Fig. 33, Plates 41 and 42. Schütz's Subgenus *Macrosemineum* Section *Paraguayensia*; Buxbaum's Series *Uruguayenses* Subseries *Denudata*

This is a variable species, but should not be confused with the completely different *G.*

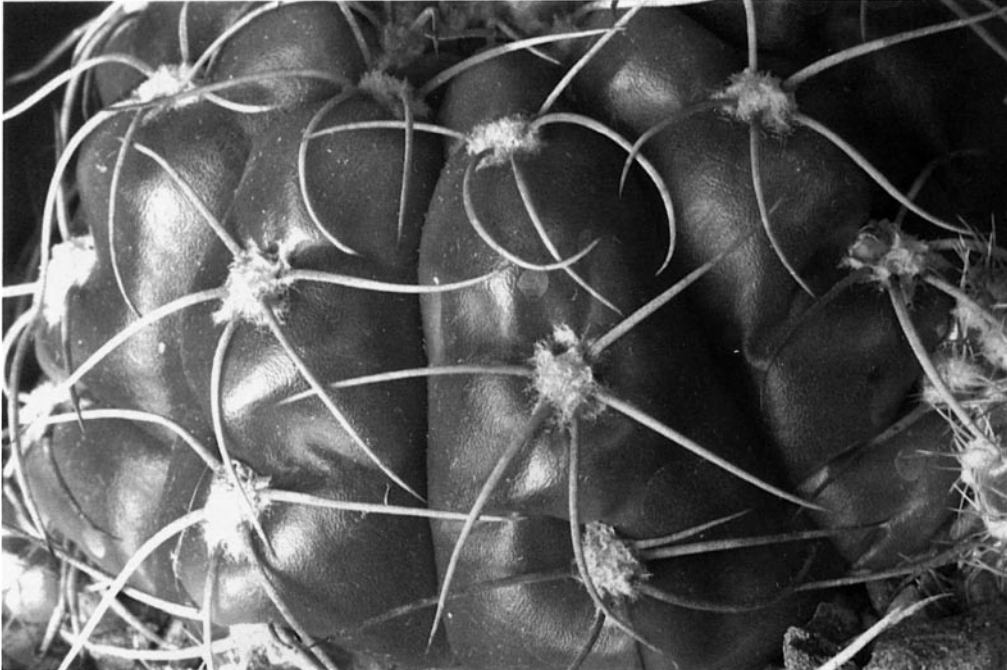


Figure 33.
G. fleischerianum

mihanovichii var. *fleischerianum*. The stem is globular, solitary at first, later clustering, glossy green, with about 8 prominent, rounded ribs, with little undulation from tubercles, flat-globular, about 6 cm tall and to about 10 cm wide. It is sometimes seen labelled as *G. paraguayense* or *G. denudatum* var. *paraguayense*, but this is a poor identification for this quite different species. Areoles have a small amount of brownish-cream wool. Radial spines number up to about 20, but there are more often about 5 or 7; there is one similar central spine. Flowers are funnel-shaped, white, more or less flushed pink, with pinkish throat, about 4 cm long, opening to about 3.5 cm wide.

Reported from Paraguay, Cordillera at 350 m (1145 ft) altitude.

Collectors' numbers referred here are WO 75; M 4, 9, 32, 41; P 411, 416, 443, 453; LB 11, 20/21, 91, 107; HU 304; A 1, 21, 25, 65, 83; JL 118.

Schütz has referred three former varieties of *G. denudatum* to varietal level beneath this species, viz. var. *andersohnianum*, var. *heuschkelianum*, and var. *meiklejohnianum* (Friciana Rada 6.40:11.1966). This may well be the more correct placing for these taxa, but in view of the variability of the species, and lack of field data to support a properly considered view of the standing of what seem to be merely minor variants, their standing remains in question.

G. fricianum* Plesnik, Kakt. u.a. Sukk. 15(6):110 (1964); Backeb., Kakteenlex. 167 (1966); Cact. Lex. (Engl. ed.) 186 (1978); Putnam, Gymnocalyciums 26(1978); Ritter, Kakt. Südamer. 1:270 (1979); Merregalli, Pianta Grasse 5(1):23 (1985); Schütz, Monogr. Gymno. 60 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (syn. *G. marsoneri*)

Schütz's Subgenus *Muscosemineum* Section Periferalia;

Buxbaum's Series Schickendantzianae Subseries Marsoneriana

This species is practically unknown in cultivation since its introduction in 1964, at least

under this name. It was described as solitary, flat-globular, to 9 cm wide, 6 cm tall, with about 11 acute ribs, with prominent tubercles. Areoles have pale brown wool. Spines are all radial, numbering 2 or 3 at first, later up to 7. Flowers are 5 cm long, 3 cm wide, bell shaped, white, with slender tube, 3 cm long. Fruit is carmine with pink scales.

Reported from Paraguay, without detailed locality.

The above description, placing in classification and the reported locality, although not precise, indicate that this is probably just a redescription of *G. megatae*, although *G. marsoneri* has also been offered as a candidate; indeed in the *CITES Cactaceae Checklist* it is referred along with *G. megatae* to synonymy with *G. marsoneri*.

G. friedrichii (Werdermann) Pazout, *Friciana* 4, 23:3-19 (1964); Werdermann, *Blüh. Kakt.* 29, Fig. 113 (1936); Putnam, *Gymnocalyciums* 26-7 (1978); Meregalli, *Piante Grasse* 5(1):25 (1985); Schütz, *Monogr. Gymno.* 61(1986); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (provisionally accepted species). Figs 34-36, Plates 43-46. Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*; Buxbaum's Series *Schickendantzianae* Subseries *Mihanovichiana*

There has been some discussion over the years about the separate identity of this species from *G. mihanovichii*, with which it is closely related, and it has been mooted that they are one and the same species. But recent opinion has indicated that this species is separate and more likely nearer to *G. anisitsii*, perhaps intermediate between that species and *G. mihanovichii*. But it is worth noting that the recent *CITES Cactaceae Checklist* evidences some disagreement among the experts as it is shown only as provisionally accepted.

Metzing (in letters) gives the opinion that it is synonymous with Ritter's *G. stenopleurum*, and maintains that since there is no valid combination of *G. friedrichii* into the genus, *G. stenopleurum* is the prior name. There will be more information on this line of thought in a paper by Metzing to be published shortly in *Piante Grasse*, in an article about the cacti of Paraguay. For the moment it is considered here under its more popular handle.

It is popular with collectors, with attractive body colouring in bronzy, purple-brown, with little evidence of cross-banding, except in youth. It was separated from *G. mihanovichii* in 1964, and has maintained its separate standing fairly constantly since then, mainly because of its different body colouring and the manner in which its flowers open widely, compared with the more narrow flower shape of *G. mihanovichii*; and there are other minor differences in the make-up of these two species.

Stems of the type are about 6 to 8 cm in diameter, flat-globular to globular, later becoming taller than broad, to as much as 12 cm tall or more, eventually clustering from around the base in cultivation. Ribs are comparatively more prominent and sharper than in *G. mihanovichii*. Spines number 6 to 8, to 20 mm long, bristle-like, brown at first, later grey. Flowers are a dull greenish-white.

Reported from Bolivia, Laguna Redonda, and by Lau from Bolivia, north of Charagua; see also reported habitat for varieties below.

Collectors' numbers referred here are Lau 373; HU 311, 312, 313, 314.

var. **albiflorum** (Pazout) Schütz, *Friciana*, 17/51, 17 (1979); Pazout, *Friciana* 3/17, 6 (1963) as *G. mihanovichii* var. *albiflorum*; Kopecky, *Kaktusy* 22(2):30-4 (1986); Meregalli, *Piante Grasse* S(1):25 (1985); Schütz, *Monogr. Gymno.* 62 (1986)

This is a variety with white flowers. Plants in cultivation under this name are attractively marked with bands of lighter colouring on the grey-green bodies.

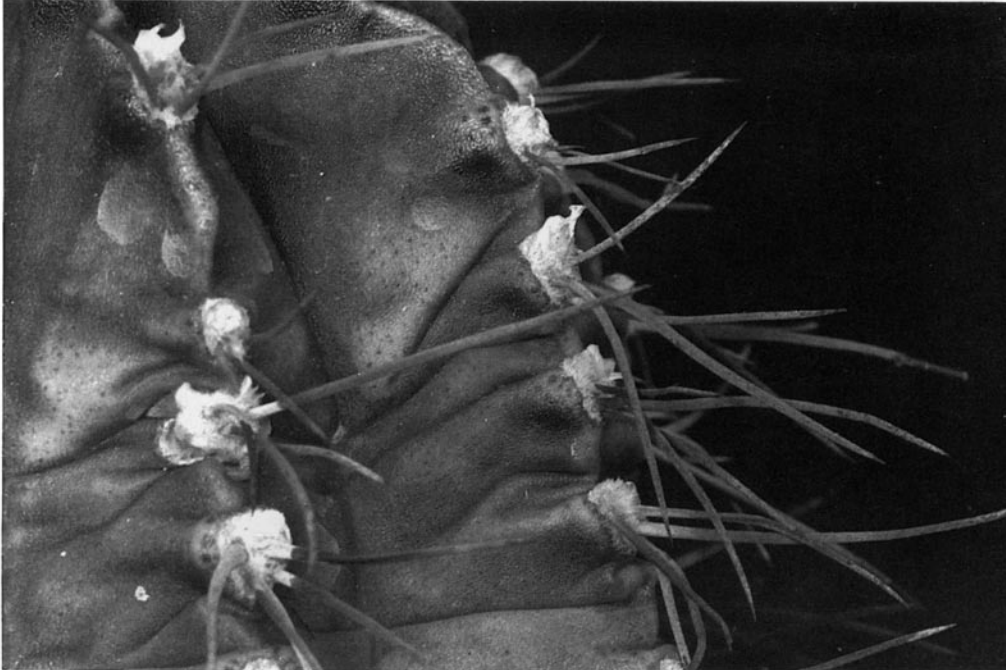


Figure 34.
G. friedrichii var.
melocactiformis

Knoll reports it from Paraguay, Boqueron at 500 m (1640 ft) altitude (W053?); HU3 14 is also referred here.

var. **melocactiformis** Pazout, *Kaktus listy* no.5(1948), l.c. 16:10, 109-159 (1951); *Sukkulentenk.* 3:30 (1949); *Backeb., Die Cact.* 3:1782 (1959); *Meregalli, Piante Grasse* 5(1):25 (1985); *Schütz, Monogr. Gymno.* 62 (1986)

This is a popular variety, not least for its lovely pink flowers, but it lives under the stigma of suspicion of hybrid origin. There seems to be no real basis for this, and it comes true from seed and sets seed well in cultivation, which tends to speak against its being so. It has some banding, and grows to 10 cm or more wide, with 8 to 12 ribs. Areoles have creamy-white wool. Spines are all radial, usually about 5 in number, standing out, longer in relation to the body size than other varieties, to 2 cm long, yellowish-brown tipped dark brown. Flowers are slim-tubed, pale pink and slim-petalled.

var. **moserianum** Pazout, *Friciana* 37 (1966); & *Succulenta* 45:99 (1966); *Strigl, Kakt. u.a. Sukk.* 23(9):240-3 (1972); *Kopecky, Kaktusy* 22(2):30-4 (1986); *Metzing, Gymnos* 6:22 (1989); *Metzing, Arbeitsgr. Gymno. Osterreich. Kakteenfr.* 2(2):13-18 (1989)

This variety is immediately distinguishable from its fellows because of its sharp-ridged ribs, with prominently white-woolled areoles. The banding on the dark, greyish-brown body is maintained, if anything becoming more prominent as it ages, unlike the type. Spines are thin, all radial, brownish-yellow, often lightly attached and falling in age. The flowers are white or pale pink, with petals opening widely at the top, and reflexing.

Reported from Yrebdaque in the north-west of Nuevo Asuncion in Paraguay on the border with Bolivia, and from Paraguay, Boqueron, at 450 m (1475 ft) altitude.

Collectors' numbers referred here are WO 79; M 24; P 435; HU 309; LB 79.

var. **pazoutianum*** Moser & Valnicek, *Kaktusy* 58 (1967)

Referred to var. *piraretaense*.

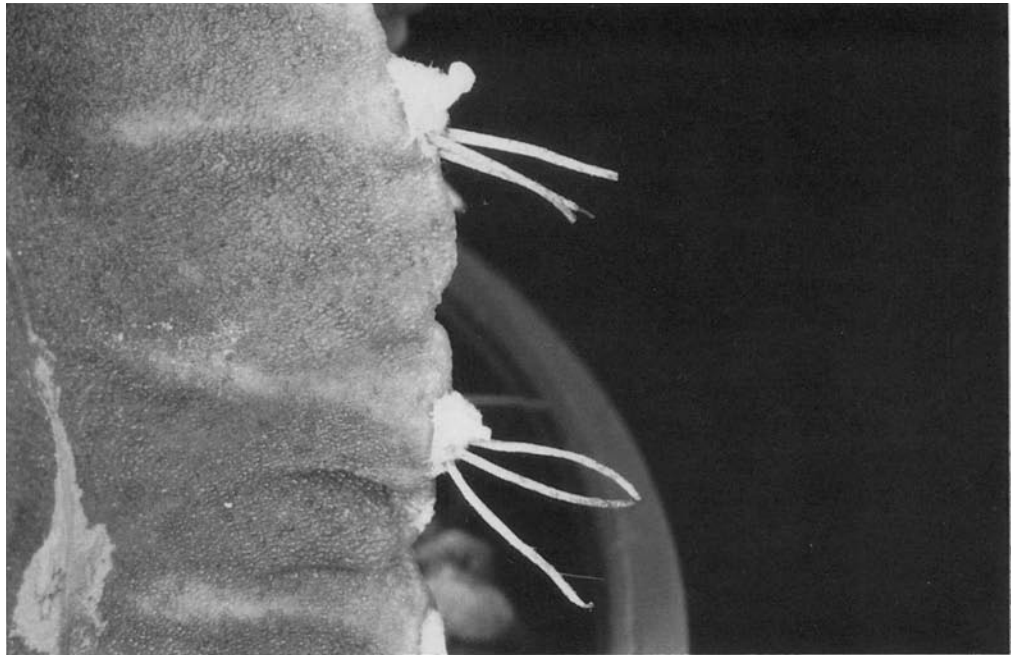


Figure 35.
G. friedrichii var.
moserianum

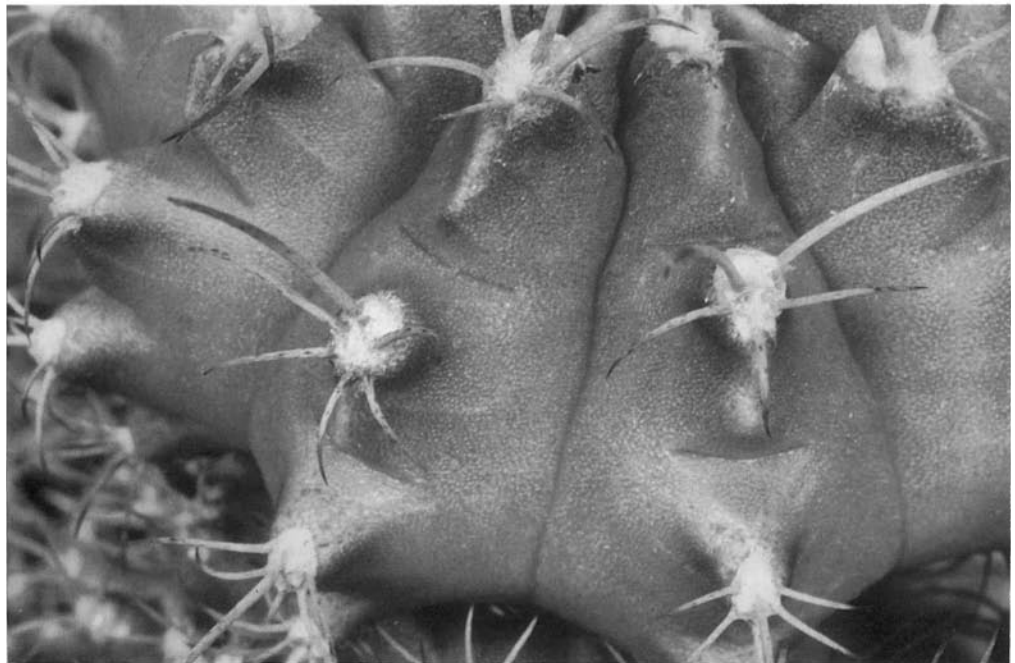


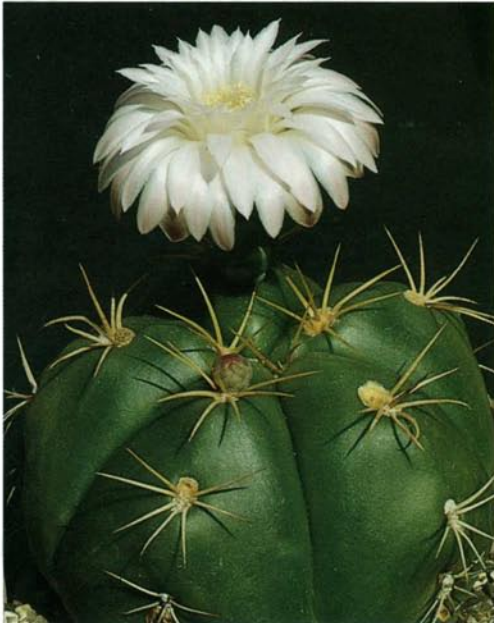
Figure 36.
G. friedrichii var.
piraretaense

Plates

- 41. *G. fleischerianum*
- 42. Locality of *G. fleischerianum* DM4, Cordillera de los Altos, Paraguay
- 43. *G. friedrichii* var. *melocactiformis*
- 44. *G. friedrichii* var. *moserianum* SPI 186/74
- 45. *G. friedrichii* var. *moserianum* DM24, in habitat
- 46. *G. friedrichii* var. *piraretaense* SPI 187/74

41	42
43	44
45	46





var. **piraretaense** Pazout (not as often seen incorrectly ‘pirarettaense’), Kaktus Listy, no. 4.30 (1948); Sukkulentenk. 3:29 (1949); Backeb, Die Cact. 3:1781 (1959); Frank, Kakt. u.a. Sukk. 15(9):170 (1964) Meregalli, Piante Grasse 5(1):25 (1985); Schütz, Monogr. Gymno. 63 (1986)

This is a clustering, low-growing variety with dark bronze, purple-brown body colouring, and little evidence of any cross banding. Stems are about 6 or 7 cm in diameter, flat-globose to globose, with 8 to 12 ribs. Spines are flexible, thin, sharp, yellowish to dull brown, 2 to 3 cm long. Flowers are pink, long-tubed, the petals reflexing at the top. Fruit is long, club-shaped, bluish-green.

Reported from Paraguay, Chaco Paraguayo, near Pirareta.

var. **rysanekianum*** Pazout, Friciana Rada 5/35:11 (1965)

Referred to var. *albiflorum*.

fa. *nigra* nom. nud. – a catalogue name used for a somewhat darker form of this species, with slaty-grey, almost black body colour, with pale grey banding.

fa. *rubra* nom. nud. – a catalogue name for a reddish form of the species (not to be confused with the commercial horror, a chlorophyll-less grafted *Gymnocalycium* from this stable, usually called Ruby Ball, which is a freak seedling, perpetuated by some adroit, very early in life Oriental grafting).

G. gerardii nom. nud.

Referred to *G. gibbosum*.

G. gibbosum (Haworth) Pfeiffer, Abbild. u. Beschr. bluh. Cact. 2: Fig. 1(1845); Haw, Syn. P1. Succ. 173 (1812) – as *Cactus gibbosus*; B. & R., The Cact. 3:158, Fig. 166 (1922); Backeb., Die Cact. 3:1752 (1959); Kakteenlex. 167 (1966); Cact. Lex. (Engl. ed.) 186 (1978); Putnam, Gymnocalyciums 27-8 (1978); Meregalli, Piante Grasse 5(1):25 (1985); Schütz, Monogr. Gymno. 63 (1986); Piltz, Gymnos 7(14):36-39 (1990); Kopecky, Gymnos 7(14):42-44 (1990); Kiesling, Flora Patagonica 5:224-6 with Fig. (1990); Kiesling, Cactus de la Patagonica, 224-6 with Fig. (1990), extracted separate publication by author from former publication; Hunt (ed.), CITES Cact. Checklist 66 (1992) (accepted species). Figs 2, 37 and 38, Plates 1 and 47.

Schütz’s Subgenus *Gymnocalycium* (*Ovatisemineum*) Section *Gymnocalycium* (*Ovatisemineum*);

Buxbaum’s Series *Gymnocalycium* (*Baldiana*)

Kiesling has recently published his findings on the type species of the genus (see ref. above), and indicated that *G. denudatum*, hitherto regarded as the type is incorrect, and that this species, *G. gibbosum* is the type species of the genus.

Nearly 30 varietal names have been allocated to this species since it was originally

Plates

47	47. <i>G. gibbosum</i>
48 49	48. <i>G. glaucum</i>
50 51	49. <i>G. griseo-pallidum</i>
	50. <i>G. horridispinum</i>
	51. <i>G. horstii</i>

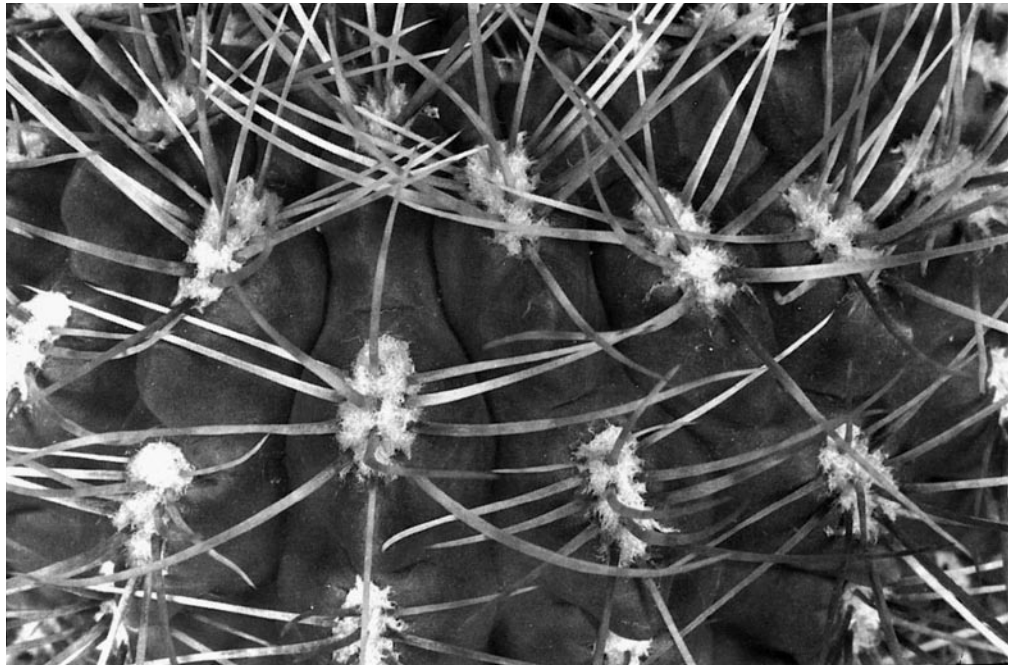


Figure 37.
G. gibbosum

described in 1812, indicating its wide variation. It is characterised by globular to short-columnar stems well armed with stiff, straight spines, dark brown to nearly black. The plant body gets to about 12 to 15 cm tall and 10 to 12 cm wide in cultivation, with 11-16 ribs, the body colour varying from dark green to blue-black or greyish-green. Areoles have brownish-cream wool. Radial spines vary from about 7 to 15. Central spines are often not easily distinguishable from the radials and are similar but slightly stronger from 0 to 6. Flowers are large and white, to about 6 cm long and opening to about the same in width. Fruit is short club-shaped, dark green.

Reportedly widespread in Argentina, covering a great deal of Patagonia, the provinces La Pampa and Buenos Aires and as far west as Mendoza and San Luis; reported from southern Argentina, at Chubut, Rio Negro and Santa Cruz; recently by Piltz from Argentina, Abra de la Ventana at 400 to 500 m (1310 to 1640 ft), Puelches at 400 m (1640 ft) altitude.

Collectors' numbers referred here are FR 12; WR 539; P 94, 95, 97; B 42, 92; DV 55.

The only varieties commonly seen and exhibiting any real difference from what must be regarded as a very variable species anyway, are:

var. **brachypetalum** (Speg.) Backeb., *Kaktus ABC* 289 (1935); Speg., *Anales Soc. Ci. Argent.* 99:137, Fig. 178 (1925); *Nuev. Not. Cactol.*, 55(1925); Backeb., *Die Cact.* 3: 1758, Fig. 1689 (1959) – as *G. brachypetalum*.

This is described as bluish dark-green, to 10 cm tall and 7 cm wide, with 13 ribs. Spines number 5 to 7, to 2.5 cm long, stiff, awl-shaped. Flowers 5.5 cm long, white, the petals broad.

Reported from Argentina, Rio Negro around Carmen de Patagones, and by Piltz from Chelforo at 300 m (980 ft), Choele Choel at the same altitude.

Collectors' numbers referred to this variety are P 100, 101; DV 50.

var. **chubutense** Spegazzini, *Anales Mus. Nac. Buenos Aires* 7:285 (1902) – as



Figure 38.
G. gibbosum var.
chubutense

Echinocactus gibbosus var. *chubutensis*; Nuev. Not. Cactol. 57 (1925) – as *G. chubutense*; Backeb., Die Cact. 3:1758, Fig. 1690 (1959)

This is a small, clearly defined variety from the Rio Chubut, Argentina, which Putnam refers to as a dwarf form from the southern part of the range of the species. It is distinctive from the collector's point of view, with a much smaller and slower habit of growth and blackish-grey body colour, the flower too seems much larger, more pure white and more widely opening than the type. The central spine is often lacking or, if present, is solitary.

Collectors' numbers referred here are DV47, 47a; WP89-049/062, 052/065.

var. *gerardii* Bödeker, nom. nud. is an undescribed variety with more flexible and twisting spines than others of the species. But it hardly warrants separate consideration, especially with no information as to its occurrence in the wild;

var. **nigrum*** Backeberg, Blatt. fur Kakteenf. 6(1936); Die Cact. 3:1755, Fig. 1687 (1959); Kakteenlex. 167 (1966); Cact. Lex. (Engl. ed.) 186 (1978)

This is a variety named for its blackish-green body colour and black spines.

Reported from Argentina, Rio Colorado.

Collector's number referred here is WP89-054/067?

var. **nobile*** (Haworth) Y. Ito, Cacti 88 (1952); Haw, Syn. P1. Succ. (1812) – as *Cactus nobilis*; Y. Ito, Expl. Diagn. 189 (1957); Backeb., Die Cact. 3:1754, Figs. 1684-6 (1959); Kakteenlex. 167 (1966); Cact. Lex. (Engl. ed.) 186 (1978)

This is a variety named for its somewhat larger size and stronger spines, but with no indication of its separate occurrence in the wild, and therefore justification for its varietal status.

Others, rarely if ever seen in collections or commerce, and dubiously identified or identifiable, include:

var. *althaeae* Fric, nom. nud., – catalogue name;

var. *balcarsensis* nom. nud., – field list of Dirk van Vliet (DV 55a);

- var. *caespitosum* Fric ex Fleischer 1964;
 var. *celsianum* (Labouret) Y. Ito 1957 (1853);
 var. *cerebriforme* (Spegazzini) Y. Ito 1957 (1899);
 var. *fennellii* (Haage jr.) Y. Ito 1957 (1898);
 var. *ferox* (Labouret) Y. Ito 1957 (1853);
 var. *genseri* (B 42);
 var. *kleiniana* nom. nud., on Walter Rausch's collection list (WR 539), reported from Argentina, La Pampa, Lihuel Calel;
 var. *leonense* (Hildmann) Y. Ito 1957 (1898);
 var. *leucacanthum* (K. Schumann) Y. Ito 1957 (1898);
 var. *leucodictyon* (K. Schumann) Y. Ito 1957 (1898); Kakteenlex. 186 (1966); Cact. Lex. (Engl. ed.) 186 (1978). Described as more bluish-green, smaller and more freely offsetting;
 var. *platense*, on Walter Rausch's collection list (WR 539a), reported from Argentina, La Pampa, Lihuel Calel; see under *G. platense*;
 var. *pluricostatum* (Rümppler) Y. Ito 1957 (1885);
 var. *polygonum* (K. Schumann) Y. Ito 1957 (1898);
 var. *rostratum* Fleischer 1964;
 var. *schlumbergeri* (Cels) Y. Ito 1957 (1908), reported according to Weber from the wasteland opposite the Isla Leones in the province Comodoro Rivadaria;
 var. *ventanicola* (Spegazzini) Y. Ito 1957 (1905); Kiesling, Succulenta 67 (11): 237-238 (1988).

As indicated by the names chosen most represent merely minor variations in shape or spination.

G. glaucum Ritter, Sukkulentenk. 7/8:37 (1963); Backeb., Kakteenlex. 167 (1966); Cact. Lex. (Engl. ed.) 186 (1978); B. & J. Piltz, Kakt. u.a. Sukk. 28(6):00 (1977); Putnam, Gymnocalyciums 28-9 (1978); The Chileans 12(42):98-104 (1983); Merregalli, Piante Grasse 5(1):25 (1985); Schütz, Monogr. Gymno. 64 (1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (provisionally accepted species). Fig. 39, Plate 48. Schütz's Subgenus *Microsemineum* Section Mazanensia; Buxbaum's Series Mostiana

This is a slow growing and somewhat difficult species in cultivation, being prone to over-react to water, or any prolonged dampness. It is related to *G. hossei*, and described as solitary, flat-globose, 5 to 20 cm in diameter, with 7 to 18 obtuse ribs, and coloured ash grey-green. It is noted for its large taproot, reported in one instance as about 45 cm (18 in) long. Areoles are oval, 8 to 15 mm long, 5 to 8 mm wide, with white wool. Spines are all radial, numbering 5 to 9, 2 to 4 cm long, sometimes to 7 cm, reddish-brown or greyish-black, becoming grey, somewhat curved and strong. Flowers are white with purple throat extending at least halfway up the tube, 3.5 to 5.5 cm long, 2.5 to 4.5 cm wide. Fruit is elongate barrel shape, 2.5 to 3 cm long, 1.5 to 2 cm wide, bluish grey-green to brownish-green, reddish at base.

Reported from Argentina, Province Catamarca, south-east of Tinogasta, near the border with Province La Rioja, at 1000 m (3280 ft); Salicas at 1600 m (5250 ft) altitude; Sierra de Copacabana. Jorg Piltz summarizes its distribution as follows: the typical *G. glaucum* grows in the northern part of the Sierra di Copacabana (collector's number P 36), another form is to be found rather more to the south-east near San Bias (P 36a); yet another form which is the most eastern one is the plant from Santa Teresita called *G.*

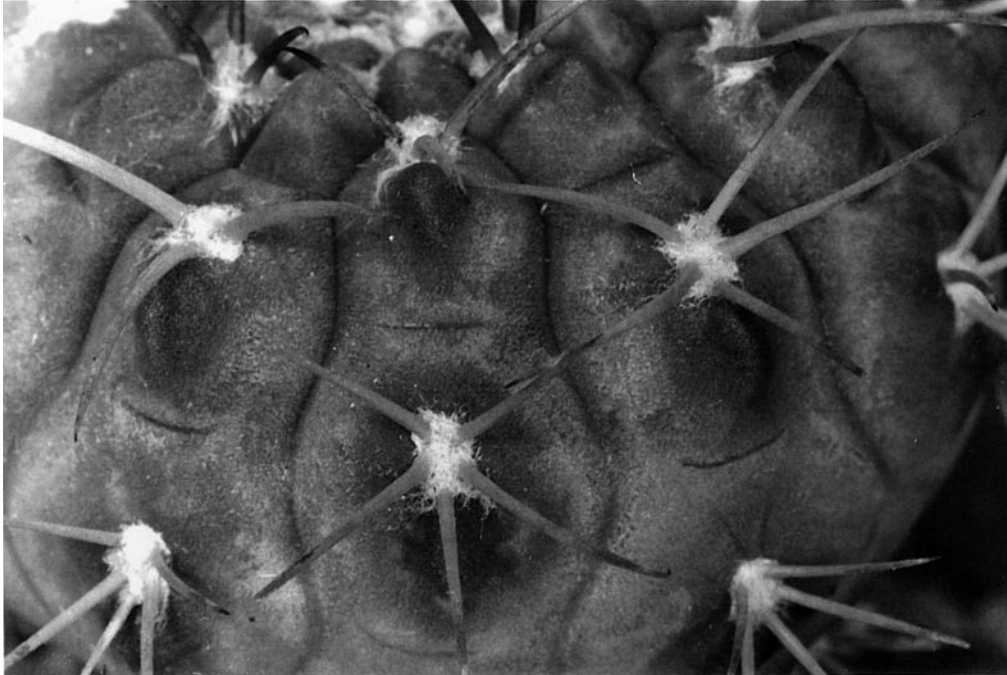


Figure 39.
G. glaucum

ferrarii (P 136); perhaps there is yet another related form to be found between Tinogasta and Chilerito (P 218).

Collectors' numbers referred here are FR 961; Lau 509; WR 718; P 36, 36a, 136; JL 18.

G. grandiflorum* Backeberg, *Kaktus ABC* 289, 417 (1935); *Die Cact.* 3:1747, Fig. 1677 (1959); *Kakteenlex.* 167 (1966); *Cact. Lex.* (Engl. ed.) 187 (1978); Putnam, *Gymnocalyciums* 29 (1978); Meregalli, *Piante Grasse* 5(1):25 (1985); Schütz, *Monogr. Gymno.* 66(1986); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (syn. *G. mostii*)

Referred to *G. mostii*.

G. griseo-pallidum Backeberg, *Kakteenlex.* 167 (1966); Frank, *Kakt. u.a. Sukk.* 17(00):155 (1966); & *Succulenta* 56(0): 8, 20 (1967); *Cact. Lex.* (Engl. ed.) 187 (1978); Putnam, *Gymnocalyciums* 30 (1978); Bercht, *Succulenta* 63(2):43-5 (1984); Meregalli, *Piante Grasse* 5(1):26 (1985); Schütz, *Monogr. Gymno.* 66 (1986); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (syn. *G. anisitsii*). Fig. 40, Plate 49.

Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*;

Buxbaum's *Schickendantzianae* Subseries *Mihanovichiana*

This is one of the species from the so-called 'Grey Hell' on the borders of Bolivia and Paraguay, an area of thorn-scrub with salt-pans and shallow brine pools, and with very low rainfall. This species reflects its environment with its chalky greyish-green to somewhat reddish body colour, and in its aptitude to go off its roots, if provided with too much water. While it has been thought in the past to be closely related to *G. pseudomalacocarpus* from the same area, examination of material has recently given rise to the opinion by Dr Meregalli that this species is closer to *G. anisitsii*, while *G.*



Figure 40.
G. griseo-pallidum

pseudomalacocarpus is, as before, considered close to *G. megatae*; indeed the recent *CITES Cactaceae Checklist* puts *G. griseo-pallidum* into synonymy with *G. anisitsii*. From a collector's point of view this is however a distinct collector's plant, and for the present, while the dust settles, it is regarded herein as a good species.

I have seen clumps of *G. griseo-pallidum* nearly 30 cm wide, growing well in cultivation, but it is not commonly so. It was described as offsetting in the wild, and it does this in cultivation after very few years from seed. Stems are about 6 or 7 cm wide, to 3 cm tall, with 7 or more ribs, notched between the areoles, chalky-grey to brownish-grey, sometimes dull green in cultivation and flushing brownish-red in full light conditions. Spines are all radial, numbering 4 or 5, occasionally 6, to 15 mm long, straight, black or greyish-white. Flowers are creamy white, about 3 to 4 cm long and wide.

Reported from Bolivia, Department Santa Cruz, San Jose; by Knize from Paraguay, Salinas at 400 m (1310 ft) altitude.

Collectors' numbers referred here are U 2179, Lau 368, KK510.

G. griseum Hort., a catalogue name, which Meregalli refers to *G. pflanzii*.

G. guanchinense* Schütz, Zpravy es. spol. kat. 21(1947); Sukkulentenk. 2:32 (1948); Backeb., Die Cact. 3:1764 (1959); Kakteenlex. 167 (1966); Cact. Lex. (Engl. ed.) 187 (1978); Putnam, *Gymnocalycium* 30-1 (1978); Ritter, Kakt. Südamer. 2:477 (1980); Meregalli, *Piante Grasse* 5(1):26 (1985); Schütz, *Monogr. Gymno.* 67 (1986); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (provisionally accepted species)
Schütz's Subgenus *Microsemineum* Section *Mazanensia*;
Buxbaum's Series *Mostiana*

There has been doubt for many years about the real identity of this species, and it is now thought to fall within the broad concept of *G. hossei*, which now embraces *G. mazanense*, *G. nidulans* and *G. weissianum* as well as this species.

G. guerkeanum* (Heese) Britton & Rose, *The Cact.* 3:154, Fig. 161 (1922); Heese, *Monatsschr. Kakteenk.* 21:132 (1911) – as *Echinocactus guerkeanus*; K. Schumann, *Blüh. Kakt.* 3: Fig. 144 (1912) – as *Echinocactus guerkeanus*; Backeb., *Die Cact.* 3:1721(1959); *Kakteenlex.* 167(1966); *Cact. Lex. (Engl. ed.)* 187(1978); Frank, *Kakt. u.a. Sukk.* 21(4):62- 4 (1970); Putnam, *Gymnocalyciums* 31(1978); Schlosser & Schütz, *Kakt. u.a. Sukk.* 33(2):26 (1982); Meregalli, *Piante Grasse* 5(1):26 (1985); Schütz, *Monogr. Gymno.* 68 (1986); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (syn. *G. uruguayense*)

This inadequately described species (without cited locality and with no detail of flowers or seed), seems most probably referable *G. uruguayense*.

G. hamatum* Ritter, *Kakt. Südamer.* 2:663 (1980); Backeb., *Kakteenlex.* 168 (1966); *Cact. Lex. (Engl. ed.)* 187 (1978); Putnam, *Gymnocalyciums* 31(1978); Meregalli, *Piante Grasse* 5(1):26 (1985); Schütz, *Monogr. Gymno.* 68 (1986); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (syn. *G. marsoneri*). Plate 67.
Schütz's Subgenus *Muscosemineum* Section *Periferialia*;
Buxbaum's Series *Schickendantzianae* Subseries *Marsoneriana*

This recently described species has been offered commercially in the last few years, but seems to be no more than yet another variant of *G. megatae* with spines sometimes slightly hooked. Both are referred to synonymy with *G. marsoneri* in the recent *CITES Cactaceae Checklist*. But it makes a handsome collector's plant with more yellowish spines and more green body than usually seen in *G. megatae*.

It is described as solitary, flat-globular, 6 to 16 cm wide, the body colour grey-green, with 9 to 16 ribs and blunt tubercles. Areoles are 5 to 8 mm long, 3 mm wide, and 10 to 18 mm apart, with white to cream coloured wool. Spines are all radial, numbering 5 to 9, 15 to 20 mm long or more, awl-shaped, pale yellowish-brown, curved and at the tip more strongly curved with a suggestion of a hook, hence the specific name, meaning hooked. Flowers appear towards the sides, away from the centre, 5 cm long, white with pink midstripe. Fruit is reddish, with blue bloom, spindle shaped, 25 to 30 mm long, 15 to 20 mm wide, with pinkish pulp.

Reported from Bolivia, Gran Chaco, Palos Blancos; by Knize from Bolivia, Villazon at 2200 m (7220 ft) altitude.

Collectors' numbers referred here are FR 819, KK 1099.

G. hammerschmidii* Backeb., *Descr. Cact. Nov.* 3:7 (1963); Backeb. *Kakteenlex.* 168 (1966); *Cact. Lex. (Engl. ed.)* 187 (1978); Hunt (ed.), *CITES Cact. Checklist* 66 (1992) (syn. *G. chiquitanum*)

This species has for some time been recognized to be synonymous with *G. chiquitanum*.

G. hennissii Hort. This is an undescribed, reputed hybrid, of variable appearance.



Figure 41.
G. horridispinum

G. heuschkelianum Hort. This name is sometimes seen from a contraction of the old, discarded varietal name, *G. denudatum* var. *heuschkelianum*.

G. horizonthalonium Fric, nom. nud., Frank, Kakt. u.a. Sukk. 15:116 (1964); Hunt (ed.), CITES Cact. Checklist 66 (1992) (syn. *G. spegazzinii*)

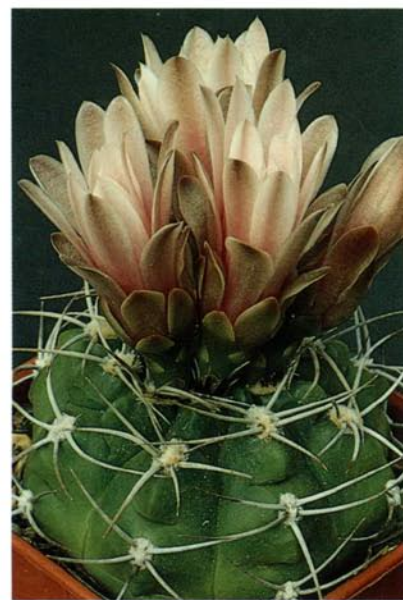
Referred to *G. spegazzinii*.

G. horridispinum Frank, Kakt. u.a. Sukk. 14(1):8-10(1963) nom. inval.; & Succulenta 47(8):114-5 (1968); Backeb., Kakteenlex. 168 (1966); Cact. Lex. (Engl. ed.) 187 (1978); Putnam, Gymnocalyciums 32 (1978); H. Till, Kakt. u.a. Sukk. 38(8):191 (1987) – validation; Meregalli, Piante Grasse 5(1):26 (1985); Schütz, Monogr. Gymno. 69 (1986); H. Till, Arbeitsgr. Gymno. Osterreich. Kakteenfr. 1(3):7-8 (1988); & 6(3):99-106 (1993); Hunt (ed.), CITES Cact. Checklist 66 (1992) (provisionally accepted species). Fig. 41, Plate 50.

Plates

- 52. *G. Gibosum* fa. ex Piltz
- 53. *G. hossei* (*nidulans*)P138
- 54. *G. hossei* (*weissianum*)
- 55. *G. hybopleurum* Lau 503
- 56. *G. hyptiacanthum*
- 57. *G. intertextum*

52	53
53	54
54	55
55	56
56	57





Schütz's Subgenus *Microsemineum* Section Hybopleura;
Buxbaum's Series Horridispina

This fiercely spined species has become well known in cultivation from frequently available seed, and its equally frequent appearance on the show bench in England, where, when it is in flower, it usually excites a good deal of interest. It is solitary, to 8 cm or more wide, and to 12 cm or more tall, the body colour dark green or brownish green, with 10 to 13 ribs, deeply angled, and with strongly pointed tubercles. Radial spines number 10 to 12, and are stiff and strong, 20 to 25 mm long, grey tipped brown, a little recurving. Central spines number usually 4, similarly coloured to the radials, but stronger, 3 to 4 cm long. Flowers are white with violet-pink edged petals, or are entirely purple-pink with darker midstripe and white throat, 6 cm long and wide when fully open.

G. achirasense is referred to synonymy beneath this species in the recent CITES Cactaceae Checklist, but it is an individual, collectable variation – see under that name.

And both these species are reduced by Hans Till beneath *G. monvillei* in a recent issue of the Austrian publication, Arbeitsgruppe *Gymnocalycium Österreichische Kakteenfreunde*, but this is not acknowledged here.

Reported from northern Argentina, province Cordoba, south west of Salsacate, on grassy hills, at 700 to 800 m (2300 to 2625 ft) altitude, La Mudana.

Collectors' numbers referred here are HT 119; Lau 517.

G. horstii Buining, Kakt. u.a. Sukk. 21(9):161-5 (1970); Haage in Backeb., Cact. Lex. (Engl. ed.) 187 (1978); Putnam, *Gymnocalyciums* 31-2 (1978); Meregalli, *Piante Grasse* 5 (1):26 (1985); Schütz, *Monogr. Gymno.* 70(1986); Hunt (ed.), CITES Cact. Checklist 66 (1992) (accepted species). Fig. 42, Plate 51.

Schütz's Subgenus *Macrosemineum* Section Denudata?;

Buxbaum's Series Uruguayenses Subseries Denudata ? (see Chapter 2 about the anomaly of the placing of this species)

This is a handsome, large growing species, with 5 or 6 ribbed stems, which are light, shining green in colour, and grow to about 20 cm tall and wide or more. It eventually clusters, but will make quite a large, solitary head before doing so, unlike the species linked here, *G. buenekerii*, which clusters at an early age. The ribs are rounded, but fairly acute and deeply furrowed. There are usually 5 radial spines, standing out slightly from the body, pale yellow, straight to slightly curved, one pointing downwards, the others to the sides, to 3 cm long. There are no central spines. Flowers are large, to 11 cm long and wide, lilac-pink to creamy white with darker coloured pink midstripe. Fruit is ovoid, bluish green. Seed is similar to *G. buenekerii*, with general characteristics of the subgenus *Macrosemineum*, but only 1 mm or so in diameter, and with raised tubercles

Plates

58	59	58. <i>G. kieslingii</i>
61	60	59. <i>G. kieslingii</i> fa. <i>alboareolatum</i>
62		60. <i>G. kieslingii</i> fa. <i>castaneum</i>
		61. <i>G. kozelskyanum</i> SPI 275 or 287/74
		62. <i>G. leptanthum</i> SPI 129/74

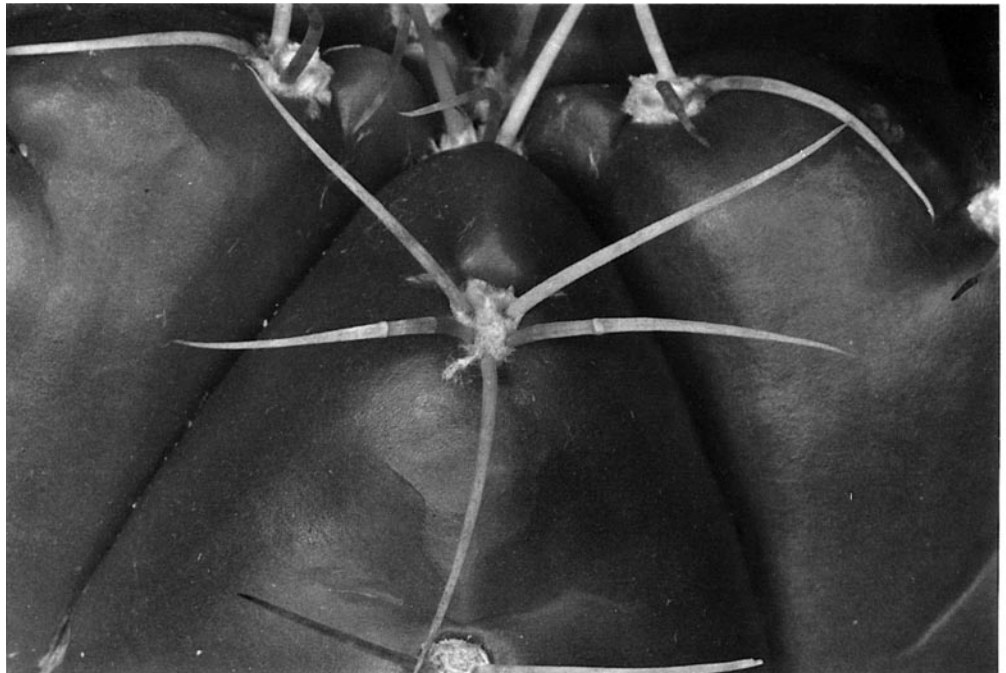


Figure 42.
G. horstii

on the testa in the style of *Trichosemineum* species, but without their prominent aril/hilum.

Reported from Brazil, Rio Grande do Sul, near Cacapava.

Collectors' numbers referred here are HU79; LB 923; GF 175.

The variety described at the same time as this species, *G. horstii* var. *buenekeri*, was elevated to specific status subsequently by Geoff Swales; see under *G. buenekeri*.

G. hossei (Haage jr) Berger, Kakteen 226 (1929); Haage jr, Katalog 15 (1927) – as *Echinocactus hossei*; Backeb., Die Cact. 3:1734, Fig. 1669 (1959) – wrongly depicted; Kakteenlex. 168 (1966); H. Till, Succulenta 50(2):24-5 (1971); Haage, Nat. Cact. Succ. J. 26:104(1971); Backeb., Cact. Lex. (Engl. ed.) 187-8 (1978); Putnam, Gymnocalycium 33-4 (1978); Meregalli, Piante Grasse 5(1):28 (1985); Schütz, Monogr. Gymno. 71(1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (accepted species). Figs 43 and 44, Plates 52-54.

Schütz's Subgenus *Microsemineum* Section *Mazanensia*;

Buxbaum's Series *Mostiana*

This species is now taken by Metzging to be the prior name for the synonymous *G. mazanense*, *G. nidulans*, *G. weissianum* and varieties of those species and probably *G. guanchinense*. But the sure determination of this species, or indeed the type of *G. mazanense* at this distance in time from the original descriptions is now difficult, and I am not sure that the case has been proved.

If Metzging is to be believed then it is an extremely variable species in its spination. The plants are flat-globose to globose, with dark brownish-green body colouring, and about 13 ribs. Areoles are longish, 5 to 6 mm, with grey-white wool. Radial spines number 7 to 9 in number, spreading and somewhat recurving, to 15 mm long, in pairs at

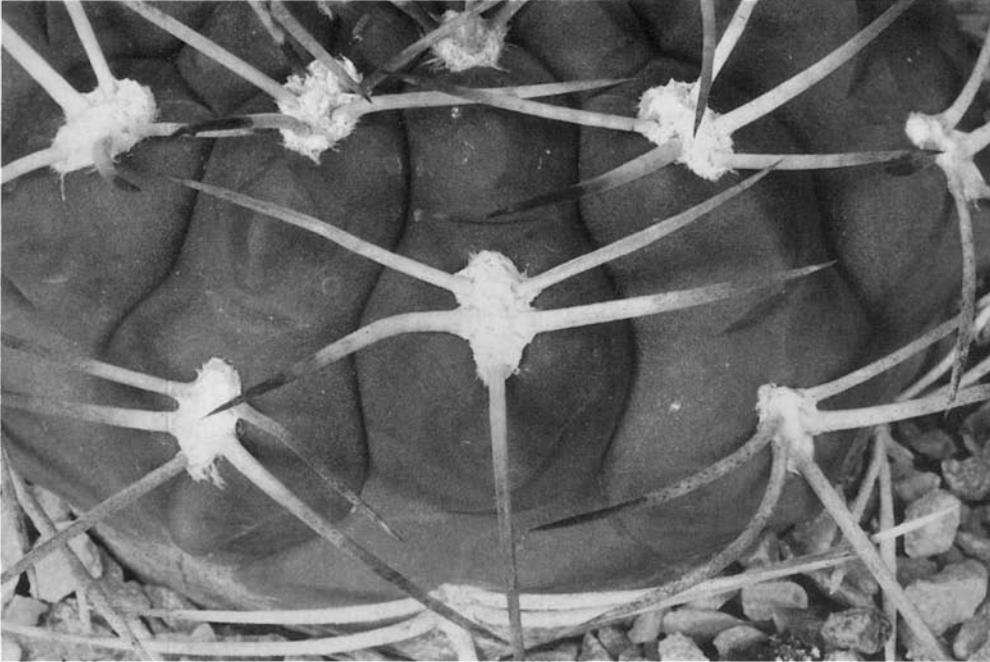


Figure 43.
G. hossei (*mazanense*)

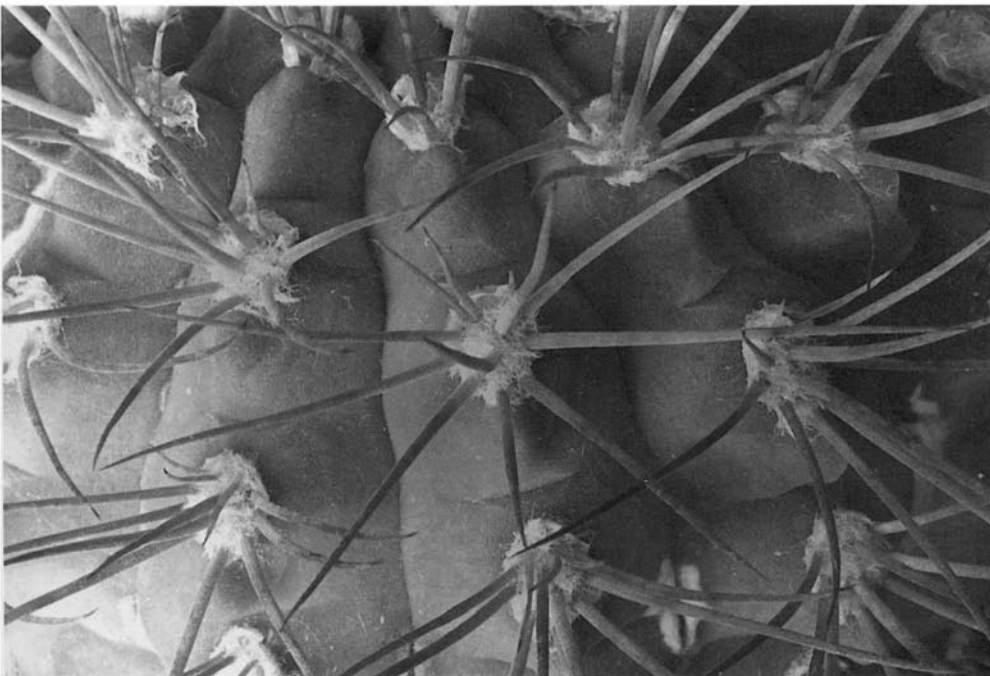


Figure 44.
G. hossei (*weissianum*)

the sides of the areole with one pointing downwards, brown in youth, later grey with dark tips, also sometimes with a single central spine, especially in older plants, similar to the radials. Flowers are short tubed, whitish to deep pink.

Reported from northern Argentina, from Sierra Mazan on the borders of Catamarca and La Rioja, Quebrada de Cebila, at 800 to 1500 m (2625 to 4920 ft) altitude, Carrizal

at 900 m (2950 ft), Sierra Famatina, Cuesta Miranda and Cuesta Guanchin, La Pena, 900 to 1100 m, Carrizal, 900 to 1850 m, Catamarca, Andalgalá, at 700 m (2300 ft) altitude.

Collectors' numbers referred here are FR 432, WR 121, 121a, 138, 142, 563; Lau 483, 485, 487, 510, 580; P30, 30a, 30b, 75, 79, 138, 139; WO 100, 107; KK716; B49, 59, 62, 126, 132, 164; DV48; JL 10, 12, 15, 16.

G. hybopleurum (K. Schumann) Backeberg, Kaktus ABC 289 (1935); K. Schumann, Gesamtb. 405 (1898) – as *Echinocactus multiflorus hybopleurus*; Backeb., Die Cact. 3:1750 (1959); Kakteenlex. 168 (1966); Cact. Lex. (Engl. ed.) 188 (1978); Putnam, Gymnocalyciums 34-5 (1978); Bercht, Succulenta 62(10):220-4 (1983); & 64(7-8):159-62 (1985); Meregalli, Piante Grasse 5(1):28 (1985); Schütz, Monogr. Gymno. 72 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (accepted species). Fig. 45, Plate 55.

Schütz's Subgenus *Microsemineum* Section Hybopleura;
Buxbaum's Series Mostiana

This is a very variable species in its spination, which led Backeberg to erect 5 varieties, which are generally regarded as merely variants of the species. They are:

- var. **breviflorum***, with shorter tubed flowers;
- var. **centrispinum***, with 2 or 3 central spines;
- var. **euchlorum***, with shorter and fewer spines and lighter greyish-green body colouring;
- var. **ferocior***, with much stouter, grey spines, including 1 or 2 centrals;
- var. **ferox***, with very stout radial spines and no centrals.

Such minor differences could give rise to as many more, and they are not here recognised.

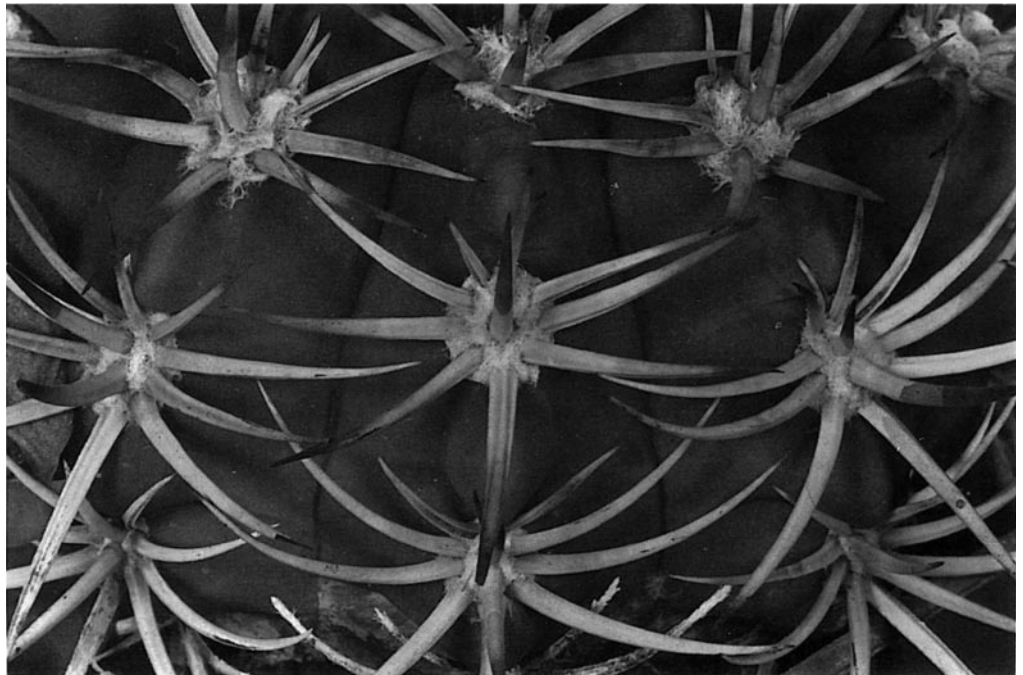


Figure 45.
G. hybopleurum

An all-embracing description for this species is as follows: body globular to flat-globular, dull to greyish-green, with 11 to 13 ribs; spine pattern constant, with two or more radial spines lying almost parallel and horizontal, with one spine pointing downwards; central spines when present often curving strongly, similar to the radials, all spines grey, light brown in youth. Radial spines number usually 9 or thereabouts, 3 to 4 cm long. Up to 3 central spines are recorded, not always present, but when there set in a straight line vertically. Flowers are up to about 4 cm long, white to greenish-white, with greenish-pink throat. Fruit is green.

Reported from Argentina, Cordoba; Catamarca, Hualfin, Andalgalá; Portezuela at 800 to 1000 m (2625 to 3280 ft) altitude.

Collectors' numbers referred here are WR 145, 724, 724a; Lau 491, 503; P 39, 72, 73, 73a, 161; WO 114; B 108, (126, 150?); DV95; JL21, 22, 161.

G. pugionacanthum has long been considered synonymous with this species.

G. hyptiacanthum (Lemaire) Britton & Rose, *The Cact.* 3:156 (1922); Lem., *Cact. Gen. Nov. Sp.* 21 (1839) – as *Echinocactus hyptiacanthus*; K. Schum., *Blüh. Kakt.* 3: Fig. 164 (1914) – as *Echinocactus hyptiacanthus*; Backeb., *Die Cact.* 3: 1738, Fig. 1673 (1959); *Kakteenlex.* 168 (1966); *Cact. Lex. (Engl. ed.)* 188 (1978); Frank, *Kakt. u.a. Sukk.* 21(4):62-4 (1970); Putnam, *Gymnocalyciums* 36 (1978); Schlosser & (?) Schütz, *Kakt. u.a. Sukk.* 33(.):88 (1982); Neutelings, *Succulenta* 61(12):257-9 (1982); Bercht, *Succulenta* 62(4):72-8 (1983); Meregalli, *Piante Grasse* 5(1):28 (1985); Schütz, *Monogr. Gymno.* 73 (1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (provisionally accepted species). Fig. 46, Plate 56.

Schütz's Subgenus *Gymnocalycium* (*Ovatisemineum*) Section *Gymnocalycium* (*Ovatisemineum*);

Buxbaum's Series *Gymnocalycium* (*Baldiana*)

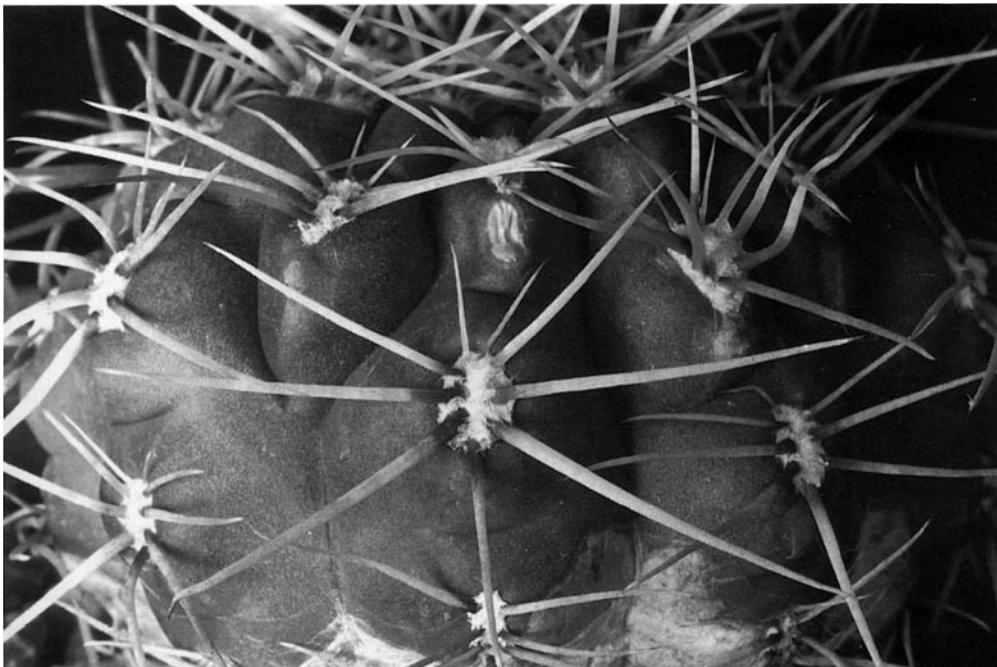


Figure 46.
G. hyptiacanthum

What is being grown as this species has dull, greyish-green, flat-globular to globular stems, getting fairly large (10 cm or more in diameter), with 10 or so ribs, and 5 to 11 stiff, straight, white to greyish, radial spines and one similar central spine. Flowers are pale yellowish-white or dull white.

Metzing, in letters, considers this a doubtful species, probably related to *G. gibbosum*.

Reported originally vaguely from Uruguay; more recently according to Schlosser extensively from Rivera, Artigas, Lavaleja, Canelones, Soriano, Rio Negro, Salto.

Collectors' numbers referred here are Schl. 107, 109, 111, 119, 126-9, 131, 135, 136, 138; WP89-003/005, 005/007, 005/007a, 060/073a (var. *mardelplatense* n.n.), 061/073b, 062/075, 059/073 (var. *mardelplatense* n.n.).

G. immemoratum* Castellanos & Lelong, Lilloa (Notas Fanerogamicus 2) 4:195 (1939); Piltz, Kakt. u.a. Sukk. 30(3):64-8 (1979); Meregalli, Piante Grasse 5(1):28 (1985); Schütz, Monogr. Gymno. 74 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. valnicekianum*)

For some time this species has been widely considered to be synonymous with *G. valnicekianum*.

G. intermedium Hort., Meregalli, Piante Grasse 5(1):28 (1985)

This is an old and persistent name for a hybrid, first used by Hildmann in 1898 (*Echinocactus intermedius*). Its exact application is undetermined. It has been used recently by Piltz as a provisional name (P113) for a quite different plant related to *G. moserianum* or *G. intertextum* according to Meregalli. Hans Till recently has given it half-hearted acknowledgement in his combination of *G. intertextum* beneath *G. bodenbenderianum*, placing *G. intermedium* (Piltz's P 113) beneath his *G. bodenbenderianum* subsp. *intertextum*. Neither combination is acknowledged herein.

G. intertextum Backeberg, Kakteenlex. 169 (1966) nom. inval; Cact. Lex. (Engl. ed.) 188, Fig. 138 (1978); H. Till, Kakt. u.a. Sukk. 38(8):191 (1987) – validation; Putnam, Gymnocalyciums 36 (1978); Meregalli, Piante Grasse 5(1):28 (1985); Schütz, Monogr. Gymno. 74 (1986); H. Till, Arbeitsgr. Gymno. Osterreich. Kakteenfr. 2(1):9-12 (1989); Hunt (ed.), CITES Cact. Checklist 67 (1992) (provisionally accepted species). Fig. 47, Plate 57.

Schütz's Subgenus *Trichomosemineum*;
Buxbaum's Series *Quehliana*

Although described nearly 20 years ago, this species has been slow to get into commercial nurseries. It is described as solitary, flat-globular, to 11 cm wide, with greyish-green body colour, and with 13 to 15 ribs, deeply furrowed transversely beneath roundly pointed tubercles. Radial spines number 5 to 7, and are up to 2.5 cm long, strong, irregularly curving and interlacing, pinkish-grey, brownish-grey or brownish-yellow. The central spine is solitary or absent, when present curving towards the apex and similar to the radials. Flowers are white to pale pink.

Reported vaguely from northern Argentina.

Collectors' numbers referred here are U (Uhlig) s = HT 722 (deposited at Vienna), B 136 (56?).

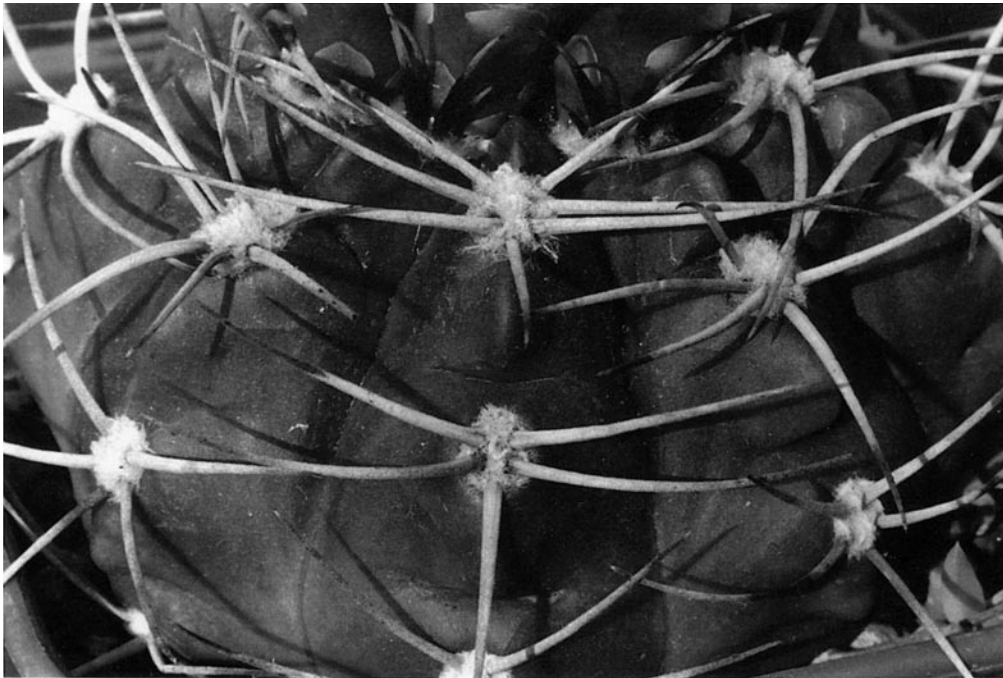


Figure 47.
G. intertextum

G. izozogsii* Cardenas, Cact. Amer. 38(..)145 (1966); Haage in Backeb., Cact. Lex. (Engl. ed.) 188 (1978); Meregalli, Piante Grasse 5(1):28 (1985); Schütz, Monogr. Gymno. 75 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. pflanzii*)

Referred to *G. pflanzii*, of which it is a northerly form (from Bolivia, Department Santa Cruz, Province Cordillera, near Atajado, at 400 m (1640 ft) altitude.

Plants sometimes seen misidentified under this name are referable to *G. megatae*.

G. joossensianum* (Bödeker) Britton & Rose, The Cact. 3:166(1922); Bödeker, Monatsschr. Kakteenk. 28:40 (1918) – as *Echinocactus joossensianus*; Backeb., Die Cact. 3:1770, Fig. 1710 (1959); Kakteenlex. 169 (1966); Cact. Lex. (Engl. ed.) 188 (1978); Putnam, Gymnocalyciums 36 (1978); Meregalli, Piante Grasse 5(1):28-29 (1985); Schütz, Monogr. Gymno. 76 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (provisionally accepted species)

Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*;

Buxbaum's Series *Schickendantzianae* Subseries *Schickendantzianae*

Described as solitary, flat-globose, with dull green body, flushed red to coppery red, and 6 to 9 ribs, this is an attractive, well coloured species with unusually coloured, very beautiful flowers. It has been available from time to time, but in recent years has usually been misnamed in commerce, the masquerader referable to *G. anisitsii*. Areoles have light brown wool. Spines are all radial, numbering 6 to 9, the lower the longer, curving, coloured brown. Flowers vary from wine-red to deep or pale lilac, with a fairly short tube. Fruit is spindle-shaped with red-edged scales. Until it reappears in cultivation its standing is in doubt.

Reported from the Gran Chaco of Paraguay or northern Argentina.

Significantly there are no collectors' field numbers referred here.

G. karwinskyanum Hort., Pazout, Ges. Ost. Kakt. Newsletter Jan./Feb. 1964; transl. Wood-Allun, The Chileans 3(14):30 (1969)

Referred to *G. megatae*.

G. kieslingii Ferrari, Cact. Amer. 57(6):244-6 (1985); H. Till, Arbeitsgr. Gymno. Osterreich. Kakteenfr. 1(3):25-28 (1990); Metzinger, Arbeitsgr. Gymno. Osterreich. Kakteenfr. 3(1):25-28 (1990); Hunt(ed.), CITES Cact. Checklist 67 (1992) (provisionally accepted species). Figs 48-50, Plates 58-60.

Schütz's Subgenus *Gymnocalycium* (*Ovatisemineum*) Section *Gymnocalycium* (*Ovatisemineum*);

Buxbaum's Series *Gymnocalycium* (*Baldiana*)

This recently described species with a further two forms (see below), has found its way into commercial hands, and comes readily from seed.

It is described as solitary, with flat-globose, grey-green bodies, 6 to 9 cm wide, 2 cm tall in the wild, where is partially immersed in sandy soil under bushes. Ribs number 12 (or 9 to 13), low and rounded with tubercles separated or nearly separated by transverse furrows, with prominent chins beneath the white woolled, circular areoles. Spines are all radial, 5 to 7 (or 9) in number, appressed, slightly curved, 5 to 8 mm long, whitish with pink base. Flowers are white, about 6 cm long and 5 to 6 cm wide, with thick, grey-green tube, having whitish or pinkish scales. Fruit is spindle-shaped, narrow at base, about 3.5 cm long, 1 cm wide.

Reported from Argentina, La Rioja, Department Arauco, Cuesta de Huaco.

Collectors' numbers referred here are WR 225; JL 169a, 169b.

Two forms were described at the same time:

fa. **alboareolatum** (not to be confused with the species of that name), which differs

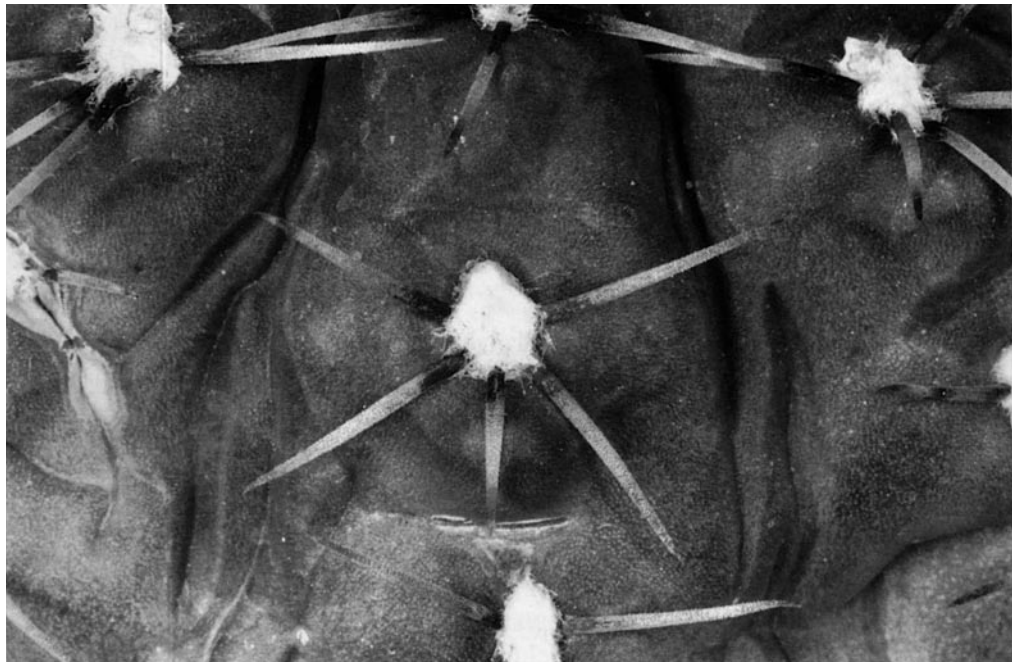


Figure 48.
G. kieslingii

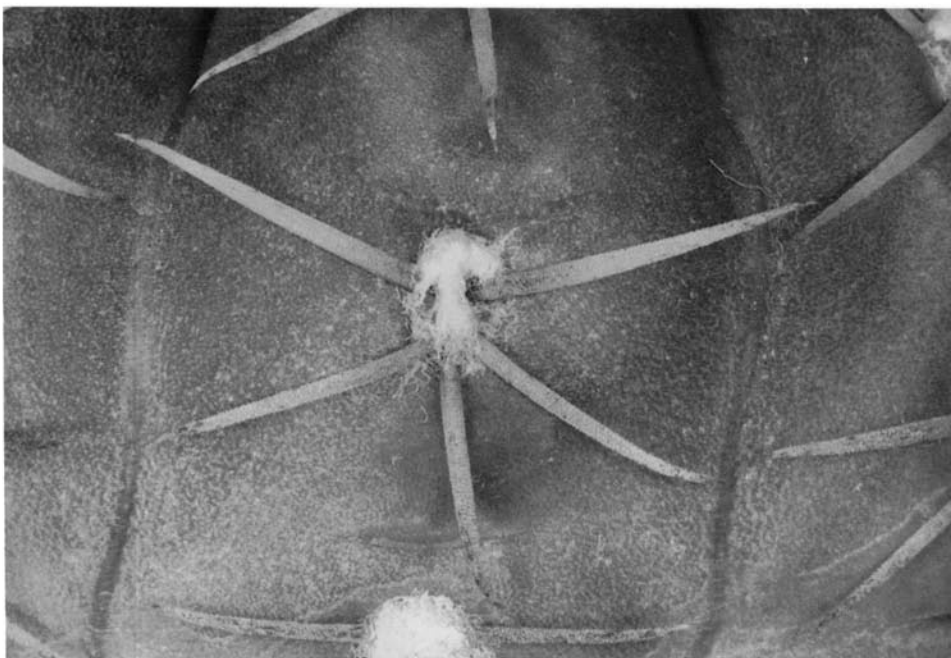
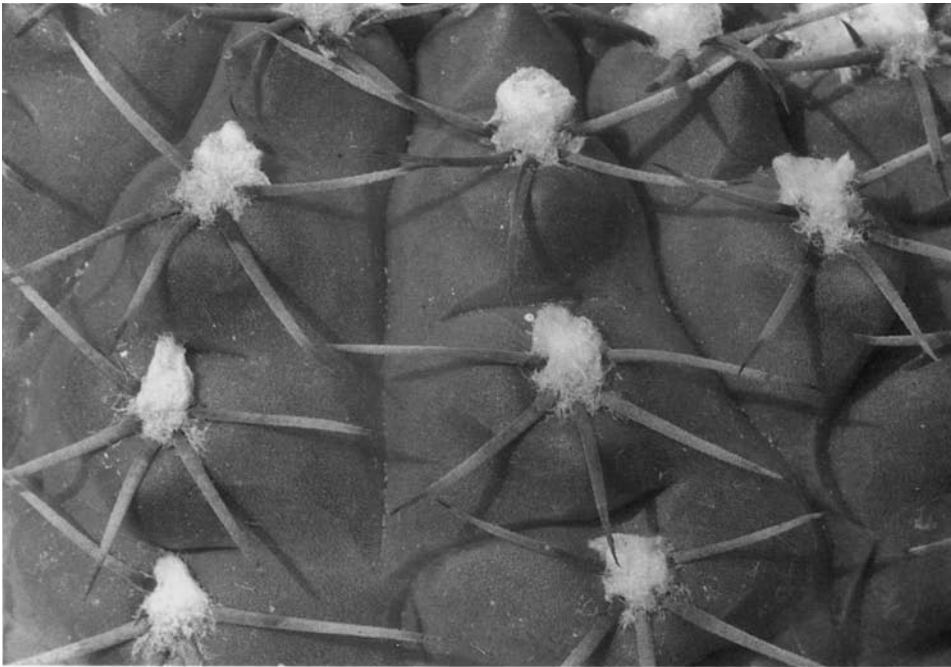


Figure 50.
G. kieslingii fa.
castaneum

from the type in having a less depressed apex, larger and more woolly areoles, 4 to 5 mm in diameter), and longer (to 13 mm) and more numerous (to 8) spines.

Reported from Argentina, La Rioja, Department Sanagasta, near Villa Sanagasta.

fa. **castaneum**, which differs from the type in its less prominent chins, dark greenish-red body colour, large and very woolly areoles, and stronger, dark based spines.

Reported from Argentina, La Rioja, Department Sanagasta, a few kilometres north of Villa Sanagasta.

Collectors' numbers referred here are WR 716a; JL 58.

G. knebelii Fric, nom. nud., Kakteenjager 8(1929); Backeb., Die Cad. 3:1785 (1959); Kakteenlex. 169 (1966); Cact. Lex. (Engl. ed.) 188 (1978); Pazout, Ges. Ost. Kakt. Newsletter Jan./Feb.1964; transl. Wood-Allun, The Chileans 3(14):27-31 (1969); Putnam, Gymnocalyciums 36-7 (1978); Bercht, Succulenta63(1):7 (1984); Meregalli, Piante Grasse 5(1):29 (1985)

Referred to *G. marsoneri*.

G. knollii Hort., Meregalli, Piante Grasse 5(1):29 (1985)

A catalogue name (Uhlig's), compared by Meregalli to *G. moserianum*.

G. kozelskyanum Schütz, Kaktusy 66: 28, 47 (1966); Succulenta 46(3):37-8 (1967); Haage in Backeb., Cact. Lex.(Engl.ed.) 188 (1978); Meregalli, Piante Grasse 5(1):29 (1985); Schütz, Monogr. Gymno. 77 (1986). Fig. 51, Plate 61.

Schütz's Subgenus *Trichomosemineum*;

Buxbaum's Series Quehliana

This species has been appearing in trade lists of plants and seed in recent years. It is a beautifully brown coloured plant, solitary, flat-globular, stems to 6 cm tall, 10 cm wide, with about 14 low ribs with little tubercle development. Areoles are round, about 20

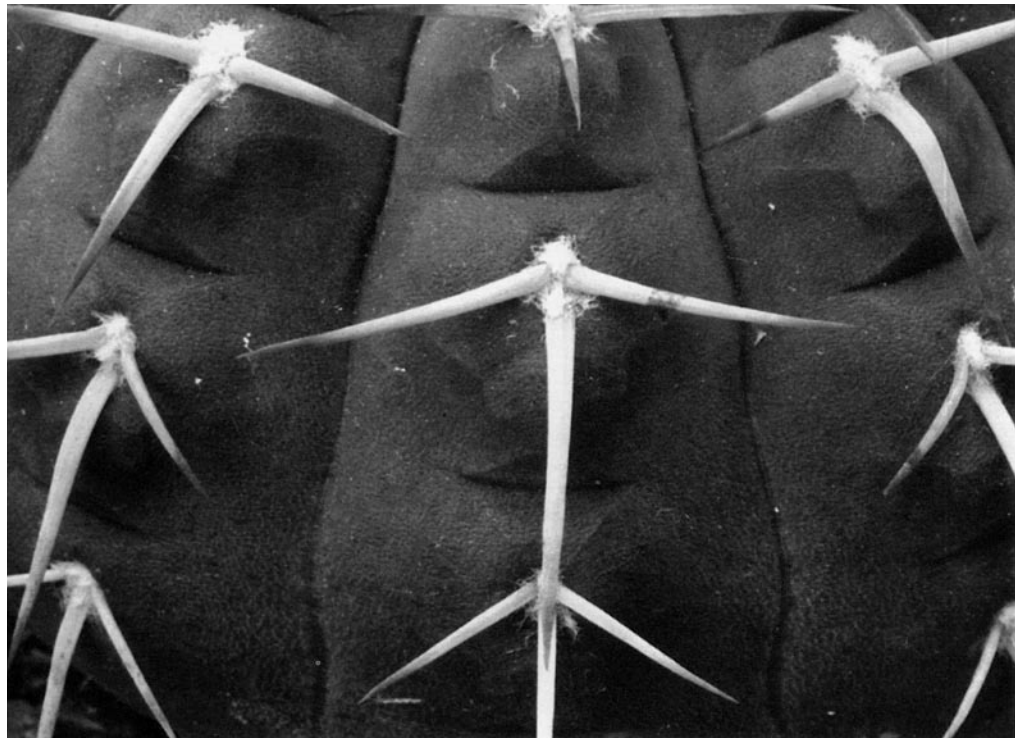


Figure 51.
G. kozelskyanum

mm apart, with dingy white wool. Spines are all radial, numbering usually 3, straight or a little curved upwards, and stiff, 20 mm long, dark brown, later pale grey. Flowers are deep pink, purple throated, and about 6 cm long. Fruit is dark bluish green.

Hans and Walter Till have recently reduced it to subspecific status beneath *G. riojense*, viz. *G. riojense* subsp. *kozelskyanum*, see comments under *G. riojense*.

It is unaccountably omitted from the recent *CITES Cactaceae Checklist*. Metzging (in letters) says that it is an invalidly described name.

Reported from Argentina, Cordoba; La Rioja, Ulapes, Sierra de los Colorados, 1100 m (3610 ft), and Malanzan, 600 m (1880 ft).

Collectors' numbers referred here are P 76a; LB 396; B 74.

G. kurtzianum* (Gürke) Britton & Rose, *Addisonia* 3:5 (1918); Gürke, *Monatsschr. f. Kakteenk.* 11 (1906); Meregalli, *Piante Grasse* 5(1):29 (1985); Schütz, *Monogr. Gymno.* 77(1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (syn. *G. mostii*)

Referred to *G. mostii* var. *kurtzianum*.

G. lafaldense* Vaupel, *Zeitschr. f. Sukkulantenk.* 192 (1924); Meregalli, *Piante Grasse* 5(1):29 (1985); Schütz, *Monogr. Gymno.* 78 (1986)

Referred firmly to *G. bruchii*, by no means for the first time.

G. lagunillasense* Card., *Kakt. u.a. Sukk.* 9(2):22 (1958); Backeb., *Kakteenlex.* 169 (1966); *Cact. Lex. (Engl. ed.)* 189 (1978); Meregalli, *Piante Grasse* 5(1):29 (1985); Schütz, *Monogr. Gymno.* 80(1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (syn. *G. pflanzii*)

Referred to *G. pflanzii*.

G. leeanum* (Hooker) Britton & Rose, *The Cact.* 3:154, Fig. 164 (1922); Hooker, *Curtis Bot. Mag.* 71: Fig. 4184 (1845) – as *Echinocactus leeanus*; Backeb., *Die Cact.* 3:1735 (1959); *Kakteenlex.* 169(1966); *Cact. Lex. (Engl. ed.)* 189 (1978); Frank, *Kakt. u.a. Sukk.* 21(4):62-4 (1970); Moser, *Kakt. u.a. Sukk.* 23(9):237 (1972); Putnam, *Gymnocalyciums* 37-8 (1978); Schlosser & Schütz, *Kakt. u.a. Sukk.* 33:88 (1982); Metzging, *Gymnos* 8(16):63-65 (1991); Meregalli, *Piante Grasse* 5(1):29 (1985); Schütz, *Monogr. Gymno.* 81(1986); Metzging, *Gymnos* 8(16):63-4 (1991); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (provisionally accepted species)

From research done by Detlev Metzging, it appears that the original description and drawing refer to a plant from Argentina, Buenos Aires province, ascribable to the *G. gibbosum* complex, and probably the same as what is now known as *G. schatzlianum*. The name for plants in cultivation under this name, with surely Uruguayan origins is *G. netrelianum*, see under that name.

G. leptanthum (Spegazzini) Spegazzini, *Nuev. Not. Cactol.* 8(1925); *Cact. Plat. Tent.* 504 (1905) – as *Echinocactus platensis leptanthus*; Backeb., *Die Cact.* 3:1712, Fig. 1640 (1959); *Kakteenlex.* 169 (1966); *Cact. Lex. (Engl. ed.)* 189 (1978); Putnam, *Gymnocalyciums* 38 (1978); Bercht, *Succulenta* 62(4):72-8 (1983); Kiesling, *Cact.*

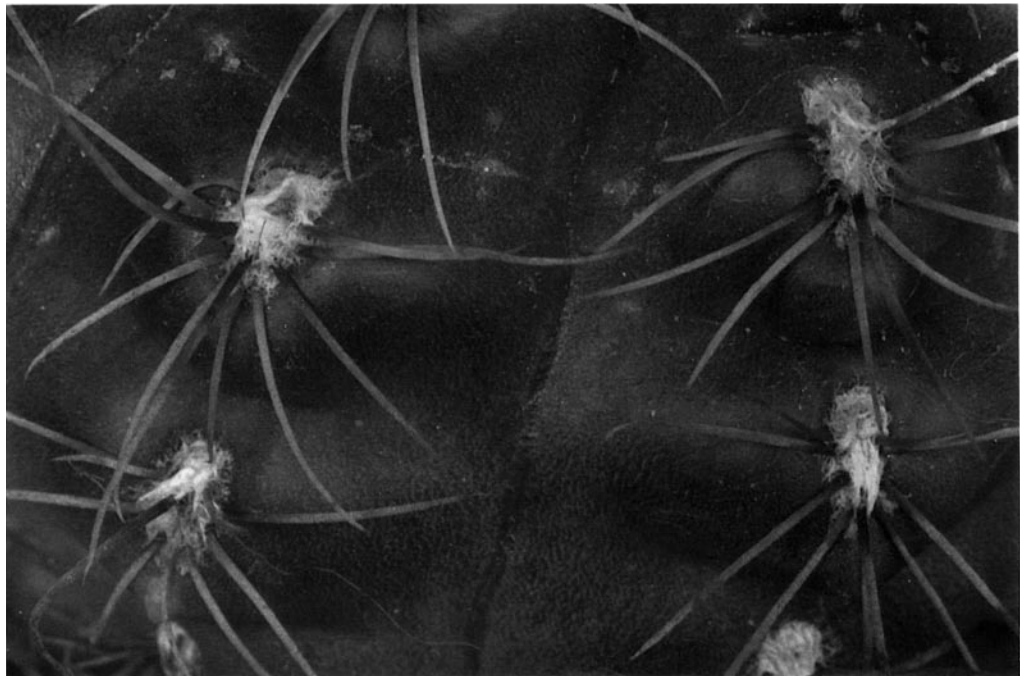


Figure 52.
G. leptanthum

Amer. 57(6):246 (1985); Meregalli, *Piante Grasse* 5(1):29 (1985); Schütz, *Monogr. Gymno.* 82 (1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (accepted species). Fig. 52, Plate 62.

Schütz's Subgenus *Microsemineum* Section *Calochlora*;
Buxbaum's Series *Gymnocalycium* (*Baldiana*)

This species has become well-known in cultivation in the last few years, through seed and seedlings from commercial sources. But Kiesling casts doubt on its rediscovery, and consequently what we are now growing under this name. Dr Meregalli considers it probably the oldest name for the recently described *G. kieslingii*.

What we are growing in cultivation under this name, rightly or wrongly, makes a flat-globular, dark blackish-green, solitary stem about 5 or 6 cm wide and about 3 cm tall, with about 12 ribs, clearly defined but not deeply furrowed. Spines are all radial, usually 7 in number, short (about 10 mm) lying flat to the body, dirty white or grey, flexible, more or less straight and evenly spread. The flowers have a distinctly slender tube, opening out broadly to a white flower with pink flushed throat, about 3-4 cm wide and (with tube) about 6-7 cm long. Fruit is about 2 to 3 cm long, 8 mm wide, club shaped, green with large paler green edged scales.

Reported from Argentina, Cordoba, Cosquin; Catamarca, Sierra Ambato.

Collectors' numbers referred here are WR 722; B 63; DV 57; JL 37.

G. loricaum* (Spegazzini) Spegazzini, *Nuev. Not. Cactol.* 60 (1925); *Anal. Mus. Nac. Buenos Aires* 3/4, 502 (1905) – as *Echinocactus loricaum*, non Poselger, 1853; Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (syn. *G. spegazzinii*)

Long regarded as synonymous with *G. spegazzinii*.

G. lumbrerasense Ritter, nom. nud., Kakt. Südamer. 2: 477 (1980)

As yet undescribed because of lack of sight of the flower, this find by Ritter is placed by him near to *G. antherostele* and *G. schickendantzii*. It is reported from Argentina, province Salta, near Lumbreras, where it is rare.

Collector's number referred here is FR 962. Now that Friedrich Ritter has gone, it is doubtful whether the application of this name will ever be determined.

G. marajes (or *G. marayes*) Hort., nom. nud., Putnam, *Gymnocalyciums* 38 (1978); Putnam, *The Cactus File* 1(2):12-13 (1991)

This catalogue name is used for a plant found in La Rioja, Argentina, at or near Marajes, with seed of the *Muscosemineum* type. It is certainly close to *G. schickendantzii*, as Putnam states in his booklet, bearing striking, violet pink flowers.

G. marquezii* Card., Kakt. u.a. Sukk. 9:26 (1958); Backeb., *Kakteenlex.* 169 (1966); *Cact. Lex.* (Engl. ed.) 189 (1978); Meregalli, *Piante Grasse* 5(1):31 (1985); Schütz, *Monogr. Gymno.* 82 (1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (syn. *G. pflanzii*). Plate 88.

Referred together with *G. marquezii* var. *argentinense* (Backeberg, *Kakteenlex.* 169. 1966) to *G. pflanzii*.

G. marsoneri (Fric) Y. Ito, *Expl. Diagr.* 175, 293 (1957); Fric in Kreuzinger, *Verzeichnis* 14(1935); Backeb., *Die Cact.* 3: 1784, Fig. 1714 (1959); *Kakteenlex.* 169 (1966); *Cact. Lex.* (Engl. ed.) 189 (1978); Putnam, *Gymnocalyciums* 38 (1978); Meregalli, *Piante Grasse* 5(1):31 (1985); Schütz, *Monogr. Gymno.* 83(1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (accepted species). Fig. 53, Plate 63.

Schütz's Subgenus *Muscosemineum* Section *Periferialia*;

Buxbaum's Series *Schickendantzianae* Subseries *Marsoneriana*

This is a species with a beautiful, coppery body colour if given enough light, with a low growing stem, flat-globose, solitary, sometimes dull brownish, grey-green, with about 15 ribs, with somewhat flat, roundish tubercles. Areoles are oblong, with whitish-brown wool. Spines are all radial, straight to recurving, about 7 in number, 2 to 3 cm long, at first clear brown, later dark brown. Flowers are 3 to 3.5 cm long, 3 to 4.5 cm wide, pale yellowish white. Fruit is fat, round to a little ovoid, purple or red and long persisting.

In the recent *CITES Cactaceae Checklist* it is taken as the prior name for *G. brevistylum*, *G. eytianum*, *G. fricianum*, *G. hamatum*, *G. matoense*, *G. megatae*, *G. michoga*, *G. onychacanthum*, *G. pseudomalacocarpus*, *G. tortuga* and *G. tudaе*. Many of these names have long been regarded as superfluous, but *G. megatae* (as the prior name for the trio described by Ito, viz. *G. megatae*, *G. tudaе* and *G. onychacanthum*) and *G. pseudomalacocarpus* have both held their own until now. For me they still do, and I have lingering doubts over *G. hamatum* being swept under here too.

Reported from northern Argentina, in the Gran Chaco area; Salta, Quebrada del Toro, and Campo Quijano at 1100 m (3610 ft) altitude.

Collectors' numbers referred here are WR 159; P 230; B 151; DV 51; JL 32.

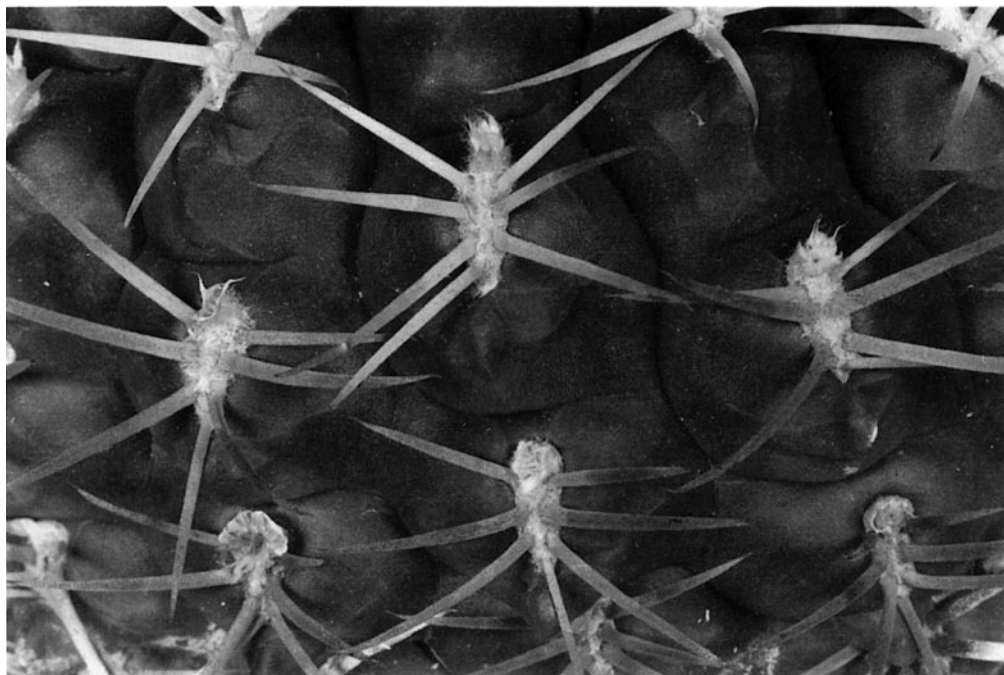


Figure 53.
G. marsoneri

G. matoense* Buining & Brederoo, *Kakt. u.a. Sukk.* 26(12):265 (1975); Putnam, *Gymnocalyciums* 38-9 (1978); Bercht, *Succulenta* 63(2):43-5 (1984); Meregalli, *Piante Grasse* 5(1):31 (1985); Schütz, *Monogr. Gymno.* 84 (1986); P J Braun, *Kakt. u.a. Sukk.* 42(10):228 (1991); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (syn. *G. marsoneri*). Plate 66.

Schütz's Subgenus *Muscosemineum* Section *Periferalia*;

Buxbaum's Series *Schickendantzianae* Subseries *Marsoneriana*

This was hailed as the first species of *Gymnocalycium* found in the Mato Grosso area of Brazil. It has remained mysteriously not found in collections, even among the most ardent 'Gymnophiles', although seedlings under this name have recently become available. The strong indication is that it is yet another variant of *G. megatae*, found under its various pseudonyms further west. In the recent *CITES Cactaceae Checklist* it is referred (with *G. megatae*) to synonymy with *G. marsoneri*.

It was described as solitary, flat-globular, to 15 cm wide, 7 cm tall, with dark green to olive-brown body colour, and up to 21 ribs. Areoles are oval, with cream coloured wool at first, later naked. Radial spines number 9, curving, at first yellowish, later greyish, 11 to 15 mm long, shorter spines at the top of the areole, the lowest the longest. There is one central spine on mature plants, which is absent in youth, similar to the radials, but longer, 17 to 19 mm. Flowers are funnel shaped, white, with brown outer petals, 38 mm long, 14 mm wide. Fruit is bluish-pruinose, oval, 2.5 cm long, 1.6 cm wide.

Reported from Brazil, Mato Grosso area, on the Brazilian side of the river Paraguay, at Porto Murтинho, at 140 m (460 ft) altitude.

Collectors' numbers referred here are HU 452; Braun 248.

G. *mazanense** Backeberg, Die Kaktfrd. 133 (1932); Blatt. Kakteenfr. 2 (1935); Backeb., Kaktus ABC 291 (1935); Backeb., Die Cact. 3:1765 (1959); Kakteenlex. 170 (1966); Cact. Lex. (Engl. ed.) 189 (1978); Putnam, Gymnocalyciums 39-40 (1978); Meregalli, Piante Grasse 5(1):31 (1985); Schütz, Monogr. Gymno. 85 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (provisionally accepted species). Plate 52.

Schütz's Subgenus *Microsemineum* Section *Mazanensia*;

Buxbaum's Series *Mostiana*

Now to be reduced to synonymy with the previously named *G. hossei*, according to Metzging (in letters), this species has been shrouded in mystery for some time. The most clearly identifiable and also referable plants to *G. hossei* in circulation are the synonymous *G. nidulans* and *G. weissianum*. See under *G. hossei*.

G. *megalothelos* (Sencke) Britton & Rose, The Cact. 3:162, Plate 18 Fig. 1, & Fig. 173 (type plant) (1922); Sencke ex Schumann, Gesamtb. Kakt. 415 (1898) – as *Echinocactus megalothelos*; Backeb., Die Cact. 3:1770 (1959); Kakteenlex. 170 (1966); Cact. Lex. (Engl. ed.) 189 (1978); Strigl, Kakt. u.a. Sukk. 23(9):246 (1972); Putnam, Gymnocalyciums 40(1978); Bercht, Succulenta 62(3):51-4 (1983); Meregalli, Piante Grasse 5(1):31 (1985); Schütz, Monogr. Gymno. 86(1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (provisionally accepted species). Figs 1 and 54, Plate 64.

Schütz's Subgenus *Macrosemineum* Section *Denudata*;

Buxbaum's Series *Uruguayenses* Subseries *Denudata*

This species has become more available in recent years from nurseries as either seed or seedlings. It is solitary, flat-globose, up to 10 cm wide, dull green to brownish-green, with 10 to 12 ribs, acute and divided deeply into prominent tubercles. Areoles are large, oval, with prominent tufts of light brown wool. Radials spines number 7 or 8, spreading

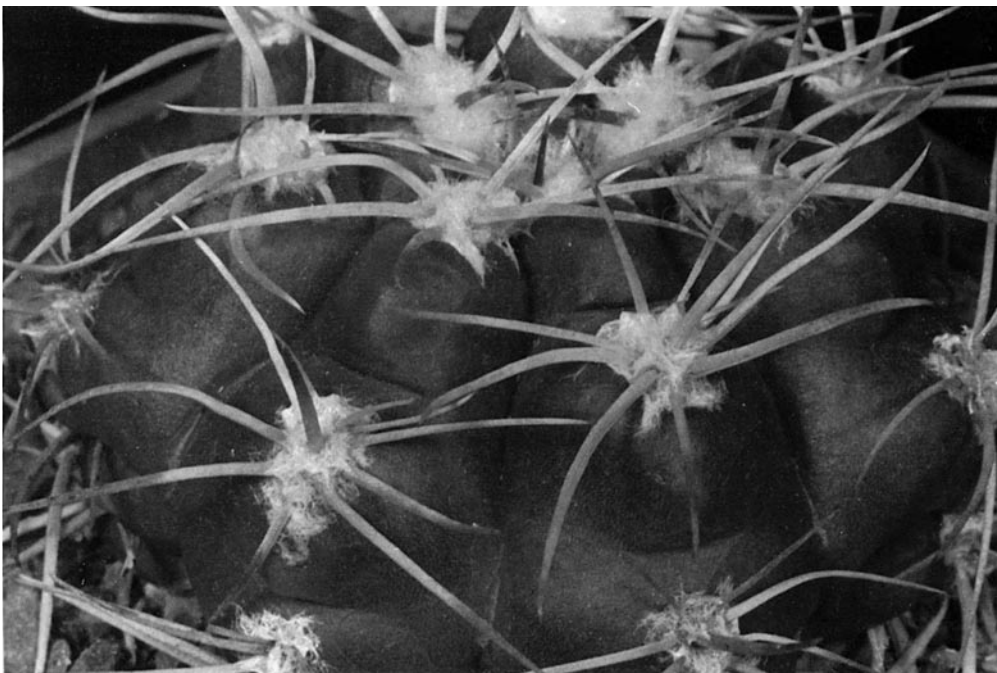


Figure 54.
G. megalothelos

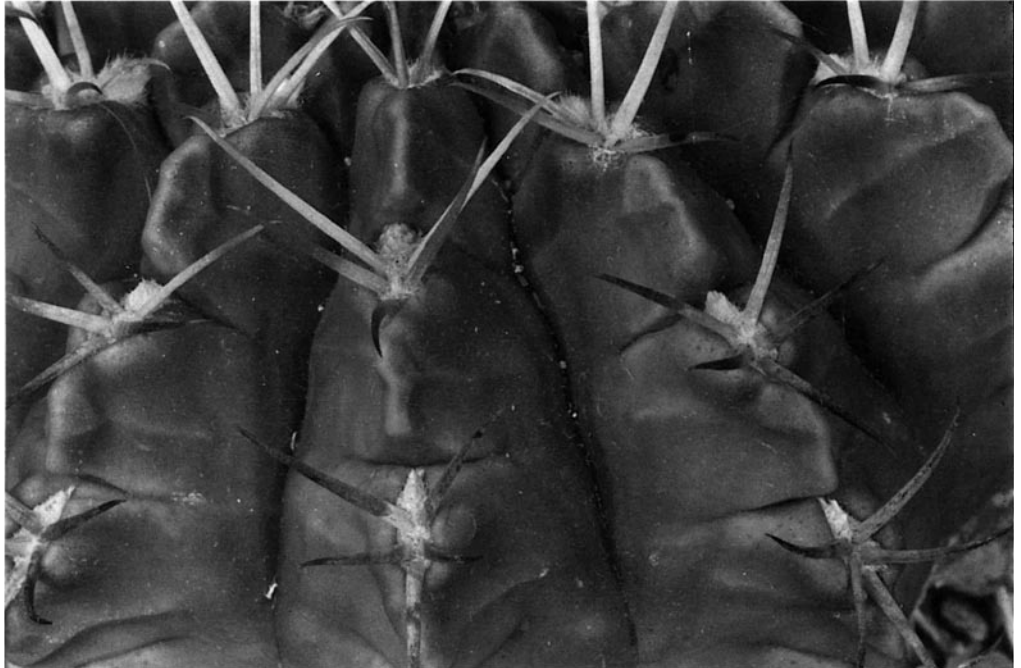


Figure 55.
G. megatae

or sometimes more ascending, needle-like, 10 to 15 mm long or longer, brown or brownish-grey. There is one central spine, 2 to 3 cm long, a little curved, similar to the radials.

Flowers are pinkish-white, 3 to 4 cm long, appearing at the centre. Fruit is ovoid, about 2 cm long, 1 to 1.5 cm wide, bluish-green.

One variety has been described: *G. megalothelos* var. *delatianum* (Haage jr.) Schütz, *Friciana* 4, 40:11(1966).

Reported from Paraguay, without locality.

It is perhaps extraordinary that none of the field collectors active in the field have ascribed any of their numbers to this species.

G. megatae Y. Ito, *Expl. Diagr.* 292, 172 (1957); Backeb., *Kakteenlex.* 170 (1966); *Cact. Lex.* (Engl. ed.) 189 (1978); Moser, *Nat. Cact. Succ. J.* 26(1):4 (1971); Putnam, *Gymnocalyciums* 41(1978); Meregalli, *Piante Grasse* 5(1):31, 33 (1985); Schütz, *Monogr. Gymno.* 88 (1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (syn. *G. marsoneri*). Figs 55 and 56, Plates 65-67.

Plates

63. *G. marsoneri*
64. *G. megalothelos* SPI 189/74
65. *G. megatae*
66. *G. megatae* (*matoense*)
67. *G. megatae* (*hamatum*)

63		64
65		
66		67
67		





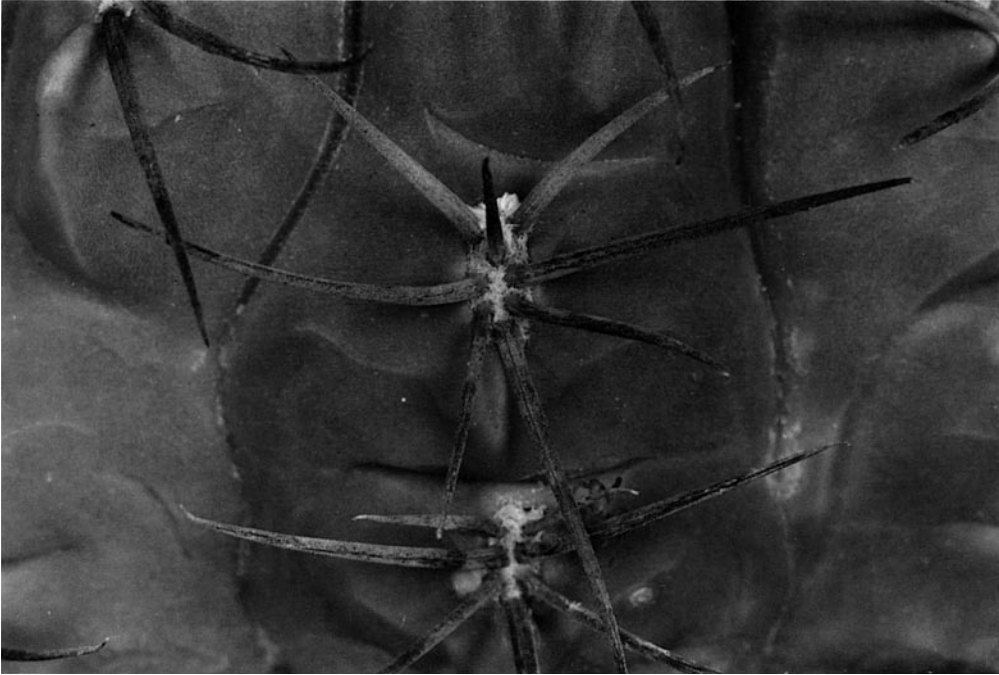


Figure 56.
G. megatae (*hamatum*)

Schütz's Subgenus *Muscosemineum* Section *Periferialia*;
Buxbaum's Series *Schickendantzianae* Subseries *Marsoneriana*

In spite of what has been indicated in print before now, this species has priority on the page over *G. onychacanthum* and *G. tudaе*, and is therefore the preferred name for these synonymous species. It is solitary, flat-globular, 6 cm tall and to 20 cm wide, variable in colour from light greyish-green to light grey to rust-brown, with 9 to 13 sharpish ribs. Spines are all radial, to 5 in number, 2 cm long, brown becoming blackish. Flowers are a dirty white, with greyish smudges on the outer petals, to 5 cm long and wide. It is one of the most slowly growing of species in the genus, and makes an impressive plant in age, taking at least ten years to get to about 15 cm wide. With its low-growing, grey appearance and its strong spines it gives the impression it would withstand being run over by a vehicle in the wild, just settling a little further into its hostile environment.

The recent *CITES Cactaceae Checklist* refers it to synonymy with the earlier described *G. marsoneri*, but it is maintained herein.

Reported from Bolivia, east of Charagua, Boyuibe, on the Santa Cruz and Chuquisaca border, Carapari – Palos Blancos at 800 m (2625 ft), Guanacos; Paraguay, Boqueron at 500 m (1640 ft) altitude.

Plates

68		69	68. <i>G. mesopotamicum</i>
70			69. <i>G. mihanovichii</i> (ex Fric)
71		71	70. <i>G. mihanovichii</i> var. <i>albiflorum</i>
72			71. <i>G. mihanovichii</i> var. <i>filadelfiense</i>
			72. <i>G. monvillei</i>

Collectors' numbers referred here include FR 1133 (*G. tuda* var. *bolivianum*), FR 1180 (*G. tuda*), Lau 371, 374, KK 830, WO 82, H 316, 317.

G. pseudomalacocarpus, sometimes referred hereunder is here treated separately, see under that name.

G. melanocarpum* (Arechavaleta) Britton & Rose, *The Cact.* 3:161, Fig. 171 (1922); *Arech.*, *Anal. Mus. Nac. Montevideo* 5:220 (1905) – as *Echinocactus melanocarpus*; *Monatsschr. f. Kakteenfr.* 164 (1907); *Backeb.*, *Die Cact.* 3:1719 (1959); *Kakteenlex.* 170 (1966); *Cact. Lex. (Engl. ed.)* 189 (1978); *Buining, Kakt. u.a. Sukk.* 20:82 (1969); *Schütz, l.c.* 28():131 (1977); *Putnam, Gymnocalyciums* 41(1978); *Meregalli, Piante Grasse* 5(1):33 (1985); *Schütz, Monogr. Gymno.* 89 (1986) – in error as *G. melanocentrum*; *Hunt (ed.), CITES Cact. Checklist* 67 (1992) (provisionally accepted species)

Schütz's Subgenus *Macrosemineum* Section *Denudata*

Buxbaum's Series *Uruguayenses* Subseries *Uruguayenses*

This species was described as solitary, globose, 7 to 9 cm wide, with 15 ribs, broad and rounded, strongly divided into tubercles. Spines are all radial, 10 to 12 in number, yellow, later greyish, 2 to 2.5 cm long. Flowers appear at the centre, and were reckoned to be yellow. Fruit is spherical, 2 cm long, 1.5 to 2 cm wide, shining, dark olive-green.

Reported from north-western Uruguay, near Paysandu.

There is much doubt surrounding this species, and discrepancies between the now ancient description and the illustrations at the time. It is unlikely that it will ever be positively identified.

Collector's number referred tentatively here is HU 288a.

G. mesopotamicum Kiesling, *Cact. GB* 42(2):39 (1980); *Bercht, Succulenta* 63(5):112 (1984); *Metzing, Kakt. u.a. Sukk.* 38(12):34-35 (1987); *Meregalli, Piante Grasse* 5(1):33 (1985); *Schütz, Monogr. Gymno.* 89 (1986); *Bercht, Gymnos* 9(17):21-23 (1992); *Hunt (ed.), CITES Cact. Checklist* 67 (1992) (accepted species). Fig 57, Plate 68.

Schütz's Subgenus *Macrosemineum* Section *Denudata*;

Buxbaum's Series *Uruguayenses* Subseries *Denudata*

A recent discovery on a trip made by a team from the Royal Botanic Gardens, Kew, in collaboration with the Instituto Darwinion, Argentina, this species was named by Dr Roberto Kiesling while carrying out studies at Kew. It is an individual, striking new species, described as solitary, the dark green stem shining when in growth, getting to about 2 or 3 cm tall and 4 or 5 cm wide (more in cultivation, and offsetting too), with about 7 to 9 low, obtuse ribs with a slight horizontal groove above each areole. Spines number 9 to 12, the uppermost couple only 2 to 3 mm long, the lower several spines up to 9 mm, thin and bristle like, reddish-brown in youth, becoming greyish- or pinkish-white. Flowers are narrow tubed, white tinged pink, with red in the throat of the inner tube, 6 to 7 cm long, opening to 6.5 cm wide. Fruit is club shaped, 2 to 3 cm long, 7 to 8 mm wide, dull green. Seed according to Meregalli is intermediate between Buxbaum's Series *Uruguayenses* and Series *Quehliana*.

Seedlings have proved not difficult to raise, and they grow quite quickly to flower when the stem is only 2 or 3 cm wide.

Reported from Argentina, Corrientes, Mercedes at 200 m (660 ft) altitude.

Collectors' numbers referred here are HU 414; P 241; LB 612.

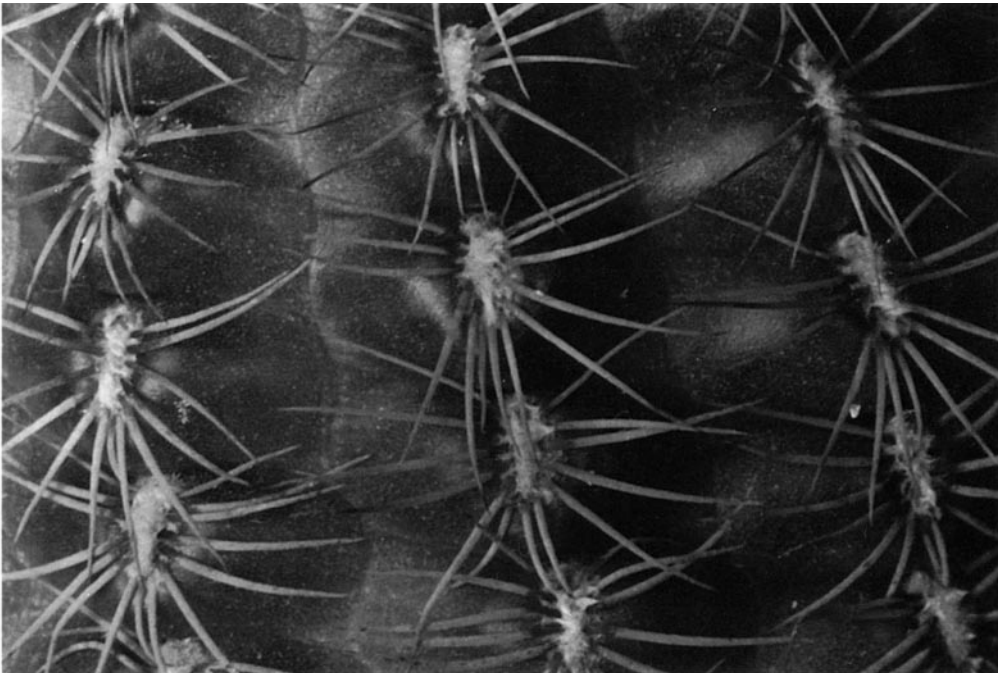


Figure 57.
G. mesopotamicum

G. michoga* Ito, Expl. Diagr. 292, 175 (1957); Fric, Liste 'Kakteenjager' 8 (1929) nom. nud.; Backeb., Die Cact.: 1783 (1959); Kakteenlex. 170 (1966); Cact. Lex. (Engl. ed.) 189 (1978); Pazout. Ges. Ost. Kakt. Newsletter Jan-Feb. (1964), transl. Wood-Allun, The Chileans 3(14):28 (1969); Putnam, Gymnocalyciums 41(1978); Meregalli, Piante Grasse 5(1):33 (1985); Schütz, Monogr. Gymno. 91 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. marsoneri*)

This is referable to *G. schickendantzii*.

G. mihanovichii (Fric & Gürke) Britton & Rose, The Cact. 3:153, Fig. 159 (1922); Fric & Gürke, Monatsschr. Kakteenk. 15:142 (1905) – as *Echinocactus mihanovichii*; Werderm., Blüh. Kakt. 29: Fig. 112 or 114 (1936); Backeb., Die Cact. 3:1781, Fig. 1713 (1959); Valnicek, Kakt. u.a. Sukk. 13:177 (1962); Backeb., Kakteenlex. 170 (1966); Cact. Lex. (Engl. ed.) 190 (1978); Putnam, Gymnocalyciums 41-2 (1978); Bercht, Succulenta 63(4):82-6 (1984); Meregalli, Piante Grasse 5(1):33-34 (1985); Schütz, Monogr. Gymno. 91(1986); Metzinger, Arbeitsgr. Gymno. Österreich. Kakteenfr. 2(2):13-18 (1989); Hunt (ed.), CITES Cact. Checklist 67 (1992) (accepted species). Figs 58 and 59, Plates 69-7 1.

Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*;
Buxbaum's Series *Schickendantzianae* Subseries *Mihanovichiana*

This is one of the most well known and popular species, although confusion reigns between it and *G. friedrichii*, which has been combined and separated in the past according to differing taxonomic thinking. In broad terms *G. mihanovichii* is more a green or brownish-green bodied species, with usually quite prominent banding on the ribs, from paler colouring in transverse bands around the stem, while *G. friedrichii* has much more red colouring in its make-up, and less prominent or no banding as indicated

above; flowers of the former are generally green or greenish-yellow or white, the petals not usually reflexing, so that the flower remains cup shaped or campanulate, while those of the latter are usually white or pink, and open wide at the top of the tube, reflexing to a right-angle or more, making a parasol shaped flower.

Recent opinion has swung towards regarding *G. friedrichii* as a separate species, with perhaps closer relationships to *G. anisitsii*, perhaps intermediate between that species and *G. mihanovichii*. See therefore under *G. friedrichii* for this species and its varieties and forms.

The type of *G. mihanovichii*, is globular to flat-globular, becoming columnar with age in cultivation, to 5 cm wide, greyish-green, with about 8 acute ribs, and more or less prominent banding from paler colouring in transverse strips running from the areoles into the groove between the ribs. Areoles are small, 12 mm apart, with all radial spines, 5 or 6 in number usually, weak and flexible, yellowish to brownish-grey, about 8 to 10 mm long. Flowers are about 3 cm long and wide, with long, narrow tubes, green or yellowish-green, often tinged red. Fruit is long, spindle shaped. Reported from Paraguay, the road from Mariscal Estigarribia to Filadelfia from 70 to 350 km; by Piltz from Argentina, Chaco Austral, and by Lau from Bolivia, near Guanacosa.

Collectors' numbers referred here are Lau 372, P 242.

Some of the varieties of this species have wavered between allegiance to this species or *G. friedrichii*. Their publication has often been in journals not readily available and difficult to discover even in the most sophisticated of horticultural libraries. They are as follows:

var. **albiflorum*** (Pazout) Schütz, *Friciana* 3:17:5-7 (1963)

Referred to *G. friedrichii* var. *albiflorum*;

var. **angusto-striatum*** Pazout, *Friciana Rada* 1:7, 3 (1962)

Referred to *G. friedrichii*;

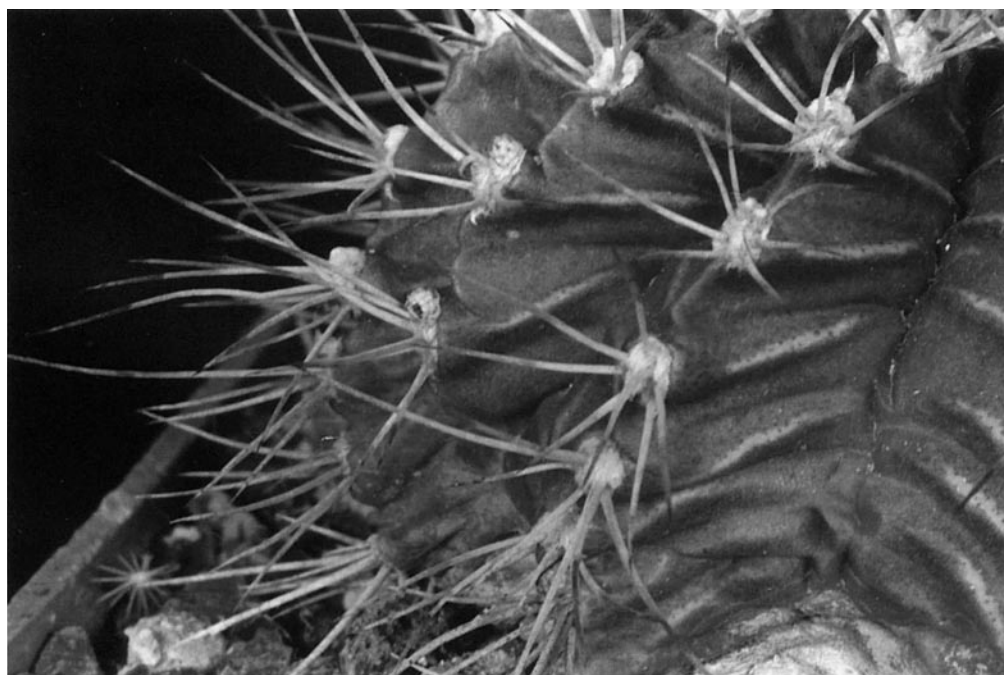


Figure 58.
G. mihanovichii
var. *filadelfiense*

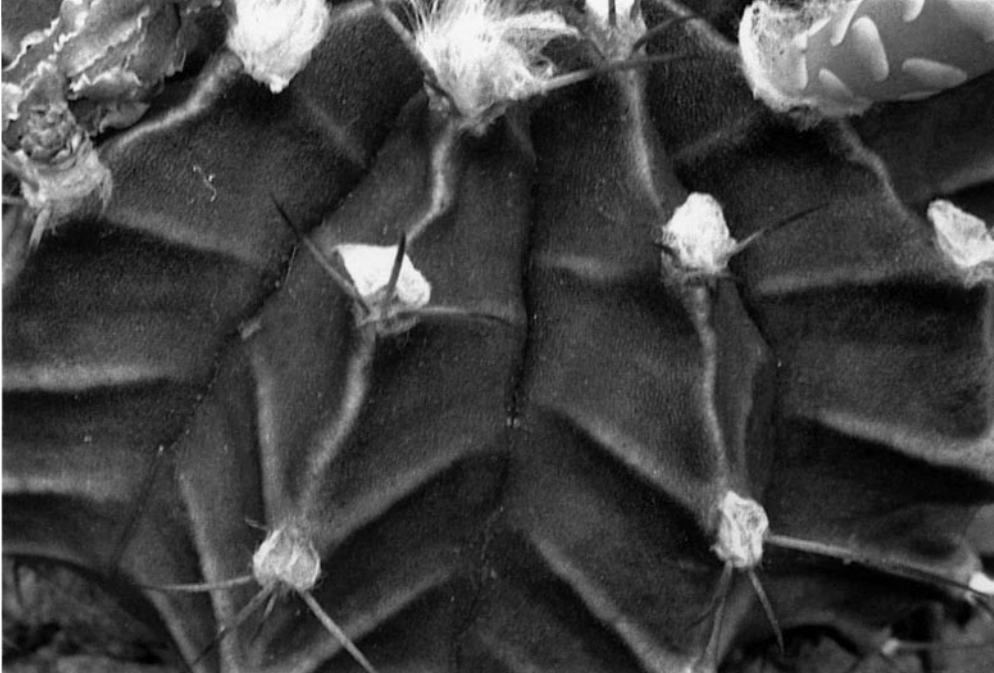


Figure 59.
G. mihanovichii
var. *moserianum*

var. *chacoanum* nom. prov., Bercht., Succulenta 63(4):85 (1984)

var. *chlorostictum* Ritter, nom. nud., Kakt. Südamer. 1:265 (1980)

Referred to *G. mihanovichii* var. *filadelfiense*;

var. **filadelfiense** Backeberg, Kakteenlex. 170 (1966); Cact. Lex. (Engl. ed.) 190 (1978); Pazout, Kaktusarske 65:65 (1965); Ritter, Kakt. Südamer. 1:265 (1979); Kopecky, Kaktusy 22(2):30-34 (1986); Metzging, Gymnos 6:21-22 (1989) – this variety, often seen labelled as *G. chlorostictum*, an undescribed name, is globular to shortly columnar, dark olive green to brownish green with tiny green spots all over the body, but with little evident banding. It has 8 acute ribs, 3 to 5 radial spines, at first brown and darker brown tipped, later dark brown to grey, somewhat chalky. Areoles are round, with a little brownish-yellow wool. Flowers are long-tubed, green with reddish midstripe on the outer petals, the inner petals somewhat reluctant to open and show their yellow anthers and stigma. Fruit is red to reddish-green, spindle shaped with red flesh.

Reported from Paraguay, near Filadelfia.

Collectors' numbers referred here are FR 1181; U 2125; M 19; P 430; LB 68; A 79, 80.

var. **fleischerianum*** Pazout, Kaktus Listy 16:10, 109.159 (1951); Schütz, Friciana 8, 51:17 – referred to synonymy with *G. friedrichii* var. *albiflorum*;

var. **friedrichii*** Werdermann, Blüh. Kakt. 29: Fig. 113 (1936); Pazout, Friciana 4, 23:3-19 (1964)

Referred to *G. friedrichii*;

var. *heesei* nom. nud. – a catalogue name, undefined as far as I can ascertain, dismissed by Putnam as 'a worthless, invalid name';

var. **melocactiformis*** Pazout, Kaktus Listy no. 5 (1948)

Referred to *G. friedrichii* var. *melocactiformis*;

var. *mendozaense* nom. prov., Bercht, Succulenta 71(1):5 (1992)

var. **moserianum***

Referred to *G. friedrichii* var. *moserianum*;

var. **pazoutianum*** Moser & Valnicek

Referred to *G. friedrichii* var. *piraretaense*;

var. **piraretaense*** Pazout

Referred to *G. friedrichii* var. *piraretaense*;

var. **rysanekianum*** Pazout

Referred to *G. friedrichii* var. *albiflorum*;

var. **stenogonum** Fric & Pazout, Kaktus. Listy 3:17 (1948); & 16:10, 109-159 (1951).

This variety has a large stem, to 15 cm wide, smooth, fresh green colouring to bronze in strong light conditions. Ribs number about 8, sharp edged, with pronounced horizontal banding. Spines number 5, to 2 cm long. Flowers are greenish to brownish, about 8 cm long.

Reported from Paraguay, Chaco Austral, near Toro Alarachi, according to Pazout, and from Argentina, province Chaco (P 242).

Collector's number referred here is P242.

var. *stenostriatum* Pazout, nom. nud., Friciana Rada 1/7:10 (1962).

This variety has been referred to *G. mihanovichii* var. *angusto-striatum*, and thence to *G. friedrichii*.

Mention must be made of the chlorophyll-less and variegated forms of this species, which are very popular as grafted plants horticulturally. They vary in colour from the most commonly seen, bright red (the so-called 'Ruby Ball') to yellow, orange and various combinations of colours where the chlorophyll is partly present. They arise in the main from seedlings lacking chlorophyll, which would normally die as soon as the sustenance from their cotyledons were exhausted, since they are incapable of sustaining life with no chlorophyll present. Before this time, within a few days of germination, they are grafted (a task for skilled and steady fingers), so that they may obtain their nourishment from a stock plant with which they are united. On no account should they be removed from the graft to be rooted, unless there is some chlorophyll material in the grafted part of the plant (green or dark reddish-brown colouring), since, even though they may have grown considerably drawing on the stock plant beneath for sustenance, they are unable, as indicated above, to fend for themselves. They can of course be regrafted if the stock collapses, and the rot has not extended into the scion – see Chapter 1.

G. millaresii* Cardenas, Cact. Amer. 38:144, 161 (1966); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 93 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. pflanzii*)

Referred to *G. pflanzii*.

G. monvillei (Lemaire) Britton & Rose, The Cact. 3:161, Figs. 169, 170 (1922); Lem., Cact. Aliq. Nov. 14 (1838) – as *Echinocactus monvillei*; Schumann, Blüh. Kakt. 1, Fig. 10 (1901) – as *Echinocactus monvillei*; Backeb., Die Cact. 3:1769, Fig. 1705 (1959); Kakteenlex. 170 (1966); Cact. Lex.(Engl. ed.) 190 (1978); H. Till & Schatzl, Succulenta 52 (10-12)173, 193, 215, 230 (1973); & l.c. 53(1):4 (1974); Putnam, Gymnocaly-



Figure 60.
G. monvillei

ciums 43 (1978); Bercht, *Succulenta* 62(9):193-7 (1983); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 94 (1986); H. Till, *Arbeitsgr. Gymno. Österreich. Kakteenfr.* 3(3):33-40 (1990); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (accepted species); H. Till & Neuhuber, *Arbeitsgr. Gymno. Österreich. Kakteenfr.* 6(3):99-106 (1993); & 6(4):107-112 (1993). Fig. 60, Plates 4 and 72.

Schütz's Subgenus *Microsemineum* Section *Hybopleura*;
Buxbaum's Series *Horridispina*

This is an 'old' species described some 150 years ago. Studies in recent years indicate that this is the prior name for what we have been growing for some time as *G. multiflorum*, i.e. large growing, for some time solitary stems (to 30 cm in diameter), pale green, strongly yellow spined plants, somewhat reluctant to flower until mature, in spite of the species name. Some authorities indeed favour placing *G. multiflorum* into synonymy with *G. monvillei*, published some 7 years earlier. But others have argued quite strongly for its retention, identifying it as a smaller growing plant, allied to *G. achirasense* and *G. horridispinum* – see further remarks under *G. multiflorum*.

G. monvillei then is described as a solitary-stemmed species (clustering in cultivation after a while), up to 20 cm or more wide, globular to flat-globular, with 10 to 17 broad, obtuse ribs, strongly tubercled, with pronounced chins. Areoles are long-oval, to 10 mm long, with creamy-white wool. Radial spines number 7 to 13, 3 to 4 cm long, slightly curving, thick and strong, yellowish with reddish or purple colouring at the very base. Central spines are not always present, but number 1 to 4 if there, similar to radial spines. Flowers vary in size from about 3 or 4 cm to 7 or 8 cm long, opening to about 7 cm, when fully open, white flushed pink. Fruit is almost globular, about 2 cm in diameter or larger, green with paler green-edged scales.

There is some confusion in the literature in the past as to the occurrence of this

species in the wild, and its original reporting from Paraguay is thought to be in error. The more positive, recent findings point to northern Argentina, from Cordoba and San Luis provinces – see below.

Collectors' numbers referred here (as *G. multiflorum*) are WR 102; P6, 12, 12a-d, 182; WO53, 53a & b, 64; B17; JL 1a & b; WP89-068/091 (*brachyanthum?*), 069/091a (var. *brachyanthum*), 079/097e?, 083/112, 087/119 (var. *steineri*), 088/122, 093/122a.

In two recent, detailed papers Hans Till has erected firstly two new varieties. One is based on Backeberg's *G. grandiflorum*, which, in the recent *CITES Cactaceae Checklist* is referred to synonymy with *G. mostii*, so there is already a conflict of opinions here.

var. **grandiflorum*** (Backeb.) H. Till, a flat-globular, clear green stem with 9 to 12 ribs, 5 to 7 (to 9) radiating spines, 17 to 28 mm long, yellow, with one central spine on older plants. Flower is white, with pink tipped petals.

Reported from Argentina, Cordoba, south-east Sierra Grande, at 1400 m (4600 ft) altitude.

Collector's number referred here is HT 88-223.

var. **steineri*** H. Till, differing from the type in its more elongated stem and long, dense spines.

Reported from Argentina, Cordoba, Sierra Grande at 1850 m (6070 ft).

In this first paper a very short spined form was also reported of this variety, but the temptation to name it was commendably resisted.

But in a second paper in the Austrian serial publication devoted entirely to this genus, Neuhuber and Till go hook, line and sinker for a very expanded concept of *G. monvillei*, still seen as distinct from *G. multiflorum*.

Firstly they sweep in *G. achirasense*, *G. horridispinum* and *G. brachyanthum* as subspecies of *G. monvillei*. Secondly they erect several new varieties, and with an evident last-minute faint-heartedness one form. It is too early to assess other experts' opinion on this combination, but for the record, their concept of the species resolves as follows:

G. monvillei;

G. monvillei subsp. *monvillei* var. *grandiflorum*;

G. monvillei subsp. *monvillei* var. *steineri*;

G. monvillei subsp. *achirasense* (syn. *G. achirasense*);

G. monvillei subsp. *achirasense* var. *achirasense* fa. *villamercedense* (from Argentina, San Luis, near Juan Llerena at 900 m; collector's reference GN88-79/197);

G. monvillei subsp. *achirasense* var. *chacrasense* (Argentina, San Luis, Las Vertientes, 1050 m; GN90-269/859);

G. monvillei subsp. *achirasense* var. *echinatum* (Argentina, San Luis, Sierra de San Luis, near El Durazno, at 1000-1200 m; GN91-346/1186);

G. monvillei subsp. *achirasense* var. *kainradiae* (Argentina, San Luis, Sierra de San

Plates

73. *G. moserianum* P118

74. *G. mostii* SPI 134/74

75. *G. mostii* in habitat, 35 km north of Cordoba airport, south of La Granja, Argentina

76. *G. mostii* var. *kurtzianum*

73	75
74	76

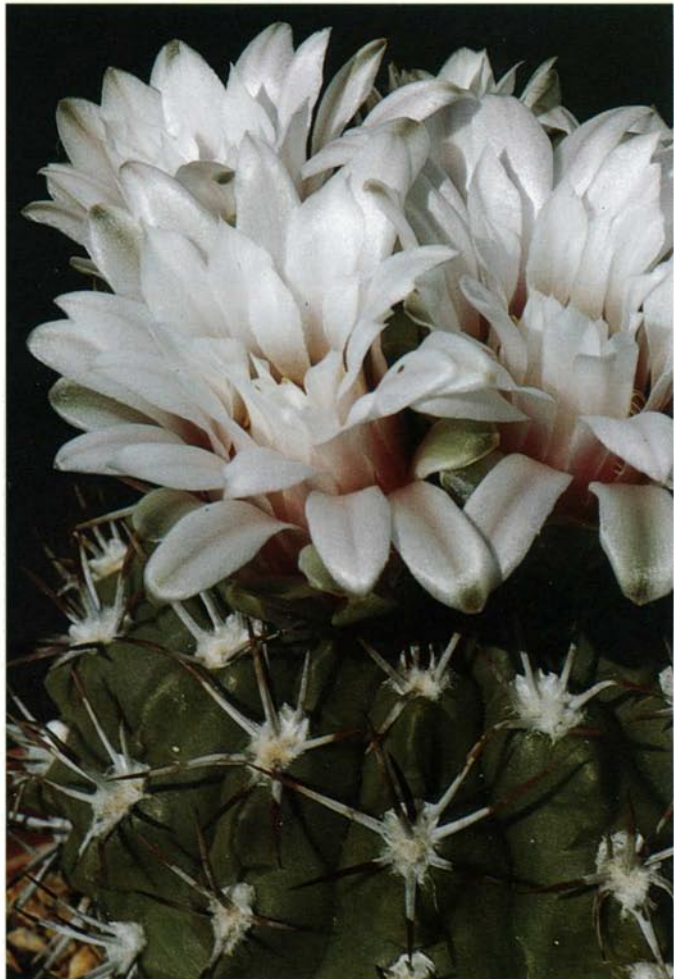
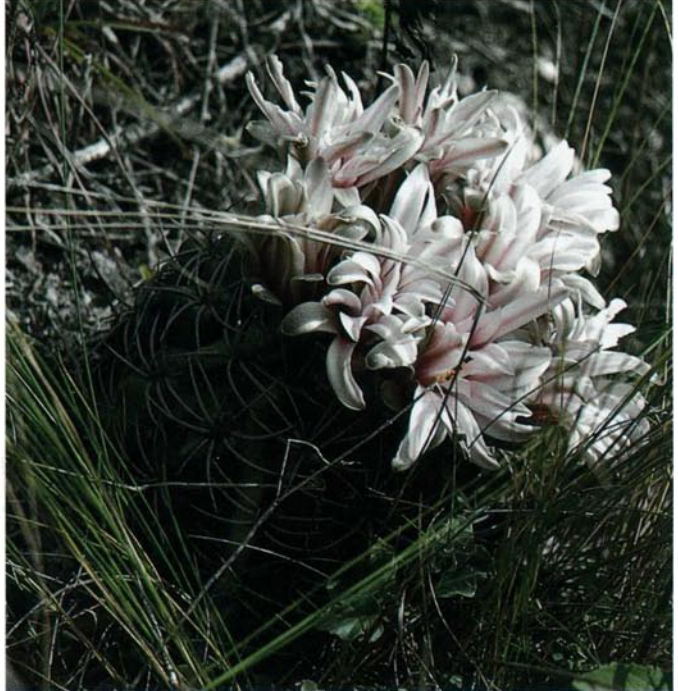






Figure 61.
G. moserianum

Luis, near Coronel Pringles, at 1300 m; GN 88-29/47);

G. monvillei subsp. *achirasense* var. *orientale* (Argentina, Cordoba, near Alpa; GN91-341/1 157);

G. monvillei subsp. *brachyanthum* (syn. *G. brachyanthum*) (Argentina, San Luis, near Suyuque, 1320 m; GN91-7711 183);

G. monvillei subsp. *brachyanthum* var. *gertrudae* (Argentina, San Luis, Sierra de San Luis, near Coronel Pringles at 1300 m; GN 88-29/50);

G. monvillei subsp. *horridispinum* (syn. *G. horridispinum*).

Till defers judgement on the placing of *G. schuetzianum*, probably to be sunk here, pending field study.

While the combination of these species does wonders for the new broom of taxonomy which sees a broader concept of species, there is a disturbing move in the other direction in the creation of so many lower taxa for minor differences.

G. moserianum Schütz, Kaktusy 66, 28, 47 (1966); Succulenta 46(3):33, 37 (1967); Strigl, Kakt. u.a. Sukk. 23(9):240-3 (1972); Haage in Backeb., Cact. Lex. (Engl. ed.) 190 (1978); Putnam, Gymnocalyciums 43-4 (1978); Meregalli, Piante Grasse

Plates

77. *G. multiflorum*

78. *G. netrelianum*

79. *G. netrelianum* (pink flowered form)

80. *G. nigriareolatum* in habitat, near Cuesta El Portezuela

81. *G. obductum* P121

82. *G. occultum*

77	78
79	80
81	82

5(1):1985; Schütz, Monogr. Gymno. 95(1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. intertextum*). Fig. 61, Plate 73.

Schütz's *Trichosemineum*;
Buxbaum's Series *Quehliana*

The latest recommendation as regards this species is that it is synonymous with *G. intertextum*, not a well-known species, and one which was vaguely reported from northern Argentina, and invalidly described by Backeberg in the first place. It is difficult to understand the confidence with which it is so referred.

G. moserianum is described as flat-globular, to 15 cm wide, 10 cm tall, dark green, with about 10 low ribs. Areoles are round to oval, about 3 or 4 mm wide, 20 mm apart, with white wool. Spines are all radial, 3 to 5 in number, to 25 mm long, somewhat thin and twisting this way and that, untidily, brownish-white, darker brown at the base. Flowers are white, about 3 cm long and wide, with red throat.

Reported from Argentina, northern Cordoba, near Serrezuela; Cordoba, Salsacate; Cordoba, Villa de Soto at 700 to 800 m (2300 to 2625 ft) ; Cuesta la Higuerra at 800 m altitude.

Collectors' numbers referred here are WR 567; P 81, 81a, 90; WO 92; (B 56, 197 ?); JL 171, 268.

G. mostii (Guerke) Britton & Rose, Addisonia 3:5 (1918); Guerke, Monatsschr. f. Kakteenk. 16:11(1906) – as *Echinocactus mostii*; B. & R., The Cact. 3:158, Pl. 17 Fig. 2 (1922); Backeb., Die Cact. 3:1761, Fig. 1693 (1959); Kakteenlex. 171 (1966); Cact. Lex. (Engl. ed.) 190 (1978); Putnam, Gymnocalycium 44 (1978); Bercht, Succulenta 62(5):100-4 (1983); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 96

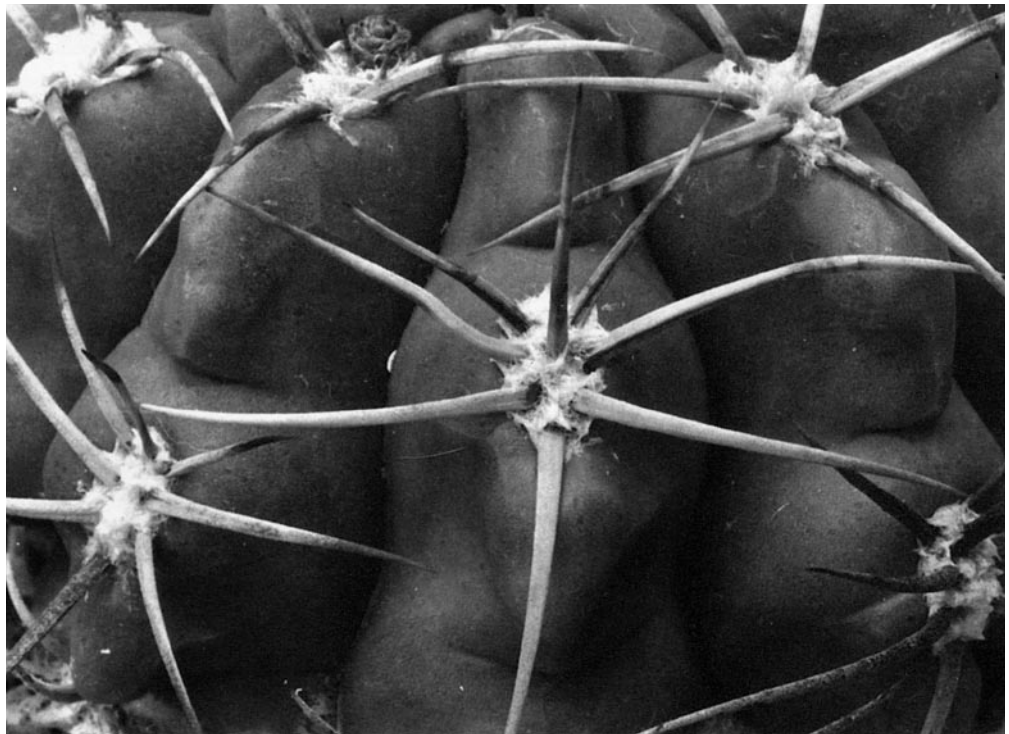


Figure 62.
G. mostii

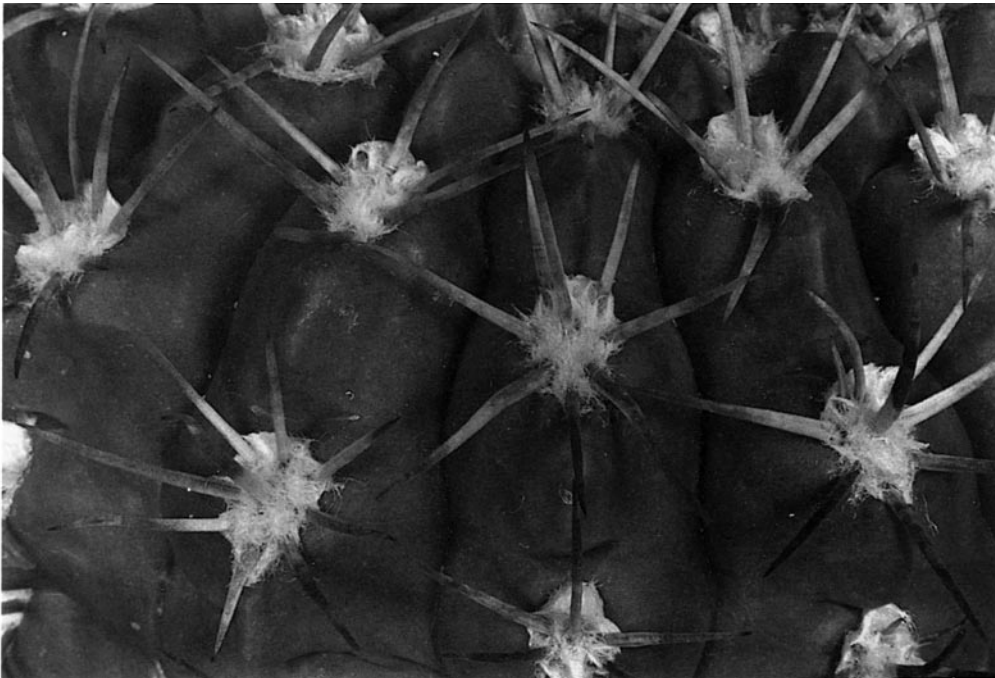


Figure 63.
G. mostii var. *kurtzianum*

(1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (accepted species). Figs 3, 62 and 63, Plates 74-76.

Schütz's Subgenus *Microsemineum* Section *Hybopleura*;
Buxbaum's Series *Mostiana*

A large, strongly spined species, this makes a solitary, flat-globose plant, 6 to 7 cm tall, to 13 cm wide, dark green, with 11 to 14 low ribs, usually strongly tubercled. Areoles are oblong, about 9 mm long, 6 mm wide, with greyish-white wool. Radial spines number 7 to 11, varying from 6 to 22 mm long, strong and curving, from yellowish-brown with darker brown tips in youth to grey later. Central spines are 1 or occasionally 2 in number, to about 20 mm long. Flowers are large, rose-pink, to 8 cm long and wide when fully open. Fruit is ovoid, slate blue green, 2 cm long, 1.5 cm wide.

Reported from Argentina, province Cordoba at 900 m (2950 ft), at Cassafouth; Cordoba, Sierra Chica, La Falda; Copina at 1250 m (4100 ft) altitude.

Collectors' numbers referred here are FR 438, 1104; WR100; P 84, 200, 201; WO 68, 69; B 9; DV 94; JL 45, 47; WP89-089/123, 109/144.

The former species *G. kurtzianum* has been reduced to varietal status beneath this species as follows:

var. **kurtzianum** (Guerke) Backeb., Kaktus ABC 292 (1935); Guerke, Monatsschr. f. Kakteenk. 16:55(1906) – as *Echinocactus kurtzianus*; B. & R., The Cact.3:163, Fig. 174 (1922) – as *G. kurtzianum*; Backeb., Die Cact. 3:1761, Fig. 1694 (1959); Kakteenlex. 171 (1966); Cact. Lex. (Engl. ed.) 191 (1978); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. mostii*)

This is a handsome, more strongly spined variety of the species, with usually 8 radial spines and one strong central spine curving up towards the crown. Flowers are large, white with red throat.

Reported from Argentina, Cordoba.

Collectors' numbers referred here are WR 100, B 70.

G. mucidum* Oehme, Kakt. u.a. Sukk. 1937(12):197 (1937); Backeb., Die Cact. 3:1767 (1959); Kakteenlex. 171 (1966); Cact. Lex. (Engl. ed.) 191 (1978); Meregalli, Pianta Grasse 5(1):1985; Schütz, Monogr. Gymno. 97 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. mazanense*)

Schütz's Subgenus *Microsemineum* Section *Mazanensia*;
Buxbaum's Series *Mostiana*

Considered to be at most a form of *G. mazanense* (or by Metzging to be close to *G. ferrarii* and *G. glauca*), this species crops up from time to time in commercial lists. The description is given for the record: flat-globose, reddish-grey or greyish-purple, with 12 ribs, acute tubercles, and oblong areoles with grey wool, 10 to 15 mm apart. There are 5 to 7 radial spines, 1 to 2 cm long, grey, horn coloured in youth. Flowers are 4 to 4.5 cm long, 4.5 to 5 cm wide, pinkish-yellow.

No locality was cited.

G. multiflorum (Hooker) Britton & Rose, Addisonia 3:5 (1918); Hooker, Curtis Bot. Mag. 71: Fig. 4181 (1845) – as *Echinocactus multiflorus*; B. & R., The Cact. 3:159, Pl. 18 Fig. 3 (1922); Backeb., Die Cact. 3:1748, Figs. 1678-9 (1959); Kakteenlex. 171 (1966); Cact. Lex. (Engl. ed.) 191 (1978); Putnam, Gymnocalyciums 44-5 (1978); Meregalli, Pianta Grasse 5(1):1985; Schütz, Monogr. Gymno. 97 (1986); H. Till, Arbeitsgr. Gymno. Österreich. Kakteenfr. 3(3):33-40 (1990); Hunt (ed.), CITES Cact. Checklist 67 (1992) (provisionally accepted species). Fig. 64, Plate 77.

Schütz's Subgenus *Microsemineum* Section *Hybopleura*;
Buxbaum's Series *Horridispina*

Although there have been strong moves to reduce this species to synonymy beneath the

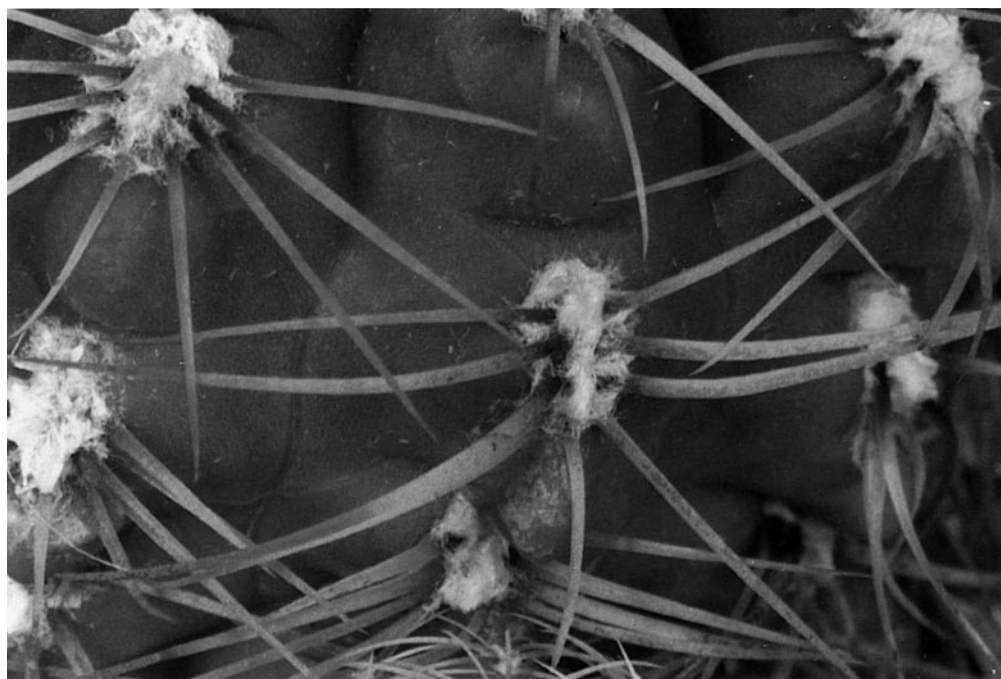


Figure 64.
G. multiflorum

prior *G. monvillei*, there have been equally strong arguments put forth for retaining both as good species.

As generally applied, plants grown as *G. multiflorum* are light green, large-growing to 20 cm or more, with long, golden-yellow, curving spines, and white flowers sometimes reluctantly produced in cultivation until the plant has reached a considerable size, giving the lie to the name 'multiflorum'. But it has been well argued that the application of this name to plants like this is in error, and certainly there are discrepancies between them and the original descriptions and illustrations of this species. These large-growing, golden spined plants should be properly called *G. monvillei*.

G. multiflorum is a smaller stemmed species, to about 10 cm in diameter, readily clustering and flowering freely with showy white flowers flushed pink. Spines number about 7 to 10 and are shorter and thinner than *G. monvillei*, pale yellow, purple at base.

Its occurrence in the wild has long been a source of confusion, amplified by the misapplication for many years of the name, and not helped by its vague reporting in the past, viz. by Britton and Rose from Brazil, Paraguay, Uruguay and Argentina, by Backeberg from Argentina, and latest by the *CITES Cactaceae Checklist* from Uruguay and Argentina. And the same considerations apply to field collection lists, i.e. it depends on the individual's views of the identity of these two species (*G. monvillei* and *G. multiflorum*); see field numbers under *G. monvillei*.

It seems that it probably occurs only in Argentina, probably in the same area as its cohort, in Cordoba and San Luis.

G. neocumingii (Backeberg) PC. Hutchison, *Cact. Amer.* 29(1):14 (1957)

A brief amalgamation of this and several other species of *Weingartia* with this genus, not accepted by any other authority or the cactus fraternity.

G. netrelianum (Monville) Britton & Rose, *The Cact.* 3:154, Fig. 160 (1922); Monville in Labouret, *Monogr. Cact.* 248(1853) – as *Echinocactus netrelianus*; Backeb., *Die Cact.* 3:1735-7, Fig. 1670 (1959) – as *G. leeanum* var. *netrelianum*; *Kakteenlex.* 169 (1966) – as *G. leeanum* var. *netrelianum*; Frank, *Kakt. u.a. Sukk.* 21:62 (1970); Haage in Backeb., *Cact. Lex. (Engl. ed.)* 191 (1978); Schlosser & Schütz, *Kakt. u.a. Sukk.* 33:88 (1982); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 98 (1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (provisionally accepted species). Fig. 65, Plates 78 and 79.

Schütz's *Macrosemineum* Section *Denudata*;

Buxbaum's Series *Uruguayenses* Subseries *Uruguayenses*

This is the preferred name for what is generally grown in cultivation as *G. leeanum*, since the latter name has been wrongly applied (see discussion under *G. leeanum*).

It is described as solitary or sometimes clustering (it usually clusters in cultivation), globular or flat-globular with depressed centre, 3 cm in diameter (it attains some 7 or 8 cm usually in cultivation), with about 14 ribs (usually less in *G. uruguayense*), broad and rounded, green to somewhat glaucous. Spines number 5 to 8, all radial, brownish to yellow, bristle-like (unlike the stronger spination of *G. uruguayense*), less than 1 cm long. Flowers are pale yellow, 5 cm long. Fruit is green, almost globular, about 1 to 1.5 cm in diameter. Seed is large, dark brown to black.

Reported from Uruguay.

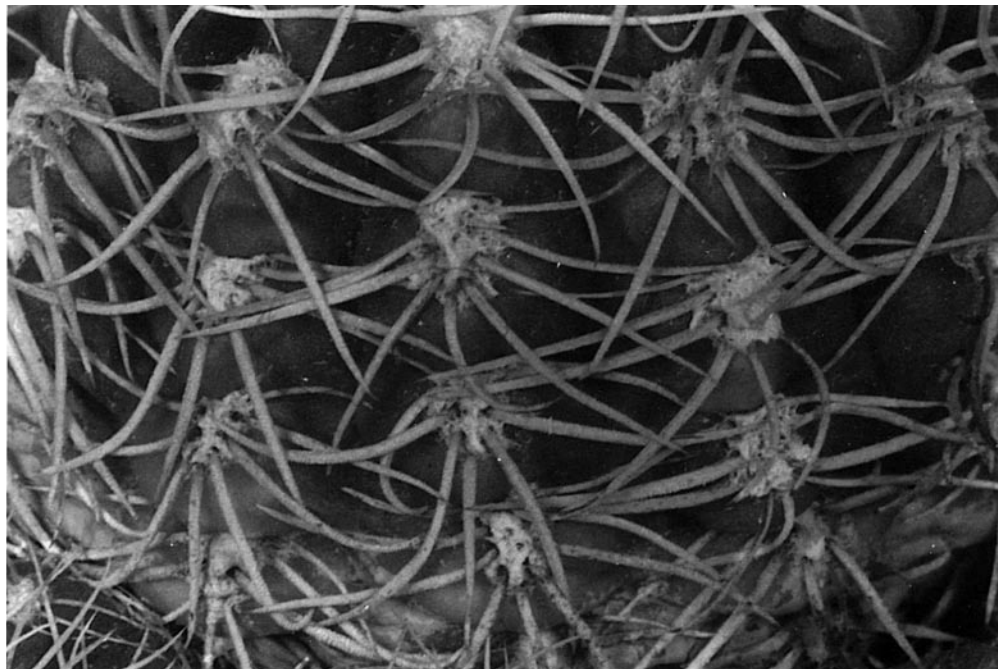


Figure 65.
G. netrelianum

Collectors' numbers referred here (usually as *G. leeanum* in the original listing) are Schl 103?, 104?, 113a, 119?, 120?, 122?, 124?, 126?, 127?, 128?, 129?, 131?, 132?, 136?, 138?; DV 53; KK 153.

G. neuhuberi* H. Till & W. Till, Arbeitsgr. Gymno. Osterreich. Kakteenfr. 1(5): 59-60 (1992)

Schütz's Subgenus *Gymnocalycium* (*Ovatisemineum*);

Buxbaum's Series *Gymnocalycium* (Baldiana)

At the time of going to press this is the most recently described species. It is a beauty, with strong, yellowish spines like *G. monvillei*, and gorgeous, deep pink flowers.

It is described as solitary, flat-globular, with greyish-green body, having 9 to 12 ribs, growing to nearly 5 cm tall, 7 cm wide. Spines are strong, straight to a little curved, 9 radially placed, the lower 5 longer, 15 to 20 mm, the upper 4, 11 to 12 mm. Young plants have one central spine, later there are 4, stronger than the radials. All spines are yellow, rarely dark yellow to brown. Flowers appear near the apex, from young areoles, short funnel-shaped, to 36 mm long, 34 mm wide, or rarely larger, lilac-pink. Fruit is dark green, egg-shaped, 15 to 18 mm long, 10 to 12 mm wide. Seed is black, subcylindrical, 1.2 mm long and about 1 mm in diameter.

Although in its description it is allocated to the subgenus *Gymnocalycium* (syn. *Ovatisemineae*), it is thought to be more closely related to *G. monvillei*, which would make this an anomaly.

Reported from Argentina, San Luis, in the southern part of the mountains of the Sierra de San Luis.

Collectors' numbers referred here are GN 88-77/189; LB 276, 289.

G. neumannianum (Backeberg) PC. Hutchison, *Cact. Amer.* 29(1):11(1957)

A combination made with several other *Weingartia* species by Paul Hutchison, but not accepted by any authorities or the cactus fraternity.

G. nidulans* Backeberg, *Kaktus ABC* 293, 417 (1935); *Die Cact.* 3:1768, Fig. 1704 (1959); *Kakteenlex.* 171 (1966); *Cact. Lex. (Engl. ed.)* 191 (1978); Aerschot, *Succulenta* 52(2):37 (1973); Strigl, *Kakt. u.a. Sukk.* 23(9):240-3 (1972); Putnam, *Gymnocalyciums* 45 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 99 (1986); Schweitzer, *Gymnos* 8(15):19, Fig. 2(1991); Hunt (ed.), *CITES Cact. Checklist* 67(1992) (syn. *G. mazanense*). Plate 53.

This is a very spiny form of *G. mazanense*, which is now referred by Metzinger, with that species too, to synonymy with *G. hossei*, along with *G. weissianum* and probably *G. guanchinense* for good measure – see under *G. hossei*.

G. nigriareolatum Backeberg, *Blatt. f. Kakteenk.* (1934-35); *Die Cact.* 3:1759, Fig. 1691 (1959); *Kakteenlex.* 171 (1966); *Cact. Lex. (Engl. ed.)* 191 (1978); Putnam, *Gymnocalyciums* 45-6 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 100 (1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (accepted species). Fig. 66, Plate 80.

Schütz's Subgenus *Microsemineum* Section *Mazanensia*;

Buxbaum's Series *Mostiana*

Described as solitary or sparingly offsetting, to 15 cm tall and wide, blue green body colouring, with 10 ribs, sharply angled, with small chins. Areoles are oblong, at first

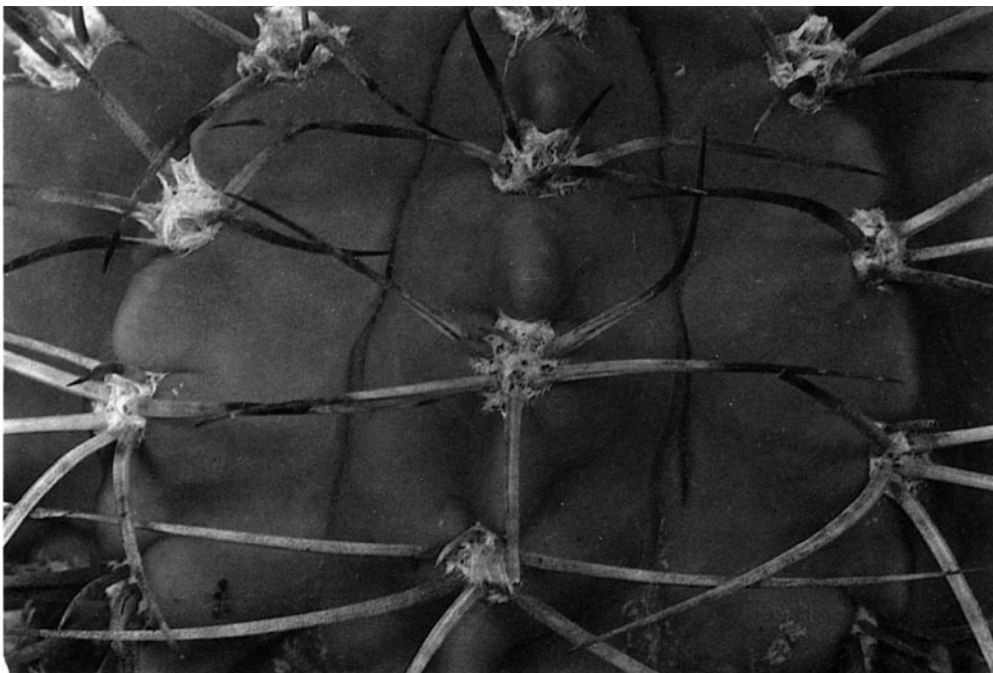


Figure 66.
G. nigriareolatum



Figure 67.
G. obductum

with yellowish-brown wool, becoming grey or black with age. Radial spines number 7 or 8, pinkish-grey, to 3 cm long, straight to somewhat curving. Central spine is solitary, similar, somewhat longer, with darker tips. Flowers are 'porcelain white', with greenish sepals. Fruit is bluish.

Reported from northern Argentina, Catamarca, Andalgalá; by Piltz possibly from Dique de Catamarca at 600 to 800 m (1970 to 2625 ft) (P 24), Cuesta de Portezuela at 800 to 1500 m (2625 to 4920 ft) (P 130), and Palo Labrado at 700 m (2300 ft) altitude.

Collectors' numbers referred here are Lau 512, 513; WR 144; P24, 130, 132, 159; B 115?, 150?; JL 33, 34, 35, 210, 211.

var. **densispinum*** Backeberg, Kat. 10 J. Kaktfrschg. 16 (1937); Die Cact. 3:1759 (1959)

This variety differs in having up to 15 ribs, denser, thinner and longer spines. It is not here recognised as more than a variant of the type.

G. nigrum Hort. Plants seen under this name are usually referable to *G. gibbosum* var. *nigrum*, a dark bodied and dark spined variety of this species.

Plates

83. *G. ochoterenai*

84. *G. oehmianum* nom. nud.

85. *G. oenanthemum*

86. *G. paediophyllum*

83	84
85	86





G. obductum Piltz, Succulenta 69(4):74-78 (1990); Mergalli, Piante Grasse 5(1):36 (1985); Gymnos 8(15):1-5 (1991); Hunt (ed.), CITES Cact. Checklist 67 (1992) (provisionally accepted species). Fig. 67, Plate 81.

Schütz's Subgenus *Trichomosemineum*;

Buxbaum's Series Quehliana

One of the most recent species to be described, this is one of those flat, grey-brown bodied plants, which are among the most slow-growing in the genus. Piltz compares it to *G. ragonesei*, of similar habit, but with several differences.

It is described as solitary, with dull reddish to grey-brown body colour, flat-globular to 7 cm wide and 6 cm tall, with 13 to 15 flattish ribs, sunken areoles with whitish wool. The 3 to 5 spines are all radial, brown, darker at base, fitting close to the body, thin and flexible, 5 mm or so long. Flowers are dirty pinkish-white, just over 1 cm long, 6 mm broad. Fruit is blue-grey, to 18 mm long, globular to egg-shaped.

Reported from Argentina, Cordoba, east of Salinas Grandes at 300 m (980 ft) altitude.

Collector's number referred here is P 121.

G. occultum Fric ex Schütz, Friciana I-Zprav C.7:4-5, 8(1962); Backeb., Kakteenlex. 171 (1966); Cact. Lex. (Engl. ed) 191 (1978); Putnam, Gymnocalyciums 46 (1978); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 100 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (provisionally accepted species). Fig. 68, Plate 82.

Schütz's Subgenus *Trichomosemineum*;

Buxbaum's Series Quehliana

This species is distinct enough in appearance to ensure its retention in collections, and it makes a lovely member of this low-growing, greyish-brown group that collectors much admire. It is flat-globose, low growing, to about 7 cm wide (to 9 cm in cultivation), and barely more than 3 or 4 cm tall or less, with 11 or 12 ribs, more acute than other close relatives, grey-brown to olive greenish-brown. Spines are all radial, 3 to 5 in number, no more than about 10 mm long, brown, blackish-brown at base, curving back on the body, stiff, not flexuous. Flowers are white with pinkish-red throat, about 3 cm long and wide.

Reported from Argentina, province Cordoba; by Piltz from Tres Puentes at 700 m (2300 ft), Catamarca, Sierra Ambato at 1000 m (3280 ft) and 1300 m (4260 ft) altitude.

Collectors' numbers referred here are P 131, 131a & b; JL 9, 53.

G. ochoterenai Backeberg & Knuth, Kaktus ABC 293, 417 (1935); Die Cact. 3:1728, Figs. 1664-5 (1959); Kakteenlex. 171 (1966); Cact. Lex. (Engl. ed.) 191 (1978);

Plates

87	88	87. <i>G. paraguayense</i> SPI 193/74
		88. <i>G. pflanzii</i> (<i>marquezii</i>)
89	90	89. <i>G. pflanzii</i> (<i>comarapense</i>)
		90. <i>G. pflanzii</i> (<i>riograndense</i>)
91		91. <i>G. pflanzii</i> (<i>zegarrae</i>)



Figure 68.
G. occultum

Putnam, *Gymnocalyciums* 46 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 101 (1986); H. Till & Neuhuber, *Arbeitsgr. Gymno. Osterreich. Kakteenfr.* 4(5):71-76 (1992); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (provisionally accepted species); W. Papsch, *Arbeitsgr. Gymno. Osterreich. Kakteenfr.* 5(4):71-76 (1992); & 6(1):77-82 (1993). Fig. 69, Plate 83.

Schütz's Subgenus *Trichomosemineum*;
Buxbaum's Series *Quehliana*

Described as flat-globular, olive-green to brownish, with about 16 broad and flat ribs. Spines are all radial, 3 to 5 in number, recurving to the body, about 10-15 mm long, brownish-yellow to whitish-yellow, tipped dark brown. Flowers are white with pale pink throat, about 3.5 cm long. Fruit is green to dull red, barrel-shaped, about 2 to 3 cm long, 1.5 to 2 cm wide.

Reported from Argentina, La Rioja, Sierra de Velasco, and at Chilecito, San Luis.

After erecting just one variety in *Die Cactaceae* (var. *cinereum*) Backeberg went on to indulge himself in three more in his *Cactus Lexicon*, (var. *polygonum*, var. *tenuispinum*, var. *variispinum*) with explanations of the variability of the species accompanying them, which contradicted the wisdom of setting up of the varieties, especially as they were apparently not based on geographical variation, but more on the different appearance among a batch of collected plants. Collectors' numbers referred here are Lau 512(var. *polygonum*), 513, 581; WR 111; P31; LB 322, 367, 378, 381, 383, 386, 389 (var. *cinereum*), 467, 468, 469 (var. *cinereum*), 471, 472; WP89-082/109?

Hans Till and Neuhuber have recently endorsed Backeberg's var. *cinereum*, because of its uniformity, and erected in addition var. *scoparium* and subsp. *herbsthoferianum*.

var. **scoparium*** H. Till & Neuhuber, differs in its globose to elongated-globose body habit, with its tubercles arranged in acute ribs, and with spines longer, more bristle-like than the type and porrect (standing out from the body).



Figure 69.
G. ochoterenai

Reported from Argentina, San Luis, near Lujan at 650 m (2130 ft) altitude.

Collectors' numbers referred here are GN 88-98/242; LB 383.

subsp. **herbsthoferianum*** H. Till & Neuhuber, differs from the type in having 6 or 7 strong, pectinate, radial spines, and one, similar central spine, as well as a shorter flower with subglobose ovary.

Reported from Argentina, San Luis, near Lujan at 650 m (2130 ft) altitude.

Collectors' numbers referred here are GN 88-100/250; LB 386.

With the known variability of this species, these taxa must be regarded with suspicion.

In a further part of the treatment of this species in the Austrian based *Gymnocalycium* study group, Wolfgang Papsch has amalgamated *G. vatteri* at subspecific level, and erected a new variety beneath it, viz. *G. ochoterenai* subsp. *vatteri* var. *altautinense*. Neither the amalgamation of *G. vatteri* nor the new variety are acknowledged here, the latter especially in view of the known variation of *G. vatteri*.

G. odoratum Hort., Meregalli, *Piante Grasse*5(1):36-37 (1985)

This is a catalogue name, which Meregalli compares to *G. hyptiacanthum*. Plants grown by the author have no unusually distinguishable scent!

G. oehmeanum Hort. Plate 84.

This is a persistent catalogue name. Plants grown from seed are flat-globose, with 6 or 7 rounded ribs, and 5 thin, flexible, yellowish-grey spines, about 20 mm long. Flowers are large, ivory-white. Seed is *Macrosemineum* type. Its origins are obscure.

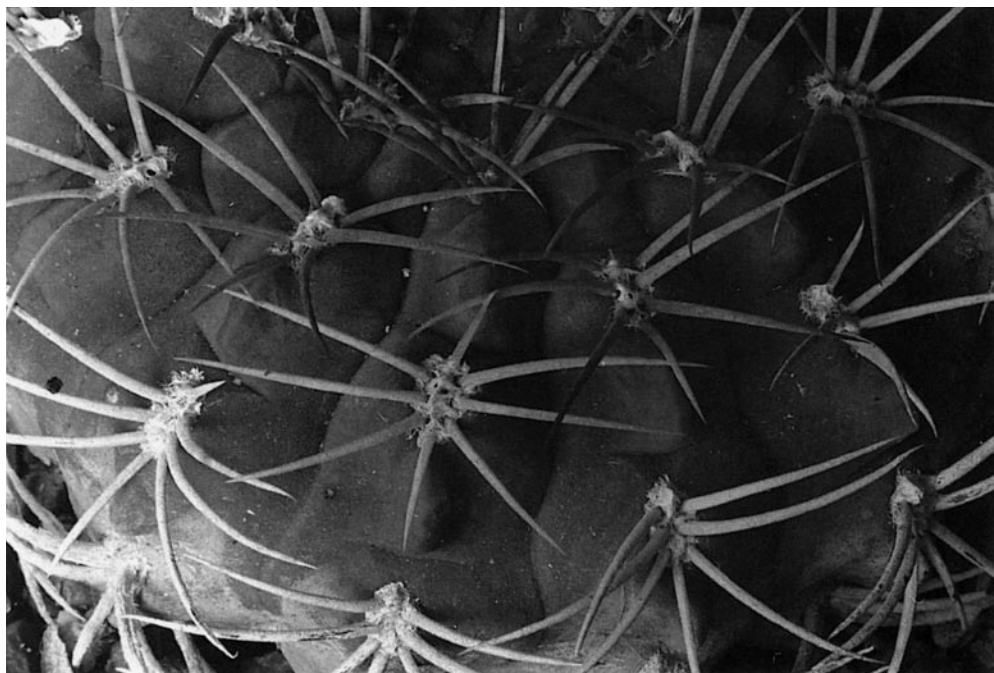


Figure 70.
G. oenanthemum

G. oenanthemum Backeberg, Blatt. f. Kakteenfr. 1934:9 (1934); Kaktusar, August (1934); Die Cact. 3:1752, Fig. 1682 (1959); Kakteenlex. 172 (1966); Cact. Lex. (Engl. ed.) 192 (1978); The Chileans 7(26):69 (1973); Putnam, Gymnocalyciums 46 (1978); Ritter, Kakt. Südamer. 2:474 (Fig. 568) (1980); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 103 (1986); Milt, Gymnos 8(15):26-32 (1991); Hunt (ed.), CITES Cact. Checklist 67 (1992) (accepted species). Fig. 70, Plate 85.

Schütz's Subgenus *Microsemineum* Section *Hybopleura*;
Buxbaum's Series *Mostiana*

This is one of the very few red-flowered species in the genus, from the same area as *G. carminanthum* and *G. tillianum*, which differ from each other only a little. This is the prior name, and it is significant that in the recent *CITES Cactaceae Checklist* it is the only one of the three which is classified as an accepted species.

In marginal notes I have of Volume 3 of Backeberg's *Die Cactaceae*, which formerly belonged to Friedrich Ritter, he (Ritter) somewhat amends Backeberg's description of this species based on his collections of it in Catamarca. For interest, Ritter's amendments are included below in brackets.

It is described as flat-globular, solitary, dull grey-green or blue-green, to 12 cm wide, 8 cm tall, with 11 to 13, sharply angled ribs (12 to 18 according to Ritter). Areoles are oblong, with yellowish wool at first, later grey. Radial spines number 5 (3 to 8, Ritter), translucent, reddish-grey with dark brown tips, straight to slightly curved, to 15 mm long. Central spines are absent (occasionally one is present, similar to the radials, Ritter). Flowers are shining, wine-red or pinkish-red, 5 cm long, to about 4 cm wide. Fruit is clear green or dark green.

Reported from Argentina, vaguely by Backeberg from Mendoza; by Ritter from Catamarca, and by Piltz from La Rioja, Sierra de Velasco at 1400 m (4590 ft) altitude.

Collector's number referred here is WR 720.

G. onychacanthum* Y. Ito, Expl. Diagr. 292, 173 (1957); Kakteenlex. 172 (1966); Cact. Lex. (Engl. ed.) 192 (1978); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 103 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. marsoneri*)

Referred to *G. megatae* (and thence according to the recent *CITES Cactaceae Checklist* to *G. marsoneri*).

G. ourselianum* (Monville) Y. Ito, Expl. Diagr. 178 (1957); Backeb., Die Cact. 3:1749-50, Fig. 1681 (1959); Schütz, Monogr. Gymno. 104 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. multiflorum*)

Long referred to *G. monvillei*.

G. paediophylum Schütz, Kaktusy 13:100 (1977); Haage in Backeb., Cact. Lex. (Engl. ed.) 192 (1978); Putnam, Gymnocalyciums 46-7 (1978); Ritter, Kakt. Südamer. 1:269, Fig. 215 (1979) – as *G. paediophilum*; Bercht, Succulenta 62(6):118-20 (1983); Metzger, Kakt. u.a. Sukk. 37(10): 28-9 (1986); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 104 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (accepted species). Fig. 71, Plate 86.

Schütz's Subgenus *Microsemineum* Section *Mazanensia* ? (probably warrants a new section or even subgenus);

Buxbaum's Series *Chiquitana*

This very recently described species is now getting into cultivation from seed and seedlings offered commercially, but it does seem to present some difficulties in cultivation, being not too tolerant of temperatures below 7–10°C. It is described as

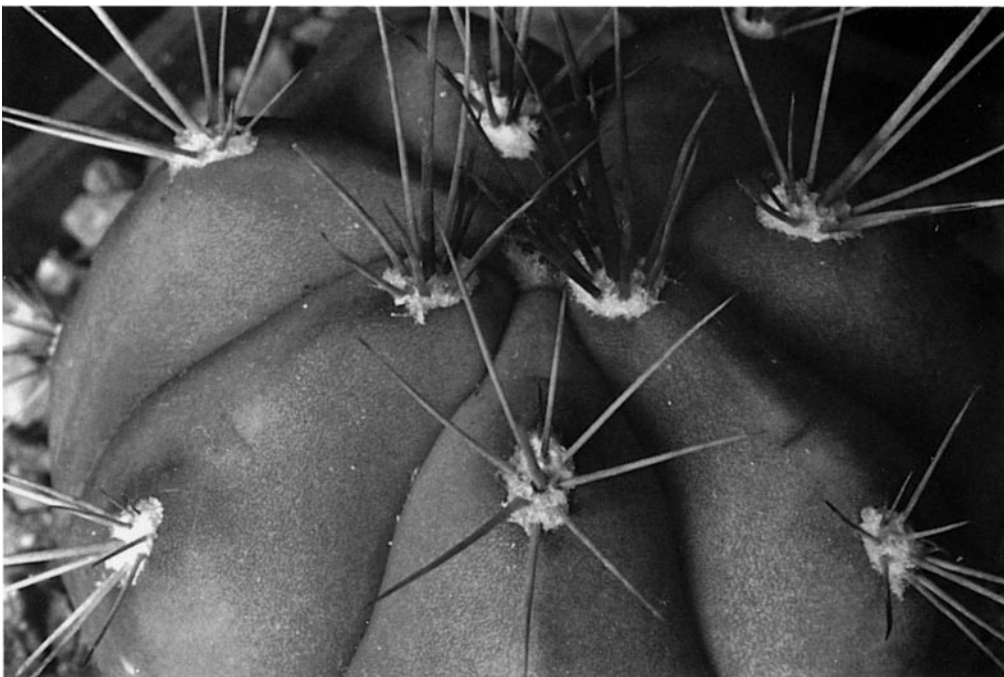


Figure 71.
G. paediophylum

clustering, with green stems, 5 to 8 cm wide, becoming eventually 2 or 3 times as tall, with 6 to 10 ribs. It seems to remain solitary in cultivation until it has become some 10 cm or so tall, when it starts to cluster around the base. Areoles are round, 3 to 5 mm wide, with brownish wool. Radial spines number 5 to 7, 8 to 30 mm long, the lower being the stronger and the longer, brown, awl shaped and straight. There is one central spine, stronger than the radials, 15 to 25 mm long, with sometimes two smaller, thinner central spines at the upper part of the areole. Flowers appear at the apex, 4.5 to 6 cm long, opening wide, almost flat to about 5 or 6 cm wide, scented and very pale red (amounting to pink). Fruit is green to blue-green, 10 to 18 mm long, 7 to 15 mm wide.

Meregalli relates it most closely to *G. chiquitanum*.

Reported from Paraguay, Department Boqueron, Cerro Leon.

Collector's number referred here is FR 1177 (not as sometimes indicated, FR 1179, which applies to *G. damsii*).

G. paraguayense (K. Schumann) Schütz, Friciana 6/40 (1966) & 8/47 (1972); K. Schum., Bull. de l'Herbier Boissier 203 (1903) – as *Echinocactus paraguayensis*; Succulenta 50(6):104-6 (1971); Putnam, Gymnocalyciums 47 (1978); Bercht, Succulenta 62(3):51-4 (1983); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 105 (1986); Metzinger, Gymnos 6:18-21(1989); Metzinger, Arbeitsgr. Gymno. Österreich. Kakteenfr. 2(2):13-18 (1989) Bercht, Gymnos 9(17):13-16 (1992); Hunt (ed.), CITES Cact. Checklist 67 (1992) (accepted species). Fig. 72, Plate 87.

Schütz's Subgenus *Macrosemineum* Section Paraguayensia;

Buxbaum's Series Uruguayenses Subseries Denudata

Schütz maintains this species separately from *G. denudatum*, where it has previously been associated, placing it along with *G. fleischerianum* in a different section; both are



Figure 72.
G. paraguayense

reported from Paraguay, while *G. denudatum* and the like are reported from Uruguay and Brazil. Plants in cultivation under the name *G. paraguayense* differ from *G. denudatum* with their more prominent ribs, more tubercular rib structure, and more outstanding spines.

G. paraguayense is solitary, about 5 to 8 cm in diameter, flat-globular at first, later more or less globular, and clustering slowly, with green shining epidermis, some 7 to 12 ribs, deeply divided into prominent tubercles as the plant matures, jutting below the areoles, less so in youth. Areoles are prominent, roughly circular with pale brownish yellow wool. Spines are all radial, 3 to 5 in number, spreading straight to a little curving, pale brownish-yellow, tipped darker brown. Flowers are white with purplish-pink throat, about 2 in (5 cm) long and wide.

Four varieties (var. *roseiflorum*, var. *scheidelianum*, var. *wagnerianum*, var. *wieditzianum*) erected by Schütz are not mentioned in his monograph, and are best disregarded as minor variants.

Reported by Knoll from Paraguay, Paraguarí at 300 m (980 ft).

Collectors' numbers referred here are P 447, 452; WO 74; M 35, 40; A 50, 52, 86; LB 100, 106.

G. parvulum* (Spegazzini) Spegazzini, Nuev. Not. Cact. 61(1925); Cact. Plat. Tent. 505 (1905) – as *Echinocactus platensis parvulus*; Backeb., Die Cact. 3:1724 (1959); Kakteenlex. 172 (1966); Cact. Lex. (Engl. ed.) 192 (1978); Putnam, Gymnocalyciums 47 (1978); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 106 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. quehlianum*)

Referred to *G. quehlianum*, of which it seems to be just a small growing form.

G. pflanzii (Vaupel) Werdermann, Bluh. Kakt. Fig. 94 (1935); Vaupel, Zeitschr. f. Sukkf. 1:83 (1923) – as *Echinocactus pflanzii*; Backeb., Die Cact. 3:1772, Fig. 1706 (1959); Kakteenlex. 172 (1966); Cact. Lex. (Engl. ed.) 192 (1978); Donald, Nat. Cact. Succ. Jo. 26:96-100 (1971); Putnam, Gymnocalyciums 47-8 (1978); Ritt., Kakt. Südamer. 2:659 (1980); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 107 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (accepted species); Bates, Gymnos 10(19):3-6 (1993). Figs 6 and 73, Plates 88-91.

Schütz's Subgenus *Pirisemineum*;

Buxbaum's Series *Pflanziana*

There is little doubt that this species embraces the several specific names erected for differing forms of it found in the same broad area, viz. *G. chuquisacanum*, *G. comarapense*, *G. izozogsii*, *G. lagunillasense*, *G. marquezii*, *G. millaresii*, *G. riograndense* and *G. zegarrae*. And although they have been reduced to varietal or form status beneath *G. pflanzii*, there is little justification for retaining them at any level for what is clearly a widespread variable species. Ritter recognized one variety on the basis of fruit colour difference, *G. pflanzii* var. *albipulpa*, under which he sank *G. zegarrae* (reduced already by Donald to varietal rank, as *G. pflanzii* var. *zegarrae*, which invalidated Ritter's choice of a new name).

Hans and Walter Till (Kakt. u.a. Sukk. 12(12):273-277 (1988) have recently taken an old varietal name invalidly erected by Backeberg, and validated it, describing it in considerable detail, viz. *G. pflanzii* var. *argentinese*, but this seems to have no more validity than those mentioned above, and in view of the proliferation of names already



Figure 73.
G. pflanzii

under this species, it is considered here inappropriate to recognize any, since the differences are insignificant, and to recognize one begs the question of recognizing them all.

It is generally a solitary species, later sometimes clustering from the base. The body in the wild is said to get to as much as 50 cm (over 18 ins) wide (but there have been doubts cast on this reporting). In cultivation it is rarely seen at more than 15 cm or so broad, 6 to 8 cm tall. It is a dull, yellowish to olive green, sometimes tinted purple, with 8 or 10 ribs, or more when larger, with fat, rounded tubercles obscuring the rib formation. Areoles are long-oval with white wool. Radial spines number 6 to 9, curving, strong, stiff, pinkish-whitish-brown with darker tips, to 25 mm long, usually curving back strongly towards the body in a very characteristic way for the species. There is one, similar central spine. Flowers are short tubed, to 5 cm long and wide, pale whitish-pink to deep salmon pink (this often applying to the name *G. marquezii*), with deep violet red throat. Fruit is almost globose, reddish-purple, about 1.5 to 2 cm wide, splitting (unusually) transversely to spill out a sticky jam containing the seeds. The seeds are tiny, brownish-black, pear-shaped.

Reported from Bolivia, near Palo Marcado, east of Villa Montes; and extensively from Argentina, at Lumbreras, Province Salta, Jujuy at 600 m (1970 ft), Rio Juramento

Plates

92. *G. piltziorum*
 93. *G. piltziorum* in habitat, 10 km west of Schaqui, Argentina
 94. *G. platygonum*
 95. *G. pseudomalacocarpus*
 96. *G. pungens* SPI 97/72

	93
92	95
94	96





at 800 m (2625 ft), Yacuba at 1200 m (3940 ft), and from Paraguay, Boqueron at 450 m (1475 ft) (WO 50), to Bolivia, Valle Grande by the Rio Grande, Comarapa at 1200 m (3940 ft) , Potosi, Lagunillas, Sotormayor, and Millares, as well as from Bolivia, Santa Cruz, Cordillera, the Izozog basin, near El Atajado, at 400 m (1310 ft) altitude, growing on the edge of thorny forest on loose, sandy soil.

Collectors' numbers referred here are Lau 343, 938 (*G. marquezii*), 940, 942 (*G. izozogsii*), 946 (*G. lagunillasense*), 948 (*G. zegarrae*), 950 (*G. comarapense*), 951, 995 (*G. millaresii*), 995a (*G. millaresii*); WR 183 (*G. zegarrae*), 183a (*G. lagunillasense*), 183b (*G. riograndense*), 291 (*G. millaresii*); FR 29, 397, P 154, 240; KK 492, 519, 521 (*G. marquezii*), 523 (*G. pflanzii* var. *pilcomayense* nom. nud.), 524, 717 (*G. riograndense*), 828 (*G. marquezii*), 831 (*G. pflanzii* var. *argentinense*), 850 (*G. lagunillasense*), 857 (*G. lagunillasense* var. *camiri* nom. nud.), 1684 (*G. pflanzii* var. *tominense* nom. nud.), 1738 (*G. pflanzii* var. *microspermum* nom. nud.); WO 80; B 107 (*G. marquezii*); DV 49 (*G. zegarrae*); HU 310; JL 29.

G. pilicarpum nom. nud., Pazout, Ges. Ost. Kakt. Newsletter Jan-Feb. 1964, transl. The Chileans 3(14):29, 31 (1969)

Only a name, not ratified.

G. piltziorum Schütz, Kakt. u.a. Sukk. 33(7):144 (1982); Hunt (ed.), CITES Cact. Checklist 67 (1992) (provisionally accepted species). Fig. 74, Plates 92 and 93.

Schütz's Subgenus *Trichomosemineum*;

Buxhaum's Series *Quehliana*

This lovely species, found by and named for Brigitte and Jorg Piltz of Düren, West Germany, was fairly recently described, and is represented in most collections only by seedling plants, which have proved somewhat sensitive when young to over exposure to sunshine. It has a depressed-globose, solitary body, bluish-green in adult plants, brownish in young seedlings, dull and with a roughened surface. There are usually about 12 ribs (10 to 17 are mentioned in the description), with deep and narrow grooves between them. The 3 to usually 5 radial spines stand erect from the body on first emerging at the apex, later radiating, closer to the body, strong and stiff, to 25 mm long, brownish-pink with darker tips. There are no central spines. Flowers are lilac-pink, 7 to 8 cm long, and opening to about 6 cm wide. Fruit is club-shaped, 3 cm long, 1 cm wide, spindle shaped, grey-green with few rounded scales, lilac-pink-edged. Seed is hemispherical, 1 mm long, 1.2 mm broad, brown, shining with pale margin.

Reported from Argentina, La Rioja in the Sierra Velasco at 1200 m (3940 ft) altitude.

Collectors' numbers referred here are P 38; JL 60; HT 88-174.

Plates

97		97. <i>G. quehlianum</i>
98		98. <i>G. quehlianum</i> var. <i>albispinum</i>
98		99. <i>G. ragonesei</i>
99		100. <i>G. riojense</i> SN 46/70
99		101. <i>G. ritterianum</i> P219



Figure 74.
G. piltziorum

(Hans and Walter Till in a complex article have recently reduced this species beneath *G. riojense* as a subspecies, viz. *G. riojense* subsp. *piltziorum*, see comments under *G. riojense*.)

G. platense* (Spegazzini) Britton & Rose, *The Cact.* 3:163, Pl. 18 Fig. 2, Pl. 19 Fig. 1, Fig. 177 (1922); Speg., *Contr. Fl. Vent.*, 28 (1896) – as *Echinocactus platensis*; Speg., *An. Mus. Nac. Buenos Aires* 3(11):7 (1903); Backeb., *Die Cact.* 3:1712, Fig. 1639 (1959); *Kakteenlex.* 172 (1966); *Cact. Lex.* (Engl. ed.) 192 (1978); Putnam, *Gymnocalyciums* 48-9 (1978); Kiesling, *Darwiniana* 24(1-4):437-442 (1982) Bercht, *Succulenta* 62(4):72-8 (1983); Crombez, *Succulenta* 67(11): 233-238 (1988); Piltz, *Gymnos* 7(14):36-39 (1990); *l.c.* 8(15):18 (1991) Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 108 (1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (provisionally accepted species)

Schütz's Subgenus *Gymnocalycium* (*Ovatisemineum*) Section *Gymnocalycium* (*Ovatisemineum*);

Buxbaum's Series *Gymnocalycium* (*Baldiana*)

This is an indeterminate name, and from Britton & Rose's discussion in their major work, *The Cactaceae*, it seems that they thought it lay somewhere between *G. baldianum* and *G. leptanthum* in character, i.e. a white flowered version of the former, or a short tubed version of the latter. But there was considerable confusion then and it remains the position now. According to Schütz, Spegazzini admitted that *G. platense* could not be found in Sierra Ventana, and Schütz concludes that it seems likely that it was merely a form of *G. gibbosum*. More recently Dr Meregalli has expressed the opinion too, in letters, that it is hardly differentiated at subspecific level from *G. gibbosum*.

It was described as having small stems, flat-globose, 4 to 9 cm wide, dull bluish-green or purple or bronzed, with 8 to 12 broad, low ribs, divided into round-ended tubercles by transverse grooves. Areoles when young have white wool. Spines are all radial, 3 to 6 or 7 in number, 10 mm or less long, thin, needle-like, more or less appressed, brown with white tips. Flowers are 6 cm long, with dull, bluish-green tube, scales more or less edged purplish, with white outer petals, with greenish midstripe, throat purple.

Reported from a wide range in Argentina by Backeberg, near Buenos Aires, but by no one else at all!

As indicated above its standing is doubtful, and plants appearing in cultivation usually have no good identifiable pedigree, nor much resemblance to what is purported to be the character of this mysterious species. There are times when it is probably best to pull out the plug, and let an ailing old name die, but taxonomists find this difficult to do.

G. platygonum (H. & W. Till) Pilbeam, stat. nov.; H. Till & W. Till, Arbeitsgr. Gymno. Osterreich. Kakteenfr. 2(4):47-50; l.c. 3(4):51-54; l.c. 4(4):55-58 (1991). Fig. 75, Plate 94.

Schütz's Subgenus *Trichosemineum*;

Buxbaum's Series *Quehliana*

Plants circulating under this name for some years now, clearly belong with the subgenus *Trichosemineum*, maintaining a very low profile, almost flush with soil-level, dull, grey-brown in colour, getting to about 8 or 10 cm broad, but barely 1 or 2 cm tall. Hans Till and Walter Till have recently made good the name, but at the lower end of a trinomial, in a complex article on *G. riojense*, viz. *G. riojense* subsp.

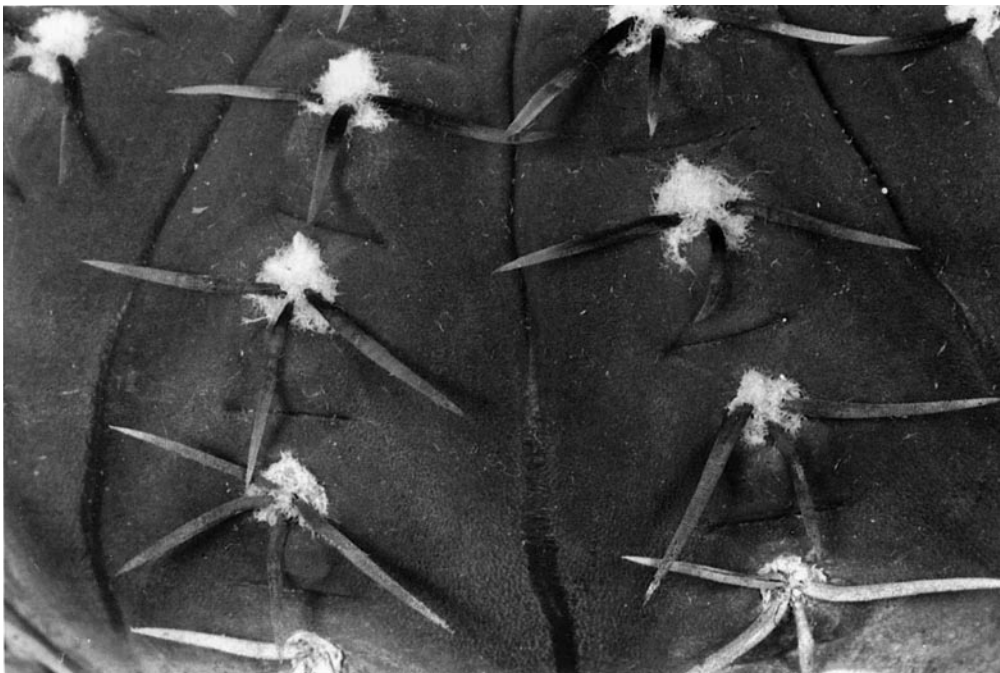


Figure 75.
G. platygonum

paucispinum var. *platygonum*. While the complexity of this very 'splitting' article are not taken to heart herein, some recognition of this very individual plant is welcomed. The plants featured and description matches plants which have been in circulation for a number of years, since the 1960s.

It is therefore here recognized as a good species, having as much individuality as others in this complex, which other authorities regard as good species.

Till describes it as disc-like, completely flat, with hardly discernible ribs, the body brownish to greyish-brownish-green, with 10 to 12 ribs, and 3 'claw-like' spines, close to the body, two sideways pointing, 7 to 9 mm long, the downward pointing spine only 3 to 5 mm long, all stiff, in youth brown, soon becoming grey. Flowers are described as scented, 45-48 mm long, 40-44 mm wide, pearl-white with pink tint, the throat pink, sometimes brownish-yellow, fruit is long, thin club-shaped, greyish-brown, seed is typical of the subgenus *Trichosemineum*.

It is reported from Argentina, Catamarca, north of Salinas Grandes.

Collectors' numbers referred here are P216; HT 87-7.

G. polycephalum Hort. A catalogue name (Piltz, P 223), referable to *G. mazanense*, and hence to *G. hossei*.

G. proliferum* (Backeberg) Backeberg, Kaktus ABC 295 (1935); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. calochlorum*)

Referred to *G. calochlorum*.

G. pseudomalacocarpus Backeberg, Kakteenlex. 172 (1966); Frank, Kakt. u.a. Sukk. 17:155 (1966); Succulenta 56:8, 20 (1967); Backeb., Kakteenlex. 172 (1966); Cact. Lex. (Engl. ed.) 192 (1978); Putnam, Gymnocalyciums 49(1978); Bercht, Succulenta 63(2):43-5 (1984); Meregalli, Pianta Grasse 5(1):1985; Schütz, Monogr. Gymno. 109 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. marsoneri*). Fig. 76, Plate 95.

Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*;
Buxbaum's Series *Schickendantzianae* Subseries *Marsoneriana*

This species is one of the most attractively coloured in the genus. In the recent *CITES Cactaceae Checklist* it is placed beneath *G. marsoneri*, via the also-sunk *G. megatae*, but I find this difficult to comprehend. From a collector's point of view it is a most individual species, presenting some difficulty in growing well, but worth the effort for the lovely reddish-brown colouring that it adopts at certain times of the year. Meregalli puts it closer to *G. damsii*, with which I have a certain sympathy.

It is flat-globular with stems to about 7 cm in diameter or more in cultivation, and to about 3 cm tall, clustering from the base, dull greyish olive-green, becoming intense reddish-brown if exposed to sufficient sunlight. It has up to 11 ribs, quite sharply defined with transverse grooves. Areoles are more or less sunken, with sparse, whitish wool. Spines are all radial, numbering 3 or 5, to 17 mm long, brown, curving slightly, the lower one thicker, occasionally there is a very thin, light coloured upper pair of spines present. Flowers are white to pale pink, about 4 cm long and wide, opening flat, with a long blue-green tube, having paler green, pink tipped scales. Fruit is bluish-green.

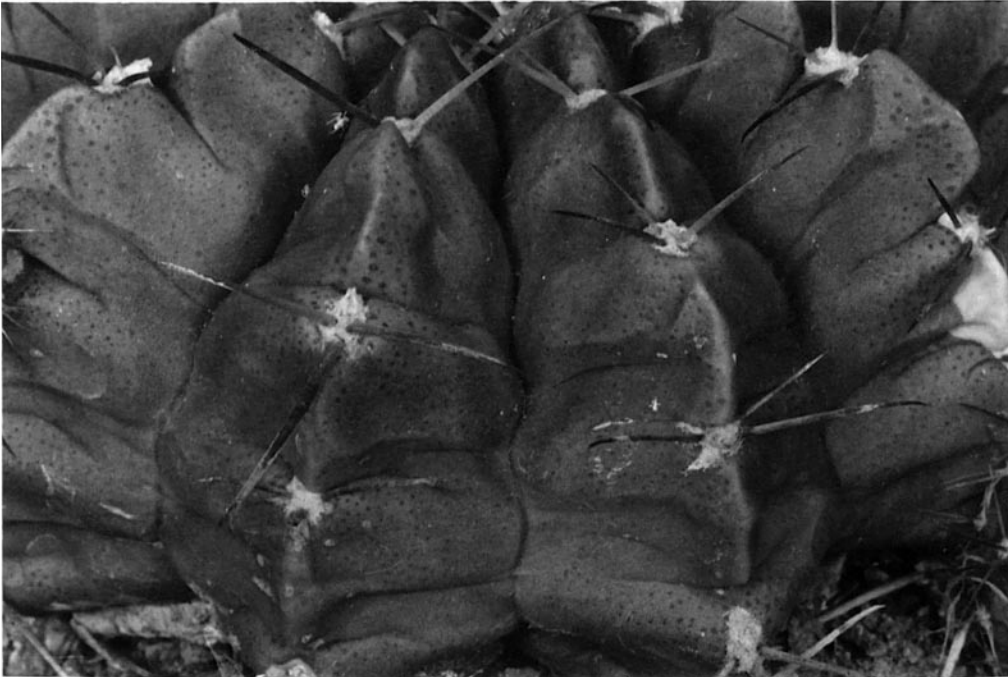


Figure 76.
G. pseudomalacocarpus

Reported from Bolivia, Department Santa Cruz. Lourdes, and at San Jose at 500 m (1640 ft) altitude, in salt dunes.

Collectors' numbers referred here are Lau 365; KK 509.

G. pseudoragonesii nom. nud., Putnam, *Gymnocalycium*s 49 (1978); Strigl, *Kakt. u.a. Sukk.* 34(4):90 (1983)

A plant common in cultivation, with unclear origins, usually referable to *G. quehlianum* or *G. bodenbenderianum*.

G. pugionacanthum* Backeberg, *Kakteenlex.* 172 (1966) nom. inval.; *Cact. Lex.* (Engl. ed.) 192 (1978); H. Till & Schatzl, *Kakt. u.a. Sukk.* 24(10):230-2 (1973); Putnam, *Gymnocalycium*s 49 (1978); Bercht, *Succulenta* 62(10):220-4 (1983); H. Till, *Kakt. u.a. Sukk.* 38(8):191 (1987) – validation; Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 110 (1986); Metzinger, *Arbeitsgr. Gymno. Osterreich. Kakteenfr.* 2(3):19-20 (1989); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (syn. *G. hybopleurum*)

Long ago referred to synonymy with *G. hybopleurum*.

G. pulquinense (Card.) PC. Hutchison, *Cact. Amer.* 29(1):13 (1957)

A combination along with several other species of *Weingartia*, but not accepted by any other authority or the cactus fraternity.



Figure 77.
G. pungens

G. pungens* Fleischer, Friciana I-Zprav C.7:1, 8 (1962); Backeb., Kakteenlex. 173 (1966); Cact. Lex. (Engl. ed.) 193 (1978); Putnam, *Gymnocalyciums* 50 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 110 (1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (provisionally accepted species). Fig. 77, Plate 96. Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*; Buxbaum's Series *Schickendantzianae* Subseries *Schickendantzianae*

It is doubtful if this species stands separately from *G. schickendantzii*, of which it seems just to be a more densely and longer spined, but very attractive, variant. It was described as globular, to 10 cm tall, 8 cm wide, dark green with 13 ribs and oblique(?) tubercles. Areoles are oval, 5 mm long, 2 mm wide. Spines are normally all radial, numbering 7, thin, needle-like, 4 to 4.5 cm long, pale grey, tipped dark brown. Central spines number 1 or 2, if present, similar to the radials, but sometimes there are none. Flowers are 4 cm long, white. Fruit is pale red, spherical.

The locality was not reported, but has been guessed to be as for *G. schickendantzii*, in north west Argentina.

It is significant that no field collector of recent years at least has allocated a number to this species; at a guess, assuming they found plants of this ilk, they saw in front of them what they took to be no more than *G. schickendantzii*!

G. quehlianum (Haage jr.) Bgr., *Kakteen* 221 (1929); Haage jr. n Quehl, *Monatsschr. f. Kakteenk.* 43 (1899) – as *Echinocactus quehlianus*; Backeb., *Die Cact.* 3:1721-4, Figs 1651-8 (1959); *Kakteenlex.* 173 (1966); *Cact. Lex.* (Engl. ed.) 193 (1978); Putnam, *Gymnocalyciums* 50-2 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 111(1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (accepted species);

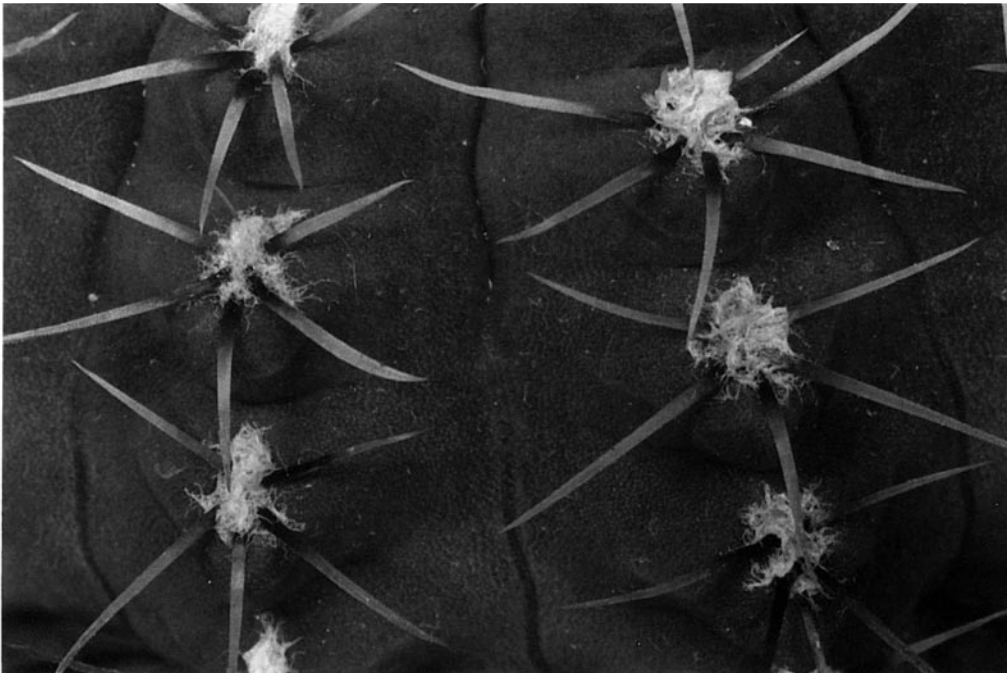


Figure 78.
G. quehlianum

Meregalli, *Gymnos* 9(18):54-61 (1993); H. Till, *Arbeitsgr. Gymno. Osterreich. Kakteenfr.* 6(2):89-98 (1993). Fig. 78, Plates 97 and 98.

Schütz's Subgenus *Trichomosemineum*;

Buxbaum's Series *Quehliana*

This popular species has had nine or more varietal names attached to it, validly and invalidly, mostly some 30 or 40 years ago, few of which have proved sufficiently distinct to perpetuate themselves in collections, and for the most part there is no clear idea of their differentiation from the type.

In cultivation it is an easy-going species, making eventually a solitary or sparingly clustering stem to about 10 or 15 cm tall and wide, but more often seen at a much smaller size. The stem is brown or brownish-green, with about 14 low ribs, having fairly closely placed cream coloured, felted areoles, bearing clusters of 5 to 7 short, weak spines, to about 10 mm long, coloured whitish-brown at the base. Flowers are white, long funnel shaped, with narrow tube, flushed red at the base of the petals and in the throat. Fruit is slender, club-shaped, greyish-brown.

Reported from Argentina, Sierra de Cordoba, Sierra Chica.

Collectors' numbers referred here are FR 442a, 442b, 1097; WR 103; P 13, 13a-c, 117, 160, 187, 196, 197, 198, 202; B 20, 69, 171; DV 60, 60a; JL 3, 44, 174, 176, 340; WP89-0911125?, 0921125a?, 094/ 125b?

The varietal names which appear from time to time, not always by any means correctly applied, are as follows, but they are little differentiated from the type:

var. **albispinum*** Bozsing in Backeberg, *Die Cact.* 3:1722 (1959) – perhaps the most striking, with white spines; This variety reported from Argentina, Cordoba, Sierra Chica by Rausch; by Piltz from Cordoba, Sierra Tulumba, Villa Tulumba at 800 m (2625 ft), Cosquin at 1000 m (3280 ft), Cruz del Eje to Falda, Copina at 1100 to 1300 m (3610 to 4260 ft), Sierra de los Condores at 550 m (1805 ft), Villa C. de America at 800

m (2625 ft), Alta Gracia at 750 m (2465 ft), and Villa Carlos Paz at 700 m (2300 ft) altitude.

Collector's number referred here is WR 103a.

var. *brunispinum* nom. nud. – a brown spined form;

var. *caespitosum* Fric & Kreuzinger, nom. nud. – a clustering form;

var. **flavispinum*** Bozsing in Backeberg, *Die Cact.* 3:1722 (1959) – with yellowish spines;

var. *kleinianum* nom. nud., in Walter Rausch's collection list (WR 103b), also reported by Knolla from Argentina, Cordoba at 900 m (2950 ft) altitude (WO 70);

var. **parvulum*** Spegazzini, sometimes seen labelled as *G. parvulum* – a small growing form; collector's number referred to this variety is WR 115, reported from Argentina, San Luis, Sierra San Luis;

var. **rolfianum*** Schick, *Sukkulentenk.* 2:26 (1948); Backeb., *Die Cact.* 3:1723 (1959) – differs in having flatter, broader ribs, and slightly different flowers; reported from Argentina, Cordoba at 1000 m (3280 ft) altitude.

Collectors' numbers referred to this variety are Schick 732, FR 442, WR 726a, WO 58.

var. *roseiflorum* nom. nud., – a pink flowered form;

var. **stellatum*** (Spegazzini) Dölz, *Sukkulentenk.* 6:30 (1957) – an attempt to combine *G. stellatum* with this species, here regarded as separate – see under *G. stellatum*;

var. **zantnerianum*** Schick, *Sukkulentenk.* 2:25 (1948); Backeb., *Die Cact.* 3:1723 (1959) – differing from the type in having more ribs, lilac-pink outer petals, and other minor differences in the flower (Schick 731); the other collector's number referred here is JL 299.

G. ragonesei Castellanos, *Lilloa* 23:5 (1950); Backeb., *Die Cact.* 3:1724 (1959); *Kakteenlex.* 173 (1966); *Cact. Lex.* (Engl. ed.) 193 (1978); van Vliet, *Succulenta* 50(4):67-71 (1971); *The Chileans* 10(34):29 (1977); Hetzenecker, *Kakt. u.a. Sukk.* 34(1):91 (1983); Putnam, *Gymnocalyciums* front cover & 52 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 114 (1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (accepted species). Fig. 79, Plate 99.

Schütz's Subgenus *Trichomosemineum*;

Buxbaum's Series *Quehliana*

This is a well-known, delightful, small, almost completely flat-growing species in the wild, getting to no more than 4 or 5 cm if grown in full light in cultivation, and to about 5 cm wide. Described originally as coloured brick red to greenish-grey, plants in cultivation are usually matt brown to olive-greenish brown. The 7 to 9 or more ribs are very flattened, with barely discernible transverse furrows and slight humps on which the areoles sit, greyish-white woolled, but sparsely so. Spines are all radial, thin and wispy, up to 6 in number, whitish with brown tips, 3 mm long. Flowers are about 3 or 4 cm long, 3 cm wide, with long, narrow tubes, white, with reddish tints in the throat. Fruit is ovoid or spindle shaped, to 25 mm long, greenish-brown.

Reported from Argentina, Catamarca, Salinas Grandes, between 969 km and Totralajos, at 400 m (1310 ft) altitude; Cordoba, Cruz del Eje.

Collectors' numbers referred here are Lau 472; WR 224; P 18, 121.

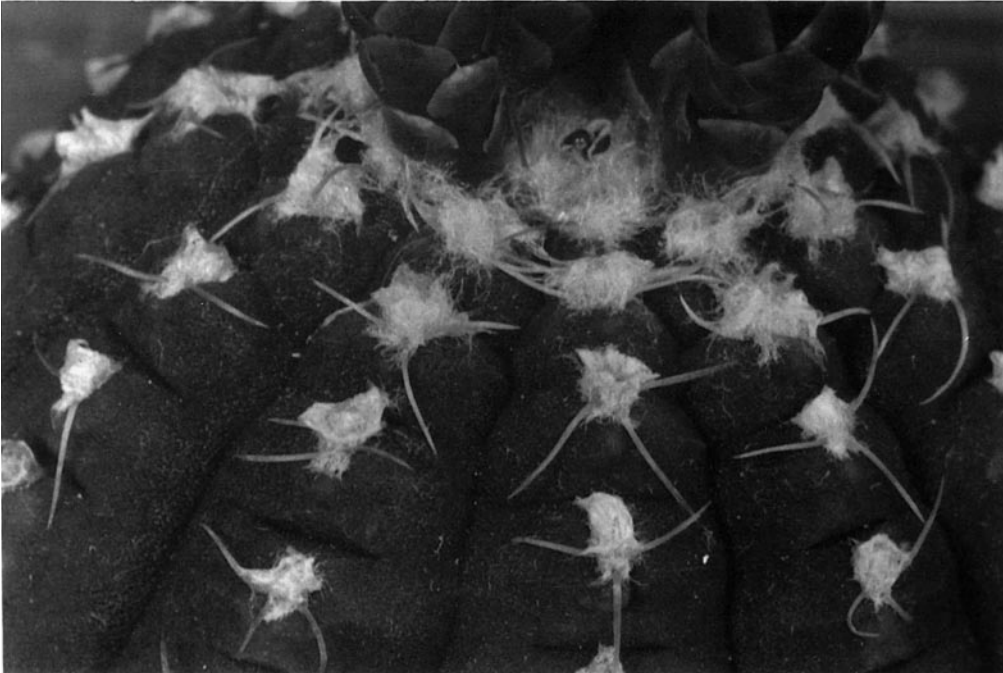


Figure 79.
G. ragonesei

G. rauschii* H. Till & W. Till, *Succulenta* 69(2):27-31 (1990); *Arbeitsgr. Gymno. Österreich. Kakteenfr.* 5(4):41-42 (1990); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (provisionally accepted species)

Subgenus *Gymnocalycium* (*Ovatisemineum*) Section *Gymnocalycium* (*Ovatisemineum*);

Buxbaum's Series *Gymnocalycium* (*Baldiana*)

This is a newly described species which has not appeared in circulation commercially as yet. It is compared with *G. schroederianum*.

It is described as solitary, the body dull, dark green to grey-green, flat-globular with 10 to 12 (to 14) ribs. Spines are straight, sometimes slightly curved, usually 9 in number, but sometimes 7, 12 to 17 mm long, yellowish in youth, later red-brown. Flowers are wide funnel shaped, 25 to 35 mm long, 23 to 30 mm wide, pale pink, with deeper pink midstripe, marked greenish-brown on the outside of the petals. Fruit is small, ovoid, about 7 × 5 mm. Seed is egg-shaped, matt black or brown, about 1.5 mm in diameter.

Reported from Uruguay, Tacuarembó, near Ansina, but not found there subsequently I am told.

Collector's number referred here is WR 350.

G. reductum* (Link) Pfeiffer, *Abbild. u. Beschr. blüh. Cact.* 2, Fig. 12 (1847); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (syn. *G. gibbosum*)

Long ago referred to *G. gibbosum*.

G. rhodantherum* Bödeker, *Kakteenk.* 1934:13 (1934) – as *Echinocactus rhodantherus*; Backeb., *Die Cact.* 3:1767 Fig. 1701 (1959); *Kakteenlex.* 173 (1966); *Cact.*

Lex. (Engl. ed.) 193 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 115 (1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (syn. *G. maza-nense*)

Referred to *G. maza-nense*, and hence to *G. hossei*.

G. riograndense* Cardenas, *Kakt. u.a. Sukk.* 9:2, 24 (1958); Backeb., *Die Cact.* 3: 1774 (1959); *Kakteenlex.* 173 (1966); *Cact. Lex.* (Engl. ed.) 193 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 116 (1986); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (syn. *G. pflanzii*). Plate 90.

Referred to *G. pflanzii*.

G. riojense Fric ex Pazout, Valnicek & Subik, *Kaktusy* 132, 65 (1960) nom. inval.; Backeb., *Die Cact.* 3:1725 (1959); *Kakteenlex.* 173 (1966); *Cact. Lex.* (Engl. ed.) 193 (1978); Putnam, *Gymnocalyciums* 52-3 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 117 (1986); Fric ex H. Till & W. Till, *Arbeitsgr. Gymno. Osterreich. Kakteenfr.* 4(2):47-50; *l.c.* 4(3):51-54; *l.c.* 4(4):55-58 (1991); Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (provisionally accepted species). Fig. 80, Plate 100. Schütz's Subgenus *Trichomosemineum*;
Buxbaum's Series *Quehliana*

For some time this species has languished under a double stigma: firstly it was invalidly described in 1960, although this could have been easily put right at any time; secondly it was widely regarded as synonymous with *G. bodenbenderianum*, to which it is undoubtedly closely related. Just where to draw the line in this subgenus of similar looking species is difficult indeed.

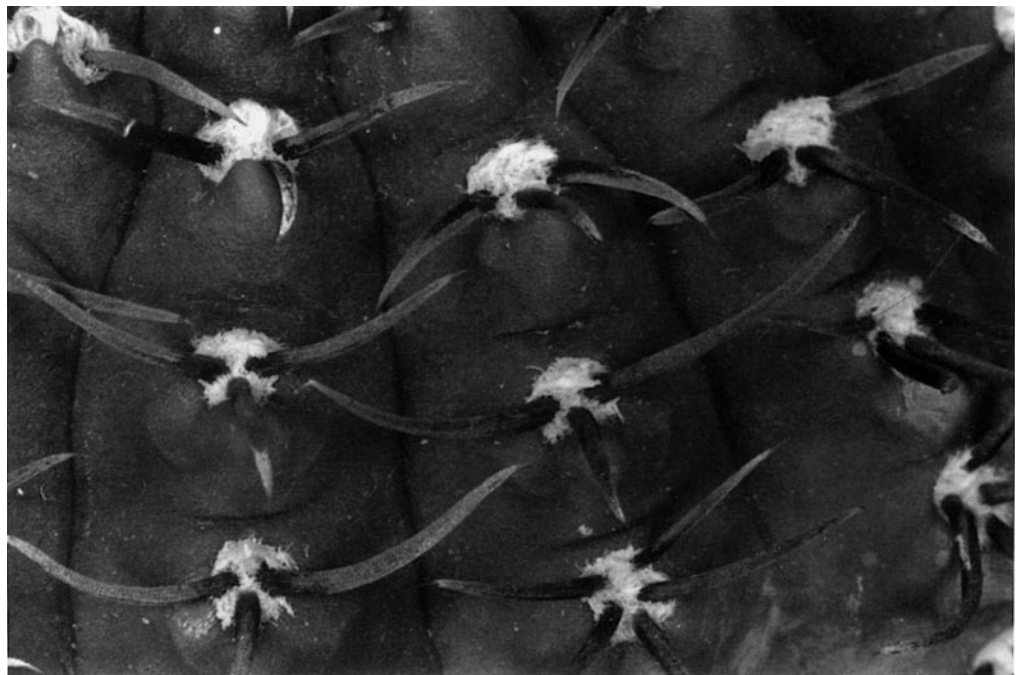


Figure 80.
G. riojense

In an excellently printed series of loose-leaf bulletins issued by the Arbeitsgruppe Gymnocalycium Osterreichische Kakteenfreunde, Hans and Walter Till have recently validated this species, combined beneath it several former species, and for good measure described six new taxa, no less, for what seem to be at best local variants. It remains to be seen what weight is accorded to this scheme, which I have set out below for interest and completeness's sake. It is significant in this context that the recently published *CITES Cactaceae Checklist* recognizes as wholly accepted species only *G. bodenbenderianum*, *G. quehlianum* and *G. ragonesei* of this whole subgenus, and Metzger tells me that they favour *G. bodenbenderianum* as embracing this species.

Whether you favour the splitters or the lumpers, there is no doubt that *G. riojense* is worth growing, whatever handle you put on it, and plants I received years ago originating from Gunther Moser have given me much pleasure with their tortoise-pace increase in size over about 20 years from small seedlings to flat-topped, brown, timeless plants about 9 cm wide.

The type is described as solitary, flat-globose, matt green, brownish-green or brown, 8 to 10 cm wide, only 6 to 8 mm tall, the apex depressed and spineless. There are 15 or more ribs, straight, indistinctly tubercles. The areoles are round to oval, with brownish-yellow wool. There are usually 5 spines, two pairs pointing sideways, one downwards, adpressed, light brown, tipped dark brown, about 2 cm long. Flowers appear at the apex, and are whitish to pinkish-brown, with brownish midstripe to the petals, about 3.5 cm wide, short-tubed.

Reported from the centre of La Rioja, between Sierra Los Colorados, Sierra Velasco south of Cuesta de Huaco, the southern end of Sierra de Mazan and south of Sierra de Arganaraz, between 300 and 500 m (985 and 1640 ft) altitude.

Collectors' numbers referred here are JL 19, 71; LB 423, 427, 433, 435, 436, 443, 448, 452, 457, 458, 460.

The species resolves according to Hans and Walter Till, aided and abetted for the last-named by Franz Strigl, as follows:

- subsp. *riojense* (syn. *G. triacanthum* Backeb., nom. inval.);
- subsp. *riojense* var. *guthianum*;
- subsp. *riojense* var. *pipanacoense*;
- subsp. *piltziorum* (syn. *G. piltziorum* Schütz);
- subsp. *kozelskyanum* (syn. *G. kozelskyanum* Schütz);
- subsp. *kozelskyanum* var. *mirandaense*;
- subsp. *kozelskyanum* var. *sanjuanense*;
- subsp. *paucispinum* (syn. *G. asterium* var. *paucispinum*, and *G. stellatum* var. *paucispinum*);
- subsp. *paucispinum* var. *platygonum* (syn. *G. platygonum* Hort.);
- subsp. *paucispinum* var. *guasayanense*.

Several of these newly described taxa are not yet commercially available, but no doubt they will be.

For details of *G. piltziorum* and *G. kozelskyanum*, see under those names elsewhere in this book. The rest are very briefly dealt with below:

subsp. *riojense* var. *guthianum*, a new variety, is described as differing from the type in having a more conical body-shape, 13 more angular ribs, with large, more prominent tubercles, pale brown spines, 10 to 21 mm long, more widespreading, flowers smaller, 4 cm long, 3 cm wide, pale pink to whitish with brownish-pink throat. It is reported from Argentina, La Rioja, Dique de los Sauces, at 550 to 600 m (1800 to 1970 ft) altitude.

Collector's number referred here is HT 87-16.

subsp. *riojense* var. *pipanacoense*, another new variety, is described as differing from the type in its dark grey-green body-colour, larger stem size, often to 20 cm in diameter, with 20 or more ribs, and spines frequently up to 4 cm long, and straight. It is reported from Argentina, Catamarca, between Salar de Pipanaco and Sierra de Manchao.

Collector's number referred here is HT 87-43.

subsp. *kozelskyanum* var. *mirandaense* – this new variety is described as differing from subsp. *kozelskyanum* mainly in its long, spreading spines and narrow tulip-like perianth, as well as the cylindric pericarp and fusiform fruit.

Reported from Argentina, La Rioja, Dept. Grl. Lavalle.

Collector's number referred here is HT 87-89.

subsp. *kozelskyanum* var. *sanjuanense* is described as differing from subsp. *kozelskyanum* in its smaller, flatter body, dark olive to greyish-green, and less tubercles ribs, with a carmine to violet-brown throat to the flower. It is reported from Argentina, San Juan, Dept. Jachal, between San Jose de Jachal and Niquivil.

Collectors' numbers referred here are WR 548a; GN 88/14; LB 427, 433.

subsp. *paucispinum* is a resurrection of Backeberg's *G. asterium* var. *paucispinum* – see under *G. stellatum*, to which it was subsequently referred.

subsp. *paucispinum* var. *platygonum* is a recognition of a nomen nudum (a name without description), which has been in cultivation to a limited extent for some 20 years or more under the name *G. platygonum*. It is worth more recognition than it receives in this complicated treatment under *G. riojense*, and it is herein regarded as a good species, see under *G. platygonum*.

subsp. *paucispinum* var. *guasayanense*, a new variety is described by Franz Strigl as differing from var. *platygonum* in its more distinct ribs and somewhat longer, straight spines. It is reported from Argentina, Santiago del Estero, Sierra de Guasayan.

Collector's number referred here is ST 89-273.

G. ritterianum Rausch, Kakt. u.a. Sukk.23(7):180-1 (1972); Haage in Backeb., Cact. Lex. (Engl. ed.) 193 (1978); Putnam, Gymnocalyciums 53 (1978); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 117 (1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (provisionally accepted species). Fig. 81, Plate 101.

Schütz's Subgenus *Microsemineum* Section *Mazanensia*;

Buxbaum's Series *Mostiana*

This species has been slow to get into collections since its description by Walter Rausch in 1972, accompanied by excellent colour photographs in the German society's journal. It is a flat-globose, solitary or sparingly clustering species, to 11 cm wide, 3 to 4 cm tall, with clear green body colouring, with purple brown tinges when grown in full light. There are 10 to 12 ribs, adorned with somewhat concave areoles, with white wool, and with small humped tubercles below them, as well as a short transverse furrow below the tubercles. Radial spines number 7 to 9, one directed downwards, the others to the side, curving back on to the body, pinkish-brown, to 25 mm long. Rarely there is a solitary, longer central spine, curving back towards the apex, similarly coloured to the radials. Flowers are 6.5 cm long, 7.5 cm wide, described as shining white with violet-pink throat, but the colour photograph accompanying the description shows a creamy-pink coloured flower, reminiscent of the colour seen in some flowers of *G. pflanzii*. Fruit is pear-shaped, bluish with whitish-pink scales.

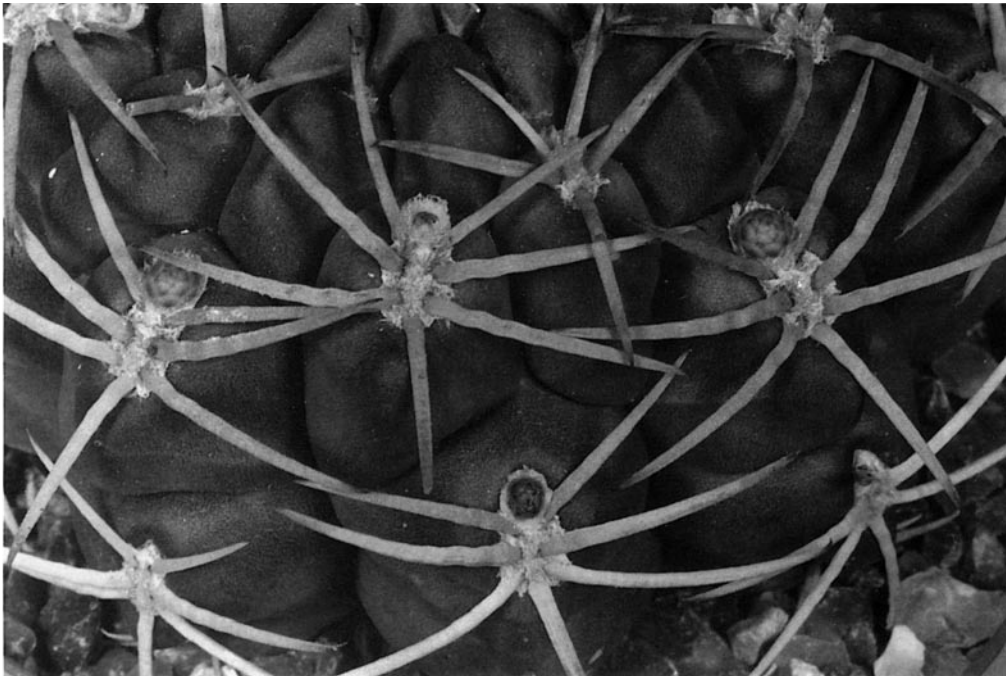


Figure 81.
G. ritterianum

Reported from Argentina. La Rioja, Sierra Famatina, near Famatina, at 1800 m (5905 ft) and 3000 to 3500 m (9840 to 11480 ft) altitude, which makes it with *G. tillianum* the highest recorded locality for *Gymnocalycium* species.

Collectors' numbers referred here are WR 126; FR 436; P219.

G. rotundicarpum Hort., Pazout, Ges. Ost. Kakt. Newsletter Jan./Feb. 1964 – transl. Wood-Allun, The Chileans 3(14):30 (1969)

Referred to *G. megatae*.

G. rubriflorum Hort.

This is a catalogue name, possibly a confusion with *G. carminanthum*.

G. saglionis (Cels) Britton & Rose emend Krainz, B. & R.. The Cact. 3:157, P1.17 Fig. 1 (1922). in error as *G. saglione*; Cels, Portef. Hort. 180 (1847) – as *Echinocactus saglionis*; K. Schum., Gesamtb. Kakt. 416-7 (1898); Gesamtb. Kakt. Nachtr. 124-5 (1903); Krainz, Die Kakteen, C, VIe (1956); Backeb., Die Cact. 3:1772 (1959); Kakteenlex. 173 (1966); Cact. Lex. (Engl. ed.) 193 (1978); Putnam, *Gymnocalyciums* 53(1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 118 (1986) Hunt (ed.), *CITES Cact. Checklist* 67 (1992) (accepted species). Figs 82 and 83, Plates 102-104.

Schütz's Subgenus *Microsemineum* Section *Microsemineum*;

Buxbaum's Series *Sagliones*

This large, flat-globular, solitary species can get to about 30 cm (1 ft) wide, and is usually about half as tall as wide. It has large, separated tubercles, more or less rounded.

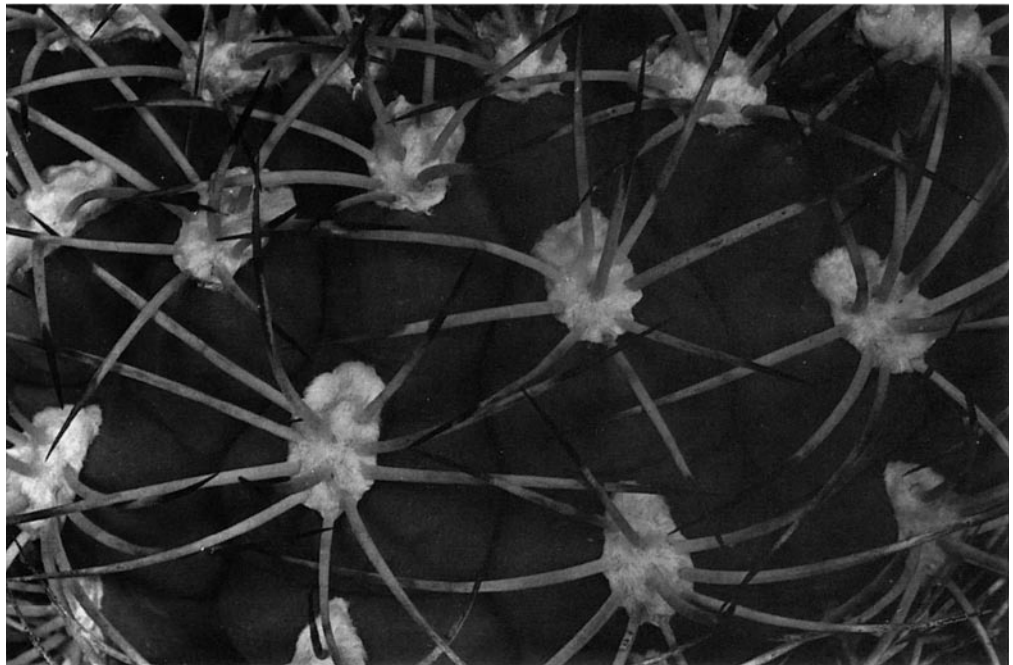


Figure 82.
G. saglionis

and a dull green body colour. Radial spines number up to 10 on young plants, increasing to about 15 on older plants, varying in colour from yellowish-brown, to red brown to almost black, becoming grey in age; they are about 3 or 4 cm long, curving back on to the plant body evenly. Central spines are similar, but straighter, numbering one or more, increasing, like the radials as the plant gets older and larger. Flowers are white or white tinged with pink, with red throat, 3.5 cm long, 2 to 3 cm wide, short tubed, urn shaped. Fruit is reddish, almost globular.

Reported from northern Argentina, widespread in Catamarca, Tucuman, Salta and Jujuy and in southern Bolivia, from 900 m (2950 ft) to 2000 m (6560 ft) altitude

Collectors' numbers referred here are FR 21, FR 21a (var. *tilcareense*), 57 (var. *tilcareense*); Lau 448; WR 28 (var. *tilcareense*), WR 124; P 26, 60, 70 (var. *tilcareense*), 126; DV 61; WO 14; JL 7, 11, 24, 67, 70; LB 392, 434, 449, 454; JL 7, 11, 24, 28, 67, 70. The numerous varietal names which have been ascribed to *G. saglionis*, mostly erected on the basis of the colour of the spines, are herein regarded as merely representing minor variation in a widespread species. For the record they are as follows:

- var. *albispinum* Ritter, nom. nud. – a white spined form;
- var. *bolivianum* Cardenas, nom. prov. – referred to *G. pflanzii*;
- var. *flavispinum* Fric, nom. nud. – a yellow spined form;
- var. *jujuyense* Backeberg, nom. prov. – a smaller growing form, later described as var. *tilcareense*;
- var. *longispinum* Fric, nom. nud. – a longer spined form;
- var. *luteispinum* Hort. – a brownish-yellow spined form;
- var. *nigrispinum* Hort. – a black spined form;
- var. *roseispinum* Ritter, nom. nud. – a pink spined form;
- var. *rubrispinum* Hort. – a red spined form;
- var. **tilcareense*** Backeb., Kaktus ABC 295 (1935) – this was subsequently elevated

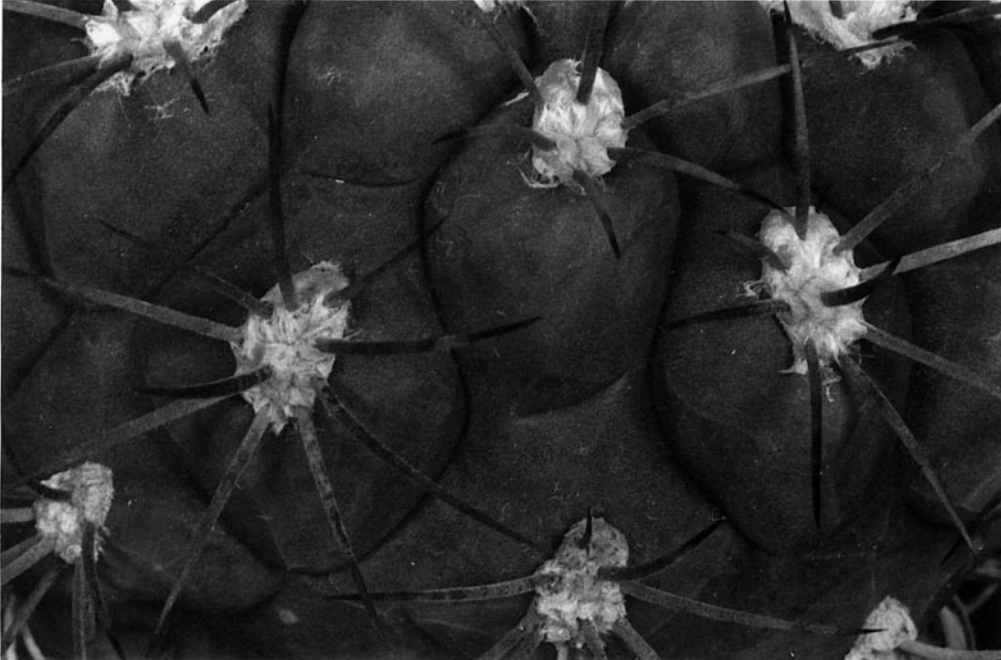


Figure 83.
G. saglionis var. *tilcarensis*

to form a new monotypic genus, as *Brachycalycium tilcarensis* by Backeberg in 1942 (Cact., J. DKG. (II):38, 76). It is here regarded as just another variant of *G. saglionis*; var. *tucumanense* Hort. – a form from Tucuman.

G. sanguiniflorum* (Werdermann) Werdermann, Kakteenk. 1936:183 (1936); Monatsschr. Deutsch. Kakt. Ges.194 (1932); Backeb., Die Cact. 3: 1731 (1959); Kakteenlex. 173 (1966); Cact. Lex. (Engl. ed.) 193 (1978) H. Till, Kakt. u.a. Sukk. 23(9):238-40 (1972); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 119(1986); Hunt (ed.), CITES Cact. Checklist 67 (1992) (syn. *G. baldianum*)

Long ago referred to *G. baldianum*.

G. schatzlianum Strigl & W. Till, Kakt. u.a. Sukk. 36(12):250 (1985); Succulenta 62(4):76 (1983) – as nom. prov.; Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 120 (1986); Piltz, Gymnos 7(14):36-39 (1990); Hunt (ed.), CITES Cact. Checklist 68 (1992) (provisionally accepted species). Fig. 84, Plate 105.

Schütz's Subgenus *Gymnocalycium* (*Ovatisemineum*) Section *Gymnocalycium* (*Ovatisemineum*);

Buxbaum's Series *Gymnocalycium* (*Baldiana*)

This recently described species is one of the very few that out of flower do not appear obviously to relate to this genus, as its rib and spine arrangement do not readily bring the genus to mind.

It is described as flat-globose, to 12 cm wide, 8 cm tall, greyish dark green. There are about 16 to 20 ribs, with weakly defined tubercles, not very obviously chinned as with many species. Areoles have short white wool. Radial spines number 9 to 11, thin, straight, pale yellowish brown, up to 25 mm long, one (the uppermost) to 30 mm long.

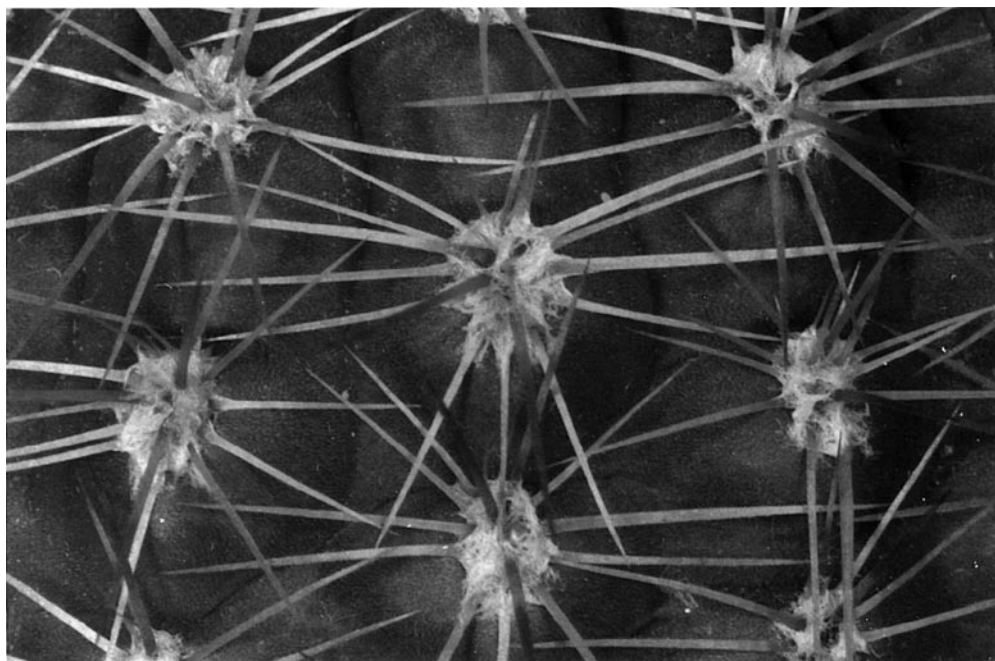


Figure 84.
G. schatzlianum

Central spines number usually 4 to 7, occasionally there is only one present, about 25 mm long, one (the uppermost) to 30 mm, similar to the radials. Flowers are pale greenish-yellow, broad funnel shaped, appearing near the centre at the apex, 6 to 7.5 cm long, 7 to 8 cm wide. Fruit short club-shaped, dark green. Seed cap-shaped, matt black, 1.5 mm long and wide, 1 mm thick.

Reported from Argentina, province Buenos Aires, in the south east of the Sierra del Tandril, the type locality near Balcarce at 300 m (980 ft) altitude.

Collectors' numbers referred here are WR 541; P 93; WP89-007/008, 008/009, 010/010, 011/011

Piltz has recently expressed the opinion that this species is part of the *G. gibbosum* complex, while Meregalli has expressed the opinion that it may well have been that originally described as *G. leeanum*, and Metzinger (in letters, and see *Gymnos* 8(16):63-65 (1991)) is of the opinion that probably the older name for *G. schatzlianum* is *G. hyptiacanthum*, but this speculation has not been carried forward to more openly forthright opinion in the recent *CITES Cactaceae Checklist*.

Plates

102. *G. saglionis* (pale spined form)

103. *G. saglionis* in habitat, 20 km south of Cafayate, 1800 m, Argentina

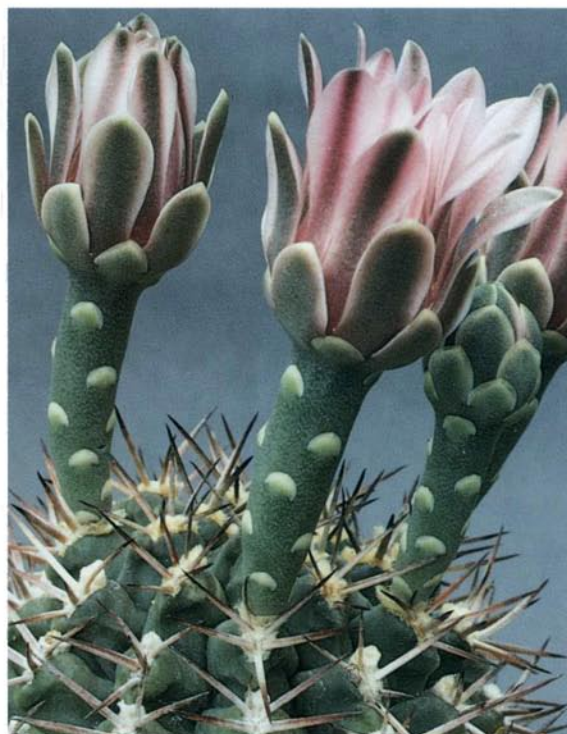
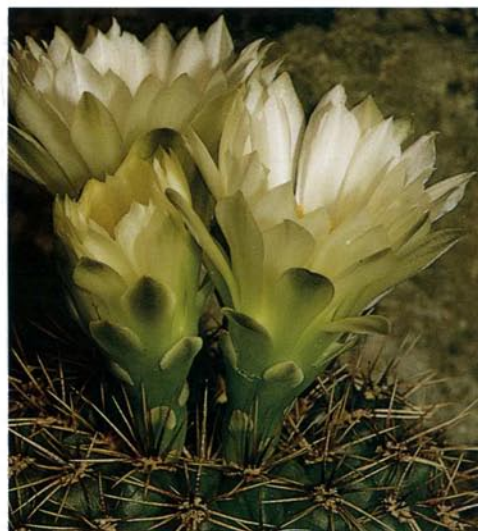
104. *G. saglionis* var. *tilcarensis*

105. *G. schatzlianum* WR 541

106. *G. schickendantzii*

107. *G. schickendantzii* (from Marajes)

102	103
104	105
106	107





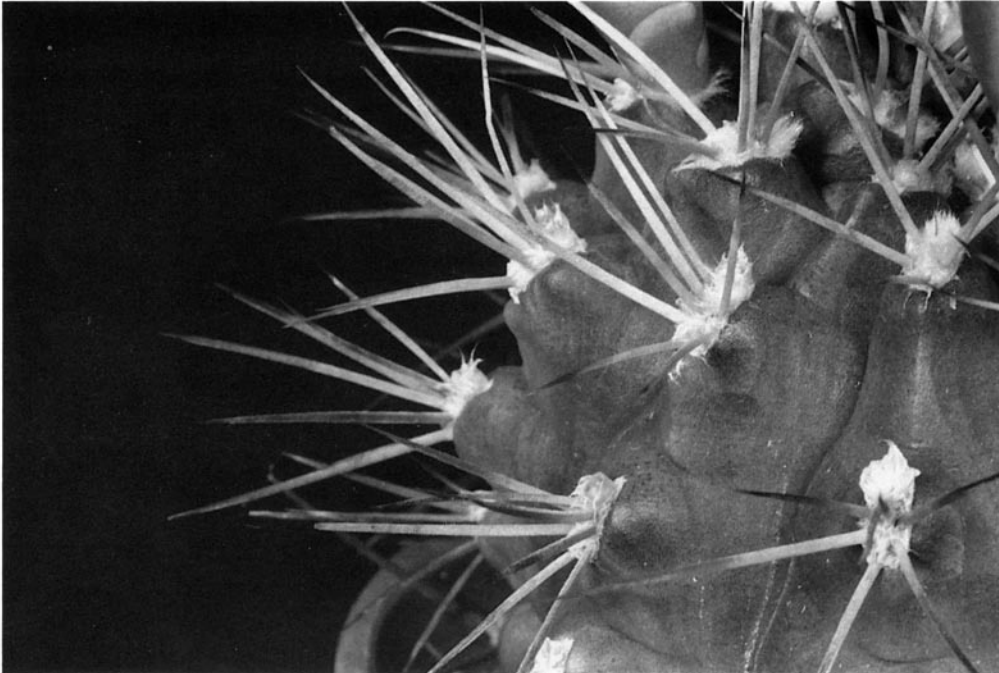


Figure 85.
G. schickendantzii

G. schickendantzii (Weber) Britton & Rose, *The Cact.* 3:164, Pl. 19, Figs 2, 179 and 181 (1922); Weber, *Dict. Hort. Bois.* 470 (1896) – as *Echinocactus schickendantzii*; Backeb., *Die Cact.* 3:1778, (1959); *Kakteenlex.* 173 (1966); *Cact. Lex. (Engl. ed.)* 193 (1978); Putnam, *Gymnocalyciums* 53-4 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 121 (1986); Hunt (ed.), *CITES Cact. Checklist* 68 (1992) (accepted species). Figs 5 and 85, Plates 106 and 107.

Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*;

Buxbaum's Series *Schickendantzianae* Subseries *Schickendantzianae*

This is a well-known species more often seen as young plants than mature. It is described as solitary, more or less globular, to 10 cm wide, or more, with usually 7 or so ribs, but in maturity with up to 14 or more. Body colour is greyish- or brownish-green, not shining, with more or less tuberculate ribs, the tubercles tending to run into each other, except in *G. schickendantzii* var. *delaetii* (see below). Spines are all radial, 6 or 7 in number, to about 3 cm long, somewhat flattened, curving outwards and slightly recurving, reddish-grey to yellowish-brown. Flowers appear towards the sides or

Plates

108		109	108. <i>G. schroederianum</i>
110		111	109. <i>G. schuetzianum</i>
113		112	110. <i>G. spegazzinii</i>
			111. <i>G. spegazzinii</i> in habitat, south of Cachi, Argentina
			112. <i>G. stellatum</i>
			113. <i>G. strigianum</i>

shoulders of the body, and are white to reddish, flushed pink inside, to 5 cm long, with longish tubes; flower buds are greenish-white. Fruit is fat-ovoid, green or slaty blue.

Reported from north west Argentina, by Lau from Salta, Sierra Medina and Salinas Grandes, from south of Cordoba to Catamarca and Tucuman; La Rioja, Patquia (see Piltz's list for more precise reported locations: P 17 & 17a-t, Chapter 8).

Collectors' numbers referred here are FR 444, 444a & b; WR 133; Lau 446, 473, 486; P 17, P 17a-t; B 16; DV 52; LB 263, 292, 293, 313, 377, 385, 387, 394, 401, 426, 442, 462, 463, 474, 476; JL 5, 6, 14 (var. *pectispinum* nom. nud.), 52; WP89-063/080, 064/080a, 065/080b, 096/128, 101/128a.

The following varietal names have been attached to this species:

var. **delaeitii** (K. Schumann) Backeb., Kaktus ABC 296 (1935); K. Schum., Monats-schr. f. Kakteenk. 11:186(1901) – as *Echinocactus delaetii*; Backeb., Die Cact. 3:1778, Fig. 1709 (1959) – defined as having lighter green body colour, separate, not confluent tubercles, divided with an acute, transverse furrow, coupled with reddish flower buds and deeper pink flowers than the type, particularly the inner petals; reported from Argentina, Salta, Cafayate, Alemania, Quebrada de Cafayate at 1400 m (4590 ft) by Piltz, and Cruz Quemada at 1000 m (3280 ft) altitude by Knolla;

Collectors' numbers referred here are Lau 455; WR 46; P 55; WO 28; B 54, 94; DV 46; JL27, 30, 31.

var. **knebelii*** Fric ex Backeberg, Kaktus ABC 296 (1935) – referred to *G. marsoneri*;

var. **marsoneri*** Fric ex Backeberg, Kaktus ABC 296 (1935) – referred to *G. marsoneri*;

var. **michoga*** Fric ex Backeberg, Kaktus ABC 296 (1935) – considered to be merely a form of *G. schickendantzii*.

G. schroederianum von Osten, Notas s. Cact. (Anal. Museo Hist. Nat. Montevideo) 2:5, 1.? (1941); Backeb., Die Cact. 3:1713 (1959); Kakteenlex. 173 (1966); Cact. Lex. (Engl. ed.) 194 (1978); Putnam, Gymnocalyciums 54-5 (1978); Merregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 122 (1986); Kiesling, Cact. Amer. 59(2):44-49 (1987); Hunt (ed.), CITES Cact. Checklist 68 (1992) (accepted species). Fig. 86, Plate 108.

Schütz's Subgenus *Gymnocalycium* (*Ovatisemineum*) Section *Gymnocalycium* (*Ovatisemineum*);

Buxbaum's Series *Gymnocalycium* (*Baldiana*)

This a solitary, neatly spined species, popular with collectors. It has a dark green stem, to 15 cm wide, 5 cm tall in the wild, with numerous low ribs (15 to 18) or more, set with creamy white woolled areoles, bearing neatly stitched clusters of 5 or 7 appressed radial spines, coloured cream yellow with a reddish base, or completely dark brown. The spines are 4 to 10 mm long, straight and thin, not overlapping from areole to areole. There are no central spines. Flowers are slim tubed, to 7 cm long, whitish or cream (or yellowish or greenish white), olive-green outside, opening at their widest to about 5.5 cm. Fruit is slim, more or less club-shaped, 2.5 cm long, 1.2 cm wide, greyish-olive.

Reported from Uruguay, Department Rio Negro, Nueva Melhem, near the border with Argentina; by Kiesling from Argentina, Entre Rios, Department Gualaguaychu, north of Parana over a large area, in clay soil, in areas frequently subject to flooding.

Collectors' numbers (surprisingly few!) referred here are HU 289; WR 714; Kiesling & others 5931.

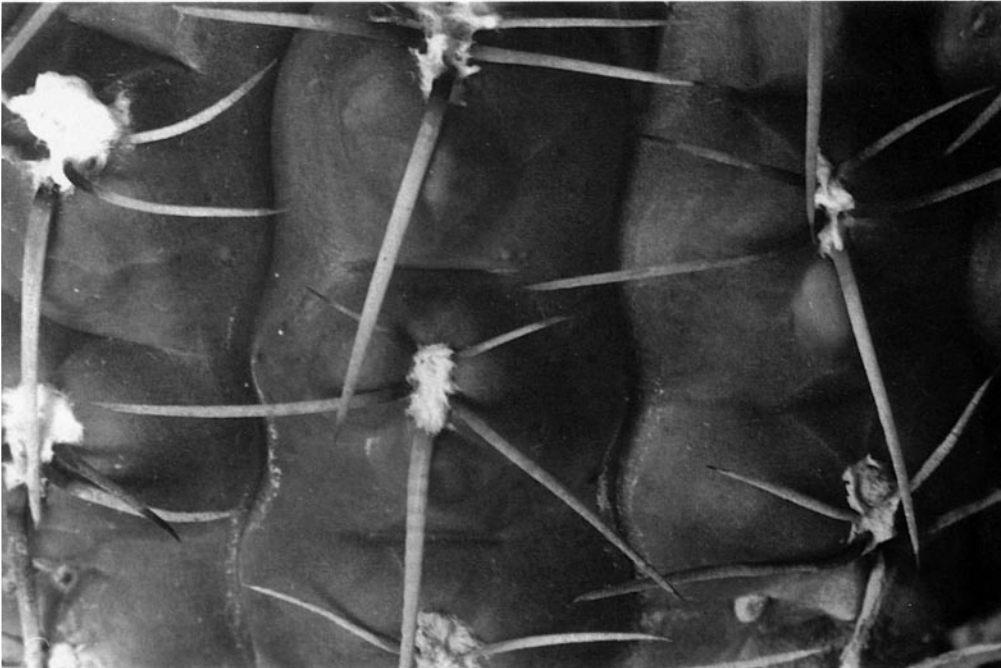


Figure 86.
G. schroederianum

Kiesling has studied this species intensively in the field, his findings reported in the US journal (ref. above). He has erected two subspecies:

subsp. **bayense**, which differs from the type by its smaller stems, 7(-10) cm in diameter, its pale grey body colouring, an occasional solitary central spine and shorter tubed flowers (4-5 cm) with obconic pericarpel. This subspecies reported from Argentina, Buenos Aires, Pdo. Olavarría, Sierras Bayas, on top of low mountains in granite rock crevices, or in humus.

Collector's number referred here is Kiesling & A.G. Lopez 4323.

The second subspecies erected by Kiesling is:

subsp. **paucicostatum**, which differs in its lower number of ribs (9-11), which are wider and sharper angled. Areoles are widely spaced, with 3, rarely 5, in a Y-shape, the lower longer, 2 to 4 cm long, strong, the others 1 to 1.5 cm, all suberect, arching outwards, horn-coloured, reddish-brown at base. Flowers are pure white with red throat, style pale green. This subspecies reported from Argentina, Corrientes, Department Curuzo Cuatía, Arroyo Mocoleta, also from Department Paso de los Libres, Río Mirinay, growing in clay soil similar to that where the type is found.

Collector's number referred here is A. Schinini 21678.

G. schuetzianum H. Till & Schatzl, Kakt. u.a. Sukk. 32(10):234-236 (1981); Bercht, Succulenta62(9):194 (1983); Lambert, Succulenta64(9): 179-182 (1985); Kundelius, Kaktusy 22(5): 97-9 (1986); Merregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 122 (1986); Metzling, Kakt. u.a. Sukk. 43(10): 215, 217 (1992); Hunt (ed.), CITES Cact. Checklist 68 (1992) (syn. *G. monvillei*). Fig. 87, Plate 109.

Subgenus *Microsemineum* Section Hybopleura

This is a comparatively recently described species, although collected long ago by



Figure 87.
G. schuetzianum

Friedrich Ritter, notable for its red, or deep pink flower colouring, little available as yet in cultivation.

The recent *CITES Cactaceae Checklist* refers it uncompromisingly to synonymy with *G. monvillei*, but its beautiful, deep pink flowers make it worth seeking out, and it may well survive as a variety of *G. monvillei*; indeed Hans Till has forecast the possible inclusion of it beneath this species, pending further field work.

It is described as a flat-globular, solitary species, 9 to 11 cm wide or more, and about two-thirds as tall, with 9 to 11 ribs, or up to 17 in older plants, eventually in age offsetting. Areoles are oval, 8 to 9 mm long, with dense white wool. Radial spines number 5, or up to 7, yellowish or yellowish-brown, darker at the tips, to 4 cm long, curving. The one similar central spine is present only on older plants. Flowers are pale red to pure red, and said to be 6 cm long, and 6 to 8 cm wide, short tubed (flowers in the photograph accompanying the original description are what I would call deep pink). Fruit is almost globose, 14 mm in diameter. Seed reddish-brown to blackish-brown, almost identical to *G. monvillei* seed.

Reported from Argentina, Province Cordoba, at Cruz del Eje.

Collector's number referred here is FR 430.

G. seminudum Hort., Ges. Ost. Kakt. Newsletter Jan./Feb. 1964-transl. Wood-Allun, The Chileans 3(14):30 (1969)

Referred to *G. megatae*.

G. sigelianum* (Schick) Bgr., Kakteen 220 (1929); Schick in Möller's Deutsche Gärten. 38:26, 201 (1923) – as *Echinocactus sigelianus*; Backeb., Die Cact. 3:1713, Figs. 1641-3 (1959); Kakteenlex. 174 (1966); Cact. Lex. (Engl. ed.) 194 (1978);

Putnam, *Gymnocalycium* 55 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 123 (1986); Hunt (ed.), *CITES Cact. Checklist* 68 (1992) (syn. *G. capillaense*)

Referred to *G. capillaense*.

G. spgazzinii Britton & Rose, *The Cact.* 3:155, Fig. 162 (type plant) (1922); Spgazzini, *Anal. Mus. Nac. Buenos Aires* 3(4):502 (1905) – as *Echinocactus toricatus* (non Poselger, 1853); Krainz, *Die Kakt.* 1.XI.CVIE (1956); Backeb., *Die Cact.* 3:1746, Fig. 1674 (1959); *Kakteenlex.* 174 (1966); *Cact. Lex. (Engl. ed.)* 194 (1978); Frank, *Kakt. u.a. Sukk.* 15(6): 116-8 (1964); Piltz, *Kakt. u.a. Sukk.* 28: 214-7 (1977); Putnam, *Gymnocalycium* 56 (1978); Wolters, *Brit. Cact. Succ. J.* 6(1):3-5 (1988); Bercht, *Succulenta* 62(10):220-4 (1983); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 124 (1986); Hunt (ed.), *CITES Cact. Checklist* 68 (1992) (accepted species). Fig. 88, Plates 5, 110 and 111.

Schütz's Subgenus *Microsemineum* Section *Loricata*;

Buxbaum's Series *Sagliones*

This well-known, beautifully spilled species is popular in collections, but slow growing. It is solitary, flat-globose, to 6 cm tall or taller in age, and to 14 cm wide, greyish-green to brown, with 10 to 15 low ribs. Areoles are oval, with creamy white to brownish-yellow wool, very dense at the growing point of the stem. Spines are thick, all radial, variable, numbering 5 to 7, curving downwards and over the ribs, 2 to 5.5 cm long, brown to greyish-brown. Flowers are white or pale pink with purple-red throat, to 7 cm long and 5 cm wide. Fruit is long-ovoid.

Reported from Argentina, over some 300 km, spreading over Salta, Tucuman and Catamarca, from Quebrada del Toro in the north to its most southerly near the Capillitas

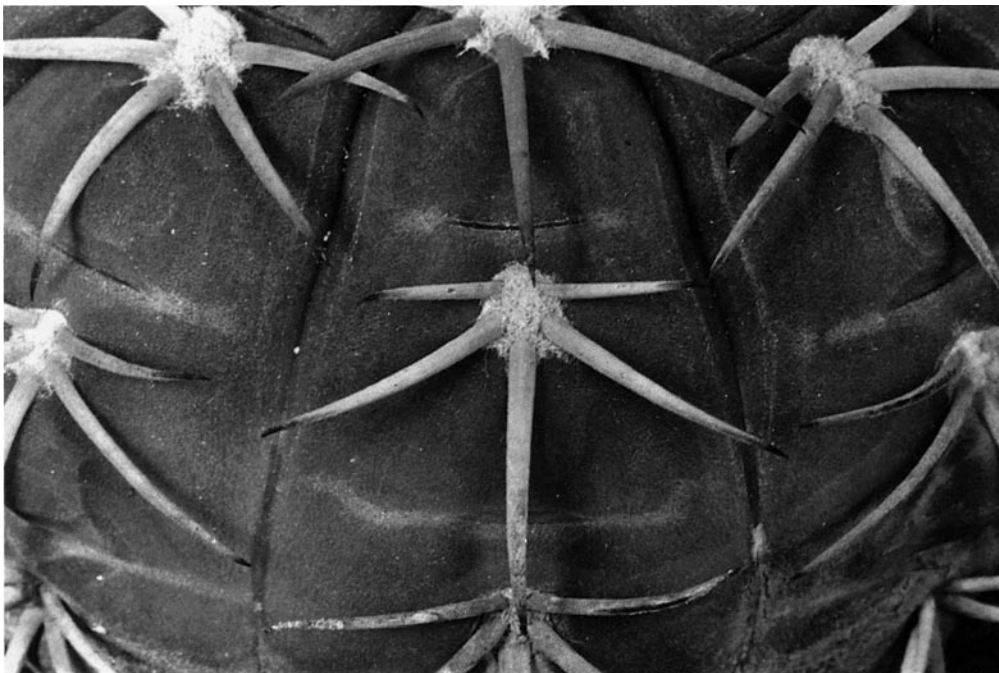


Figure 88.
G. spgazzinii

mine. Reported in particular from La Vina; Quebrada del Toro, Sierra de Quilmes; Quebrada Tucuman, Amaicha del Valle at 2300 m (7540 ft); Catamarca, Capillitas at 2800 m (9185 ft) and Cafayate; the centre reported by Piltz to be the valley of Rio Santa Maria.

Collectors' numbers referred here FR 33; Lau 451, 452, 530; WR 3; P 43, 43a-d; KK 1034; WO 15, 42, 43; B 34(194?); DV 62; JL 23, 26, 150.

Backeberg described a larger growing variant from around Cachipampa in the same area, as getting to 22 cm tall and wide, viz. *G. spegazzinii* var. *major* Backeb., Blätt. f. Kakt. 1936, 4 (1936); Die Cact. 3:1746, Fig. 1675 (1959).

G. stellatum (Spegazzini) Spegazzini, Nuev. Not. Cact. in An. Soc. Cient. Argentina 99:142/?62 (1925/?1935); Cact. Plat. Tent. in An. Mus. Nac. Buenos Aires 11 (pt.4):505 (1905) – as *Echinocactus stellatus*; Dölz, Sukkulentenk. 6:30 (1957) – as *G. quehlianum* var. *stellatum*; Backeb., Die Cact. 3:1727-8, Fig. 1662 (1959); R. Strong, Nat. Cact. Succ. J. 30:49 (1975); Putnam, Gymnocalyciums 56 (1978); Meregalli, Pianta Grasse 5(1):1985; Schütz, Monogr. Gymno. 125 (1986); H. Till, Arbeitsgr. Gymno. Österreich. Kakteenfr. 1(1): 1-2 (1988); Hunt (ed.), CITES Cact. Checklist 68 (1992) (provisionally accepted in part). Figs 4 and 89, Plate 112.

Schütz's Subgenus *Trichomosemineum*;

Buxbaum's Series Quehliana

Although Backeberg referred this species to *G. asterium*, the reverse proved to be correct, since *G. stellatum* is the prior name. The mistake was ably and fully corrected by Richard Strong of Kew (ref. above). But now, with current thinking moving to even broader definitions of species, it seems we may yet lose the name *G. stellatum*.

This species has a flattened-globose body, to about 10 cm in diameter, solitary for some time, but eventually clustering in cultivation, with matt, greyish- or brownish-

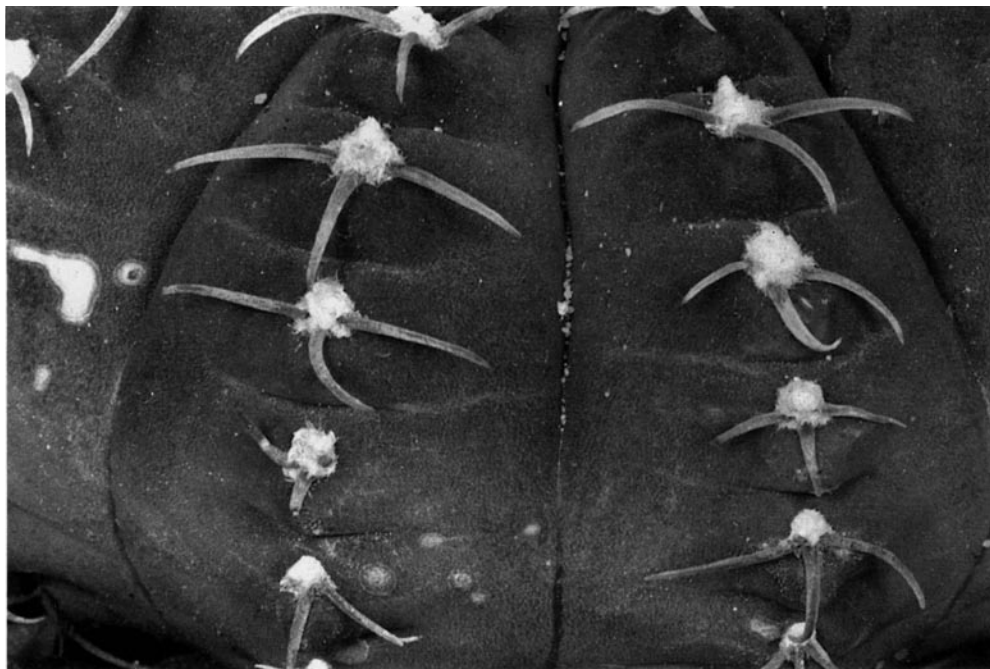


Figure 89.
G. stellatum

green colouring, and with 7 to 11 flattish-rounded ribs, and not very prominent chinning. Spines are all radial, numbering usually 3 to 5, dark brown in youth, later grey, stiff and straight to slightly curving inwards. Flowers are white, 6 to 6.5 cm long and wide. Fruit is cylindrical.

Reported from Argentina, Cordoba.

A variety was described, viz. *G. stellatum* var. *minimum* Pazout, Valnicsek & Subik, Kaktusy 132 (1960); Friciana 1/6, 7, which is possibly in reality *G. ragonesei* or a form of *G. quehlianum*.

A further variety, *G. (asterium) stellatum* var. *paucispinum* (Backeb.) Strong, l.c. Backeb., Kakteenlex. 174 (1966); Cact. Lex. (Engl. ed.) 183, Fig. 127 (1978) was described as very flat-bodied, with 10 or 11 very flat ribs, only faintly tuberculated or chinned, with shallow, transverse furrows; spines all radial, 3 in number, dark to blackish when young; flowers are smaller, 2 cm long, 3.2 cm wide, whitish with wine-red throat. Fruit is greyish-olive, top 3.5 cm long. Backeberg's figure gives the lie to most plants in cultivation under this varietal name. It has recently been reduced to subspecific status beneath *G. riojense* by Hans Till, but this is yet to be evaluated.

Reported from Argentina, La Rioja, Patquia, Sierra Mazan at 800 m (2620 ft), Nonogasta at 1500 m (4920 ft), Pagamzo at 1000 m (3280 ft), Tinogasta at 1000 m (3280 ft), Cuesta Miranda Recreo at 500 m (1640 ft), Huasca, Mendoza, Niquivil, Solar de Pipanaco at 900 m (2950 ft) altitude.

Collectors' numbers referred here are FR 435; WR 132, 548a; Lau 479; P76, 76a-c, 122, 140, 222, 224; WO 99; B3, 74; DV 59; JL 8, 13, 61; WP89-091/125?, 092/125a?, 094/125b, 096/127, 102/136?, 103/137, 104/138.

G. stenopleurum* Ritter, Kakt. Südamer. 1:265 (1979); Putnam, Gymnocalyciums 56 (1978); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 127 (1986); Hunt (ed.), CITES Cact. Checklist 68 (1992) (syn. *G. friedrichii*)
Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*;
Buxbaum's Series *Schickendanziana* Subseries *Mihanovichiana*

According to Metzger we may have to face up to this species being the valid prior name for the well-known, popular *G. friedrichii*, since there is a question mark over the validity of the latter's combination into this genus. For the present text, until this problem is resolved, *G. friedrichii* is maintained.

G. strigianum Jeggler, Kakt. u.a. Sukk. 24(12):267-8 (1973) nom. inval.; Putnam, Gymnocalyciums 56-7 (1978); H. Till, Kakt. u.a. Sukk. 38(8):191 (1987) – validation; Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 127 (1986); H. Till, Arbeitsgr. Gymno. Österreich. Kakteenfr. 1(2):3-6 (1988); Hunt (ed.), CITES Cact. Checklist 68 (1992) (provisionally accepted species). Fig. 90, Plate 113.
Schütz's Subgenus *Gymnocalycium* (*Ovatisemineum*) Section *Gymnocalycium* (*Ovatisemineum*);
Buxbaum's Series *Gymnocalycium* (*Baldiana*)

This species has been available from commercial sources in the last few years, and is a strikingly dark, almost black bodied species with spines to match. It is described as solitary, 4 to 8 cm wide, 3 to 5 cm tall, with a glaucous, blue-grey to brown or blackish-green stem. There are 8 to 12 ribs, with well spaced oval areoles with greyish-brown wool. Spines are all radial, numbering 3 to 5, 15 mm long, blackish-

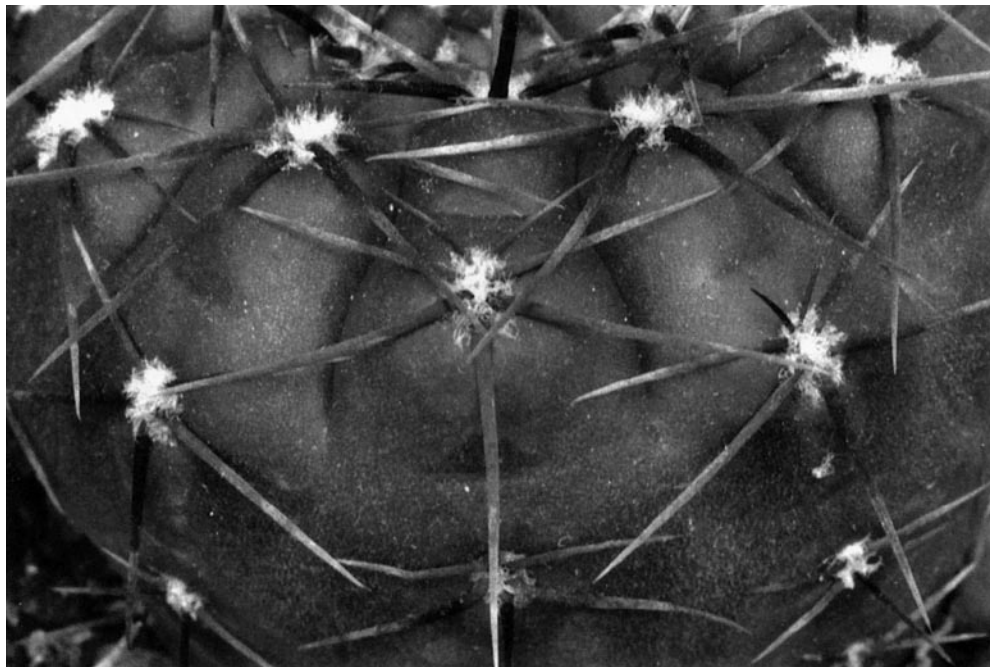


Figure 90.
G. strigianum

brown, lying close to the stem. Flowers are creamy-white, flushed pink, 5 cm long, 4 cm wide. Fruit is grey-green, longer than broad.

Reported from Argentina, province Mendoza, Quebrada del Toro, and near Zanjitas in the south of the province of San Luis.

Collectors' numbers referred here are HT 563; WR 548; LB 290, 295; WP89-063/078 (*G. borthii?*), 064/078a (*G. borthii?*); BO 89.

G. stuckertii (Spegazzini) Britton & Rose (non Fric = *G. pungens*); The Cact. 3:165, Fig. 180 (1922); Speg., Cact. Plat. Tent in Anal. Mus. Nac. Buenos Aires 111.4:502 (1905) – as *Echinocactus stuckertii*; Dölz, Sukkulantenk. 6:31 (1957); Backeb., Die Cact. 3:1733 (1959); Kakteenlex. 174 (1966); Cact. Lex. (Engl. ed.) 194 (1978); Putnam, Gymnocalyciums 58 (1978); Frank, Kakt. u.a. Sukk. 14:153-4 (1963); Pazout, Ges. Ost. Kakt. Newsletter Jan./Feb. 1964, transl. Wood-Allun, The Chileans 3(14):27-31 (1969); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 128 (1986); Hunt (ed.), CITES Cact. Checklist 68 (1992) (provisionally accepted species). Fig. 91, Plate 114.

Plates

114. *G. stuckertii*
115. *G. tanningaense* P212
116. *G. tillianum*
117. *G. triacanthum* SPI 140/74
118. *G. uebelmannianum* WR141

114		117
115		
		118
116		





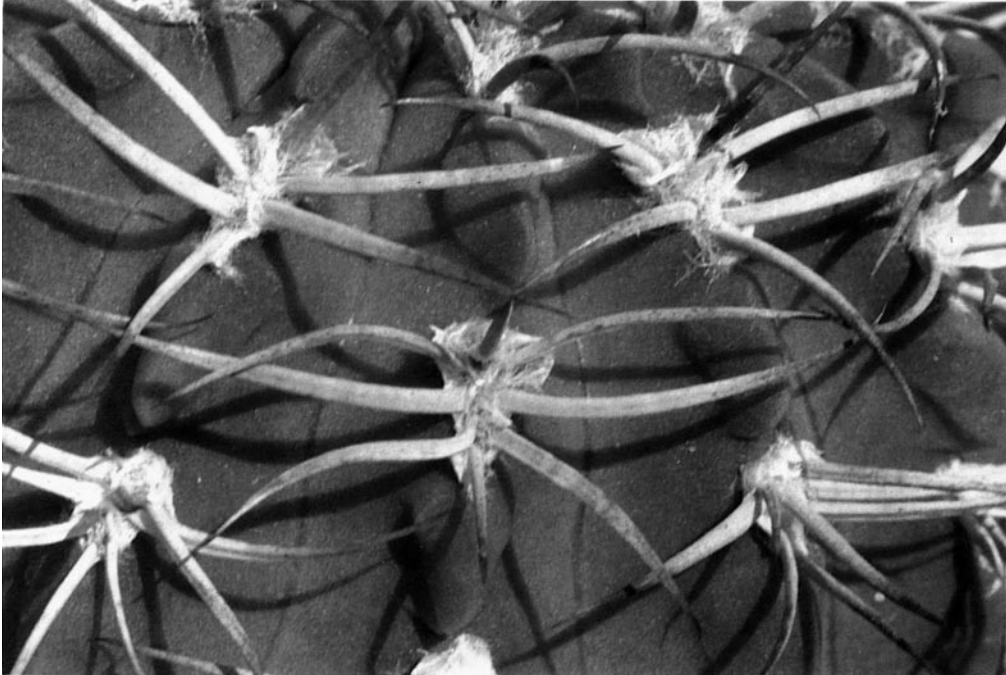


Figure 91.
G. stuckertii

Schütz's Subgenus *Muscosemineum* Section *Muscosemineum*;
Buxbaum Series *Schickendantzianae* Subseries *Schickendantzianae*

This is not a well-known species in cultivation. It is solitary, globose, sometimes flat-globose, with dull green stem, 6 to 6.5 cm wide, 3.5 to 4 cm tall, and 9 to 11 obtuse ribs, with a somewhat sharp edged chin below the areole. Spines are all radial, pinkish to brown, flattened, puberulent, 1 to 2.5 cm long, spreading. Flowers are off white, 4 cm long, short tubed.

Reported from northern Argentina, type locality province San Luis, distributed to Cordoba through Tucuman to Salta.

Collectors' numbers referred here are Lau 439 ?; LB 258, 265, 279, 475; WP89-0651 084, 066/088?, 071/092?

G. sutterianum* (Schick) Berger, *Kakteen* 220 (1929); Schick in Möller's *Deutsche Gärtnerz.* 3.8:26, 201 (1923) – as *Echinocactus sutterianus*; Oehme, *Kakt. u.a. Sukk.* 1937(12):198 (1937); Backeb., *Die Cact.* 3:1714, Figs. 1644-5 (1959); *Kakteenlex.*

Plates

		119. <i>G. uruguayense</i>
		120. <i>G. uruguayense</i> var. <i>roseiflorum</i>
119	120	121. <i>G. valnicekianum</i>
121	122	122. <i>G. vatteri</i>
123	124	123. <i>G. vatteri</i> in habitat, near Las Rojas, 850 m, Argentina
		124. <i>G. villamercedense</i>

174 (1966); Cact. Lex. (Engl. ed.) 194 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 129 (1986); Hunt (ed.), *CITES Cact. Checklist* 68 (1992) (syn. *G. capillaense*)

Referred to *G. capillaense*.

G. tanningaense Piltz, *Kakt. u.a. Sukk.* 41(2):22-26 (1990); Hunt (ed.), *CITES Cact. Checklist* 68 (1992) (provisionally accepted species). Fig. 92, Plate 115.

Schütz's Subgenus *Gymnocalycium* (*Ovatisemineum*) Section *Gymnocalycium* (*Ovatisemineum*);

Buxbaum's Series *Gymnocalycium* (*Baldiana*)

Recently described this fine-spined, attractive species is already widespread from commercially available seed.

It is described as solitary, clustering when older, flat-globular, 4.5 to 6 cm wide, 2.5 cm tall (taller in cultivation), the body with a silken sheen, lead coloured to slate-grey. There are 9 to 11 shallow ribs, weakly chinned. Areoles are round, somewhat sunken with white wool. Spines number 7 to 11, of these occasionally 1 or 2 are centrally placed, these to 11 mm long, red-brown or grey-brown to grey, darker when new, and darker at the base of the spines, thin, needle-like, straight to a little curved, the radial spines sideways and downwards pointing, 3 to 8 mm long, red-brown to grey, darker at base, similar otherwise to the centrals. Flowers (produced early in the season in cultivation) are white with faint brown midstripe to the petals, with pale yellow throat, 4 to 5.5 cm long, 3 to 4.5 cm wide, with slender calyx. Fruit is egg to club shaped, blue-green, about 2 cm long. Seed is 1.2 to 1.4 mm long, 1 to 1.2 mm broad, matt black.

Reported from Argentina, Cordoba, near Tanninga at 950 m (3120 ft) altitude.

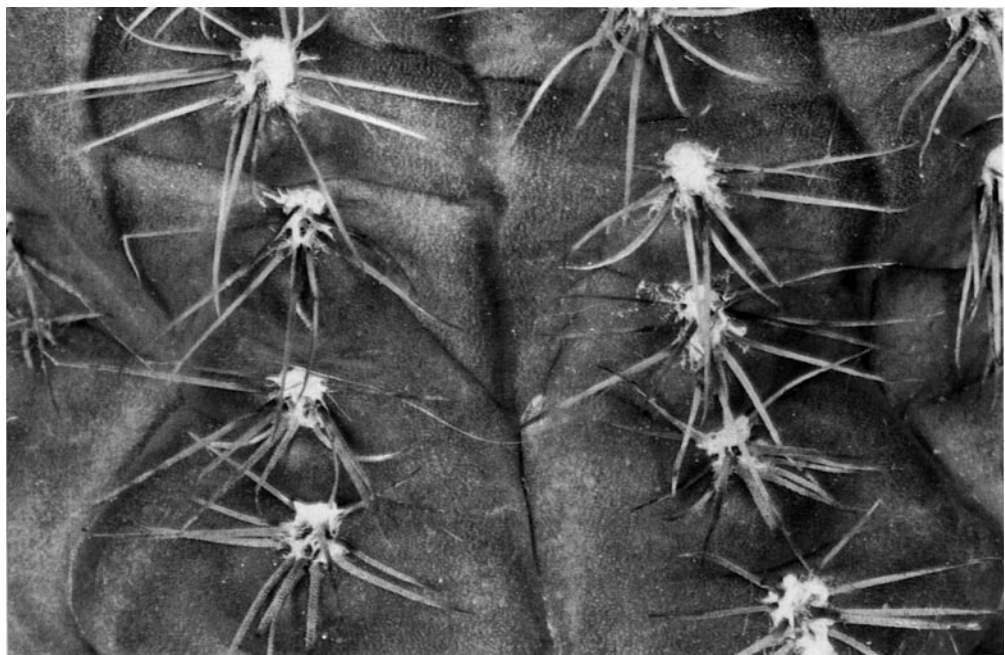


Figure 92.
G. tanningaense

G. (Brachycalycium) tilcareense* Backeberg, Kaktus ABC:295 (1935); Putnam, *Gymnocalyciums* 58-9 (1978)

See under *G. saglionis*.

G. tillianum Rausch, Kakt. u.a. Sukk. 21(4):66 (1970); van Vliet, *Succulenta* 50:42-44 (1971); *The Chileans* 7(26):66 (1973); Haage in Backeb., *Cact. Lex. (Engl. ed.)* 194 (1978); Putnam, *Gymnocalyciums* 59 (1978); Bercht, *Succulenta* 62(6): 118-20 (1983); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 130 (1986); Milt, *Gymnos* 8(15):26-32 (1991); Hunt (ed.), *CITES Cact. Checklist* 68 (1992) (provisionally accepted species). Fig. 93, Plate 116.

Schütz's Subgenus *Microsemineum* Section *Hybopleura*;

Buxbaum's Series *Mostiana*

This strong-spined, red flowered species has been getting into cultivation in recent years, and is a valuable addition to the few really red flowered species in the genus. Whether or not it is really different from the prior *G. oenanthemum* from the same area is debatable; in the recent *CITES Cactaceae Checklist* it is not declared synonymous with that species, but then neither is it categorised as more than just a provisionally accepted species. It is slow-growing, solitary, flat-globose, to 10 cm tall, 15 cm wide, described as greyish-green (it is usually a dull matt green in cultivation), with up to 15 ribs. Areoles are about 8 mm long, 5 mm wide, with creamy yellow wool. The 7 radial spines are in three pairs, curving sideways, with one pointing downwards, to 30 mm long, stiff, thickened at base, black to brown, later grey. The single central spine, not always present, is similar to the radials, curving upwards. Flowers are 3 cm long, 2.5 cm wide, with short green tube and rounded, bright red petals. Fruit is flattened-globular, green or greenish-brown with paler scales.

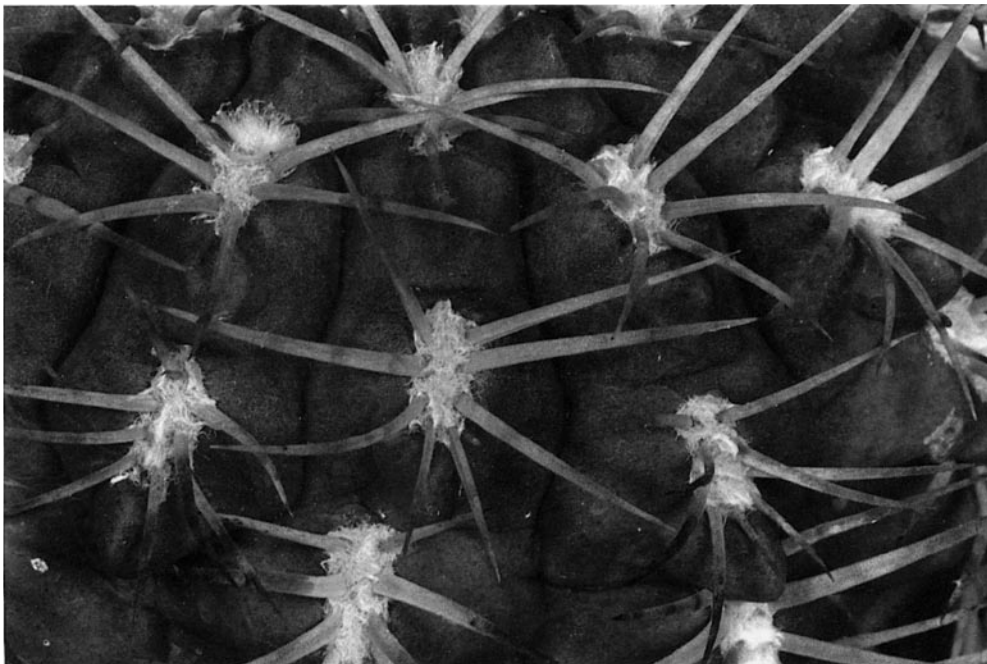


Figure 93.
G. tillianum

Reported from Argentina, Catamarca, Sierra Ambato, from 2600 to 3500 m (8530 to 11480 ft) altitude, making this, with *G. ritterianum*, the highest *Gymnocalycium* species recorded.

Collectors' numbers referred here are WR 227; Lau 488; FR 437; DV 56.

G. tobuschianum* Schick, Cact. GB 44:36 (1953); Piltz, Kakt. u.a Sukk. 30(3):64-8 (1979); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 133 (1986); Hunt (ed.), CITES Cact. Checklist 68 (1992) (syn. *G. valnicekianum*)

Referred to *G. valnicekianum*.

G. tortuga Hort.(Blossfeld), Backeberg, Die Cact. 3:1784 (1959); Kakteenlex. 174 (1966); Cact. Lex. (Engl. ed.) 194 (1978); Ritter, Kakt. Südamer. 1:269-70 (1979); Hunt (ed.), CITES Cad. Checklist 68 (1992) (syn. *G. marsoneri*)

Referred to *G. megatae*.

G. triacanthum Backeberg, Die Cact. 3:1730, Fig. 1666 (1959); Kakteenlex. 174 (1966); Cact. Lex. (Engl. ed.) 195 (1978); Putnam, *Gymnocalyciums* 59-60 (1978); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 130 (1986); Hunt (ed.), CITES Cact. Checklist 68 (1992) (provisionally accepted species). Fig. 94, Plate 117.

Schütz's Subgenus *Trichomosemineum*;

Buxbaum's Series *Quehliana*

This species has not been common in cultivation until very recently when seed and seedlings have appeared in nursery listing. Unfortunately it is often misidentified, and

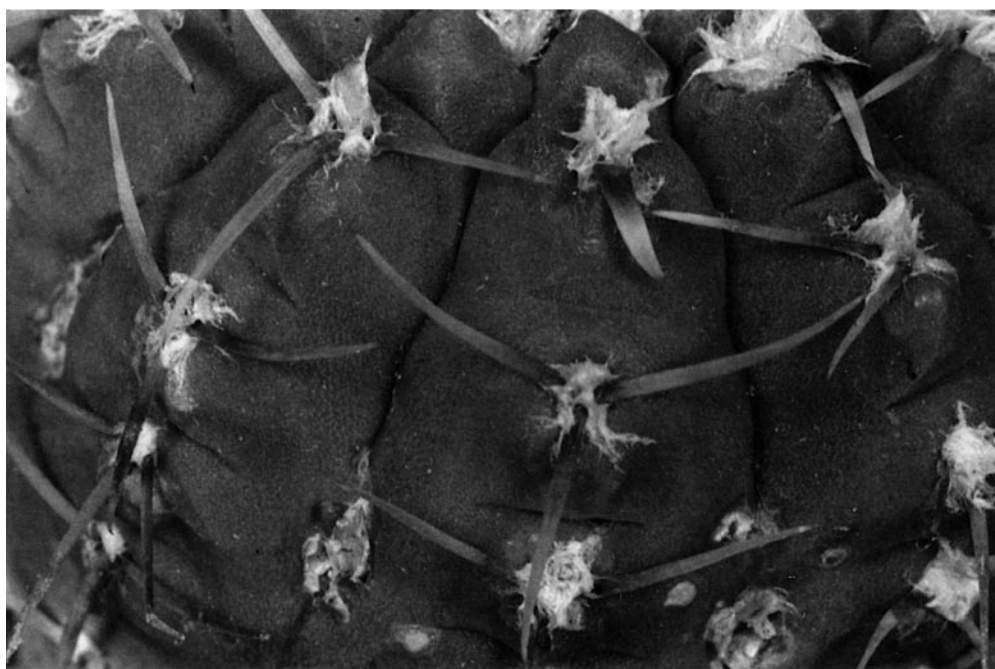


Figure 94.
G. triacanthum

what emerges are plants owing more to *G. quehlianum*. Hans Till includes it in his synonymy of *G. riojense*, but this is hard to follow, especially in view of the photograph in Backeberg's *Die Cactaceae*, which shows a plant very different from that low-growing species. It is a flat-globular plant at first, later shortly columnar, with greyish-brown to greyish-green colouring, to about 7 cm wide, 8 cm tall, with up to 12 ribs. The tubercles are not prominent, and quite closely placed. Areoles are round, with brownish-cream wool. Spines are all radial, usually 3 in number, rarely 5, to about 13 mm long, grey, at first pinkish-brown. Flowers are white, the throat pinkish, about 3.5 cm long.

Reported from Argentina, Sierra Ancasti at 600 to 700 m (1970 to 2300 ft) altitude. Collectors' numbers referred here are WR 719; P 124.

G. tuda* Y. Ito, *Expl. Diagr.* 292, 172 (1957); Backeberg, *Kakteenlex.* 174 (1966); *Cact. Lex. (Engl. ed)* 195 (1978); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 132 (1986); Hunt (ed.), *CITES Cact. Checklist* 68 (1992) (syn. *G. marsoneri*) Referred to *G. megatae*.

G. uebelmannianum Rausch, *Succulenta*, 51(4):61-4 (1972); Putnam, *Gymnocalyciums* 60 (1978); Bercht, *Succulenta* 62(4):72-8 (1983); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 133 (1986); H. Till, *Arbeitsgr. Gymno. Österreich. Kakteenfr.* 4(1):43-45 (1991); Hunt (ed.), *CITES Cact. Checklist* 68 (1992) (provisionally accepted species). Fig. 95, Plate 118.

Schütz's Subgenus *Gymnocalycium* (*Ovatisemineum*) Section *Gymnocalycium* (*Ovatisemineum*);

Buxbaum's Series *Gymnocalycium* (*Baldiana*)

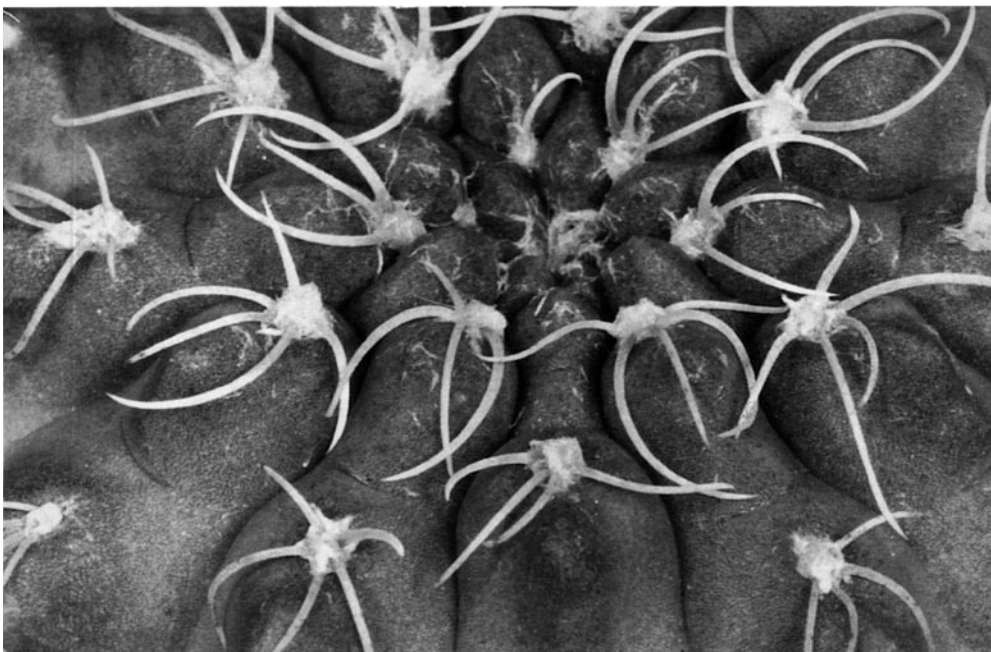


Figure 95.
G. uebelmannianum

This species has been slow to get widely into collections, but it comes readily from seed, and is an attractive species for its curling spination, which is the form usually seen. It is described as solitary, but often found in clusters in the wild through being damaged, flat-globose, to 7 cm wide, 1 cm tall (taller in cultivation, almost globose and clustering), glaucous grey-green, pulled down into the ground in the wild. Ribs are straight, 8 to 12 in number, divided into chins or tubercles, with grooves between the areoles.

Spines are all radial, numbering 5 to 7, mostly with one directed downwards, 5 to 15 mm long, flexible and somewhat curving, sometimes very tortuously, chalk white. Flowers are 3.5 cm long and wide, white, pale yellowish inside, the outer petals olive-green to somewhat brown with clear margins throat clear to indistinct pink, stigmas yellow. Fruit is broad-globose, 6 mm wide, green with yellowish-brown scales.

Reported from Argentina, La Rioja, Sierra de Velasco, at 2200 to 2800 m (7220 to 9185 ft) altitude.

Collector's number referred here is WR 141.

G. uruguayense (Arechavaleta) Britton & Rose, *The Cact.* 3:162, Fig. 172 (1922); Arechavaleta, *An. Mus. Nac. Montevideo* 5:218, Pl. 14 (1905) – as *Echinocactus uruguayensis*; Backeb., *Die Cact.* 3:1730 (1959); *Kakteenlex.* 174 (1966); *Cact. Lex.* (Engl. ed.) 195 (1978); Frank, *Kakt. u.a. Sukk.* 20(11):218-220 (1969); & 21(4):62-4 (1970); Putnam, *Gymnocalyciums* 60-1 (1978); Schloss. & Schütz, *Kakt. u.a. Sukk.* 33(2):26 (1982); Schütz, *Monogr. Gymno.* 131 (1986); Hunt (ed.), *CITES Cact.*

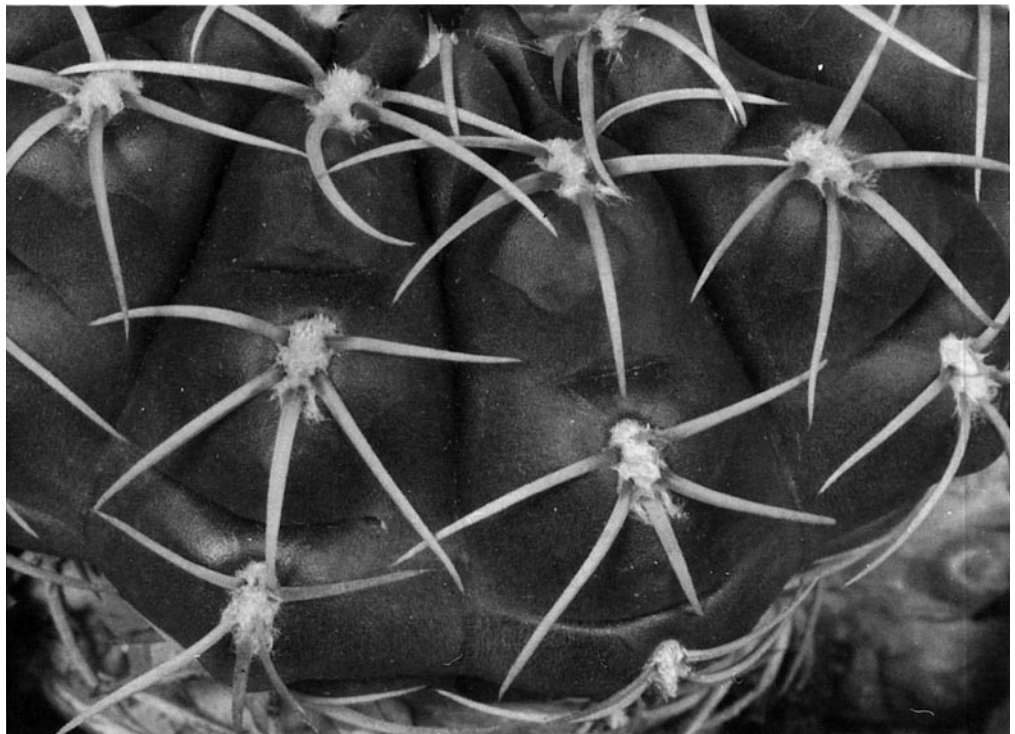


Figure 96.
G. uruguayense

Checklist 68 (1992) (accepted species); Bercht, *Gymnos* 10(19):26-30 (1993). Fig. 96, Plates 119 and 120.

Schütz's Subgenus *Macrosemineum* Section *Denudata*;
Buxbaum's Series *Uruguayenses* Subseries *Uruguayenses*

This species is a variable one, and the species *G. artigas* and *G. guerkeanum* have been referred to synonymy here.

It is a small-stemmed, clustering species, with flat-globose, shining green heads about 5 to 10 cm or so wide, with 8 to 14 ribs, usually about 8, with well-spaced areoles having yellowish-brown to whitish wool. Spines are all radial, variable in length from a few millimetres to about 2 cm, pale yellowish-brown to whitish, straight or sometimes a little curving, varying in number from about 3 to 7, lying close to the stem. Flowers are greenish-yellow to pale yellow, or white, or pale pink, often dioicous, i.e. with only male or female characters in the flower.

Reported from Uruguay extensively: the type locality Paso de los Toros, and from various localities by Hugo Schlosser (see Chapter 8), mainly in the province of Maldonado.

Collectors' numbers referred here (with some possible confusion with *G. netrelia-num*) are FR 1374; Schl. 101-106, 108, 110, 111a, 112, 113, 116, 118, 120-125, 130, 132, 133, 134; HU 60, 93, 93a; LB 633, 644, 649, 651, 658, 677, 680, 682, 691, 693, 696, 728, 732, 734, 736; GF 142, 209.

There are two varietal names associated here:

var. *floreo roseo* Fric, nom. nud. (1928), probably referable to the following named variety;

var. **roseiflorum*** Y. Ito, *Expl. Diagr.* 293, 198 (1957).

This variety is named for its pink rather than yellow flowers, but this difference hardly warrants varietal status.

Reported from Uruguay, Artigas, Paso Rial.

Collector's numbers referred here are Schl. 114, 114a, 115, 139, 140.

G. valnicekianum Jajo, *Kaktusar.* 5:7, 73 (1934); Backeb., *Die Cact.* 3:1759, Fig. 1692 (1959); *Kakteenlex.* 174 (1966); *Cact. Lex.* (Engl. ed.) 195 (1978); Putnam, *Gymnocalyciums* 61 (1978); Piltz, *Kakt. u.a. Sukk.* 30(3):64-68 (1979); Metzinger, *Kakt. u.a. Sukk.* 39(7): 19-20 (1988); Meregalli, *Piante Grasse* 5(1):1985; Schütz, *Monogr. Gymno.* 133 (1986); Hunt (ed.), *CITES Cact. Checklist* 68 (1992) (unclear – see below). Fig. 97, Plate 121.

Schütz's Subgenus *Microsemineum* Section *Hybopleura*;
Buxbaum's Series *Mostiana*

This is a well-known, very spiny species, popular with growers and magnificent clustering, large specimens are seen on the show-bench in the UK.

There seems to be an error in the *CITES Cactaceae Checklist* since this species is shown as provisionally accepted on one line and on the next referred to synonymy with *G. mostii*. I think the former is the case.

It is described as staying solitary for some time, but eventually clustering, stems globular, to about 10 cm tall, 12 cm wide, or larger in cultivation, smooth, dark grass-green, with usually 9 to 12 broadly rounded ribs, with high ridges and deep, acute furrows between the ribs. Areoles are elliptical, with grey wool.

Radial spines number 7 to 9, or to 15 or more, whitish-grey, at first darker tipped.

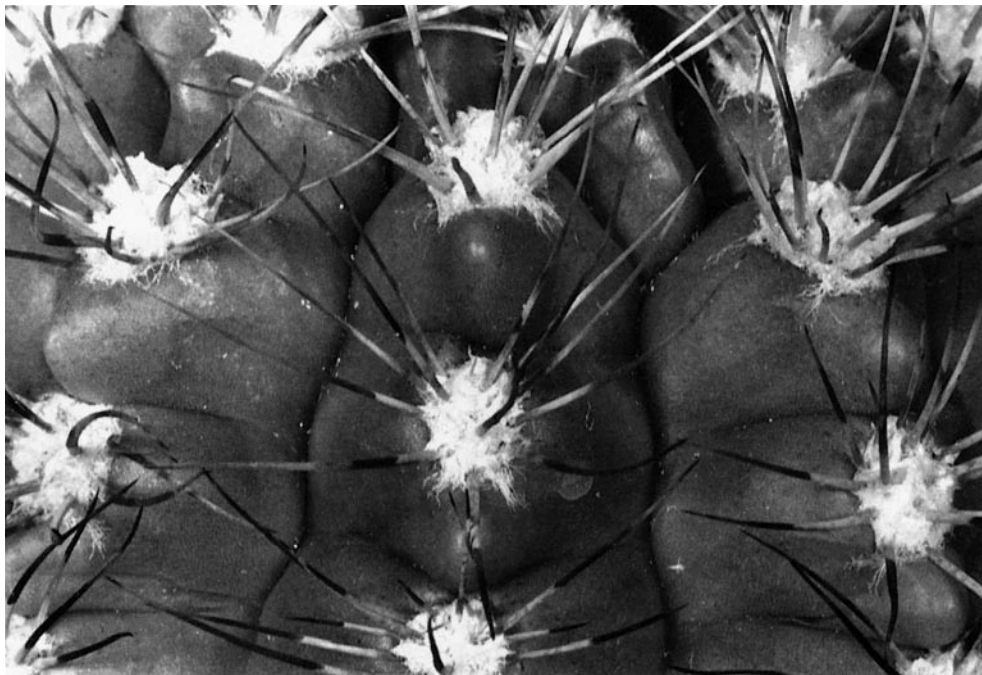


Figure 97.
G. valnicekianum

Central spines number 1 to 6, similar to the radials. Flowers are about 5 cm long and broad, or somewhat smaller, pure white, with reddish throat and reddish striped outer petals.

Reported from Argentina, Cordoba from 1000 to 1300 m (3280 to 4260 ft) altitude; Capilla del Monte, El Zapata, at 900 to 1000 m (2950 to 3280 ft); La Luna; Cordoba, Cruz del Eje; Cordoba, Cap del Monte at 1100 m (3610 ft).

Collectors' numbers referred here are FR 433; WR 725, 725a, 725b; P 83, 83a; WO 55, 59; A 108; JL4I; WP89-095/123a, 100/123?, 101/123.

Two varietal names are associated with this species, doubtfully warranting recognition in view of the variability of spination in this species, they are:

var. *centrispinum* Fleischer, nom. nud. – an undescribed variety for a form of the species with central spines;

var. *polycentralis** Schütz, Kakt. Listy 6:41 (1949) – similarly a variety described for plants with 4 to 6 central spines; reported from Argentina, Cordoba at 1100 m (3610 ft) altitude.

Collector's numbers referred here are WO 52, 60.

G. vatteri Buining, Succulenta 5:65-7 (1950); Krainz, Die Kakt. 15.1 1.CV1e (1957); Backeb., Die Cact. 3:1724 (1959); Kakteenlex. 174 (1966); Cact. Lex. (Engl. ed.) 195 (1978); Putnam, Gymnocalyciums 61(1978); Metzger, Kakt. u.a. Sukk. 43(1):unnumbered centre pages (1992); Meregalli, Pianta Grasse 5(1):1985; Schütz, Monogr. Gymno. 134 (1986); Hunt (ed.), CITES Cact. Checklist 68 (1992) (provisionally accepted species); W. Papsch, Arbeitsgr. Gymno. Österreich. Kakteenfr. 6(1): 77-82 (1993). Fig. 98, Plates 122 and 123.

Schütz's Subgenus *Trichomosemineum*;

Buxbaum's Series *Quehliana*



Figure 98.
G. vatteri

This is a slow-growing, usually solitary species, although in age it will offset around the base. It is a sparsely spined species, distinctive in its spination, although this is variable in length and thickness (see illustrations in Backeberg's *Die Cactaceae*). Wolfgang Papsch recently reduced this species beneath *G. ochoterenai* at subspecific level, at the same time erecting a new variety, viz. *G. ochoterenai* subsp. *vatteri* var. *altautinense*. Neither the amalgamation nor the new variety are acknowledged herein, the latter in particular because of the known wide variation of *G. vatteri*.

Stems are flat-globular, to 9 cm wide and 4 cm tall (larger in cultivation), dull olive greyish-green, with 11 ribs, about 2.5 cm wide are their widest development, divided into roundish humps or chins, sharply notched between. Areoles are somewhat depressed, about 5 mm wide, with short grey wool. Spines number 1 or 2, sometimes 3, standing out from the stem in youth, but later curving inwards to the body, to 2 cm long, thicker at the base. Flowers are white, with brownish-grey throat, to 5 cm long, 4 cm wide.

Reported from Argentina, Cordoba, near the village Nono in the Sierra Grande, at 800 to 1000 m (2625 to 3280 ft) altitude; by Piltz from Argentina, Las Rabonas at 900 m (2950 ft), Salsacate at 900 m (2950 ft) altitude.

Collectors' numbers referred here are FR 439; WR 110; Lau 516, 518; P 108; B 8, 117?, 123?, 149 ?; WP89-080/107, 082/109?, 0841113, 086/116.

G. velenowskyi* Spegazzini; Marshall & Bock, *Cactaceae* 152 (1941); Backeb., *Die Cact.* 3:1785 (1959)

There is little doubt that this was a case of mistaken identity, for a *Notocactus*.

G. venturianum* Fric ex Backeberg, Kaktus ABC 296 (1935); Kakteenlex. 174 (1966); Cact. Lex. (Engl. ed.) 195 (1978); Kaktusar 61 (1934); H. Till, Kakt. u.a. Sukk. 23(9): 238-40 (1972); Putnam, Gymnocalyciums 62 (1978); Bercht, Succulenta 62(4):72-8 (1983); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 32 (1986)

Referred to *G. baldianum*; the name persists in commercial listings, but with no real justification.

G. villamercedense* Ritter, nom. nud., Kakt. Südamer. 2:477 (1980); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 135 (1986); H. Till & Neuhuber, Arbeitsgr. Gymno. Osterreich. Kakteenfr. 6(3): 99-106 (1993). Plate 124.

Described briefly in Ritter's major work, as particularly waxy and without thick roots, stems about 9 to 12 cm tall and wide, green, with 13 to 18 indented, strongly chinned ribs. Areoles are 7 to 10 mm long, about 5 mm apart. There are about 10 radial spines, yellowish or reddish to black, 1 to 2 cm long. Central spines number 1 to 4, 20 to 25 mm long, curved at the tips, flower unknown, fruit red, globular.

Till and Neuhuber have recently published an expansive article combining *G. horridispinum*, *G. achirasense* and *G. brachyanthum* beneath *G. monvillei*, bringing in this hitherto undescribed name as *G. monvillei* subsp. *achirasense* var. *achirasense* fa. *villamercedense*. It is differentiated from the type form (i.e. what we usually know as *G. achirasense*) by its thinner spines and prominent chinning. See under *G. monvillei*.

G. weissianum* Backeberg, Kaktus ABC 296, 417 (1935); Die Cact. 3:1763, Figs. 1696-8 (1959); Kakteenlex. 175 (1966); Cact. Lex. (Engl. ed) 195 (1978); Putnam, Gymnocalyciums 62 (1978); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 135 (1986); Hunt (ed.), CITES Cact. Checklist 68 (1992) (syn. *G. maza-nense*)

Schütz's Subgenus *Microsemineum* Section Mazanensia;

Buxbaum's Series Mostiana

Thought for some time to be synonymous with *G. maza-nense*, this species has now been referred (along with *G. maza-nense* and *G. nidulans*) to *G. hossei*.

G. westii PC. Hutchison, Cact. Amer. 29(1):11(1957)

A species erected at the time of transfer to *Gymnocalycium* of *Weingartia* species by Paul Hutchison. This has not been accepted by any other authorities, and was returned to *Weingartia* in 1958 by John Donald.

G. zegarrae* Cardenas, Kakt. u.a. Sukk. 9(2):21 (1958); Backeb., Kakteenlex. 175 (1966); Cact. Lex. (Engl. ed.) 195 (1978); Meregalli, Piante Grasse 5(1):1985; Schütz, Monogr. Gymno. 136 (1986); Hunt (ed.), CITES Cact. Checklist 68 (1992) (syn. *G. pflanzii*). Plate 91.

Referred to *G. pflanzii*.

CHAPTER 7

Checklist of *Gymnocalycium* species

The recent publication *CITES Cactaceae Checklist*, compiled by David Hunt of the Royal Botanic Gardens, Kew, includes the latest published thinking on the taxonomy of *Gymnocalycium* according to advice on this genus by Massimo Meregalli, Detlev Metzger and Geoffrey Swales, all devotees of the genus. The checklist below is based on that contained in this publication. Species accepted are in bold, provisional species awaiting resolution are in roman, and rejected species are in italics, with their synonymy indicated.

It may well be that some of the rejected names will re-emerge in the near future at infraspecific level, as many are individual collectors' plants worthy of recognition, but this remains to be seen; my thoughts on this score are contained in the main body of this book, which also includes the benefit of recent correspondence with Detlev Metzger:

achirasense = *horridispinum*

acorrugatum

albispinum = *bruchii*

alboareolatum

altagraciense nom. prov.

ambatoense

andreae

anisitsii

antherostele = *schickendantzii*

armatum = *cardenasianum*

artigas = *uruguayense*

asterium = *stellatum*

baldianum

bayrianum

bicolor

bodenbenderianum

borthii

bozsingianum = *castellanosii* var.

brachyanthum = *monvillei*

brachypetalum = *gibbosum*

brevistylum = *marsoneri*

bruchii

bueneri

calochlorum

capillaense

cardenasianum

carminanthum

castellanosii

chiquitanum

chubutense = *gibbosum*

chuquisacanum = *pflanzii*

comarapense = *pflanzii*

curvispinum = *nigriareolatum*

damsii = *anisitsii*

deeszianum

denudatum

erinaceum

eurypleurum

eytianum = *marsoneri*

ferox = *hybopleurum*

ferrari

fleischerianum

fricianum = *marsoneri*

friedrichii

gerardii = *gibbosum*

gibbosum

glaucum

grandiflorum = *mostii*

griseo-pallidum = *anisitsii*

guanchinense

guerkeanum = *uruguayense*

hamatum = *marsoneri*

hammerschmidii = *chiquitanum*

horizonthalonium = *spgazzinii*

horridispinum

horstii

hossei

hybopleurum

- hyptiacanthum
immemoratum = *valnicekianum*
 intertextum
izozogsii = *pflanzii*
 joossensianum
 kieslingii
kozelskianum (not included, nom. inval.?)
kurtzianum = *mostii*
lafaldense = *bruchii*
lagunillasense = *pflanzii*
 leeanum
leptanthum
loricatum = *spgazzinii*
marquezii = *pflanzii*
marsoneri
matoense = *marsoneri*
 mazanense
 megalothelos
megatae = *marsoneri*
 melanocarpum
mesopotamicum
michoga = *schickendantzii*
mihanovichii
millaresii = *pflanzii*
monvillei
moserianum = *intertextum*
mostii
mucidum = *mazanense*
 multiflorum
 netrelianum
nidulans = *mazanense*
nigriareolatum
 obductum
 occultum
 ochoterenai
oenanthemum
onychacanthum = *marsoneri*
ourselianum = *multiflorum*
paediophyllum
paraguayense
parvulum = *quehlianum*
pflanzii
- piltziorum
 platense
platygonum (post-dates CITES checklist)
proliferum = *calochlorum*
pseudomalacocarpus = *marsoneri*
pugionacanthum = *hybopleurum*
 pungens
quehlianum
ragonesei
 rauschii
reductum = *gibbosum*
rhodantherum = *mazanense*
riograndense = *pflanzii*
 riojense
 ritterianum
saglionis
sanguiniflorum = *baldianum*
 schatzlianum
schickendantzii
schroederianum
schuetzianum = *monvillei*
sigelianum = *capillaense*
spgazzinii
 stellatum
stenopleurum = *friedrichii*
 striglianum
 stuckertii
sutterianum = *capillaense*
 taningaense
tilcarensis = *saglionis*
 tillianum
tobuschianum = *valnicekianum*
tortuga = *marsoneri*
 triacanthum
tudae = *marsoneri*
 uebelmannianum
uruguayense
 valnicekianum
 vatteri
weissianum = *mazanense*
zegarrae = *pflanzii*

CHAPTER 8

Field lists of *Gymnocalycium*

Please note that the names applied to the numbers in the lists below are those published by the collector himself. Subsequently it has occasionally turned out that a few identifications are incorrect, but to undertake to determine the correctness of the application of these names is beyond the scope of this author, or indeed any other I should think, so I have left them as published, without comment – see text for any further information on unfamiliar names. Alternative names or additions in round brackets () indicate subsequent amendments by the collectors themselves; those in square brackets [] indicate alternatives or additions suggested by others.

In addition to the below published lists there are others sometimes seen in cultivation, such as HT (Hans Till), FB (Franz Bozsing), GM (Günther Moser), JF (Jürgen Falkenberg), BS (Bohumil Schütz), SM (Wilhelm Simon), DJF (David Ferguson), GN (Gert Neuhuber).

ALFRED LAU COLLECTION NUMBERS (Lau)

Lau 343	<i>G. pflanzii</i> var. <i>riograndense</i>	Bolivia, Rio Grande 900-1400 m
Lau 361	<i>G. damsii</i> var. <i>tucavocense</i>	Bolivia, Aguas Sucas
Lau 363	<i>G. damsii</i> var. <i>rotundulum</i>	Bolivia, Robore 550 m
Lau 364	<i>G. sp.</i>	Bolivia, Aguas Sucas 500 m
Lau 365	<i>G. pseudomalacocarpus</i>	Bolivia, Lourdes, Taperas 550 m
Lau 366	<i>G. hammerschmidii</i> [<i>chiquitanum</i>]	Bolivia, San Jose 650 m
Lau 368	<i>G. griseo-pallidum</i>	Bolivia, Salinas 450 m
Lau 369	<i>G. damsii</i> var. <i>torulosum</i>	Bolivia, San Jose 550 m
Lau 371	<i>G. tudaе</i> [<i>megataе</i>]	Bolivia, Guanacos 400 m
Lau 372	<i>G. mihanovichii</i>	Bolivia, near Guanacos 400 m
Lau 373	<i>G. friedrichii</i>	Bolivia, Laguna N. Charagua 600 m
Lau 374	<i>G. tudaе</i> form [<i>megataе</i>]	Bolivia, E Charagua 600 m
Lau 396	<i>G. tudaе</i> form [<i>megataе</i>]	Bolivia, Boyuibe 800 m
Lau 397	<i>G. tudaе</i> var. <i>viridis</i> [<i>megataе</i>]	Bolivia, Carapara-Palos Blancos
Lau 439	<i>G. sp.</i> [<i>stuckertii?</i>]	Argentina, Tucuman, Sierra Medina 1400 m
Lau 445	<i>G. schickendantzii</i> v. <i>delatetii</i>	Argentina, Salta, Sierra Medina 700 m
Lau 446	<i>G. schickendantzii</i> form	Argentina, Salta, Sierra Medina 700 m
Lau 447	<i>G. bayrianum</i>	Argentina, Salta, Sierra Medina 1500 m
Lau 447a	<i>G. bayrianum</i>	Argentina, Tucuman/Salta border
Lau 448	<i>G. saglionis</i>	Argentina, Salta, Sierra Medina 600 m
Lau 451	<i>G. spegazzinii</i>	Argentina, Amaicha del Valle 2200 m
Lau 452	<i>G. spegazzinii</i> form	Argentina, Amaicha del Valle
Lau 472	<i>G. ragonesei</i>	Argentina, Salinas Grandes 300 m
Lau 473	<i>G. schickendantzii</i> form	Argentina, Salinas Grandes
Lau 479	<i>G. asterium</i> v. <i>paucispinum</i>	Argentina, Salinas Grandes

Lau 483	<i>G. mazanense</i>	Argentina, Mazan
Lau 485	<i>G. weissianum</i>	Argentina, Mazan 1100 m
Lau 486	<i>G. schickendantzii</i> form	Argentina, Mazan 1050 m
Lau 487	<i>G. nidulans</i>	Argentina, Poman
Lau 488	<i>G. tillianum</i>	Argentina, Sierra Ambato 2300 m
Lau 491	<i>G. hybopleurum</i>	Argentina, Hualfin 2 100 m
Lau 501	<i>G. baldianum</i>	Argentina, Ancasti 1100 m
Lau 503	<i>G. hybopleurum</i>	Argentina, Andalgalá
Lau 509	<i>G. glaucum</i>	Argentina, Tinogasta 1000 m
Lau 510	<i>G. nidulans</i> form	Argentina, Sierra Mazan 800 m
Lau 512	<i>G. polygonum</i> [<i>ochoterenai</i> form?]	Argentina, Tinogasta
Lau 513	<i>G. ochoterenai</i>	Argentina, Chilecito
Lau 516	<i>G. vatteri</i> form	Argentina, Salsacate 1000 m
Lau 517	<i>G. horridispinum</i>	Argentina, La Mudana 1200 m
Lau 518	<i>G. vatteri</i>	Argentina, Nono 800 m
Lau 530	<i>G. spegazzinii</i> <i>horizontalonium</i>	Argentina, Quebrada del Toro
Lau 531	<i>G. bodenbenderianum</i>	Argentina, Los Colorados, 800 m
Lau 580	<i>G. nidulans</i> form	Argentina, Campana
Lau 581	<i>G. ochoterenai</i>	Argentina, Campana-Famatina
Lau 929	<i>G. cardenasianum</i>	Bolivia, Carrizal 2500 m
Lau 938	<i>G. pflanzii</i> v. <i>marquezii</i>	Bolivia, Angusto Villamontes 400-1000 m
Lau 940	<i>G. pflanzii</i>	Bolivia, Rio Pilcomayo, Villamontes
Lau 942	<i>G. pflanzii</i> form	Bolivia, Eyti 1100 m
Lau 944	<i>G. pflanzii</i> v. <i>eytianum</i> [<i>megatae</i>]	Bolivia, Eyti 1100 m
Lau 944a	<i>G. tudaе</i> v. <i>chuisacanum</i>	
Lau 946	<i>G. pflanzii</i> v. <i>lagunillasense</i>	Bolivia, Lagunillas 900-2000 m
Lau 948	<i>G. pflanzii</i> v. <i>zegarrae</i>	Bolivia, Comarapa, Saipina 2000 m
Lau 950	<i>G. pflanzii</i> v. <i>comarapense</i>	Bolivia, Comarapa 2200 m
Lau 995	<i>G. pflanzii</i> v. <i>millaresii</i>	Bolivia, Millares
Lau 995a	<i>G. pflanzii</i> v. <i>millaresii</i>	Bolivia, Sotomayor 1800 m

WALTER RAUSCH COLLECTION NUMBERS (WR)

WR 3	<i>G. spegazzinii</i>	Argentina, Salta, Quebrada del Toro
WR 28	<i>G. tilcarensis</i>	Argentina, Jujuy, Quebrada de Humahuaca
WR 46	<i>G. delaetii</i>	Argentina, Salta Cafayate, Alemania
WR 100	<i>G. mostii</i>	Argentina, Cordoba, Sierra Chica
WR 102	<i>G. multiflorum</i>	Argentina, Cordoba, Sierra Chica
WR 103	<i>G. quehlianum</i>	Argentina, Cordoba, Sierra Chica
WR 103a	<i>G. quehlianum</i> v. <i>albispinum</i>	Argentina, Cordoba, Sierra Chica
WR 103b	<i>G. quehlianum</i> v. <i>kleinianum</i> n.n.	Argentina, Cordoba, Sierra Chica
WR 104	<i>G. bruchii</i>	Argentina, Cordoba, Sierra Chica
WR 106	<i>G. capillaense</i>	Argentina, Cordoba, Sierra Chica
WR 107	<i>G. calochlorum</i>	Argentina, Cordoba, Sierra Grande
WR 108	<i>G. andreae</i> v. <i>longispinum</i> n.n.	Argentina, Cordoba, Sierra Grande
WR 110	<i>G. vatteri</i>	Argentina, Cordoba, Sierra Grande
WR 111	<i>G. ochoterenai</i>	Argentina, San Luis, Sierra San Luis
WR 115	<i>G. parvulum</i>	Argentina, San Luis, Sierra San Luis
WR 121	<i>G. weissianum</i>	Argentina, La Rioja, Sierra Famatina
WR 121a	<i>G. nidulans</i>	Argentina, La Rioja, Sierra Famatina
WR 124	<i>G. saglionis</i>	Argentina, La Rioja, Sierra Famatina
WR 126	<i>G. ritterianum</i>	Argentina, La Rioja, Sierra Famatina
WR 132	<i>G. asterium</i> [<i>stellatum</i>]	Argentina, La Rioja, Patquia
WR 133	<i>G. schickendantzii</i>	Argentina, La Rioja, Patquia

WR 138	<i>G. mazanense</i> v. <i>ferox</i>	Argentina, La Rioja, Patquia
WR 141	<i>G. uebelmannianum</i>	Argentina, La Rioja, Sierra Velasco, 2500 m
WR 142	<i>G. mazanense</i>	Argentina, La Rioja, Sierra Mazan
WR 144	<i>G. nigriareolatum</i>	Argentina, Catamarca, Andalgalá
WR 145	<i>G. pugionacanthum</i> [<i>hybopleurum</i>]	Argentina, Catamarca, Hualfin
WR 150	<i>G. baldianum</i>	Argentina, Catamarca, Andalgalá, Hualfin
WR 159	<i>G. marsoneri</i>	Argentina, Salta, Quebrada del Toro
WR 183	<i>G. zegarrae</i>	Bolivia, Santa Cruz, Mataratal, Comarapa
WR 183a	<i>G. lagunillasense</i> [<i>pflanzii</i>]	Bolivia, Santa Cruz, Rio Mizque
WR 183b	<i>G. riograndense</i> [<i>pflanzii</i>]	Bolivia, Santa Cruz, Rio Grande
WR 224	<i>G. ragonesei</i>	Argentina, Córdoba, Cruz del Eje
WR 225	<i>G. leptanthum</i> [<i>kieslingii</i> ?]	Argentina, Catamarca, Sierra Ambato
WR 227	<i>G. tillianum</i>	Argentina, Catamarca, Sierra Ambato
WR 291	<i>G. millaresii</i> [<i>pflanzii</i>]	Bolivia, Potosí, Potosí
WR 350	<i>G. uruguayense</i> [later named as <i>G. rauschii</i>]	Uruguay, Tacuarembó
WR 539	<i>G. gibbosum</i> v. 'klein'	Argentina, La Pampa Lihuel Calel
WR 539a	<i>G. gibbosum</i> var. <i>platense</i>	Argentina, La Pampa. Lihuel Calel
WR 541	<i>G. schatzlianum</i>	Argentina, Buenos Aires, Balcarce
WR 548	<i>G. striglianum</i>	Argentina, Mendoza, Quebrada del Toro
WR 548a	<i>G. asterium</i> v. (<i>G. riojense</i> ssp. <i>kozelskyanuin</i> var. <i>sanjuanense</i> acc. to Till)	Argentina, Huasca, Mendoza, Niquivil?
WR 563	<i>G. mazanense</i> v.	Argentina, La Rioja, Cuesta Miranda
WR 567	<i>G. moserianum</i>	Argentina, Córdoba, Salsacate
WR 567a	<i>G. sp.</i>	Argentina, Córdoba, Salsacate
WR 568	<i>G. guanchinense</i>	Argentina, La Rioja, Cuesta Guanchin
WR 713	<i>G. bozsiangianum</i>	Argentina, Buenos Aires to La Rioja
WR 714	<i>G. schroederianum</i> var.	Argentina, Buenos Aires to La Rioja
WR 715	<i>G. castellanosi</i>	Argentina, Buenos Aires to La Rioja
WR 715a	<i>G. castellanosi</i> var.	Argentina, Buenos Aires to La Rioja
WR 716	<i>G. ferrarii/alboareolatum</i>	Argentina, Buenos Aires to La Rioja, Santa Theresa
WR 718	<i>G. glaucum/ferrari</i>	Argentina, Buenos Aires to La Rioja
WR 719	<i>G. triacanthum</i>	Argentina, Buenos Aires to La Rioja
WR 720	<i>G. oenanthemum</i>	Argentina, Buenos Aires to La Rioja
WR 721	<i>G. carminanthum</i>	Argentina, Buenos Aires to La Rioja
WR 722	<i>G. leptanthum</i>	Argentina, Buenos Aires to La Rioja
WR 724	<i>G. hybopleurum</i>	Argentina, Buenos Aires to La Rioja
WR 724a	<i>G. hybopleurum</i> var.	Argentina, Portezuela
WR 725	<i>G. valnicekianum</i>	Argentina, Córdoba
WR 725a	<i>G. valnicekianum</i> var.	Argentina, La Luna
WR 725b	<i>G. valnicekianum</i> var.	Argentina, Córdoba, Cruz del Eje
WR 726	<i>G. sutterianum</i> [<i>capillaense</i>]	Argentina, Córdoba
WR 726a	<i>G. quehlianum</i> v. <i>rolfianum</i>	Argentina, Córdoba
WR 727	<i>G. bruchii</i> var. <i>niveum</i>	Argentina, Córdoba, near Capilla del Monte

FRIEDRICH RITTER COLLECTION NUMBERS (FR)

FR 6	<i>G. villamercedense</i>	San Luis, Villa Mercedes, Juan Lierana
FR 12	<i>G. gibbosum</i>	
FR 21	<i>G. saglionis</i>	
FR 21a	<i>G. saglionis</i> v. <i>tilcarensis</i>	

FR 22	<i>G. guanchinense</i> v.	Catamarca, Catamarca
FR 22a	<i>G. guanchinense</i> v. <i>tinogastiense</i>	Tinogasta
FR 22b	<i>G. guanchinense</i> v. <i>robustius</i> n.n.	S. Maria
FR 23	<i>G. bodenbenderianum</i>	
FR 29	<i>G. pflanzii</i>	Palo Macardo
FR 33	<i>G. spegazzinii</i>	
FR 51	<i>G. saglionis</i> v. <i>tilcarensis</i>	
FR 88	<i>G. cardenasianum</i>	Bolivia, Tarija, Carrizal
FR 88a	<i>G. cardenasianum</i> var.	Argentina, El Puente, Chayasa
FR 397	<i>G. pflanzii</i> v. <i>albipulpa</i>	
FR 430	<i>G. sp.</i> [<i>schuetzianum</i>]	Argentina, Cordoba, Cruz del Eje
FR 432	<i>G. mazanense</i>	
FR 433	<i>G. valnicekianum</i> cf.	Argentina, Cordoba, Capilla del Monte
FR 434	<i>G. capillaense</i>	
FR 435	<i>G. stellatum</i> cf.	Argentina, La Rioja, Gobernador Gordillo
FR 436	<i>G. ritterianum</i>	Argentina, La Rioja, Famatina
FR 437	<i>G. oenanthemum</i> [<i>carminanthum</i>]	
FR 438	<i>G. mostii</i>	Argentina, Cordoba, Capilla del Monte
FR 439	<i>G. vatteri</i>	
FR 440	<i>G. proliferum</i> cf.	Argentina, Cordoba, Las Rabonas
FR 441	<i>G. lafaldense</i> [<i>bruchii</i>]	
FR 442	<i>G. quehlianum</i> v. <i>rolfianum</i>	Argentina, San Luis
FR 442a	<i>G. quehlianum</i> var.?	Argentina, Cordoba, Cruz del Eje
FR 442b	<i>G. quehlianum</i> cf.	Argentina, Juan Lierena
FR 443	<i>G. baldianum</i>	
FR 444	<i>G. schickendantzii</i>	Argentina, La Rioja, Cordoba
FR 444a	<i>G. schickendantzii</i> fa. <i>cristata</i>	
FR 444b	<i>G. schickendantzii</i> var.	Argentina, San Luis, Quines
FR 819	<i>G. hamatum</i> [<i>megatae</i>]	Bolivia, Tarija, Palos Blancos
FR 961	<i>G. glaucum</i>	Catamarca, Tinogasta
FR 962	<i>G. lumbrerasense</i>	Argentina, Salta, Lumbreras
FR 963	<i>G. antherostele</i> [<i>schickendantzii</i>]	Argentina, General Moldes
FR 964	<i>G. antherosacos</i> [<i>schickendantzii</i>]	Argentina, Alemania
FR 1097	<i>G. sp.</i> (<i>quehlianum</i> aff.)	Argentina, San Luis, Termas de Zapallar
FR 1103	<i>G. sp. nov.</i>	Argentina, Sierra Quines, 900-1400 m
FR 1 104	<i>G. mostii</i> var.	Argentina, Sierra Quines
FR 1105	<i>G. sp.</i>	Argentina, La Rioja, Gobernador Cordillo
FR 1131	<i>G. armatum</i> [<i>cardenasianum</i>]	El Paicho
FR 1133	<i>G. tudaе</i> var. <i>bolivianum</i> [<i>megatae</i>]	Santa Cruz, Boyuibe
FR 1176	<i>G. stenopleurum</i>	Boqueron, Cerro Leon
FR 1 177	<i>G. paediophilum</i>	Cerro Leon
FR 1178	<i>G. eurypleurum</i>	Cerro Leon
FR 1179	<i>G. damsii</i>	Concepcion, Puerto Casado
FR 1180	<i>G. tudaе</i> [<i>megatae</i>]	Filadelfia
FR 1181	<i>G. mihanovichii</i> v. <i>filadelfiense</i>	Boqueron, 160 km n. Filadelfia
FR 1372	<i>G. denudatum</i> v. <i>backebergii</i>	Rio Grande do Sul, s. Ana de Boa Vista
FR 1373	<i>G. denudatum</i> v. <i>denudatum</i>	
FR 1374	<i>G. uruguayense</i>	Rio Grande do Sul, Quarai

HUGO SCHLOSSER COLLECTION NUMBERS (Schl)

Schl 101	<i>G. uruguayense</i>	Uruguay, Artigas
Schl 102	<i>G. uruguayense</i>	Uruguay, Tacuarembó, near Tambores
Schl 103	<i>G. uruguayense/netrelianum</i>	Uruguay, Treinta y Tres

Schl 104	<i>G. uruguayense/netrelianum</i>	Uruguay, Treinta y Tres
Schl 105	<i>G. uruguayense</i>	Uruguay, Tacuarembó, Paso de los Toros
Schl 106	<i>G. uruguayense</i>	Uruguay, Rivera, Cuchilla Negra
Schl 107	<i>G. hyptiacanthum/uruguayense</i>	Uruguay, Rivera, Minas Corrales
Schl 108	<i>G. uruguayense</i>	Uruguay, Tacuarembó, Paso de los Toros
Schl 109	<i>G. hyptiacanthum</i>	Uruguay, Maldonado, Laguna del Sauce
Schl 110	<i>G. uruguayense</i>	Uruguay, Rivera, Cuchilla Negra
Schl 111	<i>G. hyptiacanthum</i>	Uruguay, Artigas, Colonia Pintado
Schl 111a	<i>G. uruguayense</i>	
Schl 112	<i>G. uruguayense</i>	Uruguay, Tacuarembó
Schl 113	<i>G. uruguayense</i>	Uruguay, Cerro Largo Melo
Schl 113a	<i>G. leeanum</i>	Uruguay, Cerro Largo Melo
Schl 114	<i>G. uruguayense</i> var. <i>roseiflorum</i>	Uruguay, Artigas, Paso Rial
Schl 114a	<i>G. uruguayense</i> var. <i>roseiflorum</i>	Uruguay, Artigas, Paso Rial
Schl 115	<i>G. uruguayense</i> var. <i>roseiflorum</i>	Uruguay, Artigas, Paso Rial
Schl 116	<i>G. uruguayense</i>	Uruguay, Artigas, Paso Rial
Schl 117	<i>G. denudatum</i>	Brazil, Cacapava do Sul
Schl 118	<i>G. uruguayense</i>	Uruguay, Tacuarembó
Schl 119	<i>G. hyptiacanthum/netrelianum</i>	Uruguay, Lavaleja, Durazno to Treinta y Tres u Battle y Ordonez
Schl 120	<i>G. uruguayense/netrelianum</i>	Uruguay, Lavaleja, Estancia Salus
Schl 121	<i>G. uruguayense</i>	Uruguay, Tacuarembó
Schl 122	<i>G. uruguayense/netrelianum</i>	Uruguay, Lavaleja, Aigua
Schl 123	<i>G. uruguayense</i>	Uruguay, Rio Negro
Schl 124	<i>G. uruguayense/netrelianum</i>	Uruguay, Treinta y Tres
Schl 125	<i>G. uruguayense</i>	Uruguay, Tacuarembó, Tambores
Schl 126	<i>G. hyptiacanthum/netrelianum</i>	Uruguay, Canelones, Cerro Piedras de Afilas
Schl 127	<i>G. hyptiacanthum/netrelianum</i>	Uruguay, Soriano, Mercedes
Schl 128	<i>G. hyptiacanthum/netrelianum</i>	Uruguay, Rio Negro
Schl 129	<i>G. hyptiacanthum/netrelianum</i>	Uruguay, Salta, Termas de Arapey
Schl 130	<i>G. uruguayense</i>	Uruguay, Rivera, Cuchilla Negra
Schl 131	<i>G. hyptiacanthum/netrelianum</i>	Uruguay, Lavalleja, Arroyo, Casupa Chico
Schl 132	<i>G. uruguayense/netrelianum</i>	Uruguay, Treinta y Tres
Schl 133	<i>G. uruguayense</i>	Uruguay, Artigas
Schl 134	<i>G. uruguayense</i>	Uruguay, Durazno, Paso de los Toros
Schl 135	<i>G. hyptiacanthum</i>	Uruguay, Salto, Termas de Dayman
Schl 136	<i>G. hyptiacanthum/netrelianum</i>	Uruguay, Colonia
Schl 137	<i>G. denudatum</i>	Uruguay, Cacapava do Sul
Schl 138	<i>G. hyptiacanthum/netrelianum</i>	Uruguay, Maldonado, Punta Ballena
Schl 139	<i>G. uruguayense</i> var. <i>roseiflorum</i>	Uruguay, Artigas, Cuaro
Schl 140	<i>G. uruguayense</i> var. <i>roseiflorum</i>	Uruguay, Artigas, Cuaro

JORG PILTZ COLLECTION NUMBERS (P)

P5	<i>G. capillaense</i> fa.	Argentina, Cordoba,
P5a	<i>G. capillaense</i>	Argentina, Cordoba, Rio Tercera
P6	<i>G. multiflorum</i>	Argentina, Cordoba, Cordoba. El Hongo
P12	<i>G. multiflorum</i>	Argentina, Cordoba, Sierra Tulumba, 900 m
P12a	<i>G. multiflorum</i>	Argentina, Cordoba, Sierra Tulumba
P12b	<i>G. multiflorum</i>	Argentina, Cordoba, Cosquin, 1100 m
P12c	<i>G. multiflorum</i>	Argentina, Cordoba, Pampa de Achala, 1000 m
P12d	<i>G. multiflorum</i>	Argentina, Cordoba, Copina
P13	<i>G. quehlianum</i>	Argentina, Cordoba, Sierra Tulumba
P13a	<i>G. quehlianum</i>	Argentina, Cordoba, Sierra Tulumba

P13b	<i>G. quehlianum</i>	Argentina, Cordoba, Cosquin, 1000 m
P13c	<i>G. quehlianum</i>	Argentina, Cordoba, Villa Tulumba, 800 m
P17	<i>G. schickendantzii</i> form	Argentina, Catamarca, Salinas Grandes, 400 m
P17a	<i>G. schickendantzii</i>	Argentina, La Rioja, Sierra de Velasco, 1600-1700 m
P17b	<i>G. schickendantzii</i>	Argentina, La Rioja, Sierra de Velasco, 1300 m
P17c	<i>G. schickendantzii</i>	Argentina, Catamarca, Quebrada de Sebila, 1100 m
P17d	<i>G. schickendantzii</i>	Argentina, La Rioja, Nonogasta, 1500 m
P17e	<i>G. schickendantzii</i>	Argentina, La Rioja, Paganzo, 1000 m
P17f	<i>G. schickendantzii</i>	Argentina, La Rioja, Sierra de Malanzan, 800 m
P17g	<i>G. schickendantzii</i>	Argentina, Cordoba, Serrezuela, 700 m
P17h	<i>G. schickendantzii</i>	Argentina, Zanjitas, 700 m
P17j	<i>G. schickendantzii</i>	Argentina, Cruz del Eje
P17k	<i>G. schickendantzii</i>	Argentina, Cordoba, Sierra Tulumba, 900 m
P17l	<i>G. schickendantzii</i>	Argentina, Tres Puentes
P17m	<i>G. schickendantzii</i>	Argentina, Suriyaco, 1200 m
P17n	<i>G. schickendantzii</i>	Argentina, Carrizal, 900 m
P17o	<i>G. schickendantzii</i>	Argentina, Salarde Pipanaca, 900 m
P17p	<i>G. schickendantzii</i>	Argentina, Cuesta de Clavillo, 1000 m
P17q	<i>G. schickendantzii</i>	Argentina, Cruz del Eje, La Falda, 700 m
P17r	<i>G. schickendantzii</i>	Argentina, Serrezuela
P17s	<i>G. schickendantzii</i>	Argentina, La Rioja, Chepes Viejo, 700-800 m
P17t	<i>G. schickendantzii</i>	Argentina, La Rioja, Sanagasta, 1100 m
P18	<i>G. ragonesei</i>	Argentina, Cordoba, Salinas Grandes, 400 m
P22	<i>G. ambatoense</i>	Argentina, Catamarca, Concepcion
P24	<i>G. sp. (nigriareolatum?)</i>	Argentina, Catamarca, Dique de Catamarca, 600-800 m
P26	<i>G. saglionis</i>	Argentina, Catamarca, Dique de Catamarca
P29	<i>G. ambatoense</i>	Argentina, Catamarca, Chumbicha
P29a	<i>G. ambatoense</i>	Argentina, Catamarca, Chumbicha
P30	<i>G. mazanense</i>	Argentina, La Rioja, Quebrada de Cebila, 1000 m
P30a	<i>G. mazanense</i>	Argentina, La Rioja, Quebrada de Cebila, 1200 m
P30b	<i>G. mazanense</i>	Argentina, La Rioja, Quebrada de Cebila, 1500 m
P31	<i>G. ochoterenai</i>	Argentina, La Rioja, Sierra de Velasco, 1400 m
P36	<i>G. glaucum</i>	Argentina, Catamarca, SE of Tinogasta, 1000 m
P36a	<i>G. glaucum</i> var. nov.	Argentina, Salicas, 1600 m
P38	<i>G. piltziorum</i>	Argentina, Sierra de Velasco, 1200 m
P39	<i>G. sp. (cf. hybopleurum)</i>	Argentina, Sierra de Graciana
P43	<i>G. spegazzinii</i>	Argentina, Salta, Sierra de Quilmes
P43a	<i>G. spegazzinii</i>	Argentina
P43b	<i>G. spegazzinii</i>	Argentina, Tucuman, Amaicha, 2300 m
P43c	<i>G. spegazzinii</i>	Argentina, Catamarca, Capillitas, 2800 m
P43d	<i>G. spegazzinii</i>	Argentina, Salta, Quebrada de Cafayate
P55	<i>G. delaetii</i>	Argentina, Salta, Quebrada de Cafayate, 1400 m
P60	<i>G. saglionis</i>	Argentina, Cafayate
P70	<i>G. tilcarensis</i>	Argentina, Quebrada de Purmamarca
P72	<i>G. pugionacanthum</i>	Argentina, Catamarca, Andalgalá, 1000 m
P73	<i>G. hybopleurum?</i>	Argentina, Catamarca, Andalgalá, 1000 m
P73a	<i>G. hybopleurum?</i>	Argentina,
P75	<i>G. mazanense</i> form (<i>rhodanthemum?</i>)	Argentina, La Rioja, Sierra Mazan, 1000 m
P76	<i>G. stellatum</i>	Argentina, La Rioja, Sierra Mazan, 800 m
P76a	<i>G. stellatum</i> fa. (aff. <i>kozelskyanum</i>)	Argentina, La Rioja, Sierra de los Colorados, 1100 m
P76b	<i>G. stellatum</i> form	Argentina, La Rioja, Nonogasta, 1500 m
P76c	<i>G. stellatum</i> form	Argentina, La Rioja, Paganzo, 1000 m
P79	<i>G. mazanense</i> fa.? (<i>nidulans</i>)	Argentina, Sierra de los Colorados, Guanchin, 1300 m

P80	<i>G. castellanosii</i> form	Argentina, Sierra de los Colorados, S. Malanzan, north of Tama, 800 m
P80a	<i>G. castellanosii</i> form	Argentina, S. Malanzan, north of Tama
P80b	<i>G. castellanosii</i>	Argentina, S. Malanzan, La Aguadita
P80c	<i>G. castellanosii</i>	Argentina, S. Malanzan, south of Atilas
P81	<i>G. aff. moserianum</i>	Argentina, Cordoba, Villa de Soto, 700-800 m
P81 a	<i>G. moserianum</i> var.	Argentina, Cuesta La Higuerra, 800 m
P82	<i>G. capillaense</i>	Argentina, Cordoba, Cap. del Monte, 1100 m
P82a	<i>G. capillaense</i>	Argentina, Cordoba, Cosquin, 1 100 m
P83	<i>G. valnicekianum</i>	Argentina, Cordoba, Cap. del Monte, 1100 m
P83a	<i>G. valnicekianum</i>	Argentina, Cordoba, Cap. del Monte
P84	<i>G. mostii</i>	Argentina, Cordoba, La Falda
P90	<i>G. moserianum</i>	Argentina, Serrezuela
P93	<i>G. schatzlianum</i>	Argentina, Prov. Buenos Aires, 300 m
P94	<i>G. gibbosum</i> type?	Argentina, Abrade la Ventana, 400-500 m
P95	<i>G. gibbosum</i> var.	Argentina, Rio Colorado, 300 m
P97	<i>G. gibbosum</i> var.	Argentina, Puelches, 400 m
P100	<i>G. gibbosum</i> v. <i>brachypetalum</i>	Argentina, Chelforo, 300 m
P101	<i>G. gibbosum</i> v. <i>brachypetalum</i>	Argentina, Choele, Choel, 300 m
P103	<i>G. sp. (capillaense)</i>	Argentina, Prov. San Luis, 1000 m
P103a	<i>G. sp. -capillaense</i>	Argentina, Prov. San Luis, 1100 m
P103b	<i>G. sp. -sutterianum</i>	Argentina, Prov. San Luis, 1000 m
P103c	<i>G. sp.</i>	Argentina, Prov. San Luis, 1000 m
P104	<i>G. achirasense</i>	Argentina, Va. del Carmen, 900-1100 m
P104a	<i>G. achirasense</i>	Argentina, Mercedes, 1000 m
P104b	<i>G. achirasense</i>	Argentina, El Trapiche, 1100 m
P104c	<i>G. achirasense</i>	Argentina, Cordoba, Alpa Corral
P106	<i>G. sp. nov. (stuckertii)</i>	Argentina, Prov. San Luis, 1100 m
P106a	<i>G. sp. nov., var. nov.</i>	Argentina, Prov. San Luis, 1000 m
P108	<i>G. vatteri</i>	Argentina, Las Rabonas, 900 m
P109	<i>G. calochlorum</i>	Argentina, Nono, 1000 m
P109a	<i>G. calochlorum</i>	Argentina, Las Rabonas, 900 m
P109b	<i>G. calochlorum</i>	Argentina, Villa Cura Brochero, 1000 m
P113	<i>G. intermedium</i> nom. prov.	Argentina, Salsacate, 900 m
P116	<i>G. bicolor</i>	Argentina, Cordoba, 500 m
P117	<i>G. quehlianum</i>	Argentina, Cordoba
P118	<i>G. vatteri</i> var.	Argentina, Salsacate, 900 m
P119	<i>G. altagraciense</i>	Argentina, Villa de Maria, 500 m
P119a	<i>G. altagraciense</i>	Argentina, Sierra Tulumba, 900 m
P121	<i>G. ragonesei</i> var. (later named as <i>G. obductum</i>)	Argentina, Salinas, 400 m
P122	<i>G. stellatum</i> var.	Argentina, Recreo, 500 m
P124	<i>G. triacanthum</i> (sensu Rausch)	Argentina, Sierra Ancasti, 600-700 m
P126	<i>G. saglionis</i>	Argentina, Sierra Ancasti, 900 m
P127	<i>G. baldianum</i>	Argentina, Sierra Ancasti, 900 m
P127a	<i>G. baldianum</i>	Argentina, Cuesta de Portezuelo, 1700 m
P130	<i>G. nigriareolatum</i> var.	Argentina, Cuesta de Portezuelo, 900-1500 m
P131	<i>G. occultum</i>	Argentina, Tres Puentes, 700 m
P131a	<i>G. occultum</i>	Argentina, Catamarca, Sierra Ambato, 1000 m
P131b	<i>G. occultum</i>	Argentina, Catamarca, Sierra Ambato, 1300 m
P132	<i>G. nigriareolatum</i>	Argentina, El Portezuelo, 800 m
P133	<i>G. carminanthum</i>	Argentina, Sierra Ambato, 1600 m
P136	<i>G. ferrari</i>	Argentina, La Rioja, 1000 m
P138	<i>G. nidulans</i>	Argentina, La Pena, 900-1000 m

P139	<i>G. mazanense</i> var.	Argentina, Carrizal, 900 m
P140	<i>G. stellatum</i> var.	Argentina, Solar de Pipanaco, 900 m
P152	<i>G. sp.</i>	Argentina, Vipos, 800 m
P154	<i>G. pflanzii</i>	Argentina, Rio Juramento, 800 m
P159	<i>G. nigriareolatum</i> var.	Argentina, Palo Labrado, 700 m
P160	<i>G. quehlianum</i> var.	Argentina, Cruz del Eje to Falda, 700 m
P161	<i>G. hybopleurum</i>	Argentina, Catamarca, 800 m
P165	<i>G. baldianum</i>	Argentina, Cuesta de Totoral, 1100 m
P173	<i>G. sp.</i> [vatteri?]	Argentina, Cordoba, 1600 m
P174	<i>G. bruchii</i>	Argentina, Cordoba, 1300 m
P176	<i>G. mostii</i>	Argentina, Cordoba
P178	<i>G. borthii</i>	Argentina, San Luis
P180	<i>G. quehlianum</i>	Argentina, Cordoba, Rio Tercero
P182	<i>G. multiflorum</i>	Argentina, Cordoba, Mina Clavero
P187	<i>G. quehlianum</i>	Argentina, Cordoba, Copina, 1300 m
P191	<i>G. aff. sutterianum</i>	Argentina, Cordoba, Alpa Corral
P192	<i>G. sp.</i>	Argentina, Cordoba, Berrotaran, 700 m
P194	<i>G. quehlianum</i>	Argentina, Sierra de los Condores, 550 m
P195	<i>G. sp. aff. sutterianum</i>	Argentina, Cordoba, Villa C. de America, 800 m
P196	<i>G. quehlianum</i>	Argentina, Cordoba, Villa C. de America, 800 m
P197	<i>G. quehlianum</i>	Argentina, Cordoba, Alta Gracia, 750 m
P198	<i>G. quehlianum</i>	Argentina, Cordoba, Copina, 1100 m
P199	<i>G. andreae</i>	Argentina, Cordoba, El Condor, 2000 m
P200	<i>G. bruchii</i> var.	Argentina, Cordoba, Copina, 1250 m
P201	<i>G. mostii</i>	Argentina, Cordoba, Copina, 1250 m
P202	<i>G. quehlianum</i>	Argentina, Cordoba Villa Carlos Paz, 700 m
P203	<i>G. calochlorum</i> v. <i>proliferum</i>	Argentina, Cordoba, Villa Carlos Paz, 700 m
P205	<i>G. bozsingianum</i>	Argentina, La Rioja, Chepes Viejo, 700 m
P206	<i>G. aff. bodenbenderianum</i>	Argentina, La Rioja Ulapes, 500 m
P209	<i>G. castellanosii</i>	Argentina, La Rioja, Ambil, 750 m
P211	<i>G. calochlorum</i> var.	Argentina, Cordoba, La Mudana, 1000 m
P212	<i>G. sp. nov.</i> (later named as <i>G. tanningaense</i>)	Argentina, Cordoba, Salsacate, 950 m
P213	<i>G. andreae</i>	Argentina, Cordoba, Cerro los Gigantes, 1900 m
P214	<i>G. bruchii</i> var. <i>briggittae</i>	Argentina, Cordoba, Tanninga, 1850 m
P216	<i>G. platygonum</i>	Argentina, La Rioja 750 m
P217	<i>G. castellanosii</i> var. <i>armillatum</i>	Argentina, La Rioja, Ulapes, 500 m
P218	<i>G. glaucum</i>	Argentina, Tinogasta, 1000 m
P219	<i>G. ritterianum</i>	Argentina, La Rioja, Sierra Famatina, 1800 m
P220	<i>G. alboareolatum</i> [kieslingii var. <i>castaneum</i>]	Argentina, La Rioja, 1100 m
P221	<i>G. sp.</i> [alboareolatum]	Argentina, La Rioja, Sanagasta, 1100 m
P222	<i>G. stellatum</i> var.	Argentina, Cuesta Miranda
P223	<i>G. mazanense</i> var. <i>polycephalum</i>	Argentina, La Rioja, Sierra de Velasco, 1500 m
P224	<i>G. stellatum</i> var.	Argentina, Tinogasta, 1000 m
P226	<i>G. sp.</i> [cf. <i>guanchinense</i>]	Argentina, Cuesta Miranda, 1500 m
P230	<i>G. marsoneri</i>	Argentina, Salta, Campo Quijano, 1100 m
P240	<i>G. pflanzii</i>	Argentina, Jujuy, 600 m
P241	<i>G. mesopotamicum</i>	Argentina, Corrientes, 200 m
P242	<i>G. mihanovichii</i> var.	Argentina, Chaco Austral, 150 m
P378	<i>G. andreae</i> var.	Argentina, Cordoba, Pampa de San Luis, 2000 m
P379	<i>G. capillaense</i> var.	Argentina, La Higuera, 700 m
P380	<i>G. spec. nov.</i>	Argentina, Cordoba, Sa. Tulumba, 1000 m

P381	<i>G. erinaceum</i>	Argentina, Cordoba, Sa. Tulumba, 1000 m
P383	<i>G. kieslingii</i>	Argentina, La Rioja, Cuesta Huaco, 1100 m
P385	<i>G. ferrari</i>	Argentina, La Rioja, Sa. Mazan, 800 m
P393	<i>G. castellanosii</i>	Argentina, La Rioja, Olta, 650 m
P397	<i>G. schroederianum</i>	Argentina, Entre Rios, Rio Gualeguaychu, 150 m
P399	<i>G. bayrianum</i>	Argentina, Tucuman, N. Trancas, 800 m
P400	<i>G. spec. nov.</i>	Argentina, Cordoba, Ongamira, 1000 m
P402	<i>G. stellatum</i>	Argentina, Catamarca, Salinas Grandes, 400 m
P406	<i>G. capillaense</i>	Argentina, Cordoba, Ongamira, 1000 m
P411	<i>G. fleischerianum</i>	Paraguay, Cordillera, Oyopoi
P416	<i>G. fleischerianum</i>	Paraguay, Cordillera, Pirareta
P430	<i>G. mihanovichii</i> v. <i>filadelfiense</i>	Paraguay, Boqueron, Mcal. Estigarribia
P431	<i>G. eurypleurum</i>	Paraguay, Nueva Asuncion, S. Cerro Leon, 200 m
P434	<i>G. eurypleurum</i>	Paraguay, Nueva Asuncion, Cerro Leon
P435	<i>G. friedrichii</i> v. <i>moserianum</i>	Paraguay, Nueva Asuncion, Amenco Picco
P443	<i>G. fleischerianum</i>	Paraguay, Cordillera, Saltos Amambay
P447	<i>G. paraguayense</i>	Paraguay, Cordillera, Cerro Pero
P452	<i>G. paraguayense</i>	Paraguay, Paraguari, Ita Moroti
P453	<i>G. fleischerianum</i>	Paraguay, Cordillera, Piribebuy

KAREL KNIZE COLLECTION NUMBERS (KK)

KK 149	<i>G. uruguayense</i>	Uruguay, Paso de los Toros
KK153	<i>G. leeanum</i>	Uruguay, Las Minas
KK161	<i>G. albiflorum</i>	Brazil, Libramento, 1200 m
KK492	<i>G. comarapense</i>	Bolivia, Comarapa
KK497	<i>G. damsii</i> v. <i>torulosum</i>	Bolivia, San Jose, 600 m
KK503	<i>G. damsii</i> fa.	Paraguay, Bahia Negra, 400 m
KK504	<i>G. damsii</i> v. <i>tucavocense</i>	Bolivia, Tucavoca San Jose, 600 m
KK506	<i>G. damsii</i> fa.	Paraguay, Bahia Negra, 500 m
KK509	<i>G. pseudomalacocarpus</i>	Bolivia, San Jose, 500 m
KK510	<i>G. griseo-pallidum</i>	Paraguay, Salinas, 400 m
KK511	<i>G. chiquitanum</i>	Bolivia, San Jose, 600 m
KK512	<i>G. damsii</i> v. <i>rotundulum</i>	
KK519	<i>G. comarapense</i>	Bolivia, Comarapa, 1200 m
KK520	<i>G. eytianum</i> [pflanzii]	Bolivia, Eyti, 1200 m
KK521	<i>G. marquezii</i> [pflanzii]	Bolivia, Via Montes 1000 m
KK523	<i>G. pflanzii</i>	Argentina, Yacuba, 1200 m
KK524	<i>G. zegarrae</i> [pflanzii]	Bolivia, Mataral
KK651	<i>G. damsii</i>	Paraguay, Bahia Negra, 400 m
KK676	<i>G. cardenasiatum</i>	Bolivia, Carrizal, 800 m
KK715	<i>G. cardenasiatum</i> v. <i>horridispinum</i>	Bolivia, Carrizal, 1000 m
KK716	<i>G. weissianum</i>	Argentina, Mazan, 1200 m
KK717	<i>G. riograndense</i> [pflanzii]	Bolivia, Millares, 1500 m
KK736	<i>G. zegarrae</i> v. <i>saipinense</i> n.n. [pflanzii]	Bolivia, Saipina, 1500 m
KK737	<i>G. zegarrae</i> var. [pflanzii]	Bolivia, Pers, 1300 m
KK771	<i>G. sp.</i>	Argentina, Hornillos, 1200 m
KK772	<i>G. sp.</i>	Argentina, Cordoba, Hornillos, 1000 m
KK821	<i>G. chiquitanum</i>	Bolivia, San Jose, Santa Anna, 400 m
KK828	<i>G. marquezii</i> [pflanzii]	Bolivia, Rio Pilcomayo, 600 m
KK830	<i>G. tudae</i> [pflanzii]	Bolivia, Palos Blancos, 800 m
KK831	<i>G. pflanzii</i> v. <i>argentinense</i>	Argentina, Yacuba, 1000 m
KK850	<i>G. lagunillasense</i> [pflanzii]	Bolivia, Lagunillas, 800 m
KK855	<i>G. lagunillasense</i> [pflanzii]	Bolivia, Lagunillas - Camiri, 600 m

KK857	<i>G. lagunillasense</i> var. [<i>pflanzii</i>]	
KK1034	<i>G. spegazzinii</i>	Argentina, Salta, 1500 m
KK1099	<i>G. hamatum</i> [<i>megatae</i>]	Bolivia, Villazon, 2200 m
KK1684	<i>G. sp.</i> [<i>pflanzii</i> 'tominense']	Bolivia, Chuquisaca, Tomina
KK1738	<i>G. lagunillasense</i> var. [<i>pflanzii</i>]	

WILHELMA KNOLL COLLECTION NUMBERS (WO)

WO 14	<i>G. saglionis</i>	Argentina, Salta, Cafayate, 2000 m
WO 14a	<i>G. saglionis</i>	Famatina
WO 14b	<i>G. saglionis</i>	Poman
WO 15	<i>G. spegazzinii</i>	Argentina, Salta, Cafayate, 2000 m
WO 15a	<i>G. spegazzinii</i>	San Carlos
WO 28	<i>G. schickendantzii</i> var. <i>delaetii</i>	Argentina, Salta, Cruz Quemada, 1000 m
WO 30	<i>G. sp.</i>	Argentina, Salta, Cruz Quemada, San Nicolas, 1000 m
WO 42	<i>G. spegazzinii</i>	Argentina, Salta, Puerta Tastil, 2000 m
WO 43	<i>G. spegazzinii</i> v. <i>major</i>	Argentina, Salta, Puerta Tastil, 3000 m
WO 52	<i>G. valnicekianum</i>	Argentina, Cordoba, La Falda, 1100 m
WO 52a	<i>G. sp.</i>	Argentina, Cordoba, Cosquin
WO 53	<i>G. multiflorum</i>	Argentina, Cordoba, La Falda, 1500 m
WO 53a	<i>G. multiflorum</i>	Capilla del Monte
WO 53b	<i>G. multiflorum</i>	Copina
WO 54	<i>G. bruchii</i>	Argentina, Cordoba, La Falda, 1600 m
WO 54a	<i>G. bruchii</i>	Capilla del Monte
WO 54b	<i>G. bruchii</i>	Copina
WO 54c	<i>G. bruchii</i>	Nono
WO 55	<i>G. valnicekianum</i>	Argentina, Cordoba, Capilla del Monte, 1300 m
WO 57	<i>G. capillaense</i>	Argentina, Cordoba, Capilla del Monte, 1300 m
WO 58	<i>G. quehlianum</i> v. <i>rolfianum</i>	Argentina, Cordoba, Capilla del Monte, 1000 m
WO 59	<i>G. valnicekianum</i>	Argentina, Cordoba, Capilla del Monte, 1000 m
WO 60	<i>G. valnicekianum</i>	Argentina, Cordoba, La Falda, 1100 m
WO 62	<i>G. calochlorum</i>	Argentina, Cordoba, Nono, 1000 m
WO 64	<i>G. multiflorum</i>	Argentina, Cordoba, Nono, 1200 m
WO 66	<i>G. sp. nov.</i> (<i>G. knollii</i> n.n.)	Argentina, Cordoba, Taninga, 1000 m
WO 66a	<i>G. sp.</i>	Salsacate
WO 68	<i>G. mostii</i>	Argentina, Cordoba, Biale Masse, 900 m
WO 69	<i>G. mostii</i> fa.	Argentina, Cordoba, Biale Masse, 900 m
WO 70	<i>G. quehlianum</i> v. <i>kleinianum</i> ?	Argentina, Cordoba, 900 m
WO 74	<i>G. denudatum/paraguayense</i>	Paraguay, Paraguari, Chololo Y., 300 m
WO 75	<i>G. fleischerianum</i>	Paraguay, Cordillera, Pirareta, 350 m
WO 77	<i>G. mihanovichii</i> var. <i>filadelfiense</i>	Paraguay, Mariscal, Estigarribia to Filadelfia, 70 km, 350 km
WO 77a	<i>G. mihanovichii</i>	Santa Teresita
WO 79	<i>G. friedrichii</i> var. <i>moserianum</i>	Paraguay, Boqueron, Teniente Encisco, 450 m
WO 80	<i>G. pflanzii</i>	Paraguay, Boqueron, Teniente Encisco, 450 m
WO 82	<i>G. marsoneri/megatae</i>	Paraguay, Boqueron, Nuevo Asuncion, 500 m
WO 83	<i>G. friedrichii</i> var. <i>albiflorum</i>	Paraguay, Boqueron, Nuevo Asuncion, 500 m
WO 92	<i>G. intertextum</i> (<i>moserianum</i>)	Argentina, Cordoba, Serrezuela, 300 m
WO 93	<i>G. schickendantzii</i>	Argentina, Cordoba, Serrezuela, 300 m
WO 99	<i>G. stellatum</i> fa.	Argentina, La Rioja, Los Colorados, 700 m
WO 99a	<i>G. stellatum</i> v.	El Vivero
WO 100	<i>G. nidulans</i>	Argentina, La Rioja, Los Colorados, 700 m
WO 107	<i>G. weissianum</i>	Argentina, La Rioja, Famatina, 1200 m
WO 114	<i>G. hybopleurum</i>	Argentina, Catamarca, Andalgalá, 1200 m

DOROTHEA MUHR COLLECTION NUMBERS (B)

B2	<i>G. sp.</i>	
B3	<i>G. stellatum?</i>	
B5	<i>G. cf. calochlorum</i>	Cordoba, Achiras, 700 m
B6	<i>G. calochlorum</i>	
B7	<i>G. calochlorum</i>	Nono, 800 m
B8	<i>G. vatteri</i>	Argentina, San Luis, Merlo, 800 m
B9	<i>G. mostii</i>	Argentina, Cordoba, V. Carlos Paz, 900 m
B12	<i>G. calochlorum</i>	
B13	<i>G. calochlorum</i>	
B16	<i>G. schickendantzii</i>	Catamarca
B17	<i>G. multiflorum</i>	Argentina, Cordoba, Pampa Pocho, 1300 m
B20	<i>G. quehlianum</i>	Copacabana, 800 m
B21	<i>G. achirasense</i>	Achiras, 700 m
B23	<i>G. sp.</i>	
B29	<i>G. sp.</i>	
B34	<i>G. spegazzinii</i>	Argentina, Salta, Molinos, 1700 m
B36	<i>G. cf. glaucum</i>	
B39	<i>G. capillaense</i>	
B41	<i>G. sigelianum</i>	
B42	<i>G. gibbosum</i> v. <i>genseri</i>	
B44	<i>G. bicolor</i>	Argentina, Cordoba, S. Pedro, 700 m
B49	<i>G. weissianum</i>	Argentina, La Rioja
B52	?	
B54	<i>G. schickendantzii</i> var. <i>delaetii</i>	Argentina, Salta, 1700 m
B56	<i>G. moserianum</i> (<i>G. intertextum?</i>)	Argentina, Cordoba
B57	<i>G. sp.</i> (subg. <i>Trichosemium</i>)	
B58	<i>G. calochlorum</i>	Argentina, Cordoba, 800 m
B59	<i>G. hossei?</i>	Argentina, Catamarca, Andalgalá, 700 m
B62	<i>G. hossei?</i>	
B63	<i>G. leptanthum</i>	
B66	<i>G. sp.</i> (subg. <i>Trichosemium</i>)	
B69	<i>G. quehlianum</i>	
B70	<i>G. mostii</i> var. <i>kurtzianum</i>	
B73	<i>G. castellanosii</i>	Argentina, La Rioja, Malanzan, Los Hornos, 800 m
B74	<i>G. stellatum</i> (<i>kozelskianum</i>)	Argentina, La Rioja, Malanzan, 600 m
B78	<i>G. sp.</i>	
B79	<i>G. castellanosii</i>	
B80	<i>G. baldianum</i>	
B92	<i>G. gibbosum</i> (<i>G. chubutense?</i>)	
B93	<i>G. sigelianum/sutterianum</i>	Argentina, San Luis, Merlo, 800 m
B94	<i>G. schickendantzii</i> var. <i>delaetii</i>	
B107	<i>G. pflanzii</i> (<i>marquezii?</i>)	
B108	<i>G. hybopleurum</i> fa.	
B111	<i>G. sp.</i>	
B115	<i>G. nigriareolatum?</i>	
B117	<i>G. vatteri?</i>	
B123	<i>G. sp.</i> (<i>vatteri?</i>)	
B126	<i>G. hybopleurum/mazanense</i> fa.?	
B128	?	
B132	<i>G. mazanense</i>	
B136	<i>G. intertextum</i>	

B137	<i>G. calochlorum</i>	
B149	<i>G. sp. (vatteri?)</i>	
B150	<i>G. nigriareolatum</i> (<i>hybopleurum?</i>)	Argentina, Catamarca
B151	<i>G. marsoneri</i>	
B164	<i>G. cf. mazanense</i>	Argentina, La Rioja, 800 m
B165	<i>G. valnicekianum</i>	Argentina, Cordoba, 1200 m
B167	<i>G. sp.</i>	
B169	<i>G. bicolor</i> fa.	
B170	<i>G. sp. (subg. Trichomosemi- neum)</i>	
B171	<i>G. quehlianum</i>	
B184	<i>G. calochlorum</i>	Argentina, Cordoba
B194	<i>G. capillaense/sigelianum</i>	
B197	<i>G. moserianum?</i>	
B197a	<i>G. sp.</i>	Argentina, Cordoba, 800 m
B197b	<i>G. bicolor</i>	Argentina, Cordoba
B198	<i>G. sp. nov.</i>	

DIRK VAN VLIET COLLECTION NUMBERS (DV)

DV44	<i>G. denudatum</i>	
DV45	<i>G. capillaense</i>	
DV46	<i>G. schickendantzii</i> var. <i>delatetii</i>	
DV47	<i>G. gibbosum</i> v. <i>chubutense</i>	
DV47a	<i>G. gibbosum</i> v. <i>chubutense</i>	
DV48	<i>G. hossei</i>	
DV49	<i>G. zegarrae</i> [<i>pflanzii</i>]	
DV50	<i>G. gibbosum</i> v. <i>brachypetalum</i>	
DV51	<i>G. marsoneri</i>	
DV52	<i>G. schickendantzii</i>	
DV53	<i>G. leeanum?</i>	
DV55	<i>G. gibbosum</i>	
DV55a	<i>G. gibbosum</i> v. <i>balcarsensis</i> n.n.	
DV56	<i>G. tillianum</i>	
DV57	<i>G. leptanthum</i>	
DV58	<i>G. ragonesei</i>	
DV59	<i>G. stellatum</i>	
DV60	<i>G. quehlianum</i>	
DV60a	<i>G. quehlianum</i> var.	
DV61	<i>G. saglionis</i>	
DV62	<i>G. spegazzinii</i>	
DV94	<i>G. mostii</i>	
DV95	<i>G. pugionacanthum</i> [<i>hybopleu- rum</i>]	

HORST-UEBELMANN COLLECTION NUMBERS (HU)

HU7	<i>G. denudatum</i> var. nov.	Rio Grande do Sul
HU28	<i>G. denudatum</i> fa.	Rio Grande do Sul
HU60	<i>G. uruguayense</i>	Rio Grande do Sul
HU79	<i>G. horstii</i>	Rio Grande do Sul, Cacapava
HU93	<i>G. uruguayense</i>	Uruguay, Rio Grande do Sul

HU93a	<i>G. uruguayense</i> var. nov.	Uruguay, Rio Grande do Sul
HU288a	<i>G. melanocarpum</i>	Uruguay
HU289	<i>G. schroederianum</i>	Uruguay
HU296	<i>G. leeanum</i>	Uruguay
HU304	<i>G. fleischerianum</i>	Paraguay
HU309	<i>G. friedrichii</i> var. <i>moserianum</i>	Paraguay
HU310	<i>G. pflanzii</i>	Paraguay
HU311	<i>G. friedrichii</i> var.	Paraguay
HU312	<i>G. friedrichii</i> var.	Paraguay
HU313	<i>G. friedrichii</i> var.	Paraguay
HU314	<i>G. friedrichii</i> var.	Paraguay
HU316	<i>G. onychacanthum</i> [pflanzii/megatae]	Paraguay
HU317	<i>G. tudaе</i> [megatae]	Paraguay
HU363	<i>G. buenekerii</i>	Rio Grande do Sul
HU414	<i>G. mesopotamicum</i>	
HU452	<i>G. matoense</i> [megatae]	
HU557	<i>G. damsii</i> v. <i>multiproliferum</i>	

LUDWIG. BERCHT COLLECTION NUMBERS (LB)

LB11	<i>G. fleischerianum</i>	Paraguay, Ojopoi
LB20	<i>G. fleischerianum</i>	Paraguay, Pirareta
LB21	<i>G. fleischerianum</i>	Paraguay, Pirareta
LB68	<i>G. mihanovichii</i> v. <i>filadelfiense</i>	Paraguay, Mision Santa Teresita
LB69	<i>G. eurypleurum</i>	Paraguay, Puesto Leite
LB76	<i>G. eurypleurum</i>	Paraguay, Cerro Leon
LB79	<i>G. friedrichii</i> v. <i>moserianum</i>	Paraguay, Americo Picco
LB91	<i>G. fleischerianum</i>	Paraguay, Salto Amambey
LB100	<i>G. paraguayense</i>	Paraguay, Itacurubi
LB106	<i>G. paraguayense</i>	Paraguay, Piribebuy
LB107	<i>G. fleischerianum</i>	Paraguay, Chololo
LB258	<i>G. stuckertii</i>	Argentina, San Luis, San Luis (sensu Kiesling)
LB263	<i>G. schickendantzii</i>	Argentina, San Luis, San Luis
LB265	<i>G. stuckertii</i>	Argentina, San Luis, San Luis (sensu Kiesling)
LB267	<i>G. sp.</i>	Argentina, San Luis, San Luis
LB268	<i>G. borthii</i> var.	Argentina, San Luis, San Luis
LB269	<i>G. sp.</i>	Argentina, San Luis, Villa Dora
LB270	<i>G. borthii</i>	Argentina, San Luis, Villa Dora
LB272	<i>G. sp.</i>	Argentina, San Luis, El Volcan
LB275	<i>G. sp.</i>	Argentina, San Luis, Villa de la Quebrada
LB276	<i>G. neuhuberi</i>	Argentina, San Luis, Villa de la Quebrada
LB278a	<i>G. sp.</i>	Argentina, San Luis, Potrero de los Funes
LB279	<i>G. stuckertii</i> var.	Argentina, San Luis, Aquilas
LB280	<i>G. sp.</i>	Argentina, San Luis, Virorco
LB281	<i>G. sp.</i>	Argentina, San Luis, Virorco
LB283	<i>G. sp.</i>	Argentina, San Luis, El Trapiche
LB284	<i>G. sp.</i>	Argentina, San Luis, El Trapiche
LB285	<i>G. sp.</i>	Argentina, San Luis, El Trapiche
LB287	<i>G. sutterianum</i>	Argentina, San Luis, El Trapiche
LB288	<i>G. brachyanthum</i>	Argentina, San Luis, El Trapiche
LB289	<i>G. neuhuberi</i>	Argentina, San Luis, Villa de la Quebrada
LB290	<i>G. strigianum</i> (sp.?)	Argentina, San Luis, Juan W. Gez.
LB292	<i>G. schickendantzii</i>	Argentina, San Luis, Beazley
LB293	<i>G. schickendantzii</i>	Argentina, San Luis, Donado

LB295	<i>G. strigianum</i> var. (sp.?)	Argentina, San Luis, Alto Pencoso
LB296	<i>G. borthii</i>	Argentina, San Luis, La Petra
LB297	<i>G. sp.</i>	Argentina, San Luis, La Petra
LB299	<i>G. sp.</i>	Argentina, San Luis, Saladillo
LB300	<i>G. sp.</i>	Argentina, San Luis, Saladillo
LB301	<i>G. sp.</i>	Argentina, San Luis, San Jose del Morro
LB302	<i>G. sp.</i>	Argentina, San Luis, San Jose del Morro
LB304	<i>G. achirasense</i>	Argentina, San Luis, San Jose del Morro
LB305	<i>G. sp.</i>	Argentina, San Luis, San Jose del Morro
LB306	<i>G. sp.</i>	Argentina, San Luis, La Toma
LB307	<i>G. sp.</i>	Argentina, San Luis, Co. Guanaco
LB309	<i>G. sp.</i>	Argentina, San Luis, Co. Guanaco
LB310	<i>G. achirasense</i>	Argentina, San Luis, Co. Guanaco
LB312	<i>G. sp.</i>	Argentina, San Luis, Santa Rosa
LB313	<i>G. schickendantzii</i>	Argentina, San Luis, Santa Rosa
LB314	<i>G. borthii</i>	Argentina, San Luis, Santa Rosa
LB317	<i>G. borthii</i>	Argentina, San Luis, Los Chanares
LB320	<i>G. sp.</i> (sp. nov.)	Argentina, San Luis, Los Chanares
LB322	<i>G. ochoterenai</i>	Argentina, San Luis, Los Chanares
LB325	<i>G. sp.</i>	Argentina, San Luis, Renca
LB326	<i>G. sp.</i>	Argentina, San Luis, Sa. del Morro
LB328	<i>G. bruchii</i> var.	Argentina, San Luis, Sa. del Portezuelo
LB329	<i>G. sp.</i>	Argentina, San Luis, La Punilla
LB330	<i>G. achirasense</i>	Argentina, San Luis, La Punilla
LB331	<i>G. achirasense</i>	Argentina, San Luis, Merlo
LB332	<i>G. achirasense</i> var.	Argentina, Cordoba, Las Albahacas
LB335	<i>G. bruchii</i> var.	Argentina, San Luis, La Punilla
LB337	<i>G. sp.</i>	Argentina, San Luis, Villa del Carmen
LB339	<i>G. sp.</i>	Argentina, San Luis, Sa. del 'Estanzuela'
LB343	<i>G. borthii</i>	Argentina, San Luis, Cerros del Rosario
LB345	<i>G. sp.</i>	Argentina, San Luis, Cerros del Rosario
LB346	<i>G. achirasense</i>	Argentina, San Luis, Cerros del Rosario
LB348	<i>G. sp.</i>	Argentina, San Luis, Cerros del Rosario
LB349	<i>G. achirasense</i>	Argentina, San Luis, Paso Grande
LB350	<i>G. sp.</i>	Argentina, San Luis, Paso Grande
LB351	<i>G. sp.</i>	Argentina, San Luis, Potrerillo
LB352	<i>G. achirasense</i>	Argentina, San Luis, Potrerillo
LB353	<i>G. sp.</i>	Argentina, San Luis, Potrerillo
LB354	<i>G. achirasense</i>	Argentina, San Luis, Potrerillo
LB359	<i>G. sp.</i>	Argentina, San Luis, Las Chacras
LB360	<i>G. achirasense</i>	Argentina, San Luis, Las Chacras
LB362	<i>G. achirasense</i>	Argentina, San Luis, Villa de Praga
LB365	<i>G. achirasense</i>	Argentina, San Luis, San Martin
LB367	<i>G. ochoterenai</i>	Argentina, San Luis, San Martin
LB368	<i>G. sp.</i>	Argentina, San Luis, San Martin
LB377	<i>G. schickendantzii</i>	Argentina, San Luis, Quines
LB378	<i>G. ochoterenai</i>	Argentina, San Luis, Quines
LB381	<i>G. ochoterenai</i>	Argentina, San Luis, Quines
LB383	<i>G. ochoterenai</i> (var. <i>scoparium</i>)	Argentina, San Luis, Lujan
LB385	<i>G. schickendantzii</i>	Argentina, San Luis, Lujan
LB386	<i>G. ochoterenai</i> var. (subsp. <i>herbstoferianum</i>)	Argentina, San Luis, Lujan
LB387	<i>G. schickendantzii</i>	Argentina, San Luis, Lujan
LB389	<i>G. ochoterenai</i> v. <i>cinereum</i>	Argentina, San Luis, San Francisco
LB390	<i>G. sp.</i>	Argentina, San Luis, San Francisco

LB392	<i>G. saglionis</i>	Argentina, La Rioja, Ulapes
LB394	<i>G. schickendantzii</i>	Argentina, La Rioja, Ulapes
LB396	<i>G. kozelskyanum</i> aff.	Argentina, La Rioja, Ulapes
LB398	<i>G. castellanosii</i> var.	Argentina, La Rioja, Pozo de Piedra
LB399	<i>G. bozsingianum</i>	Argentina, La Rioja, Chepes Viejo
LB401	<i>G. schickendantzii</i>	Argentina, La Rioja, Chepes Viesco
LB423	<i>G. riojense</i> var.	Argentina, San Juan, Huaco
LB426	<i>G. schickendantzii</i>	Argentina, La Rioja, Los Baldecitos
LB427	<i>G. riojense</i> (var. <i>sanjuanense</i>)	Argentina, La Rioja, Los Baldecitos
LB433	<i>G. riojense</i> (var. <i>sanjuanense</i>)	Argentina, San Juan, Los Baldecitos
LB434	<i>G. saglionis</i>	Argentina, San Juan, Rio El Rincon
LB435	<i>G. riojense</i>	Argentina, San Juan, Rio El Rincon
LB436	<i>G. riojense</i>	Argentina, San Juan, Rio las Talas
LB437	<i>G. castellanosii</i> ?	Argentina, San Juan, San Agustin
LB438	<i>G. acorruatum</i>	Argentina, San Juan, San Agustin
LB439	<i>G. acorruatum</i>	Argentina, San Juan, San Agustin
LB440	<i>G. castellanosii</i>	Argentina, San Juan, San Agustin
LB442	<i>G. schickendantzii</i>	Argentina, La Rioja, San Roque
LB443	<i>G. riojense</i>	Argentina, La Rioja, San Roque
LB445	<i>G. castellanosii</i>	Argentina, La Rioja, San Antonio
LB447	<i>G. castellanosii</i>	Argentina, La Rioja, San Antonio
LB448	<i>G. riojense</i>	Argentina, La Rioja, Illisca
LB449	<i>G. saglionis</i>	Argentina, La Rioja, Illisca
LB450	<i>G. castellanosii</i>	Argentina, La Rioja, Malanzan
LB452	<i>G. riojense</i>	Argentina, La Rioja, Illisca
LB453	<i>G. castellanosii</i>	Argentina, La Rioja, El Portezuelo
LB454	<i>G. saglionis</i>	Argentina, La Rioja, Atilés
LB456	<i>G. castellanosii</i>	Argentina, La Rioja, Huaja
LB457	<i>G. riojense</i>	Argentina, La Rioja, Represa del Monte
LB458	<i>G. riojense</i>	Argentina, La Rioja, Tasquin
LB459	<i>G. castellanosii</i>	Argentina, La Rioja, Calingate
LB460	<i>G. riojense</i>	Argentina, La Rioja, Retamal
LB461	<i>G. bozsingianum</i>	Argentina, La Rioja, Noqueve
LB462	<i>G. schickendantzii</i>	Argentina, La Rioja, Noqueve
LB463	<i>G. schickendantzii</i>	Argentina, La Rioja, Chepes
LB466	<i>G. schickendantzii</i> (<i>ochoterenai</i>)	Argentina, San Luis, Piedra Cuesta
LB467	<i>G. ochoterenai</i>	Argentina, San Luis, Piedra Cuesta
LB468	<i>G. ochoterenai</i>	Argentina, San Luis, La Linea
LB469	<i>G. ochoterenai</i> v. <i>cinereum</i>	Argentina, San Luis, San Francisco
LB471	<i>G. ochoterenai</i>	Argentina, San Luis, Puerta de la Quebrada
LB472	<i>G. ochoterenai</i>	Argentina, San Luis, Puerta de la Quebrada
LB473	<i>G. schickendantzii</i>	Argentina, San Luis, Ruta 8
LB474	<i>G. schickendantzii</i>	Argentina, San Luis, Suyuque
LB475	<i>G. stuckertii</i>	Argentina, San Luis, Suyuque
LB476	<i>G. schickendantzii</i>	Argentina, San Luis, Alto Pencoso
LB478	<i>G. sp.</i>	Argentina, San Luis, El Durazno
LB479	<i>G. brachyanthum</i>	Argentina, San Luis, La Verbena
LB480	<i>G. sp.</i>	Argentina, San Luis, La Verbena
LB584	<i>G. buenekeri</i>	Brazil, Sao Francisco de Assis
LB586	<i>G. buenekeri</i>	Brazil, Sao Francisco de Assis
LB612	<i>G. mesopotamicum</i> var.	Brazil, Corrientes
LB633	<i>G. uruguayense</i>	Uruguay, Artigas, Arroyo Cuaro
LB642	<i>G. sp.</i>	Uruguay, Artigas, Javier di Viana
LB644	<i>G. uruguayense</i>	Uruguay, Artigas, Cuaro
LB649	<i>G. uruguayense</i> (fa. <i>roseiflora</i>)	Uruguay, Artigas, Arroyo de los Chanchos

LB651	<i>G. uruguayense</i> (fa. <i>roseiflora</i>)	Uruguay, Artigas, Arroyo Tres Cruces
LB655	<i>G. sp.</i>	Uruguay, Artigas, Arroyo Tres Cruces
LB658	<i>G. uruguayense</i> (fa. <i>roseiflora</i>)	Uruguay, Artigas, Campamento
LB677	<i>G. uruguayense</i>	Uruguay, Salto, Ruta 31
LB680	<i>G. uruguayense</i>	Uruguay, Tacuarembo
LB682	<i>G. uruguayense</i>	Uruguay, Tacuarembo
LB691	<i>G. uruguayense</i>	Uruguay, Tacuarembo, Tambores
LB693	<i>G. sp.</i> [<i>uruguayense</i>]	Uruguay, Tacuarembo, Tambores
LB696	<i>G. uruguayense</i>	Uruguay, Tacuarembo, Curtina
LB700	<i>G. sp.</i>	Uruguay, Tacuarembo, Curtina
LB705	<i>G. sp.</i>	Uruguay, Tacuarembo, Cerro del Arbolito
LB717	<i>G. sp.</i>	Uruguay, Rivera, Minas de Corrales
LB718	<i>G. sp.</i>	Uruguay, Rivera, Minas de Corrales
LB725	<i>G. sp.</i>	Uruguay, Rivera, Masoller
LB728	<i>G. uruguayense</i>	Uruguay, Artigas, Masoller
LB732	<i>G. uruguayense</i> (fa. <i>roseiflora</i>)	Uruguay, Artigas, Ruta 30
LB734	<i>G. uruguayense</i>	Uruguay, Artigas, Ruta 30
LB736	<i>G. uruguayense</i> (fa. <i>roseiflora</i>)	Uruguay, Artigas
LB738	<i>G. sp.</i> (<i>uruguayense</i> var.)	Brazil, Quarai
LB739	<i>G. sp.</i>	Brazil, Quarai
LB743	<i>G. sp.</i>	Brazil, Quarai
LB750	<i>G. sp.</i>	Brazil, Passe da Guarda
LB755	<i>G. sp.</i>	Brazil, Passe da Guarda
LB775	<i>G. sp.</i>	Brazil, Livramento
LB780	<i>G. sp.</i>	Brazil, Livramento
LB782	<i>G. sp.</i>	Brazil, Livramento
LB787	<i>G. sp.</i>	Brazil, Livramento
LB804	<i>G. denudatum</i>	Brazil, Pedras Altas
LB805	<i>G. denudatum</i>	Brazil, Pedras Altas
LB811	<i>G. denudatum</i>	Brazil, Pedras Altas
LB814	<i>G. denudatum</i>	Brazil, Pedras Altas
LB817	<i>G. denudatum</i>	Brazil, Herval
LB 839	<i>G. sp.</i>	Uruguay, Cerro Largo, Melo
LB876	<i>G. denudatum</i>	Brazil, Lavras
LB880	<i>G. denudatum</i>	Brazil, Lavras
LB885	<i>G. denudatum</i>	Brazil, Lavras
LB888	<i>G. denudatum</i>	Brazil, Cerro do Ouro
LB891	<i>G. denudatum</i>	Brazil, Cerro do Ouro
LB 896	<i>G. denudatum</i>	Brazil, Cerro do Ouro
LB897	<i>G. denudatum</i>	Brazil, Cerro do Ouro
LB921	<i>G. denudatum</i>	Brazil, Minas de Camaqua
LB923	<i>G. horstii</i>	Brazil, Minas de Camaqua
LB930	<i>G. denudatum</i>	Brazil, Santana da Boa Vista

ARZBERGER COLLECTION NUMBERS (A)

A1	<i>G. fleischerianum</i>	Paraguay, Pirareta
A2	<i>G. anisitsii</i>	Paraguay, Concepcion
A25	<i>G. fleischerianum</i>	Paraguay, Ita Moroti
A29	<i>G. fleischerianum</i>	Paraguay, Chololo
A50	<i>G. paraguayense</i>	Paraguay, Oyopoi
A52	<i>G. paraguayense</i>	Paraguay, Oyopoi
A60	<i>G. sp.</i>	Paraguay, Yhaguy Guazu
A65	<i>G. fleischerianum</i>	Paraguay, Piribebuy

A79	<i>G. mihanovichii</i> var. <i>filadelfiense</i>	Paraguay, M.cal Estigarribia
A80	<i>G. mihanovichii</i> var. <i>filadelfiense</i>	Paraguay, 30 km S. Filadelfia
A83	<i>G. fleischerianum</i>	Paraguay, Itacurubi
A97	<i>G. mihanovichii</i> var.	Paraguay, Madrejon
A98	<i>G. mihanovichii</i> var.	Paraguay, 35 km. E. Agua Dulce
A99	<i>G. mihanovichii</i> var.	Paraguay, Cerro Leon
A100	<i>G. mihanovichii</i> var. <i>stenopleurum</i>	Paraguay
A 108	<i>G. valnicekianum</i>	Argentina, Cordoba-Capilla del Monte

NORBERT GERLOFF COLLECTION NUMBERS (GF)

GF18	<i>G. denudatum</i>	Minas do Camaqua
GF32	<i>G. denudatum</i>	Cacapava do Sul
GF38	<i>G. denudatum</i>	Lavras do Sul
GF54	<i>G. denudatum</i>	Torinhas
GF65	<i>G. denudatum</i>	Pedras Alias
GF86	<i>G. denudatum</i>	Bage
GF105	<i>G. denudatum</i>	Cordilheira
GF142	<i>G. uruguayense</i>	Barro do Quarai
GF175	<i>G. horstii</i>	Minas do Camaqua
GF209	<i>G. uruguayense</i>	Acegua
GF217	<i>G. sp.</i>	Dom Pedrito
GF240	<i>G. denudatum?</i>	Cordilheira
GF260	<i>G. buenekeri</i>	
GF304	<i>G. aff. denudatum</i>	near Dom Pedrito
GF309	<i>G. aff. denudatum</i>	near Dom Pedrito
GF332	<i>G. denudatum</i>	Cacapava do Sul

JACQUES LAMBERT COLLECTION NUMBERS (JL)

JL1a	<i>G. multiflorum</i>	Tanti 880 m
JL1b	<i>G. multiflorum</i>	Dos Rios 2050 m
JL2	<i>G. calochlorum</i>	Tanti 880 m
JL3	<i>G. quehlianum</i>	Tanti 880 m
JL4	<i>G. castellanosi</i>	Ulapes 600 m
JL5	<i>G. schickendantzii</i>	Ulapes 600 m
JL6	<i>G. schickendantzii</i>	Chepes Viejo 900 m
JL7	<i>G. saglionis</i>	Cuesta Miranda 1850 m
JL8	<i>G. stellatum</i>	Sanogasta 1150 m
JL9	<i>G. occultum</i> aff.	Sanogasta 1150 m
JL10	<i>G. mazanense</i>	Chilecito 1400 m
JL11	<i>G. saglionis</i>	El Jumeal 1400 m
JL12	<i>G. mazanense</i>	Alto Carrizal 1850 m
JL13	<i>G. stellatum</i>	Los Molinos 1350 m
JL14	<i>G. schickendantzii</i> v. <i>pectinispinum</i> n.n.	Los Molinos 1350 m
JL15	<i>G. mazanense</i> (<i>nidulans</i>)	Senor de la Pena 1050 m
JL16	<i>G. mazanense</i>	Carrizal 1100 m
JL18	<i>G. glaucum</i>	Copacabana 1700 m
JL19	<i>G. riojense</i>	Sierra de Vinquis 1150 m
JL20	<i>G. sp.</i>	Quebrada de Belen 1400 m
JL21	<i>G. hybopleurum</i>	Quebrada de Belen 1400 m

JL22	<i>G. hybopleurum</i>	Quebrada de Belen 1400 m
JL23	<i>G. spegazzinii</i>	El Hombre Muerto 1800 m
JL24	<i>G. saglionis</i>	Colalao 1800 m
JL25	<i>G. quehlianum</i>	Tanti 880 m
JL26	<i>G. spegazzinii</i>	Cachi 2500 m
JL27	<i>G. schickendantzii</i> v. <i>delaetii</i>	Colonel Moldes 1300 m
JL28	<i>G. saglionis</i>	Osma 1300 m
JL29	<i>G. pflanzii</i>	Lumbreras 850 m
JL30	<i>G. schickendantzii</i> v. <i>delaetii</i>	Lumbreras 850 m
JL31	<i>G. schickendantzii</i> v. <i>delaetii</i>	Trancas 780 m
JL32	<i>G. marsoneri</i>	Vipos 850 m
JL33	<i>G. nigriareolatum</i>	Monte Pontrero 850 m
JL34	<i>G. nigriareolatum</i>	El Portezuelo 600 m
JL35	<i>G. nigriareolatum</i>	El Portezuelo 600 m
JL36	<i>G. baldianum</i>	Anquincila 1150 m
JL37	<i>G. leptanthum</i> aff.	Balbuena 600 m
JL38	<i>G. sp.</i>	San Miguel 625 m
JL39	<i>G. calochlorum</i>	Sauce Punco 1050 m
JL40	<i>G. erinaceum</i>	Sauce Punco 1050 m
JL41	<i>G. valnicekianum</i>	Capilla del Monte 900 m
JL42	<i>G. capillaense</i>	Capilla del Monte 1000 m
JL44	<i>G. quehlianum</i>	Cuesta del Aguila 700 m
JL45	<i>G. mostii</i>	Bialet Masse 650 m
JL47	<i>G. mostii</i>	PK 12 /Villa Allende 625 m
JL52	<i>G. schickendantzii</i>	Serrezuela 350 m
JL53	<i>G. occultum</i> aff.	Sierra de Ambato 500 m
JL56	<i>G. sp.</i>	Los Molinos 1300 m
JL58	<i>G. kieslingii</i> f. <i>castaneum</i>	Anjullon 1350 m
JL60	<i>G. piltziorum</i>	Agua Blanca 1650 m
JL61	<i>G. stellatum</i>	Los Colorados 700 m
JL63	<i>G. castellanosi</i> aff.	Cortaderas 550 m
JL65	<i>G. castellanosi</i> aff.	Anzulon 700 m
JL67	<i>G. saglionis</i>	Solca 900 m
JL68	<i>G. castellanosi</i>	Sierra de Malanzan 1050 m
JL69	<i>G. acorruatum</i>	San Augustin de Valle Fertil 850 m
JL70	<i>G. saglionis</i>	San Augustin de Valle Fertil 850 m
JL71	<i>G. riojense</i>	Astica 700 m
JL105	<i>G. capillaense</i> (<i>sutterianum</i>)	Lomas el Plateado 950 m
JL106	<i>G. achirasense</i>	Juan Llerena 900 m
JL107	<i>G. achirasense</i>	Cerros Largos 1400 m
JL109	<i>G. calochlorum</i>	San Sebastian 900 m
JL118	<i>G. fleischerianum</i>	Pirareta
JL121	<i>G. mihanovichii</i>	Pozo del Tigre
JL150	<i>G. spegazzinii</i>	Quebrada del Toro 2000 m
JL161	<i>G. hybopleurum</i> aff.	Hualfin 1850 m
JL169a	<i>G. kieslingii</i>	Cuesta de Huaco 1250 m
JL169b	<i>G. kieslingii</i>	Agua Blanca 1650 m
JL171	<i>G. moserianum</i>	Los Patayes 700 m
JL172	<i>G. bicolor</i>	Agua Colorado 825 m
JL174	<i>G. quehlianum</i>	La Falda 1025 m
JL175	<i>G. capillaense</i>	Cosquin 850 m
JL176	<i>G. quehlianum</i>	Cosquin
JL177	<i>G. calochlorum</i>	La Higuera 1000 m
JL178	<i>G. sp.</i>	Quebrada de Cebila 700 m
JL1 80	<i>G. ambatoense</i>	Quebrada de Cebila

JL210	<i>G. nigriareolatum</i>	Cuesta de los Angeles
JL211	<i>G. nigriareolatum</i>	Cuesta de los Angeles
JL250	<i>G. bayrianum</i>	El Tala
JL268	<i>G. moserianum</i>	Salsacate 950 m
JL299	<i>G. quehlianum</i> (var. <i>zantnerianum</i>)	Sauce Punco 850 m
JL328	<i>G. ambatoense</i>	E Andalgala 800 m
JL340	<i>G. quehlianum</i>	Santa Monica 600 m
JL341	<i>G. capillaense</i> (<i>sutterianum</i>)	Road to Yacanto 750 m
JL342	<i>G. bruchii</i>	Road to Yacanto 900 m
JL343	<i>G. bruchii</i>	Road to Athos Pampa 1000 m

WOLFGANG. PAPSCH COLLECTION NUMBERS (WP)

WP89-003/005	<i>G. hyptiacanthum</i> v. <i>hyptiacanthum</i>	Argentina, Prov. Buenos Aires, Tandil, northerly Sierra Tandil, 350 m
WP89-005/007	<i>G. hyptiacanthum</i> v. <i>hyptiacanthum</i>	Argentina, Prov. Buenos Aires, Tandil, southerly Sierra Tandil, 350-420 m
WP89-005/007a	<i>G. hyptiacanthum</i> var. <i>hyptiacanthum</i> fa.	Argentina, Prov. Buenos Aires, Tandil, Sierra Tandil
WP89-007/008	<i>G. hyptiacanthum</i> fa. (aff. <i>schatzlianum</i>)	Argentina, Prov. Buenos Aires, Napaleofu, Cerro Morro, 250 m
WP89-008/009	<i>G. hyptiacanthum</i> var. <i>schatzlianum</i>	Argentina, Prov. Buenos Aires, Balcarce, Sierra Cinco Cerros, 220-300 m
WP89-010/010	<i>G. hyptiacanthum</i> var. <i>schatzlianum</i>	Argentina, Prov. Buenos Aires, Balcarce, Sierra Cinco Cerros, 350 m
WP89-011/011	<i>G. hyptiacanthum</i> var. <i>schatzlianum</i>	Argentina, Prov. Buenos Aires, Balcarce, Sierra Bachicha, 350 m
WP89-012/012	<i>G. sp.</i>	Argentina, Prov. Buenos Aires, Route 76, Cerro de Tuna, 390-590 m
WP89-013/013	<i>G. sp.</i>	Argentina, Prov. Buenos Aires, Route 76, Sierra de la Ventana, 300-350 m
WP89-014/014	<i>G. sp.</i>	Argentina, Prov. Buenos Aires, Route 76, Sierra de la Ventana, C. Mambaches, 370-420 m
WP89-015/015	<i>G. sp.</i>	Argentina, Prov. Buenos Aires, Sierra de Tuna-Sierra Pillahuinco, 350-500 m
WP89-016/018	<i>G. sp.</i>	Argentina, Prov. Buenos Aires, Sierra de la Ventana, 350-650 m
WP89-017/019	<i>G. sp.</i>	Argentina, Pro Buenos Aires, Sierra de la Ventana, Cerro Tres Picos, 300-650 m
WP89-017/020	<i>G. sp.</i>	Argentina, Prov. Buenos Aires, Sierra de la Ventana, Cerro Tres Picos, 740 m
WP89-018/021	<i>G. sp.</i> (cf. <i>G. platense</i>)	Argentina, Prov. Buenos Aires, Sierra de la Ventana, Sierra Tornquist, 300-550 m
WP89-019/023	<i>G. sp.</i> (cf. <i>G. gibbosum</i>)	Argentina, Prov. Buenos Aires, Sierra Cura Malal, 330 m
WP89-020/024	<i>G. sp.</i>	Argentina, Prov. Buenos Aires, Sierra Cura Malal, Abrade Hinojo, 650 m
WP89-021/024a	<i>G. sp.</i>	Argentina, Prov. Buenos Aires, Sierra Cura Malal, Abra de Hinojo, 600-750 m
WP89-022/025	<i>G. sp.</i> (cf. <i>G. platense</i> var. <i>ventanicola</i>)	Argentina, Prov. Buenos Aires, Sierra Bra-yard, Cerro Barancoso, 700 m
WP89-023-026	<i>G. sp.</i> (cf. <i>G. platense</i> var. <i>ventanicola</i>)	Argentina, Prov. Buenos Aires, Sierra Cura Malal Chico, 350-670 m

WP89-025/028	<i>G. sp. (cf. G. platense)</i>	Argentina, Prov. Buenos Aires, Pigtié, Sierra de Puan, 400 m
WP89-060/073a	<i>G. hyptiacanthum</i> var. <i>mardelpiatense</i> n.n.	Argentina, Prov. Buenos Aires, Mar del Plata, Sierra Peregrina, 300 m
WP89-061/073b	<i>G. hyptiacanthum</i> fa.	Argentina, Prov. Buenos Aires, Balcarce, Sierra de Virgilancia, 320 m
WP89-062/075	<i>G. hyptiacanthum</i> fa.	Argentina, Prov. Buenos Aires, Balcarce, Sierra Chata, 330 m
WP89-063/078	<i>G. striglianum (G. borthii?)</i>	Argentina, Prov. San Luis, Zanjitas
WP89-063/080	<i>G. schickendantzii</i>	Argentina, Prov. San Luis, Zanjitas
WP89-064/078a	<i>G. striglianum (G. borthii?)</i>	Argentina, Prov. San Luis, Sierra Pelado
WP89-064/080a	<i>G. schickendantzii</i>	Argentina, Prov. San Luis, Sierra Pelado
WP89-065/080b	<i>G. schickendantzii</i>	Argentina, Prov. San Luis, Sierra San Luis, 800 m
WP89-065/084	<i>G. sp. (stuckertii sensu Kiesling)</i>	Argentina, Prov. San Luis, Sierra San Luis, 800 m
WP89-066/088	<i>G. sp. (cf. G. stuckertii?)</i>	Argentina, Prov. San Luis, Sierra San Luis, 800-1000 m
WP89-067/089	<i>G. sp.</i>	Argentina, Prov. San Luis, Sierra San Luis, 700 m
WP89-068/090	<i>G. sp.</i>	Argentina, Prov. San Luis, Sierra San Luis, Quebrada de los Condores, 800-1000 m
WP89-068/091	<i>G. sp. (monvilleibrachyanthum)</i>	Argentina, Prov. San Luis, Sierra San Luis, Quebrada de los Condores, 800-1000 m
WP89-069/090a	<i>G. sp.</i>	Argentina, Prov. San Luis, Sierra San Luis, Potrero de los Furies, 1000 m
WP89-069/091a	<i>G. monvillei</i> var. <i>brachyanthum</i>	Argentina, Prov. San Luis, Sierra San Luis, Potrero de los Funes, 1000 m
WP89-070/090b	<i>G. sp.</i>	Argentina, Prov. San Luis, Sierra San Luis, El Durazno, 900 m
WP89-070/091b	<i>G. sp.</i>	Argentina, Prov. San Luis, Sierra San Luis, El Durazno, 900 m
WP89-071/092	<i>G. sp. (cf. G. stuckertii)</i>	Argentina, Prov. San Luis, Sierra San Luis, 1000-1200 m
WP89-072/091c	<i>G. villamercedense</i>	Argentina, Prov. San Luis, Juan Llerena, Sierra del Yulto, 950 m
WP89-072/094	<i>G. sp.</i>	Argentina, Prov. San Luis, Juan Llerena, Sierra del Yulto, 950 m
WP89-073/095	<i>G. sp.</i>	Argentina, Prov. San Luis, Sierra del Morro, 1000 m
WP89-074/097	<i>G. achirasense</i> fa.	Argentina, Prov. San Luis, Sierra del Morro, 800 m
WP89-074/098	<i>G. sp.</i>	Argentina, Prov. San Luis, Sierra del Morro, 800 m
WP89-075/097a	<i>G. achirasense</i>	Argentina, Prov. San Luis, Sierra de Portezuelo
WP89-075/097b	<i>G. achirasense</i>	Argentina, Prov. San Luis, La Punilla, 850-1000 m
WP89-075/099	<i>G. sp.</i>	Argentina, Prov. San Luis, La Punilla, 850-1000 m
WP89-076/097c	<i>G. achirasense</i>	Argentina, Prov. San Luis, Sierra Cornechingones, Va. del Carmen, 900-1650 m
WP89-076/100	<i>G. sp. (bruchii fa.)</i>	Argentina, Prov. San Luis, Sierra Cornechingones, Va. del carmen, 900-1650 m
WP89-027/030	<i>G. sp.</i>	Argentina, Prov. La Pampa, Sas. Carapache Grande, 220 m

WP89-028/033	<i>G. sp.</i>	Argentina, Prov. La Pampa, Sierra Lihuel Calel, 300-700 m
WP89-029/037	<i>G. sp.</i>	Argentina, Prov. La Pampa, Sierra Lihuel Calel Chica, 280-360 m
WP89-030/039	<i>G. sp.</i>	Argentina, Prov. La Pampa, Route 152, Puelches, 200 m
WP89-031/039a	<i>G. sp.</i>	Argentina, Prov. La Pampa, Route 152, Puelches, 200 m
WP89-032/040	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 152, Chelforo, 180 m
WP89-033/041	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 22, Chimpay, 150 m
WP89-034/043	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 22, Choele Choel, 150 m
WP89-035/045	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 250, south of Choele Choel, 180 m
WP89-037/047	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 2, Lomas de Gualichos, 120 m
WP89-038/048	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 2, Salinas de Gualichos, 100 m
WP89-039/050	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 61, Minas Geotecnicas-Los Berros, 250-400 m
WP89-040/050a	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Sierra Colorado o Paileman, 250-400 m
WP89-041/050b	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 58, Los Berros-Aroya de la Ventana, 350 m
WP89-042/054	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 58, Sierra de la Ventana, 330 m
WP89-044/055	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 5, A. de la Ventana-Sierra Grande, 350 m
WP89-044/055a	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 5, A. de la Ventana-Sierra Grande, 350 m
WP89-045/056	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 5, Sierra Grande, 300 m
WP89-046/057	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 3, Sierra de San Antonio, 350-400 m
WP89-049/062	<i>G. sp.</i>	Argentina, Prov. Chubut, Dolavon, 200 m
WP89-052/065	<i>G. chubutense</i>	Argentina, Prov. Chubut, Route 4, Sierra Chata, 400 m
WP89-054/067	<i>G. sp.</i> (cf. <i>G. gibbosum</i> var. <i>nigrum</i>)	Argentina, Prov. Buenos Aires, Carmen de Patagones, 50 m
WP89-055/070	<i>G. sp.</i>	Argentina, Prov. Rio Negro, Route 53, Guardia Mitre, 80 m
WP89-057/071	<i>G. sp.</i>	Argentina, Prov. Buenos Aires, Sierra Pillcahuinca, 420-620 m
WP89-059/073	<i>G. hyptiacanthum</i> var. <i>mardelpiatense</i> n.n.	Argentina, Prov. Buenos Aires, Mar del Plata, Sierra de los Padres, 290 m
WP89-076/101	<i>G. sp.</i>	Argentina, Prov. San Luis, Sierra Cornechingones, Va. del Carmen, 900 m
WP89-077/102	<i>G. sp.</i>	Argentina, Prov. San Luis, Sierra Estancuela, 1100 m
WP89-078/097d	<i>G. achirasense</i>	Argentina, Prov. San Luis, Sierra Cornechingones, Rio Papagayos, 1100-1400 m
WP89-078/103	<i>G. sp.</i>	Argentina, Prov. San Luis, Sierra Cornechingones, Rio Papagayos, 1100-1400 m

WP89-079/097e	<i>G. sp. (achirasense/monvillei)</i>	Argentina, Prov. San Luis, Sierra Corn- echingones, Merlo, 1000-1400 m
WP89-080/107	<i>G. vatteri</i>	Argentina, Prov. Cordoba, Sierra Corn- echingones, Luyaba, 700 m
WP89-082/109	<i>G. vatteri</i> (cf. <i>G. ochoterenai</i> ?)	Argentina, Prov. Cordoba, Sierra Corn- echingones, La Poblacion, 800 m
WP89-083/111	<i>G. sp.</i>	Argentina, Prov. Cordoba, Sierra Corn- echingones, San Javier, 1200-1700 m
WP89-083/112	<i>G. monvillei</i> fa.	Argentina, Prov. Cordoba, Sierra Corn- echingones, San Javier, 1200-1700 m
WP89-084/113	<i>G. vatteri</i>	Argentina, Prov. Cordoba, Sierra Corn- echingones, Barranca de los Loros, 730 m
WP89-085/115	<i>G. sp.</i>	Argentina, Prov. Cordoba, Sierra Corn- echingones, Los Hornillos, 1050-1500 m
WP89-086/116	<i>G. vatteri</i>	Argentina, Prov. Cordoba, Las Rabonas, 710 m
WP89-086/116a	<i>G. sp.</i>	Argentina, Prov. Cordoba, Las Rabonas, 710 m
WP89-087/118	<i>G. bruchii</i> fa.	Argentina, Prov. Cordoba, Cumbre de Achala, 1700 m
WP89-087/119	<i>G. monvillei</i> var. <i>steineri</i>	Argentina, Prov. Cordoba, Cumbre de Achala, 1700 m
WP89-088/121	<i>G. bruchii</i> fa.	Argentina, Prov. Cordoba, Pampa de Achala, 1900 m
WP89-088/122	<i>G. monvillei</i>	Argentina, Prov. Cordoba, Pampa de Achala, 1900 m
WP89-089/123	<i>G. mostii</i> fa.	Argentina, Prov. Cordoba, Sierra Chica, Villa Carlos Paz, 1000 m
WP89-090/124	<i>G. bruchii</i> fa.	Argentina, Prov. Cordoba, Villa Carlos Paz, 750 m
WP89-091/125	<i>G. quehlianum/stellatum</i>	Argentina, Prov. Cordoba, Pampa de Olaen, 1000 m
WP89-092/125a	<i>G. quehlianum/stellatum</i>	Argentina, Prov. Cordoba, La Falda, 900- 1000 m
WP89-093/122a	<i>G. monvillei</i> fa.	Argentina, Prov. Cordoba, Sierra Chica, La Cumbre, 1000 m
WP89-094/125b	<i>G. quehlianum/stellatum</i>	Argentina, Prov. Cordoba, Capilla del Monte, 1000 m
WP89-094/126	<i>G. capillaense</i>	Argentina, Prov. Cordoba, Capilla del Monte, 1000 m
WP89-095/123a	<i>G. valnicekianum</i> fa.	Argentina, Prov. Cordoba, Los Mogotos, 950 m
WP89-096/127	<i>G. stellatum</i>	Argentina, Prov. Cordoba, Sierra Masa, 670 m
WP89-096/128	<i>G. schickendantzii</i>	Argentina, Prov. Cordoba, Sierra Masa, 670 m
WP89-097/130	<i>G. sp.</i>	Argentina, Prov. Cordoba, Sierra Masa, Los Tartagos, 650 m
WP89-098/131	<i>G. sp.</i>	Argentina, Prov. Cordoba, Sierra Higue- rita, San Pedro de Toyos, 650 m
WP89-099/133	<i>G. sp. (Trichosemineum)</i>	Argentina, Prov. Cordoba, Route 16, Jaime Peter, 700 m
WP89-100/123	<i>G. valnicekianum</i> fa. (cf. <i>G. bicolor</i>)	Argentina, Prov. Cordoba, Cruz del Eje, 500 m
WP89-101/128a	<i>G. schickendantzii</i>	Argentina, Prov. Cordoba, Sierra Cuni- puto, 670 m

WP89- 101/123	<i>G. valnicekianum</i> fa.	Argentina, Prov. Cordoba, Sierra Cuni- puto, 670 m
WP89- 101/134	<i>G. sp. (Trichomosemineum)</i>	Argentina, Prov. Cordoba, Sierra Cuni- puto, 670 m
WP89- 102/136	<i>G. sp. (cf. G. stellatum)</i>	Argentina, Prov. Cordoba, Sierra Masa, Masa, 820 m
WP89- 103/137	<i>G. stellatum</i>	Argentina, Prov. Cordoba, Sierra Copaca- pana, 900 m
WP89- 104/138	<i>G. stellatum</i> var.	Argentina, Prov. Cordoba, Sierra Higue- rita, Dean Funes, 880 m
WP89-105/139	<i>G. erinaceum</i> fa.	Argentina, Prov. Cordoba, Sierra Ischilin, N. Ischilin, 1000 m
WP89-105/140	<i>G. sp.</i>	Argentina, Prov. Cordoba, Sierra Ischilin, N. Ischilin, 1000 m
WP89- 106/140a	<i>G. sp.</i>	Argentina, Prov. Cordoba, Sierra Ischilin, S. Ischilin, 980 m
WP89- 106/141	<i>G. proliferum</i>	Argentina, Prov. Cordoba, Sierra Ischilin, S. Ischilin, 980 m
WP89- 107/142	<i>G. proliferum</i>	Argentina, Prov. Cordoba, Sierra Ischilin, Villa Albertina, 1300 m
WP89- 108/143	<i>G. erinaceum</i> fa.	Argentina, Prov. Cordoba, Canada de Rio Pinto, 750 m
WP89- 109/144	<i>G. mostii</i> fa.	Argentina, Prov. Cordoba, Asconchinga, 1100 m
WP89- 109/145	<i>G. capillaense</i> fa.	Argentina, Prov. Cordoba, Asconchinga, 1100 m
WP89- 110/146	<i>G. capillaense</i>	Argentina, Prov. Cordoba, Agua de Oro, 1000 m

Glossary

with particular reference to *Gymnocalycium*

The following glossary is particularly geared to the genus *Gymnocalycium* and to the contents of this book. For more detailed glossaries with a wider context the reader can do no better than look at William Stearn's excellent *Botanical Latin* (1966), or the recently produced *Glossary of Botanical Terms* by Urs Eggli, published by the British Cactus and Succulent Society. If neither of these is available to the reader, try that in my *Cacti for the Connoisseur*, which pertains to the full breadth of cacti.

The names of *Gymnocalycium* species record the name of the finder, or someone who the describer wishes to honour, or they record the name of the place where the species is found, or pick out a particular characteristic of the species. The suffix used usually indicates which: -ensis, as in *G. uruguayense* indicates that this species comes from Uruguay; -ianum or -anum, as in *G. tillianum*, is used to honour Till; -ii, as in *G. horstii* indicates this species was found by Horst; the specific name of *G. carminanthum* refers to the colour of the flower. But some are more obscure. I have tried to include enough in the glossary below to enable the reader to make a fair deduction as to the meaning of most. Those not found here will usually be based on a place or person's name.

-a, -an: without, lacking	horrid-: spiny
-acanthum: spiny, spined	hybo-: tubercled
adpressed: lying flat to, or pressed towards	hypti-: appressed
albi, albo: white, dull rather than glossy	immemoratum: unmentioned
-anthum: anther(s)	intertextum: interwoven
areole: felty pad from which spines arise	lept-: narrow, slender
armatum: armed, strongly spined	loricatum: with scaly surface
artigas: area of Uruguay	megalo-: large, great
aster-: star-like	melano-: black, very dark
bi-: two	meso-: middle, mid-
brachy-: short	mucidum: musty
brevi-: short	multi-: many
caespitose: clustering	nidulans: nest-like
calo-: beautiful	nigri-: black, dark
carmin-: carmine	obductum: covered over, hidden
-carpum: fruit	occultum: hidden
-chlorum: green	oen-: wine-red
corrugatum: furrowed	onych-: claw
curvi-: curved	paedio-: of children (clustering?)
denudatum: bare	-pallidum: pale
erinaceum: hedgehog-like	parv-: small
eury-: broad	-petalum: petal(led)
ferox: fierce	plati-: broad, flat
-florum: flower(ed)	-pleurum: sided
gibbosum: humped, swollen	potamicum: river
glaucum: glaucous, bluish-green	proliferum: proliferous, multiplying
-gonum: angled	pseudo-: like (<i>pseudomalacocarpus</i> = like <i>Malacocarpus</i>)
grandi-: large	pugion-: dagger-like
griseo-: grey, verging to blue	pungens: sharp
hamatum: hooked at the tip	

reductum: reduced
rhod-: rose, rosy-red
sanguin-: blood-red
spini-: of spines
stellatum: star-like

steno-: narrow
thelos: nipple(d), tubercle(d)
tort-: twisted
tri-: three
-ulum: diminutive ending

Sources of seed or plants of *Gymnocalycium*

SEED

Steven Brack, Mesa Garden, P.O. Box 72, Belen, New Mexico 87002, USA.

Ludwig Bercht, Veerweg 18, NL-4024 BP Eck en Wiel, Netherlands.

Jorg Piltz, Monschauer Landstrape 162, D-5160 Düren-Birgel, Germany.

Gebr. De Herdt, Schommeweg 3, B-23 10 Rijkevorsel, Belgium.

Doug Rowland, 200 Spring Road, Kempston, Bedfordshire MK42 8ND, Great Britain.

PLANTS

Jorg Piltz, Monschauer Landstrape 162, D-5160 Düren-Birgel, Germany.

Connoisseurs' Cacti, 51 Chelsfield Lane, Orpington, Kent BR5 4HG, Great Britain.

Eau Brink Cacti, Eau Brink Road, Tilney All Saints, Kings Lynn, Norfolk PE34 4SQ, Great Britain.

Pete & Ken Cactus Nursery Glencote, Saunders Lane, Ash, nr. Canterbury, Kent CT3 2BX, Great Britain.

Holly Gate Cactus Nursery, Billingham Road, Ashington, W. Sussex RH20 3BA, Great Britain.

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Current periodicals which are devoted or contain frequent references to the genus Gymnocalycium

- Arbeitsgruppe Gymnocalycium Österreichische Kakteenfreunde*, Austria: A quarterly publication devoted entirely to this genus. Available on subscription of AS300 per year from Arbeitsgruppe Gymnocalycium Österreich, Bahnweg 12, A-5301 Eugendorf, Austria.
British Cactus & Succulent Journal: The journal of the British Cactus & Succulent Society, issued quarterly. Available on subscription of £12 (UK or EC), £13 (elsewhere) per year from P. Lewis, 'Firgrove', 1 Springwoods, Courtmoor, Fleet, Hants GU 13 9SU, Great Britain.
Cactus & Succulent Society Journal (US): Published by the Cactus & Succulent Society of America, Inc., 566 Gepke Parkway, Des Moines, IA 50320-6818, USA. Six issues a year, overseas membership is \$35 (1994).
The Cactus File: Published by Cirio Publishing Services Ltd, 25 Shamrock Way, Hythe, Southampton S045 6DY, Great Britain. Subscription (1994) £11.80 per year for four issues.
The Chileans: An intermittently published journal, three issues per volume. Subscription £13.80 to Mrs G. Craig, 32 Forest Lane, Kirklevington, Yarm, Tees-side TS 15 9LY, Great Britain.
Gymnos: Organ der Arbeitsgruppe Gymnocalycium, Germany (lately with summaries in English): A journal devoted entirely to the study of this genus, published twice a year. Subscription (1994) DM 20 per year. Payment by Eurocheque in DM, or bank-notes suitably insured, to Hans

Brinkhaus, Rudolf-Diesel-Str. 23, W-2900 Oldenburg, Germany. Bank account: Postgiroamt Hamburg BLZ 200 100 20, No. 4766 25-205. Enquiries in English language to Detlev Metzger, Holtumer Dorfstr. 42, D-27308 Kirchlinteln (Hollum-Geest), Germany.

Kakteen und andere Sukkulente: The journal of the German Cactus Society (Deutsche Kakteen-Gesellschaft eV, Nordstr. 30, 26939 Ovelgönne 2, Germany), with 12 issues a year. Subscription is DM65, plus a registration fee for new members of DM 10.

Piante Grasse: The journal of the Italian Society, in particular, Vol. 5(1), 1985, which was devoted entirely to an account of this genus by Massimo Meregalli.

Succulenta: The journal of the Dutch and Belgian Cactus & Succulent Society, eleven issues per year, subscription overseas Hfl. 50. Send to M.J. van Eijsden, Postbus 584, 7900 AN Hoogeveen, Netherlands.

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