

# Rebutia - one genus or two?

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In the early 1990s I attended a meeting of a Dutch cactus study-group where one of the members asked, "Do you think that there are too many species?" It crossed my mind at the time that if there were questions about too many species, just send some collectors/explorers to certain habitats and they would quickly reduce the number of species in the plant populations. But when I saw the serious faces of the other members I understood my misinterpretation.

Hunt and Barthlott (1993) transferred species of *Aylosteria*, *Mediolobivia*, *Weingartia* and *Sulcorebutia* to *Rebutia*, and Nyffeler and Eggli (1994) expanded on the idea of "consensus classifications" and recommended that collectors follow them. Although I am broad-minded and amenable, I felt that their ideas were counter to my own beliefs, which were largely based on my own extensive field studies and explorations. It so happens that I specialize in the genus *Sulcorebutia*, which now no longer exists, according to Hunt, Barthlott, Nyffeler and Eggli, who have given no explanation for their view-point. Some of their answers to my questions were surprising and difficult for me to understand - as a layman I was apparently supposed to follow their decisions without adequate explanations. Indeed, my questions were not that simple, but I was not a scientist and was therefore not considered knowledgeable. No, they had not actually done any research on *Sulcorebutia* - it was implied that if a scientist had done so, perhaps the genus could once more become acceptable.

It seems to me that we have to wait for DNA analyses to determine the modern concepts of genera and their inter-relationships. But, since that does not exist at present, we must make our decisions based upon morphology and field-data or use other valid non-DNA techniques to support or reject "consensus classification". To evaluate the older genera, one must have certain information. The proposed, expanded genus *Rebutia*, which now includes *Sulcorebutia* and *Weingartia*, should consist of small plants with similar flowers, spine formation, areoles, and growth habits, and they should all be closely related. However, when one compares *Sulcorebutia* to *Rebutia*, one sees:

- *Sulcorebutia* has its areoles on top of the tubercles.
- All areoles of *Sulcorebutia* have white wool or felt (although sometimes only a small amount).
- If the top of the perianth of *Sulcorebutia* is red, the color will change to yellowish and the throat will be violet (this combination of three colors has not been observed in *rebutias*, and I consider this a basic character of *Sulcorebutia*; see Figs. 1, 2). The scales on the pericarp of *Sulcorebutia* look more like the scales of *Gymnocalycium* than those of *Rebutia* (Hentzschel, 1999).

Some might point out that *Rebutia margarethae* is hard to distinguish from *Sulcorebutia steinbachii* - but it does not have the floral color combinations of the *sulcorebutias*. It is well-known that *Sulcorebutia* is a relatively young genus, so young in fact that in field studies one can almost predict what form will be found on adjacent hills, even though those forms may differ somewhat. For example, no one has ever found *Sulcorebutia steinbachii* outside of the "steinbachii habitat". In other words, every habitat area has its own species, with only one exception: *Sulcorebutia alba* and *S. frankiana* often do grow on the same hills but never together—they form distinct populations. So how can we now say that *S. steinbachii* is closely related to *R. margarethae* when they grow 500 miles apart?

*Sulcorebutia* is found in Bolivia from Independencia to Tarija. Many populations show much variability, but those found near the north, east, and southern borders of the area show less. To the west, dispersal was impossible because of the high Cordillera Oriental. The center of populations is around Sucre, and this area may be the origin of the genus. Subgenus *Mediolobivia* of *Rebutia*, found from La Paz, Bolivia, to Salta, Argentina, was partly successful in crossing the Cordillera Oriental when that range was less than 4000 m high, but, when the ancestors of *Sulcorebutia* approached the Cordillera, the elevation had increased above that altitude and they were not able to pass over. Of the *mediolobivias*, *Rebutia*

*steinmanni* is found not far from *Sulcorebutia verticillacantha*, between Caracollo and Cochabamba, and this subgenus has also been found from Cochabamba to Oruro and farther away, near Macha on the eastern side of the mountain range. Near Camargo and Tarija, *mediolobivias* and *sulcorebutias* have habitats rather close to each other. On the Cuesta de Sama near Tarija, the distance between populations of these two groups may be only a few meters, but near Camargo they are farther apart.

However, subgenus *Mediolobivia* appears to be much older than *Sulcorebutia*. Populations with identical characters were sometimes found over 50 miles from each other. It is not uncommon to find different species in one locality. If *Sulcorebutia* did evolve from *Mediolobivia*, one would expect to find some intermediate populations - but they have never been found. In my greenhouse I performed several trials by pollinating, *Sulcorebutia* with *Mediolobivia*. If I got seed,



Figure 1. Cut-away view of the flower of *Aylostera albopectinata*.

the seedlings were exact copies of the mother plants, indicating self-pollination.

Subgenus *Aylostera* of *Rebutia* is found on the east side of the Cordillera Oriental from Copachunchu, Bolivia, to northern Argentina. It too is much older than *Sulcorebutia*. From north to south, *Aylostera fiebrigii* is found in separate populations. Most *aylosteras* differ from *Sulcorebutia* in many characters. Most confusing might be *Aylostera heliosa* and *A. albopectinata*. The *sulcorebutias* growing clo-



Figure 2. Cut-away view of *Sulcorebutia vasqueziana* var. *losenickyana* (G-148) from Chaunaca, south of Cerro Chataquila, Bolivia.

sest to *A. heliosa* are *S. tarijensis* (from Cuesta de Sama to near Tarija) and strongly related populations from Carichi Mayu - no one would suspect that this *sulcorebutia* is related to *A. heliosa*. *Sulcorebutias* were recently discovered Between Camargo and Incahuasi, but these populations do not show any resemblance to *A. albopectinata*. We would expect intermediate variations between *A. albopectinata* and *Sulcorebutia*, but

none were found. Subgenus *Rebutia* (sensu Schumann) of *Rebutia*, from Argentina, is very distant from any *sulcorebutia*. It is extremely difficult to accept the theory that *Sulcorebutia* has evolved from the genus *Rebutia*.

The genus *Weingartia*, growing from Comarapa, Bolivia, to the Argentina border, may have had two origins, which would mean that it is not a valid, monophyletic genus. I cannot find any connection between the southern species of *Weingartia* and *Sulcorebutia*. However, the northern group of weingartias could be related to *Sulcorebutia*. For example, it is difficult to separate *Weingartia neocumingii* from *Sulcorebutia torotorensis*.

Arbitrary name changes in taxonomy for purposes of convenience are not acceptable - in this modern, technologically advanced era only the use of scientific data and logical reasoning are valid.

## Acknowledgements

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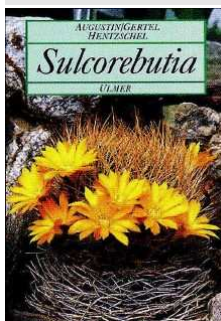
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## *Sulcorebutia*, Kakteenzwerge der bolivianischen Anden

## Book Review by Myron Kimmach



**SULCOREBUTIA, KAKTEEN - ZWERGE DER BOLIVIANISCHEN ANDEN (DWARF CACTI OF THE BOLIVIAN ANDES)**

By Karl Augustin, Willi Gertel & Günter Hentzschel. 2000; Verlag Eugen Ulmer, Wollgrasweg 41, 70599 Stuttgart, Germany; hardbound, 180 pp (text in German), 159 color photos, numerous b/w drawings and maps. DM 118 (ca. \$53).

This recent work makes a fitting companion volume to Pilbeam's *Rebutia*, as together they cover most of the species (excepting weingartias) assigned to *Rebutia* sensu lato. The only difficulty is that the text is in German, and there are no English summaries. Considering the popularity of these plants, as well as the fact that Pilbeam's earlier *Sulcorebutia* and *Weingartia*, a collector's guide is out of print, it would be desirable to being out another edition of this new work in English.

Augustin, Gertel and Hentzschel are all specialists in these plants and have meticulously and lovingly compiled their new book. It includes the original description of *Sulcorebutia* by Backeberg, a later, more comprehensive one by Brederoo & Donald and finally a much more detailed description by Hentzschel. There follow discussions on root-types, the stems, spines, flower, fruit and seed. A chapter on distribution presents maps of the main areas where *sulcorebutias* are found—there are nine in all, each with its own map of the principal towns and clearly indicating where these plants are known to grow. The cultivation of *rebutias* is non-challenging, so the subject is dispensed with in three pages.

The bulk of the book - some 111 pages - is devoted to the species themselves, presenting for each a synonymy (brief because of the authors' acceptance of most published species), a reasonably detailed description, distribution, field-numbers of various collectors, a discussion of the species, and references.

The numerous photos are of high quality and include plants in habitat as well as in cultivation, the latter also seemingly in habitat because of artful staging.

This reviewer highly recommends this new work—its maps and photos make its purchase worthwhile even for those not able to read German.

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