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THE POSITION OF PARODIA TURECEKIANA IN THE PARODIA MAMMULOSA COMPLEX

In this article, Giovanna Anceschi & Alberto Magli discuss *Parodia turecekiana* R. Kiesling, part of the *Parodia mammulosa* (Lemaire) Taylor complex.

Photographs by the authors



Fig.1 *Parodia mammulosa* (*turecekiana* populations). Uruguay, Río Negro, Nuevo Berlin. 27 Jan 2014, A&M 966

During the seven months of our 2013/2014 journey, out of the 70 new taxa we investigated in habitat for a forthcoming classification in the Cactusinhabitat system, 11 belong to the genus *Parodia* Spegazzini (precisely, 10 are Andean taxa and one from the Pampa Biome). *Parodia* being one of our genera of preference, during our next journey we hope to find or deepen the knowledge of the last four taxa that will allow us to have a complete overview of *Parodia* s.l., based on study experience in the habitats of all its components.

Parodia turecekiana R. Kiesling was one of our “black sheep”. In fact, before this year’s happy discovery, we failed to find the above mentioned taxon of the Pampa Biome on three occasions. The first time was in November 2008, in Uruguay, Dpt. Río Negro, on Ruta 25, between Bellaco and Young, following the reference *R. Kiesling* 8368 (Kiesling 1995, 67: 18). The second time, again in November 2008, in Uruguay, Dpt. Río Negro, Young, northwest of Young, locality Paso Uleste, in the blanqueales of the Estancia Viejo Pablo. The

third time was in early March 2011, in Argentina, Dpt. Gualeguaychú, northwest of Gualeguaychú, the area where Ruta 14 crosses the Arroyo Gualeguaychú (the type locality), following a note that the late Omar Ferrari marked on our map in July 2007, when we went to La Plata to get to know him. We like to remember his hospitable kindness and contagious enthusiasm when he spoke of cactus populations. That survey, which was carried out in the early days of our third South American journey (2008-2009), was a complete disaster: we forgot the repellent, mosquitoes disfigured us, and we found no trace of the taxon.

This year, the little information available led us to a small town on the Río Uruguay, Nuevo Berlín, known amongst the fans of the genus *Gymnocalycium* Pfeiffer ex Mittler as the type locality of *Gymnocalycium schroederianum* Osten. (UY, Río Negro, nr Nueva Mehlem, Apr 1922, *Schroeder* s.n. in herb. Osten 16.873) (MVM?) (Hunt *et al.* 2006, text: 133). Nueva Mehlem was a large German agricultural colony and around 1865-68, in its surroundings, the village of Nuevo Berlín grew. The references in our possession were: Field Number JPR617: *Notocactus tureczekianus*, Ruta 20, km33, left towards Nuevo Berlín, Paysandú, Uruguay (Ralph Martin's Cacti and Succulent Field Number Finder); and an e-mail from Norbert Gerloff, dated 25/07/2013 who, in reply to our request for information, wrote about the remains of an Espinal on Ruta 20 [between Arroyo Grande and Nuevo Berlín], approximately at km30, where *Notocactus tureczekianus* grew, but where, at the time of his visit, he found only 4-5 plants.

Every taxon which is subject to our studies is important, but for the journey 2013/2014, the Andean parodias and *P. tureczekiana* obviously had the highest priority. So, going up from the Argentinian Pampas, where in January 2014 we worked on a group of taxa of the genus *Gymnocalycium*, before reaching the next taxon of the same genus in the South of Salta Province (i.e. *Gymnocalycium bayrianum* H. Till), we entered Uruguay, specifically looking for *P. tureczekiana*. We were determined to leave Nuevo Berlín only after having located the populations which taxonomically constituted the missing link for our deeper understanding of the relationships within the complex of taxa next to *P. mammulosa*.



Fig.2 Soya bean plantations. Uruguay, Río Negro, Nuevo Berlín. 31 Jan 2014



Fig.3 *Parodia mammulosa* (*tureczekiana* populations). Uruguay, Río Negro, Nuevo Berlín. 27 Jan 2014, A&M 966



Fig.4 Blanqueales in wooded savanna. Uruguay, Río Negro, Young. 16 Nov 2008

This taxon represents one of the five dominant species in *Parodia* Spegazzini. The other four are: *Parodia erinacea* (Haworth) N.P. Taylor (about this taxon, see Anceschi & Magli 2012, 6: 26-33), and *Parodia ottonis* (Lehemann)

N.P. Taylor in the Pampa Biome, as well as *Parodia microsperma* (Weber) Spegazzini and *Parodia maassii* (Heese) Berger, respectively, to the South and to the North of the range of *Parodia* in the Andean zone.

On the 26th of January 2014, we reached Nuevo Berlín during a period of intense subtropical rainfall, and we stayed there until the first of February. The help of two villagers, Mr. Hector Mari and Dr. Werner Folker (whom we warmly thank, together with his family, for having spoiled us so much), was crucial to find the taxon. Thanks to them, we got in touch with a local landowner who, like most of his colleagues, had practically given up cattle ranching to devote almost all of his land to soya bean plantations. It is impressive to see that what used to be grazing land is now covered as far as the horizon by the green seedlings of soya beans [Fig.2]. It is hard to believe that, in just ten years, we could see such big changes in the Uruguayan landscape, which was disfigured in the north mainly by pine and eucalyptus plantations, and in the south by soya beans. Argentine Pampas and those of Rio Grande do Sul in Brazil are unfortunately no less so, despite the agrottoxins which are generously used being universally recognized as very poisonous. However, the profit ratio between cattle and soya beans is 1 to 4: unbeatable. It will be hard for the beloved gaucho culture to survive.

On the 27th of January, after having discarded at a glance the places indicated by the Field Number and by Gerloff (as already exploited and degraded), we entered a plot of land accompanied by the owner himself. After getting completely bogged down with the owner's 4x4, we did not wait to be rescued by tractor but we continued walking attracted by a blanqueal where finally, when the rain paused, we detected a large population of *P. turecekiana* [Fig.3]. We were surprised that, after having failed three times, we could find the taxon that easily.

Along Uruguay's western coast, on the flood plains of the homonymous river, there are areas of wooded savanna [Fig.4] with allomorphic soil (Duran 1985, quoted from Fagúndez 2003: 5). The main characteristic of this kind of soil is the sodium interchangeably, that is sometimes higher than 15% (Dochafour 1984, *ibid.*). This soil composition causes the water absorption capacity to be very limited,

with a high loss of organic matter and clay and a consequent loss of structure that favours surface erosion. The residual sand has the typical white colour that gives these strips of lands their name: blanquelales. The basic material has a sedimentary origin and it generally dates from the Middle Pleistocene to the Holocene (Duran 1985, quoted from Fagúndez 2003: 6). The physicochemical properties of these soils induce the growth of a specific flora, consisting of species which are able to tolerate such a high salinity. Plants (halophytes) adapted in order to withstand the high salt concentration or to resist the toxic action of some of them (Ragonese & Covas 1947, *ibid.*). The forests that grow on these soils are characterized by the presence of tree species such as the "algarrobo" *Prosopis nigra* Hieron, the "ñandubay" *Prosopis affinis* Spreng., which are associated with the "quebracho blanco" *Aspidosperma quebracho-blanco* Schltldl, the "chañar" *Geoffroea decorticans* (Gillies ex Hook. & Arn.) Burkart, the palm "Caranday" *Trithrinax campestris* Drude & Griseb (Chebataroff 1980, quoted from Fagúndez 2003: 5). From a phytogeographical point of view, it should be noted that many of these species are also characteristic of the province of the Espinal (Cabrera 1971, quoted from Fagúndez 2003: 5). Eduardo Marchesi (2013) considers the blanqueales an extension of the Chaco Biome.

The cacti associated with the blanqueales of the Río Uruguay are: *Echinopsis oxygona* (Link & Otto) Pfeiffer & Otto, *Frailea schilinzkyana* (K. Schumann) Britton & Rose, *Gymnocalycium uruguayense* (Arechavaleta) Britton & Rose, *Opuntia elata* Salm-Dyck, *P. erinacea* and *P. turecekiana*. Saying that *P. turecekiana* prefers blanqueales does not absolutely mean that all the blanqueales of the Río Uruguay host the taxon.

This time we visited several blanqueales again, some of which are difficult to access, but the first population we encountered remained the only one. If, and we emphasize if, the taxon is to be distinguished from *P. mammulosa*, the assessment made by Duarte, W. & Kiesling, R. (2013) Vulnerable B1ab (iii, v) on *Parodia turecekiana* for The IUCN Red List of Threatened Species. Version 2014.2: www.iucnredlist.org. (Downloaded on 17/10/2014), and justified with a possible about 20,000km² extension of the taxon's presence, is a little soft. Since the taxon is rare, and since we know that the few



Fig.5 *Parodia mammulosa* (*turecekiana* populations). Uruguay, Rio Negro, Nuevo Berlin. 27 Jan 2014, A&M 966



Fig.6 *Parodia mammulosa* (*turecekiana* populations). Uruguay, Rio Negro, Nuevo Berlin. 27 Jan 2014, A&M 966



Fig.7 *Parodia mammulosa* (*turecekiana* populations). Uruguay, Rio Negro, Nuevo Berlin. 27 Jan 2014, A&M 966



Fig.8 *Parodia mammulosa* (*turecekiana* populations). Uruguay, Rio Negro, Nuevo Berlin. 27 Jan 2014, A&M 966

populations which are known are being stolen by collectors, using the B2 criterion of the Endangered category would have been at least more realistic: "Area of occupancy estimated to be less than 500km²...". In fact, these populations live isolated on some blanqueales which are not land at risk, as they are not cultivatable and therefore not suitable for exploitation. The elements of risk for these populations are rather the scarcity and isolation of the populations and the consequent lack of genetic variability, along with the aforementioned thefts.

Returning to our survey, the blanqueal hosted a large population of *P. turecekiana* (we counted up to 24 specimens in less than one square meter), consisting of individuals of all ages and in good health [Figs.5, 1 & 6]. The largest specimen [Fig.7] measured 8.8 x 10.8cm (h x d). On average, the population showed 13 ribs, 2 more evident and flatter central spines, the lower of which < 3.85cm, 7-10 radial spines,

sometimes acicular, all papyraceous and flexible. Already at a first glance, later confirmed by a subsequent more detailed analysis of the materials, the taxon appeared rather close to *Parodia submammulosa* (Lemaire) R. Kiesling. *P. submammulosa* is a vicariant (geographical race, subspecies, deme) of *P. mammulosa*, still considered as ssp. in the systems of Anderson (2001, 546) and Anderson & Egli (2011, 505), as *Parodia mammulosa* ssp. *submammulosa* (Lemaire) Hofacker, and assimilated among the synonyms of *P. mammulosa* in the system of Hunt *et al.* (2006, text: 221,309) and in our system (Anceschi & Magli 2010,

<http://www.cactusinhabitat.org/index.php?p=specie&id=96&l=en>).

In his publication of *P. turecekiana* (1995, 67: 17-19), Roberto Kiesling indicates that the taxon differs from *P. submammulosa* "in its more depressed body, very dark epidermis,

flexible, unequal and larger central spines, larger flowers of a darker yellow colour, and bell-shaped seeds. *P. submammulosa* inhabits rocky soils in low mountains or hills, whereas *P. turecekiana* lives in clay soil in low lands subjected to flooding." The range indicated for *P. turecekiana* is Uruguay (western part [Río Negro], Argentina (provinces of Corrientes and Entre Ríos) (ibid.: 19) [see Map 1]. Comparing the two taxa [see Table 1], the major differences are, from our point of view, those relating to the central spination and the habitat. The same considerations are made by Hunt *et al.* (2006, text: 224).

In relation to the two central spines, we stress that the semaphoront, i.e. a character present in a discrete and measurable stage in the ontogenetic process of a taxon (Hennig 1966: 6-7, 32-33, 63, 65-67), is evident in *P. turecekiana* especially in the juvenile phase [Fig.8], puberty and early adulthood [Figs.9-10], while older plants [Fig.11] look like *P. submammulosa* [Fig.12]. It should be added, moreover, that the phases where the evidence of central spines is more relevant can also be found in semaphoronts of *P. submammulosa* [Figs.13-14].

Regarding the habitat, for those who distinguish different ssp. within *P. mammulosa*, the ssp. *mammulosa* lives extensively on rocky outcrops in the south of Brazil (Rio Grande do Sul), Uruguay and Argentina [?] (Anderson 2001: 546; Anderson & Egli 2011: 505), at altitudes between 0 and 1500m. asl., and the ssp. *submammulosa* in Uruguay and Argentina (Anderson, 2001: 546) or Uruguay and Argentina (Catamarca, Córdoba, San Luís, Buenos Aires, La Pampa, Mendoza, Río Negro) <1000 m. (Anderson & Egli 2011: 505)[see Map 1].

Still on the subject of *P. submammulosa*, Kiesling, who divides the taxon into two ssp. (*submammulosa* and *minor*), tells us that the type ssp. "[is] Common in the mountains of Córdoba, San Luís, La Pampa and Buenos Aires; also in Río Negro and the Cordilleran foothills of Mendoza. Between 100 to 600m, in mineral-soil rich in organic material. Apparently restricted to a very old Precambrian geologic formation called the

Map 1 (opposite page) Distribution of *Parodia mammulosa* (*mammulosa*, *submammulosa* and *turecekiana* populations), *Parodia mueller-melchersii*, *Parodia maldonadensis* (*neoarechavaletae*), and A&M mentioned in the text. The data are gathered from: Anceschi & Magli's cactusinhabitat.org (downloaded on November 2014); Anderson & Egli (2011); Anderson (2001); Gerloff *et al.* (1995); Hunt *et al.* (2006); Kiesling (1995, 67: 14-22); [Ralph Martin's field number search](#); (downloaded on November 2014).

Sierras Pampeanas." (1995, 67: 14-15). Then he adds that the populations of the ssp. *minor* extend the range of *P. submammulosa* up to the southeast of Catamarca (ibid. 16-17).

Actually some semaphoronts that should characterize the ssp. *submammulosa*, also appear among the populations of *P. mammulosa* in northern Uruguay and Rio Grande do Sul (Brazil) [Figs.15-16], identifying all these populations as the internal vicariant of a single large dominant biological species (i.e. *P. mammulosa*), within which electing distinctive elements is a truly difficult enterprise.

It is true that *P. turecekiana* occupies a distinct habitat from the *mammulosa* and *submammulosa* populations, but we think that one of the characteristics of a dominant species is to expand itself, conquering new territories and adapting itself (if successful) to new environmental conditions. In fact, as we already expressed in relation to the distribution of *Parodia claviceps* (F. Ritter) F.H. Brandt, we think that there must be a spatial continuity between the different populations of a natural species, unless extinctions occurred in the course of its evolutionary history (Anceschi & Magli 2013, 7: 38). The idea is not new, and it is expressed as follows in Darwin's words: "...so in space, it certainly is the general rule that the area inhabited by a single species, or by a group of species, is continuous; and the exceptions, which are no rare, as I have attempted to show, be accounted for by migration at some former period under different conditions [and this is not our case] ... and by the species having become extinct in the intermediate tracts." (1859: 256).

In this context, *P. turecekiana* appears to be the natural transitional element along the coasts of the Río Uruguay, between the populations of *P. submammulosa* of the Sierras Pampeanas in Argentina and those of *P. mammulosa* of the rocky outcrops of the Pampa Biome in Uruguay and southern Brazil [see Map 1]. A west-east direction of the species expansion over time is suggested by the detection of the form *submammulosa* in Uruguay and southern Brazil (see also Gerloff *et al.* 1995: 123), and not vice versa, despite *P.*



Fig.9 *Parodia mammulosa* (*turecekiana* populations). Uruguay, Rio Negro, Nuevo Berlin. 27 Jan 2014, A&M 966



Fig.10 *Parodia mammulosa* (*turecekiana* populations). Uruguay, Rio Negro, Nuevo Berlin. 27 Jan 2014, A&M 966



Fig.11 *Parodia mammulosa* (*turecekiana* populations). Uruguay, Rio Negro, Nuevo Berlin. 27 Jan 2014, A&M 966



Fig.12 *Parodia mammulosa* (*submammulosa* populations). Argentina, San Luis, Inti Huasi. 23 Dec 2013, A&M 934



Fig.13 *Parodia mammulosa* (*submammulosa* populations). Argentina, Buenos Aires, Olavarria, NW of Olavarria. 11 Jan 2014, A&M 957



Fig.14 *Parodia mammulosa* (*submammulosa* populations) Argentina, Buenos Aires, Balcarce, Sierra Barrosa. 15 Jan 2014, A&M 965

mammulosa s.s. [Fig.17] being reported in Argentina (Anderson 2001: 546; Anderson & Egli 2011: 505). In fact, the few F.N. of *P. mammulosa* (*Notocactus mammulosus* (Lemaire) A. Berger) in Argentina (see Ralph Martin's

Cacti and Succulent Field Number Finder), also indicate areas occupied by *P. submammulosa*, and are probably to be assessed as an attribution error.



Fig.15 *Parodia mammulosa* (*submammulosa* populations) Uruguay, Rivera, Rivera, Represa OSE. 27 Nov 2008, A&M 290 (cactusinhabitat.org 2010)

To be precise, *P. turecekiana* is a weak vicariant of the system, in the sense that, as already mentioned, its survival is at risk, even if our assessment on the conservation status of the populations of *P. mammulosa* to which the taxon belongs, as a whole, remains Least Concern, L.C.

Submammulosa and *turecekiana* populations are internal vicariants of the *P. mammulosa* complex. The first is a strong vicariant, because it does not highlight extinction risks; the second, as already mentioned, is rather weak. To better understand what the vicariance relationship means, we quote Hennig's definition of species: "The species would therefore be defined as a complex of spatially distributed reproductive communities, or if we call this relationship in space 'vicariance' as a complex of vicarying communities of reproduction." (1966: 47). Defining one or more taxa as geographical races, subspecies, demes or populations of a species is recognizing that at least potentially (Mayr 1942: 120) all these components might cross each other as part of the same biological unit. Who does not understand this, did not understand the concept of vicariance, nor the one of ssp. And that is why we do not recognize intraspecific ranks (Anceschi & Magli 2010: 13–14, 18–19; 2013: 35), since we cannot identify the same biological unit with more than one name.

After identifying the internal components of the *P. mammulosa* complex, we would now like to mention those which we consider close relatives of the taxon; i.e. the taxa probably belonging to the same ancestral line with



Fig.16 *Parodia mammulosa* (*submammulosa* populations) Brazil, Rio Grande do Sul, Santana do Livramento, between BR 293 and Cerros Verdes. 11 Nov 2011, A&M 817 (cactusinhabitat.org 2013)

which, despite the morphological and territorial proximity, a potential genetic flow is not evident, or it is not assumed. In our opinion, the taxa related this way are two: *Parodia mueller-melchersii* (Backeberg) N.P. Taylor and *Parodia maldonadensis* (Herter) Hofacker, a taxon we accepted instead of the perhaps best known *Parodia neoarechavaletae* (Havlicek) D.R. Hunt. For the case, see Hofacker (2012, 4: 26-34) and Anceschi & Magli (2013: 76).

The distribution areas for the first taxon are: Brazil (Rio Grande do Sul) and Uruguay (Hunt *et al.* 2006); for the second, Uruguay and neighbouring Argentina [?] (Anderson & Eggli 2011). Some researchers located populations of *P. maldonadensis* (*neoarechavaletae*) in Brazil (Rio Grande do Sul) (Hofacker 2000, 10:12). Both taxa live on rocky outcrops similar to those of



Fig.17 *Parodia mammulosa* (*mammulosa* populations). Uruguay, Rivera, Tranqueras, Valle del Lunarejo. 23 Nov 2006, A&M 76 (cactusinhabitat.org 2010)

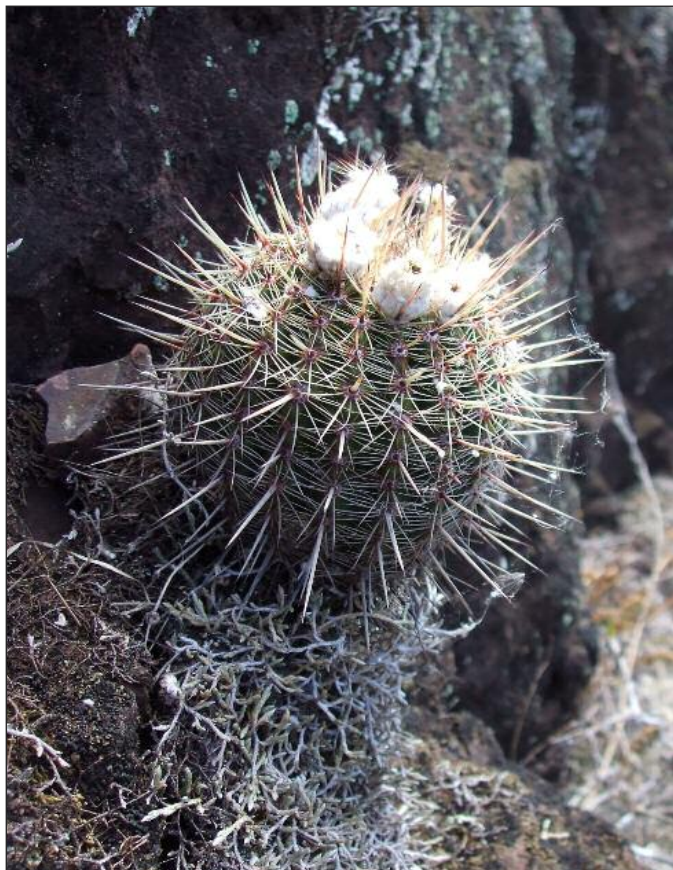


Fig.18 *Parodia mueller-melchersii*. Uruguay, Tacuarembó, Tambores. 22 Nov 2008, A&M 284 (cactusinhabitat.org 2010)



Fig.19 *Parodia mueller-melchersii*. Uruguay, Tacuarembó, Tambores. 22 Nov 2008, A&M 284 (cactusinhabitat.org 2010)



Fig.20 *Parodia mueller-melchersii*. Uruguay, Rivera, Tranqueras, Valle del Lunarejo, Mario Padern property. 21 Nov 2006, A&M 73 (cactusinhabitat.org 2010)



Fig.21 *Parodia mueller-melchersii*. Uruguay, Rivera, Tranqueras, Valle del Lunarejo, Mario Padern property. 21 Nov 2006, A&M 73 (cactusinhabitat.org 2010)

	<i>Parodia mammulosa</i> including			<i>Parodia mueller-melchersii</i> incl. <i>gutierrezii</i> , <i>rutilans</i> , <i>veeniana</i> and <i>winkleri</i> populations	<i>Parodia maldonadensis</i> (<i>neoarechavaletae</i>)
	<i>mammulosa</i> populations	<i>submammulosa</i> populations	<i>turecekiana</i> populations		
habit	simple	simple	simple	usually simple	simple
stem	globose to elongate [3-] 8 [-23] x 5-13 [-17.5]cm (h x Ø)	depressed-globose, to globose to elongate (4-) 8x5 -13cm (h x Ø)	depressed-globose, to globose 3-5 [-8,8] x 5-10 (-15)cm (h x Ø)	globose to cylindrical 5-8 (-24) x 5-6 (-11)cm (h x Ø)	globose 3-10 [-13.5] x 10 [-11]cm (h x Ø)
ribs	13-21 (-25), with large chin-like tubercles between the areolas	±13 with rounded prominent tubercles	12-13	(16-) 20-24, with small rounded tubercles	13-21 rounded and forming low tubercles
flowering areoles	very dense pale wool and few dark bristles	very dense pale wool and few dark bristles	[woolly at the stem apex]	round, white woolled, later becoming bare	densely woolly stem apex
spines	central 1-4, 2(-4)cm or more, straight, stout and stiff, usually 1 strongly flattened; radial [4-] 8-30, 0.5-1cm, acicular or stouter	central 1-2 (-3), ca 1.5-2.5cm wide, flattened, in part twisted; radial 5-10, ca. 0.7cm	central 1-2, 1-4cm, unequal, flexible, flattened, sometimes twisted; radial 6-9 [-10], 1-3cm, unequal, flexible	central 1-3, 1.5-2 [-2,3]cm, straight, subulate to acicular, not flattened; radial 12-18 or more, < 1cm, slender-acicular	central 1-4, < 3cm, stout, porrect, subulate, flattened; radial 5-9, 1-2cm, thinner
flower	subapically, ca. 3.5-5.5cm long, pale to golden yellow, rarely pale pink	subapically, 4cm long, yellow	subapically, 3-4 x 4.5cm (h x Ø), yellow	subapically, ca. 3 (-4) x 4.5-5 (-6)cm (h x Ø), pale golden yellow to citron yellow, to reddish, to rose, to carmine red	3-4 x 3-4cm (h x Ø), golden yellow
fruit	globose at first, elongating at maturity, thin-walled	fusiform, ca. 2x1cm (h x Ø), dry, dehiscent basally	globose, dry, ca. 1.6 x 1.4cm (h x Ø)	elongating at maturity, 1.5-2 (-3) x 0.7cm (h x Ø), thin walled, dehiscent basally	partly immersed in the densely woolly stem apex, fleshy at first, later drying and becoming hollow, partly naked, 2 x 0.5cm (h x Ø), white
habitat & distribution	Rocky outcrops of the Pampa Biome at elevations from 0 to 1500m asl. Native: Argentina [?], Brazil (Rio Grande do Sul), Uruguay	A very old Precambrian geological formation, part of the Pampa Biome, called the Sierras Pampeanas, in mineral soil rich of organic material, at elevations from 100 to 1000m asl. Native: Argentina (Buenos Aires, Catamarca, Chubut, Córdoba, La Pampa, Mendoza, Rio Negro, San Luis), Brazil (Rio Grande do Sul), Uruguay	Extension of the Chaco Biome. Blanqueales in wooded savanna, on floodplains with allomorphic soil, at elevations from 0 to 50m asl. The basic materials has a sedimentary origin dated from the Middle Pleistocene to the Olocene. Native: Argentina (Corrientes, Entre Ríos), Uruguay (Rio Negro)	Rocky outcrops of the Pampa Biome at elevations from 150 to 300m asl. Native: Brazil (Rio Grande do Sul), Uruguay (Artigas, Maldonado, Paisandú, Rivera, Salto, Tacuarembó)	Rocky outcrops of the Pampa Biome (mainly in the costal area of southeast Uruguay), at elevations from 0 to 250m asl. Native: Argentina [?], Brazil (Rio Grande do Sul), Uruguay (Maldonado, Rocha)

Table 1. Comparative scheme of taxa.

The data are gathered from: Anceschi & Magli Field Notes 2006, 2008, 2011, 2014, unpubl. data [data on square brackets]; Anderson & Egli (2011); Anderson (2001); Backeberg (1966); Hunt *et al.* (2006); Kiesling (1995, 67: 14-22); Van Vliet (1974, 53 (9): 171), (1975, 54 (7): 136). Internet sources: [Ralph Martin's Cacti and Succulent Field Number Finder](#) (Downloaded on 24/10/2014); The IUCN Red List of Threatened Species. Version 2014.2. <www.iucnredlist.org> (Downloaded on 17/10/2014).

P. mammulosa: the first, at elevations between 150 and 300m asl.; the second, between 0 and 250m asl (Map 1). Both are considered “weak” in the risk assessments made for the IUCN Red List of Threatened Species. Version 2014.2.

Parodia mueller-melchersii is considered Endangered A4ac by Larocca, J. *et al.*; *Parodia maldonadensis (neoarechavaletae)* Vulnerable B1ab (i, iii, v) by Larocca, J. & Duarte, W. <www.iucnredlist.org>. Downloaded on 17 October 2014. We observed cases of sympatry of *P. mammulosa* with the first taxon, but none with the second. Our taxonomic understanding of *P. mueller-melchersii* matches with that of Hunt *et al.* (2006), that considers synonyms of the taxon to be *Parodia mueller-melchersii* ssp. *winkleri* (Vliet) Hofacker, *Parodia mueller-melchersii* ssp. *gutierrezii* (W.R. Abraham) Hofacker, *Parodia rutilans* (Däniker & Krainz) N.P. Taylor, and *Parodia rutilans* ssp. *veeniana* (Vliet) Hofacker, a group of taxa still accepted in the systems of Anderson (2001) and Anderson & Eggli (2011). As already pointed out in a comment on the topic in our first booklet (Anceschi & Magli 2010: 26-28), we consider the group of mentioned taxa to be identifiers of different ontogenetic stages of *P. mueller-melchersii*. In this regard, we also noted how Backeberg’s description (1936: 254, 415) which is almost unchanged with respect to the sizes in Hunt *et al.* (2006, text: 221) and describes a taxon of about 8cm in height, 6 in diameter, with a pale yellow central spine with dark edges, [Fig.18] should be expanded to include populations with specimens reaching 20cm and more in height [Fig.19]; specimens with a completely red central spine [Fig.20]; and other specimens showing both characters [Fig.21].

In the same comment (*ibid.*), we stressed that populations of *P. mueller-melchersii* sometimes live in sympatry with those of *P. mammulosa*, like for instance in 2006 in Uruguay, Dpt. Tacuarembó, in the area between Valle Edén and Tambores, A&M 280. We also found that some forms of the two taxa are very similar to each other, so that in these forms the differences that should identify *P. mueller-melchersii* [Fig.22] from *P. mammulosa* [Fig.23], i.e. the larger number of ribs of the first taxon (21-24 vs. 13-21), in addition to the not flattened central spines and the thinner radial spines, cannot always be considered distinctive elements. Now we might ask ourselves how, apart from the alleged

potential of crossing (or not), it would possible to distinguish between all the populations in question, an internal vicariant of a species from a close relative of the same species (external from this).

In this and other cases highlighted in our latest booklet (Anceschi & Magli, 2013b: 31–32), if molecular tests are missing or insufficient, to investigate such low levels of genetic relationships, comparative holomorphy between semaphoronts (Hennig 1966: 66–67) can be used as an accessory science to recognize genetic relationships that are to be presented in the taxonomic system. In the case of *P. mammulosa*, we are led to assess the populations *submammulosa* and *turecekiana* as internal vicariants of the system because, as already mentioned, the semaphoronts which are identifiers of the two groups are actually found even among populations of the type species. In the case of *P. mueller-melchersii* and *P. maldonadensis*, however, increased genetic autonomy is inferred by the fact that some semaphoronts which are identifiers of the taxa are not found in *P. mammulosa* (i.e. the *winkleri* and *veeniana* forms of *P. mueller-melchersii*, and the woolly crown of *P. maldonadensis*). We arrive now to the other taxon that we consider to be close to *P. mammulosa*, namely *P. maldonadensis*. The question that arises spontaneously is: why a *Wigginsia* among the closest relatives of *P. mammulosa*? The answer is: because it is a *mammulosa* s.l. with a very woolly stem apex [Figs.24–25; 26–27] [Table 1].

Now that we reached the conclusion, let us go back to the beginning. To date, probably the most comprehensive study of molecular analyses carried out on the higher taxa (genera, subtribes, tribes and subfamilies) of Cactaceae by Nyffeler & Eggli appeared in Schumann (2010, 6: 109-149). Its results substantially confirm the positions of the previous literature (Anderson 2001, 2005; Hunt *et al.* 2006) about the formation of certain macro-genera, i.e. *Echinopsis* Zuccharini s.l., *Eriosyce* Philippi s.l., *Parodia* Spegazzini s.l. Among these, in the tribe Notocactae Buxbaum, in particular the authors confirm that *Parodia* Spegazzini s.l. (Nyffeler 1999: 7: 6-8) is a well-supported monophyletic clade, which includes the previous segregated genera *Brasilicactus* Backeberg, *Brasiliparodia* F. Ritter, *Eriocactus* Backeberg, *Notocactus* (K. Schumann) Frič, and *Wigginsia* D.M. Porter (*ibid.*).



Fig.22 *Parodia mueller-melchersii*. Uruguay, Tacuarembó, old road between Valle Eden and Tambores. 22 Nov 2008, A&M 280 (cactusinhabitat.org 2010)



Fig.23 *Parodia mammulosa* (*mammulosa* populations) Uruguay, Tacuarembó, old road between Valle Eden and Tambores. 22 Nov 2008, A&M 281 (cactusinhabitat.org 2010)



Fig.24 *Parodia maldonadensis* (*neoarchavaletae*). Uruguay, Rocha, P. N. Santa Teresa. 19 Dec 2006, A&M 97 (cactusinhabitat.org 2010)



Fig.25 *Parodia mammulosa* (*mammulosa* populations). Brazil, Rio Grande do Sul, Lavras do Sul, RS 630. 5 Nov 2011, A&M 802 (cactusinhabitat.org 2013)



Fig.26 *Parodia maldonadensis* (*neoarchavaletae*). Uruguay, Maldonado, Piriapolis, Cerro del Toro. 18 Nov 2011, A&M 832 (cactusinhabitat.org 2013)



Fig.27 *Parodia mammulosa* (*submammulosa* populations). Argentina, San Luis, El Volcan, Campo la Sierra. 06 Jan 2014, A&M 949

In addition, the authors point out again what was already expressed by Nyffeler in Cactaceae Consensus Initiatives (ibid.), namely that "A strongly supported subclade consisting of *Notocactus* s.s., *Parodia* s.s. and *Wigginsia* (subclade 7) supports the hypotheses that the Pampa taxa of *Notocactus* s.s. and *Wigginsia* might be more closely related to *Parodia* s.s. from the eastern slopes of the Andes than they are to the other Pampa taxa of the former genera *Brasilicactus* and *Eriocactus*..." (Nyffeler & Eggli 2010).

The close relationship between *Notocactus* s.s. and *Wigginsia* is pointed out again in Anderson & Eggli (2011: 495). Regarding what we are interested to note in this article, this means that *P. maldonadensis*, despite its prominent apical woolliness, can be considered a close relative of *P. mammulosa*. Following this line, we also know that more recent molecular analysis of *Echinopsis* (Schlumpberger & Renner 2012), clearly demonstrated that a cladistically correct interpretation of the molecular data in the direction of a monophyletic genus *Echinopsis* (Anceschi & Magli 2013b: 20-29; 2013c, 31: 24-27), leads to the assimilation in *Echinopsis* s.l. as currently conceived (Anderson 2001; Hunt *et al.* 2006; Anderson & Eggli 2011), of *Cleistocactus* Lemaire, *Denmoza* Britton & Rose, *Haageocereus* Backeberg, *Weberbauerocereus* Backeberg and 12 other genera of the tribe Trichocereae (Anderson 2001, 2005; Hunt *et al.* 2006; Anderson & Eggli 2011) or sub-tribe Trichocereinae (Nyffeler & Eggli 2010). Among these, *Espostoa* Britton & Rose and *Vatricania* Backeberg show a lateral cephalium, a character that in the past was considered distinctive at a genus level. Now, if cephalia, as well as as floral characters and pollination syndromes, are no longer indicative to define genera (Nyffeler & Eggli 2010; Schlumpberger & Renner 2012), having already found the molecular proximity of *Notocactus* s.s. and *Wigginsia*, why should we be surprised by the idea of a parental proximity between *P. mammulosa* and *P. maldonadensis*? The holomorphic proximity (i.e. morphological, ecological, chorological and genetical) (Hennig 1966: 7,32) of the two taxa must also be taken into account.

In their attempt to give new life to the genus and distinguish it from the other parodias, Albesiano & Kiesling (2009) defined pseudocephalium as a character of *Wigginsia*

that other authors identify as dense apical woolliness or woolly crown (Backeberg 1966; Anderson 2001; Hunt *et al.* 2006; Anderson & Eggli 2011). The pseudocephalium putatively protect buds, flowers and fruits, etc., but as we have already seen, the compared holomorphology between *P. mammulosa* and *P. maldonadensis*, together with the results of 15 years of molecular analysis, lead us in another direction.

Implications of this article for the genus *Parodia* Spegazzini

To be transferred to the synonymy of *Parodia mammulosa*:
Parodia turecekiana
Notocactus turecekianus
Notocactus mammulosus ssp. *turecekianus*

Bibliography

- ALBESIANO, S. & KIESLING, R. (2009). Rehabilitation and synonymy of *Wigginsia corynodes* (Cactaceae). *Haseltonia* 15: 33-40.
- ANCESCHI, G. & MAGLI, A. (2010). *South America 2005/2010*. Bologna. MODO infoshop.
- ANCESCHI, G. & MAGLI, A. (2012). *Parodia turbinata* (Arechavaleta) Hofacker: a confused taxon. *The Cactus Explorer* 6: 26-33. [epublished].
- ANCESCHI, G. & MAGLI, A. (2013a) Observations concerning *Parodia* (*Eriocactus*). *The Cactus Explorer* 7: 27-39. [epublished].
- ANCESCHI, G. & MAGLI, A. (2013b). *South America 2011/2013*. Bologna. MODO infoshop.
- ANCESCHI, G. & MAGLI, A. (2013c). The new monophyletic macrogenus *Echinopsis*. No risk of paraphyly, and the most convincing hypothesis in phylogenetic terms. *Cactaceae Systematics Initiatives* 31: 24-27.
- ANDERSON, E.F. (2001). *The Cactus Family*. Portland, Oregon: Timber Press.
- ANDERSON, E.F. (2001). *The Cactus Family*. trs. EGGELI, U. (2005). *Das grosse Kakteen-Lexikon*. Stuttgart: Eugen Ulmer KG.
- ANDERSON, E.F. (2001). *The Cactus Family*. trs. EGGELI, U. (2011). *Das grosse Kakteen-Lexikon*. Stuttgart: Eugen Ulmer KG.
- BACKEBERG, C. & KNUTH, F.M. (1936). *Kaktus - ABC*. Copenhagen: Nordisk Forlag.
- BACKEBERG, C. (1966). *Kakteenlexikon*. trs. GLASS, L. (1977). *Cactus Lexicon*. Poole: Blandford Press.
- CABRERA, A.L. (1971). Fitogeografía de la Republica Argentina. *Bol. De la Soc. Arg. Botánica*. Vol. XIV, Nº 1-2. Bs. As.
- CHEBATAROFF, J. (1980). La vegetación del

- algarrobal, monte espinoso del litoral, I. Divisiones de la Provincia fitogeografica Uruguayense. *Res.Jorn.C.Nat.1*, Montevideo. Pág. 77-78.
- DARWIN, C.R. (1859). *On the Origin of Species by Means of Natural Selection, or the Preservation of Favoured Races in the Struggle for Life*. Mineola, New York: Dover Publications, INC. (2006).
- DOUCHAFOUR. (1984). *Edafogenesis y clasificación*. Ed. Masson, Barcelona.
- DURÁN, A. (1985). *Los Suelos del Uruguay*. Editorial Hemisferio Sur. Pág. 257-273. Mdeo.
- FAGÚNDEZ, C. (2003). La Vegetación de un Blanqueal en el Litoral Oeste del Uruguay: Efectos de la Hormiga *Atta vollenweideri* Forel. *Licciatura en Ciencias Biológicas, opción Botánica*. Departamento de Ecología, Facultad de Ciencias, UDELAR [internet source].
- GERLOFF, N., NEDUCHAL, J. & STUHLIK, S. (1995). *Notokakteen*. Gesamtdarstellung aller Notokakteen. Ludwigsburg: Kveten Verlag.
- HENNIG, W. (1966). *Phylogenetic Systematics*. trs DAVIS, D. D. & ZANGLER, R. Urbana: University Illinois Press.
- HOFACKER, A. (2000). Distribution records for various *Parodia* taxa: some corrections and additions. *Cactaceae Systematics Initiatives* 10: 12.
- HOFACKER, A. (2012). Some notes on *Wigginsia corynodes*. *The Cactus Explorer* 4: 26-34. [epublished].
- HUNT, D.R. ET AL. (2006). *The New Cactus Lexicon*. Milborne Port: DH Books.
- Kiesling, R. (1995). Argentine notocacti of the genus *Parodia*. *Cactus and Succulent Journal (U.S.)* 67: 14-22.
- MARCHESI, E. (2013). *Flora y vegetación del Uruguay*. (internet source).
- MAYR, E. (1942). *Systematics and the Origin of Species*. New York: Columbia University Press.
- NYFFELER, R. (1999). *Notocactus* versus *Parodia* — the search for a generic classification of the subtribe Notocactinae. *Cactaceae Consensus Initiatives* 7: 6-8.
- NYFFELER, R. & EGGI, U. (2010). A farewell to dated ideas and concepts: molecular phylogenetics and a revised suprageneric classification of the family Cactaceae. *Schumannia* 6: 109-149.
- SCHLUMBERGER, B. O. & RENNER, S. S. (2012). Molecular phylogenetics of *Echinopsis* (Cactaceae): Polyphyly at all levels and convergent evolution of pollination modes and growth forms. *American Journal of Botany* 99(8): 1335-1349.
- RAGONESE, A. & COVAS, G. (1947). La Flora Halófila del Sur de la Provincia de Santa Fe. *Rev. Darwiniana*, t.7, n° 3. Rep. Argentina.
- VAN VLIET, D. J. (1974). *Notocactus veenianus*. *Succulenta (Nederlands)* 53(9): 171-173.
- VAN VLIET, D. J. (1975). *Notocactus winkleri*. *Succulenta (Nederlands)* 54(7): 136-139.

Websites

<http://www.cactusinhabitat.org>

www.iucnredlist.org

Ralph Martin's Cacti and Succulent Field Number Finder

<http://ralph.cs.cf.ac.uk/Cacti/finder.html>

