PARODIA SENSU STRICTU IN ARGENTINA, PART I

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In 1922 Britton and Rose established the genus *Hickenia* for a group of cacti from northwest Argentina with *Hickenia microsperma* = *Echinocactus microspermus* Weber as type species of the genus. As the name *Hickenia* was used previously for another genus, C. Spegazzini changed the name to *Parodia* in 1923. At that time and for many years only a few species had been attributed to that genus. In the past 30 years many collections have been made in the field, producing a great interest in the group. Many of the new discoveries were published with scientific names but without good understanding of the considerable variability of some species and the extent of their adaptations to different environments.

The proliferation of specific names based upon quite minimal variations makes the study of this group very difficult, especially when in general the descriptions are deficient. The appearance of these plants changes considerably under cultivation, especially if they are overfed and grown with insufficient light, causing the stems to be overly large and the spines poorly developed. Also, a lack of overhead watering and the other artificial greenhouse conditions, will produce overly woolly areoles, giving the plants an attractive but unnatural appearance. All this can be seen in the illustrations of the many proposed "new species" published in recent years.

The present work explains our concept of those species which are found in Argentina. There are in some species, such as *P. microsperma* in particular, but also in *P. setifera, P. stuemeri* and *P. maassii,* important variations that can be considered in lower categories such as variety and form, but in this work we are only dealing with the specific and subspecific levels. Almost all the Argentine localities given in original descriptions were visited by us, and some specimens from each locality have been cultivated by us. The studied material cited below is just part of the material documented in public herbaria.

We would also like to note that we, the authors, do not have a good first-hand knowledge of the Bolivian species of *Parodia* and consequently our opinions on the Bolivian synonyms are given only as a suggested approach, based on our study of the literature and cultivated plants, which moreover, with some exceptions, were not collected by us personally.

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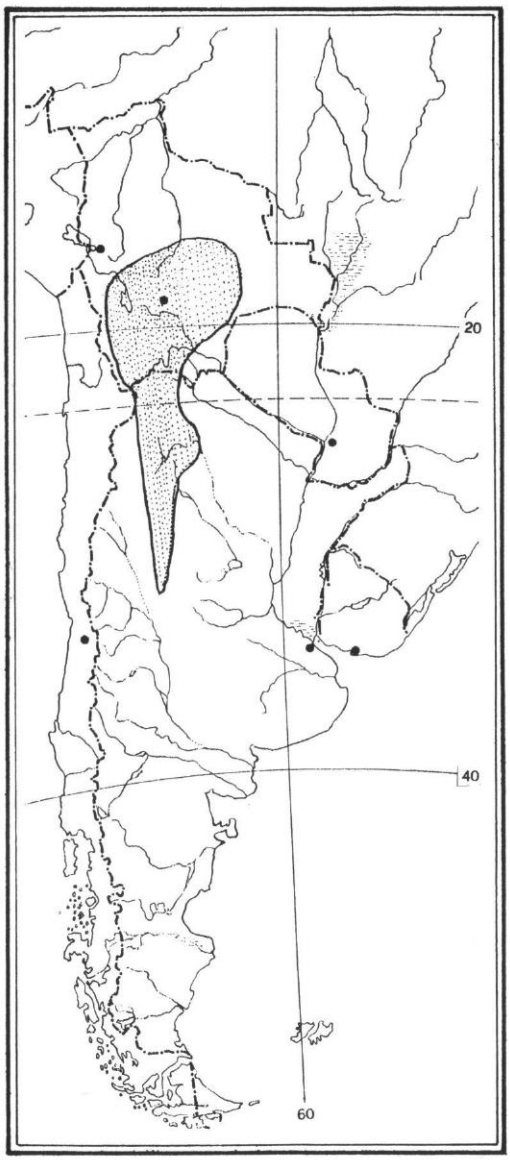
Parodia Spegazzini, An. Soc. Ci. Argentina 96: 70, 1923.

Hickenia Br. & R. (*non Hickenia* Lillo, 1919, Asclepiadaceae), Cactaceae III:207, 1922.

Plants small to medium size: 5–30 cm in diam., depressed-globose to shortly columnar. *Ribs* present or completely dissolved into tubercles. *Spines* straight, arched or hooked.



Map 1. General distribution of *Parodia*—in the narrow sense—in South America.

Flowers funnelform to campanulate, 2.5–6 cm in diam., born from the more or less central areoles. *Pericarpel* and receptacle with scales that have woolly hairs and bristles in their axils. *Perianth* sometimes changing its color with the age of the flower.

Fruits small, dry to semi-dry, globose to cylindric, the walls thin, sparsely woolly, dehiscent at the base, with dried perianth persistent. *Seeds* from very small to medium size: 0.3–1 mm in diam.

Parodia, in the narrow sense, is distributed from central and southern Bolivia to northwestern Argentina (see Map 1 and 2).

As mentioned above, in general the species show considerable infraspecific variation. Only *P. chrysacanthion* and *P. nivosa* are very uniform, perhaps because they are endemic to a reduced area; also *P. penicillata* shows some uniformity, but all three of these are quite closely related.

A. Central spines arched or straight; thick, ±rigid, hooked, radials setaceous, flexible.
  B. Stems less than 10 cm diameter (to 10 cm in cultivation). Ribs completely dissolved into tubercles, rarely with ribs. Seeds globose 0.3–0.5 mm in diam., with large caruncula. ..... 1. *P. microsperma*
  B′. Stems more than 10 cm diam. Ribs tuberculate but defined. Seeds elongated, 0.5–0.9 mm in diam. and to 1 mm long, caruncula small to absent.
    C. Stems up to 10 cm in diam., rarely bigger, epidermis glaucous. Ribs more than 20, narrow. Central spines reddish, straight or arched, acicular, rigid. ..... 2. *P. stuemeri*
    C′. Stems up to 20–25 cm in diam., epidermis greenish. Ribs less than 21, broad. Central spines yellow to brownish, arched, rarely hooked or straight, subulate, very rigid.
      D. Radial spines ca. 15, white-yellow, acicular, arched. Fruit globose. ..... 3. *P. maassii*
      D′. Radial spines ca. 40, hyaline white, setose, straight. Fruit cylindroid. ..... 4. *P. setifera*
A′. Central spines straight, acicular or setose, not or hardly distinguished from the radials.
  E. Flowers campanulate, 3–4 cm long, twice as long as the spines, red. Stems globose to elongate.
    F. Tubercles apparently in 22 rows, not forming definite ribs. Spines white. Floral areoles at the center of the plants very woolly. ..... 5. *P. nivosa*
    F′. Ribs 17–18, tuberculate but continuous. Spines yellow to brown or white. Floral areoles near the center not woolly. ..... 6. *P. penicillata*
  E′. Flowers nearly tubular, ca. 2 cm long—as long as the spines, yellow. Stems discoid to globose. ..... 7. *P. chrysacanthion*

1. **P. microsperma** (Web.) Speg., l.c.: 73, 1923

Echinocactus microspermus Weber in Boiss. Dict. Hort.: 469, 1896.

Body simple, globose, depressed to shortly columnar: 1–10 cm tall and ca. 3–7 cm in diam. (up to 15 × 10 cm in cultivation), epidermis greenish yellow to dark green or brown. *Tubercles* in 10–30 spiral rows. *Radial spines* (10–)20(–40), white or hyaline, rarely pink, 4–8 mm in length; *central spines* 4(3–7), 1(–3) hooked, the rest straight or slightly arched, reddish or brown, 5–15(–25) mm.

Flowers numerous, 3–4(–7) cm in diam. and in length, yellow, orange to dark red. *Style* and *stigma* generally yellow. *Fruits* with hairs and bristles, semi-dry. *Seeds* notable by their smallness: 0.3–0.5(–0.6) mm, with spongy, protruding caruncula.

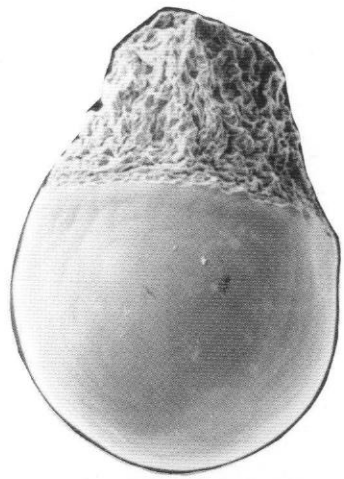


Fig. 1. *P. microsperma* seed, 0.45 mm diam, showing smooth surface and protruding caruncula (OF 11/80).

subspecies **microsperma** (Figs. 1–6):

Nomenclature, synonyms and bibliography:**

P. albofuscata Brandt, Kakt. u. Orch. Rundsch. 2(3): 22, 1977 (Salta, Cafayate).

P. argerichana Weskamp, KuaS 36(1):9, 1985 (Salta, N. Cafayate).

P. atroviridis Backbg. Descr. Cact. Nov. 3:10, 1963 (N. Argentina) (nom. illeg.; no valid species are described in this paper because the types mentioned only refer to cultivated plants which were not preserved).

** Varietal names and some dubious ones are not listed. Localities mentioned correspond to those given in original descriptions. In some cases, characteristics of the variation are also mentioned.

Fig. 2. Variation in flowering color in *P. microsperma* ssp. *microsperma* in Cuesta del Portezuelo, Catamarca.

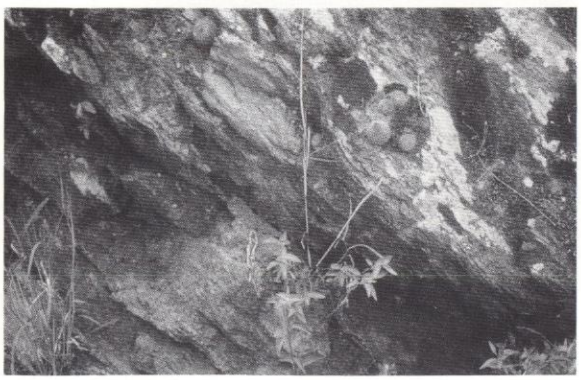


Fig. 3. Vertical slope, the habitat of the previous specimens.

P. aureispina Backbg. Blätt. f. Kakt. 68/2, 1934 (Salta, yellow spines).
P. betaniana Ritter, Kakteen in Südamerika 2:426, 1980 (Salta, Guemes; yellow spines).
P. campestris (as *campestrae*) Brandt, Kaktus (Dinamarca) 10(3):61, 1975 (Salta, R. de la Frontera; straight spines).
P. capillitaensis Brandt, Kaktusz Vilag 4:50, 1977 (fide Lit. Kakt. 2(4):244–246, 1978, Catamarca, Capillitas).
P. caraparíana Brandt, Cact. Succ. Jour. (USA) 49(3): 119, 1977 (Tarija, O'Connor).
P. carminata Backbg., in Backbg. & Knuth, Kaktus-ABC: 416, 1935 (Salta).
P. catamarcensis Backbg., l.c.: 416, 1935 (Catamarca).
P. chlorocarpa Ritt. l.c. :427, 1980 (Salta, Mojotoro).
P. erythrantha (Speg.) Backbg., l.c.: 269, 1935 (*Echinocactus microspermus* var. *erythranthus* Speg.; N. Arg.).
P. fechseri Backbg., l.c. 3:11, 1963 (La Rioja, Olta; see Fig. 4).
P. formosa Ritter, Succulenta :57, 1964 (Tarija, O'Connor).
P. glischrocarpa Ritt. l.c. :427, 1980 (Salta, Alemania).

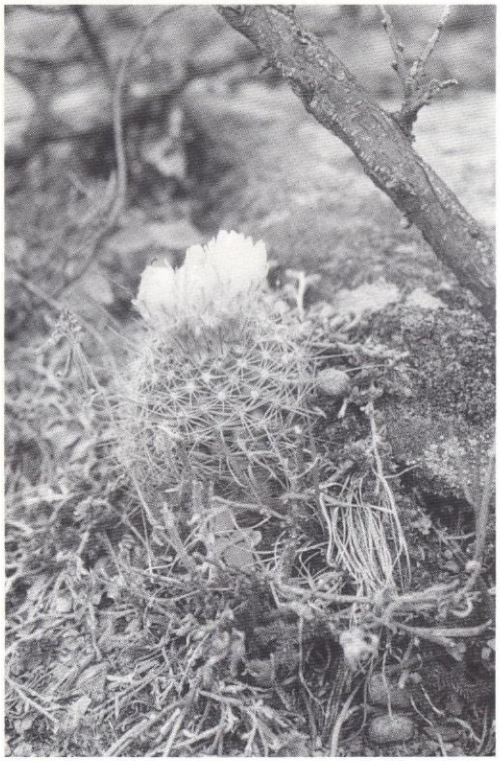


Fig. 4. *P. microsperma* ssp. *microsperma* in La Rioja: Olta, in dry and low altitude habitat ("*P. fechseri*").

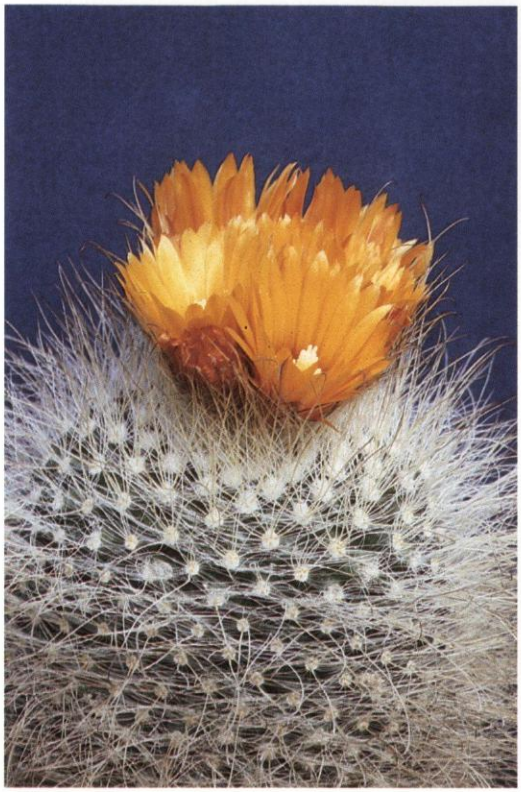


Fig. 5. *P. microsperma* ssp. *microsperma* from N of Cafayate region, named *P. herzogii*. Perhaps the nicest form of this species, with big stems, plumose radial spines and long flexible central ones.

P. herzogii Rausch, KuaS 32(2):30, 1981 (Salta, N. Cafayate; beautiful variation, very different from the rest; can be treated as a variety; see Fig. 5).
P. malyana Rausch, KuaS 20:8, 1969 (Catamarca, Ancasti; another beautiful recognizable variation; see Fig. 6).
P. mercedesiana Weskamp, KuaS 35(3):56, 1984 (Salta, Alemania).
P. mesembrina Brandt, Kakt. Orch. Rundsch. 2(3): 33, 1977 (La Rioja, Malanzan).
P. microthele Backbg., l.c. :415, 1935 (N. Arg.)
P. minuscula Rausch, Succulenta 64:230, 1985 (=*P. minima* Rausch, non Brandt; Catamarca, Ancasti).
P. mutabilis Backbg., Blätt. f. Kakt. 68/4, 7-1934 (Salta).
P. pachysa Brandt, Frankf. Kaktfrd. 5(4):5, 1978 (Tarija, O'Connor).
P. papagayana Brandt, Kaktus (Dinam.) 11(4):88, 1976 (San Juan, Srra. de la Huerta).
P. parvula Brandt, Kaktus (Dinam.) 10:6, 1975 (sine typus; Salta, Pocitos; few spines).
P. pusilla Brandt, CSSJ (USA) 49(3):120, 1977 (Salta, Pocitos; short yellow spines).
P. rubelihammata Backbg., l.c. 3:11, 1963 (La Rioja, Sanagasta).
P. talaensis Brandt, Cact. Flam. Ausg. 8(4):57, 1976 (S. Salta, El Tala).
P. rubriflora Backbg., l.c. 3:12, 1963 (N. Arg.).
P. rubristraminea Ritt., l.c. :428, 1980 (Salta, Alemania).
P. sanagasta Weingart, Kaktusar :8, 1935 (Salta [sic]; Villa Sanagasta is a town near La Rioja city; we did not find any other homonym in Salta).
P. sanguiniflora Backbg., Blätt. f. Kakt. 68/6, 12-1934 (Salta).
P. scopaoides Backbg., Kaktus-ABC :416, 1935 (Salta).
P. spanisa Brandt, Hazai Kakt. Turor 2:22, 1977 (Tucumán, Amaicha del Valle).

Fig. 6. *P. microsperma* ssp. *microsperma* from Catamarca, Sierra de Ancasti, El Taco; a beautiful form with only white spines. This form grows in pure quartz rocks and herbivorous pressure evidently produces this natural selection ("*P. malyana*").

Fig. 7. *P. microsperma* ssp. *horrida* from N of Cafayate, growing in sandy or rocky soil.

P. spegazziniana Brandt, Stachelpost 7:367, 1971 (Jujuy).
P. superba Brandt, KuaS 21(1):15, 1971 (Salta, Cafayate).
P. tafiensis Backbg., l.c. 3:12, 1963 (Tucumán, Tafí).
P. thionantha Brandt, KuaS 20(2):156, 1969 (Salta).
P. tuberculosi-costata Backbg., Kakt. Lex. :351, 1966 (Salta).
P. uebelmaniana Ritt., l.c. 2:425, 1980 (Salta, Lumbreras).
P. wagneriana Weskamp, Kakt.-Sukk. 22(3):70, 1987 (Catamarca, E. of Andalgala).
P. weberiana Brandt, KuaS 20(11):206, 1969 (N. Arg.; yellow spines).
P. weskampiana Krasucka et Spanowsky, Kakteen-Sukkulenten : 45, 1968 (fide Hummel, U., KuaS: 37, 1978; Salta?).

This subspecies has usually globose and green stems, with the central spines hooked, ±flexible and long, the radials ±hyaline, thin and flexible, the flowers yellow, orange to red or also banded.

It grows in southern Bolivia (Tarija), and in Argentina in SE Jujuy, Salta, Tucumán, Catamarca, NW of Santiago del Estero, La Rioja, and NE of San Juan, between 500 and 1,606(–2,000) m elevation, in rocks or rocky soil, in rich, humousy soil, surrounded by ±dense vegetation, with an average annual rainfall between 400 and 900 mm, which occurs mainly in summer.

Selected material examined: *Jujuy,* S. Pedro, R. Kiesling 809 (LP). *Salta,* Cafayate, A. Krapovickas et C. Cristobal 20731 (LP). *Tucumán,* Vipos, S. Venturi 8191 (SI). *Catamarca,* Gracián, A. Castellanos 1-I-1940 (BA 33288). *Sgo. del Estero,* Guasayán, A. Castellanos s.n. (BA 47529). *La Rioja,* Anzullón, A. Castellanos s.n. (BA 33320). *San Juan,* V. Fertil, R. Kiesling 3333 (SI).

Red flowered populations grow in the higher elevations in the mountains and yellow in lower places. Intermedial flower colors—orange or banded—on the middle slopes (see Fig. 3). This feature was also observed in *Gymnocalycium,* and we believe it relates to pollinators' preference.

subspecies **horrida** (Brandt) Kiesling et Ferrari, **nov. comb.**

P. horrida Brandt, Cactus (Belgium) 11(8):113, 1979 (see Fig. 7).
P. dextrohamata Backbg., l.c. 3:10, 1963 (N. Arg.).
P. dichroacantha Brand et Weskamp, KuaS 18:87, 1967 (Tucumán and Salta).
P. fuscato-viridis Backbg.?, l.c. 3:11, 1963 (without origin, recently cited at Catamarca, Q. de Belen).
P. gutekunstiana Backbg., Die Kakteen 3:1604, 1959 (Arg.).
P. heteracantha Ritt. et Wescamp, Kakteen-Sukk. 21(4):83, 1986 (Salta, Cachi to Molinos).
P. hummeliana Lau et Weskamp?, KuaS 29(10):227, 1978 (Salta, Amblayo; red flower!).
P. kilianana Backbg., l.c. 3:11, 1963 (Salta, Q. del Toro according to Backbg.; but this sort of plant does not occur there; it was found by Rausch to the west of Cachi).
P. lohaniana Lau & Weskamp, KuaS 30(6):137, 1979 (Salta, Payogasta).
P. piltziorum Weskamp, KuaS 31(7):203, 1980 (Salta, Rio Calchaquí).
P. pluricentralis Brandt, Stachelpost 7(34):365, 1971 (Salta, Amblayo).
P. rigida Backbg., l.c. 3:11, 1963 (Salta, Tolombón).

This subspecies commonly has a cylindrical stem, epidermis reddish grey (terracota); central spines subulate, strong, hooked or straight; radial spines opaque (dull), fine but rigid, and yellow flowers (red flowers in the description of *P. hummeliana*).

It is found in Salta (Cachi, Brealitos, Payogasta, Cafayate, Tolombón, . . .), W of Tucumán and perhaps N of Catamarca, in more xerophytic areas and at higher elevations (1,600–3,000 m) than the other subsp. The vegetation is sparse with naked rocks or sandy soil between the plants. Precipitation also occurs in summer but only 200–400 mm/year.

Material examined: Salta, Pomancillo, A. Castellanos s.n. (BA 33296).

The species exhibits considerable variation. We found in the wild small, relatively homogeneous populations. This is the reason why many different names have been published for this taxon. A complicated system of classification attempts to keep and explain all these names. The level of subspecies is given here not only because the morphological differences are more or less constant, but also because the environment is different. The areas overlap at the Cafayate region.

(to be continued)