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A NEW TAXONOMIC TREATMENT OF THE GENUS TRICHOCEREUS (CACTACEAE) IN CHILE

SOFÍA ALBESIANO1, 2, 3
1Universidad Pedagógica y Tecnológica de Colombia.
Tunja, Colombia
2Universidad Nacional de la Plata,
Buenos Aires, Argentina
3Instituto Argentino de Investigaciones de las Zonas Áridas-CONICET,
C.C. 507 (5500) Mendoza, Argentina
email: adriana.albesiano@uptc.edu.co

Abstract: The genus Trichocereus is represented by 19 taxa (12 species, 5 subspecies and 2 varieties) in Chile, 13 of them endemic to this country. These occur from the regions of Arica and Parinacota on the border with Peru, to the region of Maule, the IV Region of Coquimbo presenting the highest taxonomic richness. Its species are a dominant feature of the landscape and define phytogeographic regions. This taxonomic study has yielded iconographies, original descriptions, detailed descriptions, taxonomic comments, information on distribution and habitat, exsiccatas, nomenclature, and three keys for the identification of species, subspecies and varieties. This treatment provides an updated synonymy including eight new synonyms; a new combination, Eulychnia coquimbana (Molina) S. Albesiano; three taxonomic level changes: (1) Trichocereus chiloensis subsp. australis (F. Ritter) S. Albesiano, (2) Trichocereus chiloensis subsp. eburneus (Phil. ex K. Schum.) S. Albesiano, and (3) Trichocereus chiloensis subsp. panhoplites (K. Schum.) S. Albesiano; three new names: (1) Trichocereus faundezii S. Albesiano, (2) Trichocereus pectiniferus S. Albesiano, (3) Trichocereus undullosus S. Albesiano; and thirteen neotypifications.

Keywords: Cactaceae, Chile, distribution, endemism, taxonomy, Trichocereus.

Resumen: El género Trichocereus en Chile se encuentra representado por 19 taxones (12 especies, 5 subespecies y 2 variedades), 13 de ellos endémicos de este país, y distribuidos desde las regiones de Arica y Parinacota hasta la región del Maule, destacándose la IV Región de Coquimbo por la mayor riqueza taxonómica. Sus especies constituyen elementos dominantes del paisaje y definen provincias fitogeográficas. Como resultado del estudio taxonómico se proporcionan iconografías, descripciones originales, descripciones detalladas, distribuciones y hábitats, comentarios taxonómicos y nomenclatoriales, exsiccatas, y tres claves de especies, subspecies y variedades. Se provee una sinonimia actualizada con ocho nuevos sinónimos, una nueva combinación: Eulychnia coquimbana (Molina) S. Albesiano; tres cambios de rango: (1) Trichocereus chiloensis subsp. australis (F. Ritter) S. Albesiano, (2) Trichocereus chiloensis subsp. eburneus (Phil. ex K. Schum.) S. Albesiano, (3) Trichocereus chiloensis subsp. panhoplites (K. Schum.) S. Albesiano, tres nombres nuevos: (1) Trichocereus faundezii S. Albesiano, (2) Trichocereus pectiniferus S. Albesiano, (3) Trichocereus undullosus S. Albesiano y trece neotipificaciones.

Palabras clave: Cactaceae, Chile, distribución, endemismo, taxonomía, Trichocereus.

INTRODUCTION

The genus Trichocereus belongs to the subtribe Trichocereinae Buxbaum, which in turn belongs to the tribe Trichocereeae Buxbaum, subfamily Cactoideae. Columnar or sometimes globular stems characterize this subtribe. Its flowers are zygomorphic (Schick 2011), ranging in shape from campanulate to infundibuliform, with large tepals, usually white or whitish, or brightly colored in some taxa; they may or may not have nectaries, but the stamen insertion begins either at the base of the receptacle or on the nectaries (Buxbaum 1958).

Trichocereus is morphologically defined by cylindrical stems with shallow ribs, large flowers (8–30 cm), wide ovaries (2.0–2.5 cm) and floral tube covered with subulate scales, presenting an abundance of black, brown, gray or white hair in their axils (Kiesling 1978, Kiesling & Ferrari 2005). Riccobono (1909) recognized Trichocereus as a genus based on the columnar stems and flower pilosity, and the etymology of the name Trichocereus refers to those two characteristics. This genus comprises about 45 species in the Andes of Ecuador, Peru, Bolivia, Argentina and Chile, occurring in the latter country from the regions of Arica and Parinacota to Maule.

Trichocereus is a monophyletic genus, if Harrisia hahniana and Harrisia earlei are included in it (Al-
besiano & Terrazas 2012). The clade is supported by three synapomorphies and eight homoplasies. The basitonic habit with prostrate branches (branches are produced from the base, with no central trunk), imbricate scales along the floral tube, and subglobose fruit were recovered as synapomorphies, but not the growth form (columinar) and not flower pilosity (Albesiano & Terrazas 2012). *Trichocereus* has a close affinity with *Lobivia* as they share two homoplasies: sharp ribs (45°–90°) and closely positioned scales on the surface of the receptacle.

Albesiano and Kiesling (2012) determined the identity and neotypification of *Trichocereus macrogONUS* (type species of the genus) and its synonyms and affinities, contributing to the nomenclatural stability of the genus. This species has been commonly cultivated in Bolivia, Chile, Colombia, Ecuador and Peru for medicinal properties and for its use as a living fence, among other uses.

The complexity and diversity of the genera of the tribe Trichocereae (Acanthocalycium, Chaumaecereus, Echinopsis (s.s.), Hymenorebutia, Lobivia, Pseudolobivia, Soebrennia and Trichocereus) present possibly the most interesting taxonomic problem at the generic level in the family Cactaceae, at least for the South American cacti. There are over 100 names for the species of *Trichocereus* alone, and there is no modern collective treatment for the genus; there are only partial treatments of regional floras, Chile (Hoffmann & Walter 2004; Ritter 1980b); Argentina (Kiesling 1978; Ritter 1980a); Bolivia (Ritter 1980a; Navarro 1996; Navarro & Maldonado 2002); Peru (Ritter 1981; Brako & Zarucchi 1993); and Ecuador (Madsen 1989). While there are species listed for Paraguay and Brazil, this information is either inaccurate or includes species currently assigned to other genera (Kiesling 1978). Based on the literature mentioned, it is estimated that the current number of valid *Trichocereus* species approaches 45; this number depends, of course, on the taxonomic treatment of the genus, which is in the process of being reviewed by Albesiano (in prep.).

The objective of this paper is to classify the species of *Trichocereus* with natural distribution in Chile, based on morphological characteristics, in addition to resolving nomenclatural issues in order to elucidate the taxonomy of a complex group in a little-known tribe that is of great biological and cultural importance.

**MATERIALS AND METHODS**

Two botanical explorations to the arid and semi-arid regions of Chile were conducted – one in November 2008 and the other in October 2010. Data were compiled on the habitat (location and type of vegetation), and on the specimens (individual height and morphology of the ribs, areoles, spines, flowers, fruits and seeds). Fragments were collected and processed, then placed in the MERL and AGUCH Herbaria (Luis Faúndez collection, Santiago, Chile). In addition, exomorphological studies were complemented by the observation of materials from the following herbaria: LIL, LP, LPB, MERL, SGO, SI, U. These materials are denoted by the acronym of the herbarium, followed by an exclamation mark to denote personal examination by this author. In many cases, neotypes had to be designated because the authors had based their species descriptions on live specimens which had never been documented as herbarium specimens. A data sheet was created for each taxon, which included the following information: synonyms, types, iconography, original description, extended description, distribution and habitat information, taxonomic and nomenclatural comments, as well as excisicata. Three keys are provided to determine (1) species, (2) subspecies of *Trichocereus chiloensis*, and (3) varieties of *T. macrogONUS*. A list of excluded taxa that belong to another genus, or whose determination could not be achieved due to lack of information, is also included.

**Description of the genus *Trichocereus***

**Habit:** Erect plants, pendulous or cespitose; solitary (up to 15 m high) or forming dense cespitose shrubs 2–3 m high or less than one meter. **Stem:** Species such as *Trichocereus atacamensis* and *Trichocereus chiloensis* subsp. *litoralis* have branchless trunks of 0.5 to 3 m high, and a diameter of 50 cm. Many individuals of some species lack trunks (e.g., *Trichocereus deserticola*, *Trichocereus spinibarbis*). **Branches:** Cylindrical, narrow, straight or slightly curved, branched at ground level or from a trunk, with acute apices (angle 45°–90 degrees). The diameter (6–25 cm) and color (light green, dark green or gray) varies within and among species. **Ribs:** 9–25 (–40), wide (up to 5 cm), short (up to 2 cm depth), surface curvature predominantly obtuse. In cespitose species, such as *Trichocereus nigrispinus* and *Trichocereus spinibarbis*, rib characteristics remain constant throughout the length of branches, while arborescent species, such as *T. atacamensis*, present differences in number as well as in size, between apical and basal ribs. In *Trichocereus faundezii* and *T. undululosus* ribs are bulbous in the area of the areola (i.e., tuberculate). **Areoles:** May be round, oblong or obovate, short (up to 10 mm high) and pannose with white, yellow, gray, brown or black hairs. **Spines:** Terete; radial short (2 cm), numerous (11–21), at a 75° angle to the axis of the stem (divaricate) or appressed to the surface of the branch (15° angle), intersecting or not intersecting with the spines of neighboring areoles; centrals long (10–20 cm), few (1–6), and perpendicular to the branch or divaricate. Their structure may be weak and flexible (bristly) or rigid and stiff (acicular or subulate). Spines on the apices of branches have brown tips and a light green base, while those toward the base are white with black apices or have black, gray, olive green, dark brown or black dots. **Flowers:** Apical and/or subapical, infundibular, 8–21 cm long; ovary 2–3 cm in diameter; floral tube 4–7 cm long, 2–3 cm in diameter distally, and covered with subulate scales from 0.6 to 3 cm in length (shorter than
Key for identification of species

1. Apical spines flexible, weak (bristly). ........................................................................... 2
1'. Apical spines rigid, stiff. ............................................................................................... 3
2 (1). Plants columnar, scarcely branched, usually unbranched.
2. Ribs numerous (24–40). ............................................................................................... T. atacamensis
2' Plants branched, shrubby or arborescent. Ribs 12–17. .............................................. T. skottsbergii
3 (1'). Ribs few (5–6–8–9) and deep (2.5 cm). ............................................................... 4
3. Distance between areoles greater (2.5 cm). ............................................................. T. macrogonus
3'. Distance between areoles shorter (2 cm or less). .................................................... 4
4 (3'). Branches 5–10 cm in diameter. ............................................................................ 5
4'. Branches 10–25 cm in diameter. ................................................................................. 6
5 (4). Adult outer spines appressed to the stem (divergence angle ca. 15 degrees),
pectinate arrangement. .................... T. pectiniferus
5'. Adult outer spines divaricate to stem (divergence angle ca. 75 degrees),
radial arrangement. ........................................................................................................... 7
6. Ribs noticeably bulging in the area of the areoles (tuberculate). ............................... 8
6' (4'). Ribs not thickened in the area of the areoles .................................................... 9
7 (5'). Radial spines 7–10, gray. Plants of Region XV. .................................................. T. uyupampensis
7'. Radial spines 14–20, brown to greenish brown. Plants of Regions II, III and IV. .... 10
8 (6). Plants short (80 cm high), cespitose and branched at ground level. .................. T. faundezii
8'. Plants tall (2.5 cm high), shrubby and branched from the trunk. ......................... T. undulatus
9 (6'). Low rib height (0.6–1.0 cm), at middle point of stems .................................... T. bolligerianus
9'. High rib height (1.1–1.5 cm), at middle point of stems ........................................... T. chiloensis
10 (7'). Spines entirely black, subapical ................................................................. T. nigripilis
10'. Spines gray, with gray or brown tips, subapical .................................................... 11
11 (10'). Spines abundant (more than 10), bristly, flexible and curved at apex, subapex and middle of stem................... T. spinibarbis
11'. Spines absent or scarce (less than 10), bristly ......................................................... T. deserticola

TAXONOMIC TREATMENT

1. Trichocereus atacamensis (Phil.) W.T. Marshall & T.M. Bock, Cactaceae: 94. 1941. (Fig. 1).


**Original description:**

*Plant erect, up to 15 m high. Trunk 47 cm diameter, branched at heights of 1 to 3 m above the ground, 25 cm in diameter and sometimes branching. There are also plants with a single stem. Ribs at the apex 25, obtuse, 1 cm wide, with rounded areoles, 3 mm high and 2 cm wide, white when young or somewhat grayish; central spines 4, acicular, flexible and weak (bristly), 5 cm long, 1 mm diameter, yellow brown, arranged crosswise; radial spines 18, acicular, 2 cm long, 1 mm in diameter, weak and flexible, yellow brown, overlapping distally with radial spines of surrounding areoles. Ribs at the base 24–40, obtuse, 5 cm wide and 2 cm high, with circular areoles 3 mm high and 2 cm wide, completely gray; central spines 7, 9 cm long, 3 mm in diameter, acicular, yellow brown; radial spines more than 15, 3 cm long, acicular, and yellow brown. Flowers generally subapical, rarely apical, 15 cm long, with abundant brown hairs 1−2 cm long on the ovary and floral tube; perianth 18 cm in diameter; ovary 2–3 cm wide, with floral ovary scales 1 cm long, green with brown apex, floral tube scales 1–2 cm long, green or yellowish brown with brown apex; tepals 4–6 cm long, usually greenish yellow or yellowish white with brown longitudinal lines, rarely intense pink; style green, 8 cm long; stigma yellow, 1 cm long. Fruit lateral, 2–3 cm long, 3–4 cm in diameter, covered with subulate scales, with axils presenting abundant whitish hairs. Seeds 1.4 mm long, 0.8 mm wide.*

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**Extended description:**

Sic Cereum Ingentem, simplicem, columnarem voco, quem ad minus de S. Bartolo dictas prope Atacama oppidum 22914 lat. m. et 8000 p. s. m. e distantia vidi, ubi incoli K'hávul audit, et eujus ligum durum, etei poris et foraminibus nagna pertusum in oppido dicto ad portas aliasque ejusmodi continentia exhibet. Tabulas 2 pedes latus ex hocc Cacto confectas vidi! Vir egregius, minus illis praecepsit, plantam me trahere jussit, quam sedulo usque ad Santiago conduxi, sed in itiners plu visiea a mulis in solum dejecta et concusse, quando cistulam, qua inclusa ibat, aperiri poterantia apparuit.
Distribution and habitat: *T. atacamensis* is distributed in the arid and semi-arid Chilean NE, Argentine NW and Bolivian South. In Chile it occurs in Region I of Tarapacá and Region II of Antofagasta, in the Atacama Desert, and in high Andean communities of the phytogeographic region known as the Prepuña (Cabrera & Willink 1980), at altitudes of 2400–3700 m. In Argentina it grows in the provinces of Jujuy, Salta, Tucumán and Catamarca, mostly in the Prepuña or protected slopes of the Puna, at altitudes of 2000–3500 m, on rocky slopes, plains and semi-plains. Because of the height of the plant, it is a conspicuous element of the landscape. In Bolivia it occurs in the departments of Oruro and Tarija, at 3500–4000 m altitude.

**Taxonomic and nomenclatural comments:** Comparing the original descriptions and herbarium material of *Cereus atacamensis*, *Cereus eriocarpus* and *Pilocereus pasacanus*, there is a high similarity in the habit (erect, 3–15 m high), stem thickness (ca. 40 cm), number of ribs (24–40) and nature of the apical spines (thin and flexible). It is therefore suggested they be grouped under *T. atacamensis*. The variation in the number of branches is due to the variation in habitat moisture over the area in which this species grows (R. Kiesling, pers. comm.). Britton and Rose (1920) noted the similarity between *T. pasacana* and *Cereus atacamensis* and proposed they be grouped; Kiesling and Ferrari (2005) and Kiesling et al. (2008) accepted this view.

In a communication sent by Luc Willemse, curator of the herbarium U (Netherlands), he reports that the type specimen of *Trichocereus eremophilus*: Ritter 49a, does not exist in that institution, as quoted in Ritter (:iii. 1979, 1980a) and Eggli et al. (1996).


**Other material studied:** Chile, I Región de Tarapacá, Prov. Iquique, city of Iquique, Playa Brava, 12 Nov. 2008 (observed in cultivation).

2. *Trichocereus bolligerianus* (Mächler & Helmut Walter) S. Albesiano, *Haseltonia* 17: 18. 2012. (Fig. 2).


Extended description: Plants erect or pendulous, 2–6 m long, without trunk. Branches 18 cm in diameter. Ribs at the apex 17, obtuse, 0.6–2 cm wide, 3 mm high; with areoles ovate, 0.3 to 2 cm long, acicular, base light green, middle part and apex brown; with 16 radial spines, 0.5 to 2 cm long, acicular, base light grey or green, middle part and apex brown. Ribs at the base up to 20, obtuse, 2 cm wide, 10 mm high; with areoles ovate, 2 mm high, 6 mm wide, gray or brown; with 4–6 central spines, 0.2–6 cm long, smaller than 0.7 mm in diameter, acicular, olive green or dark brown; 15 radial spines, 1–2 cm long, acicular, flexible, diameter less than 0.7 mm, olive green or light grey. Flowers subapical, 1 or 3, infundibuliform, 14 cm long, with abundant brown pilosity on ovary and floral tube, perianth 7 cm in diameter, ovary 2–3 cm wide, floral scales of the pericarpel 2 cm long, green with apex brown, floral scales of tube 3 cm long, green or yellowish white with longitudinal lines brown, style green, 8 cm long, stigmas yellow, 1.5 cm long. Fruit subapical, 2–3 cm long and 3–4 cm in diameter, covered with triangular scales, from whose axils emerge abundant brown and grey hairs; pulp white. Seeds 1.8 mm long, 1.0 mm wide.

Distribution and habitat: T. bolligerianus grows in Regions V and VI, on hills of the Coastal Cordillera, next to the sea, and on steep slopes (15–20°), where part of the vegetation has been altered by tourist activities.

Taxonomic and nomenclatural comments: Analyzing the original descriptions of Trichocereus chiloensis var. conjungens and Echinopsis bolligeriana, high similarity is observed in the number of ribs and in the number and morphology of spines. Accordingly, we propose to unite these two taxa. Trichocereus chiloensis var. conjungens has been considered synonymous with Echinopsis chiloensis (Anderson 2005), and lately with T. chiloensis subsp. chiloensis (Kiesling et al. 2008), but on analyzing the phylogeny of the genus Trichocereus (Fig. 3, Albesiano & Terrazas 2012), morphological (ribs low and sharp) and molecular characters were found that allow its differentiation. The individuals in populations of Trichocereus bolligerianus observed in Region VI are smaller in size (2 m tall) because of the drastic environmental conditions (higher influence of the cold Humboldt current), compared to the Valparaiso region where populations develop under benign conditions and in more sheltered places.

Herbarium material studied: Chile, VI Región del Libertador General Bernardo O’Higgins, Prov. Cardenal Caro, Punta Lobos, 34°25’33"S; 72°02’36"W; 3 m, 2 Nov. 2008, S. Albesiano et al. 2039 (AGUCH, MERL); Costa de Pichilemu, 34°27’19"S; 72°01’05"W; 7 m, 2 Nov. 2008, S. Albesiano et al. 2040 (AGUCH, MERL).


Extended description: Plants erect, 1–6 m high. Branches 10–25 cm in diameter. Ribs at the apex 11–17, obtuse, 0.6–3 cm wide, 3–7 mm high; with obovate or oblong areoles 1–4 mm high, 0.6–1.3 mm wide, yellow hairs on the apex and gray or black on the base, or entirely yellow; central spines 1–6, acicular, 0.3–15 cm long, brown at the tips and light green at the base, subapical spines gray at the base with brown apex or white with some gray or black spots; radial spines 8–19, 0.4–4 cm long, acicular, rigid, straight, dark brown, green, yellow, gray or white with brown tips. Ribs at the base 11–21, obtuse, 1.5 to 4 cm wide, 0.2–2 cm high, with round, oblong, elliptic areoles, 1–5 mm high, 0.5–1.3 cm wide, the oldest sunken, light yellow, brown, light or dark gray or black pilosity; central spines 1–7, generally 4, acicular and straight, 0.2–20 cm long, up to 2 mm in diameter, brown or reddish apex, gray or black base or entirely olive green or dark brown; radial spines 9–24, acicular, flexible or rigid, 1–2.7 cm long, less than 1.5 mm wide, yellow, olive green or light gray with brown, dark gray or black tips. Flowers 1–8, 11–21 cm long, subapical with abundant brown hairs on the ovary and floral tube; perianth 7–11 cm in diameter; ovary 2–3 cm in diameter, with floral scales 1–3 cm long, with brown apex and dark green center; floral tube scales 1–4.5 cm long, with brown tips, green in the middle and yellowish green base; tepals spatulate, 7 cm long, pink apex and yellowish white base; style green, 10 cm long; stigma yellow, 1–2 cm long. Fruits subapical, 2–4 cm long, 3–5 cm diameter, covered with subulate scales, with abundant gray and brown axillary hairs. Seeds 2 mm long, 1 mm wide.

Distribution and habitat: T. chiloensis is the species of the genus Trichocereus with the most extensive distribution in Chile, occupying the regions: II, IV, V, VI, VII, VIII, RME, from the pacific coast inland, in river valleys and slopes, from sea level to 1500 m.

Taxonomic and nomenclatural comments: According to Article 51.1 of the International Code of Botanical Nomenclature (McNeill et al. 2006), the name Cactus chiloensis cannot be rejected or replaced even though Colla confused Chile with Chiloé island.

Console and Lemaire (Rev. Hort. 35: 173. 1864) proposed the name Echinocereus chiloensis, without providing a description of the species. Subsequently, Lemaire (Cact. 61: 1868) declared that the name was based on Cereus chiloensis.

The following taxa were excluded from the taxonomic treatment, due to the fact that the information provided in the original description regarding the color and number of central and radial spines is not sufficient for taxonomic identification, and data are missing concerning the characteristics of the stem: habit, height and diameter, in addition to the number of ribs. Furthermore, varieties whose stem diameter is below that observed in the field were not taken into account.

Cereus chiloensis var. brevispinula Salm-Dyck., Cact. Hort. Dyck. (1849): 199. 1850. (Name appears as “C. chilensis var. brevispinula”.)

Cereus chiloensis var. flavescens Salm-Dyck., Cact. Hort. Dyck. (1849): 199. 1850. (Name appears as “C. chilensis var. flavescens”.)

Cereus chiloensis var. heteromorpha K. Schum., Gesamtbeschr. Kakt. 63. 1899. (Name appears as “C. chilensis var. heteromorpha”.)


Cereus chiloensis var. poselgeri K. Schum., Gesamtbeschr. Kakt. 63. 1899. (Name appears as “C. chilensis var. poselgeri”.)

Cereus chiloensis var. pyracantha K. Schum., Gesamtbeschr. Kakt. 63. 1899. (Name appears as “C. chilensis var. pyracantha”.)

Cereus chiloensis var. zizkaana K. Schum., Gesamtbeschr. Kakt. 63. 1899. (Name appears as “C. chilensis var. zizkaana”.)

T. chiloensis has high intraspecific variation with respect to growth habit, stem diameter, as well as the number and shape of the spines; as a result, six subspecies are proposed following Schumann (1899).

Subspecies key
1. Short plants, 1–1.5 m, forming dense cespitose shrubs
2. 1’ Tall plants, greater than 2 m, shrubby or arboreal
3. 2’ Adult radial spines, flexible, very thin and numerous (14–30)
4. 3’ Stem diameter 9–10 cm
5. 4’ Presence of white spines in subapical areoles, radial spines in adult areoles 11–13
6. 5’ Presence of gray spines with brown apices in subapical areoles, radial spines in adult areoles 7–10.
7. 6’ Presence of gray spines with brown apices in subapical areoles, radial spines in adult areoles 7–10.
8. 7’ Presence of white spines in subapical areoles, radial spines in adult areoles 11–13.

Original description:
21. C. chiloensis (Colla pl. rar. Hort. Ripul. app. 2. p. 342.) ovato-erectus ro-
angulatis, angulis obtusis, aculeis pallido-pellucidis, medio validiore, lanugine
brevissima. 5 in ChilI ex test. Hortl. C. Coquimbanus Hortl. non Molin.
and Ritter’s (1980b) suggestion.

Ritter (1980b) erroneously corrected the spelling of the name T. chiloensis to T. chilensis.

4. Trichocereus chiloensis (Colla) Britton & Rose subsp. chiloensis


Extended description: Plants up to 6 m high. Branches 10 cm in diameter. Ribs 11–18, obtuse, 10–15 mm high. Areoles at the apex 5–12 mm wide, one central spine; areoles at the base with 4 central spines, 3–20 cm long, longer and thicker than radials. Radial spines up to 13, 2 cm long, dark brown when young, then light gray, brown at the tips or completely dark gray. Flowers 13 cm long; tepals white, spatulate, apiculate at the tips.

Distribution and habitat: Includes Regions IV and V and the Metropolitan area, from the coast inland, and the environs of Limache, Olmué, Santiago, etc. It is an important element of the landscape of Chile’s Mediterranean area.


5. Trichocereus chiloensis (Colla) Britton & Rose subsp. australis (F. Ritter) S. Albesiano stat. nov. TYPE: V Región de Valparaíso, Cuesta Las Chilcas, 32°51’05’S; 70°52’39”W, 400-440 m, 5 Nov. 2008, S. Albesiano et al. 2042. (Neotype, designated here: MERL. Isoneotype: AGUCH.) (Fig. 3).

Original description:

VAR. AUSTRALIS RITTER VAR. NOV.

A var. chilenis recedit caulibus 10–14 cm crassis; areolis ad 5 mm diam, spinis marginalibus plurimum 7–10, ca 1 cm longis, centrali 1, 2–5 cm longa, pleuropuncta super ca 2–3 partibus; florae imoventi seminibus ca 2,4 mm longis, ventraliter incisis; habitat Prov. Talca, Chile.

_Unterschiede gegen VAR. CHILENIS (imgenen für letztere in Klamern):_ Miaugs 3–5 m hoch (2–4 m), Endtriebe 10–14 cm dick (9–10 cm); Ar. ca. 5 mm Dm. (ca 9 mm); Ha. 7–10 von ca 1 cm (meist 2–10, meist etwas länger); Ha. 1 von 2–5 cm, meist noch 2–3 sehr kurze darüber (nur bei Jungpflanzen), später 4 stärker im Kreuz, der unterste der stärkste und längste, 1–1,7 cm lang. Hohe Triebe haben bei allen TRICH. CHILENSIS arten [Variationen abhängig, dünnere und verhärtert St., namentlich mehr Ha., bi, nicht beobachtet, ca. etwa von dreifacher Einheitsgröße, ca 2,5 cm lang (ca 1,6 cm lang), mit stärkerer Ventralerrebe (ohne oder fast ohne Ventralerrebe), Typusort VILLA PRAT, Depari, Lontué, Prov. Talca, Nr. FR 228a, die Abb. 100 zeigt ein Exemplar, das schon als eine Art zu seiner CHILENIS wurde und daher sehr niedrig blieb, hinter ihm den bodenverheissenden Teil einer normalpflanze.

Extended description: Plants 2–4 m high. Stems erect and cylindrical, 13–25 cm diameter. Ribs at the apex obtuse, 13–15, 1–3 cm wide, 3–5 mm high; with obovate areoles, 1–2 mm high, 7–8 mm wide, hairs yellow on the apex and gray on the base, or entirely yellow; central spines 1–3, acicular, 1 to 8 cm long, dark yellow to brown at the tips and green or yellow at the base, some subapical spines are gray at the base with brown apex; radial spines 9, from 0.4 to 4 cm long, acicular, yellow, some green or gray with brown tips. Ribs at the base 12–16, from 2 to 4 cm wide, 0.2–2 cm high, with round areoles, some sunken, 1–2 mm high, 6–10 mm wide, light or dark gray or black pilosity; central spine 1–3, acicular, 2–6 cm long, brown or reddish apex, gray or black base, the longest directed perpendicularly to the stem; radial spines 11, acicular, 2 cm long, yellow, green with brown or black tips. Flowers subapical, with cream or brown hairs on the ovary and floral tube, 11–21 cm long, perianth 7–11 cm in diameter; ovary 2–3 cm in diameter, with floral scales ca. 3 cm long, with brown apex and dark green center; floral tube scales subulate, 3–5 cm long, brown tips, green in the middle, and yellow basally; tepals spatulate, 4–7 cm long, with pink apex and yellow base; style
green, 6–10 cm long; stigma light yellow, up to 2 cm long.

**Distribution and habitat:** Located in Regions V, VI and VII, on the slopes of the coastal mountain range, dominated by the herbaceous plants and shrubs.

**Taxonomic and nomenclatural comments:** The type specimen (FR 228a) is mentioned (Ritter: iii., 1979, 1980b) as having been deposited in the National Herbarium of the Netherlands. According to Eggli et al. (1996), the holotype is lost, and therefore we designate a neotype for the Valparaiso region, which possesses the morphological characteristics of the original description.

In addition, Eggli et al. (1996) list seeds under number FR 228a, at the Zurich Herbarium, but there is no assurance that they correspond to the same type collection of *Trichocereus chiloensis* var. *australis* F. Ritter 228a, as the original description does not state that they have been deposited at this herbarium.

**Herbarium material studied:** Chile, Región Metropolitana, Prov. Cordillera, 8.5 km above puente El Yeso, in the valley of the río Volcán, 1420-1500 m, 1/2/1993, U. Eggli and B. Leuenberger 2299 (SGO). VI Región de O’ Higgins, Prov. Colchagua, comuna de San Fernando, Manantiales, 34°37’10”S; 71°02’47”W, 338 m, 2 Nov. 2008, S. Albesiano et al. 2038 (MERL, AGUCH); Prov. Cardenal Caro, Comuna de Llolleo, a 7 km al NE, 34°05’28”S; 71°41’07”W, 305 m, 2 Nov. 2008, S. Albesiano et al. 2041 (MERL, AGUCH). V Región de Valparaíso, Cuesta Las Chilcas, 32°51’05”S; 70°52’39”W, 400–440 m, 5 Nov. 2008, S. Albesiano et al. 2043 (MERL, AGUCH).

6. *Trichocereus chiloensis* (Colla) Britton & Rose subsp. *eburneus* (Phil. ex K. Schum.) S. Albesiano, *stat. nov.* (Fig. 4).


**Extended description:** Plants erect, shrubby, 2 m high. Lateral branches arising at ground level, light green, 13 cm wide, the apex with abundant spines, acicular, brown, 1 mm diameter. *Ribs* at the apex 12, obtuse, 2 cm wide, 4 mm high, with obovate areoles, 1 mm high, 8 mm wide, yellow hairs on the apex and gray on the base; *central spines* 4, acicular, 4–15 cm long, 1.5 mm diameter, white with some black spots; *radial spines* 10, acicular, 3 mm long, less than 1 mm diameter, white and rigid. *Ribs* at the base obtuse, 12, 3 cm wide, 1 cm high, with obovate areoles, 1 mm high, 1.3 cm wide, with entirely dark gray to black pilosity; *central spines* 4, acicular 6–12 cm long, 1.5 mm diameter, dark brown, *radial spines* 12, acicular, 2.4 cm long, black. *Flowers* subapical, 5–8, 13 cm long, *perianth* 8 cm in diameter, *ovary* and *floral tube* with scales 1.2 cm long, with brown apex, green base; from whose axils emerge abundant brown hairs, 2 mm long; *tepals* 3–6 cm long, brown apex, white base.

**Distribution and habitat:** IV Region of Coquimbo, Province of Choapa, on hillside that do not exceed 900 m, and where the dominant physiognomic type is xerophytic scrub less than 2 m high, featuring the columnar cacti *Eulychnia* and *Trichocereus*.

**Taxonomic and nomenclatural comments:** This taxon morphologically resembles *T. chiloensis* subsp. *australis*, but differs in having young spines that are white, and a greater number of radial spines in adult areoles.
Philippi proposed the name of *Eulychnia eburnea* (nom. nud.), without providing a diagnosis or morphological description for the plant. Subsequently, Schumann (1899, pp. 59–60) considered that this name corresponded to a variety of *Cereus chiloensis*, since Philippi described only three species of *Eulychnia*: *E. acida*, *E. breviflora* and *E. castanea*.

According to Article 33.3 of the International Code of Botanical Nomenclature (McNeill et al. 2006), the combination *T. chiloensis* var. *eburneus* (K. Schum.) F. Ritter is invalid, as Ritter did not provide basionym information: name, place and date of publication.


7. *Trichocereus chiloensis* (Colla) Britton & Rose subsp. *litoralis* (Johow) Faúndez, Darwiniana 45(2): 237. 2007. (Fig. 5).


**Original description**: 

Plants 3 m high. Stems: trunk 50 cm high; branches 12–18 cm in diameter; in some individuals, the branches are initially procumbent and then become erect, in other plants all branches are erect. Ribs at the apex 17, obtuse, 1 cm wide, 3 mm high; with obovate areoles 1 mm high, 6 mm wide, with yellow hairs on the apex and gray on the base; central spines 2–6, acicular, 1–6 cm long, shorter ones with brown apex, green base, longest ones gray or dark yellow; radial spines 2–6, acicular, 1–6 cm long, shorter ones with brown apex, green base, longest ones gray or dark yellow; radial spines 15–19, acicular, 2 cm long, some spines are green with brown apex or entirely gray or light brown. Ribs at the base 17–21, obtuse, 2–4 cm wide, 0.3 to 1 cm high. Areoles circular, 2–5 mm high, 1 cm wide, gray or black. At the upper edge of the areola is a transverse furrow which results in depression of that part of the areole. Central spines 4–7, 2–4 cm long, acicular, 1.5 mm in diameter, olive green or light to dark brown. Radial spines 15–24, 1–2 cm long, acicular, 0.7 mm in diameter, green with brown tips. Flowers 1 or 2, subapical, 12–16 cm long, 11 cm in diameter when open (4 cm in closed flowers), ovary 1.5 to 2.2 cm wide, floral tube scales 1–2 cm long; floral upper scales 2–3 cm; tepals 5 cm long, style 8 cm long; stigmas 1 cm long. Fruits 5 cm diameter, 4 cm long, covered by abundant brown and gray hairs.

**Distribution and habitat**: *T. chiloensis* subsp. *litoralis* occurs in Regions IV and V, extending along the coast of the Aconcagua, from Papudo south, possibly in Valparaíso and Santiago and also Zapallar and Cachagua, on plains and hillsides near the coast, at 33–100 m altitude, habitat dominated by herbaceous and shrub layers including *Fuchsia lycioides* with some scattered saplings.

**Taxonomic and nomenclatural comments**: Because of the resemblance in appearance (tall plants over 2 m, and shrubs), stem diameter (greater than
10 cm), rib number (ca. 21) and rib shape (obtuse, separated by acute and undulating grooves) *T. litoralis* has been considered a subspecies of *T. chiloensis*.

The subspecies *litoralis*, in turn, differs from the subspecies *chiloensis*, by the number and morphology of the radial spines: flexible, thin and numerous (14–30) vs. strong, rigid and few (less than 14).

The stems of some individuals of *T. chiloensis* subsp. *litoralis* are prostrate and cespitose, similar to those of *T. spinibarbis*, but differ from the latter by the larger diameter of the stems (12–18 cm vs. 4–10 cm), and rib number (17–21 vs. 8–15), in addition to the smaller size of the central spines in mature areoles (4 cm vs. 10 cm).

Looser (1929) found that the differentiating characteristics (number of stigmas and flower orientation), between *T. litoralis* and *T. chiloensis*, indicated in the original description of *C. litoralis* (Johow 1921), are of little differential value, since some individuals of this species have the same number of stigmas (18) and their flowers have the same orientation (north).


8. *Trichocereus chiloensis* (Colla) Britton & Rose subsp. *panhoplites* (K. Schum.) S. Albesiano, stat. nov. (Fig. 6).


**Iconography:** Ritter (1980b), photograph 1059: 1221.

**Original description.**

Extended description: Plants short, stems 1.0–1.5 m tall, cespitose. Branches originate at ground level, 16 cm in diameter. Ribs at the apex 11 obtuse, 3 cm wide, 7 mm high with obovate areoles 4 mm high, 1.3 cm wide, apex yellow and the rest gray. Central spines at the apex 1–3, 8 cm long, 2 mm diameter, acicular, absolutely straight and gray; radials at the apex 6–10, 2.0–2.4 cm long, acicular, three of them with green base and brown tip, the others gray. Ribs at the base 12, obtuse, 3 cm wide, 7 mm high, with elliptical areoles 2 mm high, 1.3 cm wide, spaced 10–15 mm apart and completely gray, except in the area where new spines arise, where the hairiness is yellow. Central spines 3–4, 6–9 cm long, 2 mm wide, straight, acicular, gray with black apex; radials 9–11, 3 cm long, 1.5 mm in diameter, acicular, gray with black tip. Fruit 3.5 cm long, 4 cm in diameter and covered with brown hairs.

**Distribution and habitat:** Near Ovalle, in the coastal plains, near the coastal range, at 500 m altitude; landscape dominated by herbaceous and low shrub layers.

**Taxonomic and nomenclatural comments:** Britton and Rose (1920) and Anderson (2005) considered that this taxon is a synonym of *T. chiloensis*. Based on the original description and the material collected, we found evidence to consider it a subspecies of *T. chiloensis*, for example, the low stature and cespitose stems branching at ground level, whereas other subspecies may exceed 2 m and form shrubs or exhibit an arborescent habit, branching a few meters above the ground.

According to Article 33.3 of the International Code of Botanical Nomenclature (McNeill et al. 2006), the combination *T. chiloensis* var. *panhoplites* (K. Schum.) F. Ritter is invalid, as Ritter establishes no basionym or place or date of publication.

**Herbarium material studied:** Chile, III Región of Atacama, Prov. Huasco, Mpio. Vallenar, 31 km SW of the Panamericana on the gravel road to Mina Algarrobo, 28°46.74’S; 70°58.02’W, 1100–1250 m,


*Trichocereus seren anus F. Ritter, Kakt. And. Sukkulenten* 16 (11): 212. 1965. TYPE: Chile, 15 km to the east of Serena, F. Ritter 533. (Holotype: U 116996!)


**Original description:**

*Extended description: Plants* up to 1.5 m tall, forming dense, low, shrubs. **Stems** slightly arched and cylindrical, 4 to 10 cm in diameter, the base procumbent. **Epidermis** opaque and finely velvety. **Ribs** at apex 8–12, 1 cm wide, 1 cm high, obtuse, with acute grooves; areoles obovate, 4–6 mm apart, the young 4 mm high, 1.0–1.4 cm wide, with hairs light brown on the upper half and dark brown or reddish orange on the bottom half. **Spines** mostly straight, some slightly undulating; **centrals** 4, up to 8 cm long, 1.5 mm in diameter, acicular, arranged crosswise, some growing upward, black with a yellow base or dark gray with black spots, some covered by lichens (inhabiting the damper areas); **radials** 9–16, acicular, 0.6–3 cm long, five of them yellowish brown, the others gray with black apex. **Ribs** at the base 10–15, 1 cm wide, 0.7 to 1 cm high; **areoles** 2–5 mm high, 0.5–1.4 cm wide, with brown, gray or black pilosity; **central spines** 4–6, 2–10 cm long (two are the longest) 2 mm in diameter, white or olive green with brown spots, acicular, growing horizontally; **radials** 14–20, 1.1 cm long, acicular, brown to greenish brown. **Flowers** generally apical, 1 or 2, 8–13 cm long, with abundant brown hairs on the ovary and floral tube; **perianth** 6 cm in diameter; **ovary** 2.0–2.5 cm wide; **floral scales** at middle of floral tube 2 cm long with brown edges and green center; floral scales at upper (distal) portion of floral tube 4.5 cm long, with apex red to pink with yellow edges and green center; **tepals** 4.3–5.3 cm long, 1.3–2.0 cm wide, white to yellow with pink longitudinal lines; **style** green, 5 cm long, 3 mm wide; **stigma** light yellow, up to 2 cm long and with over 10 lobes. **Fruits** mostly apical 4–6 cm long, covered with subulate scales, with abundant brownish axillary hairs 4–6 mm long. **Seeds** 1 mm long.

**Distribution and habitat:** *Trichocereus deserticola* grows in Regions II, III and IV (Kiesling et al. 7 Dic. 1994, U. Eggli and B.E. Leuenberger 2591 (SGO); IV Región de Coquimbo, Talinay, close to Ovalle, 24 Sep. 1957, C. Muñoz P. 4306 (SGO).
2008), in the coastal mountain range on rock bodies or among large stone rubble, with slopes that exceed 20 degrees inclination, between 250 and 600 m altitude. Accompanying species include: Heliotropium stenophyllum (Boraginaceae), Encelia canescens (Asteraceae), Adesmia argentea (Fabaceae), among others (Hoffmann 1989; Gajardo 1995).

**Taxonomic and nomenclatural comments:** After comparing the original descriptions to herbarium material of Cereus deserticolus, Trichocereus fulvulanus and Trichocereus serenanus, it is proposed they be grouped as synonyms of C. deserticolus, because of their great similarity in appearance (small shrubs 1.5 m high), stem thickness (less than 10 cm), number of ribs (fewer than 13), number of central spines (ca. 4) and spine shape (acicular, straight, and some slightly undulating).

The holotype of Cereus deserticolus (Werdermann 869) deposited in the Berlin herbarium, was destroyed in 1943 in World War II. Fortunately, the isotypes, which were kept separately from the general herbarium, were preserved. Unfortunately, some were severely damaged by water, as mentioned by Werdermann (1944), in his list of duplicates, referencing series No. 837 to 875, which were replaced by another set of duplicates, including C. deserticola, and Werdermann 869, which were distributed to other herbaria. Leuenberger and Eggli (1996) evaluated the Werdermann 869 specimen duplicates and concluded that they were a mix, namely that the flowers were from a Trichocereus species, but that the stem fragments presented the anatomical characters of Eulychnia.

According to Leuenberger and Eggli (1996), in the original description of C. deserticolus the color of the spines (dirty to blackish gray) and the color of the hairs of the areole (blackish to gray), correspond to Eulychnia iquiquensis, and not to C. deserticolus. We do not agree with that assessment, because at the Taltal commune we find individuals of C. deserticolus with central spines at the apex black or dark brown, with clear green base, but the ones on the central part of the stem are gray, and the hairs are also gray, as mentioned in the original description of C. deserticolus.


10. **Trichocereus faundezii** S. Albesiano **sp. nov.** **TYPE:** Chile, IV Región de Coquimbo, Prov. Choapa, 31°40‘25”S; 71°17‘11”W, 197 m, 5 Nov. 2008, S. Albesiano, L. Faúndez, R. Flores and P. Saldivia 2048. (Holotype: MERL. Isotype: AGUCH 64088). (Figs. 8 & 9).

**Plantae caespitosae 80 cm altae. Rami decumbentes, alii arcuati, 14 cm diametris, viridulae. Costae 14–18, tuberculatae, obtusae, 2 cm latae et 3 mm altae. Areoles oblongae, 1 mm altae, 8 mm latae, cinnereae. Spinae rigidae, aciculae et cinereae, centrales.
Table 1. Differences between T. faundezii and T. spinibarbis in terms of morphological characters.

<table>
<thead>
<tr>
<th>Character</th>
<th>T. faundezii</th>
<th>T. spinibarbis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Branch diameter</td>
<td>14 cm</td>
<td>10 cm</td>
</tr>
<tr>
<td>Number of ribs at the apex</td>
<td>18</td>
<td>12</td>
</tr>
<tr>
<td>Tuberculate ribs</td>
<td>Present</td>
<td>Absent</td>
</tr>
<tr>
<td>Width of ribs</td>
<td>2 cm</td>
<td>1 cm</td>
</tr>
<tr>
<td>Length of central spines</td>
<td>2.5 cm</td>
<td>10 cm</td>
</tr>
</tbody>
</table>

Morphological description: Plants cespitose, 80 cm tall. Branches decumbent, some arched, 14 cm diameter, grayish green. Ribs at the apex 18, tuberculate, obtuse, 2 cm wide, 3 mm high; with obovate areoles, 1 mm high and 8 mm wide, gray. Spines acicular and gray; central spines 1–3, 1 mm diameter, 2.5 cm long; radial spines 9, 2 cm long and 0.5 cm in diameter. Ribs at the base 14, tuberculate, obtuse, 2.5 cm wide and 3 mm high; with obovate areoles 1 mm high and 7 mm wide and gray; spines gray and acicular, central 3, of 3.5 cm long, radial 12 and 1.5 cm length. Flowers 2–6, subapical, 11 cm long, 9 cm in diameter, ovary 2 cm diameter; floral scales of the base 6 mm long, upper 2 cm long, green base, brownish pink apex and axils where abundant dark brown hairs originate; tepals 5 cm long; deep pink in flower buds later becoming white with a brownish pink apex as adults.

Etymology: Species dedicated to Luis Faúndez, the Chilean botanist, enthusiast, who kindly accompanied us and guided the explorations in the field in arid and semi-arid Chile.

Taxonomic and nomenclatural comments: The habit of this species (cespitose plants, less than 1.5 m) is similar to that of T. spinibarbis, but their differences are set forth in Table 1.

Extended description: Stems erect, 2.5–5 m tall. Branches 6–15(–20) cm diameter. Ribs at the base 7–8, obtuse, 2.5 cm wide, 2 cm tall. Areoles circular, 6 mm diameter, all grey or dark brown; a transverse dermal furrow present just above each areole. Spines acicular; central 1–3, ca. 3.3 cm long, brown with black points; radial spines ca. 8, 2–8 cm long. Flowers mostly near the stem apex, rarely at the apex, funnelform, 21 cm long, 2 cm in diameter at the level of the ovary; the latter densely covered with clear brown hairs; scales on the ovary 1 cm long, green with brown apex, scales on the tube 2.5 cm long, green or yellowish green with brown apex; tepals 9 cm long, mostly yellowish green or pale yellow with brown longitudinal lines, rarely deep pink; style green, 8 cm long; stigma yellow, 1 cm long. Seeds broadly ovoid (ratio of length to width = 1.3 to 1), small (0.9–1.1 mm long), dull, without keel, anticlinal walls of the testa straight.

Distribution and habitat: Frequently cultivated in Bolivia, Colombia, Chile, Ecuador and Peru, as an ornamental, for fences, and for medicinal or magical purposes. Its most plausible wild origin is the medium to high valleys of the Peruvian Andes, at altitudes of 2000–3000 m (Fernández and Estupiñan 2005; Albesiano and Kiesling 2012).

Taxonomic and nomenclatural comments: This species is characterized by the stems with ribs that are few (up to 10), high (2 cm) and wide (2.5 cm), with widely set areoles (2.5 cm), and the presence of a transverse dermal furrow just above each areole. It also presents a high infraspecific variation in the number and shape of the spines (Albesiano and Kiesling 2012).
Key to the varieties

1. Spines of the older areoles 18–20, 3–4 of them prominent, longer, stronger, and more robust (ca. 5 cm long, 1 mm in diameter).
   Plants up to 5 m tall, branches erect or ascending;
   stems stouter, 16–20 cm in diameter. .............................................. T. macrogonus var. macrogonus

1’. Spines of the older areoles 3–7, ca. 0.5–2 cm long, and less than 1 mm in diameter. Plants up to 2–4 m tall;
   stems erect, becoming parallel stems more slender, 6–11(–15) cm in diameter. .............................................. T. macrogonus var. pachanoi

(Neotype, US761324! Isotype, NY 386193! designated by Albesiano & Kiesling; 32. 2012)


_Extended description:_ Plants erect (sometimes decumbent), 5 m high. **Stems** bluish green or light green. Branches 16–20 cm in diameter, erect and strong. **Ribs** at the apex 7, obtuse, 2.5 cm wide and 3 cm high, with circular areoles, spaced 2 cm apart, 1–3 mm high, 6 mm wide, gray or dark brown; **central spines** (in apical areoles) 1–3, acicular, 3–10 cm long, brown with black apex; **radial spines** 7–10, acicular, 1–2 cm long, stiff, brown with black tip. Ribs at the base 8–10, obtuse, 1.2 cm wide, 1.3 cm high; with circular areoles 1–3 mm high, 6–12 mm wide, spaced 2–3 cm apart, gray with black or dark brown hairs; **central spines** (in basal areoles) 3–4, acicular, straight, 5 cm long, 1 mm diameter, black apex, brown middle, and gray base; **radial spines** 7–20, 1–3 cm long, acicular, rigid, brown with black apex. **Flowers** apical and subapical, 21 cm long, with brown hairs on the ovary and floral tube; perianth 7 cm in diameter; _ovary_ 2 cm wide, _floral ovary scales_ 1–3 cm long, green with brown apex; _floral tube scales_ 2.5 cm long, green or yellowish brown with brown apex; _tepals_ 6–9 cm long, yellowish green or yellowish white with brown longitudinal lines; _style_ green, 10 cm long; _stigma_ yellow, 1–2 cm long. **Fruits** subapical, dark green, 2–4 cm long, 3–5 cm in diameter, covered with subulate scales, from whose axils emerge brown and gray hairs. **Seeds** black, 2 mm long and 1 mm wide.

_Distribution and habitat:_ Native of Peru (Borg 1937), in the valleys of the department of Lima, at 2500 m, in the valley of Puquito, at 3300 m, southeast of Tacna at 3000–3500 m, and northeast of Estique (Ritter 1981). It is also distributed in Bolivia (1500 m), on nearly bare rocky hillsides.

_Taxonomic and nomenclatural comments:_ In 1920 Britton and Rose described _Trichocereus peruvianus_, as a species resembling _T. macrogonus_ by the number (7–10) and characteristics of the ribs (2 cm high and 2.5 cm wide), the color of its stems (green–blue or light green), by the presence of a groove above each areole, and by the distance between the areoles (2.5 cm), and so it is considered synonymous with the type variety.

Werdermann, considering this taxon under _Cereus_, had been obligated to rename it as _Cereus rosei_, to avoid the homonymy with _Cereus peruvianus_ (L.) Miller (Borg 1937).

In the original description of _Trichocereus puquienensis_, we observe that the morphological characters are coincident with those of the type variety (light green branches of 15 cm diameter, ribs 8–10, the presence of a dermal furrow just above each areole, and differentiation between central and radial spines). _T. puquienensis_ is therefore proposed as a synonym of _T. macrogonus_ var. _macrogonus_.

_Trichocereus tacnaensis_ also is considered a synonym of this variety, in spite of the 12–15 cm diameter of its branches, which may be due to high levels of environmental moisture.

_Herbarium material studied:_ Bolivia, Dpto. La Paz, Prov. Larecaja, Collabamba, 5 Nov. 2002, R. Kiesling et al. 10041 (LPB); Prov. B. Saavedra, Puente Camota, highway to Charazani, 15°13’39”S; 68°45’36”W, 1433 m, L. Cayola et al. 1533, 1534 (LPB). Perú, Dpto. Tacna, above Tacna, 74 km Weg Charaña-Tacna, ca. 3500 m, F. Ritter 994 (12118 SGO).


Kiesling 17: 32. 2012.)


*Trichocereus huanucoensis* Johnson, nom. nud.


**Original description:**

7. *Trichocereus pachanoi* sp. nov.

Plants tall, 3 to 6 meters high, with numerous strict branches, slightly glaucous when young, dark green in age; ribs 6 to 8, broad at base, obtuse, with a deep horizontal depression above the areole; spines often wanting, when present few, 3 to 7, unequal, the longest 1 to 2 cm. long dark yellow to brown; flower-buds pointed; flowers very large, 19 to 25 cm. long, borne near the top of branches, night-blooming, very fragrant; outer perianth-segments brownish red; inner perianth-segments oblong, white; filaments long, weak, greenish; style greenish below, white above; stigma-lobes linear, yellowish; ovary covered with black curled hairs; axils of scales on fruit-tube and fruit bearing long black hairs. Seeds black, 2 mm high and 1.3 mm wide.

**Extended description:** Plants 2–4 m high, branched from the base. Stems erect, straight, ar-
**Distribution and habitat:** This is the variety of *Trichocereus* with the northernmost distribution. It is found in Bolivia, Chile, Ecuador, and Peru, on the cliffs along the rivers, at altitudes up to 3000 m. It is also grown as an ornamental plant in gardens and parks, and as living fences (Madsen 1989). It is a possible native of southern Ecuador and northern Peru, where it is known as San Pedro (Borg 1937).

**Taxonomic and nomenclatural comments:** US type herbarium sheet specimen is not found (they are not on the list of Herbarium types, and a letter with curator, Rusty Russell on September 2008, confirms that the sample has not been found since 1941); therefore, the NY sheet has been designated as a lectotype.

It is befitting to designate the variety *T. macrogonus var. pachanoi* because of its proneness to having diminutive spines (less than 1 cm in length, often a small fraction of that length), even if this characteristic exhibits phenotypic plasticity reflecting the influence of different environmental conditions.

*Trichocereus torataensis* is regarded a synonym of the variety *pachanoi* by the stem diameter (usually 7 cm), the distance between the areoles (up to 2.5 cm), and by having few (less than 7 radial) spines and a single central spine. Anderson (2005) and Hunt et al. (2006) consider *T. torataensis* as a synonym of *E. peruviana*, and a synonym of *Trichocereus macrogonus var. macrogonus*, but records of the latter show an increased number of spines (20), 3–4 of which are longer and more robust (5 cm long, 1 mm diameter).

There are *Trichocereus haunouensis* Johnson (2287797–2287798MO!, 00386189NY!) specimens marked as “isotypes” in the herbarium of the Missouri Botanical Garden (MO) and at the New York Botanical Garden (NY), but this species has no description or diagnosis, making its name a *nomen nudum*. Here it is considered a synonym of *T. macrogonus var. pachanoi* on account of the similarity in the number of ribs (6), distance between the areoles (2–2.5 cm), and low number of spines (5), which are comprised of one central and 4 radials.

**Herbarium material studied:** Perú, Dpto. Moquegua, Cuajones, ca. 3000 m, F. Ritter 1467 (121146 SGO).

12. **Trichocereus nigripilis** (Phil.) Backeb.,* Cactus Journ.*, Great Brit. 5: 49. 1937. (Fig. 12).


**Iconography:** Backeberg (1959), photograph 1111: 1144.

**Original description:**

*146. Cereus nigripilis Ph. C. 3 — 4 pedales; ramius diametri tripollicitus, costa 12 — 13; verrucis prominentibus, confrertis, lana brevisima, primum fulva, denue nigra vestita; areolis usque ad 30 linius circiter, cinereus, valde inaequalis; minoribus stenosformibus, ad summum 10 lin. longis, divercitiis; majoribus centraulis robustioribus, fuscis usque ad 25 liniis longis, plurimque 10, 15, 12 lin. longis; flore albo, 5 pollina longo, tubulato, basi pilis nigris densis obtecto, qui superius modo in apice squamariis calycinares remanente; stylo dimidio corollae sequente, stigma filiformi erecto, 6 lin. longino.

A Coquimbo usque ad Paposo et fortius magis ad boream erecto. In fructu, qui nihil streut et inspeditus, valde distinctus ab illo C. Quixean provinctarum centrum. Chilasium videatur, squamos calyceorum subulatis, remotis, 1/3 lini. longis, ellisis 2 — 3 liniis longis, basi nigris, apice albis valde complanate. Sementia nigra fere 1/3 lini. longae.*

**Extended description:** *Plants* cespitose, up to 1.2 m high, forming dense, low, shrubs. *Stems* slightly arched, cylindric, 5—7 cm in diameter. *Ribs* at the apex 11, obtuse, 1 cm wide, and 1 cm high, the grooves undulating; *areoles* round, 3 mm high, 7 mm wide, brown in the apical (superior) part of the areole, and gray in the subapical (inferior) part of the areole. *Spines* straight; *centrals* 4, acicular, 2 mm in diameter, 5 cm long, both apical and subapical centrals black; *radials* 13, acicular, 0.5 mm in diameter, 0.7—2.0 cm long; radials of areoles in both apical and subapical regions of branches are black. *Ribs* at the base 10, obtuse, 1 cm wide, 0.8 mm high; with
areoles 5 mm high, 8 mm wide, round, with dark gray pilosity; central spines 4, 6 cm long, acicular, 1.5 mm in diameter, light gray with black tips; radials 12, 1 cm long, acicular, 5 mm in diameter, light gray. **Flowers** 13 cm long; ovary and floral tube covered with black pilosity; stigma erect, 1–2 cm long. **Fruits** apical, 3.5 cm long. **Seeds** 1.5 mm long, 1 mm wide, with a dark yellow hilum–micropyle region.

**Distribution and habitat**: Species distributed in Region III of Atacama and Region IV of Coquimbo, from sea level up to altitude of 700 m.

**Taxonomic and nomenclatural comments**: The following annotation by U. Eggli and B. Leuenberger appears in the sheet of the *T. nigripilis* type specimen: “flower is of *Trichocereus*, vegetative parts of *Eulychnia*.” But on reviewing the vegetative characters of the areoles (dark brown) and spines — shape (bristly, acicular and rigid), number (17), length (2 to 5 cm long) and color (gray) — we found that these characters agree with the original description of *T. nigripilis*; thus, vegetative parts do not correspond to *Eulychnia* but to *T. nigripilis*.

**Herbarium material studied**: Chile, III Región de Atacama, Prov. Huasco, Comuna Vallenar, 10 km al sur de Vallenar, 28°39′48″S; 70°45′49″W, 614 m, 6 Nov. 2008, S. Albesiano et al. 2054 (MERL, AGUCH); Qda. León, 26°56′01″S; 70°44′30″W, 330 m, 9 Nov. 2008, S. Albesiano et al. 2059 (MERL, AGUCH). IV Región de Coquimbo, al N de la Serena, 27.5 km al N de Ruta 5, al N de Juan Soldado, 29°49′S; 71°16′W, 11 Oct. 2010, S. Albesiano et al. 2083 (MERL). 13. *Trichocereus pectiniferus* S. Albesiano sp. nov. TYPE: Chile, IV Región de Coquimbo, Juan Soldado, 29°43′26″S; 71°18′45″W, 166 m, 6 Nov. 2008, S. Albesiano, L. Faúndez, R. Flores and P. Saldivia 2053. (Holotype: MERL. Isotype: AGUCH 64080.) (Fig. 13)


Planta caespitosa altae 80 cm. Rami decumbentes, aliqui arcti, 5 cm diametri. Costae 11, obtusae, 2 cm latae. Areoles ovobadäes rotundaeque, 3 mm altae, 1.2 cm latae, cinereae. Spinae centricae 4, in cruce, aciculae subulataeque, 2 mm latae, 1.5–6 cm longae, cinereae cum adultae sunt. Spinae radiales 15, aciculae, 1.3–2.2 cm longae, cinereae, adultae crescent adpressae et in pectinis forma. Fructus apices et subapices, virides, ovarium et floral tube, 2 cm longi et 4.5 cm lati et cum squamis pilosis, quadratum, circularum, 3 cm lati et et 4.5 cm longi et cum squamis pilosis, quadratum, circularum, 3 cm lati et et 4.5 cm longi et cum squamis pilosis, quadratum, circularum, 3 cm lati et et 4.5 cm longi et cum squamis pilosis. **Seeds** albi, nigra. **Fruits** apici et subapici, 3 cm longi et 4.5 cm lati, cum squamis pilosis. **Seeds** albi, nigra. **Fruits** apici et subapici, 3 cm longi et 4.5 cm lati, cum squamis pilosis. **Seeds** albi, nigra.

**Morphological description**: Plants cespitose, 80 cm tall. Branches up to 15 in number, decumbent, some arched, 5 cm diameter. Ribs at the apex 11, obtuse, 2 cm wide; with obovate areoles 2 mm high, 1.2 cm wide, yellow apex and gray base. Central spines 4, 1.5–6 cm long, acicular, 2 cm in diameter, some with dark brown apex, others green at the base and brown at the tip, others light gray with brown apex, some arched; radials 15, most acicular, few setose (one per areole), 2 cm long, light brown. Ribs at the base 10, obtuse, 2 cm wide and 7 mm high; with round areoles 3 mm high and 7 mm in diameter, gray. Central spines 4, acicular, 5 cm long, light gray, arranged crosswise and divaricate (ca. 75°) to the stem, intersecting with the central spines of neighboring areoles; radials in adult areoles 12, acicular, 1.3 cm long, gray, pectinate, appressed to stem (ca. 15°). **Flowers**: Floral remnants short, with abundant black wool. **Fruits** apical or subapical, 3 cm long and 4.5 cm in diameter, covered with subulate scales, 3 mm long and abundant, brown, and gray, hairs emerging from axils. **Seeds** with black testa.

**Iconography**: Hoffmann (1989), plate 9b: 87.

**Etymology**: Species characterized by the distribution of radial spines in adult areoles, where the radials are appressed to the surface of the stem and pectinate (organized like the teeth of a comb).

**Distribution and habitat**: It grows in Region IV of Coquimbo, at altitudes from sea level to 500 m, associated with *Eulychnia* sp., *Copiapoa* sp. and *Ompunta* sp.

**Taxonomic and nomenclatural comments**: Britton and Rose combined *T. coquimbanus* (Molina) Britton & Rose, unaware that the original description of *Cactus coquimbanus* Molina (170. 1782) corresponds to a species of *Eulychnia*. Among the vegetative traits, Molina highlighted growth habit (erect
and high) and sizeable spines 20 cm long (“which were once used to sew socks”), while the plant described by Britton and Rose presents cespitose habit and spines that do not exceed 8 cm in length. For that reason, we propose this entity as a new species of *Trichocereus* distributed in the Province of Coquimbo.

It differs from *T. glaucus* and *T. spinibarbis* by the position of external spines in adult areoles. In *T. faundezii* spines are appressed to the stem (divergence angle of ca. 15 degrees) and pectinate, while in *T. glaucus* and *T. spinibarbis* they are divaricate (divergence angle of ca. 75 degrees), and radial.

**Paratypes:** IV Región de Coquimbo, Prov. Elqui, Mpio. La Serena, 1 km E of El Peñón, 30°8.68’S; 71°12.93’W, 160–250 m, 4 Dic. 1994. U. Eggli and B.E. Leuenberger 2574 (SGO); Ruta 5, km 514, Comuna Higuera, cuesta de Buenos Aires, 29°31’S; 71°12’W, 270 m, 10 Oct. 2010. S. Albesiano et al. 2084 (MERL); camino a los Choros, 29°13’S; 71°32’W, 90 m, 10 Oct. 2010. S. Albesiano et al. 2086 (MERL).


**Original description:**

*Trichocereus skottsbergii* Backeb., in Skottsbg., *Acta Horti Gothob.* 18: 146, ill. 1950. (Fig. 14).
iognomic vegetational types are stumpy and spinose scrub, from sea level to 200 m.

**Taxonomic and nomenclatural comments:**
Backeberg (1950) established that *T. skottsbergii* and *T. deserticola* are similar, but characters were found to differentiate them (Table 2).

Within a population, there are individuals that are set apart by the smaller size of their flowers and central spines, these are named the *breviatus* variety; however, these features are within the morphological species, and as a result, the variety must pass into the synonymy of the species, as proposed by Ritter (1980b).

Charles (2005) proposed *T. skottsbergii* as a subspecies of *T. chiloensis*, but when we studied the morphology of the apical radial spines, some differences were observed: in *T. skottsbergii* those spines are flexible, dull, and no longer than 6 cm, while in *T. chiloensis* they are rigid, sharp and up to 4 cm in length. Accordingly, it is proposed *T. skottsbergii* be separated from *T. chiloensis* at the specific level. In addition, Charles did not realize that this species had been described in one of Scottsberg’s papers (vide supra), where the description was attributed to Backeberg, who must be considered the author of the species.

Claes Persson, curator of the GB herbarium (Sweden) indicates (in litt.) that the type specimen, Skottsberg 834, does not exist in that institution, as cited by Charles (2005).

**Herbarium material studied:** Chile, IV Región de Coquimbo, Dpto. Ovalle, Fray Jorge, 200 m, Nov. 1925, E. Werdermann 885 (SI); Prov. Elqui, Mpio. La Serena, Punta Teatinos, 29°49.29’S; 71°17.36’W, 10–100 m, 5 Dec. 1994, U. Eggli and B.E. Leuenberger 2579 (SGO); Puerto Osorno, al borde de la playa, 31°25’21”S; 71°35’24”W, 46 m, 6 Nov. 2008, S. Albesiano et al. 2050 (AGUCH, MERL).

15. *Trichocereus spinibarbis* (Otto ex Pfeiff.) F. Ritter, *Kakt. And Sukkulent.* 16 (11): 212. 1965. (Fig. 15)

**Original description:**

33. *C. spinibarbis* H. Berol.

Ps: Chile (Coquimbo).

C. *erectus* 9-angularis; *sinus* acutis; *costis* obtusis *flabellatis*; *areolis* immensae magnus *areolibus* albidis sub-lanuginosis; *areolis* *costis* rigidis *eiusereis*,apice rígidas, *centrales* 2---4 crassioribus, *exterioribus* 8 radiatis.

Tenuis 1½—2 pol. diam. *Areolae* maxi minimi pollitae.

b. *Globri.*

*Areolae* nudis tomentosis, inaequino nulla.


**Extended description:** *Plants* cespitose, up to 80 cm high, forming dense low shrubs. *Stems* slightly arched, and cylindrical, 6 cm in diameter. *Ribs* at the apex 9, obtuse, 1 cm wide, 0.8 mm high; with *areoles* round and obovate, 5 mm high, 1 cm wide, yellow in areoles at the apices of the branches, and gray in areoles below the apices of the branches. *Spines:* *centrales* 3—4 in areoles below the apices of the branches, arranged crosswise, 3—12 cm long, acicular, bristly, flexible, curved, 2 mm wide, gray with brown tips; *radials* 10—15, 1.5 cm long, acicular, 0.5 mm in diameter. *Ribs* at the base 9, obtuse, 1 cm wide, 1 cm high; with *areoles* 8 mm high, 1 cm wide, round, dark gray pilosity; *central spines* 4, 2—9 cm long, acicular, 1.5 mm in diameter, light gray with black tips; *radials* 22, acicular, 1 cm long, 0.5 mm in diameter,

<table>
<thead>
<tr>
<th></th>
<th><em>T. deserticola</em></th>
<th><em>T. skottsbergii</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Branches emerging at</td>
<td>ground level</td>
<td>50 to 80 cm above the ground</td>
</tr>
<tr>
<td>Number of ribs at apex</td>
<td>8–12</td>
<td>16</td>
</tr>
<tr>
<td>Branch diameter</td>
<td>to 10 cm</td>
<td>to 15 cm</td>
</tr>
<tr>
<td>Length of radial spines at apex</td>
<td>to 3 cm</td>
<td>to 6 cm</td>
</tr>
</tbody>
</table>

Table 2. Differences between *T. deserticola* and *T. skottsbergii* according to the morphological characters.
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light gray with brown tip. **Flowers** 13 cm long; **ovary** and **floral tube** covered with black pilosity; **stigma** erect, 1–2 cm long. **Fruits** apical, 4 cm long. **Seeds** 1.5 mm long, 1 mm wide, with a dark yellow hilum-micropyle region.

**Distribution and habitat:** *T. spinibarbis* occurs in Region II of Antofagasta and Region III of Atacama, at an altitude of 200 m.

**Taxonomic and nomenclatural comments:** Salm-Dyck (44, 199. 1850), created an infrageneric classification for *Cereus* taxa, suggesting *C. spinibarbis* should be placed in the subsection *Velutini*, based on its opaque and fine velvety epidermis, and the spacing between the areoles (4–6 mm). The observation made by Salm-Dyck is deemed reliable, as Salm-Dyck was Pfeiffer’s student and was well acquainted with his plants. Labouret (334. 1853) mentioned the size of the spines, ca. 30 cm long. This had not been mentioned in the original description. Schumann (62. 1899) transferred *C. spinibarbis* to the synonym of *Cereus chiloensis*, without providing comments, although *C. spinibarbis* and *C. chiloensis* differ in general appearance (dense low shrubs usually less than 1.5 m vs. shrubs or arborescent plants greater than 1.5 m), branch diameter (4–10 cm vs. 10–25 cm), and fine velvety epidermis in *C. spinibarbis*, a feature absent in *C. chiloensis*. Subsequently, Britton and Rose (1920) transferred *Cereus spinibarbis* to the genus *Eulychnia* [Eulychnia spinibarbis (Otto ex Pfeiff.) Britton & Rose, *The Cactaceae* 2: 82–83, f. 122] without providing details about this change. Additionally, the morphological characters described do not match the original description of *Eulychnia breviflora* Phil. Later Ritter (1980b) established that *Cereus spinibarbis* belongs to the genus *Trichocereus*, given that the velvety epidermis in Chilean cacti occurs only in this genus, and passed *E. spinibarbis* Britton & Rose (non *Cereus spinibarbis* Otto ex. Pfeiff.) into the synonymy of *Eulychnia breviflora* Phil.


16. **Trichocereus undulosus** S. Albesiano **sp. nov.**

**Type:** Chile, IV Región de Coquimbo, Provincia Limari, Peña Blanca, 30°48’32”S; 71°34’29”W, 359 m, 6 Nov. 2008, S. Albesiano, L. Faúndez, R. Flores and P. Saldívar 2051. (Holotype: MERL. Isotype: AGUCH). (Fig 16).

**Planta arborea, 2.5 m altae, ramificatae ex trunci 11 cm diametri. Ramae atrovirentes, erectae, 15 cm diametri. Costae 20, obtusae, 2 cm latae et 1 cm altae. Costae versantur separatae per sulcos acutos et ondulatos. Forma ondulata debetur quem costae sunt crescius altitudinem areoles et qui areoles costarum vicinarum alternantur.**

**Spinae rigidae, aciculae et atrovirentes; centrales 4, diametri 2 mm et 3.5 cm longae; radiales 12, diametri 0.5–1 mm, 1.5 cm longae.** Flores subapicalis, infundibuliformes, 13 cm longae, ovarius 2.5 cm diametri et tubus floral cum copiosis pilis (pelos) cinereis, tepali albi cum apice brunneo. Fructus virides, 3 cm latae et 2.5 longae, cum copiosis pilis cinereis. Semina nigra.

**Morphological description:** Plants 2.5 m high, stem a trunk 11 cm in diameter. Branches dark green, 15 cm in diameter. Ribs at the apex 20, obtuse and tuberculate; with obovate areoles 2 mm high, 8 mm in diameter. **Central spines** 3, 4 cm long, white with brown markings, 1 mm in diameter in the areoles at the apex of the branches, and 2 mm in diameter in the more basal areoles. **Radial spines** 12, acicular, 1 cm long, 8–10 mm wide, white with brown spots. **Ribs at the base** 20, obtuse, tuberculate, 2 cm thick, 1 cm high; with obovate areoles 2 mm high, 8 mm in diameter, entirely gray. **Central spines** 4, 2–4 cm long, 2 mm wide, acicular, dark green. **Radial spines** 12, 1.5 cm long, 0.5–1 mm in diameter, acicular, dark green. **Flowers** 3–10, subapical, 13 cm long, 6 cm in diameter; **ovary** 2.5 cm wide, **middle floral scales** 2 cm long, green with brown midstripe, with abundant axillary gray hairs; tepals 6 cm long, white with a brown midline; **style** 8 cm long; stigma lobes 1 cm
long. **Fruits** green, 3 cm diameter, 2.5 cm long, covered with subulate scales, with abundant axillary gray hairs, green exocarp, and white mesocarp and endocarp. **Seeds** black.

**Etymology:** The epithet refers to the shape of the rib: markedly undulating, giving a tuberculate appearance.

**Distribution and habitat:** This species grows in the Region of Coquimbo, at 400 m altitude, in low scrub, on rocks and protruding areas alongside *Puya* sp. (Bromeliaceae).

**Taxonomic and nomenclatural comments:** *T. undulosus* and *T. skottsbergii* resemble each other in the tuberculate shape of their ribs, but also have characters that differentiate them (Table 3).


**Iconography:** Ritter (1980b), photograph 1078: 1225.

**Table 3.** Differences between *T. undulosus* and *T. skottsbergii* in terms of morphological characters.

<table>
<thead>
<tr>
<th>Character</th>
<th><em>T. undulosus</em></th>
<th><em>T. skottsbergii</em></th>
</tr>
</thead>
<tbody>
<tr>
<td>Color of branches</td>
<td>dark green</td>
<td>grayish green</td>
</tr>
<tr>
<td>Number of ribs</td>
<td>20</td>
<td>12–17</td>
</tr>
<tr>
<td>Spines at the apex</td>
<td>thick (1 mm) and rigid</td>
<td>thin (less than 0.5 mm) and flexible (bristly)</td>
</tr>
<tr>
<td>Color of spines at the apex</td>
<td>white with brown spots.</td>
<td>Gray with little black dots and brown tip.</td>
</tr>
<tr>
<td>Thickness and size of adult central spines</td>
<td>2 mm and 3.5 cm long</td>
<td>1.5 mm and 7 cm long</td>
</tr>
</tbody>
</table>

**Original description:**

**Extended description:** *Plants cespitose, stems branching from the base, shrubs. Branches decumbent or pendent, 1–2 m long, 4–8 cm diameter, young stems green opaque, turning gray–green with age. Ribs 7–9, crenate, 2.5 cm wide, 7.5–12.5 cm high, with round areoles 1–2 cm apart, 5.0–7.5 mm in diameter, all gray or light brown. Apical *spines* black to brown, spines in the middle and lower parts of stem becoming gray; *radial* spines 7–10, rigid, strong, acicular, 2–15 mm long; *central* spines 3–6, outstanding, straight, subulate, 1.5 mm diameter, 2–8 cm long. **Flowers** 13–19 cm long, open in the evening or at night, aromatic; *green receptacle* with scales 2–5 mm long, subulate, fleshy, green; dark brown hairs; *nectaries* 3–4 mm in diameter, tubular, 13–23 mm long; *floral tube* 4–6.5 cm long, 2–3 cm wide at the top, internally greenish white, externally grayish green, bearing hair (as on the receptacle), subulate scales, larger than 1 cm long, dark green; *stamens* white, green at the bottom, inserted 2–3 cm from the base of the tube, extending to the top where they end; *style* pale green with apex white, sometimes brown, 10–11 cm long, of which 14–18 mm are the lengths of the stigmata, which vary in number from 13 to 16 and are a very pale yellow; tepals 5–8 cm long, 1–2 cm wide, with apex serrated or smooth, mucronulate, basally narrowing to 2/3 to 3/4 of maximum width, the outer tepals shorter, spatulate, with the apex mucronulate, the inner tepals white or somewhat pink. **Fruits** 4 cm long, 3...
The species described by Molina, that has tall, erect Cactaceae Eulychnia coquimbana (Molina) S. Albesiano, Arica, on the cliffs near the coast, at 400–600 m altitude (Backeberg 1976, Anderson 2005, Kiesling et al. 2008).

**Distribution and habitat:** In southern Peru, department of Arequipa, in the mountains of the lower Rio Tambo, and the department of Monquegua, in the Ilo region. In northern Chile, Region XV of Arica and Parinacota, province of Arica, south of Arica, on the cliffs near the coast, at 400–600 m altitude (Backeberg 1976, Anderson 2005, Kiesling et al. 2008).

**Taxonomic and nomenclatural comments:** Backeberg (1935) mentioned Trichocereus uyampensis as a nomen nudum when he described the vegetation in the arid region of southern Peru. Months later Backeberg (1936) published formally the diagnosis and morphological description of this species. Subsequently, Backeberg (1976) proposed T. glaucus as a variety of T. uyampensis, but sufficient common morphological characters were found (form of growth, stem diameter, number of ribs, number and shape of radial spines, etc.), to suggest grouping them.

Ritter (1962) mentioned the pendulous stem form ("pendens") which occurs south of the region of Arica in Chile. The growth habit of the stem is thought to be due to the habitat where the species grows, either on the rocky cliffs near the coast (where it has a pendulous habit) or inland, on steep rocky walls around rivers (where it exhibits an erect habit). It is proposed here that the morphological concept of T. glaucus be extended.

What is more, according to Article 37.1 of the International Code of Botanical Nomenclature (McNeill et al. 2006) Ritter did not validity publish the name T. glaucus f. pendens as he did not designate a type specimen.

**Excluded species**

**Eulychnia coquimbana** (Molina) S. Albesiano, comb. nov.


In creating the new combination, Trichocereus coquimbanus, Britton and Rose erroneously identified a kind of *Trichocereus* considered to be *T. pectiniferus*. The species described by Molina, that has tall, erect stems and 20 cm long spines ("which then were used to crochet socks"), corresponds to the genus *Eulychnia*; while the plant described by Britton and Rose is cespitose, one meter high, with spines that do not exceed 8 cm in length.

The combination of *Echinopsis coquimbanus* is included because Friedrich and Rowley conducted the transfer of all species of *Trichocereus* published by Britton and Rose (1920) to the genus *Echinopsis*, without performing a nomenclatural and taxonomic study of each species.

Eggl and Walter (2012) propose rejecting the name *Cactus coquimbanus* Molina, because the characters mentioned in the original description ("Cactus erectus, longus, 10-angularis: angulis obtusis, spines longissimus rectis") are insufficient for knowing whether they correspond to a species of the genus *Eulychnia* or to one of the genus *Trichocereus*, both of which occur in the surroundings of the city of Coquimbo. Our observations of the vegetative characters permit us to conclude that the description of *C. coquimbanus* corresponds to a species of the genus *Eulychnia*, and accordingly the description of *T. pectiniferus* (syn. *Trichocereus coquimbanus*) corresponds to cespitose plants which do not exceed 80 cm in height and which have short (6 cm) spines, while the number of ribs in *Trichocereus chiloensis* (11–21) is greater than 10.

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**LITERATURE CITED**


