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A new *Pilosocereus* (Cactaceae) from Goiás state, Brazil

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Summary. *Pilosocereus vilaboensis* subsp. *pluricostatus* N.P. Taylor *et al.*, *subsp. nov.*, is described from Pirenópolis, Goiás state, Brazil and a further heterotypic subspecies is added as *P. vilaboensis* subsp. *rizzoanus* (P.J. Braun & E. Esteves-Pereira) N.P. Taylor & Zappi, *comb. et. stat. nov.* A key to subspecies is provided.

Zusammenfassung. *Pilosocereus vilaboensis* subsp. *pluricostatus* N.P. Taylor *et al.*, *subsp. nov.*, wird aus Pirenópolis, Bundesstaat Goiás, Brasilien, beschrieben und um eine weitere heterotypische Unterart, *P. vilaboensis* subsp. *rizzoanus* (P. J. Braun & E. Esteves-Pereira) N. P. Taylor & Zappi, *comb. et. stat. nov.*, ergänzt. Ein Bestimmungsschlüssel für die Unterarten wird vorgelegt.

Resumo. *Pilosocereus vilaboensis* subsp. *pluricostatus* N.P. Taylor *et al.*, *subsp. nov.*, é descrito para Pirenópolis, no estado de Goiás, Brasil, e uma outra subespécie heterotípica é reconhecida, *P. vilaboensis* subsp. *rizzoanus* (P.J. Braun & E. Esteves-Pereira) N.P. Taylor & Zappi, *comb. et. stat. nov.* Uma chave para as subespécies é apresentada.

Introduction

In the second half of 2018, two of the authors (NT & DZ) were alerted by Priscila Rosa to the presence of a mystery cactus she had encountered on land belonging to a Zen Buddhist monastery some 20km to the north of the town of Pirenópolis, Goiás state, Brazil. The monks and nuns involved had earlier invited her and colleagues to prepare a botanical checklist of their land with the intention of creating an officially sanctioned private reserve or RPPN (*Reserva Particular de Patrimônio Natural*); Rosa *et al.* (in prep.). At first we knew the plant only from sterile cultivated specimens

at the botanic garden of Brasília, which did not permit its identification, but on 11 January 2019 all three of us were able to visit the monastery's land and study the cactus over a distance of some kilometres, travelling west to east along an almost impassable rock-strewn dirt road in our hired Renault car. We were fortunate in that the plants were fertile, bearing abundant flowers and young to nearly ripe fruits. From these it was immediately obvious that the plant was a *Pilosocereus* Byles & G. Rowley (tribe Cereeae) and clearly related to *P. vilaboensis* (Diers & E. Esteves-Pereira) P.J. Braun (*Pseudopilosocereus vilaboensis* Diers & E. Esteves-Pereira), which occurs on arenitic rocks c. 130km to the west in the Serra Dourada, near Goiás town, in the drainage of the Rio Araguaia (note that there are other more distant mountain systems called Serra Dourada in the region). Indeed, one of the monks told us upon our arrival at the monastery that the cactus had been identified as *P. vilaboensis*, though we respectfully disagreed. The manager of the monastery also told us that the local vernacular name of the cactus is 'Figo de burro' (donkey's fig). The following day, 12 January, we drove eastwards along another dirt road, the Rodovia Parque Estadual dos Pireneus, which passes through the state park of the Serra dos Pireneus (fancifully named after the European Pyrenees!), to the north-east of Pirenópolis. Here we found the plant again, though not as abundant, but ascending to almost the highest point in the range at 1330m altitude just below the Capela da Santíssima Trindade dos Pireneus. At both sites the plant grows on dark quartzitic rocks (that the município of Pirenópolis is famous for exporting) and is surrounded by fire-swept *Cerrado* vegetation, its older stems frequently exhibiting signs of severe fire damage, which are later replaced by young basal shoots. Here we will describe the plant as a



Figure 1. *P. vilaboensis* subsp. *pluricostatus* at type locality. Note that some old stems have been killed by fire. Photograph: D. Zappi.



Figure 2. *P. vilaboensis* subsp. *pluricostatus* at type locality. Stem apex showing young spines.
Photograph: D. Zappi.



Figure 4. *P. vilaboensis* subsp. *pluricostatus*. As in Figure 3. Note fire damage below the flowers.
Photograph: D. Zappi.

new subspecies of *P. vilaboensis* and also treat the synonymous *P. rizzoanus* P.J. Braun & E. Esteves-Pereira from north-eastern Goiás (Rio Paranã/Tocantins drainage) as a further subspecies. Two of us (NT & DZ) were able to study the latter taxon in habitat in August 2010.

Relationships within *P. vilaboensis* and with allied species

In her revision of the genus *Pilosocereus* in Brazil, Zappi (1994: 114–129) recognized the *P.*



Figure 3. *P. vilaboensis* subsp. *pluricostatus* at type locality. Stem bearing flowers from the previous night.
Photograph: P. Rosa.



Figure 5. *P. vilaboensis* subsp. *pluricostatus*. Type specimen prior to preservation.
Photograph: P. Rosa.

AURISSETUS Group, comprising what is now 7 species: *P. machrisii*, *P. jauruensis*, *P. pusillibaccatus*, *P. parvus*, *P. aurisetus*, *P. vilaboensis* and *P. aureispinus*, excluding *P. bohlei* (Hunt *et al.*, 2006: 234). This species-group is well-characterized both morphologically and ecologically, its mostly allopatric species occupying similar habitats on non-calcareous rock outcrops and sandy/gravelly areas in the *Cerrado* and included *Campos Rupestres* of the Brazilian highlands in Northern, Central-western, North-eastern and South-eastern Brazil, also reaching to north-eastern Paraguay. These habitats are in contrast to the *Caatinga* and other dry forest systems, such as those on limestone, in which most other Brazilian taxa of the genus are found. While members of the *P. AURISSETUS* Group are at times difficult to



Figure 6. *P. vilaboensis* subsp. *pluricostatus* at the type locality. Stem with nearly mature fruit.
Photograph: D. Zappi.

distinguish and their circumscription has been somewhat volatile over recent decades, *P. vilaboensis* is notable for its almost non-existent areolar long hairs and scarcely woolly flowering areoles, which in sterile specimens can raise doubts about its generic identity since, as the name suggests, *Pilosocereus* species are by definition rather hairy! Thus, *P. vilaboensis* (*sensu lato*) from Goiás is easily distinguished from the similar, but much more hairy or bristly, *P. aureispinus* (central Bahia) and *P. aurisetus* (Minas Gerais). Likewise, it cannot be confused with the usually rather woolly *P. machrisii*, whose range also includes parts of Goiás state.

P. vilaboensis as circumscribed here includes 3 geographically discrete taxa, on current knowledge each separated from the next by more than 100km: *P. vilaboensis* subsp. *vilaboensis* from the vicinity of the town of Goiás (formerly called Vila Boa and not to be confused with the modern Vila Boa in the eastern part of the state), *P. vilaboensis* subsp. *pluricostatus* described below from the quartzitic mountains in the município of Pirenópolis, which divide the major watersheds of the Tocantins and Paraná river systems, and *P. vilaboensis* subsp. *rizzoanus* (name validated

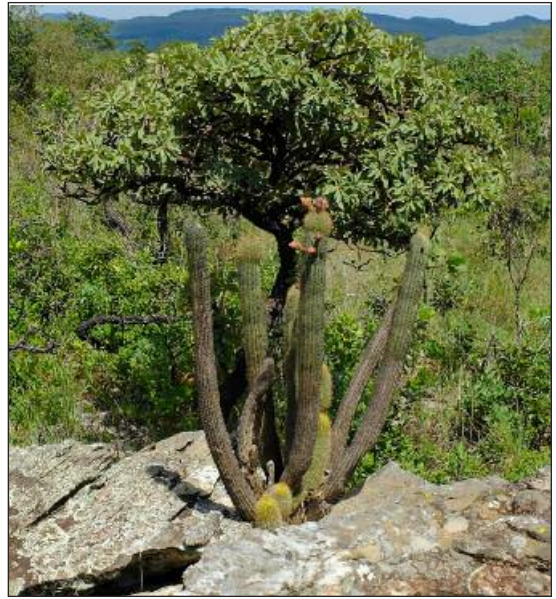


Figure 7. *P. vilaboensis* subsp. *pluricostatus* at Serra dos Pireneus, 12 January 2019.
Photograph: D. Zappi.



Figure 8. *P. vilaboensis* subsp. *rizzoanus*, Teresina (Terezinha) de Goiás – Nova Roma, Rio Paranã drainage, August 2010.
Photograph: D. Zappi

Key to the subspecies of *Pilosocereus vilaboensis*.

1. Stems 7–10cm diam.; ribs (16–)18–25 (Mun. Pirenópolis, central-E Goiás, 1100–1330m) <i>P. vilaboensis</i> subsp. <i>pluricostatus</i> .
1. Stems to 6cm diam.; ribs 12–16 2.
2. Spines on non-flowering areoles to 30mm (Serra Dourada, W Goiás) <i>P. v.</i> subsp. <i>vilaboensis</i> .
2. Spines on non-flowering areoles to 16mm (Rio Paranã drainage, NE Goiás) <i>P. v.</i> subsp. <i>rizzoanus</i> .

below) from granitic outcrops 300km away in north-eastern Goiás in a rather dry area which includes some cactus species that are otherwise found in the *Caatinga* further east, e.g. *Arrojadoa rhodantha* and *Melocactus levitesatus* (both from near Nova Roma; Taylor & Zappi, 2018: 10, 17). In habit all 3 subspecies are very similar, forming many-stemmed basally-branched clumps with golden to golden brownish spines, uniformly rather small flowers and small seeds with strongly convex testa-cells. The key above hopefully helps distinguish these disjunct taxa.

Validation of names

Pilosocereus vilaboensis (Diers & E. Esteves-Pereira) P.J. Braun subsp. *pluricostatus* N.P. Taylor, Zappi & P.O. Rosa, **subsp. nov.** Differs from *P. vilaboensis* subsp. *vilaboensis* in its greater size, to at least 200×10cm, adult stems with more numerous ribs (18–25) and shorter spines. Type: Brazil, Goiás, Mun. Pirenópolis, serra draining to the Rio do Peixe (Rio Tocantins drainage), c. 20km north of the town, 15°43'5"S, 48°56'55"W, c. 1100m, on dark quartzitic rocks in *Cerrado*, 11 Jan. 2019, P.O. Rosa 2260 (HEPH, holo.; UB, RB, isos). Range: also found in the Serra dos Pireneus state park, north-east of Pirenópolis (Rio Corumbá / Parnaíba / Paraná drainage), 15°47'31"S, 48°50'8"W, at up to 1330m (12 Jan. 2019, P.O. Rosa & D.C. Zappi, photos).

Rupicolous shrub, branching only at the base, stems to 200(–250)×10cm, vascular cylinder 2.2cm diam., very weakly lignified, parenchyma 3cm or more wide, stems 7–10cm diam., young epidermis yellow-green, turning dull green; ribs (16–)18–25, rounded, 6×12mm; areoles 8mm apart, non-flowering hairless, 3mm diam., flower-bearing 6mm diam.; central spines 3–5, to 18mm or longer on flowering areoles, radial spines 8–10, to 9mm long, golden yellow on young shoots. Flowers sub-apical, borne from slightly hairy areoles (this

character hard to verify when the plant is not flowering), in groups of up to 10, buds blunt or apex slightly pointed, flowers variable in size but averaging c. 5.5×3.6cm, strongly scented of spoilt cabbage, pericarpel 1×1.5cm, green or brownish, tube 3.5–4cm long, to 3.2cm diam. externally at apex, longitudinally ridged to warty without, green or dark reddish pink, apex of tube with 4×7mm fleshy bract-scales; nectar-chamber 11×8mm; outer perianth-segments 11×9mm, fleshy, pinkish red, inner perianth-segments 15×9mm, medium fleshy, white; outer stamens 7mm, innermost stamens curved inwards, c. 17mm, anthers creamy yellow; ovary locule 5×7mm; style c. 3.3cm, stigma-lobes c. 8, 7mm, cream. Fruit (undehisced) 2.5×4.0cm, depressed, pale green, young fruits dark green, perianth remains short, downturned, blackened. Seeds c. 1.5×1.0mm, black-brown, shiny, testa-cells strongly convex.

P. vilaboensis (Diers & E. Esteves-Pereira) P.J. Braun subsp. *rizzoanus* (P.J. Braun & E. Esteves-Pereira) N.P. Taylor & Zappi, **comb. et stat. nov.** Basionym: *P. rizzoanus* P.J. Braun & E. Esteves-Pereira ('rizzoianus') in *Cact. Succ. J. (US)* **64**: 148 (1992).

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