

## *Dyckia tubifilamentosa* (Pitcairnioideae-Bromeliaceae): a new species from Northeastern Brazil

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**ABSTRACT** - (*Dyckia tubifilamentosa* (Pitcairnioideae-Bromeliaceae): a new species from Northeastern Brazil). *Dyckia tubifilamentosa* Wand. & G. Sousa is described and illustrated. It differs from the other species of the genus *Dyckia* by several distinctive characters, namely: the ovoid shape of the flower buds, the long and exerted staminal tube formed from completely connate white filaments, the anther initially connivent and then divergent, along with the fruit with partially persistent perianth. *Dyckia tubifilamentosa* is found in some areas of the semiarid region of Northeastern Brazil (Piauí State), growing in the Caatinga and transitional Caatinga-Cerrado biomes.

**Keywords:** Caatinga, neotropics, semiarid

**RESUMO** - (*Dyckia tubifilamentosa* (Pitcairnioideae-Bromeliaceae): uma nova espécie do Nordeste do Brasil). *Dyckia tubifilamentosa* Wand. & G. Sousa é aqui descrita e ilustrada. A espécie se distingue das demais do gênero *Dyckia* pelo botão floral ovoide; tubo estaminal exserto e esbranquiçado, formado pelos filetes completamente conados; anteras coniventes passando a divergentes e fruto com restos de perianto. *Dyckia tubifilamentosa* é conhecida de algumas áreas da região semiárida do Nordeste do Brasil (estado do Piauí), crescendo na Caatinga e áreas de transição Caatinga-Cerrado.

**Palavras-chave:** Caatinga, neotrópicos, semiárido

Bromeliaceae comprises 43 genera and 1290 species in Brazil (Forzza *et al.* 2014), which represents almost 40% of the family's diversity. This family is found in all Brazilian ecosystems and is very common in the humid coastal forest region (Atlantic Forest) and in the Cerrado vegetation, especially on rocky outcrops.

Bromeliaceae has also been regarded by Andrade-Lima (1957) as one of the typical floristic components of the Brazilian semiarid vegetation, the so-called Caatinga (deciduous forest). This ecosystem combines different vegetation types throughout most of the semiarid region in Northeastern Brazil (Rodal & Sampaio 2002). Around 123 species of the family distributed in 30 genera have been cited for Caatinga by Forzza *et al.* (2014), of which the most common ones are: *Neoglaziovia variegata* (Arruda) Mez, *Bromelia laciniosa* Mart. ex Schult. & Schult. f., *Dyckia limae* L.B. Sm., *D. pernambucana* L.B. Sm. and *Encholirium spectabile* Mart. ex Schult. &

Schult. f. (Wanderley & Sousa 2002, Wanderley *et al.* 2009).

Very recently, terrestrial and rupicolous specimens of a taxon distinct from the previously described species of *Dyckia* were collected in the State of Piauí and are described herewith as a new species. The flower buds are greenish and ovoid, having a long exerted staminal tube, most of the ovary's length is above the petals and sepals; the fruits are capsular with winged seeds.

***Dyckia tubifilamentosa*** Wand. & G. Sousa, *sp. nov.* - Type: BRAZIL. PIAUÍ: Município de Pedro II, estrada Pedro II a Domingos Mourão (04°30'31"S, 41°19'98"W), cerca de 69 km do centro de Pedro II, 13-III-2008, fl., fr., M.G.L. Wanderley, G. Sousa & R. Barros 2630 (holotypus SP, isotypus TEPB). (figures: 1-2).

*Dyckia tubifilamentosa* is easily distinguished from the other species of *Dyckia* by the ovoid shape

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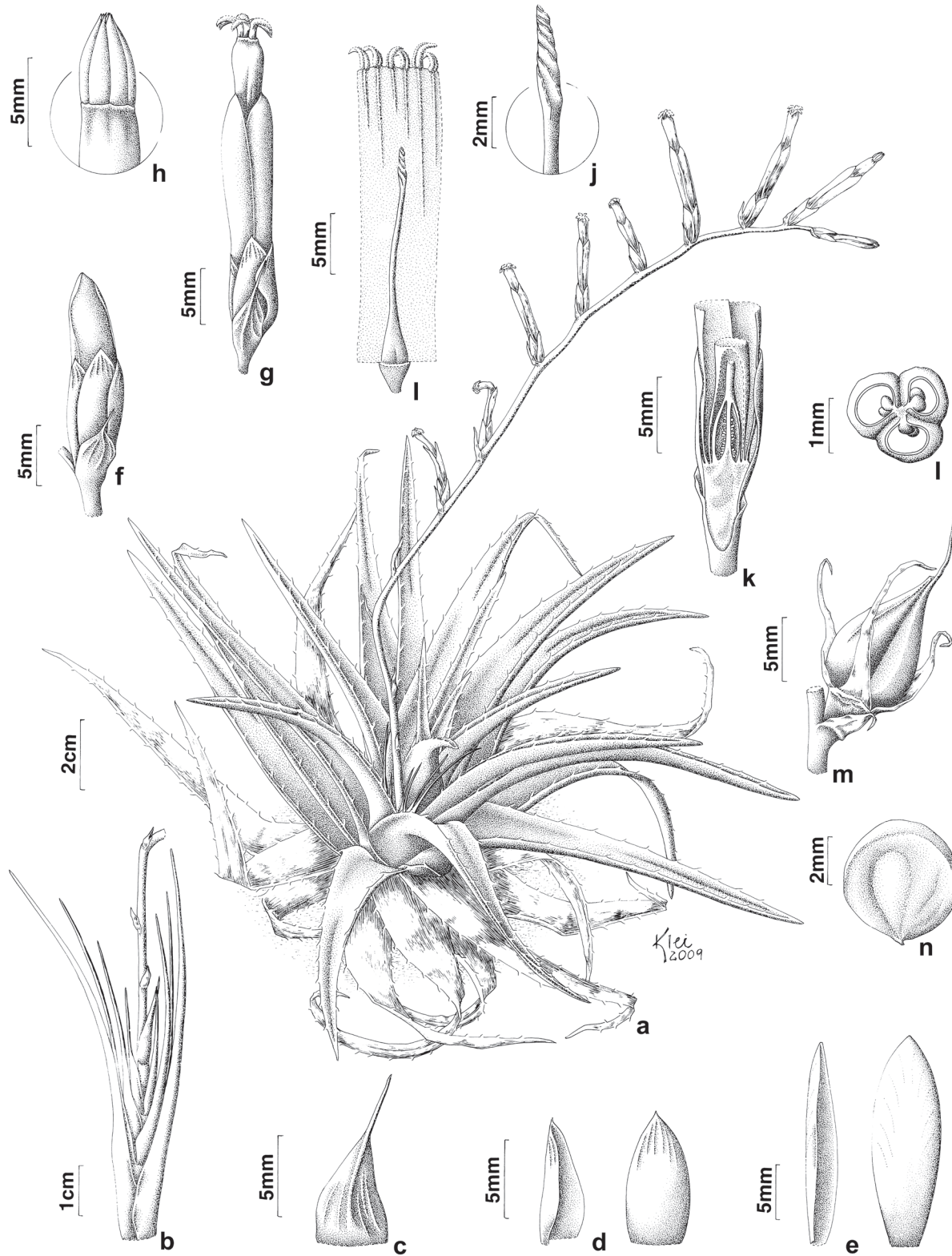


Figure 1. *Dyckia tubifilamentosa* Wand. & G. Sousa (from the holotype). a. Habit. b. Detail of the base of the peduncle. c. Floral bract. d. Sepals. e. Petals. f. Floral bud. g. Flower with the long staminal tube. h. Anthers at pre-anthesis. i. Detail of the gynoecium with the staminal tube longitudinally sectioned. j. Spirally conduplicate stigma. k. Longitudinal section of the base of the flower with a detail of the vestigial tube and the superior ovary. l. Transversal section of the ovary. m. Fruit. n. Seed.

of the flower buds, a long and exerted staminal tube formed from completely connate filaments which become vinaceous to purplish at post-anthesis; anthers are initially connivent and then divergent and the perianth is partially persistent in the fruit. This combination of characters is a distinctive and unusual set of diagnostic characters within the genus.

Herbaceous plants, terrestrial or rupicolous, growing usually in small clumps or as isolated individuals, 22-58 cm tall when in bloom. Roots thick. Rhizome contracted and covered by leaf sheaths. Rosette with strongly imbricate leaves, straight to curved, distichous or secund. Leaves 13-17 cm long; sheath 2-2.5 × 3-4 cm, sheath broad, oval, fleshy, whitish to greenish, margins entire, blade 11-14.5 cm long, narrowly triangular, green, brownish to vinaceous, cinereous lepidote, apex mucronate, margins strongly spiny, spines 1-2 mm long, brown and brittle, erect or retrorse in the upper portion of the blade. Peduncle lateral, 10-50 × 0.2 cm, glabrous, green to vinaceous, basal bracts numerous and overlapping each other, foliaceous, 6-9 × 0.2 cm and exceeding the internodes, narrowly triangular, creamy-green, apex attenuate, margins entire, keeled, the remaining peduncle bracts 0.2 × 0.8-2.0 cm and shorter than the internodes, ovate to filiform, reddish-brown with attenuate apex, margins entire. Inflorescence spicate, with 2-10 flowers, sparsely arranged, secund, rarely distichous; rachis slender, slightly geniculate. Flowers 2.8-3.2 cm long, sessile to subsessile, aestivation imbricate; buds yellowish to greenish, ovoid. Floral bracts 3-5 mm long, ovate, green to reddish-brown, apex caudate, margins entire. Sepals connate at the base, 0.8-1.1 cm long, symmetrical, ovate, apex apiculate, green with translucent dots and dark-reddish wrinkles at the base, veins slightly visible at the apex, margins entire. Petals free, naked, 1.7-2 cm long, oblong-lanceolate, slightly cucullate, green or with dark-reddish wrinkles at the apex, apex acute, margins entire. Androecium 2-2.8 cm long, filaments entirely connate, filament tube 2-2.3 cm long, white becoming vinaceous to purplish, exerted, anthers sub-basifixed, 0.5-0.6 cm long, sagittiform, creamy yellow, connivent, divergent in post-anthesis, pollen grains monosulcate, ellipsoidal, exine reticulate. Gynoecium ca. 2.2 cm long, included in the filament tube, stigma lobes laminar, spirally-conduplicate; ovary superior, ca. 1 cm long; placentation axial, ovules numerous, located in the lower third. Capsule loculicidal and also septicidal in the upper third, 1.4 × 0.9 cm,

ovoid, brown, perianth partially persistent. Seeds 4.2 × 2.5 mm, ovoid, round-ovoid to falciform, wings corky, light to dark-brown.

**Etymology:** The epithet refers to the long staminal tube.

**Habitat:** Heliophilous plants growing on rocky soils or on rock outcrops in the Caatinga vegetation (figure 2 a) as well as in areas considered transitional to the Cerrado biome in the State of Piauí, Northeastern Brazil.

**Additional material examined (paratypes):** BRAZIL. PIAUÍ: Campo Maior, Serra de Santo Antonio, 04°54'21"S 42°10'16"W, 28-I-2008, fl., fr., *Sousa & Barros 716* (TEPB); idem, 04°57'31"S 42°11'60"W, 13-III-2008, fl., *Wanderley et al. 2625* (SP, TEPB); Serra do Bugari, 6-III-2010, *Castro 2303* (EAC). Pedro II. 04°30'33"S 41°19'98"W, 8-IV-2006, fl., *Barros et al. 2764* (TEPB); Malhada da Areia, 04°30'317"S 41°19'98"W, 27-I-2008, fl., fr., *Sousa 713* (TEPB); idem, 13-III-2012, fr., *Sousa et al. 718* (TEPB).

*Dyckia tubifilamentosa* can be ascribed to the Pitcairnioideae subfamily by the terrestrial or rupicolous habit (figures 2 a-c), leaves with spiny margins (figure 1 a) and capsular fruits with winged seeds (figures 1 m, n) which are common features in most genera of the subfamily. The characteristics are the same as those used in the circumscription of Pitcairnioideae, both in the wide sense (Smith & Downs 1974) or under the new concept (Pitcairnioideae s. str.) adopted by Givnish *et al.* (2011).

This new species has lateral inflorescences (figures 1 a, 2 c), a common character in most species of *Dyckia*. However, it differs from the other species of the genus by many distinctive characters, namely: the ovoid flower buds (figures 1 f, 2 d), the long exerted staminal tube formed by completely connate white filaments which become vinaceous to purplish after the anthesis (figures 1 a, g, 2 e-g), the initially connivent then divergent and persistent anthers (figures 1 g, h, 2 e-g) and the fruit with partially persistent perianth and gynoecium. These combined features are good and unusual diagnostic characters in the genus.

*Dyckia* usually presents either orange or red to yellow petal with stamens adnate to the petals or to the sepals forming a common ring, erect and narrow to compact stigma lobes (Forzza & Wanderley 1998, Forzza 2005). The staminal tube in *Dyckia* is often short, and when longer it never exceeds the corolla (Smith & Downs 1974). *Dyckia tubifilamentosa*



also has oblong-lanceolate petals, whereas often in *Dyckia* they are ovate to obovate. These characters, observed in the new species, are considered part of the morphological character variation of *Dyckia*, thus widening the morphological circumscription of the genus.

*Dyckia* is morphologically related to *Encholirium*, especially because both genera share the presence of naked petals. They can usually be distinguished by the lateral inflorescences and adnate filaments in *Dyckia*, while *Encholirium* often has a terminal inflorescence and free filaments. The weak delimitation between these two genera can be seen in certain intermediate species of each genus which show overlapping

characters. *Dyckia tubifilamentosa* resembles *Encholirium* in its elongate and spirally conduplicate stigma lobes and green sepals and petals, however, the new species is easily distinguished from all species of *Encholirium* by its lateral scape and staminal tube, absent in *Encholirium* and present in almost all species of *Dyckia*.

Smith & Downs (1974) characterized the genera of the Pitcairnioideae *s.l.* by the position of the ovary, as for example, by an entirely superior ovary (*Encholirium*) or a partially or entirely inferior one (*Dyckia*). However, ovary position is not as consistent as previously assumed within the genera of Pitcairnioideae. Bernardello *et al.* (1991) and

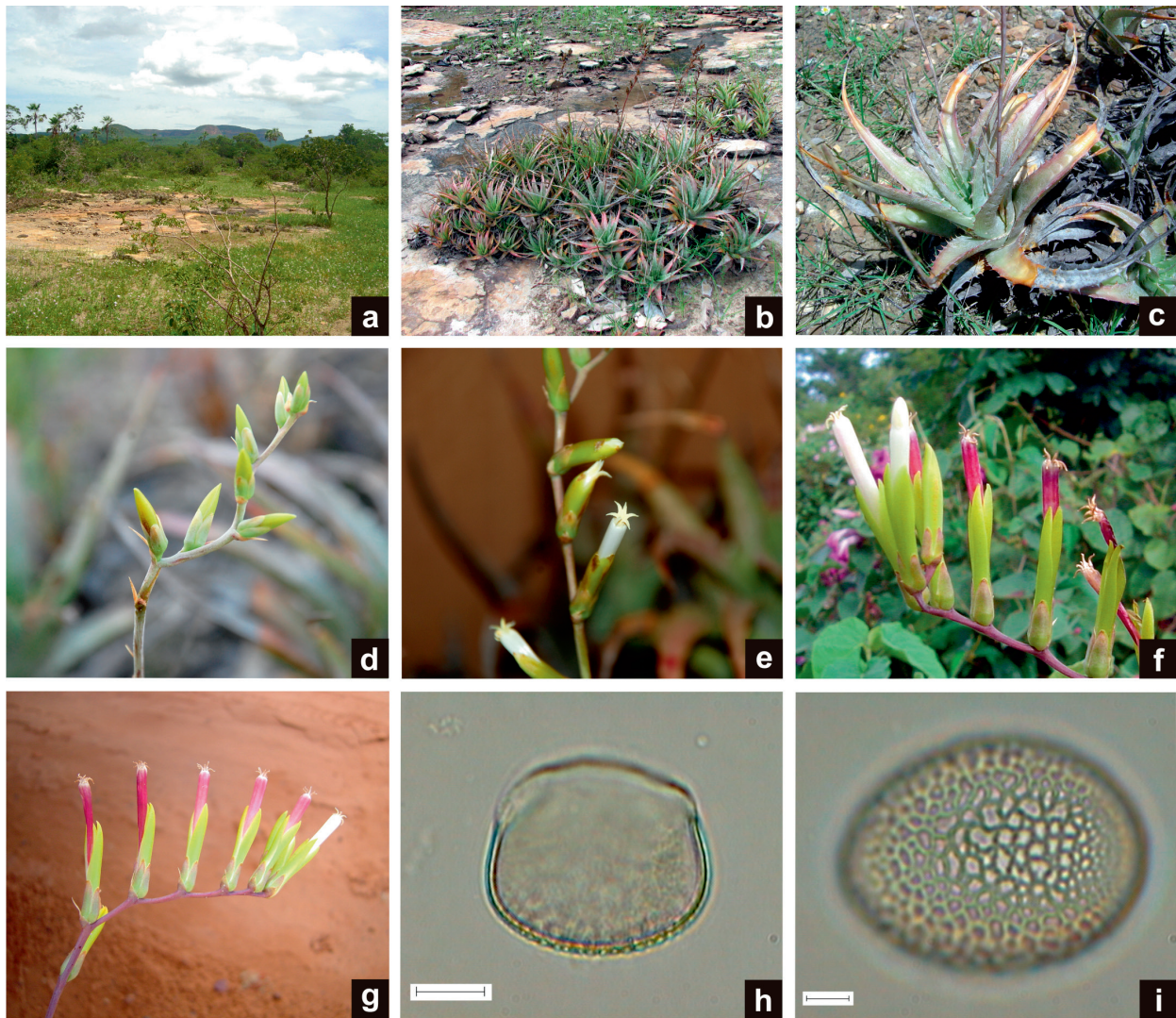


Figure 2. *Dyckia tubifilamentosa* Wand. & G. Sousa (from the holotype). a. General view of the area of occurrence in Piauí State, Northeastern Brazil. b. Habit. c. Detail of the rosette with a lateral peduncle. d. Immature inflorescence with yellowish flower buds. e. Inflorescence showing buds and open flowers with a whitish and long staminal tube and divergent anthers. f. Inflorescence with flowers with whitish and long staminal tube and flowers with reddish tube at post-anthesis. g. Inflorescence showing secund flowers. h-i. Pollen grains (Sousa *et al.* 713). h. Equatorial view showing the monosulcate aperture. i. Polar view, detail of the reticulate exine. (scales bar: h = 10  $\mu$ m; i = 5  $\mu$ m).

Forzza (2005) reported perigynous flowers with a short epigynous tube in *Encholirium*. In *Dyckia tubifilamentosa*, the occurrence of perigynous flowers was not confirmed, but an inconspicuous tube can be seen (figure 1 k). The capsular fruit (figure 1 m) and the appendaged seeds (figure 1 n) found in *D. tubifilamentosa* are also described within the Pitcairnioideae both in the wide or strict senses (Smith & Downs 1974, Givnish *et al.* 2011).

The distinctive and unusual combination of characters in *Dyckia tubifilamentosa* led us initially to consider proposing a new genus. Therefore, considering the weak delimitation of related genera of Pitcairnioideae *s.l.*, emphasized by Krapp *et al.* (2014), we have decided to describe this new species under *Dyckia*, with which it shares some diagnostic characters (lateral inflorescence and connate filaments) and similar pollen morphology, with monosulcate pollen and reticulate exine (figures 2 h, i).

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