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A "hairy situation" in Minas Gerais, Brazil: a striking new species of *Krenakanthus* (Bromeliaceae: Bromelioideae) covered with uniseriate trichomes

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Abstract

A new species of *Krenakanthus*, a member of the bromelioid "Cryptanthoid complex", is described based on plants discovered through collaborative citizen science. *Krenakanthus ribeiranus* and its only congener *K. roseolilacinus* are endemic to the "João Pinto Center of Biodiversity", a still poorly explored region with Campos Rupestres and associated vegetation in the Rio Doce Valley, in eastern Minas Gerais state, Brazil. The unusual combination of morphological characters of *K. ribeiranus*, highlighted by plant delicacy and almost all leaf and flower parts covered by uniseriate, hair-like trichomes, is illustrated and discussed in comparison with *K. roseolilacinus*, including leaf and seed anatomy, as well as pollen morphology. This micro-endemic species is assessed as Critically Endangered, reinforcing the need for strategy to protect the biodiversity of the region. The morphology of the new species validates and strengthens the diagnostic flower characters used in the circumscription of *Krenakanthus*, suggesting as secondary diagnostic characters the habit, stature, and leaf conformation.

Key words: anatomy, Campos Rupestres, *Cryptanthoid complex*, João Pinto Center of Biodiversity, morphology, uniseriate trichomes

Introduction

In June and October 2012, two field expeditions were carried out by the first author, led by findings of the bromeliad and orchid collector Reginaldo Vasconcelos, to the mountains situated in the municipalities of Alvarenga (Pico da Aliança) and Conselheiro Pena (Serra do Padre Ângelo), Minas Gerais state. It revealed for the first time an exceptionally rich and unique regional biota yet unexplored. As a result of the specimens collected in these expeditions, new species of Bromeliaceae were published in the following years [e.g., *Aechmea timida* Leme (Leme *et al*. 2014: 67), *Alcantarea occulta* Leme (Leme & Kollmann 2013: 10), *A. nana* Leme (Leme *et al*. 2014: 72), *Orthophytum vasconcelosianum* Leme (2015: 287), *Vriesea sanctaparecidae* (Leme & Kollmann 2013: 35)], drawing attention to the phytophysiognomic uniqueness of the region. The same Reginaldo Vasconcelos, driven by his curiosity about the natural world, posted

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Since the species is currently known only from two nearby collection points or subpopulations, it does not have an associated EOO polygon and has an estimated AOO of 4 km². Land use and land cover data retrieved from Mapbiomas (2022a, b) applied for the overlay analyses (Jordão *et al.* 2022) indicates that over 31% of its AOO was converted to pastures, and that 17.9% is currently designated as a mosaic of agriculture and pastureland formations (fig 1, 2). Considering the intensity of the described stress vectors, one single location is considered, as these threats may extirpate the whole population if one single intense stress event occurs within its narrow and fragile habitat. Although we have an indication of the putative number of mature individuals for each known subpopulation, no data on generation length and the population trend is known, so the species could not be assessed based on its (*a priori* small) population size and reduction rate. All known subpopulations are outside protected areas, which might increase the vulnerability of the species in face of severe anthropogenic events.

Therefore, based on the minimum values of EOO and AOO, combined with one single location and an estimated continuing decline in its AOO, extent and quality of habitat, and possibly in the number of mature individuals, the species is here declared as Critically Endangered under the aforementioned IUCN (2012) criteria.

Additional specimens examined (paraypes):—BRAZIL. Minas Gerais: Alvarenga, Serra de Santa Maria, Sobreiro de Cima, maciço quartizítico a leste da sede do Município, [precise locality withheld for conservation purposes], 595 m elevation, 27 November 2022, *J.C.S. Ribeiro 001*, cult. *E. Leme 10220* (RB!); ibidem, 615 m elevation, 1 March 2023, *P.M. Gonella 3800, J.C.S. Ribeiro & D.P. Cordeiro* (RB!).

Distinctive characters:—The set of morphological features of this new species makes its circumscription in *Krenakanthus* apparently challenging. This is true due to the several morphological differences when compared to the single known species of the genus, *K. roseolilacinus*. These differences are: (a) stemless habit (figs. 3 C–D, 5 B–C, E; *vs.* long caulescent) and much fewer leaves (7–12 *vs*. 20–27 in number); (b) leaf blades subdensely to densely covered by spreading, hair-like trichomes (figs. 4 C–D, 7 A; *vs*. glabrescent, with minute glandular trichomes, or glabrous, fig. 4 A–B), smaller (7–25 × 0.8–1.8 cm *vs.* 17–27 × 1.8–2.4 cm), thinner in texture, margins straight (fig. 5 A–B; *vs*. undulate mainly toward the base), inconspicuously spinulose and appearing entire (fig. 4 C, 7 B; *vs.* distinctly spinulose, fig. 4 A–B), spines inconspicuous [0.1–0.2 mm *vs*. 0.3 (apical ones)–3 mm (basal ones) long]; (c) inflorescence shortly pedunculate to subsessile (fig. 7 C–D; *vs*. sessile), simple (*vs*. sparsely branched only at the base and simples toward the apex); (d) flowers distinctly smaller (*ca*. 30 mm *vs*. 42–55 mm long); sepals smaller (11–11.5 × 2.5 mm *vs*. 20–27 × 4–5 mm), shorter connate at the base for 4–4.5 mm (fig. 6 G; *vs*. 3–7 mm, fig. 6 H); (e) petals smaller (25–26 × 8 mm *vs*. 35–44 × 15–20 mm), apex acute (figs. 5 D, 6 A, C; *vs*. acute to rounded, fig. 6 B, E), and exappendiculate (*vs*. bearing distinct cupuliform appendages); (f) fruits smaller, 4 × 3.5–5 mm (*vs*. 8–10 × 7–12 mm); (g) seeds smaller, 0.8–1.2 × 0.6 mm (*vs*. 2–3 × 0.7–1 mm), costal bands 8–12 cells wide, intercostal bands 1–3 cells wide (*vs*. costal bands 15–20 cells wide, intercostal bands 4–6 cells wide).

Despite the relevant differences that distinguish these two species of *Krenakanthus* from each other, the similarities that unite *K. ribeiranus* and *K. roseolilacinus* are: (a) leaves thin to very thin in texture; (b) peduncle inconspicuous to absent); (c) sepals distinctly connate at the base; (d) petals similarly free, broadly spathulate from a very narrow blade (fig. 6 C), blades spreading at anthesis and forming a fan blade-like corolla, and flaccidescent afterwards (fig. 6 A); (e) stamens deeply included and not visible at anthesis (fig. 6 A–B); (f) filaments distinctly unequal in length (fig. 6 C–D); (g) stigma conduplicate-spiral (fig. 6 M–N), being the only two representatives of the "Cryptanthoid complex" with such a stigma type; (h) epigynous tube lacking; and (i) fruits with persistent sepals 2.5–2.9 times longer than the fruit length (fig. 6 I–J). In addition, both species present similar habitats, occurring in the understory of Semideciduous Seasonal Forest in the region of Alvarenga and Conselheiro Pena (fig. 1).

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