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On the taxonomic identity and nomenclature of *Cyperus megapotamicus* (Cyperaceae)

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Cyperus megapotamicus (A. Spreng.) Kunth is a nomenclatural synonym of *Rhynchospora megapotamica* (A. Spreng.) H. Pfeiff. but was originally misapplied to a species of *Cyperus*. Contrary to the rules, both species names are in current use in different genera. We here clarify the perpetuated taxonomic and nomenclatural confusion regarding the identity of *C. megapotamicus* sensu Kunth and related names and conclude that *Cyperus jaeggii* Boeckeler is the correct name to be adopted. We provide an amended circumscription of this species, with *Cyperus mauryi* Kuntze and *Pycreus nematodes* Schrad. ex C. B. Clarke as its newly proposed heterotypic synonyms. Additionally, lectotypes are designated for the names *Scirpus megapotamicus* A. Spreng., *Rhynchospora maculata* Maury, *Rhynchospora luzuliformis* var. *elongata* Kuntze, *Rhynchospora luzuliformis* var. *subcapitata* Kuntze, *Cyperus jaeggii*, *Cyperus mauryi* and *Pycreus nematodes*.

Keywords: Argentina, Bolivia, Brazil, Chile, Cypereae, Cyperoideae, Paraguay, *Pycreus* sect. *Propinqui*, *Rhynchospora* sect. *Luzuliformes*, Surinam, Uruguay

Introduction

According to Goetghebeur (1998), *Cyperus* Linnaeus (1753: 44) belongs in subfamily Cyperoideae (sensu Suessenguth 1939), tribe Cypereae Dumortier (1829; as 'Cyperineæ'). Molecular studies reveal that Cypereae largely consist of two well-supported clades, the *Ficinia* clade (155 spp.) and the *Cyperus* clade (950 spp.), the latter encompassing a paraphyletic *Cyperus* s.str., the second largest genus in Cyperaceae (ca 700 spp.), and about 13 segregate genera in the classification of Goetghebeur (1998) (Muasya et al. 2002, 2009a, b, Simpson et al. 2007, Huygh et al. 2010, Larridon et al. 2011, Reynders et al. 2011). *Cyperus* s.l. is full of taxonomic problems and lacks a general agreement among authors on both its circumscription and infrageneric classification (Muasya et al. 2002). This explains the two approaches that have been adopted in treating it either as one large genus with several subgenera (Kükenthal 1936, Haines and Lye 1983) or segregating it into several genera (Goetghebeur 1986, 1989, 1998, Bruhl 1995), of which *Kyllinga* Rottb., *Mariscus* Vahl and *Pycreus* P. Beauv. are the largest and best known (Muasya et al. 2002). A formal proposal to merge the segregate

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genera with the expanded genus *Cyperus*, i.e. *Cyperus* s.l. = the *Cyperus* clade, was presented by Larridon et al. (2014), largely based on molecular phylogenetic analyses (Simpson et al. 2007, Muasya et al. 2009a, Larridon et al. 2011, 2013).

There has been considerable taxonomic and nomenclatural confusion regarding the identity of *Cyperus megapotamicus* described by Kunth (1837). In terms of nomenclature, Kunth's species name is based on Anton Sprengel's (1828) *Scirpus megapotamicus*, which was based on specimen(s) from his father's herbarium, collected by Friedrich Sellow. A. Sprengel's name has also been cited in the synonymy of *Isolepis megapotamica* by Dietrich (1833), *Pycreus megapotamicus* by Nees von Esenbeck (1842), and, indirectly, *Chlorocyperus megapotamicus*, which was based on *Cyperus megapotamicus* by Rikli (1895). Therefore, all these names are new combinations based on the legitimate, previously published *Scirpus megapotamicus*, which is their basionym (Art. 6.10. of the ICN; Turland et al. 2018), thus being homotypic synonyms. In terms of taxonomy, Boeckeler (1867: 453–454) was the first to recognise that *Cyperus megapotamicus* sensu Kunth and *Scirpus megapotamicus* A. Spreng. belong to different taxa, by writing: '*C. megapotamicus* Kunth l. c. p. 10. – *Scirpus megapotamicus* A. Spreng. in herb. Reg. Berol., nec planta homonyma ej. in Tentam. Suppl. descripta, nec illa herbarii patris, quae Rhynchosporae species. – *C. nematodes* Schrad. Chamisso in sched. – *Pycreus* N. ab E. l. c. p. 6'. Later, Boeckeler (1873: 632), in the protologue of *Rhynchospora luzuliformis*, cited '*Scirpus megapotamicus* C. Spreng. herb. – *Rhynchosp. nova spec.*? (dubia) Ej. in Herb. Berolin. – *R. Kunthii β composita?* aut forsan genus proprium, *Hygrocharis*, N. ab E. Cyp. brasil. p. 147. Brasilia (Sellow). Montevideo (Otto)'; thus maintaining *Cyperus megapotamicus* sensu Kunth in *Cyperus* and treating *Scirpus megapotamicus* A. Spreng. as a species of *Rhynchospora*.

Although Kunth's misapplication of Sprengel's name had been recognised by Clarke (1886: 68, 1903: 248), Kükenthal (1936: 345) and Hauman and Vanderveken (1917: 202), the usage of this name and its synonyms varies widely in the literature. This usage, in the literature and databases, can be summarized as follows: 1) *Cyperus megapotamicus* (A. Spreng.) Kunth (Hauman and Vanderveken 1917, Barros 1960); 2) '*C. megapotamicus* Kunth' (Steudel 1855, Boeckeler 1867, Grisebach 1879, Clarke 1886, 1903, Maury 1889, Niederlein 1890, Hicken 1908, 1910, Barros 1929, Osten 1931, Kükenthal 1936, Chebataroff 1942, Herter 1949–1956, Foster 1958, Rambo 1959, Eiten 1963, Bertels 1966, Guaglianone et al. 1996, 2008, Goetghebeur and Strong 1997, Simpson 1998, Irgang and Gastal Jr. 2003, Camelbeke et al. 2007, Alves et al. 2009, Rodriguez et al. 2018, Flora do Brasil 2020, GBIF 2020, IPNI 2020, Tropicos® 2020); 3) '*C. megapotamicus* (A. Dietr.) Kunth' (Govaerts et al. 2007, 2015, The Plant List 2013, Silva 2017, Silva et al. 2018, 2019a, b); 4) '*Pycreus megapotamicus* Nees' (Clarke 1886, 1908, Maury 1889, Lindman 1901, Pfeiffer 1927, Osten 1931, Kükenthal 1936, Herter 1949–1956, Muasya and Simpson 2002, IPNI 2020); 5) '*P. megapotamicus* (Kunth) Nees' (Goetghebeur 1989, Guaglianone 1995, Guaglianone et al. 1996, 2008, Goetghebeur and Strong 1997, Camelbeke et al. 2007, Trevisan et al. 2008, Alves et al. 2009, 2010, Shepherd et al. 2011, Rodriguez et al. 2018, Flora do Brasil 2020, Tropicos® 2020); 6) '*P. megapotamicus* (A. Dietr.) Nees' (Govaerts et al. 2007, 2015, Larridon et al. 2013, Reynders 2013, The Plant List 2013, Araújo et al. 2014, Silva 2017, Araújo and Trevisan 2018, GBIF 2020); 7) '*Chlorocyperus megapotamicus* (A. Dietr.) Rikli' (Govaerts et al. 2007, 2015, The Plant List 2013, Flora do Brasil 2020, Tropicos® 2020).

In the present paper we provide a complete revision of these species names, their identities, nomenclature and typification, in order to disentangle the confusion maintained around *Cyperus megapotamicus* as described by Kunth (1837) and as determined by its nomenclatural type.

Material and methods

This work is based on standard herbarium techniques, literature review and analysis of specimens deposited at K, P and R. Additional information, including detailed data and images for the specimens and names examined, has been consulted in the following databases: Flora do Brasil 2020, GBIF, IPNI, JSTOR Global Plants (<https://plants.jstor.org>), The Plant List and Tropicos. Locations of known but unseen duplicates of specimens are included. Barcode numbers are cited consistently whenever available. The terminology used in the descriptions is based on Kukkonen (1994) and Lucero and Vegetti (2012).

Taxonomic and nomenclatural treatment

1. *Rhynchospora megapotamica* (A. Spreng.) Pfeiffer (1943, p. 129).

Basionym: *Scirpus megapotamicus* Sprengel (1828, p. 4).

Based on the same type: *Isolepis megapotamica* (A. Spreng.) Dietrich (1833, p. 132). – *Cyperus megapotamicus* (A. Spreng.) Kunth (1837, p. 10). – *Pycreus megapotamicus* (A. Spreng.) Nees von Esenbeck (1842, p. 6). – *Chlorocyperus megapotamicus* (A. Spreng.) Rikli (1895, p. 563).

Protologue: 'Ad fluv. magn. [Rio grande] Brasil. Sello'.

Type: Brazil, 'Rio Grande', locality not indicated, s.d., F. Sellow s.n. (holotype B [destroyed], photo F neg. 12153 image!, left-hand specimen; Fig. 1A). 'Rio Grande', Herbier Impérial du BRÉSIL N.° 134 = F. Sellow s.n. (lectotype P00267466!, **designated here**; Fig. 1B). Rio Grande do Sul, Pântano Grande, 30°13′44.75″S, 52°21′46.08″W, 20 Dec. 2011, P. J. S. Silva Filho 1463 (superseded neotype ICN00029395 image!, designated by Silva Filho et al. (2017: 182); isoneotype NY n.v.).

Taxonomic synonyms: *Rhynchospora kunthii* var. *composita* Nees von Esenbeck (1842, p. 147). – *Hygrocharis luzuliformis* Nees von Esenbeck (1842, p. 143, as '*luzulaeformis*' [name],

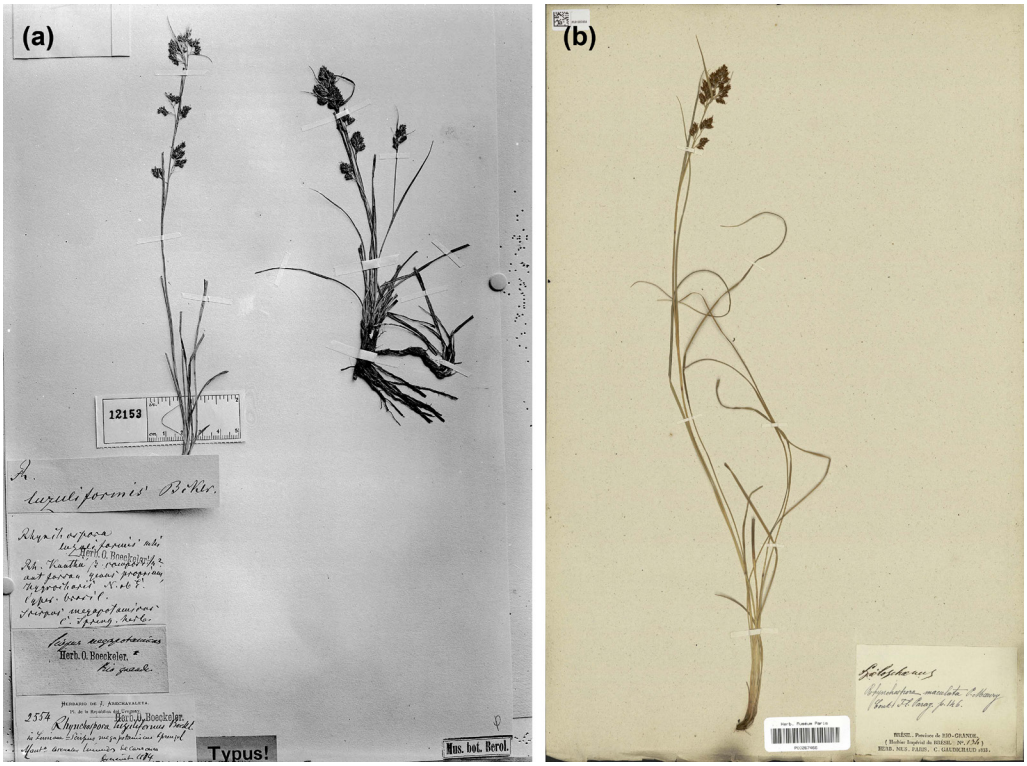

Figure 1. *Rhynchospora megapotamica* (A. Spreng.) H. Pfeiff.: (a) F. Sellow s.n. (B† [F neg. 12153], left-hand specimen), original material of *Scirpus megapotamicus* A. Spreng. and also original material of *R. luzuliformis* (Nees) Boeckeler. (b) Herbier Impérial du BRÉSIL no. 134 = F. Sellow s.n. (P00267466), syntype of *R. maculata* Maury and possible duplicate of original material of *S. megapotamicus*. Source: Botanischer Garten und Botanisches Museum Berlin-Dahlem (A), MNHN – Paris (B).

147 [description]). – *Rhynchospora luzuliformis* (Nees) Boeckeler (1873, p. 632).

Protologue: 'In Brasilia: Sellow in Herb. Reg. Berol.'

Type: Brazil. Locality not indicated, s.d., F. Sellow s.n. (B, holotype [destroyed]). Rio Grande do Sul: Pedro Osório, BR 116 km 565, 31°55′47.9″S, 52°44′05.3″W, 31 Oct 2006, R. Trevisan et al. 686 (neotype ICN00014956 image!, designated by Silva Filho et al. (2017: 182)).

– *Rhynchospora maculata* Maury (1889, p. 146, t. XLIII A).

Protologue: 'In pratis humidis planitiei ad Pirayu-bi, Septembr., n. 457'.

Type: Paraguay. 'Plaine de Pirayu-bi, dans les praires humides', 1 Sep 1874, B. Balansa 457 (lectotype P00267468!, **designated here**; isolectotype K000632426 image!). Other syntypes: Brazil. 'Rio Grande', Herbier Impérial du BRÉSIL N.° 134 = F. Sellow s.n. (P00267466!; Fig. 1B); Uruguay. Banda Oriental, *A.* St.- Hilaire Catal. C² N° 2057 (P00267471!); idem, A. St.-Hilaire Catal. C² N° 2144 (P00267470!); Uruguay. Montevideo, 'Ile S. Gabriel', 3 Nov 1855, A. Courbon s.n. (P00267467!).

– *Rhynchospora luzuliformis* var. *elongata* Kuntze (1898, 336).

Protologue: 'Paraguay: Rio Tebicuari'.

Type: Paraguay. 'Suedl. Paraguay', Sep 1892, C. E. O. Kuntze 88 (lectotype NY00051554 image!, **designated here**; probable isolectotype US02255080 image! [Kuntze 87]).

– *Rhynchospora luzuliformis* var. *subcapitata* Kuntze (1898, p. 336).

Protologue: 'Paraguay: Villa Florida etc., Uruguay: Sierra de Solis'.

Type: Paraguay. 'Villa Florida', 2 Oct 1892, C. E. O. Kuntze 86 (lectotype NY00051556 image!, **designated here**). Other syntype: Uruguay. 'Sierra de Solis', Nov 1892, C. E. O. Kuntze s.n. (NY00051555 image!) (Zanoni and Schofield 1981).

Notes

Rhynchospora megapotamica belongs to *Rhynchospora* sect. *Luzuliformes* Kükenthal (1950: 183), being characterized by perennial life form, caespitose-rhizomatous, with culms trigonous, flexuous, narrow; leaves 1.5–2.0 mm wide, flat and narrow; synflorescences with 2–4 paniculodia; spikelets grouped in fascicles, pluri-(6-)flowered, fusiform to ovoid-lanceoloid, obtuse at apex; all flowers bisexual, nearly all fertile; rachilla among flowers shortened, straight and rigid; glumes membranaceous, shortly mucronate, loosely imbricate, the two lowest glumes sterile; stamens 3; style long, deeply bifid;

stylopodium depressed, semilunate, with the same width as the apex of the achene, decurrent along margins of achene; hypogynous bristles absent; achene orbicular-obovate, turgid-biconvex, transversely undulate-rugose (from Kükenthal 1950, Silva Filho et al. 2017, Silva Filho 2018). *Rhynchospora megapotamica* was described in detail by Silva Filho et al. (2017) and Silva Filho (2018), being distinct from other species of *R.* sect. *Luzuliformes* by the following combination of characters: rhizomes 0.8–2.1 mm diam., elongate, leaves with two parallel vinaceous lines along the margin of abaxial leaf surface, spikelets no longer than 4 mm, glumes straw yellow to brownish, stylopodium 0.2–0.4 mm long (Silva Filho et al. 2017). The species is known from the states of Santa Catarina and Rio Grande do Sul in Brazil, and also from Argentina, Paraguay and Uruguay. According to Silva Filho et al. (2017), it is confined to dry and rocky grasslands of Pampas, and rarely found in Campos de Cima da Serra (high altitude grasslands of south Brazilian mountain ranges). Alves et al. (2009, 2010) cited Prance et al. 9409 (FLAS237714 image!, INPA [26545] image!, L3775850 image!, MG039812 image!, MO-2582922 n.v., NY01200328 image!) as belonging to *R. megapotamica*. However, this specimen was collected in a cloud forest in the state of Roraima in Brazil, summit of Serra da Lua, 1400 m. This disjunction seems to be improbable (but see notes below under *Cyperus jaeggii*) and was not been commented by Silva Filho et al. (2017). Prance's collection belongs to *Rhynchospora*, but its identity must be confirmed.

Most of the Sellow specimens of Cyperaceae in B were destroyed, including those cited above. Among the negatives of the Field Museum, taken from the specimens in Berlin before the World War II, the photo F neg. 12153 shows two specimens mounted together: 1) the one on the left is associated with an original label annotated by Kurt Sprengel with 'Scirpus megapotamicus * Rio Grande', which agrees with the protologue of *Scirpus megapotamicus* and denotes that it most likely is an original material used by A. Sprengel, as had been pointed out by Boeckeler (1867); and 2) the one on the right must be associated with the label of J. Arechavaleta 2554, collected in 'Montevideo, arenales húmedos de Carrasco, Diciembre 1874', with four duplicates at MVM (accession [6547] – 3 sheets, and MVM [s.n.]) and one at ZT-00072244. Among historical collections from Brazil, we have found a single specimen of *R. megapotamica* labelled Herbier Impérial du BRÉSIL N.° 134 (P00267466), which is a syntype of *R. maculata* and most likely a duplicate of the original material used by Sprengel. As demonstrated by Moraes (2020a, b), most of the specimens of the Herbier Impérial du Brésil at Paris are Sellow's collections. Sellow's specimen in question (P00267466) perfectly matches the protologue of *S. megapotamicus*, closely matches its destroyed type specimen at B† (F neg. 12153; Fig. 1) and therefore is selected here as lectotype.

Dietrich (1833: 132) transferred *Scirpus megapotamicus* to *Isolepis* R. Br., as *I. megapotamica* (A. Spreng.) A. Dietr., reproducing literally the description of A. Sprengel, which was presented, however, in an altered sequence of characters.

Nees von Esenbeck (1842) described *Hygrocharis luzuliformis*, based on another collection of Sellow at B, being the basionym of *Rhynchospora luzuliformis* (Nees) Boeckeler. Although no duplicate of the original material of *H. luzuliformis* has been located to date, this material might be found either at CGE (Cyperaceae set of the private herbarium of Nees von Esenbeck) or LE (from a set of herbarium Nees; Stafleu and Cowan 1981), which have not been checked in person (the absence of such specimens at LE was reported by curators in personal communication). The identity of *H. luzuliformis* as belonging to the same taxon currently accepted as *R. megapotamica* was recognised by Boeckeler (1873), Osten (1931), Pfeiffer (1943) and Kükenthal (1950), who had analyzed Sellow's collections in Berlin. However, Kükenthal stated in a letter to Osten (1931: 220) that he had not checked the original material of *Scirpus megapotamicus* A. Spreng.

The treatment of Cyperaceae for the Flora of Paraguay by Maury (1889) was mainly based on collections of Benedict Balansa. In the protologue of *Rhynchospora maculata*, Maury did not designate a type; hence all collections cited are syntypes. Among them, the specimen Balansa 457 at P is selected as the lectotype of Maury's species name because it is the best preserved, annotated by Maury, and has at least one duplicate already located in another herbarium.

According to Zanoni (1981) and Zanoni and Schofield (1981), the private herbarium of Otto Kuntze was purchased for the New York Botanical Garden by Andrew Carnegie, after Kuntze's death in 1907. Among the type specimens of monocotyledonous taxa described by Kuntze in his 'Revisio Generum Plantarum', those of the varieties of *R. luzuliformis* are found at NY. Clarke (1908), under *R. luzuliformis*, cited Kuntze 86, 87, 88, 89. Nevertheless, none of these specimens located so far is annotated by Clarke, which indicates that their duplicates might be housed elsewhere. Two specimens of *R. luzuliformis* var. *elongata* have been found: Kuntze 88 (NY00051554), which bears a label annotated by Kuntze with '88/Rhynchospora luzuliformis Boeck var elongata OK/Suedl. Paraguay/Ix. 92'; and Kuntze 87 (US02255080), which bears two labels annotated by Kuntze with '87 Rhynchospora luzuliformis Boeckeler', and 'Süd-Paraguay/Ix 92'. Although the labels of both specimens lack the statement 'Rio Tebicuari' mentioned in the protologue, and Kuntze 89 remains unlocated, the specimen NY00051554 is chosen as lectotype because it is the best preserved and bears the varietal name annotated by Kuntze.

Similarly, specimens of the two syntypes of *Rhynchospora luzuliformis* var. *subcapitata* have been located at NY: Kuntze 86 (NY00051556), with an original label annotated by Kuntze with '86/Rhynchospora luzuliformis Boeckeler/Villa Florida, Paraguay/2/x 92'; and Kuntze s.n. (NY00051555), with an original label by Kuntze with 'Rhynchospora luzuliformis Boeck./Uruguay Sierra de Solis Nov 1892'. Since these localities perfectly match the protologue, specimen NY00051554 is selected as lectotype because it is the best preserved.

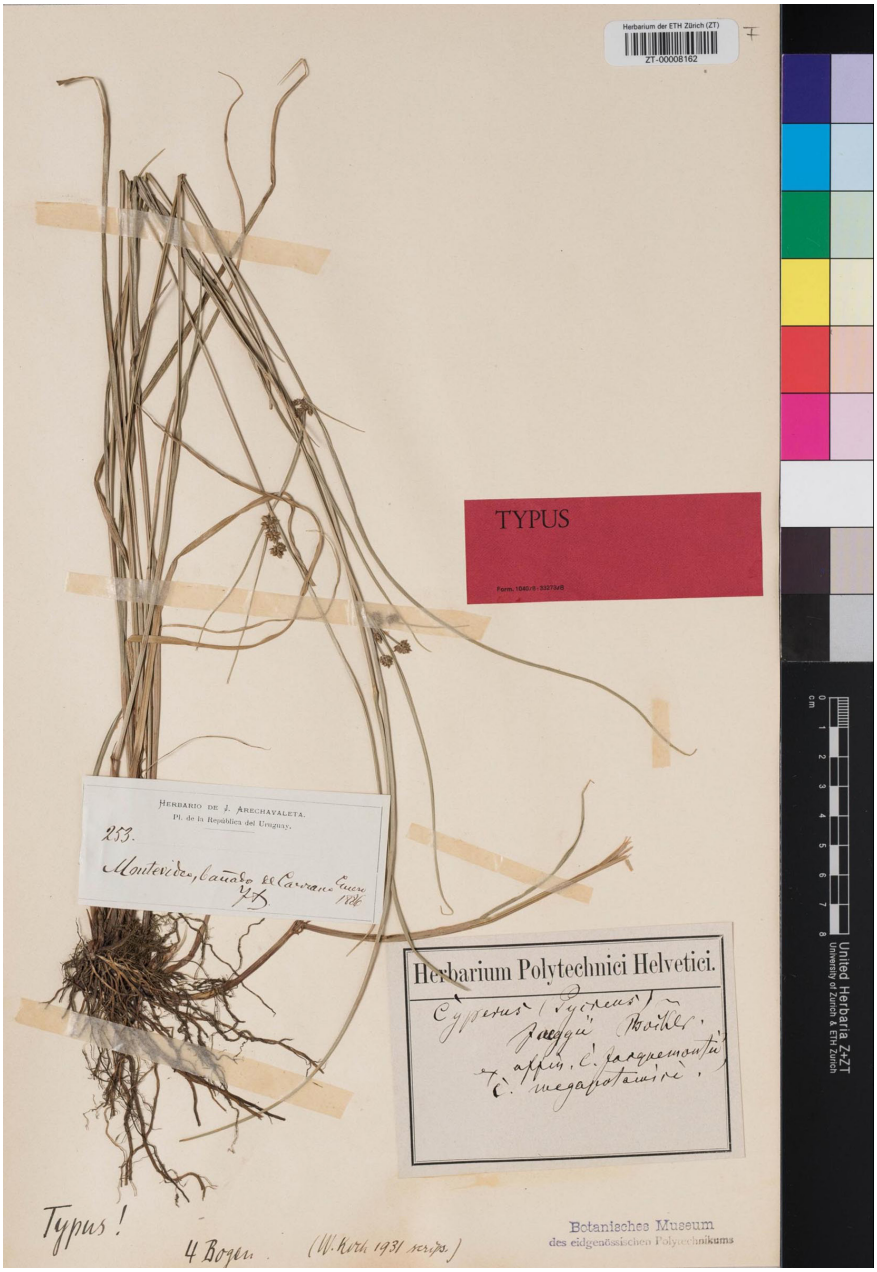

Figure 2. *Cyperus jaeggii* Boeckeler. J. Arechavaleta 253 (ZT-00008162), isolectotype. Source: Herbarium der ETH Zürich.

2. *Cyperus jaeggii* Boeckeler (1888, p. 2).

Based on the same type: *Cyperus megapotamicus* var. *jaeggii* (Boeckeler) Kük. ex Barros (1929, p. 360). – *Pycreus megapotamicus* var. *jaeggii* (Boeckeler) Guaglianone (1995, p. 137).

Protologue: 'Circa Montevideo leg. Arechavaleta.'

Type: Uruguay, Montevideo, bañados de Carrasco, Jan. 1886, J. Arechavaleta 253 (lectotype MVM [6546] image!, **designated here**; isolectotypes ZT-00008162 image! [Fig. 2], ZT-00008163 image!, ZT-00008164 image!, ZT-00008165 image!; probable isolectotypes MVM image! [Arechavaleta s.n.], US02222958 image! [Arechavaleta s.n.]).

Taxonomic synonyms: *Cyperus mauryi* Kuntze (1898, p. 333), **syn. nov.**

Protologue: 'Brasilia: Contendas in Minas Geraes. Paraguay: Balansa n. 672.'

Type: Paraguay, 'Caaguazu, dans les marais', 7 Nov 1874, B. Balansa 672 (lectotype P00254389!, **designated here**; isolectotypes G n.v., K!). Other syntypes: Brazil, Minas Gerais:

Conceição do Rio Verde, 'Contendas', Dec 1892, C. E. O. Kuntze 18 (NY00919225 image!); idem, 'Contendas', Dec 1892, C. E. O. Kuntze 18bis (K001174594 image!).

– *Pycreus nematodes* Schrad. ex Clarke (1902, p. 5), **syn. nov.**, basionym of *Cyperus megapotamicus* var. *nematodes* (Schrad. ex C. B. Clarke) Kük. ex Osten (1931, p. 131).

Protologue: 'Chile: R. Diguillin (Prov. Nuble), (philippi). Brasil. Australis (Chamisso n. 206); Minas Geraes, Paraguay et Uruguay.'

Type: Brazil. 'In insula S. Catharinae', L. K. A. von Chamisso s.n. [*35*] (lectotype LE image!, **designated here**; isolectotype B [L. K. A. von Chamisso s.n. [206] destroyed]). Other syntype: Chile. Prov. Ñuble, Río Diguillín, May 1878, F. Puga s.n. (SGO000010408 image!).

Notes

Cyperus jaeggii was placed by Kükenthal (1936: 347) in *C.* subgen. *Pycreus* section *Propinqui* (C. B. Clarke) Kükenthal (1936: 342). Clarke (1908: 95) indirectly placed it in *Pycreus* sect. *Propinqui* C. B. Clarke, since Clarke (1902) treated it as synonym of *Pycreus helvus* (Liebm.) C. B. Clarke, which was a member of that section. Boeckeler (1888) named the taxon after Jacob Jäggi, Swiss botanist, from 1870 at the Technical University of Zürich (Eidgenössische Technische Hochschule Zürich) (Stafleu and Cowan 1979), and described it based on specimens sent by Arechavaleta, recognising its affinity with '*C. megapotamicus* Kunth'. Kükenthal received specimens from C. Osten, and annotated them as a variety, i.e. '*Cyperus megapotamicus* var. *jaeggii*', which was first published by Barros (1929). Besides Kükenthal loc. cit., this taxon was accepted as a variety by several authors (Osten 1931, Barros 1938, 1960, Corcoran 1941, Herter 1949–1956, Marchesi 1984, Guaglianone et al. 1996, 2008, Trevisan et al. 2008, Rodriguez et al. 2018). Nevertheless, recent authors (Govaerts et al. 2007, 2015, Alves et al. 2009, Flora do Brasil 2020) considered it as a synonym of '*Cyperus megapotamicus* Kunth', therefore disregarding the varietal status and employing a nomeclaturally wrong name, as *C. jaeggii* is the next available name for the latter, which nomenclaturally belongs to *Rhynchospora*. The main morphological distinction between *C. jaeggii* (sensu Boeckeler and Kükenthal) and '*C. megapotamicus*' (sensu Kunth) is that the former has culms thicker, leaves wider and more developed, and inflorescences with anthelodia laxer than the latter. However, the morphological variability found within these two morphotypes is high, and there are several specimens that represent intermediate forms which make it difficult to establish definite limits between the main morphotypes. Such morphological differences were reported by Nees von Esenbeck (1842: 7), who commented on Sellow's specimen as being slender, long and truly filiform, whereas Hicken (1908) noted that Hauman's specimens collected in 'Sierra de la Ventana' (e.g. Hauman s.n. [SI n.v.]) have spikelets 4–5-flowered (versus 8-flowered) and leaves 2 mm wide and 'always folded upon themselves so that they appear at first sight to be very narrow', and Osten's (1931) stated that Osten 19322 (MVM) is a transitional form to var. *jaeggii*.

Silva (2017) argued that *Cyperus jaeggii* would deserve the status of species, as proposed by Boeckeler, thus being different from '*Cyperus megapotamicus*' sensu Kunth (Silva et al. 2019a). Among the differences between them, she listed the following: *C. jaeggii* has leaf blades developed, usually above 2 per stem (versus rarely developed in '*C. megapotamicus*'), inflorescence in lax anthelodium (versus anthelodium usually contracted in '*C. megapotamicus*'), achenes usually not apiculate (versus usually apiculate in '*C. megapotamicus*'); moreover, *C. jaeggii* does not form dense clumps (which is the case of '*C. megapotamicus*'), and it is reported only for the southern region of Brazil and temperate regions, while '*C. megapotamicus*' beyond these same locations also extends to tropical regions (e.g. Brazilian Cerrado). Silva highlighted the same differences already mentioned above, adding the difference in achenes and tussocks. Regarding the achenes being apiculate or not, Barros (1929) described variety *jaeggii* as bearing short-apiculate achenes, rather than non-apiculate ones. As for the plants forming dense tufts or not, Silva did not even mention *Cyperus maury* Kuntze and *Pycreus nematodes* C. B. Clarke, whose protologues state their occurrence in Minas Gerais, nor the specimens cited by Nees von Esenbeck (1842), Kükenthal (1936). Of them, Martius s.n. (from Minas Gerais), Kuntze 18 & 18bis (Minas Gerais), Dusén 11095 (Paraná), Lombardo-Marchesi 1908 (Uruguay) and Philippi s.n. (Chile), along with Löfgren s.n. (São Paulo), Herter 1541 (Uruguay), Eiten 1947 & 1978 (São Paulo), Skvortzov 61 (São Paulo), Pedersen 5350, 9092 & 9500 (Argentina), Hatschbach 12896 (Paraná), Hatschbach 25123 (Mato Grosso) and Longhi-Wagner 2441 (Rio Grande do Sul), are examples of collections that suit the circumscription of '*C. megapotamicus*' sensu Kunth, but do not form dense tufts (at least it is not seen in the dried specimens). Moreover, when comparing the descriptions of *C. jaeggii* and '*C. megapotamicus*' given by Silva (2017), its is clear that most of the characters, even the quantitative ones, overlap.

Therefore, *Cyperus jaeggii* Boeckeler is accepted here as the correct name for '*Cyperus megapotamicus*' sensu Kunth ≡ '*Pycreus megapotamicus*' sensu Nees, circumscribed in a broad sense, i.e. including *Cyperus mauryi* and *P. nematodes* as synonyms. Varieties are not accepted because of morphological intergradations and because there is no populational study available that would demonstrate whether the differences found in different populations, or localities, are the result of genetic variability, or a mere plasticity. Further evidence is provided by several specimens collected in a same region or locality, which show the morphological differences described earlier, e.g. Bettfreund 18 & 22 (Buenos Aires), Schulz 1322 & 1322a (Colonia Benítez), Malme 434 & 439 (Porto Alegre) and Arechavaleta 253, Osten 6486, 6508, 16052 & 16053, Rosengurtt 1172 (Montevideo, Carrasco).

Cyperus jaeggii is a perennial herb, caespitose-rhizomatous, 33–90 cm tall; culms 31.5–85.5 cm long, 0.4–1.3 mm diam., filiform, trigonous to subtrigonous, smooth, few-leaved;

leaves 0.6–28.5 × 0.6–1.9 mm, reduced to a sheath to developed, linear-lanceolate, glabrous, flat to conduplicated, smooth, slightly scabrous at apex, margins and on the midrib abaxially; sheaths red, 2.5–23.5 cm long; bracts of inflorescence 2–3, unequal, the basal 1.5–20.0 cm × 0.4–1.4 mm; inflorescences pseudolateral to terminal, 0.9–4.5 × 0.9–3.0 cm, with anthelodia lax to crowded together; primary rays 1–4, the basal ones 1–5 cm long, usually lacking; secondary rays lacking; spikelets 3–15, in spikes or glomerules, 3.5–14.0 × 1.6–2.8 mm, lanceolate to oblong-lanceolate, 6–24-flowered; rachilla 0.3–0.6 mm wide, slightly flexuosus to flexuosus, not winged; fertile glumes 1.4–2.2 × 1.1–1.5 mm, boat-shaped, ovate to oblong-ovate, 3–5-nerved (including the keel), with apex blunt, and sides pale-brown to brown to brown-yellowish; stamens 2–3, rarely 1; anthers 0.3–0.7 mm, linear, connective short; style 0.3–1.0 mm long, bifid; stigma 0.5–1.7 mm long; achenes 0.8–1.1 × 0.6–0.7 mm, obovoid, biconvex, with puncticulate surface, short to conspiscuously apiculate, subestipitate, pale brown to dark brown (from Boeckeler 1888, Barros 1929, Osten 1931, Kükenthal 1936, Silva 2017).

Cyperus jaeggii is reported from Distrito Federal and the states of Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, Paraná, Rio Grande do Sul, Santa Catarina and São Paulo in Brazil, as well as from Argentina, Bolivia, Chile, Paraguay, Surinam and Uruguay. It is an amphibious species mainly occurring in swamps, or at least in humid soils. Goetghebeur and Strong (1997) recorded with doubt the occurrence of '*Cyperus megapotamicus*' Kunth in Surinam, which later has been included without doubt in Camelbeke et al. (2007). The specimen F. H. F. Oldenburger et al. 758 (U1297800) is the only one located from Surinam, annotated by Gordon C. Tucker 2002 as correctly determined as '*Cyperus megapotamicus* Kunth'. This collection is listed by Oldenburger et al. (1973) as occurring in 'hygromorphic high-grass and shrub formation with palms in depressions', which is similar to the 'veredas' (Cerrado wetlands) in Brazil, i.e. 'in springs or headwaters of water courses, where there are hydromorphic soils associated with humid grassy and swampy fields, in a valley bottom, with or without sparse shrubs in the surroundings, of gallery forest and buritis (*Mauritia flexuosa* L.f.), and formed mainly by typical vegetation of sedges, grasses and some shrubs' (Pott 2007), where *C. jaeggii* was collected in areas of Mato Grosso do Sul and Minas Gerais. Independent of the broader circumscription adopted here, the former '*Cyperus megapotamicus* Kunth', as circumscribed by Kükenthal (1936), could not be taken as a macro-endemic species, i.e. restricted to Uruguay, northern Argentina, Brazil (south or Rio Grande do Sul, Santa Catarina and Paraná) and Paraguay, as assumed by Irgang and Gastal Jr. (2003).

In the protologue of *C. jaeggii*, Boeckeler (1888) stated 'Species insignis ex affin. C. Jacquemontii, C. megapotamici./ Circa Montevideo leg. Arechavaleta'. According to Osten (1931), Boeckeler described this species from specimens sent to him by Arechavaleta, collected in 'bañados de Carrasco', being numbered '253' in herbarium MVM. Actually, in MVM, there are two specimens that partially agree with the protologue and Osten's remarks: 1) annotated with 'Cyperus Jaeggii Böck nov. sp./Mont^{deo} Banados de Carrasco/Enero 1886/JA'; and 2) annotated with '253. Cyperus Jaeggii Bockeler nov. sp./ex aff. C. Jacquemontii et C. megapotamica/Montevideo, bañados de Carrasco Enero/1886/JA' and with label of 'Herbario del Museo de Historia Natural de Montevideo – 6546'. The latter specimen is selected as lectotype because it is the best preserved and has the label with more detailed information matching the protologue. The other specimen at MVM, though not numbered 253, and the one at US, also without number 253 and not annotated with 'bañados de Carrasco', are taken here as likely duplicates of a single collection since the inflorescences of these specimens are comparatively small, not yet well developed, as pointed out by Osten (1931). In ZT, Arechavaleta 253 is mounted in four sheets, of them ZT-00008162 is the only one with label of the 'Herbario de J. Arechavaleta' annotated with '253./Montevideo, bañado de Carrasco Enero 1886/JA' and label of 'Herbarium Polytechnici Helvetici' annotated with 'Cyperus (Pycreus) Jaeggii Böcklr. ex affin. C. Jacquemontii, C. megapotamici' (Fig. 2).

In the protologue of *Cyperus mauryi*, Kuntze (1898) cited his own collections from 'Brasilia: Contendas in Minas Geraes' and 'Paraguay: Balansa n. 672', which are therefore syntypes. The collection Balansa 672 is the best choice for lectotypification because it is numbered and represented in at least three herbaria, and encompasses the best specimens. The specimen P00254389 is here selected as lectotype because it is the best preserved and its digital image is available in databases *Sonnerat* and GBIF. Specimen Kuntze 18 at NY bears an original label annotated by Kuntze with '18/Cyperus Mauryi OK./Pycreus Mauryi Clarke msc/(n. sp.?)/= Balansa N° 672/672 = 'C. megapotamicus Kunth' Maury/Contendas, Minas/Brasil, Dec. 92', whereas specimen Kuntze 18bis at K bears a label by Kuntze annotated with '18bis/xII. 92/ Contendas, Minas Geraes, Brasilia', and annotated by Clarke with 'Pycreus nematodes C.B. Clarke/31 Aug. 1894/Comm. Sept. 1894'.

Pycreus nematodes was described by Clarke (1902) in a paper devoted to the Cyperaceae of Chile. In the introduction, Clarke informed that in 1900 he was contacted by 'Dr. J. Philippi' (i.e. Julio Philippi Bihl, grandson of Rudolph [Rodulfo] Amandus Philippi; Kabat and Coan (2017); however, this is a mistake since at that time Julio Philippi was still a law student, and in further sentences Clarke mentions 'Dr. Philippi's types', 'numerous papers of Dr. Philippi', therefore R. A. Philippi), who requested Clarke to publish a revision paper of all the Chilean Cyperaceae. By accepting this task, Clarke received from Karl Reiche, then recently hired by the Section of Botany of the National Museum of Natural History of Santiago de Chile, specimens (several being only fragmentary) 'of nearly all the new species lately described by Dr. Philippi', and relied on the catalogue of the vascular plants of Chile by Friedrich [Federico] Heinrich Eunom Philippi (1881), Rudolph's son. In the taxonomic treatment, Clarke extracted, from his manuscript on Cyperaceae, the

Chilean species, 'verifying and correcting these by comparison with Dr. Philippi's types'. The examined specimens were indicated for each accepted species and, unless otherwise mentioned, those from Chile were cited as originated from 'Philippi', either with or without a number.

Clarke named *Pycreus nematodes* based on a specimen collected by Adelbert von Chamisso, ascribed by Nees von Esenbeck (1842: 6) to '*Cyperus nematodes* Chamisso Schrad. in Schedis' in the synonymy of '*Pycreus megapotamicus*', which was also cited by Boeckeler (1867: 454) as '*C. nematodes* Schrad. Chamisso in sched.', thus being a herbarium name coined by Schrader. In the protologue, Clarke indicated the following provenance: 'Chile: R. Diguillin (Prov. Nuble), (Philippi). Distrib. Brasil. Australis (Chamisso n. 206); Minas Geraes, Paraguay et Uruguay'. The specimen 'Chamisso 206' would be a natural choice for lectotypification, but it was destroyed in Berlin. However, a well preserved duplicate has been located in Herbarium Chamisso at LE, which is annotated as 'Cyperus nematodes +/flor. Bras./Schrader = megapotamicus/NE 1842/35 Brasil: leg. Cham Hb. Cham' and perfectly matches the protologue. Regarding uncited specimens annotated by Clarke as *Pycreus nematodes*, only Kuntze 18bis, from Minas Gerais, and Anonymous s.n. [Prince Maximilian zu Wied], collected in the border of Bahia with Minas Gerais, 'Rio Belmonte [Rio Jequitinhonha] in uliginosis' (K000632080) (Moraes et al. 2013, 2016), have been located. The specimen collected in Chile, from Rio Niguillín, attributed by Clarke as a Philippi collection, was actually collected by Federico Puga Borne. The corresponding specimen deposited at SGO (SGO000010408; fragmentary) has two labels: 1) annotated as 'Scirpus megapotamicus (Scirpus) Spr.'; and 2) annotated as 'Cyperus mucronatus Rottb./8 [in pencil]/Fed. Puga/Diguillin/5. 1878'. The latter label would explain why *Cyperus mucronatus* Rottb. was listed by Philippi (1881). Evidence that F. Puga is the collector of the specimen cited by Clarke can be tracked from the guide of the National Museum of Natural History of Santiago (Museo Nacional de Santiago de Chile 1878), which informed that Federico Puga Borne, then student of medicine, was hired in 1877 as helper for 1.5 years, to incorporate and catalog plants of the foreign herbarium and to prepare collections for exchange (Muñoz Schick 1991); additionally, F. Puga B. is acknowledged as collector of plants in Diguillín, in 1875 and 1878 (Puga Borne 1879). Moreover, Rudolph Philippi, or his son Federico, has not collected plants in the region of Rio Dighillín (Taylor and Muñoz-Schick 1994). Similarly, in the protologue of *Cyperus leptophyes* C. B. Clarke, the following information is cited: '*C. laetus* herb. Philippi n. 11, non Presl', 'Chile: – R. Diguillin (Prov. Nuble), (Philippi n. 11)'. The corresponding specimens at SGO (SGO000000811, SGO000000812, SGO000000813) perfectly match the protologue and are clearly annotated as F. Puga's collection.

Additional material examined and/or cited (Fig. 3)

Argentina, Prov. Buenos Aires: Buenos Aires, Bettfreund 18 (not located; B[†]), Bettfreund 22 (not located; B[†]; as var. *jaeggii*); idem, Barros 265 (not located; as var. *jaeggii*); Dep. Tornquist, Sierra de la Ventana, 18 Mar 1884, Niederlein 604 (SI n.v.); Dep. Vicente López, 28 Feb. 1926, Barros 358 (US; as var. *jaeggii*); idem, 19 Dec 1926, Barros 1661 (SP n.v.; as var. *jaeggii*); idem, 1 Jan 1928, Barros 1935 (SI n.v.; as var. *jaeggii*). Prov. Chaco: Dep. 1° de Maio, Colonia Benítez, flor color blanquecino, forma aglomerados densos, Dec. 1934, Schulz 1322a (SI n.v.); idem, en esteros, entre juncos altos, forma aglomerados densos, Dec 1936, Schulz 1322 (SI n.v.; as var. *jaeggii*). Prov. Cordoba: La Falda to Cosquin, km 8, gravelly river bed, with perennial grasses and sedges, 800 m, 9 Jan 1983, Goetghebeur 4826 (GENT n.v., MO n.v., US). Prov. Corrientes: Dep. Mburucuyá, 'Estancia 'Santa Teresa', 15 Feb 1951, Pedersen 1018 (CTES n.v., MO n.v., P, SI n.v., U, US); idem, in tussocks, in the swamp of the 'estero' Santa Lucia, barely accessible, 7 Jan 1963, Pedersen 1916 (NY n.v., P, SI n.v., U, US; as var. *jaeggii*); idem, Dep. Empedrado, Estancia 'La Yela', Canada Ahomá, low wet ground, 9 Apr 1969, Pedersen 9092 (CTES n.v., L, MBM, P, SI n.v., US); idem, Dep. Santo Tomé, Estancia 'Garruchos', swamp, 22 Oct 1954, Pedersen 2931 (CTES n.v., P, SI n.v., US); idem, potrero Curuzu, campos pantanoso, 7 Feb 1972, Krapovickas et al. 21257 (P, ZT n.v.); idem, Dep. Mercedes, Estancia 'Itá Caabó', wet ground by the arroyo Sarandí, 6 Feb 1960, Pedersen 5350 (CTES n.v., L, SI n.v., WAG); idem, Macrosistema Iberá, Estancia Rincón del Diablo, Laguna Yacare y arroyo Itati, 1 Dec 1998, Arbo et al. 8076 (ALCB, CTES n.v., UPCB n.v.). Prov. Entre Rios: Concordia, Est. Agron., terreno húmedo, 22 Jan 1927, A. Burkart 954 (SI n.v., US). Bolivia, Prov. Andrés Ibánez: Santa Cruz, along road from Santa Cruz to Samaipata, 3 km SW of Angostura, 700 m, 25 Jan 1987, Nee 33795 (LPB n.v., MO n.v., NY n.v.); idem, 3.5 Km NW of center of Santa Cruz, in wet spot, 400 m, 26 Nov 1990, Nee 40015 (MO n.v., NY n.v.). BRAZIL. Distrito Federal: 3 km S. of Planaltina, Cerrado, 975 m, 7 Nov 1965, *Irwin et al. 10045* (NY, UB n.v.), *Irwin et al. 10046* (MO n.v., NY, UB n.v.). Goiás: Bela Vista de Goiás, 16°57′24.23″S, 48°51′35.70″W, 13 Jan. 2009, Resende 1052 (UFG); Serra do Caiapó, ca 25 km (straight line) SW of Caiapônia, gallery forest, adjacent brejo and nearby cerrado and campo limpo, 'Brejo', 800 m, 1 May 1973, Anderson 9561 (CM n.v., MO n.v., NY – 2 sheets, UB n.v.). Mato Grosso: Alto Araguaia, Córrego Lageado, brejo margens córrego, 14 Feb 1974, Hatschbach 34187 (CTES n.v., MBM, MO n.v., SI n.v., Z n.v.). Mato Grosso do Sul: Rio Sabe on road between Batáguaçu [Bataguassu] and Porto Figeira [Figueira], dense clumps in shallow water, 24 Feb 1970, Koyama et al. 13772 (K, NY, RB – 2 sheets); Amambaí, Rio Panduí, do brejo, 500 m, 13 Feb 1983, Hatschbach 46188 (MBM); idem, BR-386, Rio Amambaí, 21 km de Amambaí, 22°56′42″S, 55°13′20.4″W, brejo graminoso, com nascentes ao longo do rio, solo argiloso, hidromórfico, 20 Mar 2005, Pott et al. 7573 (CGMS n.v., ICN); Aquidauana, Fazenda Feliz, campo graminoso úmido com *M. flexuosa* em Cerrado, 2 May 2012, Moreira et al. 737 (BHCB n.v., CGMS n.v.); Brasilândia, Reserva Cisalpina, 21°15′27″S, 51°57′41″W, nascente com *Mauritia flexuosa* em solo encharcado, 19 Dec 2012, Moreira et al. 1302

(BHCB n.v., CGMS n.v.); Maracajú, Fazenda Jaboticaba, 21°33′26″S, 55°32′10″W, campo graminoso úmido com *M. flexuosa* em Cerrado, 8 Mar 2013, Moreira et al. 1405 (BHCB n.v., CGMS n.v.); Nioaque, Rodovia BR-060, km N de Nioque a Sidrolândia, 21°08′14″S, 55°46′46″W, 215 m, brejo de várzea em cerradão, solo hidromórfico com matéria orgânica, 5 Sep 2003, Pott et al. 6512 (CGMS n.v., ICN); Paranaíba, Fazenda Ponte Nova (Fazenda do Lageado), nascente de córrego que desagua no Córrego Lageado, 19°50′09.4″S, 51°32′18.2″W, 430 m, 11 Nov 2004, Pott et al. 7278 (CGMS n.v., ICN); Rio Brilhante, Rio Anhandui, do brejo, 23 Oct 1970, Hastchbach 25123 (CTES n.v., MBM, NY). Minas Gerais: Belo Horizonte, Engenho Nogueira, brejo, 15 Dec 1939, Mello Barreto 10426 (BHCB n.v., NY); Itamonte, Serra do Picu, 'Sumpfwiesen', Schenck 1448 (B†); Minas Novas, 'editis campis ad Fanado', Jul 1818, Martius s.n. (M0244295; cited by Nees von Esenbeck under *Pycreus megapotamicus*); Uberlândia, Clube Caça e Pesca Itororó, vereda, 22 Sep 1997, Araújo & Barbosa s.n. (FLOR0064363, HUFU [16597]); idem, 24 Oct 1997, Araújo s.n. (HUFU [16631]); idem, 8 Jan 2001, Amaral s.n. (FLOR0064434, HUFU [27860]), idem, Reserva Vegetal do Clube de Caça e Pesca Itororó, vereda, 19°00′21.1″S, 48°18′33.1″W, 26 May 2002, Oliveira 2633 (HUFU); idem, BR 050, à margem da estrada, vereda, 20 Oct 1997, Araújo s.n. (HUFU [16605], SPF [139719]); idem, rodovia Uberlândia-Prata, a 25 km do centro da cidade, vereda 2, 3 Nov 1997, Araújo s.n. (HUFU [16556], SPF [139676]); idem, Estação Ecológica do Panga, centro da vereda 3, 24 Sep 1998, Araújo s.n. (HUFU [17918]); idem, vereda 4, 19 Nov 1999, Lemos s.n. (HUFU [21907]); idem, estrada para Campo Florido, vereda 2, 12 Mar 1999, Barbosa 1847 (HUFU, SPF);idem, fundo direito da vereda 2, na estrada para Campo Florido, 8 Oct 1999, Araújo & Amaral 2779 (HUFU); idem, estrada para Campo Florido, vereda 2, próximo ao dreno, 20 Nov 1998, Amaral & Lemos s.n. (HUFU [18254], SPF[139718]); idem, Fazenda das Perobas, a 250 m da BR 497, km 18 de Uberlândia, vereda, 19°00′24.8″S, 48°27′32.9″W, 29 Oct 2002, Oliveira 1477 (HUFU), 22 Jan 2003, Oliveira 2513 (HUFU); Locality not indicated, 1845, Widgren s.n. (K001174595), Widgren s.n. (US02222976), Widgren 863 (not located), Widgren 864 (MO n.v.). Paraná: Arapoti, Rio das Cinzas, Barra do Perdizes, zona de cerrado,margem do rio, terreno algo brejoso, 11 Nov 1960, Hatschbach 6824 (L, MBM, SI n.v.); Balsa Nova, Ponte dos Arcos, 14 Feb 2006, Kozera & Kozera 3047 (ICN, UPCB n.v.); Campo Mourão, Oct 1978, Lima 444 (FUEL n.v., MBM); idem, 1978, Lima 479 (CTES n.v., MBM); Guarapuava, in loco paludoso, 10 Jan 1911, Dusén 11095 (US); Ponta Grossa, bañado on the bottom of the Vila Vellia [Velha] slope, Anphiteatro, km 79, a few dense clumps found on swampy clay deposit, large sedge swamp, 5 Mar 1970, Koyama et al. 13849 (NY, SP); idem, Anfiteatro, zona de campo, depressões brejosas com solo turfoso, 5 Mar 1970, Hatschbach & Koyama 24009 (CTES n.v., MBM, MO n.v., NY, SI n.v., Z n.v.); idem, Vila Velha, em banhado, 11 Oct 1976, Dombrowski 6508 (CTES n.v., MBM, SI n.v.); Tibagi, Rio Tibagi, 10 Oct 1965, Hatschbach 12896 (MBM, NY, P, UB n.v., US). Rio Grande do Sul: Bom Jesus, Fazenda Bernardo Velho, in paludosis, 13 Jan 1947, Rambo s.n. (MO n.v., NY00622364 ex PACA [34798]); Cambará do Sul, in paludosis, 29 Jan 1948, Rambo s.n. (NY00622368, NY00622369 ex PACA [36655]; as var. *jaeggii*); Campo Bom, em banhado, 29°39′41.6″S, 51°02′39.1″W, 1 Mar 2014, Silva Filho 2045 (ICN); Cruz Alta, Malme 1188 (not located; B†; as var. *jaeggii*); Esmeralda, banhado, 30 Dec 1978, Arzivenco 453 (ICN); Jaquirana, turfeira, 933 m, 7 Mar 2012, Silva Filho 1555 (ICN); Porto Alegre, Malme 434 (not located; B†; as var. *jaeggii*), Malme 439 (not located; B†); idem, Morro São Pedro, em campo úmido, 10 Nov 2008, Setubal & Trevisan 780 (ICN; as var. *jaeggii*); Quaraí, BR 293, em brejo, 30°26′51.2″S, 56°18′43.9″W, 18 Nov 2003, Hefler et al. 205 (ICN); idem, Cerro do Jarau, em turfeira, 30°12′06″S, 56°30′38.13″W, 17 Dec 2011, Silva Filho 1460 (ICN); Rio Pardo, Boa Esperança, s.d., Jürgens 40 (US); Santiago, BR 287, Santiago-São Borja, km 11, planta de banhado, 8 Jan 1991, Longhi-Wagner et al. 2422 (ICN); São José dos Ausentes, a 3 km do Monte Negro, 28°35′55.7″S, 49°58′35.8″W, banhado turfoso, 1262 m, 15 Jan 2009, Longhi-Wagner & Silveira 10720 (ICN); São Pedro do Sul, BR 287, comum no banhado, 8 Jan 1991, Longhi-Wagner et al. 2441 (ICN); Terra de Areia, banhado drenado, 29°33′11″S, 50°03′03.3″W, 18 Mar 2008, Trevisan 951 (ICN; as var. *jaeggii*); Vacaria, Estação experimental, comum no campo de solo argiloso úmido, 8 Jan 1997, Araújo 437 (ICN); Viamão, turfeiras da Faz. B. Caldas-Águas Claras, Jul 1979, Longhi-Wagner & Irgang s.n. (ICN [48168]); idem, Hospital Colônia de Itapuã, banhado com aspecto de turfeira, 30°21′40.1″S, 51°00′12″W, 9 Apr 2007, Trevisan & Boldrini 832 (FLOR n.v., ICN; as var. *jaeggii*); Locality not indicated, Herbier Impérial du BRÉSIL N.° 118 = Sellow s.n. (P00254383; Fig. 4D); 'Pampas', Tweedie 615 (K). Santa Catarina: Bom Jardim da Serra, Fazenda Invernada Grande, em brejo na baixada, 28°19′35″S, 49°40′53″W, 20 Apr 2012, Trevisan 1167 (FLOR n.v., RB); Lebon Régis, banhado, 900 m, 9 Jan 1962, Reitz & Klein 11916 (FLOR n.v., HBR n.v., L, NY, SI n.v., US); Matos Costa, Rod. SC-14, do brejo, 23 Feb 1972, Hatschbach & Koyama 29190 (CTES n.v., MBM, MO n.v., NY, SI n.v.); 'in insula S. Catharinae', Chamisso s.n. (B†; cited by Nees von Esenbeck under *Pycreus megapotamicus*) = 'Brasilia australis', Chamisso [206] (B†; syntype of *Pycreus nematodes* C. B. Clarke) = Chamisso [35] (LE, as '*Cyperus nematodes*'); idem, Eschscholtz s.n. (not located; B†; cited by Nees von Esenbeck under *Pycreus megapotamicus*). São Paulo: Atibaia, em brejo, 15 Oct 1976, Shepherd s.n. (UEC [11290]); Campinas, Cidade Universitária 'Zeferino Vaz', beira do lago, 25 Sep 1981, Vieira et al. s.n. (UEC [13020]); Itapetininga, Chacara Gomes, lugar humido, 10 Sep 1887, Löfgren ex 'Commissão Geographica e Geologica da Provincia de S. Paulo' 144 (P – 2 sheets, SP, US); Itirapina, at km 205 on Campinas-S. Carlos highway, 6 km NE of Itirapina, cerrado ticket, 14 Nov 1962, Skvortzov 61 (NY, UB n.v., US); Jundiaí, Serra do Japi, borda de lago no Sítio Filipino, 11 Nov 1996, Faria et al. 96/447

Figure 3. Geographical distribution of *Cyperus jaeggii* Boeckeler, as circumscribed here, in the South American continent.

(UEC); Mogi Guaçu, 'Campos das Sete Lagoas', Fazenda Campininha, side of brook in soaking soil, 21 Apr 1960, Eiten & Eiten 1947 (NY, SP n.v., UB n.v., US); idem, side of brook, moist soil, 22 Apr 1960, Eiten & Eiten 1978 (NY, SP n.v., UB n.v., US); São José do Barreiro, Serra da Bocaina, entrada para a Fazenda Pinheirinhos, beira de riacho, solo brejoso, 22 Jan 1996, Longhi-Wagner et al. 2968 A (UEC); São Paulo, 'Paturages secs près S.Paul', Saint-Hilaire Catal. C[1] N° 1160 (P00254384); Vitoriana, estrada em direção à Represa de Barra Bonita, brejo na margem do Rio Capivara, área alagada, 22°45'S, 48°27'W, 10 Dec 1994, Amaral & Bittrich 94/74 (UEC). State not indicated: Locality not indicated, s.d., Sellow s.n. (B[†], K000189927, LE – 2 sheets, P00254385, W as photo F neg. 31236; Fig. 4); idem, 'Brasilia', Sellow s.n. (not located; B[†]; cited by Nees von Esenbeck under *Pycreus megapotamicus*). Chile, Prov. Diguillín: Chillán, VIII Región, Estación Experimental Quilamapu, 25 Apr 1987, Ormeño-N. s.n. (SP [235191] n.v.). Paraguay, Prov. Central: near Villeta, swamp, 7 Dec 1969, Pedersen 9500 (C n.v., CTES n.v., L, MBM, P, SI n.v., US). Dep. Cordillera: 'Cordillerè de Peribébuy, dans les prairies humides', 25 Mar 1883, Balansa 4518 (G00039391, G00039392, P00254390). Prov. Misiones: Dep. Santiago, Estancia 'La Soledad', swamp, 24 Nov 1956, Pedersen 4407

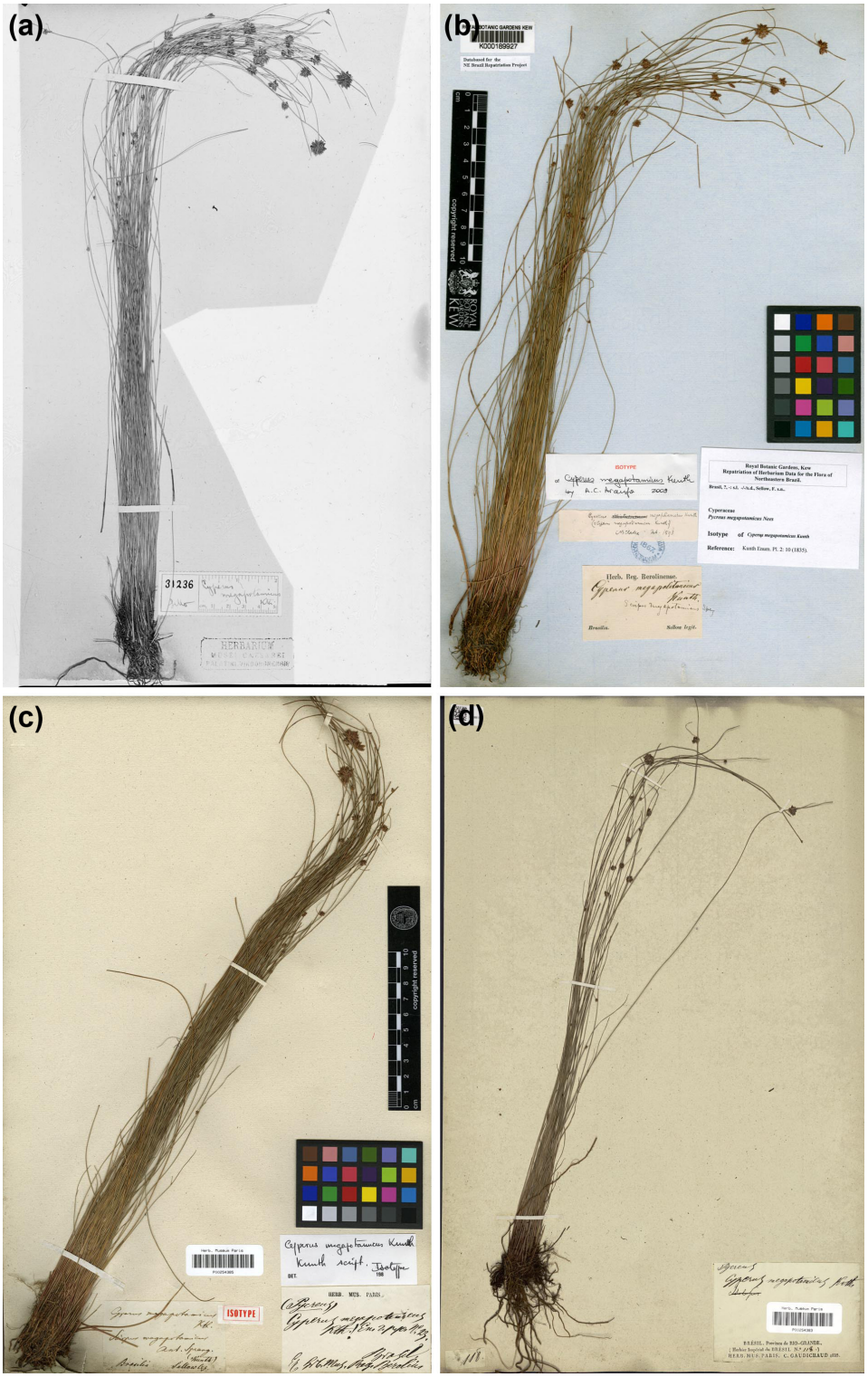

Figure 4. *Cyperus jaeggii* Boeckeler. Friedrich Sellow's specimens taken as [possible] 'type' of '*Cyperus megapotamicus* Kunth': (A) F. Sellow s.n. (W [F neg. 31236]). (B) F. Sellow s.n. (K000189927). (C) F. Sellow s.n. (P00254385). (D) Herbier Impérial du BRÉSIL N.° 118 = F. Sellow s.n. (P00254383). Source: Naturhistorisches Museum Wien (A), Royal Botanic Gardens, Kew (B), MNHN – Paris (C, D).

(CTES n.v., MO n.v., P, SI n.v., US); San Juan Bautista, wet meadow, swampy ground, 21 Dec 1965, Pedersen 7629 (L, SI n.v.; as var. *jaeggii*). Prov. San Pedro: Dep. Lima, Estancia 'Carumbé', swamp, 6 Oct 1967, Pedersen 8519 (C n.v., CTES n.v., L, NY n.v., P, SI n.v., US). Surinam, Sipaliwini savanna area on Brazilian frontier, open vegetation of *Mauritia flexuosa*, 280 m, 3 Jan 1969, Oldenburger et al. 758 (U). Uruguay Dep. Cerro Largo: Sierra Aceguá, Jan 1926, Herter in Herb. Osten 18676 (B†). Dep. Lavalleja: Minas, Penitentes, 17–22 Mar 1924, Herter in Herb. Osten 16939 (MVM). Dep. Maldonado: Piriápolis in dunis, locis paludosis, 28 Jan 1913, in fossis locis arenosis maritimis, 14 Jan. 1912, Osten 5714a (MVM; as var. *jaeggii*); idem, in dunis locis paludosis et fontanis, 28 Jan 1912, Osten 5714b (MVM, SI n.v.; as var. *jaeggii*); Socialis in ripa uliginosa, arroyo Maldonado, 25 Mar 1928, Osten 19322 (MVM, SI n.v.). Dep. Montevideo: Montevideo, Jan 1886, Arechavaleta 265 (US02222959; as var. *jaeggii*), Arechavaleta s.n. (US02222958; as var. *jaeggii*); idem, Punta Gorda, in paludosis, 10 Mar 1912, Osten 6013 (MVM, US; as var. *jaeggii*); idem, Balneario Carrasco, 16 Feb 1913, Osten 6486 (MVM); idem, Carrasco, 2 Mar 1913, Osten 6508 (MVM; as var. *jaeggii*), Mar 1921, Osten 16052 and 16053 (MVM); idem, Carrasco, 27 Feb 1937, Rosengurtt 1172 (SI n.v.; as var. *jaeggii*). Dep. San José: Barra de Santa Lucía, Mar 1926, Lombardo-Marchesi 1908 (P00254393); idem, Arechavaleta 4804 (SI n.v.); idem, in palustris herbis, 21 Jan 1930, Osten 21839 (MVM, SI n.v.); idem, Barra, 8/14 Feb 1932, Herter 1541 (AMD, MO n.v., P, RB, SI n.v., U, US, Z n.v.). Dep. Rocha: Aº La Pantanosa, rara in uliginosis – matas densas, 5 Feb 1938, Rosengurtt B 2457 (MVM [6098], SI n.v., US).

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Author contributions

Pedro Moraes: Conceptualization (lead); Investigation (lead); Writing – original draft (lead); Writing – review and editing (equal). **Alexander Sennikov**: Conceptualization (supporting); Investigation (supporting); Writing – original draft (supporting); Writing – review and editing (equal).

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