



Cenchrus pseudotriticoides (Poaceae: Panicoideae), a resilient pyrophyte grass from Central Madagascar

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Summary. A new combination is made placing *Pennisetum pseudotriticoides* in the genus *Cenchrus*. This species is common and often dominant in the southern part of central Madagascar, associated with inundation and fire, and withstanding high grazing. A description, a detailed plate, a map, and list of known specimens are provided.

Key Words. Africa, Cenchrinae, grazing, fire, Paniceae, *Pennisetum*.

Introduction

Endemic lineages provide a window into local evolutionary history. The comparatively high endemism of Poaceae in Madagascar indicates an ancient origin of its grass flora, while the endemic C₄ lineages serve as evidence of pre-human open canopy habitats (Vorontsova *et al.* 2016; Hackel *et al.* 2018). Open grasslands of central Madagascar have likely been shaped by the same fire and grazing disturbances as the African savannas (Solofondranohatra *et al.* 2020) but remain designated as secondary ecosystems in the latest vegetation classification by Gautier *et al.* (2018). Naming, classifying and characterising the common grasses of central Madagascar is important to reconstruct ecosystem history, plan conservation, and build species knowledge to support local livelihoods.

The traditionally delimited genera *Cenchrus* L. and *Pennisetum* Rich. are both ecologically significant across the tropics, characterised by bristles surrounding and subtending each spikelet, the whole structure deciduous as a unit (Clayton & Renvoize 1986). It has become increasingly clear that traditionally delimited *Cenchrus* originated from within *Pennisetum*, and both are now placed in the expanded genus *Cenchrus* in the Poaceae subfamily Panicoideae, tribe Paniceae, subtribe Cenchrinae (Chemisquy *et al.* 2010; Veldkamp 2014; Kellogg 2015; Soreng *et al.* 2017). Ten species of the united genus *Cenchrus* are listed for Madagascar by Bosser (1969), not including the cultivated crop pearl millet *Cenchrus americanus* (L.) Morrone (formerly *Pennisetum glaucum* (L.) R.Br.). All these species have names available under the genus *Cenchrus* except the sole endemic species, which is the subject of this study.

Cenchrus pseudotriticoides was originally named *Pennisetum triticoides* by Baker (1885). Camus (1947) published the replacement name *P. pseudotriticoides* as part of her grass inventory of the central Malagasy “prairies”, followed by a more extensive description (Camus 1950) where the species was characterised as “covering hard surfaces, withstanding bush fires, but very bad fodder”. The Malagasy *P. pseudotriticoides* was placed in synonymy under *P. hohenackeri* Hochst. ex Steud. by Clayton (Clayton & Renvoize 1982) but later accepted as a distinct species by Clayton *et al.* (2016). It differs from *P. hohenackeri* (now known as *Cenchrus hohenackeri* (Hochst. ex Steud.) Morrone) by its smaller height of 50 – 80 cm (vs 60 – 200 cm), more narrow panicles, few involucre bristles (vs numerous involucre bristles) subtending each spikelet, upper glume with absent to obscure veins (vs distinct primary and lateral veins), and a cartilaginous (vs membranous) upper lemma.

Today *Cenchrus pseudotriticoides* is a common roadside and village grass of south-central Madagascar. Recent ecological surveys by Solofondranohatra *et al.* (2020) found that its occurrence is associated with frequent fire, although it also resists grazing, becoming abundant in heavily grazed areas. The origin of the *C. pseudotriticoides* lineage is estimated to be around 1.8 – 2.5 Ma (Hackel *et al.* 2018) but is likely to be more recent since the most likely close relative *C. hohenackeri* was not included in the analysis. Here this species is assigned a name in the genus *Cenchrus*, and a summary of the data available on this species is presented. All specimens cited were seen by the author.

Key to close relatives of *Cenchrus pseudotriticoides*

1. Plant 50 – 80 cm tall; few involucre bristles subtending each spikelet; upper glume with absent to obscure veins; cartilaginous upper lemma. ***Cenchrus pseudotriticoides***
2. Plant 60 – 200 cm tall; numerous involucre bristles subtending each spikelet; upper glume with distinct primary and lateral veins; membranous upper lemma ***Cenchrus hohenackeri***

Cenchrus pseudotriticoides (*A. Camus*) Voronts. **comb. nov.** Type: Central Madagascar, Oct. 1881, *Baron* 683 (lectotype K000244663!, selected here).

<http://www.ipni.org/urn:lsid:ipni.org:names:77215737-1>

Basionym: *Pennisetum pseudotriticoides* A. Camus, *Rev. Int. Bot. Appl. Agric. Trop.* 27: 272 (1947). *Pennisetum triticoides* Baker (1885: 453). **nom. illegit.**, later homonym of *Pennisetum triticoides* (Poir.) Roem. & Schult. (Roemer & Schultes 1817: 877).

Densely caespitose *perennial*, firmly rooted. Culms erect; 50 – 80 cm tall. *Ligule* a fringe of hairs. Leaf-blades narrowly linear to filiform, 2 – 4 mm wide. *Panicle* spiciform, linear, 8 – 20 × 0.5 – 0.8 cm, the panicle branches accrescent to a central axis, the panicle axis angular, scaberulous. Spikelets subtended by an involucre of bristles. *Involucre bristles* easily deciduous with the fertile spikelets, 10 – 15 in one whorl, 12 – 25 mm long, with one conspicuously longer, flexible, glabrous. *Spikelets* sessile, lanceolate, dorsally compressed, 7 – 9 mm long, with two florets. *Lower glume* minute. *Upper glume* 1 – 1.5 mm long, the primary vein absent or obscure, the lateral veins absent. *Lower floret* male or sterile. *Lower lemma* membranous, ovate, 7 – 9-veined, acute, with palea. *Upper lemma* cartilaginous, lanceolate, 7 – 9 mm long, acute. Upper palea membranous. *Anthers* 3. Fig. 1.

DISTRIBUTION. Central Madagascar. Map 1.

SPECIMENS EXAMINED. MADAGASCAR. Antananarivo: Antananarivo, 1750 m, 23 Jan. 1975, *Croat* 29117a (MO, TAN); Antananarivo, *Service de l'Agriculture* 410 (TAN); Tsimbazaza, Jan. 1959, *Bosser* 12529 (P01913209); Lac Tsimbazaza, 25 Dec. 1920, *Decary* 134 (P01913190); Ambohipotsy, 16 Jan. 1921, *Decary* 227[a] (P01913191); Nanisana, 1 Feb. 1933, *Jardin Botanique de Tananarive* 324–72 (P01913208); Ambatofotsy, bord de la Sisaony, 18 Dec. 1959, *Peltier & Peltier* 1607 (P01913197); Antananarivo, Oct. 1965, *Rakotozafy* 400 (TAN); Antananarivo, 18 April 1907, *Rotureau* s.n. (P02662478); Antananarivo, Jan. 1916, *Waterlot* s.n. (P01913192); Ambohimanga, Nov. 1922, *Waterlot* 610 (P01913193); station forestière Antsampandrano, 1750 m, 23 Jan. 1975, *Croat* 29099a (P02662474); Manjakatempo, 22 Dec. 1950, *Benoist* 643

(P01913200, P03487870); Manjakatempo, 18 Dec. 1950, *Benoist* 666 (P01913204); Manjakatempo, 24 May 1951, *Benoist* 1914 (P01913201); Akidondona village, 1571 m, 24 April 2017, *Solofondranohatra, Razanatsoa & Randriantsara* SLC 828 (K, TAN); Malama maina, Ambatolampy, 1620 m, 25 April 2017, *Solofondranohatra, Razanatsoa & Randriantsara* SLC 837 (K, TAN); Mahazoarivo village, near Ihazolava, 1568 m, 26 April 2017, *Solofondranohatra, Razanatsoa & Randriantsara* SLC 858 (K, TAN); Malama maina, near Ilampy hotel, 1608 m, 26 April 2017, *Solofondranohatra, Razanatsoa & Randriantsara* SLC 892 (K, TAN); Andakana, 1251 m, 8 May 2017, *Solofondranohatra & Razanatsoa* SLC 1032 (K, TAN); Andakana, 1251 m, 8 May 2017, *Solofondranohatra & Razanatsoa* SLC 1034 (K, TAN); Antsirabe centre, 1600 m, Jan. 1913, *Perrier de la Bâthie* 10766 (P01913186); pentes du Tritriva, 1700 – 1800 m, 16 Nov. 1912, *Viguiet & Humbert* 1342 (P01913205, P02662481); Faratsiho, 3 July 1964, *Tateoka* 3556 (TAN); Merinaravatra, 28 March 1938, *Jardin Botanique de Tananarive* 3665 (P01913206, P01913207). **Fianarantsoa:** Fianarantsoa Rural, 1365 m, 25 Jan. 1975, *Croat* 29575 (MO, TAN); Fianarantsoa Rural, 1365 m, 25 Jan. 1975, *Croat* 29626 (MO, TAN); Fianarantsoa Rural, 1600 m, 28 Jan. 1975, *Croat* 30043 (MO, TAN); route Fianarantsoa – Antsirabe, 21 Jan. 1967, *Delhaye* 103 (P02662465); Fianarantsoa, prairies, March 1912, *Perrier de la Bâthie* 10875 (P01913187, P01913188). **Province not known:** *s. coll.* 10686 (P01913189); *s. coll.* 10688 (P01913195, P01913198); *Baron* 3204 (P01913202); June 1889, *Baron* 3254 (P01913203); Central Madagascar, Dec. 1883, *Baron* 3294 (lectoparatype, K000244662); 20 Jan. 1950, *Decary* 690 (P01913196); Central Madagascar, August 1880, *Parker* s.n. (lectoparatype, K000244626); *Scott-Elliot* 1730 (P01913199); *Scott-Elliot* s.n. (K000244664); 25 June 1964, *Tateoka* 3502 (TAN).

HABITAT. Sandy and silty river banks, open grassland, grazing lawns, trampled and heavily grazed locations, roadsides, 1000 – 2000 m.

CONSERVATION STATUS. Assessed here as Least Concern (LC) due to its widespread occurrence (IUCN 2001): extent of occurrence appears to be in excess of 20,000 km² and area of occupancy is above 2,000 km².

VERNACULAR NAME. Horompotsy, Tohiambazaha (Bosser 1969).

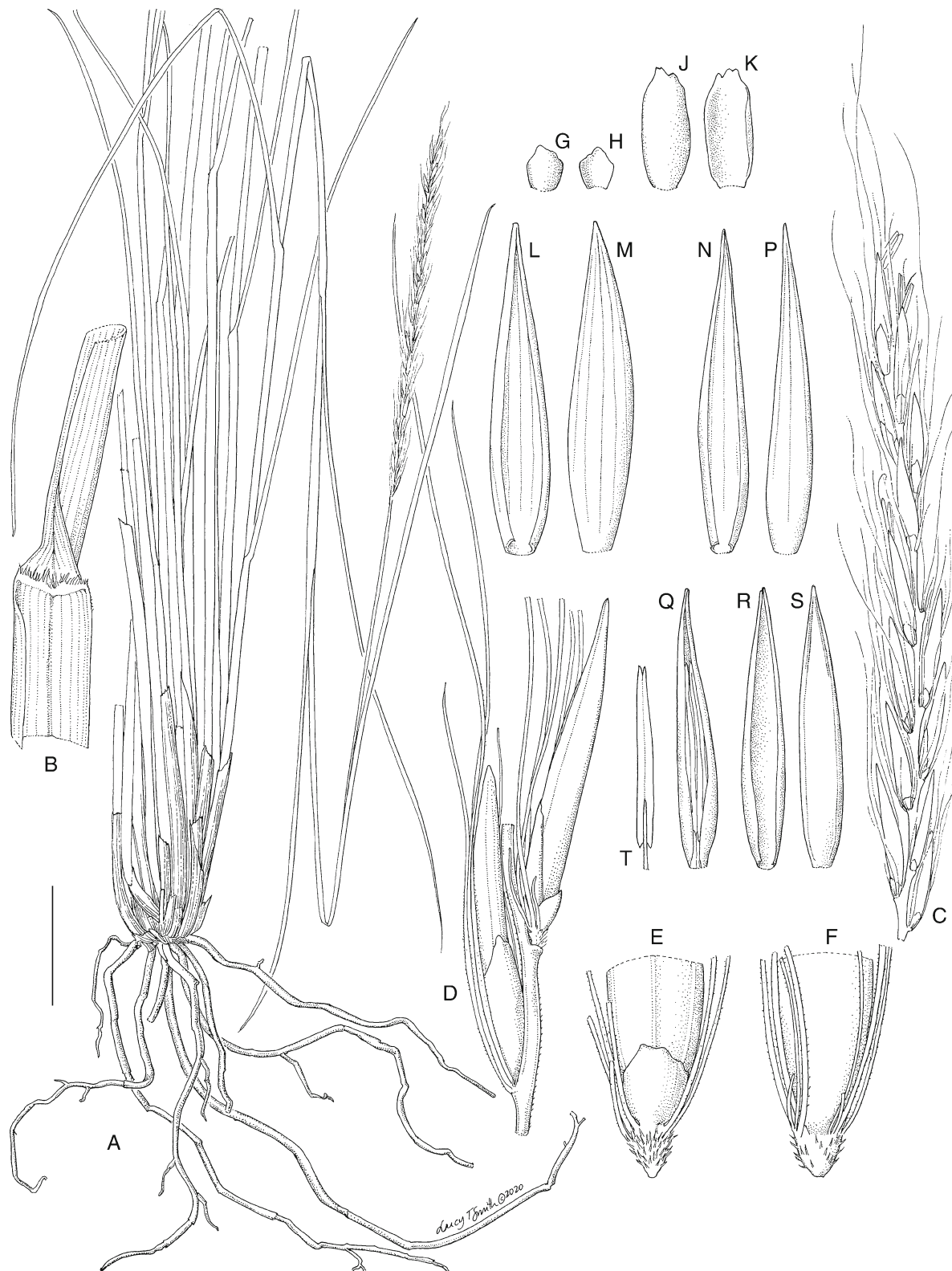
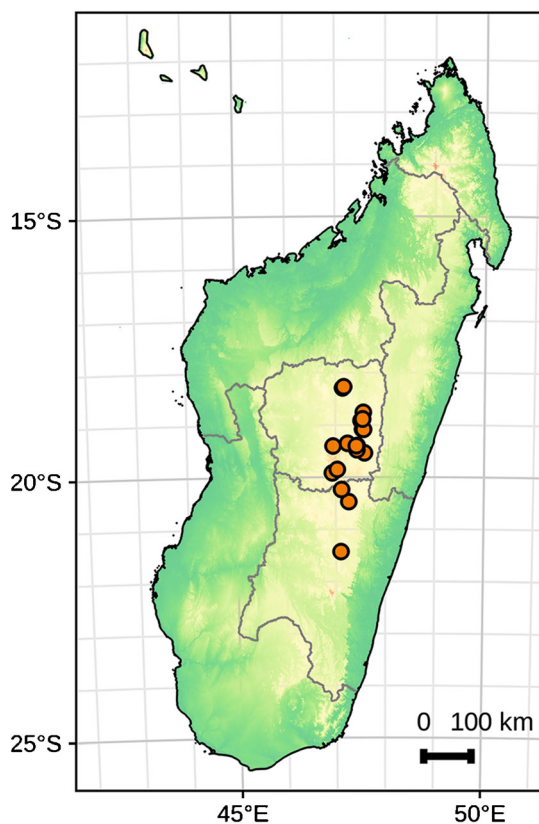


Fig. 1. *Cenchrus pseudotriticoides*. A habit, part of broader dense tussock removed; B ligule; C panicle; D panicle branch with two spikelets subtended by involucre of bristles; E basal part of spikelet showing callus and upper glume; F basal part of spikelet showing callus (lower glume removed); G lower glume, dorsal view; H lower glume, ventral view; J upper glume, dorsal view; K upper glume, ventral view; L lower lemma, ventral view; M lower lemma, dorsal view; N lower palea, ventral view; P lower palea, dorsal view; Q upper floret with palea removed; R upper lemma, ventral view; S upper palea, dorsal view; T stamen. Scale bar: A = 2 cm; B, D, G - T = 3.5 mm; C = 5 mm; E, F = 3 mm. Drawn from *Baron* 683. DRAWN BY LUCY T. SMITH.>



Map 1. Distribution of *Cenchrus pseudotriticoides* in Madagascar. Grey lines indicate major provinces. Green to yellow shading indicates elevation. DRAWN BY SARAH Z. FICINSKI.

USES. Effective for preventing soil erosion and limiting runoff due to its powerful roots. Poor fodder. (Bossier 1969).

NOTES. Dominant on some sandy alluvia and sandy ridges on the banks of rivers, can withstand temporary submergence (Bossier 1969). Covers vast areas (fide Perrier de la Bâthie 10875). The lectotype is selected due to its superior quality material and annotations on the sheet.

The type material of *Panicum triticoides* Poir. (Poiret 1816: 274) has still not been located following the search last conducted by Veldkamp (2014) and thus the application of *Pennisetum triticoides* (Poir.) Roem. & Schult. (Roemer & Schultes 1817: 877) and *Cenchrus triticoides* (Poir.) Veldkamp (2014: 71) remains unclear.

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