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Pandanaceae Specimens Relocated from the University of Neuchâtel (NEU), with Two New Synonymies

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16. CALLMANDER Martin W., Michel O. LAIVAO & Peter B. PHILLIPSON: Pandanaceae specimens relocated from the University of Neuchâtel (NEU), with two new synonymies

Introduction

In the context of a global revision of the family Pandanaceae in Madagascar for the *Flore de Madagascar et des Comores,* MOL, MWC and their colleagues, have described several species of *Pandanus* Parkinson from the island. The initial stages of this research on the systematics of Pandanaceae in Madagascar were conducted at the University of Neuchâtel (Switzerland) while MOL and MWC were doing their PhD dissertations under Prof. Philippe Küpfer's direction. The research on this paleotropical family was linked to the presence of Dr. Kim-Lang Huynh, a renowned Pandanaceae specialist, who was an Associate Professor at the University of Neuchâtel between 1976 and 2000. In 2008, when Prof. Küpfer retired, the entire Pandanaceae collection at the herbarium of the University (NEU), which is primarily focused on the European flora, was permanently transferred to the herbarium of the Conservatoire et Jardin botaniques de la Ville de Genève (G) which has an active research programme and specimen acquisition policy focused on tropical regions, and where MWC is now based. The gift comprised some 200 collections of Pandanaceae from Madagascar collected between 1996 and 1999 by MOL, MWC and their colleagues, of which eleven specimens are holotypes of *Pandanus* species described between 1997 and 2007 (Huynh, 1997, 1999; Laivao & al., 2000; Callmander, 2001; Callmander & al., 2001; Callmander & Laivao, 2002; Callmander & al., 2003a, 2003b; Laivao & al., 2006, 2007). While the holotypes have been incorporated into the general collection at G, several duplicates specimens (isotypes) were already present in the G herbarium and consequently these were given to Paris (P) or Missouri (MO) (Table 1). This note provides a complete listing of the locations of the type specimens for the 11 species described between 1999-2007 by the authors and their colleagues at NEU. Two species dating back to this period are now regarded as synonyms: *Pandanus masoalensis* Laivao & Callm. (≡ *Martellidendron masoalense* (Laivao & Callm.) Callm. & Chassot) and *Pandanus manongarivensis* Huynh. We provide a discussion of the delimitation of these species, along with original line drawings.

Table 1. –*Pandanaceae* holotypes transferred from NEU to G, with current repository of isotypes and currently accepted names. *M.* = *Martellidendron*, *P.* = *Pandanus*.

Collector(s) and number	Herbaria (protologue)	Herbaria (current)	Type of:	Currently accepted name
Callmander & Raveloson 114	holo-: NEU iso-: G, P, TAN	holo-: G iso-: MO, P, TAN	*P. gallinarum*	*M. gallinarum*
Callmander & al. 8	holo-: NEU iso-: TAN	holo-: G iso-: TAN	*P. masoalensis*	*M. karaka*
Laivao 2	holo-: NEU iso-: TAN	holo-: G iso-: TAN	*P. nosibicus*	*M. karaka*
Callmander & al. 37	holo-: NEU iso-: G, TAN	holo-: G iso-: P, TAN	*P. callmanderiana*	*P. callmanderiana*
Callmander & Laivao 57	holo-: NEU iso-: TAN	holo-: G iso-: TAN	*P. humbertii*	*P. humbertii*
Callmander & al. 33	holo-: NEU iso-: G, P, TAN	holo-: G iso-: MO, P, TAN	*P. kimlangii*	*P. kimlangii*
Callmander & Wohlhauser 144	holo-: NEU iso-: G, TAN	holo-: G iso-: P, TAN	*P. kuepferi*	*P. kuepferi*
Callmander & Laivao 59	holo-: NEU iso-: G, P, TAN	holo-: G iso-: MO, P, TAN	*P. marojejicus*	*P. marojejicus*
Callmander & Wohlhauser 141	holo-: NEU iso-: G, P, TAN	holo-: G iso-: P, TAN	*P. maromokotrensis*	*P. maromokotrensis*
Gautier & Chatelain 2648	holo-: NEU iso-: G, TAN	holo-: G iso-: P, TAN	*P. manongarivensis*	*P. sambiranensis*
Callmander & Wohlhauser 145	holo-: NEU iso-: G, P, TAN	holo-: G iso-: MO, P, TAN	*P. tazoanii*	*P. tazoanii*

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MOL: Université de Neuchâtel, Laboratoire de Botanique Evolutive, rue Emile-Argand 11, case postale 158, 2009 Neuchâtel, Switzerland. Current: Ministère de l'Environnement et des Forêts, BP 571, Ampandrianomby, Antananarivo 101, Madagascar.

PBP: Missouri Botanical Garden, P.O. Box 299, St. Louis, Missouri, 63166-0299, U.S.A. and Muséum national d'Histoire naturelle, Département Systématique et Evolution, UMR 7205, case postale 39, rue Cuvier 57, 75231 Paris, cedex 05, France.

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Systematics

Martellidendron gallinarum (Callm.) Callm. in Taxon 52: 756. 2003.

≡ *Pandanus gallinarum* Callm. in Bot. J. Linn. Soc. 137: 371. 2001.

Typus: Madagascar. Prov. Toamasina: PN de Mananara-Nord, 9 km east of Vavary, Beketra, 16º22'51"S 49º40'16"E, 300 m, 3.XI.1999, *Callmander & Raveloson 114* (holo-: G [G00303526]!; iso-: MO!, P [P00459652]!, TAN!).

Martellidendron karaka (Martelli) Callm. in Taxon 52: 756. 2003 (Fig. 1).

≡ *Pandanus karaka* Martelli in Webbia 4: 417. 1914.

Typus: Madagascar. Prov. Toamasina: Ivoilina, 1907, *Rollot 3* (holo-: FI [FI000997]!).

= *Martellidendron masoalensis* (Laivao & Callm.) Callm. & Chassot in Taxon 52: 756. 2003. ≡ *Pandanus masoalensis* Laivao & Callm. in Bot. Helv. 110: 43. 2000. **Typus: Madagascar. Prov. Toamasina:** Péninsule de Masoala, le long du chemin vers Maroangady, 15º19'08"S 50º03'43"E, 430 m, 26.XI.1996, *Callmander, Wohlhauser, Chassot & Laivao 8* (holo-: G [G00303 540]!; iso-: TAN!), **syn. nov.**

= *Pandanus nosibicus* Huynh in Bull. Soc. Neuchâteloise Sci. Nat. 120: 37. 1997. **Typus: Madagascar. Prov. Antsiranana:** Lokobe PA, Andranonankomba river, 13°25'13"S 48°19'00"E, 7.V.1996, *Laivao 2* (holo-: G [G00303539]!; iso-: TAN!) (synonymized by Callmander, 2001).

Observations. – Pandanus masoalensis Laivao & Callm. (≡ *Martellidendron masoalensis* (Laivao & Callm.) Callm. & Chassot) was the first species described by MOL and MWC in 2000. When we described this species, we followed B.C. Stone's species concept of *Pandanus karaka* Martelli (≡ *Martellidendron karaka* (Martelli) Callm.) (Stone, 1970), which included material with grouped infrutescences with up to 13 syncarps enlarged at base (8.5-14 cm in length), with pileus holding (2-)3 stigmata at apex. Later, on a visit to Florence Herbarium (FI), MWC was able to examine the type of this species and realized that the species had been misunderstood by Stone (1970: 113, Figs. 4a-e). His interpretation of species and the published illustrations correspond to a species of *Pandanus* sect. *Dauphinensia* H. St. John that we described as *P. kimlangii* Callm. & Laivao (Callmander & Laivao, 2002) (see Callmander, 2001 for more details). The typical *Martellidendron karaka* is characterized by a solitary syncarp (c. 20 cm in length) with pileus holding two stigmata forming a cross at apex (Fig. 1c, d). The morphology of the type of *M. karaka* Martelli is very similar to *M. masoalense* but initially we chose to maintain the two species based on the concave pileus of *M. masoalense* (vs. more flattened in *M. karaka*) (Fig. 1) and its occurrence at higher altitudes (ca 800 m) on the Masoala Peninsula and Marojejy (vs. altitudes of 0-10 m and occurring only near Maroantsetra). However, several new collections from the Mananara Reserve (at 200-400 m) are morphologically intermediate and suggest that the limits of *M. karaka* should be extended to include *M. masoalense*, which we now treat as a synonym.

Pandanus callmanderiana Laivao & Buerki in Adansonia 28: 278. 2006.

Typus: Madagascar. Prov. Toamasina: Tampolo FC, 8 km au Nord de Fénérive-Est, 5 m, 17°17'09''S 49°24' 22''E, 30.VII.1997, *Callmander, Laivao & Wohlhauser 37* (holo-: G [G00303537]!; iso-: P!, TAN!).

Pandanus humbertii Laivao, Callm. & Buerki in Adansonia 29: 42. 2007.

Typus: Madagascar. Prov. Antsiranana: Marojejy PN, 2e campement, 14°25'52''S 49°45'41''E, 780 m, 6.XI.1998, *Callmander & Laivao 57* (holo-: G [G00303538]!; iso-: TAN!).

Pandanus kimlangii Callm. & Laivao in Bot. Helv. 112: 51. 2002.

Typus: Madagascar. Prov. Toamasina: Réserve de Zahamena, 17°31'28''S 48°45'29''E, 1210 m, 24.7.1997, *Callmander, Laivao & Wohlhauser 33* (holo-: G [G003035 43]!; iso-: MO!, P [P00741927, P00741929]!, TAN!).

Pandanus kuepferi Callm., Wohlh. & Laivao in Candollea 58: 66. 2003.

Typus: Madagascar. Prov. Antsiranana: Réserve Intégrale n° IV du Tsaratanana, 14°03'09''S 48°56'23''E, 1750 m, 6.XII.1999, *Callmander & Wohlhauser 144* (holo-: G [G00303544]!; iso-: P!, TAN!).

Pandanus marojejicus Callm. & Laivao in Candollea 58: 67. 2003.

Typus: Madagascar. Prov. Antsiranana: Réserve du Marojejy, 14°26'51''S 49°44'34''E, forêt basse du sommet de Marojejy, 2100 m, 8.XI.1998, *Callmander & Laivao 59* (holo-: G [G00303536]!; iso-: MO!, P!, TAN!).

Pandanus maromokotrensis Callm. & Wohlh. in Adansonia 23: 53. 2001.

Typus: Madagascar. Prov. Antsiranana: Réserve Intégrale n° IV, massif du Tsaratanana, sur pente dans la forêt dense, 14°03'09''S 48°56'23''E, 1750 m, 29.XI.1999, *Callmander & Wohlhauser 141* (holo-: G [G00303541]!; iso-: P[P00459635]!, TAN!).

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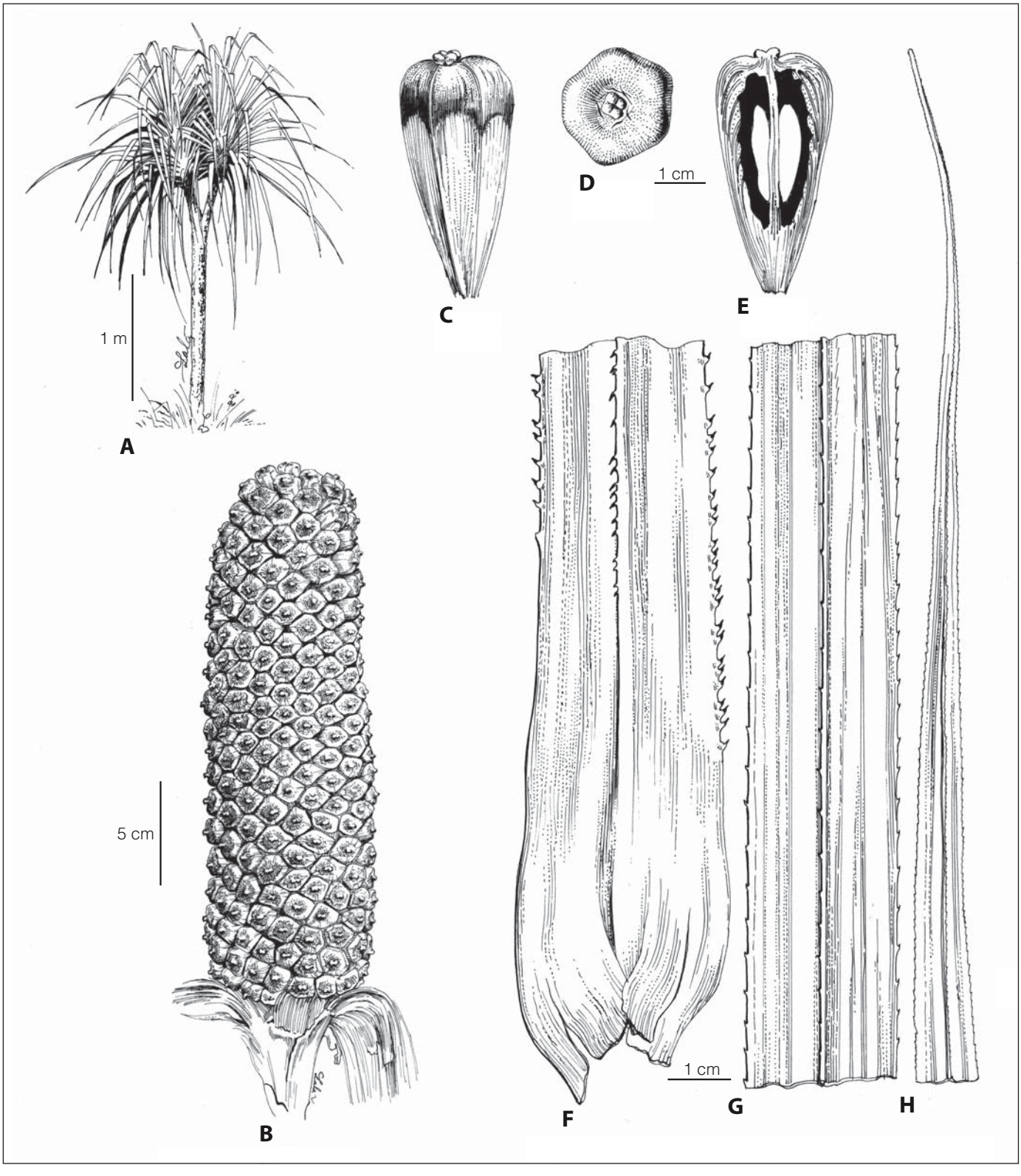

Fig. 1. – *Martellidendron karaka* (Martelli) Callm. **A.** Habit; **B.** Syncarp; **C.** Lateral view of a drupe; **D.** Apical view of a drupe; **E.** Longitudinal section of drupe showing the endocarp; **F.** Basal part of a leaf; **G.** Middle part of a leaf; **H.** Apical part of a leaf.

[**A, C-H:** *Callmander & Bemandiny 125,* TAN & photo; **B:** *Callmander & al. 7,* TAN] [Drawings: R. L. Andriamiarisoa]

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Pandanus sambiranensis Martelli in Mém. Inst. Sci. Madagascar, Sér. B, Biol. Vég. 3: 54. 1951 (Fig. 2).

Typus: Madagascar. Prov. Antsiranana: massif du Manongarivo, bords de Ramena et toute la région du Sambirano, 300-1000 m, [13°52'S 48°51'E], XI.1909, *Perrier de la Bâthie 10934* (lecto-: FI [FI001083: 1 sheet exl. st. material]!; isolecto-: P[P00219106]!) (lectotypified by Callmander & al., 2011).

= *Pandanus manongarivensis* Huynh in Candollea 54: 153. 1999. **Typus: Madagascar. Prov. Antsiranana:** Manongarivo, Besinkara, 14º04'S 48º17'E, 300-350 m, 13.V.1995, *Gautier & Chatelain 2648* (holo-: G [G0030 3535]!; iso-: P!, TAN!), **syn. nov.**

Observations. – One of us (MWC) was able to study the holotype of *P. sambiranensis* on a visit to FI. This has enabled us to re-interpret the original description of the species and to better understand certain morphological characters that were not evident in the rather poor type material that we had examined at the Paris Herbarium (P). The species is characterized by a narrow drupe (10-15 mm in width) with a dome-like apex (Fig. 2), and sub-coriaceous leaves with relatively long marginal prickles (2-3 mm). This morphology is identical to that of the type material of *P. manongarivensis* and the latter is therefore considered as a synonym. *Pandanus sambiranensis* is known only from below 800 m in the humid north-western region (the Sambirano Domain sensu Humbert, 1951, 1955).

Pandanus tazoanii Callm. & Wohlh. in Adansonia 23: 50. 2001.

Typus: Madagascar. Prov. Antsiranana: Réserve Intégrale n° IV, massif du Tsaratanana, sur une crête orientée au sud-ouest, 14°05'48''S 48°62'00''E, 1800 m, 6.XII. 1999, *Callmander & Wohlhauser 145* (holo-: G [G00303 541]!; iso-: MO!, P [P00741934, P00741939]!, TAN!).

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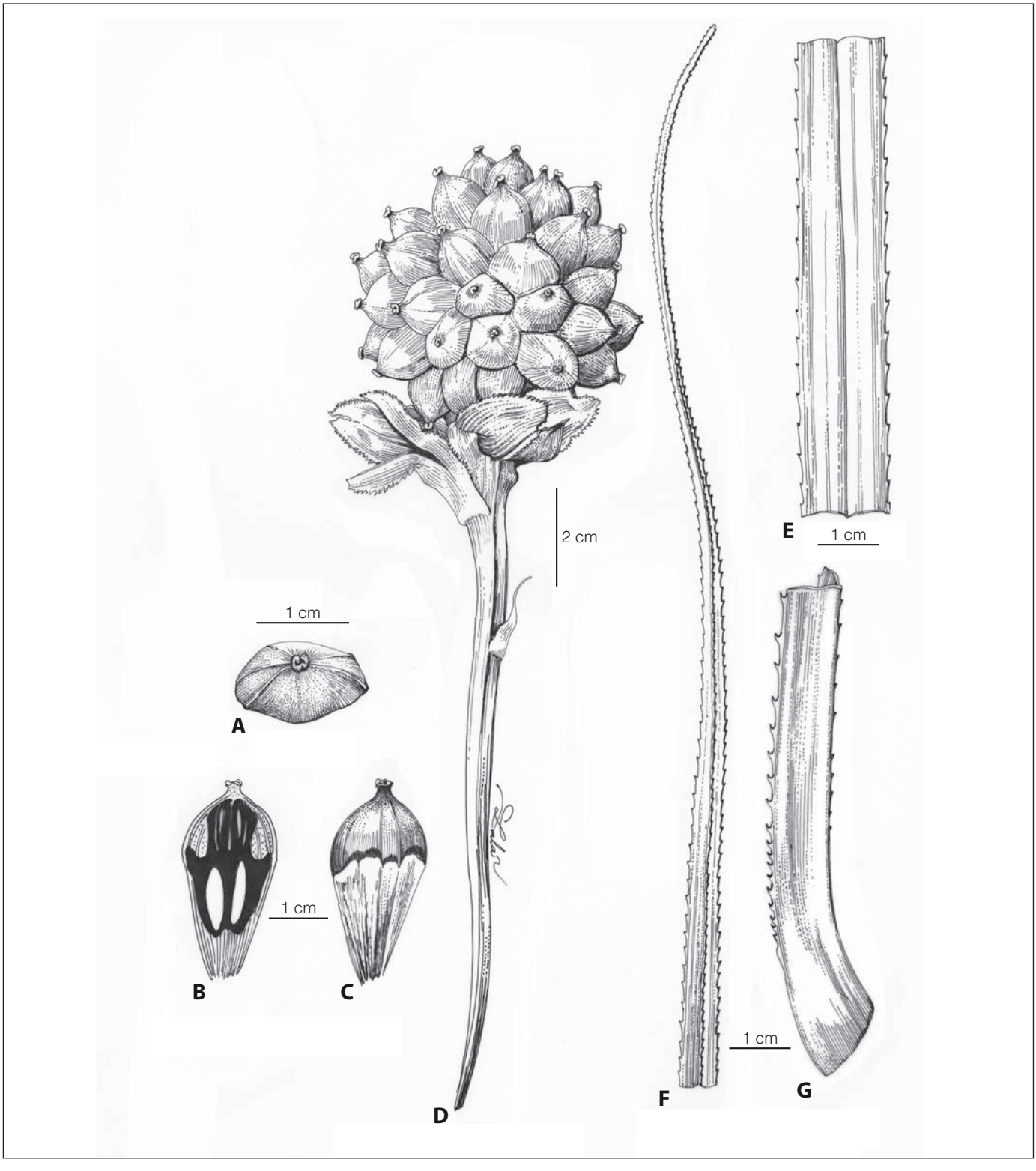

Fig. 2. – *Pandanus sambiranensis* Martelli. **A.** Apical view of a drupe; **B.** Longitudinal section of drupe showing the endocarp; **C.** Lateral view of a drupe; **D.** Syncarp; **E.** Middle part of a leaf; **F.** Apical part of a leaf; **G.** Basal part of a leaf.

[**A-D:** *Gautier & Chatelain 2648,* TEF; **E-H:** *Perrier de la Bâthie 10934,* P] [Drawings: R. L. Andriamiarisoa]

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