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Endemic families of Madagascar. XIV. A new restricted range species of *Pentachlaena* H. Perrier (Sarcolaenaceae) from central Madagascar

Tefy H. Andriamihajarivo, Porter P. Lowry II & George E. Schatz

Abstract

ANDRIAMIHAJARIVO, T.H., P.P. LOWRY II & G.E. SCHATZ (2016). Endemic families of Madagascar. XIV. A new restricted range species of *Pentachlaena* H. Perrier (Sarcolaenaceae) from central Madagascar. *Candollea* 71: 167-172. In English, English and French abstracts. DOI: <http://dx.doi.org/10.15553/c2016v712a1>

Pentachlaena vestita Andriam., Lowry & G.E. Schatz (Sarcolaenaceae) is described as a new species from open, frequently burned vegetation on quartzite substrate on Mt. Ambatolahinanahary in central Madagascar. It can be distinguished from *Pentachlaena latifolia* H. Perrier, which it most closely resembles, by several foliar characters including leaf size and venation, and especially by the presence of a dense stellate-strigose indument on the inflorescences, flowers, and fruits, and which almost totally obscures the abaxial leaf surface. A description of the new species is accompanied by a line drawing and photos taken in the field, along with a preliminary assessment of its risk of extinction following the IUCN Red List Categories and Criteria, which indicates a status of "Endangered".

Résumé

ANDRIAMIHAJARIVO, T.H., P.P. LOWRY II & G.E. SCHATZ (2016). Familles endémiques de Madagascar. XIV. Une nouvelle espèce de *Pentachlaena* H. Perrier (Sarcolaenaceae) à répartition restreinte de la région centrale de Madagascar. *Candollea* 71: 167-172. En anglais, résumés anglais et français. DOI: <http://dx.doi.org/10.15553/c2016v712a1>

Pentachlaena vestita Andriam., Lowry & G.E. Schatz (Sarcolaenaceae) est décrite comme une nouvelle espèce des formations ouvertes sur quartzites, fréquemment brûlée du Mt Ambatolahinanahary, dans la partie centrale de Madagascar. L'espèce peut être distinguée de *Pentachlaena latifolia* H. Perrier, à laquelle elle ressemble le plus, par plusieurs caractères foliaires, en l'occurrence la taille et la nervure des feuilles, et surtout par la présence d'indument étoilé-strigeux dense sur les inflorescences, fleurs et fruits, et qui tapisse presque complètement la surface abaxiale des feuilles. La description de cette nouvelle espèce est accompagnée par un dessin au trait et des photos prises sur le terrain, ainsi que par une évaluation préliminaire de son risque d'extinction selon les Catégories et les Critères de la Liste Rouge de l'UICN, indiquant un statut de « En Danger ».

Keywords

SARCOLAENACEAE – *Pentachlaena* – New species – Madagascar – Quartzite

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Introduction

Among the five families endemic to Madagascar, *Sarcolaenaceae* is the largest, with ten genera and 77 currently recognized species (MADAGASCAR CATALOGUE, 2016), 23 of which have been discovered and/or described since the start of the 21st century (HONG-WA, 2009; LOWRY & RABEHEVITRA, 2006; LOWRY et al., 2000, 2002, 2014; RABEHEVITRA & LOWRY, 2009; SCHATZ et al., 2000, 2001), largely as a result of extensive botanical inventory work conducted by staff of the Missouri Botanical Garden and other institutions contributing to the ongoing documentation of the country's rich flora. During a field ecological study of plants occurring on quartzite substrate conducted in 2005 in the remote north-western part of the Ambositra district in Madagascar's central high plateau, material was collected on Mt. Ambatolahinanahary of a plant that clearly belonged to the genus *Pentachlaena* H. Perrier but that did not match any of the three described species, *P. betampouensis* Lowry et al., *P. latifolia* H. Perrier, and *P. orientalis* Capuron (LOWRY et al., 2000). The following year additional field work in the area documented a nearby population, and an initial examination of the specimens and photos from these localities supported the idea that it might represent a new taxon. Follow-up field work was undertaken in 2014 in the same area to gather more complete material and to document the plant's ecology and conservation status. Several hundred flowering individuals were located in an area of less than 2 km², from which additional specimens were collected and photos taken. Comparison of this material with specimens deposited at P confirmed that while the population on Mt. Ambatolahinanahary resembles *P. latifolia* in overall appearance, it exhibits several distinctive morphological features that justify its recognition as a new species. The description provided below is accompanied by a line drawing, color photos taken in the field, a distribution map, and a preliminary assessment of its conservation status based on the IUCN Red List Categories and Criteria (IUCN, 2012).

Systematics

Pentachlaena vestita Andriam., Lowry & G.E. Schatz, **spec. nova** (Fig. 1, 2).

Typus: MADAGASCAR. **Prov. Fianarantsoa:** Amoron'i Mania Region, Ambositra, commune rurale Ihadilagnana, Mt. Ambatolahinanahary, 20°26'43"S 47°03'42"E, 1303 m, 4.XI.2014, fl., *Andriamihajarivo et al. 1907* (holo-: MO-6684230!; iso-: G!, MO-6685745!, P [P01066023]!; TAN!).

Haec species Pentachlaenae latifoliae H. Perrier simillima, sed ab ea foliis majoribus (7.7-13.8 × 5.8-11.8 vs. 4.5-8.8 × 3.5-7 cm) venis secundariis in paribus (10 ad) 14 ad 16 (vs. 7 ad 10) plerumque craspedodromis interdum distaliter subbrochidodromis (vs. semper brochidodromis), foliis abaxialiter necnon petiolis caulibus juvenilibus inflorescentiae axibus

bracteis sepalis et fructu trichomatibus stellato-strigosis c. 0.2-0.3 mm in diam. dense vestitis (vs. trichomatibus stellato-punctatis <0.1 mm in diam. sparsim modiceve indutis) atque petalis majoribus (1.6-2.2 × 1-1.3) vs. 1.2-2.1 × 0.8-1.4 cm) distinguitur.

Shrub, 0.5-1.5 m tall. *Leaves* ovate to oblong, rarely orbicular, coriaceous, (5.1-)10-13.8 × (4.3-)8-11.8 cm, weakly discolorous, with dense stellate-strigose trichomes c. 0.2-0.3 mm in diam. on abaxial surface, glabrous on adaxial surface, base usually subcordate, rarely rounded, margin entire, apex retuse to emarginate, midvein channeled above, raised below, venation craspedodromous, occasionally approaching brochidodromous in distal 2 to 5 major secondary veins, with (10 to) 14 to 16 pairs of secondary veins, weakly impressed above, raised below; petiole (1.3-)1.8-2.2(-2.8) cm long, 2-3 mm in diam., densely stellate-strigose, adaxially canaliculate. *Inflorescences* axillary and terminal, usually 2-flowered (occasionally 1-flowered), peduncles 1-3 mm long, densely stellate-strigose; flowers sessile, bracts (3-)4-6(-8) × 1 mm, narrowly lanceolate, margin entire to slightly dentate, sparsely stellate-strigose; involucre scale-like, densely stellate-strigose; *sepals* 5, quincuncial, unequal in size, united at the base, 0.4-0.6(-0.8) × 0.8-1 cm, stellate-strigose on outer surface, glabrous and with evident reticulate veins on inner surface; *petals* 5, quincuncial in bud, white, obovate, glabrous, free, with evident actinodromous and reticulate venation, 1.6-1.7(-2.2) × 1-1.1 (-1.3) cm, base cuneate, apex truncate, extrastaminal disc 1-1.2 mm high, with a sinuate margin; *stamens* 40 to 70 or more, filaments (0.5-)0.7-0.8(-0.9) mm long, anthers ellipsoid, 0.7-1 mm long, introrse, basifixed; ovary globose, densely stellate-strigose, 2.4-2.7 × 3-3.5 mm, locules 5, style glabrous, ovules 6 per locule, 1.5-1.6 mm long, 0.5 mm in diam., stigma capitate, light green, 5-lobed, margins of the lobes distinctly undulate. *Fruits* obloid, light brown to orangish, 3 × 2-2.5 cm, flattened at the apex and the base, ridged, dehiscent, exocarp thin, densely stellate-strigose, endocarp thin, *seeds* 1 per locule, brown, slightly flattened, c. 1.3 cm long.

Etymology. – The epithet 'vestita' refers to the dense stellate strigose indument on the abaxial surface of the leaves as well as the petioles, young stems, inflorescence axes, bracts, sepals, and fruits.

Distribution and ecology. – *Pentachlaena vestita* is restricted to Mt. Ambatolahinanahary, located near the Mania River in the north-western part of Ambositra district in central Madagascar, some 30 km to the south of the Ibity massif, where *P. latifolia*, which it most closely resembles, occurs (Fig. 3). It grows on quartzite substrate in an open matrix of wooded grassland and bushland/Tapia woodland at elevations between 1250 and 1500 m. *Pentachlaena vestita* is known from only seven collections. Material in bud and flower has been gathered in October and November, and the single fruiting collection was made in January.



Fig. 1. – *Pentachlaena vestita* Andriam., Lowry & G.E. Schatz. **A.** Flowering branch; **B.** Detail of indument on lower leaf surface; **C.** Detail of upper leaf surface; **D.** Flower; **E.** Detail of androecium; **F.** Detail of gynoecium; **G.** Fruit.
[A-F: Andriamihajarivo 1907, G, *Ravololomanana et al.* 57, TAN] **[Drawing:** R.L. Andriamiarisoa]



Fig. 2. – Photographs of *Pentachlaena vestita* Andriam., Lowry & G.E. Schatz. **A.** Flowering branch; **B.** Close-up of flower (note dense indument on lower surface of leaf); **C.** Adult plant; **D.** Habitat of type locality, with open wooded grassland and bushland/Tapia woodland and rocky quartzite substrate. [Photos: T. Andriamiharivo]

Vernacular name. – Mananamba.

Conservation status. – With an extent of occurrence of < 100 km², an area of occupancy of < 10 km², and two locations with respect to the most serious threat, which is fire, along with an estimated population size of more than 250 but probably less than 2,500 mature individuals, we assign a preliminary risk of extinction status of “Endangered” [EN B1a b(i,ii,iii,iv,v)+2ab(i,ii,iii,iv,v); C2a(ii)] using the IUCN Red List (IUCN, 2012).

Notes. – *Pentachlaena vestita* most closely resembles *P. latifolia*, which also occurs in central Madagascar, primarily on and around the quartzitic Ibity Massif some 30 km to the north (Fig. 3). These two species both have ovate to oblong, weakly discolorous leaves with a retuse to emarginate apex, axillary and terminal inflorescences with one or two flowers subtended by entire or slightly dentate bracts, and occur on quartzite substrates. Our new species can, however, be distinguished by a suite of characters, as summarized in Table 1.

Pentachlaena vestita, like *P. latifolia*, is clearly fire tolerant, as are most of the other species that have been able to survive in Madagascar’s wooded grassland and bushland/Tapia woodland habitats. The increased frequency of fires in these areas above historical pre-human levels has likely reduced the number of sites where individuals of *P. vestita* can persist and has probably also stunted their growth, preventing them from reaching their maximum potential height (Fig. 2C, D).

LOWRY et al. (2000), in their revision of *Pentachlaena*, assigned *Perrier de la Bâthie 2112* from the Mania River to *P. latifolia*, having overlooked the fact that this collection exhibits the distinctive features that characterize *P. vestita*. In re-examining the holdings of other species of *Pentachlaena* in the Paris herbarium to compare them with the material of our new species, we found that another collection, *Perrier*

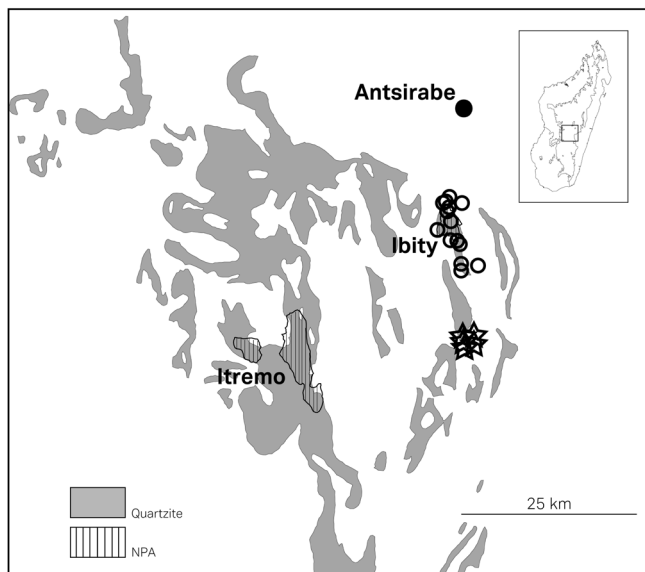


Fig. 3. – Geographic distribution of *Pentachlaena vestita* Andriam., Lowry & G.E. Schatz (stars) and *P. latifolia* H. Perrier (circles).

de la Bâthie 1998, made in January 1913, comprises a mixed gathering of material clearly belonging to *P. vestita* and to *P. latifolia*. The label data accompanying the two specimens of this gathering indicate that it was collected on Mt. Ibity, where *P. latifolia* is abundant, suggesting that some fragments of *P. vestita*, almost surely belonging to *Perrier de la Bâthie 2112*, were accidentally mounted along with the material of *Perrier de la Bâthie 1998*. While it is not out of the question that the two taxa were growing in sympatry at Ibity, this seems highly unlikely given that no individuals resembling *P. vestita* have ever been observed intermingled in the population of *P. latifolia* and that no plants of *P. vestita* have ever been collected at Ibity, which further supports our interpretation that they represent two geographically distinct taxa. A similar

Table 1. – Key characters distinguishing *Pentachlaena vestita* Andriam., Lowry & G.E. Schatz from *P. latifolia* H. Perrier

	<i>P. vestita</i>	<i>P. latifolia</i>
Largest leaf blade		
length [cm]	(7.7-)9.5-13.8	4.5-7.5(-8.8)
width [cm]	(5.8-)6.5-11.8	3.5-5.7(-7)
Indument on abaxial leaf surface	Densely stellate-strigose, trichomes c. 0.2-0.3 mm in diam., on all veins (incl. tertiary), almost completely obscuring leaf surface	Sparsely stellate-punctate, trichomes <0.1 mm in diam., along midvein and major secondary veins, occasionally on inter-secondary veins, not obscuring leaf surface
Leaf venation	Craspedodromous, occasionally approaching brochidodromous in distal 2 to 5 major secondary veins	Brochidodromous
Number of pairs of secondary veins per leaf	(10-)14-16	7-9(-10)
Indument on twigs and petioles	Densely stellate-strigose, almost totally obscuring surface	Sparsely to moderately densely stellate-punctate, covering <50% of the surface
Petal size [cm]	1.6-1.7(-2.2) × 1-1.1(-1.3)	1.2(-2.1) × 0.8(-1.4)

case of closely related but morphologically distinct species restricted to wooded grassland and bushland/Tapia woodland on quartzite and marble substrates in central Madagascar can be found in the genus *Philgamia* Baill. (*Malpighiaceae*), whose four members all occur in this same type of habitat and have clearly diversified within a limited geographic area (ARÈNES, 1950; MADAGASCAR CATALOGUE, 2016).

Paratypi. – MADAGASCAR. Prov. Fianarantsoa: Région Amoron'i Mania, Ambositra, Comm. Ihadilagnana, à l'W de Volondoha, 20°25'49"S 47°04'49"E, 1254 m, 19.I.2005, fr., *Andriamibajarivo et al.* 566 (MO, TAN); Ihadilagnana, W d'Ambositra, Mt. Ambatolahinanahary, 20°26'05"S 47°03'38"E, 1491 m, 25.III.2006, bud, *Andriamibajarivo* 874 (TAN); *ibid. loc.*, same date, fl., *Andriamibajarivo* 875 (TAN); Ambohipiandrianana-Ambohibary, Ihadilagnana, Ambositra, 20°26'43"S 47°03'42"E, 1303 m, 04.XI.2014, bud & fl., *Andriamibajarivo et al.* 1908 (G, MO, P, TAN); sur la Mania, bois à Tapia, c. 1200 m, VI.1912, fl., *Perrier de la Bâthie* 2112 (P [3 sheets]); Ihadilagnana, massif d'Ambatolahinanahary, 20°26'26"S 47°03'31"E, 1346 m, 20.I.2006, bud, fl., *Ravololomanana et al.* 57 (MO, P, TAN).

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