

## A New Species of Wild Banana *Musa arfakiana* (Musaceae) from Papua (Formerly Irian Jaya) of Indonesia

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### Abstract

*Musa arfakiana* is described and illustrated as a new species from Papua, Indonesia.

### Introduction

New Guinea is an important centre of diversity for the genus *Musa* (Argent, 1976, 2001). With the addition of this new record, there are 11 wild species recorded, most of which are endemic. The area is also arguably the richest place in the world for indigenous cultivars (Simmonds, 1966), many of which are diploids and potentially important as a gene reservoir.

Terminology and description below follows Simmonds (1962, 1966) and Argent (1976).

*Musa arfakiana* Argent, *sp.nov.*

*Musae johnsii* Argent *similis sed fructu minore distaliter acuto haud truncato non schizocarpo, fructuum fasciculo erecto, tepalis compositis cum apicibus viridibus non cremeis et canale petiolari paene clauso haud late aperto differt.*

– **Typus:** INDONESIA. Papua, West Papua, Kampung Siobri, Mokwam District, Arfak Mts. Mt. Sembiedip, 01° 07' S. 133° 54' E. 2 Feb 2009, Argent *et al* ABEG 106 (holo, BO; iso, E & Manokwari Forestry Herbarium). **Figs. 1, 2 & 3.**

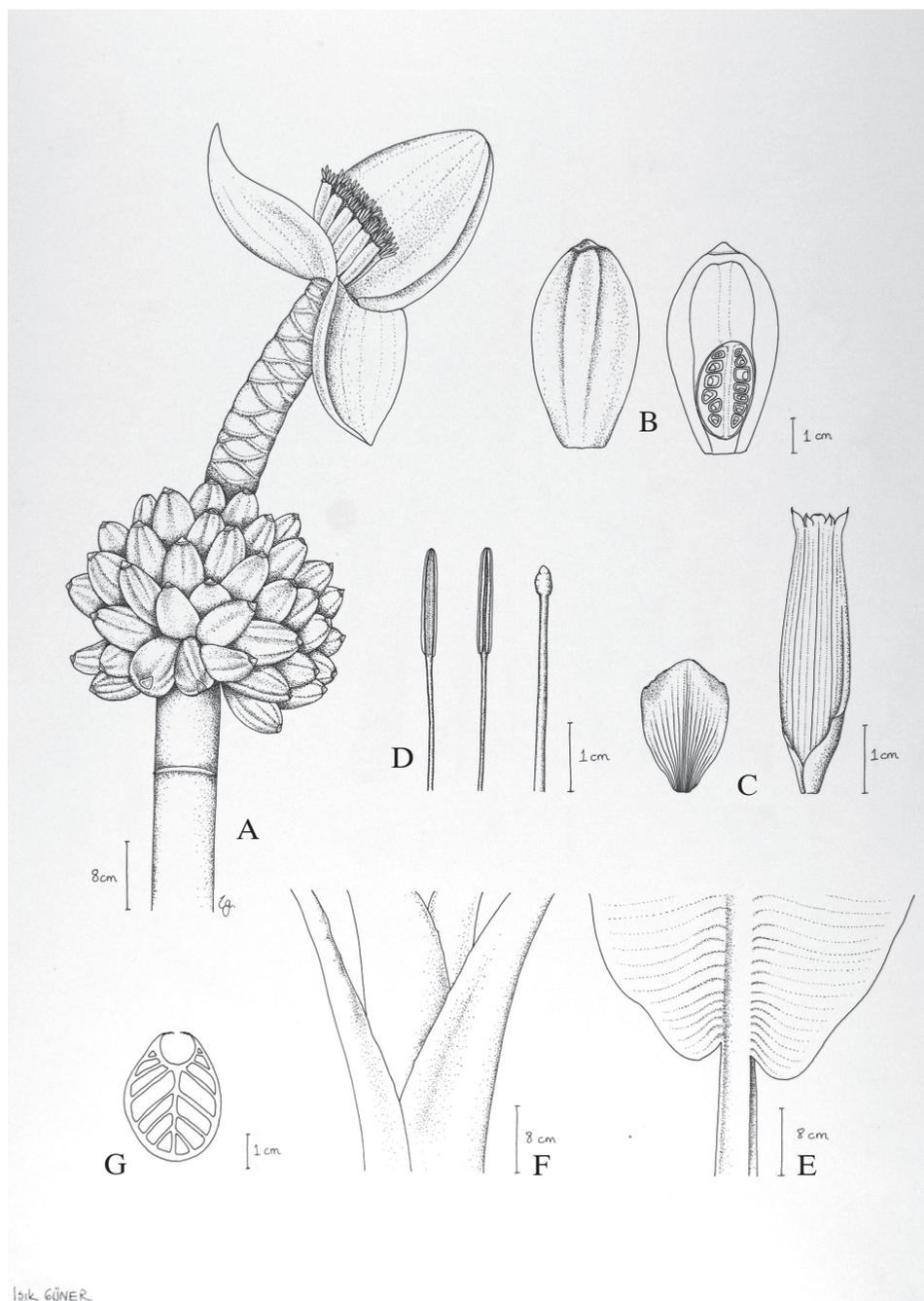
Clump forming **herbaceous plant**, suckers erect and close to the base of the parent plant but mostly only one or two, the clumps small. **Sucker** leaves mostly auriculate at the base. **Pseudostem** to 1.5-2 m, 9-12 cm diameter near the base, predominantly black, otherwise green with some dark brown coloration in the upper parts, no wax; undersheath green, inner sheath white with purple streaks, sap clear. Shoulder brown or green, entire, smooth and appressed, the margin black but not scarious. Fourth last **leaf** *ca* 160 x 45 cm, right handed to *ca* 10 mm, the base auriculate, slightly broader in the lower half. Other leaves often with a truncate or even slightly tapering base,



**Figure 1.** *Musa arfakiana* with inflorescence showing the male bud.



**Figure 2.** *Musa arfakiana* with mature fruit.



**Figure 3.** *Musa arfakiana*. A. Habit of fruit bunch, peduncle and male bud; B. Whole fruit and fruit in l.s. showing distal sterile pith chamber; C. Compound and free tepal; D. Stigma with anthers; E. Leaf base; F. Petiole bases showing upper shoulder margins; G. Petiole (t.s.) at the mid-point.

all bright green, hardly different in colour above and below, slightly paler beneath and with the prominent midrib, mostly pale yellow, sometimes with a little brown proximally, without wax. Petiole 76-80 × *ca* 3 cm, green, the adaxial channel green, almost completely closed, the wings black or green distally, TS ration 0.33 (see Argent, 1976). PB ratio 2-3.

**Peduncle** thick, green, glabrous, smooth. Bunch erect. The female bracts lanceolate, yellow, shiny outside, dull yellow and slightly paler inside, acuminate the apices with the margins strongly inrolled, quickly deciduous or sometimes trapped between the fruit. **Female flowers** hermaphrodite with fully fertile anthers, cream with green tips. Ovary trilocular, each loculus with the ovules in two rows. **Fruit bunch** dense, sub-spherical in shape to *ca* 30 × 30cm. Fruits in two rows, the second hand with *ca* 10 fruits. The fruits irregular, apparently ageotropic, showing no curvature in any part of the bunch, ripening bright orange, up to 8 × 5 cm, very strongly 2 or 3-angled, tapering in the distal half to a broadly acute apex with a prominent scars *ca* 1 cm in diameter, not splitting, sterile in the distal third, the seeds confined to the proximal two-thirds of the fruit, with orange pith and similarly coloured or yellowish flesh around the seeds in the carpel chambers. Pedicel very short *ca* 4-5 mm, the fruits almost sessile. **Seeds** dark brown 5-7 mm in diameter, irregularly angled, and with only an indistinct domed boss opposite the impressed hilum, which is *ca* 2.5-3mm in diameter and smooth.

**Male peduncle** growing vertically upwards or mostly angled upwards at about 30° to the vertical, rough with a dense covering of bract and flower scars. The male bud up to 15 × 9 cm, pale yellow or green, shiny yellow, convolute or only imbricate for *ca* 1 cm from the tip. Male bracts up to 16 × 9cm, shiny pale yellow outside, shiny yellow inside but becoming dull inside after falling, with broadly rounded, obtuse apices, lifting to a wide angle to *ca* 45° below the horizontal; after falling only recurved at the base not revolute from the apex or margins. **Male flowers**, two-rowed, cream, the free tepal translucent white, with a rounded, but irregular upper margin and no distinct sub-apical wrinkle, about half as long as the compound tepal. Compound tepal cream with green apices.

*Musa arfakiana* is similar to *Musa johnsii* Argent, in the dense sub-spherical bunch of almost sessile fruits, with sterile distal pith chambers. This new species differs from *M. johnsii* in its smaller stature; in having the petiole canals almost closed with the 'wings' inflexed not broadly open; in having erect, not hanging bunches of fruit; the fruits tapering distally to broad points, not expanding distally to broad truncate apices and the fruit is not schizocarpic as it is in *M. johnsii*.

Vernacular name 'Bulada' in the local language of Kampung Siobri, where

the people did not eat any part of the plant in contrast to the the Amungme Tribe whose people eat *Musa johnsii* as a vegetable (Argent, 2001).

*Notes:* Named after the mountain range on which it was found.

This very distinctive new species was a very surprising find above the village of Siobri in the Arfak Mountains and may have a very restricted distribution as it was not found around Anggra village which was very close to Siobri, effectively on the other side of a main ridge of mountains. A single population of *Musa arfakiana* was seen on the side of Mt. Sembiedip from ca 1500-1800m. It occurred in the upper area of secondary forest, which was regenerating after timber extraction and gardening but also occurred in the relatively undisturbed lower montane forest, sometimes in quite deep shade. The population comprised numerous plants in various stages of flowering and fruiting and like *M. johnsii*, it would appear to be non-seasonal. There was no evidence of anything eating the fruit, which remained very tough and hard even when the seeds were apparently mature, but the seeds brought back to Edinburgh failed to germinate. Nor was there any evidence of the fruit splitting open when ripe and this was confirmed by our local guide from the village, 'Zeth' who had a good knowledge of the local plants and readily confirmed that the fruit of some other species did split open at maturity. Nothing appeared to eat the fruit and thus the dissemination of the seeds remains a mystery.

This species is undoubtedly related to *M. johnsii* having a similar sterile pith chamber in the distal portion of the fruit, which until the discovery of this new species was thought to be a character unique to *M. johnsii*. It is also similar in its waxless foliage and spherical bunch shape. *M. arfakensis* significantly differs from *M. johnsii* in the almost closed petiolar canals, the shorter petiole to blade ratio having relatively longer petioles. *M. arfakensis* also has an erect fruit bunch with semi-erect male axis, unlike the half-hanging bunch with vertically descending the male axis in *M. johnsii*. The fruit, although with a similar sterile distal portion, tapers distally, unlike the truncate distal apices of *M. johnsii* and there was no evidence that the fruit ever naturally splits open. The basal flowers in *M. arfakensis* are functionally hermaphrodite, not female, and the tips of the compound tepals are green and not cream as in *M. johnsii*.

Our local guide at Kampung Siobri claimed to recognise four other different wild bananas, all growing in the vicinity. 'Binput' was *Musa ingens* Simmonds; 'Bunkan' was *M. acuminata* Colla subsp. *banksii* but the other two were not seen and could not be identified from the local descriptions. *Musa ingens* was commonly seen on the road at higher elevations, distinctive in its large size, tapering pseudostems and waxy leaves. It was also seen

on Yappen island, both these records extend the known distribution of this species away from the main range that forms the spine of mountains east-west along the island of New Guinea. Additionally *Musa schizocarpa* Simmonds was seen on the road to Siobri (Arfak Mts.).

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### References

- Argent, G.C.G. 1976. The wild bananas of Papua New Guinea. *Notes Royal Botanic Garden Edinburgh* **35**: 77-114.
- Argent, G. 2001. Contributions to the Flora of Mount Jaya VI. A New Banana, *Musa johnsii* (Musaceae) from New Guinea. *Gardens' Bulletin Singapore* **53**: 1-7.
- Simmonds, N.W. 1962. *The Evolution of the Bananas*. Longmans, U.K.
- Simmonds, N.W. 1966. *Bananas*, 2<sup>nd</sup> Ed. Longmans, U.K.