



Monoon longipetalum (Annonaceae) - a new species from Sumatra, Indonesia

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ABSTRACT: A new species *Monoon longipetalum* Nurmawati from Sumatra is described and illustrated. It is notable for its long lanceolate and narrowed petals to ca. 9×0.8 cm, velutinous on upper surface more densely to the apex of the inner and outer petals; large fusiform to 7×2 cm and bluntly apiculated monocarps. This new species is similar to *Monoon anomalum* (Becc.) B. Xue & R.M.K. Saunders and *Monoon borneense* (H. Okada) B. Xue & R.M.K. Saunders for having fusiform monocarp and long bluntly apiculate, but differ in having fewer clustered flowers in each inflorescence, lanceolate, longer, and narrower petals. Detailed morphological characters together with illustrations and diagnostic comparisons are presented. A key to the 19 species of *Monoon* in Sumatra is provided.

KEY WORDS: Annonaceae, Monocarps fusiform, *Monoon anomalum*, *Monoon borneense*, West Sumatra.

INTRODUCTION

Monoon one of the genera of Annonaceae, subfamily Malmeoideae, tribe Miliuseae (Chatrou *et al.* 2012) recently comprises about 67 tree species distributed in India, Sri Lanka, China, Indo-china, Philippines, Peninsular Malaysia, Indonesia, and Australia, Japan, Solomon Islands, and Micronesia (Turner, 2018). The largest number of species and the greatest morphological diversity is found in Borneo and Peninsular Malaysia.

Since *Monoon* being resurrected as a valid genus by Xue *et al.* (2012), Turner and Utteridge (2016) have published a synopsis of 18 *Monoon* species from Peninsular Malaysia. Nine of them are occurring also in Sumatra (*M. anomalum*, *M. borneense*, *M. congregatum*, *M. glabrum*, *M. hookerianum*, *M. lateriflorum*, *M. membranifolium*, *M. pachyphyllum*, and *M. sclerophyllum*). Our recent study based on herbarium material of *Monoon* in the Malesian region especially in Sumatra, deposited in Herbarium Andalas University (ANDA), revealed two collection numbers (four sheets) with some peculiar characters. Study of the characters highlighted and differentiated in Xue *et al.* (2012), indicated that these specimens belong to the genus *Monoon* because of the presence of the features characterizing this genus.

Detail morphological examination of the specimens, other types and protologues (Beccari, 1871; King, 1892; Okada, 1996; Sinclair, 1955) revealed that these specimens do not match any so far known *Monoon* species. We therefore consider these specimens as a species new to science. Among the members of the genus *Monoon*, morphologically it resembles *Monoon*

anomalum (Becc.) B. Xue & R.M.K. Saunders and *Monoon borneense* (H. Okada) B. Xue & R.M.K. Saunders. The three species share monocarp characters i.e. the fusiform shape, blunt apex, glabrous and wrinkled surface when dried. In addition, character comparison of the new species with two other morphologically similar species is presented in table 1.

TAXONOMIC TREATMENT

Monoon longipetalum Nurmawati, *sp. nov.*

Figs. 1 & 2

Type: INDONESIA, Sumatra: West Sumatra, around hill of Ngalau Pangian, Lintau Buo, Kabupaten Tanah Datar (Fig 3.), about 24 km from Batusangkar city, $0^{\circ}28'38.86''S$, $100^{\circ}44'49.15''E$, 17 October 2000, Pitra A 52. In flower and fruit (holotype ANDA!, Isotype ANDA!, SING!).

Diagnosis: *Monoon longipetalum* is morphologically similar to *M. anomalum* (Becc.) B. Xue & R.M.K. Saunders and *M. borneense* (H. Okada) B. Xue & R.M.K. Saunders, both occurring in Sumatra with fusiform monocarps, wrinkled surface when dried, and long bluntly apiculate. Although the new species shares some characters with *M. anomalum* and *M. borneense*, the three species can be easily individually identified with the combination of characters presented in table 1.

Trees ca. 20 m high, dbh not recorded. Branches terete with tubercles, sparsely appressed hairs, ultimately glabrous, irregularly longitudinally wrinkled. Leaves petiole transversely grooved, $10-13 \times 2.6-4$ mm, drying black, glabrous; horizontally spreading, elliptic-oblong, $20-35 \times 9-13$ cm, chartaceous, base cuneate or obtuse,

**Table 1.** Comparison of morphological characters between *Monoon longipetalum*, *M. anomalum* and *M. borneense*.

Characters	<i>M. longipetalum</i>	<i>M. anomalum</i>	<i>M. borneense</i>
Leaf apex	shortly acuminate	abruptly acuminate	abruptly acuminate
Leaf size	20–35 × 9–13 cm	5–22 × 3.5–8 cm	7–23 × 3–6 cm
Inflorescence position	ramiflorous	cauliflorous	cauliflorous
Flower	1–6 flowers in fascicles	> 10 flowers in fascicles	> 10 flowers in fascicles, generally on short branched axes arising from the trunk
Sepal shape and size	broadly triangular, 6–8 × 7–8 mm	ovate, 4–5 × 3–4 mm	ovate, 8–10 × 6–8 mm
Sepal indument	hairy abaxially more densely at the margin, glabrous adaxially	tomentose on both sides	glabrous on both sides
Petal shape	lanceolate	oblong	oblong
Outer petal size	7–9 × 0.6–0.8 cm	2–3 × 0.6–0.7 cm	4–5 × 0.8–1 cm
Inner petal size	6–8 × 0.4–0.5 cm	1.5–2.7 × 0.5–0.8 cm	3–4 × 0.7–0.8 cm
Petal indument	velutinous on both sides, more densely to the apex	glabrous abaxially, velutinous adaxially	sparsely hair on both sides, more densely to the margin
Ovary surface	glabrous	tomentose	glabrous
Stigma surface	pubescent	glabrous	pubescent
Torus diameter	ca.0.5 cm	2–2.5 cm	3–3.5 cm
Monocarp size	6–8 × 1.6–2 cm	7–9 × 2–2.5 cm	2.5–6 × 1.3–1.6 cm

symmetrical, apex shortly acuminate; midrib slightly sunken above, prominent beneath, longitudinally furrowed, glabrous above, pubescent below; secondary veins 14–17 pairs, slightly curved, oblique, angle of lateral veins with midrib 40–50 degree, slightly impressed above, glabrous, sparsely hairy abaxially, eucamptodromous, arching forward and looping evanescent to the margin, 1–2 mm, decurrent to midrib; tertiary veins obscured, scalariform. Inflorescences born on woody tubercles on branches in fascicles of 1–6 flowers. Flowers: pedicel 0.3–2 cm long, ca.0.25 cm in diameter, granular, sparsely hairy; bracteole one at base, clasping, triangular, apex acute, ca. 0.3 × 0.25 cm, glabrous inside, velutinous outside; sepal 3 thinly coriaceous, imbricate, broadly triangular, 6–8 × 7–8 mm, apex acuminate, glabrous inside, puberulous outside, more densely to the margin; bud broadly conical, densely hairy; petals 6 in two whorls of 3, fleshy, slightly imbricate, partially connate at base and concave over reproductive organ, inner and outer petals similar shape and texture, inner petal slightly shorter than those of the outer petals; outer petals lanceolate, 7–9 cm × 0.6–0.8 cm, narrow, apex acute, fleshy, yellow, glabrous at base, velutinous to the apex, more densely adaxially; inner petals 6–8 × 0.4–0.5 cm; stamens numerous, spirally arranged and tightly packed, obovate, 1.5–2 × 0.5–1 mm, capitate, orbiculate on top, apex of connective truncate, glabrous, anther cells deeply ridged in front, glabrous; carpels 8–12, ca. 1.5 × 0.8 mm; ovaries cylindrical, ca. 1 mm long, glabrous; styles absent; stigma cylindrical ca. 0.5 mm long, densely rusty hairy apically, tightly together. Fruiting pedicels longitudinally wrinkled, 0.5–2.8 cm long, 0.2–0.35 cm thick, dark brown, glabrous; torus subglobose, shallowly conical, sparsely hairy; 1–6 monocarps, fusiform, 6–8 cm long (included stipe and blunt apex), 1.6–2 cm in diameter, velutinous immature, later glabrous, drying black, wrinkled, fruit wall hard, ca. 2 mm thick; stipe slightly wrinkled, 0.5–1 cm long, 0.2–

0.25 cm thick, dark brown. Seed one per monocarp, cylindrical, ca.3×1.2 cm, attached vertically, smooth, distinct longitudinally grooved; endosperm ruminations lamelliform, soft.

Distribution, habitat and ecology: *Monoon longipetalum* has been recorded from two locations in West Sumatra: Ngalau Pangian, Lintau Buo and Dusun Kalo-kalo, Tabek Panjang Lintau. Both are in Tanah Datar district. This region is located at elevations between 200 and 500 m above sea level. Rainfall in this subdistrict area averages 172.06 mm per year. This species grows on limestone hills or along river banks.

Etymology: The specific epithet *longipetalum* is referring to the long petals.

Phenology: This species had been collected in flowering and fruiting stage in March and October.

Field Notes: Flowers yellow and fruits green

Additional specimens examined: INDONESIA. Sumatra; West Sumatra, Dusun Kalo-kalo, Tabek Panjang Lintau, along Batang Sinamar river banks, 25 March 1989, H. Hasnah & R. Tamin 221 (ANDA!).

Conservation status: This species is only known from two localities and two habitats, Ngalau Pangian on a hill side and Tabek Panjang Lintau at along a river banks, that are close together. Unfortunately, those locations where this new species was first discovered is not protected. The distribution data are insufficient to perform a feasible evaluation of its conservation status according to the IUCN criteria, therefore the status of this species is still unknown. Our attempt to find this species alive in the habitats were not successful. The habitats where the types of the new species collected were disturbed by landslides, flash floods, and anthropogenic activities i.e. deforestation and the land use changed. The status of this species might be vulnerable or even endangered. So further exploration is needed to assess the current distribution range of the species.

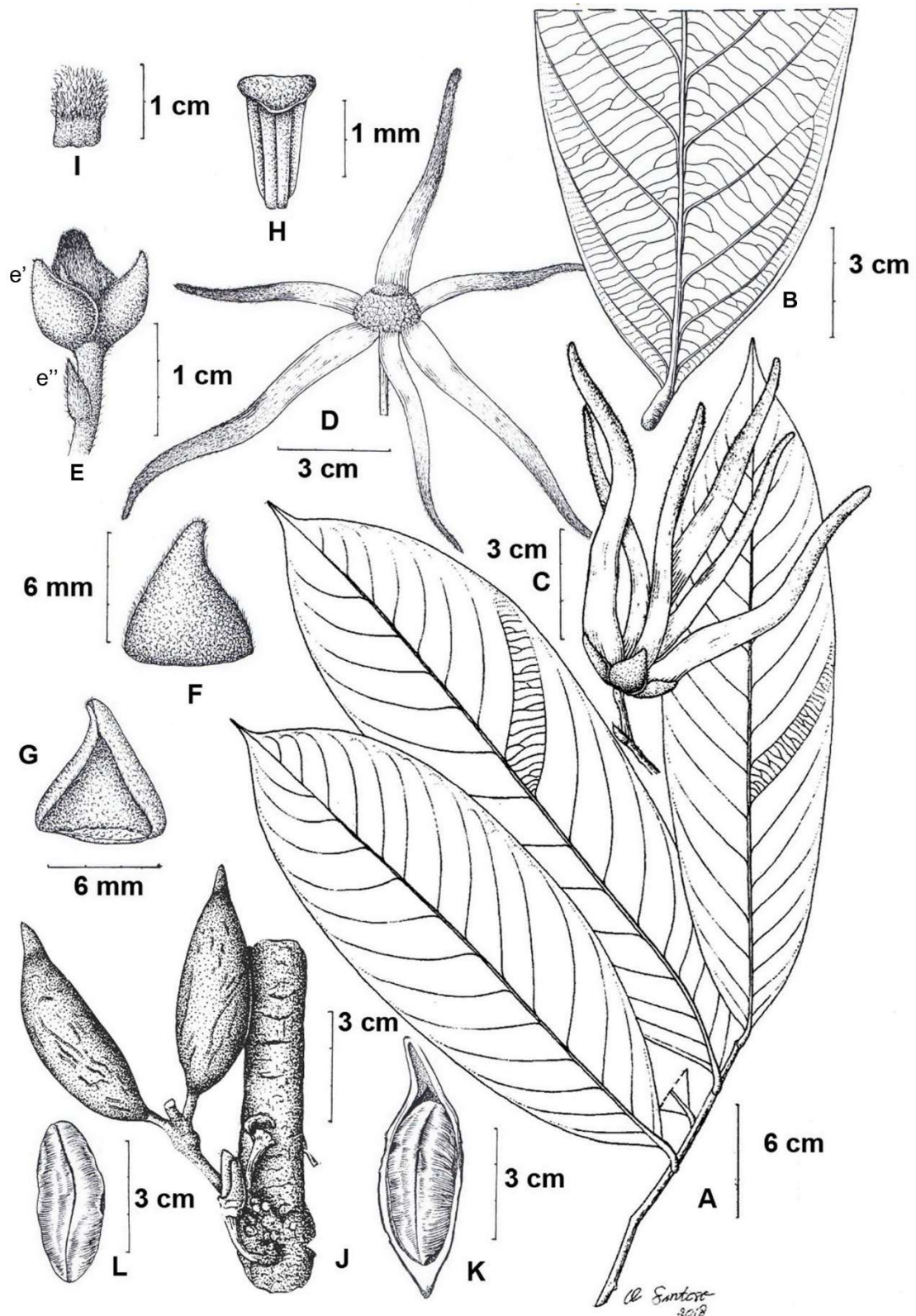


Fig.1. *Monoon longipetalum* Nurmawati. **A.** Twig with leaves. **B.** Base of leaf and detail of decurrent. **C.** Flower. **D.** Petals, stamens and carpels arrangement. **E.** Flower bud with sepals (e') and bracteole (e''). **F.** Adaxially sepal. **G.** Abaxially sepal. **H.** Stamen. **I.** Carpel. **J.** Fruit with two monocarps. **K.** Monocarp with pericarp removed. **L.** Seed. Drawn from holotype and isotype Pitra A 52 (A–J) (ANDA) and the paratype *H. Hasnah & R. Tamin 221* (K–L) (ANDA).



Fig 2. Photograph of the holotype of *Monoon longipetalum* Nurmawati (*Pitra* A. 52). Reproduced with the kind permission of the Head of Andalas University Herbarium (ANDA), Sumatra, Indonesia.

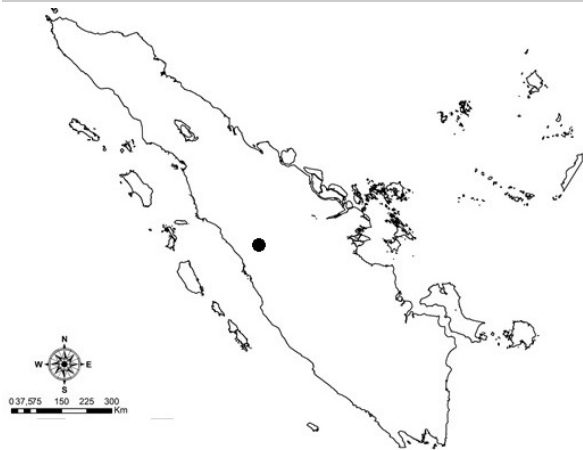


Fig 3. Type locality of *Monoon longipetalum* in Sumatra, Indonesia

Identification key of *Monoon* in Sumatra

- 1a. Leaves coriaceous 2
- 1b. Leaves membranous or chartaceous 4
- 2a. Leaves narrowed oblong; base cuneate *M. costigerum*
- 2b. Leaves elliptic-oblong; base rounded 3
- 3a. Leaf apex acute; midrib glabrous on lower surface; inflorescences cauliflorous *M. congregatum*
- 3b. Leaf apex shortly acuminate; midrib hairy on lower surface; inflorescences axillary or supra axillary *M. coreaceum*
- 4a. Leaves membranous; sepals orbicular *M. membranifolium*
- 4b. Leaves chartaceous; sepals ovate or triangular 5
- 5a. Branches pendulous; leaf margin undulate; outer petals up to 2 cm long *M. longifolium*
- 5b. Branches spreading; leaf margin flat; outer petals longer than 2 cm 6
- 6a. Leaf reticulation distinct on both surfaces *M. sclerophyllum*
- 6b. Leaf reticulation distinct only on lower surface 7
- 7a. Inflorescences born on the main trunk 8
- 7b. Inflorescences born on tubercles of branches or axillary to Supra axillary 10
- 8a. Flower solitary or few in fascicles; outer petals fleshy; monocarps cylindrical, monocarps smooth; pointed, short apiculate *M. paradoxum*
- 8b. Flowers many in fascicles; monocarp fusiform narrowly on both ends; monocarps wrinkled when dry; bluntly apiculate 9
- 9a. Leaf base obtuse; midrib hairy on upper surface; bracteole at base; sepals triangular, ca. 3 mm wide; monocarps stipe 4–5 cm long *M. anomalum*
- 9b. Leaf base rounded; midrib glabrous on upper surface; bracteole at the middle; sepals ovate, ca. 8 mm wide; monocarps stipe 1.5–2.5 cm long *M. borneense*
- 10a. Flowers many in fascicles; petals with red flush at base *M. lateriflorum*
- 10b. Flower solitary or few in fascicles; petals without red flush at base 11
- 11a. Old branches hairy; secondary veins ≥ 17 pairs 12
- 11b. Old branches glabrous; secondary veins ≤ 15 pairs 13
- 12a. Leaves oblanceolate; flowering pedicel ca. 1.5 mm diameter; outer petals connate at base ca. 1 cm, veined *M. sympetalum*
- 12b. Leaves elliptic-oblong; flowering pedicel ca. 3 mm diameter; outer petals valvate, not veined *M. grandifolium*
- 13a. Sepals indument sparsely hairy outside more densely to the margin; outer petals more than 6 cm long; monocarps wrinkled, bluntly apiculate *M. longipetalum*
- 13b. Sepals indument densely hairy outside; outer petals less than 5 cm long; monocarps smooth shortly apiculate or absent 14

- 14a. Midrib glabrous on lower surface of leaves *M. glabrum*
- 14b. Midrib hairy on lower surface of leaves 15
- 15a. Bracteole absent; sepals ovate *M. bemban*
- 15b. Bracteole at base or at the middle; sepals triangular 16
- 16a. Stipe sub-sessile; monocarps deltoid *M. pachyphyllum*
- 16b. Stipe more than 2 cm long; monocarps sub-globose 17
- 17a. Sepals corrugated; outer petals obovate *M. hookerianum*
- 17b. Sepals smooth; outer petals linear narrow 18
- 18a. Leaves ellipsoid, base obtuse; bracteole at base; sepals ca. 6 mm wide *M. kingii*
- 18b. Leaves elliptic-oblong, base rounded; bracteole at the middle; sepals ca. 3 mm wide *M. simiarum*

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