



Notes on the Taxonomic status of *Polyalthia malabarica* (Bedd.) I. M. Turner (Annonaceae) and a new variety from India

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(Manuscript received 15 April 2016; accepted 28 May 2017; online published 25 July 2017)

ABSTRACT: The taxonomic status of *Polyalthia malabarica* (Bedd.) I. M. Turner is discussed and a variety from Western Ghats of India is newly proposed with taxonomic description and illustration.

KEY WORDS: Annonaceae, India, Kerala, New variety, *Polyalthia malabarica* var. *longipedicellata*.

INTRODUCTION

The genus *Polyalthia* (Annonaceae) was first described by C. L. Blume (1830) based on type specimen *Polyalthia subcordata*, which was collected from Java (Xue *et al.*, 2012). The genus was considered as one of the largest genera in paleotropical regions in the family Annonaceae with distribution ranging from East Africa to Madagascar, Indian subcontinent and South East Asia to Australia with approximately about 150 species (Verdcourt, 1969; Xue *et al.*, 2011; Saunders *et al.*, 2011). Recently several critical studies were carried out on the genus using morphological (Verdcourt, 1969), palynological (Walker, 1971; Doyle and Le Thomas, 1994, Saunders *et al.*, 2011) and molecular tools and the phylogenetic analysis based on these revealed that the genus is polyphyletic in nature (Richardson *et al.*, 2004; Mols *et al.*, 2008; Saunders *et al.*, 2011; Xue *et al.*, 2011, 2012; Chatrou *et al.*, 2012; Chaowasku *et al.*, 2012). The main aim of these studies were to separate the each monophyletic group into respective genus similar to *Disepalum* Hooker (Johnson, 1989) with two African species, *Marsypopetalum* Schef. (Xue, *et al.*, 2011) includes five species and nine Madagascar *Polyalthia* (*s. lat.*) species were transferred to *Fenerivia* Diels (Saunders *et al.*, 2011). The critical evaluation resulted in the resurrection of a genus *Moonon* Miquel with 37 species (Xue *et al.*, 2012) and proposed three new genera namely *Greenwayodendron* Verdcourt (1969) with two African species, *Maasia* Mols *et al.*, (2008) with six South East Asian species and *Huberantha* Chaowasku with 27 species from East Africa, Madagascar to Asian (Chaowasku *et al.*, 2015). *Haplostichathus* Mueller is the only genus which is nested within the clade *Polyalthia s.s* and therefore nine species of the genus was merged with *Polyalthia* (Xue

et al., 2012). Approximately 65 species were removed from the genus *Polyalthia* but at the same time nine additions were included by merging the genus *Haplostichathus* as mentioned. Presently the genus *Polyalthia* comprises approximately 85 species and its distribution ranged to Austral-Asian region (Chaowasku *et al.*, 2012).

The genus is now characterised by reticulate venation of leaves, generally with more or less subcordate or cordate leaf base, axillary to extra axillary or terminal inflorescence, 2–6 ovules per ovary, seed with slightly grooved, spiniform ruminant endosperm and with more or less columellate or coarsely granular pollen (Chaowasku *et al.*, 2012).

The genus *Phaeanthus* Hook. f. & Thoms. (1855) was studied due to the close resemblance with *Polyalthia* (Mols & Kessler, 2000). *Phaeanthus malabaricus* was one among the species in the genus which was first described by Beddome (1874) based on the specimen collected from ‘Tambacherry ghats of south Wynaad’ (now included in Kozhikode district) of Kerala, India. During the revision, it was merged with widely distributed south East Asian species *Polyalthia suberosa* (Roxb.) Thwaites because of the unavailability of type specimen. Recently Turner transferred *Phaeanthus malabaricus* to *Polyalthia* and accordingly a taxonomic combination was made following lectotypification as *Polyalthia malabarica* (Bedd.) I. M. Turner (2015).

In India, the genus *Polyalthia* is represented with six species of which three are endemic namely *Polyalthia malabarica* (Bedd.) I. M. Turner, *P. meghalayensis* V. Prakash & Mahotra and *P. rufescens* Hook. f. & Thoms., while other three species viz. *P. cauliflora* var. *desmantha* (Hook. f. & Thoms.) J. Sinclair, *Polyalthia corticosa* (Pierre) Finet & Gagnep, as well as *P. suberosa* (Roxb.) Thwaites shares their

**Table 1.** Comparison of morphological characters of *Polyalthia malabarica* (Bedd.) I. M. Turner var. *malabarica* and *P. malabarica* var. *longipedicellata* M. Alister, G. Rajkumar, A. Nazarudeen & Pandur.

Characters	<i>P. malabarica</i> var. <i>malabarica</i>	<i>P. malabarica</i> var. <i>longipedicellata</i>
Habit	Tree, 3 – 4 m tall	Shrub, 1 – 2.5 m tall
Leaf	Elliptic to ovate-lanceolate, oblong, apex acuminate to caudate	Ovate, broadly elliptic to oblong, apex abruptly acuminate
Lateral nerves	Very prominent beneath	Lax on both sides
Petiole	Pubescent	Glabrous
Pedicel	3 – 8 mm, stout, thick, short, deep red	1.2 – 2.5 cm, slender, long, green
Sepal	Broadly ovate, cucullate	Deltoid
Outer petal	Ovate, not spreading, 8 – 10 × 6 – 8 mm	Rhomboidal, spreading, 6 – 8 × 4 – 6 mm
Inner petal	Incurved, 1.5 – 2.5 × 1 – 1.2 cm, ca. 2.5 mm thick, red tinged, creamy yellow	Straight to incurved, 1.2-2 × 0.8-1 cm, ca. 1.8 mm thick, greenish- yellow
Stamen	ca. 2 × 1 mm, connective prolongation flat, sparsely ciliate	ca. 1.5 × 0.8 mm, connective prolongation slightly raised, densely ciliate
Stigma	Triangular to cylindrical, strigose at apex	Obovate, sparsely pilose at apex
Fruits	Compressed globose, rarely constricted, glabrous except apex	Strictly globose, puberulous to pubescent
Stipe	6 – 7 mm, red	4 – 5 mm, green

distribution with other South East Asian countries.

During the study of Annonaceae of Western Ghats, we have come across with a taxon which is distributed southward of Palghat gap and shows some difference in habit, flower and fruiting nature when compared to *Polyalthia malabarica* from type locality. Critical examination of the specimen revealed some unique and novel characteristic features and hence described here as a new variety, *P. malabarica* var. *longipedicellata*. A comparative analysis of the characters between *P. malabarica* var. *malabarica* and *P. malabarica* var. *longipedicellata* is given in Table 1.

TAXONOMIC TREATMENTS

Polyalthia malabarica (Bedd.) I. M. Turner var. *longipedicellata* M. Alister, G. Rajkumar, A. Nazarudeen & Pandur., **var. nov.** **Figs. 1 & 2**

Phaeanthus malabaricus Bedd. Mohanan *et al.*, J. Econ. Tax. Bot. 5 (2): 390-400, 1984; Mohanan & Sivadasan, Flora of Agasthyamala, 59-60, 2002; Anilkumar *et al.*, Flora of Pathanamthitta, Western Ghats, Kerala, 45 & 47, 2005.

Type: INDIA: Kerala: Kollam District, Rosemala, alt. ± 600 m, 31 Mar 2015, *M. Alister, G. Rajkumar & A. Nazarudeen 84194* (Holotype: TBGT; Isotype: MH).

Shrubs 1 – 2.5 m tall; young branches puberulous on flushing, glabrous; young leaves brick red; mature leaves, ovate to broadly elliptic - oblong, 4 – 25 × 1.5 – 7 cm, base round, unequal or cordate, apex acute to abruptly acuminate, subcoriaceous, glabrous above, sparsely hairy along the nerves; midrib straight, prominent, channeled above, raised beneath, lateral nerves 6 – 12 pairs, reticulate; petiole 2 – 4 mm long, glabrous. Flowers axillary or extra axillary, solitary or rarely paired; pedicel, slender, ca. 2.5 cm long, puberulous, green; bracts 2, deltoid to ovate, ca. 0.5 mm long, puberulous above, glabrous below. Sepals 3, deltoid, 3 – 4 × 4 – 5 mm, apex acute, pubescent above, glabrous within, margin ciliate, green. Petals 6; outer petals 3, ovate

rhomboid, 6 – 8 × 4 – 6 mm, ca. 1 mm thick, apex acute, pubescent above, glabrous within, spreading, greenish yellow; inner petals 3, ovate oblong, 1.2 – 2 × 0.8 – 1 cm, ca. 1.8 mm thick, cucullate, apex obtuse, incurved to form a loose pollination chamber, pubescent above, glabrous within, creamy yellow; torus hemispherical, ca. 5 × 8 mm. Stamens numerous, ca. 1.5 × 0.8 mm, connective prolongation slightly raised, apex densely ciliate, creamy yellow. Carpels many, cylindrical or ovate oblong, ca. 2 × 1 mm, strigose; style indistinct; stigma obovate, capitate, apex sparsely pilose; ovules 2. Fruitlets up to 20, globose, 0.7 – 1 cm across; apex beaked, puberulous to pubescent, red; stipitate ca. 5 mm long. Seed one or rarely two, spherical or hemispherical, slightly grooved, pitted.

Flowering and fruiting: February – September.

Distribution: India (Kerala), endemic (Fig. 3).

Etymology: The species is named based on the presence of distinctly long slender pedicel.

Notes: The new variety is distributed southward of the Palaghat gap possess phylogeographical significance. In India the genus *Phaeanthus* was represented by *P. malabaricus* Bedd. (Gamble 1914; Mitra 1993; Karthikeyan *et al.*, 2009). As per the revisionary study by Mols & Keßler (2000) the species was treated as *Polyalthia suberosa*. Later, Turner (2015) critically studied both the specimens and found both as distinctly different with unique characteristic features of their own and made a combination as *Polyalthia malabarica*. Hence, based on all these studies it can be concluded that the genus *Phaeanthus* does not exist in India.

Additional specimens examined: INDIA: KERALA, Kollam District, Rosemala 520 m, 28 Mar 2014, *G. Rajkumar & M. Alister 80673*; Kulirkadu, 360 m, 22 May 2014, *G. Rajkumar & M. Alister 81311*; Rockwood estate, 320 m, 28 May 2015, *G. Rajkumar, A. Nazarudeen & M. Alister 85201*; Thenmala, 4 Mar 2005, *Geetha Kumary 55333* (TBGT); Idukki District, Meenmuttery, ± 600 m, 30 May 1982, *C.N. Mohanan 74093*; Kulamavu, 700 m, 11 Jun. 1983, *V. S. Raju 73125*; Meenmuttery, ± 800 m, 25 Feb. 1983, *C.N. Mohanan 74093*; Meenmuttery, ± 700 m, 11 Jun. 1983, *A.G. Pandurangan 76694*;

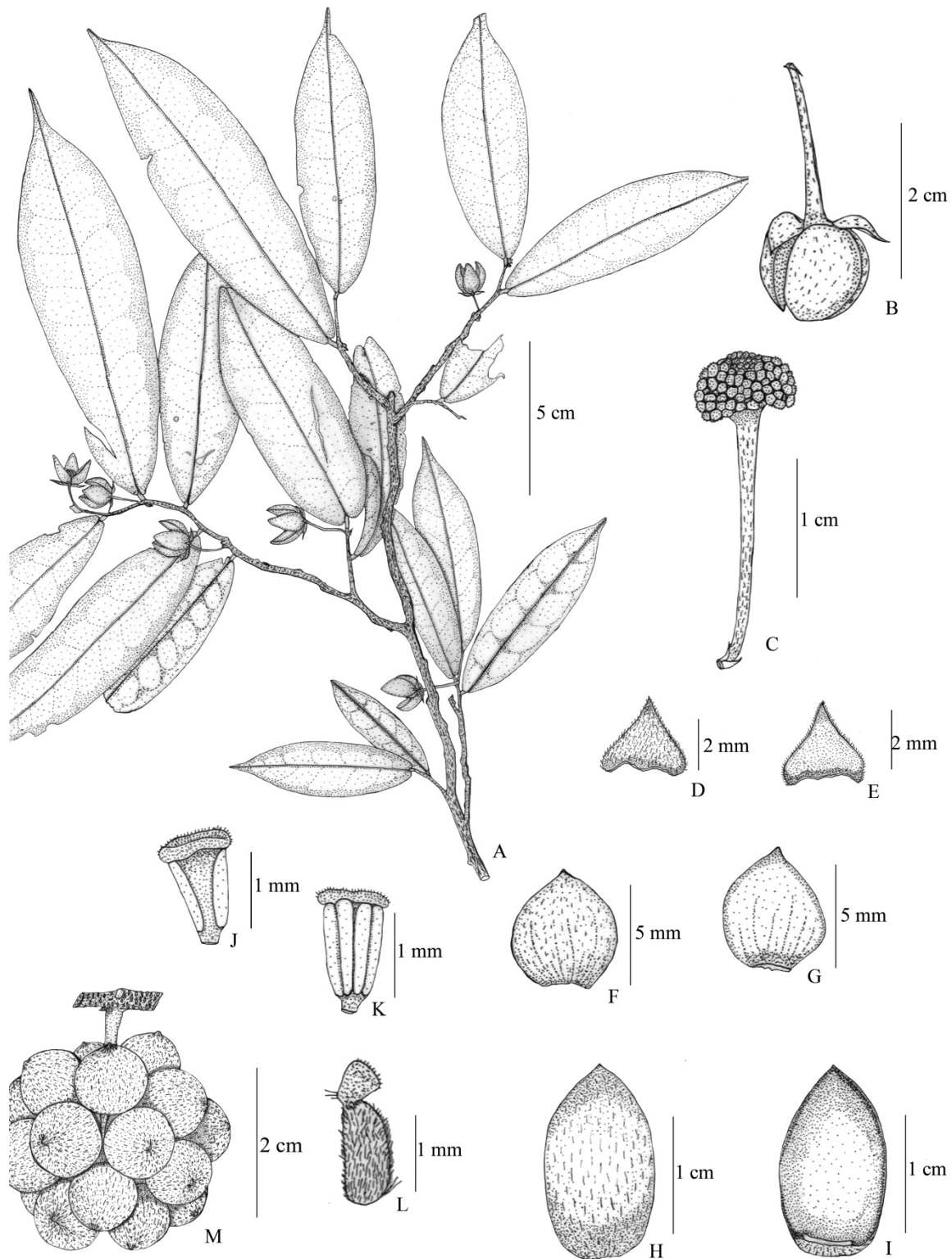


Fig. 1. Illustration of *Polyalthia malabarica* var. *longipedicellata* M. Alister, G. Rajkumar, A. Nazarudeen & Pandur., **A:** Habit. **B:** Flower. **C:** Flower with petals removed. **D:** Sepal adaxial. **E:** Sepal abaxial. **F:** Outer petal adaxial. **G:** Outer petal abaxial. **H:** Inner petal adaxial. **I:** Inner petal abaxial. **J:** Stamen abaxial. **K:** Stamen adaxial. **L:** Pistil. **M:** Mature carpels.



Fig. 2. *Polyalthia malabarica* var. *longipedicellata* M. Alister, G. Rajkumar, A. Nazarudeen & Pandur., var. nov. (A-D) and *Polyalthia malabarica* var. *malabarica* (Bedd.) M. Turner. (E-H). A: Habit. B: Flower. C: Unripe infructescence. D: Ripe infructescence. E: Habit. F: Flowering branch. G: Flower. H: Unripe infructescence.

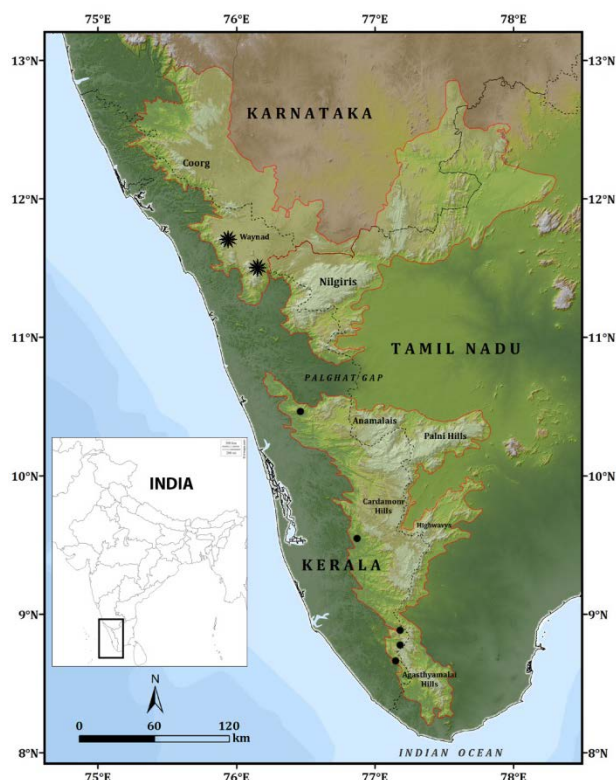


Fig. 3. Distribution of *Polyalthia malabarica* var. *malabarica* (Aster) and *P. malabarica* var. *longipedicellata* (Dot) in Western Ghats.

ibid., 25 Feb. 1984, A.G. Pandurangan 78087; Painavu, 28 Apr. 1984, C.N. Mohanan 81645 (MH); Adimali, 408 m, 20 Mar. 1991, A.E. Shanavas Khan 7521 (TBGT). Pathanamthitta District, Chathanthara ± 200 m, no date, N. Anilkumar 1598 (CALI). Thiruvananthapuram District, Bonaccord, 700 m, 21 Dec. 1987, N. Mohanan 9086; Attayar, 650 m, 1 Mar. 1991, N. Mohanan 10552; Chemunji, 950 m, 18 Mar. 1991, N. Mohanan 11326; Athirumala, 1100 m, 23 Jun. 1993, N. Mohanan 11431; Attayar, 15 Jan. 1998, M.S. Kiran Raj 36091; Balippara, 700 m, 26 Jul. 2001, NWFPS 46271; Puranmala, 800 m, 31 May 2001, NWFPS 46614 (TBGT). Thrissur District, Vellayanipacha, 350 m, 30 Apr. 1984, Sasidharan 3128; Chathupara, Peechi ± 400 m, 11 Mar 1988, Sasidharan 4834; Malayattoor, 16 Mar 1992, K.K.N. Nair 6913; Malayattoor, 30 May 1992, K.K.N. Nair 6944 (KFRI); Vellayanipacha, 350 m, 25 Nov. 2014, M. Alister & G. Rajkumar 83734 (TBGT).

Autonym: Due to the publication of a new variety, *Polyalthia malabarica* var. *longipedicellata* under *Polyalthia malabarica* (Bedd.) I. M. Turner, automatically a new variety *malabaica* gets recognized as per ICN regulations and the same is treated below.

Polyalthia malabarica (Bedd.) I. M. Turner var. *malabarica*; *Phaeanthus malabaricus* Bedd., Icones Plantarum Indiae Orientalis 16, t. 76. 1874; in Hook. f. & Thomson, Flora of British India 1: 72. 1875; V. S. Ramachandran & V. J. Nair, Flora of Cannanore 41. 1988; Debika Mitra, Annonaceae in Flora of India 230-231. 1993. *Polyalthia suberosa* (Roxb.) Thwaites, Mols and Kessler, Blumea 4: 205-233. 2000.

Type: INDIA: Kerala, Kozhikode District,

Tambacherry, Malabar, 2000 ft, 1871, *Beddome* (Lectotype: Barcode no. MH 00001756; accession no. MH 561).

Additional specimens examined: INDIA: Kerala, Tambacherry, Malabar, R.H. *Beddome* s.n. without date (MH 00001755, image!); Kannur District, Panoth Peria, 860 m, 2 May 1979, V.S. *Ramachandran* 61693 (MH); Wayanad District, Vythiri, 500 m, 14 Feb. 2000, M.K. *Ratheesh* 2719 (CALI); Vythiri churam, 400 m, 23 Feb. 2001, M.K. *Ratheesh* 1477; Vythiri Ghats, 800 m, 27 Jun. 2003, M.K. *Ratheesh* 3227; ibid., 18 Feb. 2011, M.K. *Ratheesh* 0667; ibid., 13 Mar. 2000, M.K. *Ratheesh* 3403; ibid., 14 Feb. 2000, M.K. *Ratheesh* 2719 (MSSH). Kozhikode District, ibid., 704 m, 1 May 2014, G. *Rajkumar* & M. *Alister* 81181; ibid., 210 m, 25 Oct. 2014, M. *Alister* 81372 (TBGT).

ACKNOWLEDGEMENTS

We express our sincere thanks to Dr. I. M. Turner, Royal Botanic Garden Kew for providing the relevant literature during the study. Thanks are also due to the Director, Jawaharlal Nehru Tropical Botanic Garden and Research Institute for providing facility and encouragement. We also thank Kerala Forest Department for granting permission and also providing logistic support during field study. We extend our thanks to Dr. G. V. S. Murthy, Addl. Director, Botanical Survey of India, Southern Regional Circle, Coimbatore for the permission to refer Type specimen. We thank herbarium in charge of CALL, MSSH and KFRI for granting permission to consult their herbaria. We also thank Dr. G. Gnanasekaran, Botanical Assistant, BSI, Southern Regional Circle, Coimbatore for his assistance at MH.

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