

## New records in the orchid flora of Myanmar

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**ABSTRACT.** Five orchid species, *Calanthe alismifolia* Lindl., *Ceratostylis radiata* J.J. Sm., *C. subulata* Blume, *Cleisostoma linearilobatum* (Seidenf. & Smitinand) Garay and *Panisea tricallosa* Rolfe are newly recorded for Myanmar. While the occurrence of *Ceratostylis radiata* is a remarkable extension of the geographical range of this species, the remaining four species were previously known to occur in most of the surrounding countries and their discovery in Myanmar is therefore not surprising.

**KEY WORDS:** Myanmar, new records, Orchidaceae.

### INTRODUCTION

The remarkably rich orchid flora of Myanmar is one of the most poorly known in Asia, and is currently the subject of ongoing inventory work (Kress, 2003; Ormerod & Kumar, 2003, 2008; Ormerod & Wood, 2010; Tanaka et al., 2011; Kurzweil & Lwin, 2012). Comprehensive studies by the authors of this paper, by Paul Ormerod, Sathish Kumar and Jin Xiaohua are aimed at producing a complete checklist of all species recorded in the country so far. During two fieldtrips in the northernmost part of Kachin State in 2007 and 2009 we collected material of five species of Orchidaceae which are not known in Myanmar as yet, and these new distribution records are presented below.

**1. *Calanthe alismifolia*** Lindl., Fol. Orchid. 6: 8. 1855; Hook.f., Fl. Brit. India 5: 849. 1890; Seidenf., Opera Bot. 114: 94, fig. 47. 1992; N. Pearce & P.J. Cribb, Fl. Bhutan 3(3): 283. 2002; S.C. Chen et al. in Z.Y. Wu et al. (eds), Fl. China 25: 302. 2009 [as *alismatifolia*]; Z.Y. Wu et al. (eds), Fl. China Illustrations 25: 431.1–2, 432.1–17. 2010.—*Alismorkis alismifolia* (Lindl.) Kuntze, Revis. Gen. Pl. 2: 650. 1891.—Type: India, Sikkim, *Hooker* 239A (syntype **K-LINDL**); India, Khasia, *Hooker* & *Thomson* 239B (syntype **K-LINDL**). [fide Pearce & Cribb, 2002].

**Distribution.**—Eastern Himalayas to Vietnam, China and southern Japan.

**Ecology.**—Our collection was made in undisturbed mountain forest at about 1115 m. In the eastern Himalayas the species is found among grass at the base of rocks between 660 and 1600 m (Pearce & Cribb, 2002), and in China in evergreen broad-leaved forest between 700 and 2100 m (Chen & al., 2009).

**Myanmar.**—Kachin State: Mountains west of Putao, near the village of Ziyadan, undisturbed mountain forest, 1115 m, 23 March 2009, *Kurzweil & Lwin* 2693 (**SING** [spirit]).

**Notes.**—A widespread species with white flowers and typically three-lobed lip. A characteristic feature are the rather wide ovate-elliptic leaves to which the species epithet alludes. Due to its general distribution the occurrence in Myanmar is not surprising.

**2. *Ceratostylis radiata*** J.J. Sm., Orch. Java: 295. 1905; Seidenf., Opera Bot. 89: 115, fig. 66, pl. 9c. 1986; Seidenf. & J.J. Wood, Orchid. Penins. Malaysia Singap.: 311, fig. 137c–e, pl. 19c. 1992; J.J. Wood & P.J. Cribb, Checklist Orch. Borneo: 205. 1994. Type: Java, Soekaboemi, Garoet and south Preangen, *Raciborski* s.n. (holotype **BO**). [fide Wood & Cribb, 1994]. Fig. 1A–B.—*Ceratostylis*

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*linearifolia* Ridl., Fl. Malay Penins. 4: 110. 1924. Type: Malaysia, Kedah, Langkawi, Gunung Raja, 13 Nov. 1921, Haniff 7103 (holotype SING!).

Distribution.— Vietnam and Peninsular Thailand to West Malesia.

Ecology.— Our collection was made in secondary mountain forest. The few published habitat records in other parts of the distribution area indicate that in Java *Ceratostylis radiata* grows as a trunk epiphyte in shade at altitudes of between 750 and 1070 m (Comber, 1990). Populations in Borneo are found in lower montane forest, podsol forest and oak-laurel forest at altitudes of between 1100 and 1900 m (Wood & Cribb, 1994).

Myanmar.— Kachin State: Mountains west of Putao, between the villages of Wasadan and Ziyadan, secondary mountain forest, 20 March 2009, Kurzweil & Lwin 2609 (SING, SING [spirit]).

Notes.— This species is unmistakable with its large white stellate flowers with densely hairy sepal dorsal surfaces and a characteristic lip shape. The reticulate leaf sheaths make the species recognisable in the vegetative state. It appears that an immature specimen was illustrated by Seidenfaden (1986: fig. 66 on page 114) as it shows a specimen with connate lateral sepals, i.e. it was drawn before the lateral sepals had opened up. In contrast, the colour photo in the same publication (plate 9c) shows fully open flowers.

*Ceratostylis radiata* was previously only known to occur in Vietnam, Peninsular Thailand, Peninsular Malaysia, Sumatra, Borneo and Java. The nearest occurrence to the Myanmar locality is in Peninsular Thailand (in the provinces of Phangnga and Nakhon Si Thammarat) which is about 2000 km away, and this is a surprising range extension.

**3. *Ceratostylis subulata* Blume, Bijdr.: 306. 1825; Seidenf., Opera Bot. 89: 109, fig. 62. 1986; Seidenf., Opera Bot. 114: 161. 1992; Seidenf. & J.J. Wood, Orchid. Penins. Malaysia Singap.: 310, fig. 136a-d, pl. 29b. 1992; J.J. Wood & P.J. Cribb, Checklist Orch. Borneo: 205. 1994; N. Pearce & P.J. Cribb, Fl. Bhutan 3(3): 363. 2002; S.C. Chen & J.J. Wood in Z.Y. Wu et al. (eds), Fl. China 25: 361.**

2009; Z.Y. Wu et al. (eds), Fl. China Illustrations 25: 485.4-6. 2010. Type: Java, Salak, *Blume* s.n. (syntype, herbarium unknown); Pantjar, *Blume* s.n. (syntype, herbarium unknown). Fig. 1C.— *Ceratostylis teres* (Griff.) Rchb.f., Bonplandia (Hannover) 2: 89. 1854; Hook.f., Fl. Brit. India 5: 825. 1890.— *Appendicula teres* Griff., Not. Pl. Asiat. 3: 35. 1851. Type: India, Upper Assam, Negrigam, *Griffith* s.n. (holotype K-LINDL) [fide Pearce & Cribb, 2002].— *Ceratostylis cepula* Rchb.f., Bonplandia (Hannover) 5: 53. 1857. Type: Java, Prov. Bandong, Zollinger 3185 (holotype, herbarium unknown).— *Ceratostylis malaccensis* Hook.f., Fl. Brit. India 5: 825. 1890. Type: Perak, *Scortechini* s.n. (syntype K); Batang Padung, 4900 ft., Wray s.n. (syntype K); Johor, Mount Ophir, *Griffith* s.n. (Kew Distr. 5213) (syntype K).

Distribution.— North-eastern India and eastern Himalaya to southern China, and throughout the whole of Malesia as far east as Vanuatu.

Ecology.— Our specimen was epiphytic in secondary forest. In China the plants are epiphytic on trees or lithophytic on rocks in forest (Chen & al., 2009). In Peninsular Malaysia the species is a common epiphyte in montane as well as lowland forest (Seidenfaden & Wood, 1992). Plants in Borneo grow in lowland forest, hill dipterocarp forest and lower montane oak-laurel forest at altitudes of between 400 and 1700 m (Wood & Cribb, 1994). According to Comber (1990) Javanese plants grow in tufts on high branches and are therefore usually only seen on fallen trees, and this may be the case in other parts of the distribution area as well.

Myanmar.— Kachin State: Mountains north-east of Putao, epiphytic in secondary forest, 560 m, 4 March 2007, Kurzweil & Lwin 2379 (SING [spirit]).

Notes.— The species, in its current delimitation, is very widespread in tropical and subtropical Asia. Thus its discovery in Myanmar is quite natural. In the past, this collection would have been referred to *Ceratostylis teres* (Griff.) Rchb.f. which was described from north-eastern India, but is now regarded as a synonym (Ormerod, pers. comm.). Most recent authors consider *C. subulata* and *C. teres* as conspecific, although Seidenfaden (1986, 1992) raised doubts about their conspecificity.

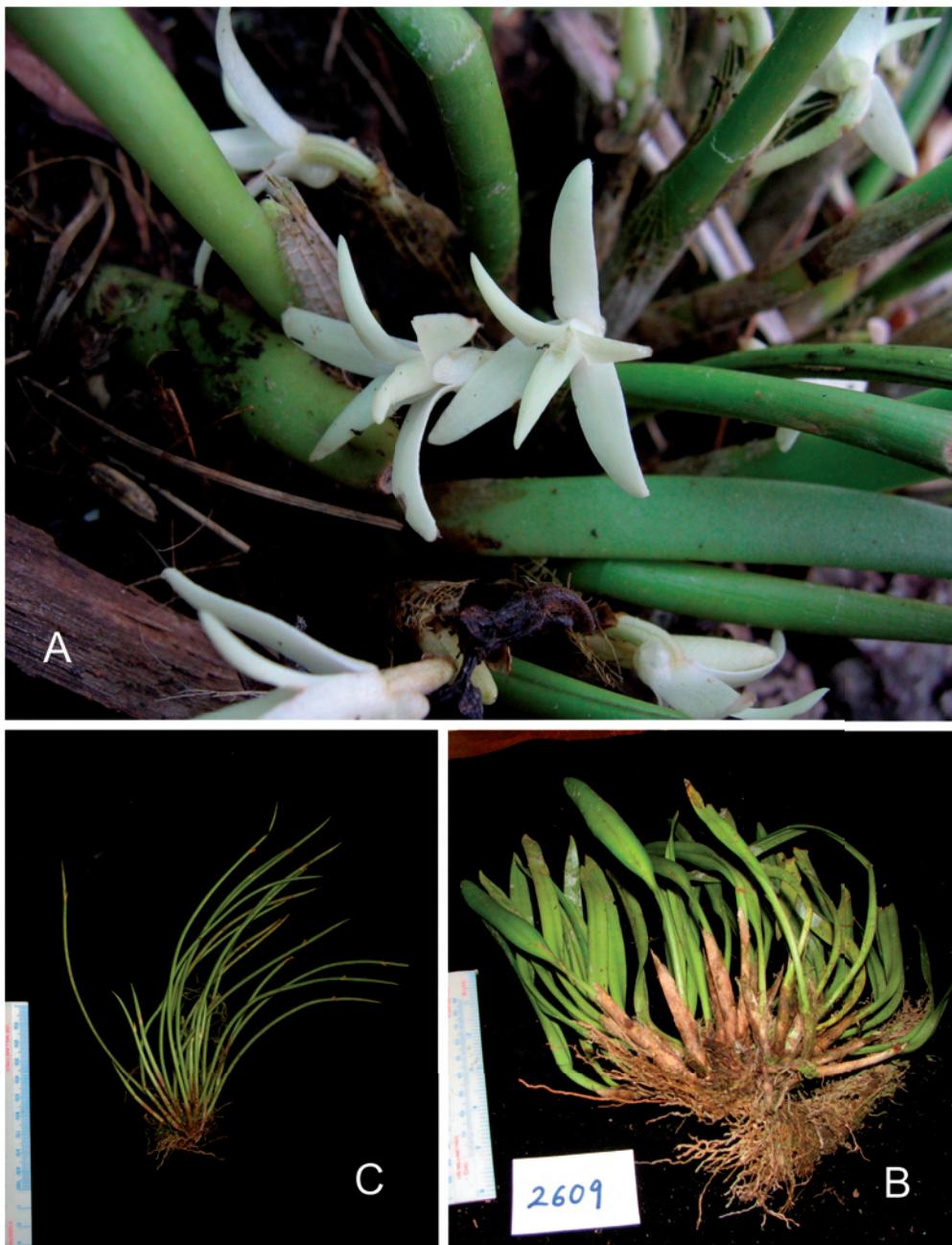


Figure 1. A–B. *Ceratostylis radiata* J.J. Sm.: A. Flowers; B. Habit. Kurzweil & Lwin 2609. Note the reticulate leaf sheaths; C. *C. subulata* Blume, habit. Kurzweil & Lwin 2379.

The Myanmar specimen cited corresponds in flower, stem and leaf structure as well as in the flower colour well with *Ceratostylis subulata* (Seidenfaden, 1986). However, the column-foot is unusually long, measuring nearly 2 mm.

**4. Cleisostoma linearilobatum** (Seidenf. & Smitinand) Garay, Bot. Mus. Leafl. 23: 172. 1972; Seidenf., Opera Bot. 124: 60. 1995; N. Pearce & P.J. Cribb, Fl. Bhutan 3(3): 509, fig. 113, pl. 27. 2002; S.C. Chen & J.J. Wood in Z.Y. Wu et al. (eds), Fl. China 25: 459. 2009; Z.Y. Wu et al. (eds), Fl. China Illustrations 25: 606.5–7. 2010.—*Sarcanthus linearilobatus* Seidenf. & Smitinand, Orch. Thail. (Prelim. List): 684. 1965.—*Ormerodia linearilobata* (Seidenf. & Smitinand) Szlach., Ann. Bot. Fenn. 40: 68. 2003.—Type: Thailand, Chiang Mai, Kawng He, 960 m, Kerr 363 (holotype K). Fig. 2A.

*Cleisostoma sagittiforme* Garay, Bot. Mus. Leafl. 23: 174. 1972; Seidenf., Dansk Bot. Ark. 29(3): 19, fig. 5. 1975.—*Sarcanthus sagittatus* King & Pantl., J. Asiat. Soc. Bengal, Pt. 2, Nat. Hist. 66: 595. 1897.—*Ormerodia sagittata* (King & Pantl.) Szlach., Ann. Bot. Fenn. 40: 68. 2003.—Type: India, Khasia, Pantling 629 (holotype CAL).

*Cleisostoma sikkimense* Lucksom, Indian J. Forest. 15: 27. 1992.—Type: India, Sikkim, Leevung, Lucksom 204A (holotype BHSC) [fide Pearce & Cribb, 2002].

**Distribution.**—India (Sikkim) to south-western China and Peninsular Malaysia.

**Ecology.**—Our plants grew in evergreen mountain forest, which also corresponds well with populations in Yunnan (Chen & al., 2009). Eastern Himalayan plants grow in shade on *Castanopsis tribuloides* at altitudes of between 500 and 2000 m (Pearce & Cribb, 2002).

**Myanmar.**—Kachin State: Mountains west of Putao, undisturbed evergreen forest, 22 March 2009, Kurzweil & Lwin 2684 (SING [spirit]); mountains west of Putao, 1000 m, 25 March 2009, Kurzweil & Lwin 2772 (SING [spirit]).

**Notes.**—Among the species with flat and apically bilobed leaves and flowers with a linear stipe, *Cleisostoma linearilobatum* is well characterised having flowers with a longitudinal spur septum and a truncate operculum front edge.

Characteristic features of the species are also the two prominent rostellum lobes and the outward-bulging distal parts of the lip side lobes. The species is rather widespread in continental Asia, and its discovery in Myanmar falls into a gap in its known distribution.

**5. Panisea tricallosa** Rolfe, Bull. Misc. Inform. Kew 1901: 148. 1901; Seidenf., Opera Bot. 89: 86, fig. 46, pl. 6c. 1986; Lund, Nord. J. Bot. 7: 520, figs. 10–17. 1987; Seidenf., Opera Bot. 114: 196. 1992; N. Pearce & P.J. Cribb, Fl. Bhutan 3(3): 347. 2002; S.C. Chen & J.J. Wood in Z.Y. Wu et al. (eds), Fl. China 25: 333. 2009.—*Sigmatogyne tricallosa* (Rolfe) Pfitzer in H.G.A. Engler (ed.), Pflanzenr., IV, 50(32): 133. 1907.—Type: India, Assam, cult. RBG Glasnevin (holotype K!). Fig. 2B–C.

*Panisea pantlingii* (Pfitzer) Schltr., Orchideen: 155. 1914.—*Sigmatogyne pantlingii* Pfitzer in H.G.A. Engler (ed.), Pflanzenr., IV, 50(32): 134. 1907.—Type: India, Assam, Watt 571 (holotype K!).

*Sigmatogyne bia* Kerr, J. Siam Soc., Nat. Hist. Suppl. 9: 236. 1933.—*Panisea bia* (Kerr) Tang & F.T. Wang, Acta Phytotax. Sin. 1: 79. 1951.—Type: Laos, Phu Bia, 1500 m, 12 April 1932, Kerr 0971 (holotype K).

*Panisea unifolia* S.C. Chen, Acta Bot. Yunnan. 2: 304. 1980.—Type: China, Yunnan, Fong Chin, 2100 m, T. T. Yu 16321 (holotype PE).

*Panisea tricallosa* var. *garrettii* I.D. Lund, Nordic J. Bot. 7: 524. 1987.—Type: Thailand, Doi Inthanon, 1550 m, Garrett 623 (holotype BKF).

**Distribution.**—Nepal to Indochina and south-western China.

**Ecology.**—Our specimens were growing in mountain forest. Eastern Himalayan plants were cited as growing on rocks in open oak forest at an altitude of 1700–2160 m (Pearce & Cribb, 2002).

**Myanmar.**—Kachin State: Mountains north-east of Putao, in primary mountain forest, 6 March 2007, Kurzweil & Lwin 2442 (SING [spirit]); mountains west of Putao, on fallen tree in a clearing in secondary forest, 1325 m, 19 March 2009, Kurzweil & Lwin 2573 (SING).

**Notes.**—A widespread species in the subtropical parts of continental Asia, and its occurrence in Myanmar was therefore expected.

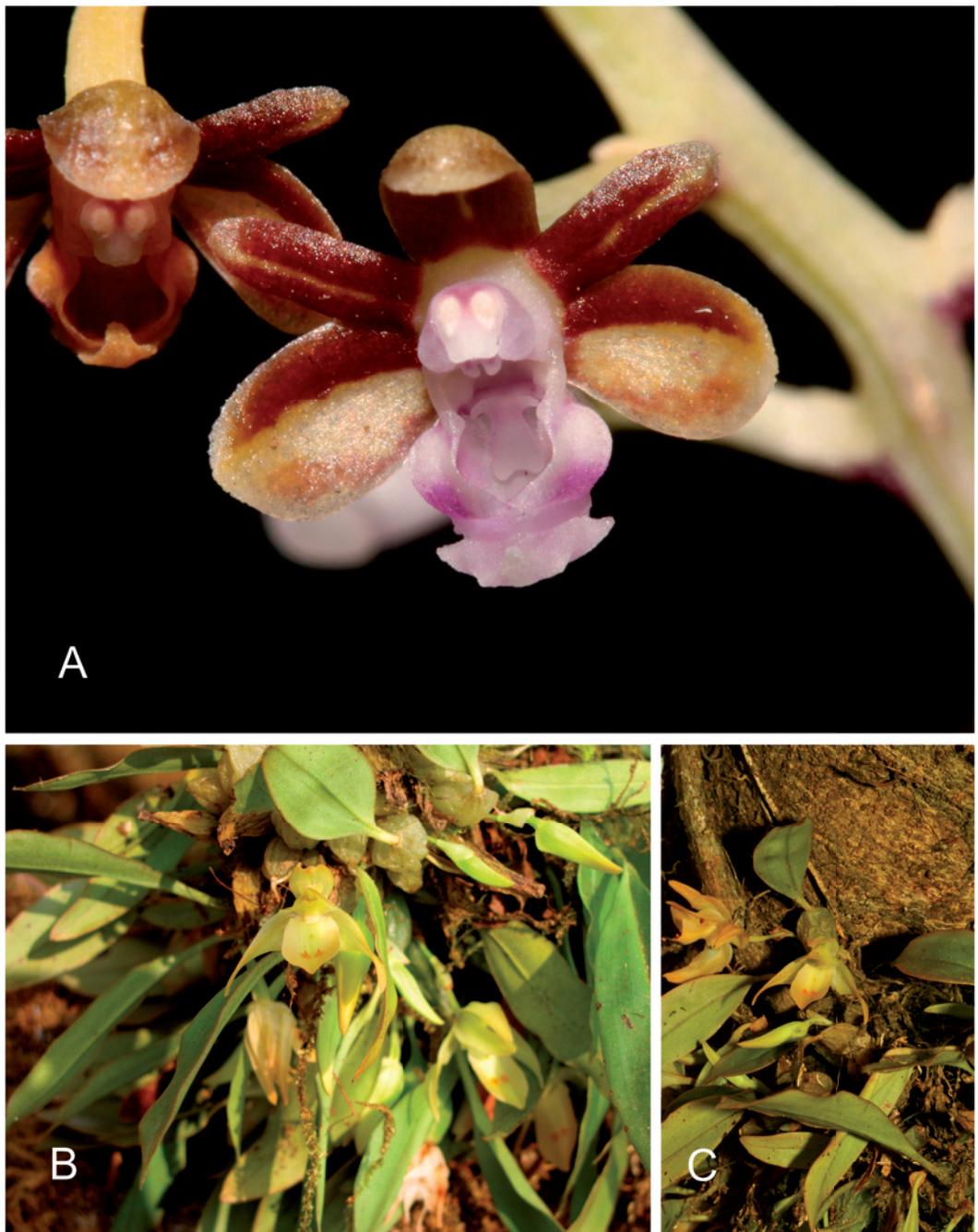


Figure 2. A. *Cleisostoma linearilobatum* (Seidenf. & Smitinand) Garay, flower. Kurzweil & Lwin 2772; B–C. *Panisea tricallosa* Rolfe. Kurzweil & Lwin 2573.

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