

Contributions to the Flora of Myanmar VII: Nine new distributional records of flowering plants from Myanmar

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ABSTRACT. In the course of inventory of flowering plants in Myanmar, nine species representing nine genera and eight families are recorded for the first time from Myanmar: *Arisaema sukotaiense* Gagnep. (Araceae), *Aristolochia perangustifolia* Phuph., *Thottea parviflora* Ridl. (Aristolochiaceae), *Calceolaria tripartita* Ruiz & Pav. (Calceolariaceae), *Murdannia versicolor* (Dalzell) G. Brückn. (Commelinaceae), *Musa flaviflora* N. W. Simmonds (Musaceae), *Picrophloeus javanensis* Blume (Gentianaceae), *Schima crenata* Korth. (Theaceae) and *Zingiber callianthus* Triboun & K. Larsen (Zingiberaceae). In each taxon, voucher specimens, the general distribution and photographs are provided with taxonomic notes.

KEYWORDS: angiosperms, Burma, checklist, inventory, taxonomy

INTRODUCTION

Myanmar is known as the “floristic blank” among continental Southeast Asian countries (Tanaka, 2010), and it is located at the crossroads between South Asia, East Asia

and Indochina, with influences from each adjacent region—from the Sino-Himalayan flora in the north, the Yunnanese flora in the northeast, the Assamese flora in the

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northwest, the Thai-Indochinese flora in the southeast, and the Malesian flora in the southern region (Middleton *et al.*, 2019).

Even if the collection density of the country was raised up to 20 per 100 km², many regions in Myanmar still lack sufficient floristic inventories (Middleton *et al.*, 2019). Among them, the northwestern (Kachin State and Sagaing Region) and southern peninsular regions including the Mergui Archipelago in the Andaman Sea (formerly Tenasserim) are considered as the most under-collected (Tanaka *et al.*, 2018).

In the course of identification of the specimens accumulated by our floristic inventory studies performed in Mt. Victoria (Natma Taung) and northern Chin Hills in Chin State, Karen Hills in Kayin and Kayah States, Kyaikhtiyo Wildlife Sanctuary in Mon State, Tanintharyi Nature Reserve, Dawei and Mergui Archipelago in Tanintharyi Region enable us to find additional plant species to be recorded for the flora of Myanmar. Those are a total of nine species of flowering plants representing nine genera and eight families, and those species are reported here: *Arisaema sukotaiense* Gagnep. (Araceae), *Aristolochia perangustifolia* Phuph., *Thottea parviflora* Ridl. (Aristolochiaceae), *Calceolaria tripartita* Ruiz & Pav. (Calceolariaceae), *Murdannia versicolor* (Dalzell) G. Brückn. (Commelinaceae), *Musa flaviflora* N. W. Simmonds (Musaceae), *Picrophloeus javanensis* Blume (Gentianaceae), *Schima crenata* Korth. (Theaceae) and *Zingiber callianthus* Triboun & K. Larsen (Zingiberaceae). Their voucher specimens,

distribution, and taxonomic notes are provided as follows.

NEWLY RECORDED TAXA IN MYANMAR

ARACEAE

Arisaema sukotaiense Gagnep., Notul. Syst. (Paris) 9: 129. 1941. Fig. 1A.

Type: Thailand, Sukhothai [Sukotai], Khao [Kao] Juang, 3 May 1922, *Kerr 5936* (lectotype K [K000400639, image!] designated by Gusman & Gusman, 2006).

Myanmar.—Kayah State: Htee Phruso Cave, Phruso Township, Loikaw District, 19°22'41.988"N, 97°02'32.274"E, 1,400 m alt., 10 June 2019, *Nobuyuki Tanaka et al. MY 4948* (RAF, TNS); along the roadside to Hoya, Phruso Township, Loikaw District, 19°19'47.622"N, 97°01'11.382"E, 1,500 m alt., 11 June 2019, *Nobuyuki Tanaka et al. MY4975* (RAF, TNS).

Distribution.—China, Myanmar and Thailand.

Notes.—*Arisaema sukotaiense* was described by Gagnepain (1941) based on the Kerr's specimens collected from Sukhothai and Doi Inthanon, Thailand. This aroid is characterised by its red-brown to blackish (rarely greenish) funnellform spathe tube with thin, white stripes and radiate leaf blade, and is classified into section *Sinarisaema* Nakai (Gusman & Gusman, 2006; Murata *et al.*, 2014). Thus far *A. sukotaiense* has been recorded only from China (Yunnan) and northern Thailand (Li *et al.*, 2010; Boyce *et al.*, 2012). This study recorded this species

for the first time from Myanmar. A habitat is open sunny place at the edge of the evergreen forest in the limestone area that stretches across the border between Thailand and Myanmar.

ARISTOLOCHIACEAE

Aristolochia perangustifolia Phuph., Thai Forest Bull., Bot. 34: 183. 2006. Fig. 1B.

Type: Thailand, North-eastern, Khon Kaen, Pha Nok Khao, near Phu Kradueng, 29 October 1984, *Murata et al. T-51751* (holotype BKF, isotype KYO!).

Myanmar.— Chin State: along the roadside, on the foot of Natma Taung (Mt. Victoria), Kampetlet Township, Mindat District, 700–800 m alt., 4 December 2002, *Jin Murata et al. 2002124* (RAF, TNS).

Distribution.— Myanmar and Thailand.

Notes.— *Aristolochia perangustifolia* was described by Phuphathanaphong (2006) from Khon Kaen, northeastern Thailand, and thus far known only from Thailand. Based on the morphological investigation, a specimen collected from the foothill of Mt. Victoria (Natma Taung) in Chin State, western Myanmar, is identified as *A. perangustifolia*. The species is a member of subsection *Aristolochia* (subgenus *Aristolochia*) based on the absence of a stipe between the utricle and the ovary (González & Stevenson, 2002). The Myanmar specimen matched well with the original description of the species except for the shape of leaf blade. For specimens collected in Thailand, leaf blade is narrowly lanceolate, on the other

hand, ovate to ovate-lanceolate in the Myanmar specimen. This species is considered to have wide range of variations in leaf blade. In addition, the perianth tube is sparsely hispid inside even this character is not involved in the original protologue of the species. A habitat in Myanmar is mixed deciduous forest floor, which is similar to that of type locality in Thailand, but not in limestone area.

Thottea parviflora Ridl., J. Straits Branch Roy. Asiat. Soc. 57: 89. 1911. Fig. 1C.

Type: Peninsular Malaysia, Perak, Temenggor, July 1909, *Ridley 14580* (lectotype SING [SING97415] designated by Yao, 2013).

Myanmar.— Tanintharyi Region: along the roadside en route from Mawtaung to Tanintharyi, ca. 43 km SE of Tanintharyi town, 11°51'32.63"N, 99°19'28.02"E, 172 m alt., 6 June 2016, *Shuichiro Tagane et al. MY333* (FU, RAF, TNS); 1020 point, along the roadside, near the border with Boping Township, ca. 20 km N of Manoron, 11°43'30.47"N, 99°05'32.36"E, 218 m alt., 7 June 2016, *Nobuyuki Tanaka et al. MY390* (FU, RAF, TNS); along the Hlaing Gyi Aw Trail, Bo Cho Island, Kawthaung Township, 10°40'38.2"N, 98°14' 58.6"E, 30–108 m alt., 6 February 2018, *Nobuyuki Tanaka et al. MY3026* (RAF, TNS); Bo Cho Island, the Lampi Marine National Park, Kawthaung Township, 18 May 2017, *Shuichiro Tagane et al. MY1973* (RAF, TNS).

Distribution.— Myanmar, Thailand and Peninsular Malaysia.

Notes.— *Thottea* Rottb. is a small genus with about 45 species distributed in Sri Lanka, India, Bangladesh, Myanmar, Thailand, Laos, Vietnam, China, Peninsular Malaysia, Singapore, Indonesia and the Philippines (Yao, 2013; Tagane *et al.*, 2017). *Thottea parviflora* was described from Peninsular Malaysia and also distributed in peninsular region of Thailand (Ridley, 1911; Phuphathanaphong, 1987a, 1987b). Yao

(2013) described nine new species and *Thottea* is now represented by 16 species in Peninsular Malaysia. As the result of this study, *Thottea parviflora* is also recorded from the peninsular region of Myanmar, which is the first record to Myanmar flora. *Thottea parviflora* is erect shrubby species having axillary inflorescence with pinkish flowers, and very common in Tanintharyi Region, Myanmar.

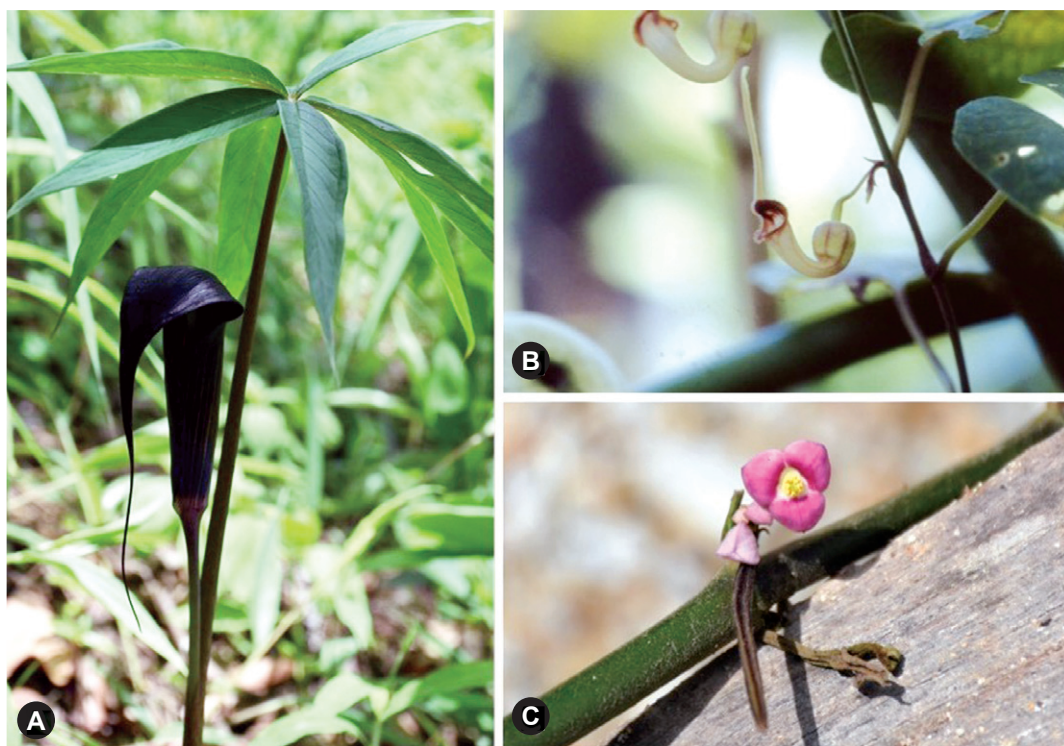


FIGURE 1. Newly recorded species from Myanmar: A. *Arisaema sukotaiense*; B. *Aristolochia perangustifolia*; C. *Thottea parviflora*.

CALCEOLARIACEAE

Calceolaria tripartita Ruiz & Pav., Fl. Peruv. 1: 14. 1798. Fig. 2A.

Myanmar.— Chin State: Kennedy Peak, Tedim Township, Falam District, 20

November 2019, Nobuyuki Tanaka *et al.* MY5568 (RAF, TNS).

Distribution.— Colombia, Costa Rica, Ecuador, Guatemala, Mexico, Panama, Peru, Venezuela. Naturalized in Asian tropics and Pacific Islands.

Notes.— This species is collected from the Kennedy Peak, next highest peak to Mt. Victoria in the Chin Hills, but we observed it commonly growing along the road toward Mizoram, India. Kress *et al.* (2003) listed *Calceolaria mexicana* Benth., however it could be misidentified due to its high similarity. Landrum & MacVaugh (1973) well compared the difference between these two species as follows: *Calceolaria mexicana* has smaller flower than *C. tripartita*. Cauline leaves are toothed, pinnately incised, but the sinuses seldom approaching to the rachis in *C. mexicana*, on the other hand, they are pinnate, the blade dissected to the rachis in *C. tripartita*. *Calceolaria mexicana* is usually procumbent, and *C. tripartita* is normally erect. Based on these characters, our specimen is identified as *C. tripartita*. *Calceolaria tripartita* is native to Mexico to Peru and naturalized in Asia (India, Sri Lanka, East Himalaya, China, Japan etc.) (POWO, 2019; Tagane *et al.*, 2020).

COMMELINACEAE

Murdannia versicolor (Dalzell) G. Brückn. in Engler, Nat. Pflanzenfam. ed. 2, 15a: 173. 1930. Fig. 2B.

Myanmar.— Magway Region: on forest floor, along the road between Minbu and Ann, Gokkyi, ca. 9 km east of Mt. Nat Yae Kan, 19°52'12.18"N, 94°27'51.282"E, 850 m alt., 12 August 2019, *Nobuyuki Tanaka et al.* MY5348 (RAF, TNS).

Distribution.— India, Myanmar, Vietnam and Philippines.

Notes.— *Murdannia versicolor* is so far known from India, Vietnam and Philippines, but there are no records from Myanmar or Thailand, which lies between them. A field excursion to southern Arakan Mountain Range led us to collect *M. versicolor*. The plant is identified as *M. versicolor* due to the following morphological characters: stout habit, linear to linear-lanceolate glabrous leaves, axillary orange-yellow flowers with glabrous pedicels from upper leaf sheaths. At least records were obtained from Myanmar, where there was no distribution data so far, and partially we were able to fill in the distribution gaps.

GENTIANACEAE

Picrophloeus javanensis Blume, Bijdr. Fl. Ned. Ind.: 1020. 1826. Fig. 2C.

Myanmar.— Tanintharyi Region: along the trail in south of the Lampi Island from the west side of the island, the Lampi Marine National Park, Bokepying Township, 10°47'37"N, 98°15'5.8"E, 17 m alt., 22 May 2017, *Shuichiro Tagane et al.* MY2518 (RAF, TNS).

Distribution.— Myanmar, Malaysia, Indonesia and Papua New Guinea.

Notes.— The genus *Picrophloeus* Blume is a small genus with four shrubby species, and known to be distributed in Sumatra, Java, Malay Peninsula, Borneo, Sulawesi, Moluccas and New Guinea (Wong, 2012; POWO, 2019). It was included *Fagraea* complex but distinguished by its terminal cymes, and conspicuously exerted styles and filaments (Sugumaran & Wong, 2012).

Among the four species in the genus, *P. javanensis* shows the widest distribution in Sumatra, Java, Malay Peninsula, Borneo, Moluccas and New Guinea (Wong, 2012) and our record on Lampi Island in Myanmar

represents its northern limit of distribution for both species and genus. During our field survey on Lampi Island in May 2017, some flowering individuals were observed along small streams in lowland dipterocarp forest.



FIGURE 2. Newly recorded species from Myanmar: A. *Calceolaria tripartita*; B. *Murdannia versicolor*; C. *Picrophloeus javanensis*.

MUSACEAE

Musa flaviflora N. W. Simmonds, Kew Bull. 11: 471. 1957. Fig. 3A–C.

Myanmar.— Sagaing Region: Let Say Kan, Maw Laik, Kalay Township, 820 m alt., 20 November 2019, *Nobuyuki Tanaka et al.* MY5557 (FU, RAF, TNS).

Distribution.— India (northeast) and Myanmar.

Notes.— *Musa flaviflora* was described based on the plant grown in the West Indies originally collected from Assam, India (Simmonds, 1956a, 1956b). Häkkinen *et al.* (2014) revised the rigorous identity of *M. flaviflora* and showed it was distinct species different from *M. thomsonii* King ex A. M. Cowan & Cowan, which was sometimes erroneously synonymized under the former species. *Musa flaviflora*, commonly occurring in eastern India, is easily distinguishable due to dense waxy immature plants with erect leaves, reddish to pinkish male bud with compact fruit bunch (Häkkinen *et al.*, 2014). This is the first record of this species from Myanmar. It might be distributed in the Patkai Mountain Range from Chin Hills to Assam.

THEACEAE

Schima crenata Korth. in Verh. Nat. Gesch. Ned. Bezitt., Bot.: t. 29. 1841. Fig. 3D.

Myanmar.— Tanintharyi Region: in Tanintharyi Nature Reserve, Yephyu Township, Dawei District, 518 m alt., 17

November 2018, *Shuichiro Tagane et al.* MY4405 (RAF, TNS).

Distribution.— Myanmar, China (Hainan), Thailand, Laos, Cambodia, Vietnam and Malaysia.

Notes.— *Schima* Reinw. ex Blume is widely distributed in subtropical and tropical areas of Southeast and East Asia, and the species are often dominant components of evergreen broadleaved forest or lower montane forest in the area. The number of species in *Schima* had been controversial due to its wide distribution range and high morphological similarity among species. Among the claims, Bloembergen (1952) regarded the genus as monotypic, *Schima wallichii* (DC.) Korth. with nine geographically separated subspecies and three varieties, which has been widely accepted in the regional checklists and floras. Recently, however, Yu *et al.* (2017) demonstrated that phylogenetic analysis based on chloroplast genome resolved the relationship of 11 *Schima* species including *S. wallichii* and *S. crenata* as distinct species with a strong support. So far four species of *Schima*, *S. argentea* E. Pritz. ex Diels, *S. khasiana* Dyer, *S. noronhae* Reinw. ex Blume, and *S. wallichii*, have been known from Myanmar (Kress *et al.*, 2003; Ming & Bartholomew, 2007). *Schima crenata* is easily distinguished from these four in having 6–7 pairs of secondary veins and leaf margin undulate crenate on apical *ca.* 1/2 (vs serrate or entire in *S. khasiana*) (Ming & Bartholomew, 2007).

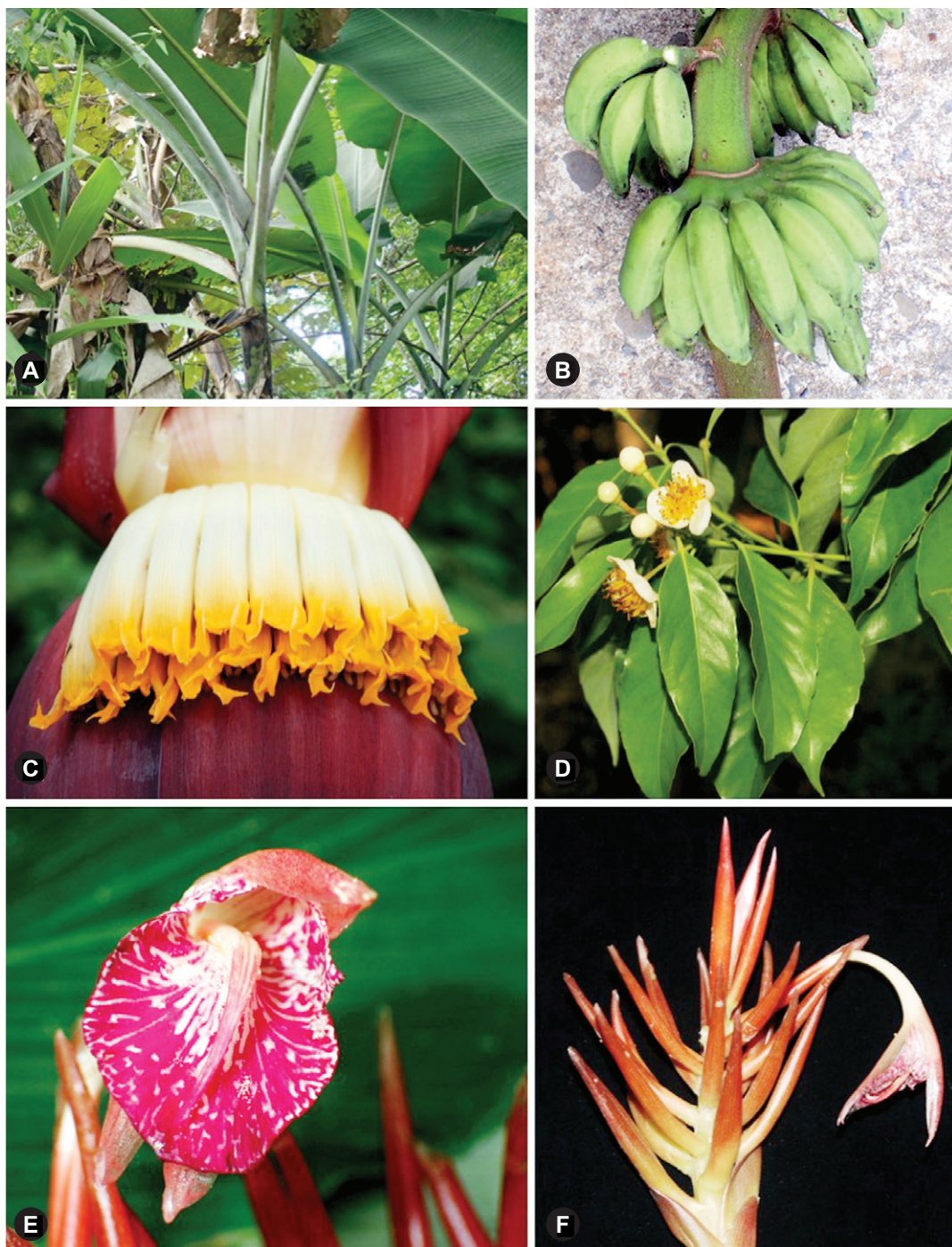


FIGURE 3. Newly recorded species from Myanmar: A–C. *Musa flaviflora*: A. stem; B. young fruits; C. staminate flowers; D. *Schima crenata*; E–F. *Zingiber callianthus*: E. front view of flower; F. inflorescence with a flower.

ZINGIBERACEAE

Zingiber callianthus Triboun & K. Larsen, Thai J. Bot. 6: 59. 2014. Fig. 3E–F.

Myanmar.— Mon State: Winkaba Taung, Kyaikhtiyo Wildlife Sanctuary, Kyaikto Township, Kyaikto District, 19°28'14.9"N, 97°06'08.5"E, ca. 1,000 m alt., 21 August 2020, *Mu Mu Aung et al.* MY5896 (RAF, TNS).

Distribution.— Myanmar and Thailand.

Notes.— *Zingiber callianthus* was described from Mae Ramad, Mae Sot District, western Thailand, and characterised by having inflorescence with open bracts and visible inflorescence rachis. So far this species has been considered as endemic to Thailand. A fieldwork to Kyaikhtiyo Wildlife Sanctuary in August in 2020 recorded *Z. callianthus* on the forest floor of the mixed deciduous forest. Collection site is eastern Myanmar, located ca. 200 km northwest of the type locality of *Z. callianthus* in Thailand. It might be distributed in the limestone hill range lying over Thai-Myanmar border. The number of taxa of *Zingiber* presently occurring in Myanmar is raised to 37 as the results of this study.

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