

An Orchid Checklist of Mt. Popa, Central Myanmar

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Abstract As part of floristic inventory work of Myanmar, a preliminary orchid flora of Mt. Popa, central Myanmar, is provided. We herein record 102 taxa of orchids representing 42 genera from this region.

Key words: checklist, Orchidaceae, Mt. Popa, Myanmar

Introduction

Myanmar (old Burma) is located south of the Himalayan region and, with a land area of 676,500 km² (approximately twice the size of Japan), spans tropical evergreen, mixed deciduous, savanna and alpine vegetation types (Tanaka, 2005). An updated checklist of the gymnosperms and flowering plants of Myanmar has been published (Kress *et al.*, 2003) based on previous or preceding works by Lace (1912), Rodger (1922), Hundley and Chit (1961) and Hundley (1987), and with additional records accumulated from floras of neighbouring regions. However, no modern critical floristic surveys have been conducted in the country, and much remains to be learnt of its flora as well as of floristic relations with neighbouring regions in Asia (Frodin 2001; Tanaka 2005, 2010).

Located in Mandalay Division, Mt. Popa (20°56'N, 95°12'E) is an extinct volcano that, at an altitude of 1,518m, stands topographically isolated within the dry zone lowland savannah of

central Myanmar (Fig. 1). Working in the 1930s, Frederik Garrett Dickason was probably the first botanist to make collections on Mt. Popa (Tanaka *et al.*, 2006). Yin Yin Kyi reported on the vegeta-

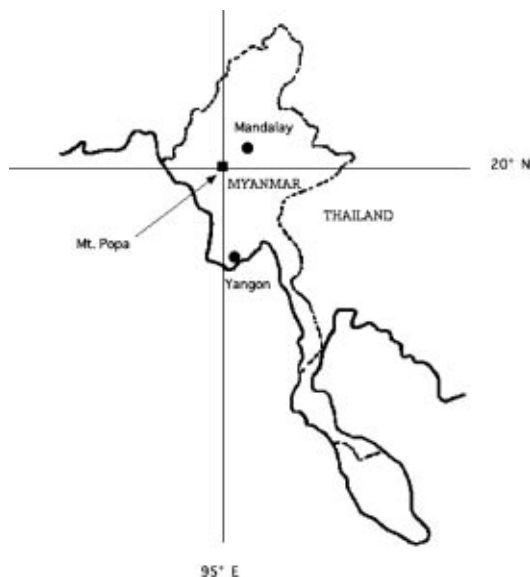


Fig. 1. Location of Mt. Popa in Myanmar.

tion of Mt. Popa and later made a survey of the crater's vegetation from which she produced an enumeration of 221 vascular plant species (Kyi, 1992). However, she did not record any orchid species from Mt. Popa (Kyi and Moe, 1997). In her article, she recognized four forest types, namely, dry forest, dry hill forest, dry upper mixed deciduous forest and Indaing forest, with grassland dominating at the summit.

Owing to its climatic and geological diversity, Mt. Popa exhibits great plant diversity, and richness of vegetation has developed since the last eruption about 320,000 years ago (Kyi, 1992). To provide a comprehensive floristic inventory of the area, a floristic survey in Popa Mountain Park was carried out by us with cooperation of the Nature and Wildlife Conservation Division of the Myanmar Forest Department. The result of the inventory work of all flowering plants except for Orchidaceae has already been published (Tanaka *et al.*, 2006). Subsequent expeditions to Mt. Popa focusing on the inventory of orchids documented fourteen species newly recorded from Myanmar (Tanaka *et al.*, 2011).

Thus far, seven expeditions to Popa Mountain Park were conducted with specimens being collected in both the dry and wet seasons. Sterile plants were planted in the nursery of Popa Mountain Park Office, and spirit specimens were made when they bloomed. Herbarium specimens were made in the Park's Environmental Education Centre. The first set was retained there, while duplicates were sent to three Japanese institutions, namely the Makino Botanical Garden (MBK), the University of Tokyo (TI), and the National Museum of Nature and Science (TNS) for identification.

As the result of our identification, a checklist of orchids of this region is provided in which 103 taxa belonging to 42 genera are recorded. Scientific names are arranged alphabetically. Myanmar vernacular names for each species followed Hundley (1987). Additional notes are provided for certain taxa as appropriate.

ENUMERATION OF TAXA

1. *Acampe* Lindl.

1.1. *Acampe joiceyana* (J.J.Sm.) Seidenf. in Nord. J. Bot. 22: 532 (2002).

Specimen examined: Western slope of Mt. Popa, 1200–1500 m alt., 30 March 2006, *Khin Myo Htwe 102* (spirit collection-MBK, TNS).

Life form: Epiphyte.

Distribution: Myanmar, Thailand, and Vietnam.

Note: Tanaka *et al.* (2011) newly recorded this species from Myanmar based on the specimen cited above.

1.2. *Acampe* aff. *praemorsa* (Roxb.) Blatt. & McCann in J. Bombay Nat. Hist. Soc. 35: 495 (1932). [Fig. 2-A]

Specimen examined: Inside of the crater, Mt. Popa, 1200–1500 m alt., 8 May 2005, *Khin Myo Htwe 13* (spirit collection-MBK, TNS).

Life form: Epiphyte.

Note: Our material matches well an Indian plant in Wight (1852: tab. 1670) after which Lindley (1853) described *Acampe wightiana* (Lindl.) Lindl. This name is widely accepted as a synonym of *A. praemorsa* (Roxb.) Blatt. & McCann. The illustration associated with the protologue of *Epidendrum praemorsum*, the basionym of *A. praemorsa*, in Roxburgh (1795: tab. 43) is also similar to our material but the spur of the lip is scarcely developed. Some contemporary illustrations of *A. praemorsa* based on Indian plants also have a saccate, rather than spurred lip (e. g., Rao, 1998; Misra, 2004). Besides, our material is also similar to material from tropical and subtropical Africa, although the shapes of spur, mid lobe of the lip, and lateral lobes of the lip vary in the figures that were consulted (Verdoorn, 1954; Cribb, 1989; Geerinck, 1992; Linder and Kurzweil, 1999). Currently, *A. pachyglossa* Rchb. f. is the most widely accepted name for the African plants (e. g., Cribb, 1989). The plants from Mt. Popa are unusual in their flower colour, the well-developed spur and the

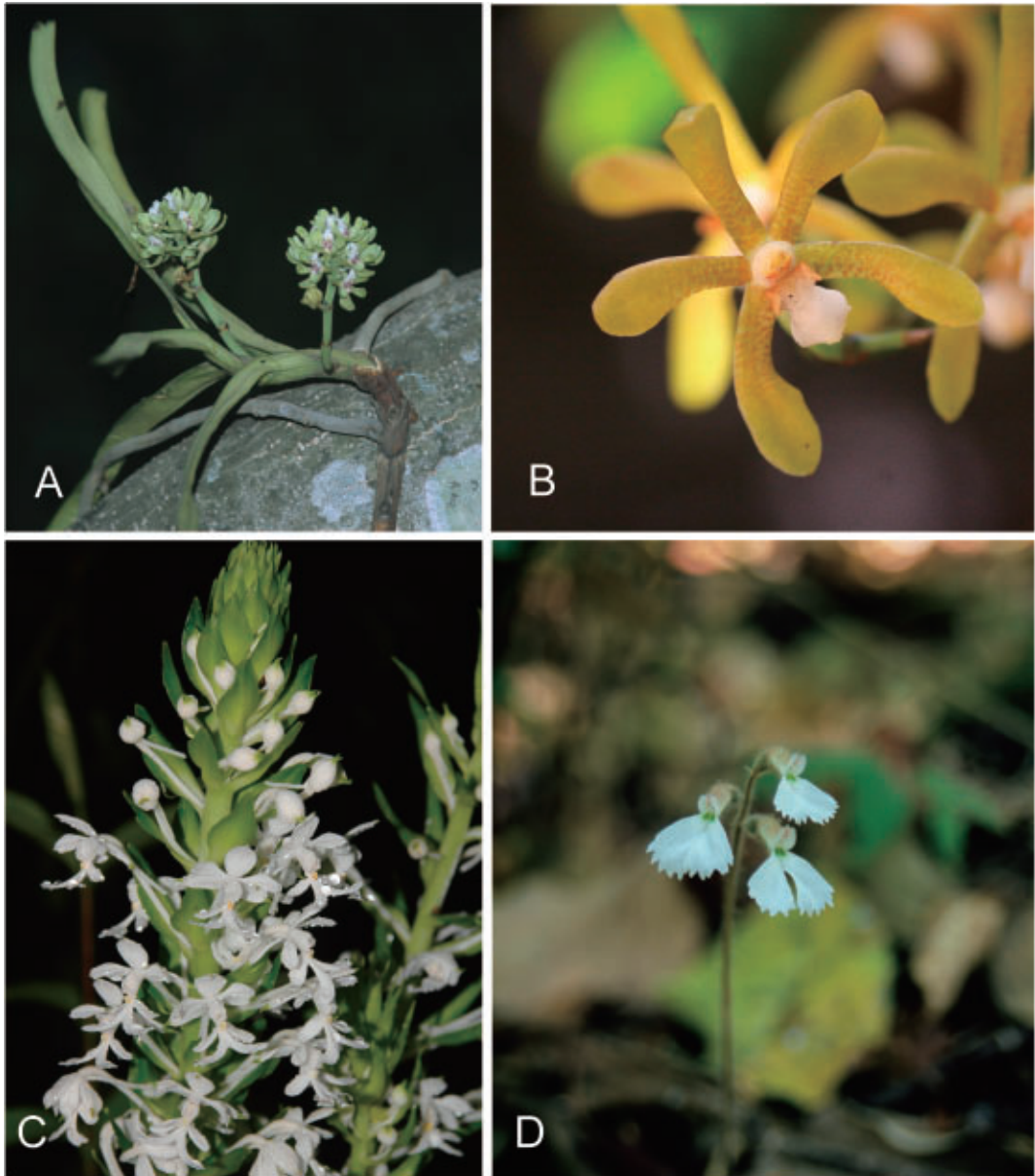


Fig. 2. A. *Acampe* aff. *praemorsa* (Roxb.) Blatt. & McCann. B. *Armadorum siamense* Schltr. C. *Calanthe triplicata* (Willem.) Ames. D. *Cheirostylis spathulata* J.J. Sm. (Photo A by K.M. Htwe; B by Y. Tsujita; C by S. Watthana; D by S. Gale)

shape of lateral lobes of the lip. The flower shows pale green with dark red-purple spots on the tepals and white with dark red-purple markings on the lip. Further comparative studies using Indian and African specimens are indispensable to reach satisfactory conclusions on the taxon-

omy of this complex.

2. *Aerides* Lour.

2.1. *Aerides crassifolia* C.S.P.Parish ex Burb. in *The Garden* 3: 461 (1873).

Specimens examined: In the crater of Mt. Popa, 1200–1500 m alt., 8 May 2005, *Khin Myo Htwe 14* (spirit collection-TNS); cult. in the nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka et al. 036165* (MBK).

Life form: Epiphyte.

Distribution: India, Myanmar, Thailand, Laos, and Vietnam.

Local name: Sagalay-ani.

2.2. *Aerides falcata* Lindl. & Paxton in Paxton's Fl. Gard. 2: 142 (1851).

Specimen examined: Inside of the crater of Mt. Popa, 1200–1500 m alt., *Khin Myo Htwe 33* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, Myanmar, Thailand, Laos, Cambodia, and Vietnam.

Local name: Sagalay-ahpyu.

3. *Apostasia* Blume

3.1. *Apostasia* cf. *wallichii* R.Br. in N.Wallich, Pl. Asiat. Rar. 1: 75 (1830).

Specimen examined: East side of Mt. Popa, 12 December 2003, *Khin Myo Htwe 030019* (MBK).

Life form: Terrestrial.

Note: We examined sterile specimens only. Results of molecular identification showed that it differed from *Apostasia wallichii* (Yukawa *et al.*, 2009). Further study is required to clarify its identity.

4. *Arachnis* Blume

4.1. *Arachnis labrosa* (Lindl. & Paxton) Rchb.f. in Bot. Centralbl. 28: 343 (1886).

Specimen examined: Mt. Popa, cult. in the nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka et al. 036150* (MBK).

Life form: Epiphyte.

Distribution: Bhutan, India, Myanmar, Vietnam, China, Taiwan, and Japan.

Note: This species has been recorded from Mon State and Taninthayi Region in Myanmar (Kress *et al.*, 2003) and is here newly recorded

from Mandalay Region, central Myanmar.

5. *Armodorium* Breda

5.1. *Armodorium siamense* Schltr. in Orchis 6: 67 (1912). [Fig. 2-B]

Specimen examined: Mt. Popa, 10 May 2006, *Khin Myo Htwe 108* (spirit collection-MBK, TNS).

Life form: Epiphyte.

Distribution: Myanmar, Thailand, and Vietnam.

Note: Tanaka *et al.* (2011) newly reported this species from Myanmar.

6. *Bletilla* Rchb.f.

6.1. *Bletilla* sp.

Specimen examined: Near Taung Kalat, ca. 600 m alt., 13 August 2011, *Y. Dong et al. MY 524* (herbarium specimen deposited in the Central Forestry Development Training Center).

Life form: Terrestrial.

Note: Three species of the genus *Bletilla*, i. e., *B. chartacea* (King & Pantl.) Tang & F.T.Wang, *B. foliosa* (King & Pantl.) Tang & F.T.Wang, and *B. formosana* (Hayata) Schltr., have been recorded from Myanmar (Kurzweil and Lwin, 2014). The material, however, does not agree with any of these species.

7. *Bulbophyllum* Thouars

7.1. *Bulbophyllum picturatum* (Lodd.) Rchb.f. in Ann. Bot. Syst. 6: 262 (1861).

Specimen examined: Mt. Popa, 25 March 2007, *Khin Myo Htwe 133* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, China, Myanmar, Thailand, Cambodia, and Vietnam.

7.2. *Bulbophyllum polyrrhizum* Lindl., Gen. Sp. Orchid. Pl.: 53 (1830).

Specimen examined: Mt. Popa, 21 March 2006, *Khin Myo Htwe 98* (spirit collection -MBK, TNS).

Life form: Epiphyte.

Distribution: India, Nepal, China, Myanmar, and Thailand.

Local name: Thazin-lay.

Note: This species has been recorded from Shan State in Myanmar (Kress *et al.*, 2003) and is here newly recorded from Mandalay Region.

7.3. *Bulbophyllum reclusum* Seidenf. in Opera Bot. 124: 47 (1995).

Specimens examined: Mt. Popa, 24 February 2006, *Khin Myo Htwe 53* (spirit collection-MBK, TNS); Mt. Popa, 15 February 2006, *Khin Myo Htwe 25* (spirit collection-MBK, TNS).

Life form: Epiphyte.

Distribution: Myanmar and Thailand.

Note: This species was considered to be endemic to Thailand. However, Tanaka *et al.* (2011) newly recorded this species in Myanmar based on the specimens cited above.

8. *Calanthe* R.Br.

8.1. *Calanthe triplicata* (Willemet) Ames in Philipp. J. Sci., C 2: 326 (1907). [Fig. 2-C]

Specimen examined: Mt. Popa, 12 May 2005, *Khin Myo Htwe 28* (spirit collection-MBK, TNS).

Life form: Terrestrial.

Distribution: Throughout tropical and subtropical Asia to Australia and the Pacific Islands.

Local name: Padein-ngo.

Note: This species was recorded from Myanmar for the first time by Ormerod and Kumar (2003).

9. *Cheirostylis* Blume

9.1. *Cheirostylis spathulata* J.J.Sm. in Bull. Jard. Bot. Buitenzorg, sér. 3, 9: 32 (1927). [Fig. 2-D]

Specimens examined: Mt. Popa, 1 April 2008, *Tsujita et al. 036251* (spirit collection-TNS); near the junction of the road to Ye Nge Guest house, 5 March 2005, *Khin Myo Htwe 90* (spirit collection-TNS); near to the natural spring, along the

circular forest road, 2 March 2006, *Tetsuo Ohi-Toma 035000* (MBK).

Life form: Terrestrial.

Distribution: Indonesia, Myanmar, Thailand, and Vietnam.

Note: This species was recorded from Myanmar for the first time by Ormerod and Kumar (2003).

10. *Chiloschista* Lindl.

10.1. *Chiloschista usneoides* (D.Don) Lindl. in Edwards's Bot. Reg. 18: t. 1522 (1832).

Specimens examined: Southwestern slope of Mt. Popa, 1400m alt., 2 June 2006, *Tsujita et al. 036178* (spirit collection-TNS); Mt. Popa, Popa Mountain Park, 13 March 2006, *Khin Myo Htwe 035053* (MBK).

Life form: Epiphyte.

Distribution: India, Bhutan, Nepal, and Myanmar.

11. *Cleisomeria* Lindl. ex G.Don

11.1. *Cleisomeria pilosulum* (Gagnep.) Seidenf. & Garay in Bot. Tidsskr. 67: 120 (1972).

Specimens examined: Mt. Popa, *Khin Myo Htwe 25, 39* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: Bhutan, Myanmar, Thailand, Laos, Cambodia, and Vietnam.

Note: Tanaka *et al.* (2011) newly recorded this species in Myanmar.

12. *Coelogyne* Lindl.

12.1. *Coelogyne lentiginosa* Lindl., Fol. Orchid. 5: 3 (1854).

Specimen examined: along the trail of Mt. Popa, 19 April 2006 (photographic record by *Khin Myo Htwe* only).

Life form: Epiphyte.

Distribution: Myanmar, Thailand, and Vietnam.

Note: This species has been recorded from Mon State and Taninthayi Region (Kress *et al.*, 2003), and is a new record for Mandalay Region.

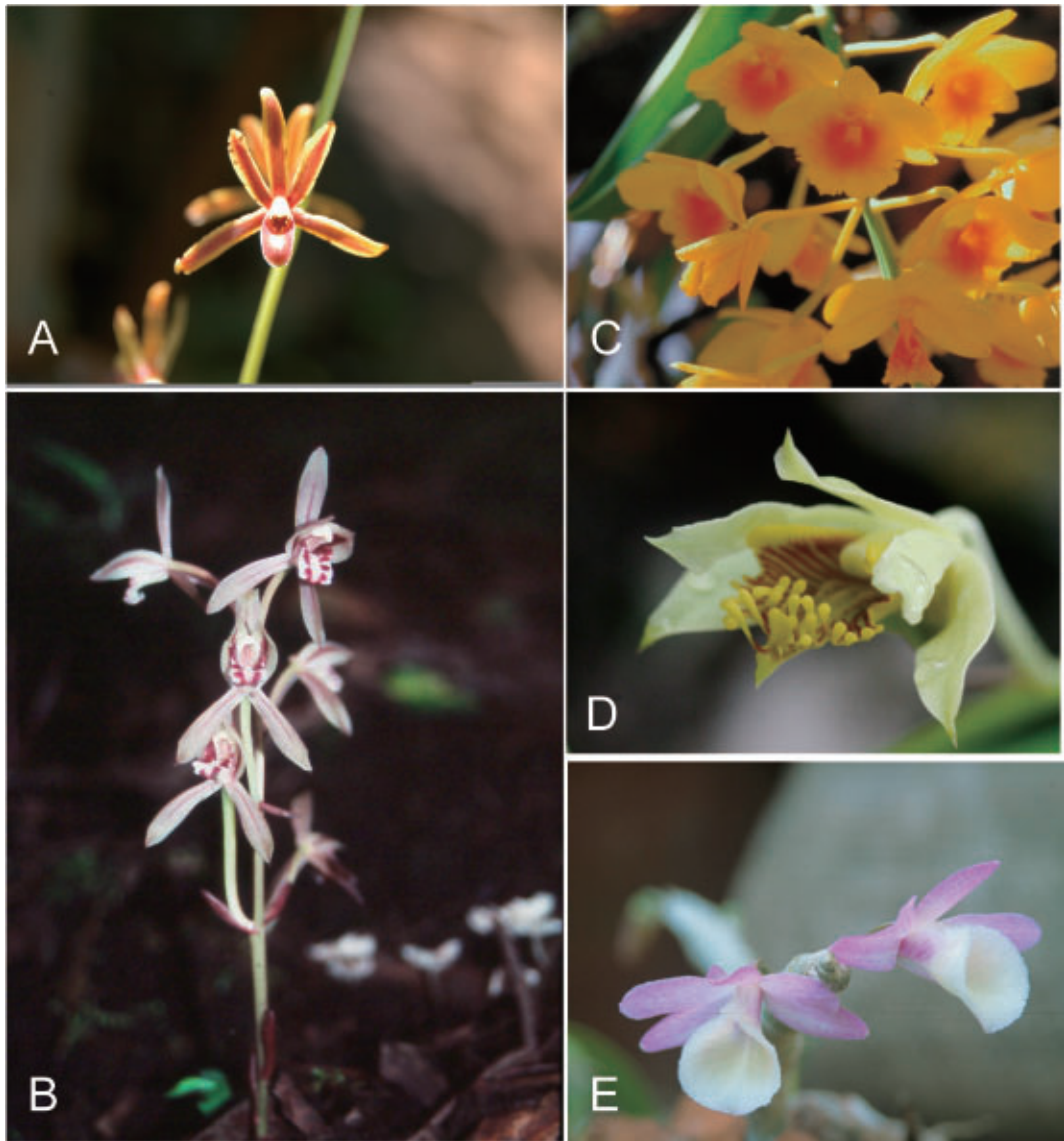


Fig. 3. A. *Cymbidium crassifolium* Herb. B. *Cymbidium macrorhizon* Lindl. C. *Dendrobium chrysotoxum* Lindl. D. *Dendrobium delacourii* Guillaumin. E. *Dendrobium polyanthum* Wall. ex Lindl. (Photo A by N. Tanaka; B by N. Inagaki; C, E by K.M. Htwe; D by Y. Tsujita)

13. *Cymbidium* Sw.

13.1. *Cymbidium crassifolium* Herb., Gard. Mag. & Reg. Rural Domest. Improv., n.s., 5: 205 (1839). [Fig. 3-A]

Specimen examined: Mt. Popa (photographic record only).

Life form: Epiphyte.

Distribution: India, Bhutan, Nepal, Bangladesh, China, Myanmar, Thailand, Laos, Cambodia, and Vietnam.

13.2. *Cymbidium ensifolium* (L.) Sw. subsp. *ensifolium* in Nov. Act. Upsal. 6: 77 (1799).

Specimens examined: Mt. Popa, *Khin Myo Htwe 118* (spirit collection-TNS); along the trail

to the northeastern ridge of Mt. Popa, Popa Mountain Park, 3 June 2005, *Tanaka et al. 036213* (MBK); near Taung Baw village, Mt. Popa, 3 June 2006, *Tsujita et al. 036209 & 036214* (spirit collection-TNS).

Life form: Terrestrial.

Distribution: India, China, Myanmar, Laos, Cambodia, Thailand, Vietnam, Philippines, Taiwan, and Japan.

13.3. *Cymbidium macrorhizon* Lindl., Gen. Sp. Orchid. Pl.: 162 (1833). [Fig. 3-B]

Specimens examined: Along the trail to the top of Mt. Popa via the cave, 21 June 2000, *Tanaka et al. 020495* (MBK); Mt. Popa, 25 July 2005, *Khin Myo Htwe 58* (spirit collection-TNS).

Life form: Terrestrial.

Distribution: Pakistan, India, Bhutan, Nepal, China, Myanmar, Thailand, Laos, Vietnam, Korea, and Japan.

Note: This species has been recorded from Chin and Shan States in Myanmar (Kress *et al.*, 2003). It is here newly recorded from Mandalay Region.

14. *Dendrobium* Sw.

14.1. *Dendrobium aphyllum* (Roxb.) C.E.C. Fisch. in J.S.Gamble, Fl. Madras: 1416 (1928).

Specimens examined: Mt. Popa, 8 May 2005, *Khin Myo Htwe 8* (spirit collection-TNS); near the Environmental Education Center, 10 May 2005, *Khin Myo Htwe 27* (spirit collection-TNS); Mt. Popa, 18 May 2005, *Khin Myo Htwe 32* (spirit collection-TNS); Mt. Popa, 13 March 2006, *Khin Myo Htwe 035054* (MBK).

Life form: Epiphyte.

Distribution: India, Bangladesh, Bhutan, Nepal, China, Myanmar, Thailand, Laos, Vietnam, and Peninsular Malaysia.

Local name: Kha-mauk-kyo.

14.2. *Dendrobium* cf. *bensoniae* Rchb.f. in Bot. Zeitung (Berlin) 25: 230 (1867).

Specimens examined: Mt. Popa, 6 June 2005, *Khin Myo Htwe 35* (spirit collection-TNS); in

crater, Mt. Popa, 30 May 2006, *Tanaka et al. 036101 & 036103* (spirit collection-MBK, TNS); western slope of Mt. Popa, 2 June 2006, *Tanaka et al. 036193* (spirit collection-MBK, TNS).

Life form: Epiphyte.

Note: The Popa material has smaller flowers than those of typical *D. bensoniae*, while the mentum and the claw of the lip are longer in the former. Characteristics of the papillae on the lip and on the operculum are also different from typical *D. bensoniae*.

14.3. *Dendrobium capillipes* Rchb.f. in Gard. Chron. 1867: 997 (1867).

Specimen examined: Mt. Popa, 22 March 2006, *Khin Myo Htwe 57* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, China, Myanmar, Thailand, Laos, and Vietnam.

Local name: Payaung-chetoe.

14.4. *Dendrobium cariniferum* Rchb.f. in Gard. Chron. 1869: 611 (1869).

Specimens examined: Mt. Popa, 21 March 2006, *Khin Myo Htwe 95* (spirit collection-TNS); Mt. Popa, cult. in the nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka et al. 036151* (MBK).

Life form: Epiphyte.

Distribution: India, China, Myanmar, Thailand, Laos, and Vietnam.

Local name: Mahar-dewi, Payaung-setku-pan.

14.5. *Dendrobium chrysanthum* Wall. ex Lindl. in Edwards's Bot. Reg. 15: t. 1299. (1829).

Specimen examined: Mt. Popa (photographic record only).

Life form: Epiphyte.

Distribution: Bhutan, India, Nepal, China, Myanmar, Thailand, Laos, and Vietnam.

Local name: Shwe-tu-thitkwa.

14.6. *Dendrobium chryseum* Rolfe in Gard. Chron., ser. 3, 3: 233 (1888).

Specimen examined: Along the trail, Mt. Popa, 8 May 2005, *Khin Myo Htwe 5* (spirit collection-

TNS).

Life form: Epiphyte.

Distribution: India, Nepal, Bangladesh, China, Myanmar, Thailand, Laos, Vietnam, and Taiwan.

Note: Further studies are indispensable to clarify taxonomic issues surrounding this species.

14.7. *Dendrobium chrysotoxum* Lindl. in Edwards's Bot. Reg. 33: t. 19 (1847). [Fig. 3-C]

Specimens examined: Mt. Popa, 8 May 2005, *Khin Myo Htwe 2* (spirit collection-TNS); Mt. Popa, cult. in the nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka et al. 036164* (MBK).

Life form: Epiphyte.

Distribution: Bangladesh, India, China, Myanmar, Thailand, Laos, Cambodia, and Vietnam.

Local name: Mauk-khan-wa, Thitkwa-ahwa.

14.8. *Dendrobium crepidatum* Lindl. & Paxton in Paxton's Fl. Gard. 1: 63 (1850).

Specimens examined: Western slope of Mt. Popa, 2 June 2006, *Tanaka 036184 & 036186* (MBK); Mt. Popa, 9 May 2005, *Khin Myo Htwe 19* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: Bangladesh, Bhutan, Nepal, India, China, Myanmar, Thailand, Laos, and Vietnam.

Local name: Ganaing-nabe-pauk.

14.9. *Dendrobium crystallinum* Rchb.f. in Gard. Chron. 1868: 572 (1868).

Specimens examined: Along the trail of Mt. Popa, 8 May 2005, *Khin Myo Htwe 3* (spirit collection-TNS); southern slope of Mt. Popa, 9 May 2005, *Khin Myo Htwe 21* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, China, Myanmar, Thailand, Laos, Cambodia, and Vietnam.

Local name: Pan-setku-thitkwa.

14.10. *Dendrobium dantaniense* Guillaumin in Bull. Mus. Natl. Hist. Nat., sér. 2, 28: 547 (1957).

Specimens examined: Southern slope of Mt.

Popa, 11 July 2005, *Khin Myo Htwe 53 & 54* (spirit collection-TNS); cult. in the nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka et al. 036154* (MBK).

Life form: Epiphyte.

Distribution: Myanmar, Thailand, and Vietnam.

Note: This species was newly recorded from Myanmar based on the specimens cited above (*Tanaka et al.*, 2011).

14.11. *Dendrobium delacourii* Guillaumin in Bull. Mus. Natl. Hist. 30: 522 (1924). [Fig. 3-D]

Specimen examined: Southern side of Mt. Popa, *Khin Myo Htwe 36* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: Myanmar, Thailand, Cambodia, Laos, and Vietnam.

14.12. *Dendrobium draconis* Rchb.f. in Bot. Zeitung (Berlin) 20: 214 (1862).

Specimen examined: Mt. Popa, 6 June 2005, *Khin Myo Htwe 34* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, Myanmar, Thailand, Laos, Cambodia, and Vietnam.

Local name: Kadaw-sut, Kein-na-yi.

14.13. *Dendrobium heterocarpum* Wall. ex Lindl., Gen. Sp. Orchid. Pl.: 78 (1830).

Specimen examined: Mt. Popa, 4 February 2006, *Khin Myo Htwe 75* (spirit collection-MBK).

Life form: Epiphyte.

Distribution: Bhutan, Nepal, India, Sri Lanka, China, Myanmar, Thailand, Laos, Vietnam, Malaysia, and Indonesia.

14.14. *Dendrobium* aff. *jamesianum* Rchb. f. in Gard. Chron. 1869: 554 (1869).

Specimen examined: Around the crater, Mt. Popa, ex cult. in the nursery of Popa Mountain Park, 1 May 2003, *Yukawa et al. 029773* (spirit collection-TNS).

Life form: Epiphyte.

Note: Although the flower of the Popa material

is closely related to *Dendrobium jamesianum*, the shape of the labellum is distinctive. Further study is needed to clarify its identity.

14.15. *Dendrobium moschatum* (Buch.-Ham.) Sw. in Schrad. Neues J. Bot. 1: 94 (1805).

Specimen examined: Mt. Popa, cult. in the nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka et al. 036153* (MBK).

Life form: Epiphyte.

Distribution: Bangladesh, India, Nepal, China, Myanmar, Thailand, Laos, Cambodia, and Vietnam.

Local name: Lettan-she, Pha-yaung-che-toe.

Note: This species has been recorded from Ayeyarwady, Bago, Chin, Kayin, Magway, Mon, Rakhine, Shan, Taninthayi, and Yangon (Kress *et al.*, 2003), and is here newly recorded from Mandalay Region.

14.16. *Dendrobium ochreatum* Lindl. in Edwards's Bot. Reg. 21: t. 1756 (1835).

Specimen examined: Mt. Popa, cult. in the nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka et al. 036156* (MBK).

Life form: Epiphyte.

Distribution: India, Bangladesh, Myanmar, Thailand, and Laos.

Local name: Taung-nabay-bauk.

14.17. *Dendrobium parcum* Rchb.f. in Gard. Chron. 1866: 1042 (1866).

Specimens examined: Mt. Popa, 24 February 2006, *Khin Myo Htwe 18* (spirit collection-TNS); Mt. Popa, 14 March 2006, *Khin Myo Htwe 035056* (MBK).

Life form: Epiphyte.

Distribution: Myanmar, Thailand, and Vietnam.

Local name: Pan-tet-pya.

14.18. *Dendrobium parishii* Rchb.f. in Bot. Zeitung (Berlin) 21: 236 (1863).

Specimens examined: Mt. Popa, *Khin Myo Htwe 7* (spirit collection-TNS); between the Environmental Education Center and the Popa

Mountain Resort, *Khin Myo Htwe 30* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, Bangladesh, China, Myanmar, Thailand, Laos, and Vietnam.

Local name: Ka-yan-yaung-lwin-pyin, Tagunlon-gyi.

14.19. *Dendrobium polyanthum* Wall. ex Lindl., Gen. Sp. Orchid. Pl.: 81 (1830). [Fig. 3-E]

Specimens examined: Mt. Popa, 13 March 2006, *Khin Myo Htwe 49* (spirit collection-TNS); Mt. Popa, *Khin Myo Htwe 94* (spirit collection-MBK, TNS).

Life form: Epiphyte.

Distribution: India, Nepal, China, Myanmar, Thailand, Laos, and Vietnam.

14.20. *Dendrobium pulchellum* Roxb. ex Lindl., Gen. Sp. Orchid. Pl.: 82 (1830). [Fig. 4-A]

Specimens examined: southern side slope of Mt. Popa, 8 May 2005, *Khin Myo Htwe 11* (spirit collection-TNS); Mt. Popa, cult. in the nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka 036159* (MBK).

Life form: Epiphyte.

Distribution: India, Nepal, Bangladesh, Myanmar, Thailand, Laos, Vietnam, and Peninsular Malaysia.

Local name: Lettan-to, Sinma-myet-kwin.

14.21. *Dendrobium thyrsoflorum* Rchb.f. ex André in Ill. Hort. 22: 88 (1875).

Specimen examined: Mt. Popa, 1 April 2006, *Khin Myo Htwe 103* (spirit collection-MBK, TNS).

Life form: Epiphyte.

Distribution: India, China, Myanmar, Thailand, Laos, and Vietnam.

Local name: Kyet-u-hnit, Tagunlon-ngwe.

14.22. *Dendrobium venustum* Teijsm. & Binn. in Natuurk. Tijdschr. Ned.-Indië 27: 18 (1864).

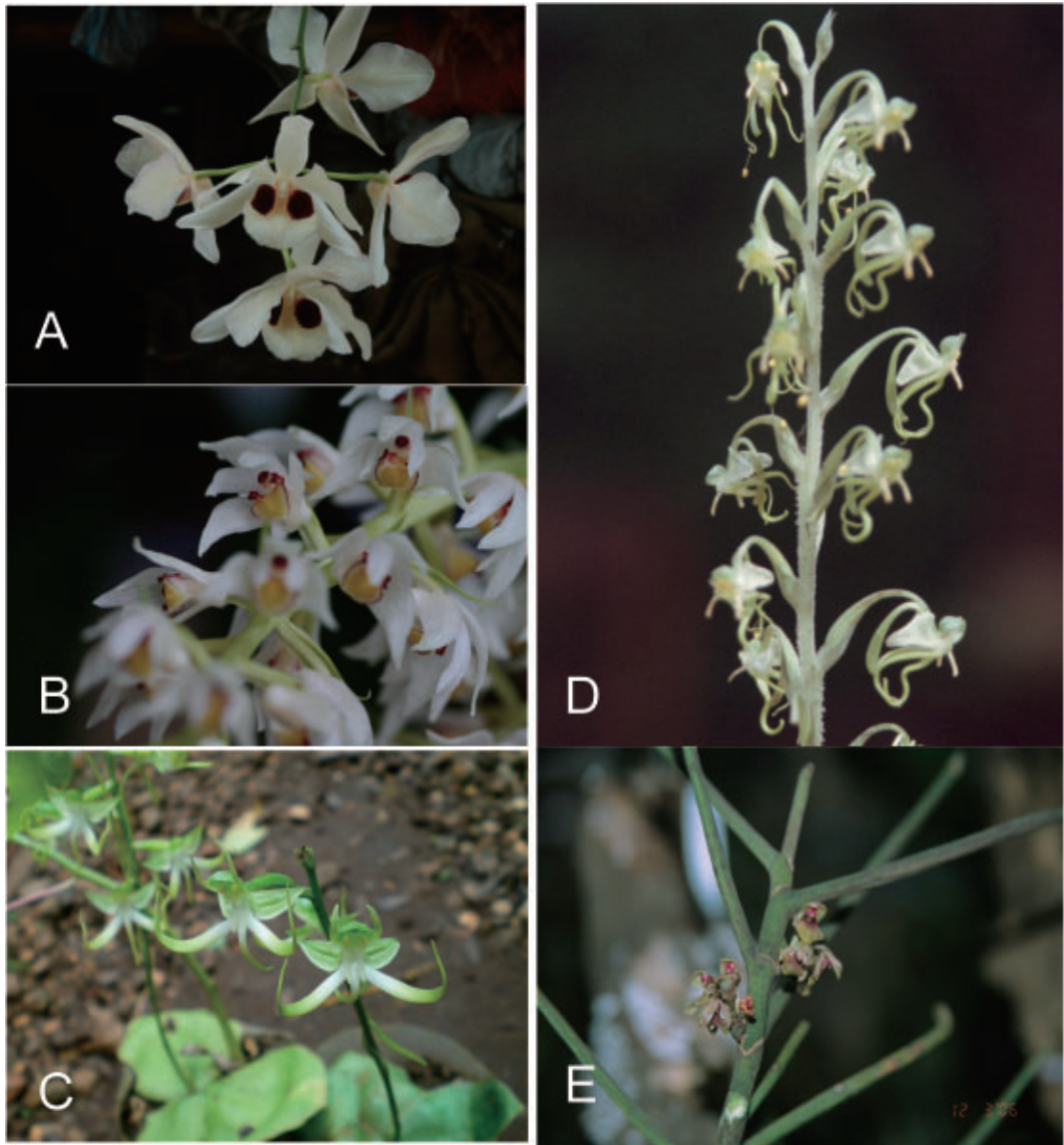


Fig. 4. A. *Dendrobium pulchellum* Roxb. ex Lindl. B. *Eria sutepensis* Rolfe ex Downie. C. *Habenaria* cf. *poilanei* Gagnep. D. *Habenaria reflexa* Blume. E. *Luisia platyglossa* Rehb.f. (Photo A by N. Tanaka; B by Y. Tsujita; C, D, E by K.M. Htwe)

Specimen examined: Mt. Popa, cult. in the nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka et al.* 036163 (MBK).

Life form: Epiphyte.

Distribution: Myanmar, Thailand, Laos, Cambodia, and Vietnam.

15. *Dienia* Lindl.

15.1. *Dienia ophrydis* (J.Koenig) Seidenf., Contr. Orchid Fl. Thailand. 13: 18 (1997).

Specimens examined: Northeast slope of the crater, Mt. Popa, ca. 1200m alt., 2 June 2006, *Tanaka et al.* 036192 (TNS); near the sandalwood forest, ca. 800m alt., 23 June 2006, *Khin*

Myo Htwe 43 (spirit collection-TNS).

Life form: Terrestrial.

Distribution: Throughout tropical and subtropical Asia to Australia and the Pacific Islands.

16. *Epipogium* J.G.Gmel.

16.1. *Epipogium roseum* (D.Don) Lindl. in J. Proc. Linn. Soc. Bot. 1: 177 (1857).

Specimen examined: Mt. Popa (photographic record only).

Life form: Terrestrial.

Distribution: Throughout tropical and subtropical Asia to Australia and the Pacific Islands.

Note: Recently, a specimen of this mycoheterotrophic species was also collected from Kampetlet, Chin State (*Kuroiwa et al. 051335* in MBK).

17. *Eria* Lindl.

17.1. *Eria globulifera* Seidenf. in Opera Bot. 62: 125 (1982).

Specimen examined: Southern side of Mt. Popa, 19 August 2005, *Khin Myo Htwe 59* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, Myanmar, Thailand, Laos, Cambodia, and Vietnam.

Note: This species was newly recorded from Myanmar by Tanaka *et al.* (2011) based on the specimen cited above.

17.2. *Eria sutepensis* Rolfe ex Downie in Bull. Misc. Inform. Kew 1925: 376 (1925). [Fig. 4-B]

Specimens examined: Mt. Popa, 6 July 2005, *Khin Myo Htwe 46* (spirit collection-TNS); northeast of the crater, Mt. Popa, 1400 m alt., 2 June 2006, *Tsujita et al. 036172 & 036175* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, Myanmar, Thailand, Laos, Cambodia, and Vietnam.

18. *Eulophia* R.Br. ex Lindl.

18.1. *Eulophia andamanensis* Rchb.f. in Flora 55: 276 (1872).

Specimens examined: Mt. Popa, Popa Mountain Park, 8 May 2005, *Khin Myo Htwe 9* (spirit collection-MBK, TNS); Mt. Popa, 20 April 2006, *Khin Myo Htwe 035063* (MBK).

Life form: Terrestrial.

Distribution: Andaman Islands, Myanmar, Thailand, Laos, Cambodia, Vietnam, and Peninsular Malaysia, and Indonesia.

Note: This species has been reported from Taninthayi Region (Kress *et al.*, 2003), and is here newly recorded from the central region of Myanmar.

18.2. *Eulophia graminea* Lindl. in Wall., Numer. List n. 7372 (1832).

Specimen examined: Mt. Popa, 23 March 2006, *Khin Myo Htwe 44 & 100* (spirit collection-TNS).

Life form: Terrestrial.

Distribution: Throughout tropical and subtropical Asia to Australia and the Pacific Islands.

Note: This species has been reported from Kachin State and Taninthayi Region (Kress *et al.*, 2003), and is here recorded from central Myanmar for the first time.

18.3. *Eulophia pauciflora* Guillaumin in Bull. Soc. Bot. Fr. 77: 338 (1930).

Specimen examined: Mt. Popa (photographic record only).

Life form: Terrestrial.

Distribution: Myanmar, Thailand, Laos, Cambodia, and Vietnam.

18.4. *Eulophia spectabilis* (Dennst.) Suresh. in D.H.Nicolson, C.R.Suresh & K.S.Manilal, Interpret. Van Rheede's Hort. Malab.: 300 (1988).

Specimen examined: Mt. Popa, 9 May 2006, *Khin Myo Htwe 107* (spirit collection-MBK).

Life form: Terrestrial.

Distribution: Throughout tropical and subtropical Asia to Australia and the Pacific Islands.

18.5. *Eulophia zollingeri* (Rchb.f.) J.J.Sm. in Fl. Buitenzorg 6: 652 (1905).

Specimen examined: Northern slope of the crater of Mt. Popa, 5 June 2006, *Tanaka et al.* 036244 (MBK).

Life form: Terrestrial.

Distribution: Throughout tropical and subtropical Asia to Australia.

19. *Geodorum* Jacks.

19.1. *Geodorum densiflorum* (Lam.) Schltr. in Repert. Spec. Nov. Regni Veg. Beih. 4: 259 (1919).

Specimen examined: Taung Kalat, 16 June 2000, *Tanaka et al.* 020328 (MBK).

Life form: Terrestrial.

Distribution: Throughout tropical and subtropical Asia to Australia and the Pacific Islands.

Note: This species has been reported in Bago Region (Kress *et al.*, 2003), and is here newly recorded from Mandalay Region.

19.2. *Geodorum eulophioides* Schltr. in Repert. Spec. Nov. Regni Veg. 17: 70 (1921).

Specimens examined: Mt. Popa, 13 July 2005, *Khin Myo Htwe 55* (spirit collection-TNS); northern side of the crater, Mt. Popa, 3 June 2006, *Tsu-jita 036208* (spirit collection-TNS).

Life form: Terrestrial.

Distribution: China and Myanmar.

19.3. *Geodorum pulchellum* Rolfe in J. Straits Branch Roy. Asiat. Soc. 50: 138 (1908).

Specimen examined: Along the roadside of Byatta Road, foot of Mt. Popa, Popa Mountain Park, 18 June 2000, *Tanaka et al.* 020437 (MBK).

Life form: Terrestrial.

Distribution: China, Myanmar, Thailand, and Vietnam.

Note: Recently we newly recorded this species from Myanmar based on the specimen cited above (Tanaka *et al.*, 2011). However, the occurrence of the species in Myanmar has been reported before: according to Ormerod and

Kumar (2003), the Myanmar plants that Jayaweera and Seidenfaden identified as *G. purpureum* and *G. densiflorum* are also referable to *G. pulchellum*.

19.4. *Geodorum recurvum* (Roxb.) Alston in Trimen, Hand-Book Fl. Ceylon vi. Suppl.: 276 (1931).

Specimens examined: Mt. Popa, 18 June 2005, *Khin Myo Htwe 41* (spirit collection-TNS); Mt. Popa, 18 June 2005, *Khin Myo Htwe 42* (spirit collection-TNS); Mt. Popa, 20 May 2006, *Khin Myo Htwe 109* (spirit collection-MBK, TNS).

Life form: Terrestrial.

Distribution: India, China, Myanmar, Thailand, Cambodia, and Vietnam.

19.5. *Geodorum* sp.

Specimen examined: Mt. Popa, 6 July 2005, *Khin Myo Htwe 47* (spirit collection-TNS).

Life form: Terrestrial.

Note: This material does not match any species of *Geodorum* recorded in Myanmar as yet.

20. *Habenaria* Willd.

20.1. *Habenaria dentata* (Sw.) Schltr. in Repert. Spec. Nov. Regni Veg. Beih. 4: 125 (1919).

Specimen examined: Near the sandalwood forest, Popa Mountain Park, 16 November 2005, *Khin Myo Htwe 71* (spirit collection-MBK, TNS).

Life form: Terrestrial.

Distribution: India, Nepal, China, Myanmar, Thailand, Laos, Cambodia, Vietnam, Peninsular Malaysia, Philippines, Taiwan, and Japan.

Note: This species has been recorded from Chin State (Kress *et al.*, 2003), and our collection is the first record from central Myanmar.

20.2. *Habenaria digitata* Lindl., Gen. Sp. Orchid. Pl.: 307 (1835).

Specimen examined: Along the trail to the peak, Mt. Popa, 11 July 2005, *Khin Myo Htwe 50* (spirit collection-TNS).

Life form: Terrestrial.

Distribution: Pakistan, Nepal, India, Bangladesh, Myanmar, Laos, and Cambodia.

20.3. *Habenaria lucida* Wall. ex Lindl., Gen. Sp. Orchid. Pl.: 319 (1835).

Specimens examined: Along the trail via U German Cave to the peak of Mt. Popa, 30 October 2000, *Murata et al. 021000* (MBK); Mt. Popa, 10 September 2005, *Khin Myo Htwe 61* (spirit collection-TNS).

Life form: Terrestrial.

Distribution: India, China, Myanmar, Thailand, Laos, Cambodia, Vietnam, and Taiwan.

Local name: Myet-thazin-pan.

20.4. *Habenaria malintana* (Blanco) Merr. in Bur. Sci. Publ. Manila 12: 112 (1918).

Specimen examined: Along Ye Nge Road from the Environmental Education Center to Ye Nge Guest House, 25 October 2000, *Tanaka et al. 020764* (MBK).

Life form: Terrestrial.

Distribution: India, China, Myanmar, Thailand, Vietnam, and Philippines.

Note: This species has been recorded from Mon State and Taninthayi Region (Kress *et al.*, 2003). This is the first record from Mandalay Region, central Myanmar.

20.5. *Habenaria medioflexa* Turrill in Bull. Misc. Inform. Kew 1923: 118 (1923).

Specimen examined: Along Ye Nge Road from Environmental Education Center to Ye Nge Guest House, 20 October 2004, *Tanaka et al. 020761* (MBK, TNS).

Life form: Terrestrial.

Distribution: China, Myanmar, Thailand, Cambodia, Vietnam, and Peninsular Malaysia.

20.6. *Habenaria* cf. *poilanei* Gagnep. in Bull. Soc. Bot. France 78: 73 (1931). [Fig. 4-C]

Specimen examined: Mt. Popa (photographic record only).

Life form: Terrestrial.

Note: In general appearance, the plant is similar to *H. poilanei* recorded from Vietnam. Obser-

vations of spirit material are required to confirm the identity.

20.7. *Habenaria reflexa* Blume, Bijdr. Fl. Ned. Ind. 8: 403 (1825). [Fig. 4-D]

Specimen examined: Mt. Popa, 29 September 2005, *Khin Myo Htwe 67* (spirit collection-MBK).

Life form: Terrestrial.

Distribution: Myanmar, Thailand, Vietnam, Peninsular Malaysia, and Indonesia.

20.8. *Habenaria rodgeri* W.W.Sm. & S.C. Banerji in Rec. Bot. Surv. India 6: 34 (1914).

Specimen examined: Near Mon-kon Village, 15 September 2002, *Khin Myo Htwe 024088A* (MBK).

Life form: Terrestrial.

Distribution: Myanmar.

Note: Taxonomic problems of *Habenaria rhodocheila* Hance complex remain to be resolved. Our material fits well with one such entity, *H. rodgeri*. This species differs from *H. rhodocheila* by its mottled, elliptic, rosulate leaves, although Ormerod (2012) reduced it to a synonym of *H. rhodocheila*. Tanaka *et al.* (2011) identified the same material as *H. erichmichelii* Christenson, another species belonging to this complex. *H. erichmichelii* shares pink flowers with our material but can be separated by plain, linear, cauline leaves. Further studies may indicate the conspecificity of *H. rodgeri* and *H. erichmichelii*.

20.9. *Habenaria stenopetala* Lindl., Gen. Sp. Orchid. Pl.: 319 (1835).

Specimen examined: Mt. Popa, 25 September 2005, *Khin Myo Htwe 66* (spirit collection-TNS).

Life form: Terrestrial.

Distribution: Bhutan, Nepal, Bangladesh, China, India, Myanmar, Philippines, Thailand, Vietnam, Taiwan, and Japan.

20.10. *Habenaria viridiflora* (Rottl. ex Sw.) Lindl., Gen. Sp. Orchid. Pl.: 319 (1835).

Specimen examined: Mt. Popa (photographic

record only).

Life form: Terrestrial.

Distribution: Bangladesh, India, Sri Lanka, China, Myanmar, Thailand, Laos, Cambodia, and Vietnam.

Note: Tanaka *et al.* (2011) reported a new record of this species in Myanmar.

20.11. *Habenaria yuana* Tang & Wang in Bull. Fan Mem. Inst. Biol., Bot. 7: 135 (1936).

Specimen examined: Mt. Popa, 25 September 2005, *Khin Myo Htwe 65* (spirit collection-TNS).

Life form: Terrestrial.

Distribution: China, Myanmar, Thailand, and Vietnam.

Note: This entity from Mt. Victoria (Natma Taung), Chin State was identified as *H. limprichtii* and was reported as the first record from Myanmar (Tanaka *et al.*, 2011). However, Ormerod and Kumar (2008) revealed that the material from Thailand identified previously as *H. limprichtii* should be treated as *H. yuana* and that *H. limprichtii* is endemic to China. We thus provisionally identified our collections in Myanmar as *H. yuana*.

21. *Herminium* L.

21.1. *Herminium lanceum* (Thunb. ex Sw.) Vuijk in Blumea 11: 228 (1961).

Specimen examined: Along the trail to the peak of Mt. Popa, 1 November 2000, *Murata et al. 021048* (MBK).

Life form: Terrestrial.

Distribution: Pakistan, India, Nepal, Mongolia, China, Myanmar, Thailand, Vietnam, Malaysia, Taiwan, Korea, Japan, Philippines, Indonesia, and New Guinea.

22. *Holcoglossum* Schltr.

22.1. *Holcoglossum amesianum* (Rchb.f.) Christenson in Notes Roy. Bot. Gard. Edinburgh 44: 255 (1987).

Specimen examined: Near Popa Mountain Resort, *Khin Myo Htwe 76* (spirit collection-

MBK, TNS).

Life form: Epiphyte.

Distribution: China, India, Myanmar, Thailand, Laos, Cambodia, and Vietnam.

Local name: Mo-kadawt-pan, Sagalay-ywetlon.

23. *Liparis* Rich.

23.1. *Liparis regnieri* Finet in Bull. Soc. Bot. France 55: 338 (1908).

Specimen examined: Southeast of Mt. Popa, 1400 m alt., 2 June 2006, *Tsujita et al. 036188* (spirit collection-TNS).

Life form: Terrestrial.

Distribution: China, Myanmar, Thailand, and Vietnam.

24. *Luisia* Gaudich.

24.1. *Luisia macrotis* Rchb.f. in Gard. Chron. 1869: 110 (1869).

Specimen examined: Mt. Popa, *Khin Myo Htwe 26* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: China, India, Myanmar, Thailand, Laos, and Vietnam.

24.2. *Luisia platyglossa* Rchb.f. in W.G. Walpers, Ann. Bot. Syst. 6: 622 (1863). [Fig. 4-E]

Specimens examined: Near Popa Mountain Resort, 9 May 2005, *Khin Myo Htwe 17* (spirit collection-TNS); Mt. Popa, 26 March 2006, *Khin Myo Htwe 035060* (MBK); on the slope of the crater, Mt. Popa, 900–1000 m alt., 5 June 2006, *Tanaka et al. 036242* (spirit collection-MBK, TNS) and *036252* (spirit collection-TNS); near Taung Kalat, *Khin Myo Htwe 93* (spirit collection-MBK).

Life form: Epiphyte.

Distribution: Throughout tropical Asia to the western Pacific Islands.

Note: If we deal with this entity in a broad sense, *Luisia tristis* (G.Forst.) Hook.f., based on a collection from New Caledonia, could be applied.

24.3. *Luisia psyche* Rehb.f. in Bot. Zeitung (Berlin) 21: 98 (1863). [Fig. 5-A]

Specimens examined: Near the sandalwood forest, Mt. Popa, cult. in the nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka et al. 036142* (MBK, spirit collection-TNS); Mt. Popa, cult. in the Environmental Education Center, 1 June 2006, *Tsujita et al. 036167* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, Myanmar, Thailand, Laos, and Vietnam.

25. *Malaxis* Sw.

25.1. *Malaxis acuminata* D.Don, Prodr. Fl. Nepal.: 29 (1825).

Specimen examined: Mt. Popa, 8 July 2005, *Khin Myo Htwe 48* (spirit collection-TNS).

Life form: Terrestrial.

Distribution: Throughout tropical and subtropical Asia to Australia and the Pacific Islands.

26. *Nervilia* Comm. ex Gaud.

26.1. *Nervilia aragoana* Gaudich., Voy. Uranie, Bot.: 422 (1829).

Specimens examined: Inside the crater of Mt. Popa, 20 August 2000, *Than Than Aye & Khin Myo Htwe 020725* (MBK); near the Environmental Education Center, 27 August 2002, *Khin Myo Htwe 024044* (MBK).

Life form: Terrestrial.

Distribution: Throughout tropical and subtropical Asia to Australia and the Pacific Islands.

Local name: Tabin-shwe-hti.

26.2. *Nervilia* sp.

Specimen examined: Western slope of Mt. Popa, 2 June 2006, *Tanaka et al. 036189* (MBK).

Life form: Terrestrial.

Local name: Tabin-shwe-hti.

Note: We collected a single sterile specimen only. The plant has purplish red and glabrous leaves. Flowering material is required for its identification.

27. *Oberonia* Lindl.

27.1. *Oberonia ensiformis* (J.E.Sm.) Lindl. in Fol. Orchid. 8 (*Oberonia*): 4 (1859).

Specimen examined: Along the trail of Mt. Popa, *Khin Myo Htwe 74* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, Nepal, China, Myanmar, Thailand, Laos, and Vietnam.

28. *Panisea* (Lindl.) Lindl.

28.1. *Panisea uniflora* (Lindl.) Lindl. in Fol. Orchid. 5 (*Panisea*): 2 (1854).

Specimens examined: Western slope of Mt. Popa, 2 June 2006, *Tanaka et al. 036190* (MBK, TNS); western slope of Mt. Popa, 2 June 2006, *Tanaka et al. 036185* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: Bhutan, Nepal, India, China, Myanmar, Thailand, Laos, Cambodia, and Vietnam.

29. *Pecteilis* Raf.

29.1. *Pecteilis susannae* (L.) Raf., Fl. Tellur. 2: 38 (1837)

Specimen examined: Along Ye Nge Road from the Environmental Education Center to Ye Nge Guest House, 25 October 2000, *J. Murata et al. 020761* (MBK).

Life form: Terrestrial.

Distribution: India, China, Myanmar, Thailand, Laos, Cambodia, Vietnam, Malaysia, and Indonesia.

Local name: Padein-ngo.

30. *Peristylus* Blume

30.1. *Peristylus constrictus* (Lindl.) Lindl., Gen. Sp. Orch. Pl.: 300 (1835). [Fig. 5-B]

Specimens examined: Near Ye Nge Guest House, 14 June 2000, *Tanaka et al. 020246* (MBK); Mt. Popa, 11 July 2005, *Khin Myo Htwe 68* (spirit collection-TNS).

Life form: Terrestrial.

Distribution: Bhutan, India, Nepal, Bangla-



Fig. 5. A. *Luisia psyche* Rehb.f. B. *Peristylus constrictus* (Lindl.) Lindl. C. *Phaius wallichii* Lindl. D. *Pholidota imbricata* Lindl. E. *Porpax ustulata* (C.S.P.Parish & Rehb.f.) Rolfe (Photo A by N. Tanaka; B by N. Inagaki; C by K.M. Htwe; D, E by Y. Tsujita)

desh, China, Myanmar, Thailand, Cambodia, Vietnam, and Philippines.

30.2. *Peristylus parishii* Rehb.f. in Trans. Linn. Soc. London 30: 139 (1874).

Specimen examined: Southeast of Mt. Popa, 1400 m alt., 2 June 2006, *Tanaka et al.* 036191

(MBK, spirit collection-TNS).

Life form: Terrestrial.

Distribution: India, Nepal, China, Myanmar, Thailand, and Vietnam.

30.3. *Peristylus* sp.

Specimens examined: Along the circular forest

road, Popa Mountain Park, 28 October 2000, *Murata et al. 020894* (MBK).

Life form: Terrestrial.

31. *Phaius* Lour.

31.1. *Phaius wallichii* Lindl. in Wall. Pl. Asiat. Rar. 2: 46, t. 158 (1831). [Fig. 5-C]

Specimen examined: Mt. Popa, 12 May 2005, *Khin Myo Htwe 29* (spirit collection-TNS).

Life form: Terrestrial.

Distribution: Bhutan, India, Sri Lanka, Bangladesh, China, Myanmar, Thailand, and Vietnam.

Local name: Gamon-zedigyi.

32. *Pholidota* Lindl. ex Hook.

32.1. *Pholidota articulata* Lindl., Gen. Sp. Orchid. Pl.: 38 (1830).

Specimens examined: U Yin Tha Ai, southern side of the slope of Mt. Popa, 9 May 2005, *Khin Myo Htwe 24* (spirit collection-TNS); *ibidem*, 3 July 2005, *Khin Myo Htwe 45* (MBK); Mt. Popa, cult. in the nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka et al. 036158* (MBK).

Life form: Epiphyte.

Distribution: Bhutan, Cambodia, China, India, Indonesia, Laos, Malaysia, Myanmar, Nepal, Thailand, and Vietnam.

32.2. *Pholidota imbricata* Lindl. in W.J. Hooker, Exot. Fl. 2: t. 138 (1825). [Fig. 5-D]

Specimen examined: Mt. Popa, 10 October 2005, *Khin Myo Htwe 69* (spirit collection-MBK, TNS).

Life form: Epiphyte.

Distribution: Widely distributed in tropical Asia, extending to Australia, New Guinea, and the islands of the southwestern Pacific.

Local name: Padi-sint, Sin-mi-thitkwa.

33. *Polystachya* Hook.

33.1. *Polystachya concreta* (Jacq.) Garay & H.R.Sweet in Orquideologia 9: 206 (1974).

Specimen examined: Mt. Popa, cult. in the

nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka et al. 036162* (MBK).

Life form: Epiphyte.

Distribution: India, Sri Lanka, China, Myanmar, Thailand, Laos, Cambodia, Vietnam, Philippines, Malaysia, and Indonesia; also in Africa and subtropical and tropical America.

34. *Porpax* Lindl.

34.1. *Porpax ustulata* (C.S.P.Parish & Rchb.f.) Rolfe in Orchid Rev. 16: 8 (1908). [Fig. 5-E]

Specimens examined: Mt. Popa, cult. in nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka et al. 036155* (MBK); southwestern slope of Mt. Popa, 1400 m alt., 2 June 2006, *Tanaka et al. 036187* (MBK, spirit collection-TNS).

Life form: Epiphyte.

Distribution: China, Myanmar, and Thailand.

Note: This species has been recorded from Mon State (Kress *et al.*, 2003) and this is the first record from Mandalay Region. *Porpax ustulata* is growing on the tree trunk of *Engelhardtia spicata* Blume on the southwestern slope (opposite of the crater) of Mt. Popa.

35. *Rhynchostylis* Tausch

35.1. *Rhynchostylis gigantea* (Lindl.) Ridl. in J. Linn. Soc., Bot. 32: 356 (1896).

Specimens examined: Near Popa Mountain Resort, 19 November 2005, *Khin Myo Htwe 72* (spirit collection-MBK, TNS); sandalwood forest, Mt. Popa, 1 June 2006, *Tanaka et al. 036139* (MBK).

Life form: Epiphyte.

Distribution: India, China, Myanmar, Thailand, Laos, Cambodia, Vietnam, and Malaysia.

Local name: Kyaung-mi-nantha, Tagun-longyi.

35.2. *Rhynchostylis retusa* (L.) Blume, Bijdr. Fl. Ned. Ind. 7: 286 (1825).

Specimens examined: Mt. Popa, 27 May 2005, *Khin Myo Htwe 032884* (MBK); in the crater, Mt. Popa, 30 May 2006, *Tanaka 036102* (MBK, spirit collection-TNS); near the sandalwood

forest, Mt. Popa, 31 May 2006, *Tanaka et al.* 036139 (MBK, spirit collection-TNS).

Life form: Epiphyte.

Distribution: Throughout Southeast Asia.

Local name: Kyaung-mi-tu, Tagun-lon.

36. *Satyrium* Sw.

36.1. *Satyrium nepalense* D. Don, Prodr. Fl. Nepal.: 26 (1825). [Fig. 6-A]

Specimen examined: On grassy open space, near the peak of Mt. Popa, ca. 1450 m alt. (photographic record only).

Life form: Terrestrial.

Distribution: Pakistan, Bhutan, India, Sri Lanka, Nepal, China, Myanmar, and Thailand.

Note: This species was recently also found in Thailand (Kurzweil, personal communication).

37. *Spathoglottis* Blume

37.1. *Spathoglottis affinis* de Vriese in Ill. Orchid. Ind. Orient. 3: t. 15 (1855).

Specimen examined: Along the trail to the peak of Mt. Popa, 1 November 2000, *Murata et al.* 021040 (MBK, TNS).

Life form: Terrestrial.

Distribution: Myanmar, Thailand, Cambodia, Laos, Vietnam, Malaysia, and Indonesia.

Note: *Spathoglottis lobbii* Rchb.f. has been reduced to a synonym of *S. affinis* in recent taxonomic treatments. However, they may represent separate entities (H. Kurzweil, personal communication). In that case, *S. lobbii* is the correct name.

37.2. *Spathoglottis plicata* Blume, Bijdr. Fl. Ned. Ind. 8: 401 (1825).

Specimens examined: Eastern side of Mt. Popa, 8 May 2005, *Khin Myo Htwe* 4 (spirit collection-TNS); Mt. Popa, cult. in Popa Mountain Park Office, 1 June 2006, *Tanaka et al.* 036160 (MBK).

Life form: Terrestrial.

Distribution: Throughout tropical and subtropical Asia to Australia and the Pacific Islands.

38. *Staurochilus* Ridl.

38.1. *Staurochilus ramosus* (Lindl.) Seidenf. in Opera Bot. 95: 95 (1988). [Fig. 6-B]

Specimen examined: Near Yeik Thar, along the trail to the top of Mt. Popa, 5 May 2005, *Khin Myo Htwe* 15 (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, Bangladesh, Myanmar and Thailand.

39. *Thunia* Rchb.f.

39.1. *Thunia alba* Rchb.f. in Bot. Zeitung (Berlin) 10: 764 (1852).

Specimen examined: Mt. Popa, 12 June 2005, *Khin Myo Htwe* 40 (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, Nepal, China, Myanmar, Thailand, Vietnam, and Peninsular Malaysia.

Local name: Kyauk-thitkwa-phyu.

40. *Tropidia* Lindl.

40.1. *Tropidia curculigoides* Lindl., Gen. Sp. Orchid. Pl.: 497 (1840). [Fig. 6-C]

Specimens examined: Near Popa Mountain Resort, along the roadside to Ye Nge Camp, foot of Mt. Popa, 14 August 2000, *Than Than Aye & Khin Myo Htwe* 020642 (MBK); along the circular forest road, 28 October 2000, *Murata et al.* 020892 (MBK); in the crater of Mt. Popa, Popa Mountain Park, 2 February 2001, *Than Than Aye & Khin Myo Htwe* 021361 (MBK, TNS).

Life form: Terrestrial.

Distribution: Throughout tropical and subtropical Asia.

41. *Vanda* Jones ex R.Br.

41.1. *Vanda bensonii* Bateman in Bot. Mag. 92: t. 5611 (1866). [Fig. 6-D]

Specimens examined: Near the Popa Mountain Resort, 8 May 2005, *Khin Myo Htwe* 12 (spirit collection-TNS); Mt. Popa, cult. in the nursery of Popa Mountain Park Office, 1 June 2006, *Tanaka*



Fig. 6. A. *Satyrium nepalense* D.Don. B. *Staurochilus ramosus* (Lindl.) Seidenf. C. *Tropidia curculigoides* Lindl. D. *Vanda bensonii* Bateman. (Photo A by J. Murata; B by Y. Tsujita; C by M.M. Aung; D by N. Tanaka)

et al. 036152 (MBK).

Life form: Epiphyte.

Distribution: India, Myanmar, and Thailand.

Local name: Moe-thuza.

Note: Some individuals show characteristics of *Vanda brunnea* and *V. liouvillei* in the flower. It is likely that the three species, *V. bensonii*, *V.*

brunnea, and *V. liouvillei*, make hybrid swarms on Mt. Popa. Consequently, collections of the three species in this list may include natural hybrids among them.

41.2. *Vanda brunnea* Rchb.f., *Xenia Orchid.* 2: 138 (1868).

Specimens examined: Mt. Popa, 21 March 2006, *Khin Myo Htwe 97* (spirit collection-MBK); Mt. Popa, 3 May 2006, *Khin Myo Htwe 16* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: China, Myanmar, Thailand, and Vietnam.

Local name: Thayet-hte-thitkwa.

41.3. *Vanda coerulescens* Griff., Not. Pl. Asiat. 3: 352, t. 331 (1851).

Specimen examined: Mt. Popa, 21 February 2006, *Khin Myo Htwe 81* (spirit collection-MBK) & *89* (spirit collection-TNS).

Life form: Epiphyte.

Distribution: India, China, Myanmar, and Thailand.

Local name: Moe-kadaut-pan, Moe-lon-hmaingale, Sargalay-ywet-lon.

Note: We often found intermediate forms between *Vanda testacea* and *V. coerulescens* in floral characteristics. It is likely that the two species make hybrid swarms on Mt. Popa. Consequently, collections of the two species in this list may include this natural hybrid.

41.4. *Vanda liouvillei* Finet in Notul. Syst. (Paris) 2: 299 (1912).

Specimens examined: Mt. Popa, 20 April 2006, *Khin Myo Htwe 035062* (MBK); near Yeik Thar, along the trail of Mt. Popa, 8 May 2005, *Khin Myo Htwe 6* (spirit collection-TNS); between the Environmental Education Center and Taung Kalat, 9 May 2005, *Khin Myo Htwe 20* (spirit collection-TNS); near the entrance of Popa Mountain Park, 1 May 2006, *Khin Myo Htwe 106* (spirit collection-MBK, TNS).

Life form: Epiphyte.

Distribution: India, Myanmar, Thailand, Laos, and Vietnam.

41.5. *Vanda testacea* (Lindl.) Rchb.f. in Gard. Chron., n. s., 8: 166 (1877).

Specimens examined: Mt. Popa, 13 February 2006, *Khin Myo Htwe 79* (spirit collection-MBK); Mt. Popa, Popa Mountain Park, 13 Febru-

ary 2006, *Khin Myo Htwe 78 & 83* (spirit collection-MBK, TNS); Mt. Popa, 21 February 2006, *Khin Myo Htwe 82* (spirit collection-MBK, TNS).

Life form: Epiphyte.

Distribution: India, Sri Lanka, Nepal, China, Myanmar, and Thailand.

41.6. *Vanda* sp.

Specimen examined: Mt. Popa, 13 February 2006, *Khin Myo Htwe 77* (spirit collection-TNS).

Life form: Epiphyte.

Note: The floral characters indicate a natural hybrid between *Vanda brunnea* and *V. coerulescens*, both of which are distributed in Mt. Popa region.

42. *Zeuxine* Lindl.

42.1. *Zeuxine affinis* (Lindl.) Benth. ex Hook.f. in Fl. Brit. India 6: 108 (1890).

Specimen examined: Along the trail to the top of Mt. Popa, 1100–1300m alt., 24 February 2004, *Akiyama et al. 030199* (MBK); Mt. Popa, March 2006, *Ohi-Toma 035001* (MBK).

Life form: Terrestrial.

Distribution: Bhutan, India, Bangladesh, China, Myanmar, Thailand, Laos, Vietnam, Taiwan, and Japan.

42.2. *Zeuxine flava* (Wall. ex Lindl.) Trimen in J. Ceylon Branch Roy. Asiat. Soc. 9: 90 (1885).

Specimen examined: Mt. Popa (photographic record only).

Life form: Terrestrial.

Distribution: Bhutan, India, Nepal, Bangladesh, China, Myanmar, Thailand, Vietnam, and Malaysia.

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