

An updated checklist of *Begonia* (Begoniaceae) in Cambodia including a new record

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ABSTRACT

Five *Begonia* species are recorded from Cambodia of which *Begonia longifolia* is reported for Cambodia for the first time. An updated checklist of *Begonia* with sectional classification, and species expected to occur in Cambodia are also provided, supplemented with photographs, information on geographical range and a distribution map showing occurrences in Cambodia.

KEYWORDS: Flora of Cambodia, Indochina, new distribution record, taxonomy.

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INTRODUCTION

Cambodia is one of the most botanically unexplored countries in South-East Asia, with only 16 estimated herbarium collections per 100 km² (Middleton *et al.*, 2019). *Begonia* L. is mega-diverse genus consisting of currently 2,164 species in 70 sections (Hughes *et al.*, 2015–; Moonlight *et al.*, 2018). One species of *Begonia* has been described by Gagnepain (1919) from Cambodia, *B. geoffrayi* Gagnep., with three species in total reported from the country in 2008 (Hughes, 2008) namely: *B. geoffrayi* Gagnep., *B. hymenophylla* Gagnep., and *B. sinuata* Wall. ex Meisn. Kiew (2007) later separated *Begonia phamiana* Kiew from *B. rupicola* Miq. and described it as new species from Cambodia and Vietnam. Since then, no further species have been recorded from Cambodia, in contrast to neighbouring countries in continental South-East Asia. For instance, Thailand has reported 60 *Begonia* species (Phutthai *et al.*, 2019; 2021), 49 species in Laos (Lin *et al.*, 2022) and 113 in Vietnam (Hughes *et al.*, 2015–; Averyanov *et al.*, 2021; Pham *et al.*, 2021). It is therefore likely that a significant number of new records and new taxa await discovery in Cambodia, especially in the

northeast near the Laos border, the east near the Vietnam border, the southwest near the Thailand border, and also in limestone forest areas.

A field survey was conducted in Battambang Province, Samlout District during October to November 2021. The second author collected a caulescent monoecious *Begonia* species ca 1.5 m tall with 6 tepals in the pistillate flowers, and 3-locular baccate fruit. Fertile voucher specimens were deposited at the Herbarium of Royal University of Phnom Penh (RUPP). The identification of species in this study was compared with relevant literature (Tebbutt, 2003; Hughes, 2008; Hughes & Girmansyah 2011; Camfield & Hughes, 2018; Phutthai *et al.*, 2019), along with herbaria specimen images available online held at the Royal Botanic Garden Edinburgh (E), Kunming Institute of Botany, Chinese Academy of Sciences (KUN), Vascular Plants Herbarium of the Komarov Botanical Institute RAS (LE), Muséum national d'histoire naturelle, Paris (P), The Queen Sirikit Botanic Garden Herbarium (QBG), Singapore Herbarium, National Parks board (SING) and the Global Biodiversity Information Facility (GBIF). After careful examination of the specimens, the

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collection was identified as *B. longifolia* Blume, a species widely distributed in South-East Asia, from India in the west, and China in the north, to Vietnam in the east, and Indonesia (Sulawesi) in the south. Here, we report it as a new record for Cambodia. Moreover, we present a distribution map of *B. longifolia* (Fig. 2) and other species known from the country (Fig. 3), along with an updated checklist of *Begonia* species in Cambodia as a reference for future studies. All specimens cited have been examined unless stated.

NEW RECORD FOR CAMBODIA

***Begonia* sect. *Platycentrum* (Klotzsch) A.DC.**

Begonia longifolia Blume, *Catalogus*. 102. 1823; Tebbitt, *Brittonia* 55: 25. 2003; M.Hughes, *Annot. Checkl. SE Asian Begonia* 72. 2008; R.Camfield & M.Hughes, *Eur. J. Taxon.* 396: 58. 2018; Phutthai *et al.*, *Fl. Thailand* 14(3): 396. 2019; Souvannakhoummane *et al.*, *Turczaninowia* 24(2): 116. 2021.— *Diploclinium longifolium* (Blume) Miq., *Fl. Ned. Ind.* 1(1): 687. 1856. Type: Indonesia. Salak, s.d., *Blume 740* (lectotype **B** [B100238313] designated by Camfield & Hughes, 2018).

— *Casparya trisulcata* A.DC., *Ann. Sci. Nat. Bot.*, IV 11: 119. 1859; DC., *Prodr.* 15(1): 277. 1864.— *Begonia trisulcata* (A.DC.) Warb., *Nat. Pflanzenfam.* 3(6A): 142. 1894. Type: Indonesia, Java, Mt Jojing, 1 May 1845, *H. Zollinger 2850* (lectotype **G-DC**; isolectotypes **B**, **BM**, **P** [2 sheets], designated by Camfield & Hughes, 2018).

— *Begonia inflata* C.B.Clarke in Hook.f., *Fl. Brit. Ind.* 2: 636. 1879; C.B.Clarke, *J. Linn. Soc., Bot.* 18: 115. 1881; Burkill, *Rec. Bot. Surv. India* 10: 412. 1924; Craib, *Fl. Siam* 1: 774. 1931; Grierson, *Fl. Bhutan* 2: 242. 1991; Tebbitt, *Brittonia* 55(1): 25. 2003; Uddin, *J. Econ. Tax. Bot.* 31(3): 594. 2007. Type: Myanmar [Birma], *W. Griffith 2587*, s.d. (lectotype **K**, isolectotypes **B**, **GH**, **K**, **P**, designated by Hughes & Girmansyah, 2011).

— *Begonia sarcocarpa* Ridl., *J. Fed. Malay States Mus.* 8(4): 38. 1917; Tebbitt, *Brittonia* 55: 27. 2003. Type: Indonesia, Sumatra, West Sumatra, Korinchi, Barong Baru, 5 June 1914, *H.C. Robinson & C.B. Kloss 61* (lectotype **BM**, designated by Camfield & Hughes, 2018).

— *Begonia tricornis* Ridl., *J. Roy. Asiat. Soc., Straits Br.* 75: 35. 1917; Tebbitt, *Brittonia* 55(1): 25. 2003. Type: Peninsular Malaysia, Pahang, Telom, Nov. 1900, *H.N. Ridley 14123* (lectotype **SING**, isolectotype **K**, designated by Camfield & Hughes, 2018).

— *Begonia turbinata* Ridl., *J. Fed. Malay States Mus.* 8(4): 37. 1917; Tebbitt, *Brittonia* 55: 28. 2003. Type: Sumatra, West Sumatra, Korinchi, Siolak Dras, 15 Mar. 1914, *H.C. Robinson & C.B. Kloss s.n.* (lectotype **BM**, isolectotypes **BM**, **K**, designated by Tebbitt, 2003).

— *Begonia crassirostris* Irmsh., *Mitt. Inst. Allg. Bot. Hamburg* 10: 513. 1939; Tebbitt, *Brittonia* 55(1): 25. 2003. TYPE: China, Hainan, Lam Ko District, Lin Fa Shan, 2 Aug. 1927, *Tsang Wai Tak 278* (lectotype **E**; isolectotypes **A**, **G** n.v., **K**, **MO** n.v., **UC** n.v. designated by Hughes & Girmansyah, 2011).

Specimen examined.—CAMBODIA: Battambang Province [Samlout District, 12°43.787' N, 102°32.496' E, 1 Nov. 2021, 490 m, a.s.l. *D. Song, SLSD001 (RUPP)*]. (Fig. 1).

Distribution.— India, China, Myanmar, Thailand, Laos, Vietnam, Cambodia, Malaysia and Indonesia (Tebbit, 2003; Camfield & Hughes, 2018; Phutthai *et al.*, 2019; Souvannakhoummane *et al.*, 2021). (Fig. 2).

Habitat.— Grows along the edge of small streams, in clay soil in evergreen forest at 490 m, a.s.l., growing in association with *Homalomena* sp. (Araceae), and *Elatostema* sp. (Urticaceae).

Phenology.— Flowering and fruiting in October to December (from field observation).

Conservation status.— *Begonia longifolia* is a very widespread and ecologically tolerant species found throughout South-East Asia and has been previously been provisionally assessed as Least Concern (Hughes, 2008; Camfield & Hughes, 2018).

Note.— The material from Cambodia has male flowers with six tepals, different from the four tepals usually recorded (Tebbit, 2003), whereas the female flowers were similar to populations recorded in Peninsular Malaysia which usually have six tepals (Kiew, 2005). The specimen also has more broadly ovate leaves compared to specimens collected from Laos, 18–24 × 8–11 cm (vs 14–20 × 5–7 cm in Laos)

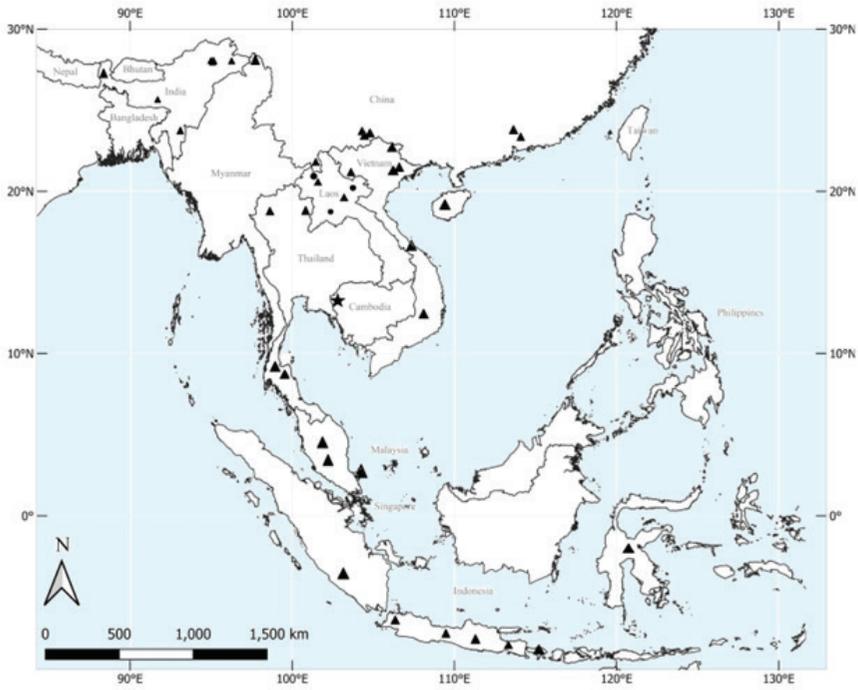


Figure 2. Distribution map of *Begonia longifolia* Blume (▲) (Tebbit, 2003; Camfield & Hughes, 2018; Phutthai et al. 2019; Souvannakhoummane et al. 2021). New distribution record in Cambodia (★), and (●) New localities record in Laos (Phonpaseuth et al. field surveys 2022–2023). Locations may represent the nearest point and not the exact site.

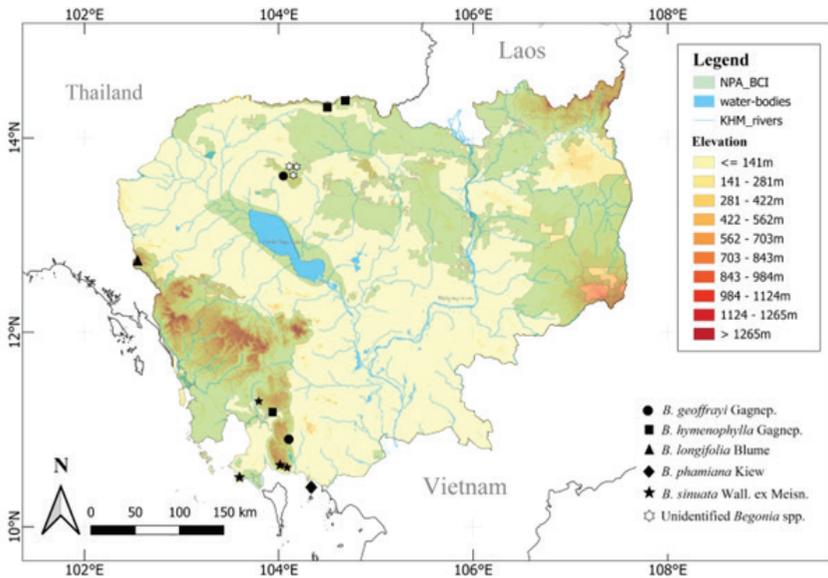


Figure 3. Distribution map of *Begonia* spp. in Cambodia. Locations may represent the nearest point and not the exact site.

SE Asian *Begonia* 72. 2008; Moonlight *et al.*, Taxon. 67(2): 298. 2018. Type: Cambodia, Kampot Province, Kamchay Mts, 30 July 1904, *Geoffray 416* (syntypes **P** [P00341527], **P** [P00507931]).

Specimen seen.— CAMBODIA: Siem Reap Province, 13°36'44" N, 104°02'43" E, 210 m, 30 June 2006, *Long et al. F* (**P** [P00626037]); Mundulkiri Province, Saen Monourom municipality, Laoka Village, D. Song (photographic voucher, Fig. 4A).

Distribution.— Cambodia and Vietnam.

Begonia phamiana Kiew, *Adansonia* 29(2): 232. 2007; M.Hughes, Annot. Checkl. SE Asian *Begonia* 72. 2008; Moonlight *et al.*, Taxon. 67(2): 298. 2018. Type: Cambodia, Gulf of Cambodia (Île du Pic) 15 Aug. 1905, *Geoffray 483* (holotype **P** [P00539153], isotype **P** [P00539154], designated by Kiew, 2007).

Distribution.— Cambodia and Vietnam.

Notes.—The type of this species was included under *Begonia rupicola* Miq. by Gagnepain (1921); but that species is considered endemic to Java. *Begonia phamiana* is known from Cambodia by the type collection.

Begonia sinuata Wall. ex Meisn. Ber. Verh. Naturf. Ges. Basel 2:42. 1836; M.Hughes, Annot. Checkl. SE Asian *Begonia* 117. 2008; Moonlight *et al.*, Taxon. 67(2): 298. 2018. Phutthai *et al.*, Fl. Thailand 14(3): 419. 2019. Type: Malaysia, Penang, *G. Porter s.n.*, s.d., *Wallich Cat. #3680* (types **BM**, **K**).

Specimens seen.— CAMBODIA: Koh Ta Kiev (Ile de la Baie), July 1903, *Geoffray 227* (**P**); Elephant Mountain (no exact locality), 9 Aug. 1919, *E. Poilane 260* (**P**); Kampot Province, Bokor Mt, 5 July 1938, *Muller 312* (**P**); Koh Kong Province, Near the Dam of Kirirom III Hydroelectric Bot Project site, 15 Nov. 2010, *Wu et al. SC0143* (**KUN** [KUN0977713]); Siem Reap Province, 225 m, 22 July 2009, *J.F. Maxwell 09-203* (**QBG** [QBG41723]). (Fig. 4D).

Distribution.— Bangladesh, Myanmar, Thailand, Cambodia, Vietnam, Malaysia (Peninsular) and Indonesia (Sumatra).

Begonia Sect. **Reichenheimia** (Klotzsch) A.DC.

Begonia hymenophylla Gagnep. Bull. Mus. Hist. Nat. (Paris) 25: 200. 1919; Gagnep., in Lecomte (ed.), Fl. Indo-Chine 2: 1099. 1921; M.Hughes Annot. Checkl. SE Asian *Begonia* 52. 2008;

Phutthai *et al.*, Fl. Thailand 14(3): 387. 2019; Lin *et al.*, Phytotaxa 543(3): 201. 2022. Type: Laos, Champasak Province (Bassac), 1866–1888, *Thorel 2358* (type **P** [P00341533]).

Specimens seen.— CAMBODIA: Dangrek Mts., 4 Nov. 1927, *E. Poilane 14001* (**P**); Preah Sihanouk Province, Thmor Rung National Resort, 6 Oct. 2017, D. Song (photographic voucher, Fig. 4B).

Distribution.— Myanmar, Thailand, Laos and Cambodia.

Begonia Sect. **Platycentrum** (Klotzsch) A.DC.

Begonia longifolia Blume. Catalogus 102. 1823; Blume, Enum. Pl. Javae 1: 97. 1827.

Specimens seen.— CAMBODIA: Battambang Province, Samlout District, 12°43.787' N, 102°32.496' E, 1 Nov. 2021, 490 m, a.s.l. *D. Song. SLSD001* (**RUPP**).

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

Species expected to occur in Cambodia

From our literature review of *Begonia* species in neighbouring countries, we expect the following species to be found in Cambodia in the future, potentially increasing the number of *Begonia* species in Cambodia to 20 or more.

Begonia afromigrata J.J.de Wilde

Distribution.— Thailand and Laos (De Wilde *et al.*, 2011; Phutthai *et al.*, 2019; Lin *et al.*, 2022).

Note.— A photograph of vegetative *Begonia* morphologically similar to *B. afromigrata* was taken in Samlout Multiple Use Area, Battambang Province (Fig. 4F). Further field surveys in that area are needed to confirm the identity of the species.

Begonia hemslyana Hook.

Distribution.— China, Laos (Bolaven plateau, Champasak Province), and Vietnam (Hughes, 2008; Phutthai *et al.*, 2019; Souvannakhoumane *et al.*, 2021; Phonepaseuth *et al.*, 2024).

Note.— Recorded in the far south of Laos, hence likely to occur in Cambodia.

Begonia integrifolia Dalzell

Distribution: India, Myanmar, Thailand, Laos, Vietnam and Peninsular Malaysia (Hughes, 2008;

Phutthai *et al.*, 2019; Lin *et al.*, 2022; Phonepaseuth *et al.*, 2024).

Note.— This species is widespread in continental South-East Asia, and its presence in Cambodia is expected. Photographs taken in Ratanakiri Province, 15 Aug. 2020 by D. Song (Fig. 4E) are a good match, but a specimen is required to confirm.

***Begonia modestiflora* Kurz**

Distribution.— India, China, Myanmar, Thailand, Laos (Champasak province), and Vietnam (Dak Lak province)(Hughes, 2008; Phutthai *et al.*, 2019; Lin *et al.*, 2022; Phonepaseuth *et al.*, 2024).

Note.— This has been recorded in the far south of Laos (*Thorel 2239, P*) very close to the border of Cambodia.

***Begonia palmata* D.Don.**

Distribution.— China, Thailand, Laos (Phongsali, Luangprabang, Houaphanh, Xiengkhouang, Sekong Provinces), Vietnam (Hughes, 2008; Phutthai *et al.*, 2019; Lin *et al.*, 2022, Phonepaseuth *et al.*, 2024).

Note.— One of the most widespread *Begonia* species in continental South-East Asia, likely to occur in Cambodia but not yet recorded.

***Begonia poilanei* Kiew**

Distribution.— China, Laos (Bolaven plateau, Champasak Province), Vietnam (Haut Donai District, Djijuih [Dalat])(Kiew, 2007; Phonepaseuth *et al.*, 2021, 2024).

Note.— A photo of a vegetative *Begonia* morphologically similar to *B. poilanei* was taken by local forest guide on 14 July 2022 in Pursat Province. Kiew (2007) noted that a specimen from Cambodia (*Martin M244, P* [P00539141], sterile) is very similar to *B. poilanei*, fertile collections from the specimen locality are needed for confirmation.

***Begonia siamensis* Gegnep.**

Distribution.— India (Arunachal Pradesh), Myanmar, Laos (Phongsaly, Champasak (Bolaven plateau), and Attapeu Provinces), Thailand. (Borah *et al.*, 2024; Hughes, 2008; Phutthai *et al.*, 2019; Lin *et al.*, 2022; Phonepaseuth *et al.*, 2024).

***Begonia vivipara* Aver., Nuraliev & Y.M.Shui**

Distribution.— Laos (Champasak Province near Cambodia)(Averyanov *et al.*, 2021; Phonepaseuth *et al.*, 2024).

Note.— A photo of a morphologically similar species with bulbils at the leaf sinus and red linear dots on petioles and peduncles was taken in Preah Vihear Province, which is near the type locality (Fig. 4G). Further field surveys in that area are needed to confirm the species.

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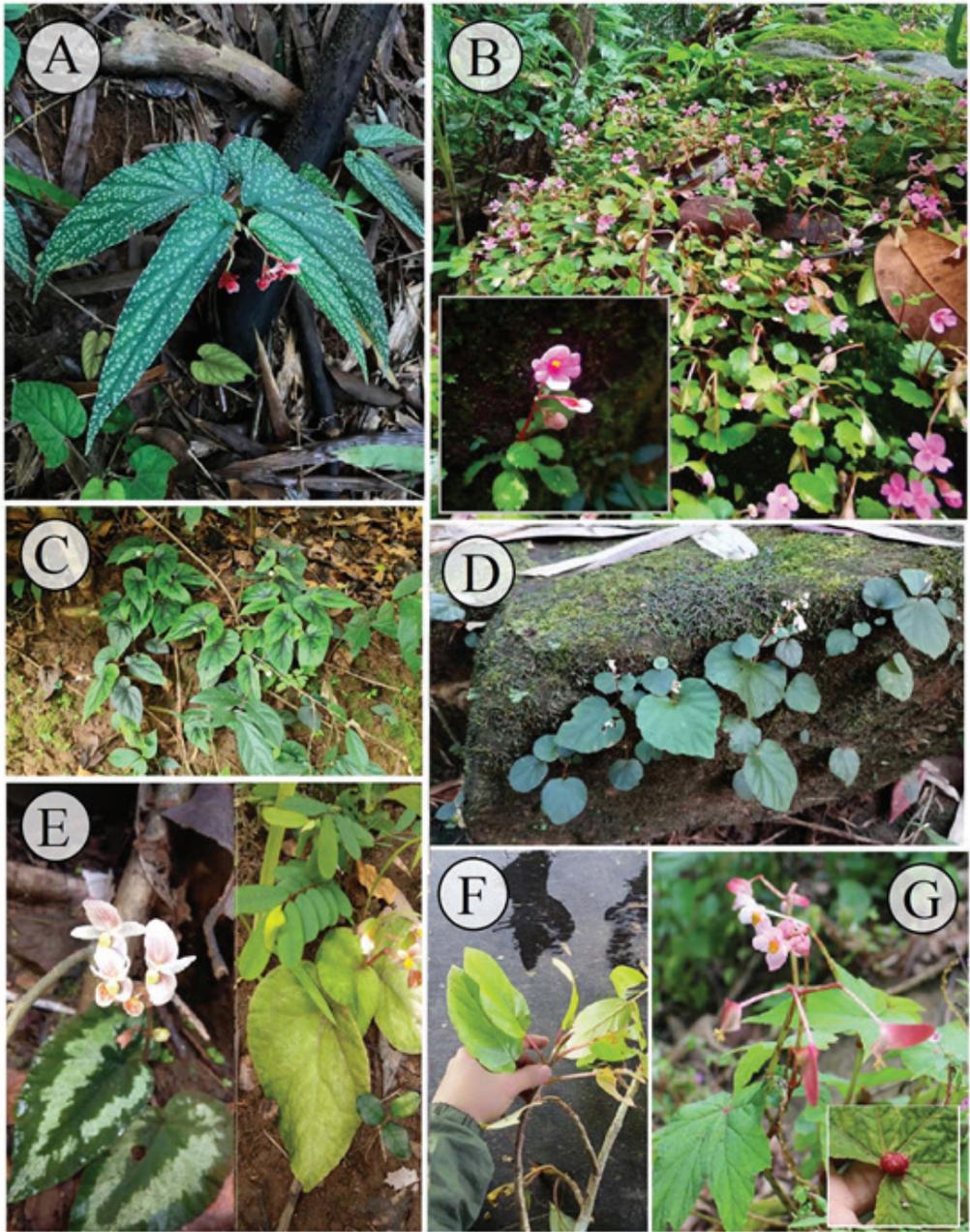


Figure 4. Some *Begonia* species found in field surveys in Cambodia. A. *B. geoffrayi* Gagnep., B. *B. hymenophylla* Gagnep., C. *B. cf. phamiana* Kiew, D. *B. sinuata* Wall. ex Meisn. E. *B. cf. integrifolia*, F. *B. cf. afromigrata* J.J.de Wilde, G. *B. cf. vivipara* Aver., Nuraliev & Y.M.Shui. Photos (A, C–F) by D. Song. (B) by P. Chum, (D and G) by N. Mao.

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