Revision of Cyclocodon Griff. ex Hook.f. & Thomson (Campanulaceae)

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ABSTRACT. This work concerns the recognition, enumeration, and discussion of 4 species of Cyclocodon Griff. ex Hook.f. & Thomson, a genus occurring in Southeast Asia and Malesia. A key to the species of Cyclocodon is given. Cyclocodon axillaris (Oliv.) W.J.de Wilde & Duyfjes, based on Campanumoea axillaris Oliv. is reinstated, as this taxon was previously included in synonymy of Cyclocodon lancifolius (Roxb.) Kurz.

KEY WORDS: Campanulaceae, Cyclocodon taxonomy, Asia, Malesia.

INTRODUCTION

Cyclocodon is a genus of Campanulaceae close to Campanumoea Blume and Codonopsis Wall., and into both of which it has previously been synonymised. The genus was recently reinstated as distinct mainly based on characters of the seed coat or pollen (Morris & Lammers, 1997; Hong & Pan, 1998; Lammers, 1998, 2007a, 2007b). It is distributed in SE Asia from Bhutan and NE India through S China to Japan and southeast through Indochina and Malesia to New Guinea. The three genera also differ in macro morphology, in growth habit, disposition of flowers, and in fruit (capsular versus baccate), and for a large part also in the position of the sepals (calyx lobes) relative to the ovary (Table 1). Concerning this latter item, following the schematic figures of lengthwise flower sections as presented by Chipp (1908) and Moeliono (1960), the differences between the three genera as accepted by the present authors are depicted in figure 1.

Table 1. Differences between Codonopsis, Cyclocodon, and Campanumoea.

<table>
<thead>
<tr>
<th></th>
<th>Codonopsis</th>
<th>Cyclocodon</th>
<th>Campanumoea</th>
</tr>
</thead>
<tbody>
<tr>
<td>root</td>
<td>tuberous</td>
<td>short rootstock</td>
<td>tuberous</td>
</tr>
<tr>
<td>growth habit</td>
<td>twining</td>
<td>erect</td>
<td>twining</td>
</tr>
<tr>
<td>phyllotaxis</td>
<td>alternate (mostly)</td>
<td>opposite</td>
<td>opposite (mostly)</td>
</tr>
<tr>
<td>position of flowers</td>
<td>terminal</td>
<td>terminal</td>
<td>axillary</td>
</tr>
<tr>
<td>disposition of sepals relative to the ovary</td>
<td>apical or lateral on the ovary Fig. 1A - A₂</td>
<td>either lateral on the ovary, or at base of, or below the ovary Fig. 1B₁ - B₃</td>
<td>at base of the ovary Fig. 1C</td>
</tr>
<tr>
<td>filaments</td>
<td>dilated at base (mostly)</td>
<td>terete or dilated at base 4 or 5 (or 6)</td>
<td>terete</td>
</tr>
<tr>
<td>stigma-lobes and locules of ovary and fruit</td>
<td>3</td>
<td>3</td>
<td>3</td>
</tr>
<tr>
<td>fruits</td>
<td>capsule</td>
<td>berry</td>
<td>berry</td>
</tr>
</tbody>
</table>

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For the treatment of Campanulaceae for the Flora of Thailand the genus has been studied again. After the reinstatement of Cyclocodon axillaris (Oliv.) W.I.de Wilde & Duyfjes, based on Campanumoea axillaris Oliv., we recognize four species in Cyclocodon. Two species occur in Thailand: Cyclocodon celebicus (Blume) D.Y.Hong and C. parviﬂorus (Wall. ex A.DC.) Hook.f. & Thomson. Because Campanumoea axillaris was formerly mostly placed in synonymy of Cyclocodon lancifolius (Roxb.) Kurz, Codonopsis lancifolia (Roxb.) Moeliono or Campanumoea lancifolia (Roxb.) Merr., in previous taxonomic treatments the latter species had a much wider circumscription when compared to that in the present treatment.

TAXONOMY

CYCLOCODON


Perennial herbs, stems mostly branched, erect; roots ﬁbrous from short root-stock. Leaves opposite. Inflorescences in loose terminal panicles (or solitary, terminal or axillary, not in Thailand). Flowers pedicellate; bracteoles present or absent; perianth regular, 4- or 5-merous (in Thailand), ovary subglobose, inferior to corolla, superior or partly superior to sepals, 4- or 5-locular; sepals persistent; corolla partially divided; ﬁlaments not or only somewhat dilated at base; stigma 4- or 5-lobed. Fruit: a berry, 4- or 5-locular. Seeds numerous, somewhat ﬂattened, subglobose, very small.

Note.— The lectotypiﬁcation of the genus Cyclocodon by Hong & Pan (1998) with Cyclocodon adnatus Griff. is rejected because this name is invalid and also not mentioned in Hooker & Thomson (1858).

KEY TO THE SPECIES

1. Flowers 4-merous. Sepals inserted at base of the ovary or below the ovary on the pedicel, also in these positions in the fruit

   4. C. parviflorus

1. Flowers 5- (or 6)-merous. Sepals inserted at base of the ovary or on the ovary, in fruit always inserted on the fruit

2. Sepals pectinately long-lobed. Flowers solitary, long-pedicelled, (terminal and) axillary to normal foliage leaves. Filaments much widened at base

   1. C. axillaris

2. Sepals dentate-serrate, or sub-laciniate or entire. Flowers terminal, solitary or in panicles, pedicels short or long. Filaments not widened at base

3. Flowers solitary on short pedicels, 2 cm long or less, terminal or axillary to normal foliage leaves, bracts small, not appearing as reduced leaves

3. Flowers in loose terminal panicles with mostly longer pedicels, 1–6 cm long, bracts minute or larger, often appearing as much reduced (petiolate) leaves

3. C. lancifolius

2. C. celebicus

Figure 1. Insertion of the sepals relative to the ovary in Codonopsis, Cyclocodon, and Campanumoea. Note that the corolla is always at the apex of the ovary. Stamens are not indicated. A1–A2. Codonopsis; B1–B2. Cyclocodon; C. Campanumoea.

*Flowers* solitary, 5- or 6-merous, on axillary peduncles ca. 5 cm long; bracteoles minute, linear, ca. 5 mm long; sepalas linear, with (1–)3–6 pinnately arranged side-lobes; filaments much widened and adaxially hairy at base. *Fruits* green, globose, ca. 1 cm in diam.

**Distribution.** — China (Sichuan), Taiwan, Japan, Laos, Vietnam, N Sumatra, Philippines (no material seen), Moluccas (Buru).

Notes. — 1. In the Flora of China (Hong & Lammers, 2011) this species, under the name *Cyclocodon lancifolius*, is described as having purple-black fruits; in other *Cyclocodon* species the fruits are white (or pinkish).

2. The name *Campanumoea truncata* used by Merrill (1912), as ascribed to Endlicher, Gen. Pl. 1: 515, (“1836”) 1838, does not exist. We have not seen Vanoverbergh 965 (N Luzon) on which Merrill’s record of *C. truncata* was based.


*Flowers* commonly in few-flowered sub-parniculate terminal inflorescences, 5–10 cm across, with pedicels 1–6 cm long; bracts often with the appearance of reduced leaves; bracteoles small, linear; sepals linear, entire or few-serrate or few-dentate; filaments (sub)terete, glabrous. *Fruits* white, depressed globose, (0.5–)1 cm in diam.

**Distribution.** — South China (no material seen), southern Myanmar, Thailand, throughout Malesia to New Guinea.

Notes. — 1. In the collection *Vidal et al.* 6179 (Thailand) exceptionally the fruit opens by 3 apical valves.

2. In the original description Blume (1826) only mentions “Celebes”, and Miquel (1857), who obviously examined the material, mentions “Celebes (Reinwardt)”. This material is composed of two sheets in L, presumably duplicates. One sheet (L0585034) bears in Reinwardt’s handwriting “1520 Campanula caesia R. Habitat in sylvis ad flumen Batudoelang ...... Celebes. Sepr. 1821”. The other sheet (L0585035) bears in Blume’s handwriting: “Campanula caesia, Celebes, Campanumoea celebica”. We have chosen the latter (L0585035) as the lectotype.

3. The collection Teysmann 5768 (L) from Menado (Celebes) deviates in alternating leaves which are glabrous on the lower surface.

4. Some collections from Sumatra (*Korthals s.n.*, *De Vroogd 322* and *1491*) approach *Cyclocodon parviflorus* in that the sepals are inserted at or close to the base of the ovary, also in fruit. The flowers, however, are 5-merous. In some flowers the opposite bracteoles (reduced leaves) are inserted on the
peduncle (pedicel) close to the flower, resembling the sepalms as in *C. parvi*; however, these flowers (and fruits) additionally also have true sepalms inserted on the ovary (fruit) close to the base.


*Type:* NE India, Pandua, *Witchu* 1300 (holotype G, photo seen; isotype K-W, photo seen).— *Cyclocodon distans* Griff., *Not. Pl. Asiat.* 4: 277. 1854, *nom. inval.* Fig. 2A.

*Flowers* 4-merous, in poor-flowered terminal panicles; bracts (bracteoles) minute; sepalms 4, linear, few dentate-lacerate, inserted on the pedicel at base of ovary or up to 4 mm below ovary; filaments terete, slightly widened at base, glabrous. *Fruits* whitish, globose-ovoid, 4-locular, ca. 6 mm in diam.

Distribution.— NE India (Assam, Sikkim), Bangladesh, Bhutan, S China, Myanmar, Thailand, Laos.

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**REFERENCES**


Figure 2. A. *Cyclocodon parviflorus* (A.DC.) Hook.f. & Thomson. B–E. *Cyclocodon celebicus* (Blume) D.Y.Hong. Photographed by Pramote Triboun (A), Brigitta Duyfjes (B–E).


