

A reassessment of the identity and rarity of *Clerodendrum chlorisepalum* (Lamiaceae) in Thailand and Vietnam

JAMES A. WEARN* & CHARAN LEERATIWONG**

ABSTRACT. Re-examination of the type material of *Clerodendrum chlorisepalum* Merr. ex Moldenke, and additional, previously cited collections from Thailand and Vietnam, has necessitated a clarification of the identity and rarity of the species. This is due to confusion with the much more common plant *C. nutans* Wall. ex Jack. *Clerodendrum chlorisepalum* has been assessed as Vulnerable (VU B1ab(iii)+D) using the IUCN Red List categories due to redetermination of specimens and reappraisal of its distribution. *Clerodendrum chlorisepalum* is endemic in Vietnam and, therefore, hereby excluded from the Flora of Thailand. The Thai specimens are *C. nutans*.

KEY WORDS: *Clerodendrum*, distribution, Lamiaceae, Red List, taxonomy.

INTRODUCTION

The genus *Clerodendrum* L. (Lamiaceae) numbers some 150 species globally, of which 28 are found in Thailand (Leeratiwong et al., 2011) and between 30 (Govaerts, 2011) and 34 (Phuong, 2007) have been recognised in Vietnam. During IUCN Red List research on *Clerodendrum* by the first author and the preparation of an account of the genus in Thailand by the second author, a discrepancy was noticed concerning the distribution of *Clerodendrum chlorisepalum* Merr. ex Moldenke. This species has been accepted previously as native in Thailand and Vietnam (Moldenke, 1963, 1980, 1985; Govaerts, 2011). However, we have found that the concept of this elegant species had been confused by Moldenke, in its original description (Moldenke, 1963) and in subsequent reviews of its status (Moldenke, 1980, 1985). Although *C. chlorisepalum* had been included in the 1997 IUCN Red List (Walter & Gillett, 1998) as threatened in Thailand, with the additional category 'I' (recorded in nation but status not available), it had been omitted from later IUCN lists due to data deficiencies. It was also omitted from recent checklists of threatened plants in Thailand (Pooma et al., 2005; Santisuk et al., 2006).

REASSESSMENT

Despite having been included in the first global Red List of threatened plants (Walter & Gillett, 1998), the distribution of *C. chlorisepalum* in Thailand was believed to be geographically wide ranging (specimens from Northern, Central and Southwestern floristic regions had been determined in herbaria as this species and cited by Moldenke (1963: 87; 1985: 452)), but with few individuals present in each region. The protologue of *C. chlorisepalum* was published in the Studies of the Flora of Thailand series (Moldenke, 1963). In doing so, Moldenke took up a name which had been coined more than two decades earlier by Merrill (who had never published it), then relating to a single specimen from Vietnam (Pétiot 6401, see the revised species description, below). Nevertheless, '*Clerodendrum chlorisepalum* Merr.' was a name which Moldenke had cited under Indo-China in his geographical summaries prior to its validation by him (Moldenke, 1942: 59; Moldenke 1949: 136). Later, Moldenke thought he had seen material from Thailand and, using Merrill's epithet, along with a second Pétiot specimen (Pétiot 8485) as the type, he described the species, adding Thailand to its distribution (Moldenke, 1971: 294). The trigger for Moldenke's

* Herbarium, Library, Art & Archives, Royal Botanic Gardens, Kew, Richmond, Surrey, TW9 3AE, UK. Email: j.wearn@kew.org

** Department of Biology, Faculty of Science, Prince of Songkla University, Hat Yai, Songkhla 90112, Thailand.

description of *C. chlorisepalum* was a then newly collected plant from Sai Yok in Southwest Thailand (Larsen 8515), which Moldenke believed to be conspecific with the Vietnamese collections of Pételot). However, this determination was erroneous, and has led to subsequent confusion of the identity and distribution of the species.

Pételot 8485 does represent material of *C. chlorisepalum* as understood by Merrill, and that

collection was chosen by Moldenke as the type. We have found that the additional Thai collection, included at the end of the protologue (i.e. *Larsen 8515*), and other putative material from Thailand, which was later cited by Moldenke (1985: 452), represent material of *C. nutans* Wall. ex Jack. Several characters clearly separate these collections from *C. chlorisepalum* (see Table 1).

Table 1. Comparison of *C. chlorisepalum* with the species with which it is most commonly-confused, *C. nutans*, using revised concepts.

	<i>C. chlorisepalum</i> Merr. ex Moldenke	<i>C. nutans</i> Wall. ex Jack
Inflorescence	Nodding, lax/spreading.	Distinctly pendulous.
Corolla (at anthesis)	Tube 1.9–2.2 cm long, longer than lobes; lobes ovate-elliptic, each 3–4 mm wide.	Tube 0.8–1.2 cm long, equal in length to, or shorter than lobes; four lateral lobes obovate and 6–7 mm wide, upper one broadly elliptic and 4–4.5 mm wide.

Following communications with staff at herbaria holding Thai specimens identified as *C. chlorisepalum* and examination of that material, as well as investigation of undetermined collections and discussions with botanists local to collection localities, we are able to conclude that all material collected from Thailand, and previously perceived to be *C. chlorisepalum*, is in fact *C. nutans*. No collections of *C. chlorisepalum* from Laos have been found by us, although botanical collecting more generally has not been abundant in that country (Schuiteman & de Vogel, 2000; Newman et al., 2007). These assertions reduce the known distribution of *C. chlorisepalum* significantly – to Vietnam only (Le Trong Cuc (2005: 289); Phuong (2007: 106); and see below).

It is worth noting that, *C. nutans* (syn. *C. wallichii* Merr.) has also been frequently confused with *C. laevifolium* Blume, a species with larger calyces and subsessile leaves (see Wearn & Mabberley, 2011).

It is rather ironic that a report from a project which had focused on the flora of Thailand contains the protologue of a species which was never actually found there. This situation is not unique

and is reminiscent of Thunberg's description of plants from Japan (often including the epithet 'japonica') which were, in fact, originally from China. More importantly, without critical reassessment of this material, the narrower ecological breadth and geographic distribution of *C. chlorisepalum* would not have been understood.

***Clerodendrum chlorisepalum* Merr. ex Moldenke**, Dansk Bot. Arkiv 23: 87. 1963, only type, not additional specimen cited. Type: Vietnam, Lao Cai Province, route from Laokey [Lao Cai] to Chope [Sa Pa], 1943, *Pételot 8485* (holotype NY [image seen]; isotypes P, VNM [image seen]).

Small shrub, 1–2 m tall; branchlets slender, pale brown, quadrangular, glabrous or subglabrous. Leaves decussate; blade ± elliptic, 8–15 cm long by 2.5–7 cm wide, 2.5–3.2 times as long as wide; margin subentire-repand; base acute; apex long acuminate; surfaces subglabrous, mid-green adaxially, paler abaxially; venation arcuate, 5–7 pairs of secondary veins; petioles 1.5–3 cm long. Inflorescence a terminal thyrse, 13–30 cm long by 8–18 cm wide, finely branched, lax and nodding with cymes borne laterally from main axis;

peduncles 4 [distally]–41 [proximally] mm long, glabrous to minutely puberulent. *Calyx* green (sometimes with pale reddish tinge to lobe apices), \pm campanulate, (8–)9–10.5 mm long at anthesis; lobes 5, united near to the base, lanceolate, \pm glabrous, lacking glands or with some minute (diameter $< 50 \mu\text{m}$) glands adaxially. *Corolla* white, slightly scented, glabrous; tube 1.9–2.2 cm long; lobes ovate-elliptic, 1.3–1.4 cm long by 3–4 mm wide. *Stamens* 4, exserted, extending c. 15 mm from corolla tube. *Ovary* globose, glabrous. *Style* shortly bifid apically, extending to c. 8 mm beyond the stamens. *Fruit* not seen.

Distribution.— The revised distribution of this species includes only three confirmed localities in northern Vietnam, one in each of three provinces: Lao Cai [route from Laokey (Lao Cai) to Chope (Sa Pa), 25 Sept. 1943, *Pételot 8485* (NY, P, VNM); Hoa Binh [Mai Chau District, Pa Co, 20 Sept. 2005, *Vu Xuang Puong et al. HNK 580* (HN, K)]; and Vinh Phuc [Soc Son Pagoda, Oct. 1937, *Pételot 6401* (NY, P, VNM)]; as well as an additional, unconfirmed record from Ha Tay Province [Ba Vi, no material seen].

Ecology.— Found in open forests and in semi-open grassland; on clay soils and limestone; 958–1800 m altitude. Flowering August–October (at least).

IUCN Conservation Status.— Since the type material was collected in 1943, there has been much regional unrest, causing destruction of habitats and buildings alike (Lao Cai being razed to the ground during the late 1970s). In 1986 the Hoang Lien Son Nature Reserve was created to protect parts of the natural landscape to the south and west of Sa Pa, although the Reserve only covers a relatively small (c. 30 km²) area. Today, this species is threatened by habitat destruction as land clearance continues at an alarming pace in Vietnam, especially for terraced agriculture on the hills where *C. chlorisepalum* is native.

The total confirmed provincial area of occupancy in Vietnam is less than 15,000 km². The presence of *C. chlorisepalum* within this area is clearly sporadic. Hence, the area of actual occupancy is likely to be much smaller. We have therefore categorised *C. chlorisepalum* as Vulnerable (VU B1ab(iii)+D) using IUCN (2001) categories.

Although there may be some undiscovered populations, the distribution of this species appears to be fragmented within a restricted geographical region. Also, *C. chlorisepalum* has to our knowledge, so far been represented by single individuals at all known localities (established via personal communications), and therefore, may not be able to spread via root-suckers, unlike several other *Clerodendrum* species (e.g. *C. chinense* (Osbeck) Mabb., *C. japonicum* (Thunb.) Sweet, and *C. paniculatum* L.), though its biology is little known.

Clarification of the identity and distribution of this species is essential to avoid over-collection. It is critical that fecundity is not hampered by future collecting activities. We recognise that botanical exploration in the regions where this species is native has been rather low during the past 50+ years, but, considering the data available and discussions with in-country botanists, we believe that this assessment reflects the knowledge of the species at this time. *Clerodendrum chlorisepalum* is not known to be cultivated, and so *ex situ* stocks are unlikely to exist.

Etymology.— The epithet means ‘having green sepals’ (i.e. calyx lobes).

Notes.— *Clerodendrum chlorisepalum* is a high altitude species unlike *C. nutans*. *Clerodendrum chlorisepalum* is also similar to *C. disparifolium* Blume, although the latter has smaller calyces and narrower corolla tubes, and is also much larger in stature (i.e. a large shrub to small tree). That species is common in Malesia and has been collected from southern Thailand but is absent from Vietnam.

In 2005, collaborative fieldwork between the Royal Botanic Gardens, Kew (K) and the Vietnamese Institute of Ecology and Biological Resources (IEBR) produced a significant recent set of material from Vietnam. Among the specimens collected from northern Vietnam, was one which appears to be new material of *C. chlorisepalum* (*Phuong et al. HNK 580*).

ACKNOWLEDGMENTS

We are grateful to staff at the following herbaria for aiding our quest for material of *C. chlorisepalum*: AAU, BK, BKF, C, CMU, E, K, HNU, LL, NY, QBG, US and VNM. Eric Danell (Dokmai

Botanical Garden, Chiang Mai) facilitated contact with botanists local to focal sites in Thailand. Particular thanks is also due to David Mabberley (Royal Botanic Gardens & Domain Trust, Sydney), Alan Paton (K), Steve Bachman (K), Kurt Keller, Peter Williams and James Maxwell (CMU) for valuable discussions.

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