



Studies in Asian *Nervilia* (Nervilieae, Epidendroideae, Orchidaceae) IV: *N. umphangensis*, a new species from the Thai–Myanmar border

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Introduction

The Old World terrestrial orchid genus *Nervilia* Commerson ex Gaudichaud-Beaupré in Freycinet (1829: 421, t. 35) remains poorly known, especially in Asia. It is diagnosed by its hysteranthous habit, in which a single, terminal, one–several-flowered inflorescence and a single ovate to cordate leaf emerge in succession from a single globose tuber. This temporal separation of flowers and leaves makes complete herbarium collections rare. Some species have been described only from flowers, others have been recorded only from leaves, and occasionally the two are mismatched on the same herbarium sheet. The situation is compounded by the ephemeral nature of the plants; the flowering phase is brief, fructification is rapid with fruit set usually occurring prior to leaf flush, and all above-ground parts die back at the end of the growing season, making plants difficult to locate in the field and under-represented in herbaria. Accordingly, species circumscriptions are often inadequate, vague and sometimes overlapping, and the loss or concealment of potentially useful characters (e.g. leaf coloration, lip indumentum) in dried herbarium (especially type) material challenges their critical re-evaluation.

In the only global treatment of the genus attempted to date, Schlechter (1911) proposed a subgeneric division of three sections, *Linervia*, *Vinerlia* and *Nervilia* (as *Eunervilia*), based primarily on the number of flowers in the inflorescence, and enumerated the species referable to each. He later added a fourth, section *Kyimbilaea*, to accommodate an African species with a spurred lip (Schlechter 1915). Pettersson (1991) revised the genus in Africa and Madagascar, recognising a total of 16 species. He presented a cladistic analysis and questioned the validity of three of Schlechter's sections, incorporating species with a range in number of flowers per inflorescence into section *Nervilia* and finding the single-flowered species of section *Linervia* to be monophyletic only once recircumscribed to include the species of section *Kyimbilaea*.

No comprehensive systematic account exists for species outside Africa, although they represent the bulk of the genus. Recent studies on Asian taxa suggest that the genus comprises a series of species complexes, each defined by a suite of discrete floral and foliar characters (e.g. Chen & Gale 2009). The present high rate of description of new taxa belonging to at least one of these, the widespread and species-rich *Nervilia adolphi–punctata* alliance of one-flowered species (e.g. Gale & Wu 2008; Lin & Lin 2009; Averyanov 2011a; Hsu *et al.* 2012; Jalal *et al.* 2012; Gale *et al.* 2013; Hsieh *et al.* 2013), indicates that much remains to be learned about relationships and patterns of variation over varying geographic scales, and this, for now, precludes an accurate estimate of true species numbers and reappraisal of subgeneric classification. Resolving these issues is problematic particularly for members of the *N. adolphi–punctata* alliance because their solitary flower and generally diminutive stature limit options for character analysis, and leaf morphology is notoriously uniform (Seidenfaden 1978). However, Gale *et al.* (2010) and Eum *et al.* (2011) have demonstrated the utility of molecular markers in resolving identities and differentiating morphologically similar members of the complex.

Pettersson (1991) postulated an Asian origin of the genus, given the greater diversity of species on that continent. The predominance of Asian members of related genera in tribe Nervilieae adds weight to this hypothesis, although for now the placement and precise composition of this tribe among the basal epidendroids

Conservation status:—At present, *Nervilia umphangensis* is only known from the type locality. This population is estimated to comprise more than 1,000 emergent plants. Its remote location and the lack of thorough botanical surveys in the vicinity make it plausible that additional populations may yet be found nearby. Moreover, as many other species in the genus tend to exhibit a scattered distribution, it is possible that other populations occur in similar seasonal forest habitats elsewhere in the Indo-Burma region. Accordingly, we believe it premature to conduct a full conservation assessment based on the one known population. For now, we regard the species as Data Deficient (DD; IUCN 2012).

Etymology:—Named for Umphang District in Tak Province, the only location for the species.

Vernacular name:— ว่านแผ่นดินเย็นอุ้มผาง (Wan pan din yen umphang).

Specimens examined:—THAILAND. Tak Province: Umphang District, Doi Hua Mod, 879 m, 13 April 2013, *Suddee et al.* 4426 (BKF); Umphang District, Doi Hua Mod, 879 m, 3 June 2013, *Prommanut 308* (BKF); Umphang District, Doi Hua Mod, 879 m, 3 June 2013, *Prommanut 309* (BKF).

Taxonomic notes:—The glabrous, angular leaf of this new species immediately affiliates it with the taxonomically difficult *N. adolphi-punctata* species alliance. However, its relatively large flower with yellow-ochre tepals and orbicular, glabrous, lilac-purple epichile, and purple-bronze new leaf make it unique. Most other species of this complex have a predominantly white lip marked with purple spots and blotches on the epichile, which is typically irregularly papillate. In coloration, the lip of *N. umphangensis* is most similar to that of *N. infundibulifolia*, a species described from India (Blatter & McCann 1932) and since recorded from Bhutan (Pearce & Cribb 2002), Laos and Thailand (Seidenfaden 1978). However, the epichile of that species is pubescent throughout and bears a broad band of longer papillae along the central ridge. Moreover, the lip of *N. infundibulifolia* is discontinuously smaller (ca. 13–15 mm long) than that of *N. umphangensis*, plus the epichile is obovate and less than 5 mm wide. Indeed, the lip of all other members of the *N. adolphi-punctata* species alliance known from Thailand is notably smaller (less than 20 mm long).

In terms of floral dimensions, the new species is comparable to *N. muratana* Gale & Wu (2008: 81), another member of the *N. adolphi-punctata* alliance from southern China and Vietnam (Averyanov 2011b). That species has a lip about 25 mm long, and the epichile is also more or less glabrous. However, the epichile is ovate, and the hypochile lacks distinct auricles at its apex. Furthermore, the tepals of *N. muratana* are all lanceolate, less than 3 mm wide and white, in contrast to those of *N. umphangensis*, which are obovate, more than 4 mm wide and ochre.

Among the most noticeable features of *N. umphangensis* is the purple-bronze coloration of the young leaf, which fades to green with age. The leaf of the recently described *N. khaoyaica* Suddee, Wattana & Gale (2013: 331) from eastern Thailand exhibits colour dimorphism (green or purple), but the colour is different and persists in fully mature individuals, compared to the new species described here. The leaf coloration of other members of the complex is uniform and/or does not vary between individuals or with age.

Beyond these qualitative comparisons, the phylogenetic placement of *N. umphangensis* is unclear. DNA sequence analysis and phylogenetic reconstruction are needed to address this and many similar unresolved issues within the genus. The ability of DNA fingerprints (Gale *et al.* 2010) and sequence data (Eum *et al.* 2011) to differentiate a subset of closely related, cryptic taxa of the *N. adolphi-punctata* species alliance offers hope that molecular approaches, especially DNA barcodes, will be useful in identifying sterile material and, potentially, screening ambiguous collections to provide insights into the ecology and evolution of the genus.

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