

New species of *Microchirita* (Gesneriaceae) from Thailand

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ABSTRACT. Five new species of *Microchirita* are described: *Microchirita purpurea* D.J.Middleton & Triboun, *Microchirita karaketii* D.J.Middleton & Triboun, *Microchirita suddeei* D.J.Middleton & Triboun, *Microchirita albiflora* D.J.Middleton & Triboun and *Microchirita woodii* D.J.Middleton & Triboun.

KEY WORDS: Gesneriaceae, *Microchirita*, new species, Thailand.

INTRODUCTION

In the last few years a team of botanists has been revising the Gesneriaceae for the *Flora of Thailand*. This work has included extensive field work throughout Thailand which has led to a remarkable number of new discoveries (Middleton & Triboun, 2010, 2012; Triboun & Middleton, 2010, 2012; Middleton & Möller, 2012). At the same time molecular phylogenetic studies have also attempted to better clarify the generic limits within the family (Puglisi et al., 2011; Möller et al., 2011a, b; Weber et al., 2011a, b; Middleton & Möller, 2012), leading to a more stable classification system.

One consequence of this molecular phylogenetic work, accompanied by morphological studies, has been the splitting of *Chirita* Buch.-Ham. ex D.Don into five genera (Weber et al., 2011a). Three of these genera are found in Thailand: *Damrongia* Kerr ex Craib, *Henckelia* Spreng. and *Microchirita* (C.B.Clarke) Yin Z.Wang. Thailand is the centre of diversity for *Damrongia*, with all known species of the genus found there, and *Microchirita*, with 12 of the approximately 18 already known species recorded for Thailand (Burt, 2001; Weber et al., 2011a).

In the course of identifying recently collected *Microchirita* specimens from Thailand we discovered a number of undescribed species. Of these new species

Microchirita purpurea D.J.Middleton & Triboun is purple-flowered. The others have predominantly white flowers. There are currently only three recognised species of *Microchirita* with predominantly white flowers: *M. hamosa* (R.Br.) Yin Z.Wang, *M. sahyadriensis* (Punekar & Lakshmin.) A. Weber & D.J.Middleton and *M. tubulosa* (Craib) A. Weber & D.J.Middleton. *Microchirita sahyadriensis* is endemic to the Western Ghats of India, *M. tubulosa* is endemic to Thailand, and *M. hamosa* is reported from Western, Northern and Northeastern India, China (Guangxi, Yunnan), Burma, Thailand, Laos and Northern Vietnam (Weber et al., 2011a). We have discovered that in Thailand the plant called *Microchirita hamosa* (Fig. 2A–B) is misnamed but this will be the subject of a later paper.

The two white-flowered species reported from Thailand are very distinct from each other. *Microchirita tubulosa* has very much larger flowers that widen into a campanulate upper tube as opposed to the small tubular flowers of the species currently called *M. hamosa*. In Thailand it would appear that there has been a tendency to assign all plants with small predominantly white flowers to *Microchirita hamosa* whereas the reality is that there is quite some variation in these small-flowered *Microchirita* specimens and, on examination, this variation can be divided into morphologically and geographically discrete species. In particular the species can be

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distinguished on combinations of characters to do with additional markings in the corolla tube, the shape and size of the corolla tube, whether the stamens cohere or not, the pubescence of the anthers, the shape of the disc, and the pubescence of the ovary. Further details are discussed under each species below.

This is not the first time that the broad species concept adopted by Wood (1974) for species of *Chirita* has been challenged. Wood (1974) recognised a broadly defined *Chirita asperifolia* (Blume) B.L.Burtt but Hilliard (2004) chose to split it into 12 species.

***Microchirita purpurea* D.J.Middleton & Triboun, sp. nov.**

Differs from the other blue- and purple-flowered *Microchirita* species by the combination of epiphyllous inflorescence and the narrow base of the corolla tube which abruptly widens into a wide campanulate upper tube. – Type: Thailand, Chanthaburi, Kaeng Hang Maeo, Khao Chamao National Park, Wat Khao Wong Kot, 30 m alt., 27 Aug. 2012, *Middleton, Karaket, Suddee & Triboun 5681* (holotype **BKF**; isotypes **A, BK, E, K, P, QBG, SING**). Fig. 1A–D.

Annual erect herb 0.25–1 m tall; stems fleshy, green, tinged red, with sparse stiff multicellular-uniseriate hairs. *Leaves* opposite; petiole 2–9.5 cm long (although sometimes with new shoot associated with epiphyllous inflorescence arising from apex of petiole thereby effectively making leaf sessile), reddish, with sparse stiff multicellular-uniseriate hairs; blades thin, pale green above and beneath, ovate, 8.5–20.5 by 6–9.5 cm (although considerably smaller in shoots arising from apex of petiole), base cordate, apex acuminate, often fraying towards apex, midrib flat above, 9–23 pairs of secondary veins, steeply ascending, tertiary venation not visible, sparsely covered with stiff multicellular-uniseriate hairs above and beneath. *Inflorescence* epiphyllous at petiole/blade junction with immature flowers held down towards the midrib with the pedicels curving upwards as the corolla matures and opens and then continuing to curve back away from leaf blade as corolla falls (with the inflorescence therefore appearing as a crest with the immature flowers towards the midrib and developing fruit towards

the stem); pedicels 20–30 mm long, with dense stiff multicellular-uniseriate hairs. *Calyx* pale green, 5-lobed to base; lobes narrowly ovate, 7–9.5 by 1.5–2.3 mm, apex long acuminate, indumentum as on pedicels. *Corolla* dark purple, slightly paler in tube and on lobes, tube narrow at base, curved downwards, widening abruptly into campanulate upper tube and hardly spreading lobes, all lobes broadly orbicular with rounded apices, outside indumentum as on pedicels except glabrous at base of tube, inside glabrous except for stalked glands dorsally around level of anthers; lower tube 9–9.5 mm long, upper wider tube 10 mm long to base of lower lobes, 4 mm long to base of upper lobes; upper lobes 4 by 6 mm, sinus between them 2.5 mm deep; lateral lobes 6 by 9.5 mm; lower lobe 8.5 by 13 mm. *Stamens* inserted at point where tube widens, 2 fertile stamens and 3 staminodes; filaments arising perpendicular to corolla tube, 1.5 mm long, glabrous; anthers with apices pointing towards base of corolla, apices of two anthers attached to each other, 1.5 by 2.5 mm, glabrous except densely long pubescent near junction of upper anther locules and filaments; staminodes simple filaments inserted near base of corolla tube, 2 laterals 1 mm long, medial 0.7 mm long. Disc 1 mm long, a simple annular ring. *Ovary* fusiform, 5 mm long, glabrous; style 7 mm long, glabrous; stigma bifid into 2 flattened lobes 1.2 mm long. *Fruit* (immature) green, not twisted, curved, ca 4 cm long, ca 2 mm wide.

Thailand.— SOUTH-EASTERN: Chanthaburi [Kaeng Hang Maeo, Khao Chamao National Park, Wat Khao Wong Kot, 30 m alt., 27 Aug. 2012, *Middleton, Karaket, Suddee & Triboun 5681* (**A, BK, BKF, E, K, P, QBG, SING**)].

Distribution.— Only known from the type locality.

Ecology.— Exposed karst limestone cliffs and more shaded cave entrance.

Etymology.— Named after the colour of the corolla.

Proposed IUCN conservation assessment.— Endangered (EN B2ab(iii)). This species is extremely common at the collection locality and can be observed occurring high up on rather inaccessible cliffs. It is a karst limestone specialist and at the site where it was collected there is only about 1 km² of suitable habitat. The basal area of the outcrop

and the surroundings are degraded by human activity. What is not known is whether the same species occurs in the other nearby and rather larger karst limestone areas. If it were to be found there, however, the total area of these sites, and thereby its potential Area of Occupancy, is still less than 500 km². This, combined with the fragmented nature of these limestone outcrops, the degradation at the only known site, and the clearance of surrounding forest altering the microclimate, qualifies it as Endangered. If it is not found in future surveys of the unexplored nearby sites then a higher threat category may be more suitable.

Note.—*Microchirita purpurea* is very striking and attractive due to its dark purple flowers. It is most similar to two other species: *Microchirita barbata* (Sprague) A. Weber & D.J. Middleton, probably from somewhere in Indochina (but provenance unknown), and the common and widespread *Microchirita involucrata* (Craib) Yin Z. Wang, from Central and Southern Thailand, Cambodia and Peninsular Malaysia. It is similar to *Microchirita barbata* in the epiphyllous inflorescence and corolla colour but differs in the narrowly ovate calyx lobes (obovate in *M. barbata*), the narrow base of the corolla tube which abruptly widens into a wide campanulate upper tube (broader at base and only gradually widening in *M. barbata*) and in being much less densely pubescent than *M. barbata*. *Microchirita purpurea* is similar to *M. involucrata* in corolla colour and size but differs in the inflorescence being epiphyllous in *M. purpurea* (arising from the junction of paired bracts in *M. involucrata*) and the narrow base of the corolla tube which abruptly widens into a wide campanulate upper tube (gradually flaring from near the base towards the lobes in *M. involucrata*).

***Microchirita woodii* D.J. Middleton & Triboun, sp. nov.**

Similar to *Microchirita elphinstonia* but differing in the smaller flower and the very pale yellow to almost white corolla lobes (bright orange-yellow in *M. elphinstonia*). — Type: Thailand, Nan, Muang Nan, Tham Pha Tup Forest Park, trail to Phra Cave, 300 m alt., 16 Aug. 2012, Middleton, Karaket, Suddee & Triboun 5612 (holotype **BKF**; isotypes **BK, E, P**). Fig. 2C–D.

Herb to 50 cm tall, with fleshy stems. *Leaves* opposite except for enlarged solitary cotyledon; petioles 0.3–1 cm long, very sparsely pubescent with uniseriate hairs; blade thin, pale green above and beneath, ovate, 8–30 by 4.6–21.5 cm, apex acute, base cordate, 10–15 pairs of secondary veins, steeply ascending, tertiary venation of weak intersecondary and laxly reticulate veins, with sparse small uniseriate hairs above and beneath. *Inflorescence* epiphyllous, on short petiole with immature flowers held down towards the midrib with the pedicels curving upwards as the corolla matures and opens and then continuing to curve back away from leaf blade as corolla falls (with the inflorescence therefore appearing as a crest with the immature flowers towards the midrib and developing fruit towards the stem), axes pale green, sparsely to densely pubescent with small uniseriate hairs; pedicels 7–14 mm long. *Calyx* of 5 free lobes, narrowly ovate, 5.7–10.5 by 1–2 mm, often quite variable in size within a single flower, glabrous to sparsely pubescent but always hairy at tips, more densely so if sparsely pubescent lower. *Corolla* tube very pale green, lobes yellowish white or pale yellow, more yellow in tube and with darker yellow patch ventrally in tube and dark brown or black spots either side of patch, sparsely pubescent outside, with stalked glands dorsally in upper tube and base of upper lobes inside, all lobes broadly orbicular to ovate, apices rounded; tube 12.5–15.5 mm long to base of upper lobes, 15.9–19.5 mm long to base of lower lobe; upper lobes 3–4.2 by 4–6.6 mm; lateral lobes 4.5–5.7 by 5.5–7 mm; lower lobe 5–7.5 by 6.2–8 mm. *Stamens* inserted at 9–11.2 mm from corolla base; filaments 2–2.5 mm long, glabrous; anthers 1.3–1.8 by 1.9–2.2 mm, densely long pubescent from distal side, cohering by apices; staminodes extremely small, ca 0.2 mm long. *Disc* a continuous ring around base of ovary, 0.5–0.8 mm high. *Ovary* 5.5–7.5 mm long, papillose in lower 1/3–1/2, otherwise sparsely to densely pubescent; style 6–7.5 mm long, sparsely to densely pubescent; stigma bifid, lobes 0.8 mm long. *Fruit* (immature) to 46 mm long, ca 1 mm wide, slightly curved.

Thailand.— NORTHERN: Nan [Muang, Tham Pha Tup Forest Park, trail to Phra Cave, 300 m alt., 16 Aug. 2012, Middleton, Karaket, Suddee & Triboun 5612 (**BK, BKF, E, P**); Muang, 10 km N of Nan towards Pua, Tham Pha Tup, 400 m alt., 18



Figure 1. *Microchirita purpurea* D.J.Middleton & Triboun. A. Habit; B.–C. Epiphyllous inflorescence and flower; D. Corolla throat. Photos by Preecha Karaket.

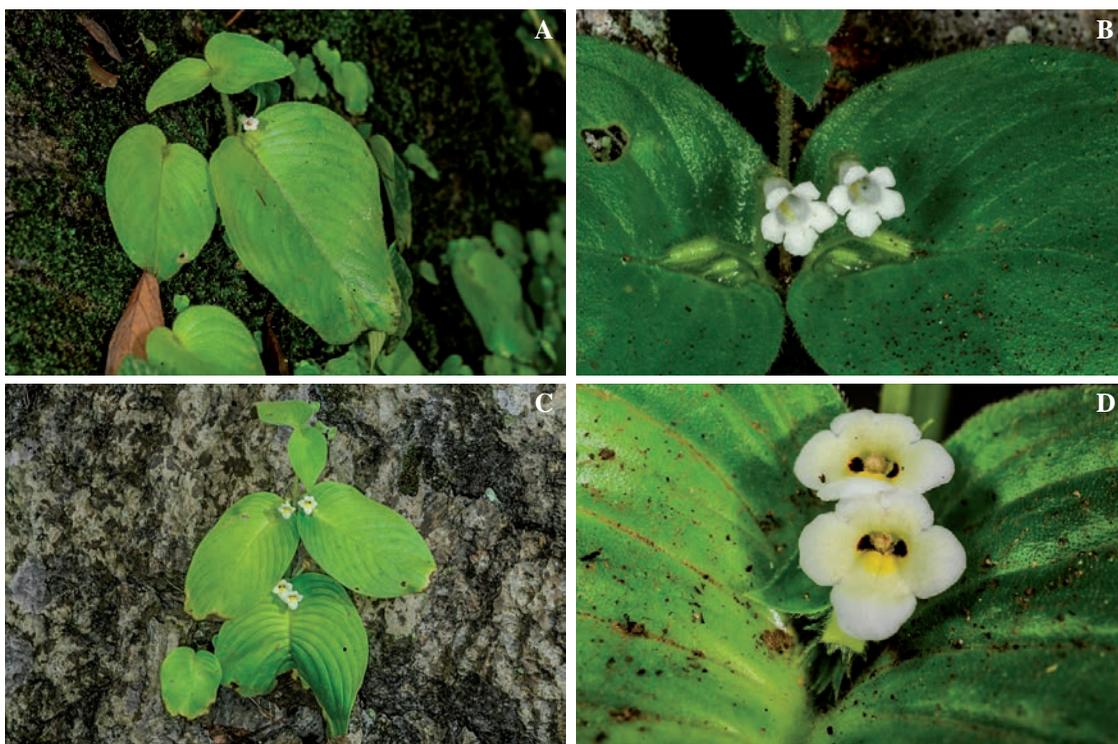


Figure 2. The species currently called *Microchirita hamosa* (R.Br.) Yin Z.Wang. A. Habit; B. Flowers. *Microchirita woodii* D.J.Middleton & Triboun. C. Habit; D. Flowers. Photos by Preecha Karaket.

Sept. 1999, *Srisanga & Puff 1110* (QBG); Tham Pa Tok near Nan, 350 m alt., 13 Sept. 1995, *Larsen, Larsen, Tange & Sookchaloem 46427* (BKF); Muang, Tham Pha Tup, ca 300 m alt, 13 Sept. 1995, *Nanakorn et al. 4236* (E, QBG); Tham Pha Thup, 230 m alt., 2 Sept. 1999, *Middleton et al. 148* (A, BKF, E)].

Ecology.—Deciduous or dry evergreen forest on karst limestone.

Etymology.—This species is named in honour of David Wood who was the last to publish a comprehensive account of the species now included in *Microchirita* (Wood, 1974).

Proposed IUCN conservation assessment.—Data Deficient (DD). *Microchirita woodii* is only known from Tham Pha Tup Forest Park which is less than 1 km² in size and subject to disturbance from tourism. However, there have been far fewer collections made in other forested areas to the north and until it can be assessed whether this species also occurs there its conservation status is uncertain.

Notes.—This species is only known from Tham Pha Tup (under various transliterations) in Nan province. The labels of the different collections describe the flowers as being pale yellow or yellow although our own collection, the type, is so pale as to be almost white on the lobes. This contrasts to the bright yellow to orange corolla of species such as *Microchirita marcanii* (Craib) A. Weber & D.J. Middleton, *M. bimaculata* (D. Wood) A. Weber & D.J. Middleton and *M. elphinstonia* (Craib) A. Weber & D.J. Middleton.

***Microchirita karaketii* D.J. Middleton & Triboun, sp. nov.**

Differing from the other small white-flowered species by the combination of the curved and longer corolla, pubescent anthers, the disc being of one broad lobe, and the mainly glabrous ovary. — Type: Thailand, Chiang Mai, Chiang Dao District, Doi Chiang Dao Wildlife Sanctuary, Tam Pak Piang, 530 m alt., 20 Sept. 2008, *Middleton, Karaket, Triboun, Kawatkul & Meeboonya 4526* (holotype BKF; isotypes E, P, QBG). Fig. 3A–D.

Herb to 60 cm tall, stems fleshy, purplish red or reddish at base, green higher. *Leaves* opposite

except for enlarged solitary cotyledon; petioles 0.5–2 cm long; blades thin, mid to dark green above, slightly paler beneath, ovate, 5.1–25 by 3.5–19 cm, apex acuminate, base cordate, 7–15 pairs of secondary veins, steeply ascending, tertiary venation of weak intersecondary and laxly reticulate veins, with sparse small uniseriate hairs above and beneath. *Inflorescence* epiphyllous, at petiole/blade junction or towards centre of petiole with immature flowers held down towards the midrib with the pedicels curving upwards as the corolla matures and opens and then continuing to curve back away from leaf blade as corolla falls (with the inflorescence therefore appearing as a crest with the immature flowers towards the midrib and developing fruit towards the stem), axes pale green, glabrous or with very occasional small uniseriate hair; pedicels 4.5–9 mm long. *Calyx* pale green, 4.3–9 mm long, 3 lower lobes free, upper 2 lobes variously and irregularly fused for 1–5 mm, lobes 1–6 by 1–1.6 mm, sparsely puberulent especially towards apices. *Corolla* white outside and inside with a yellow stripe ventrally on tube inside with a single purple patch each side of this stripe, with uniseriate hairs outside on tube and lobes, glabrous inside, all lobes broadly orbicular, apices rounded to bluntly obtuse; tube 10–13 mm long to base of upper lobes, 12–14 mm long to base of lower lobes, sparsely multicellular uniseriate pubescent outside, glabrous inside; upper lobes 2.7–3.5 by 2.8–4.7 mm, sinus 2.5 mm; lateral lobes 2.8–5 by 4–5.8 mm; lower lobe 3–4.7 by 3.8–5.5 mm. *Stamens* inserted at 5.2–6.5 mm from corolla base; filaments 2.8–3.2 mm long, straight and parallel to corolla wall, glabrous; anthers 1.2 by 2 mm, cohering by apices, sometimes free in mature flowers, with few long hairs near junction of upper anther locules and filaments; staminodes simple filaments, inserted at 3 mm from corolla base, 0.3 mm long. *Disk* half a ring ventrally at base of the ovary, 0.6–0.7 mm high. *Ovary* fusiform, 3.5–5 mm long, papillose throughout or sparsely to densely pubescent in upper half; styles 6–7 mm long, pubescent; stigma bifid, lobes 1.2 mm long. *Fruit* (immature) to 5 cm long, 1.5 mm wide, slightly curved, glabrous, calyx persistent.

Thailand.—NORTHERN: Chiang Mai [Chiang Dao District, Doi Chiang Dao Wildlife Sanctuary, Tam Pak Piang, 530 m alt., 20 Sept. 2008, *Middleton, Karaket, Triboun, Kawatkul & Meeboonya*

4526 (**BKF, E, P, QBG**); Chiang Dao District, Kio Phawok border checkpoint, 750 m alt., 30 Sept. 2009, *Middleton, Lindsay & Suksathan 5017* (**BKF, E, QBG**); Chiang Dao District, Dan Pha Wok, 740 m alt., 20 Aug. 1999, *Wattana, Suksathan & Argent 559* (**QBG**); Chiang Dao District, Road to Wiang Haeng, 610 m alt., 21 Sept. 2008, *Middleton, Karaket, Triboun, Kawatkul & Meeboonya 4536* (**BKF, E, QBG**); Doi Chiang Dao, 600–650 m alt., 28 Aug. 1935, *Garrett 1002* (**K**).

Ecology.— Mixed deciduous forest on karst limestone at 530–750 m altitude.

Etymology.— *Microchirita karaketii* is named in honour of Mr Preecha Karaket, one of the collectors of the type specimen and who has given us such invaluable help and expertise in the field over many years.

Proposed IUCN conservation assessment.— Endangered (EN B1ab(iii)). The currently known Extent of Occurrence is less than 200 km² and the known populations are all in disturbed and fragmented habitats. It should be borne in mind, however, that the northernmost known population is right on the Burmese border and the possible distribution in Burma is unknown.

Notes.— *Microchirita karaketii* is most easily distinguished from the species currently called *M. hamosa* in the more downwardly curved corolla and long tuft of downward pointing hairs arising from the anthers near the insertion with the filament. It also differs in the papillose ovary at least in the lower half (sometimes pubescent in upper half - it is densely pubescent throughout in the species currently called *M. hamosa*), the single wide disc lobe on the ventral side of the flower which half surrounds the base the ovary (of one or two narrow lobes in the species currently called *M. hamosa*), and usually in the two purple spots either side of the central yellow stripe on the inside ventral surface of the corolla. This last character is also rarely present in the species currently called *M. hamosa* but the majority of those specimens have the yellow stripe but no purple spots. The specimens of the species currently called *M. hamosa* that do have purple spots have the same corolla shape, glabrous anthers, pubescent ovary and 2 disc lobes as typical in that species. In *Microchirita karaketii* the anthers are always attached to each other at their

apices; in the species currently called *M. hamosa* the anthers would appear to always be free. The distinction between the two species can be clearly seen at Kio Phawok in northern Chiang Mai province where they grow in a mixed population with no obvious signs of introgression between them.

Microchirita suddee D.J.Middleton & Triboun, **sp. nov.**

Similar to the species currently called *Microchirita hamosa* but differing in the pubescent coherent anthers, the disc being of one broad lobe, and mainly glabrous ovary. Also similar to *Microchirita karaketii* but differing in the smaller flowers and the lack of darker spots in the corolla tube. – Type: Thailand, Phrae, Rong Kwang District, Tham Pha Nang Khoi, 210 m alt., 17 Aug. 2012, *Middleton, Karaket, Suddee & Triboun 5618* (holotype **BKF**; isotypes **E, P, QBG, SING**). Fig. 4A.

Herb to 40 cm tall; stems fleshy, red at base, otherwise pale green. *Leaves* opposite except for enlarged solitary cotyledon; petioles 0.5–2.2 cm long; blades thin, mid green above, paler beneath, ovate, 7–35 by 4–18.8 cm, apex acuminate, base rounded to cordate, 8–22 pairs of secondary veins, very steeply ascending, tertiary venation of weak intersecondary and laxly reticulate veins, with sparse small uniseriate hairs above and beneath. *Inflorescence* epiphyllous at petiole/blade junction with immature flowers held down towards the midrib with the pedicels curving upwards as the corolla matures and opens and then continuing to curve back away from leaf blade as corolla falls (with the inflorescence therefore appearing as a crest with the immature flowers towards the midrib and developing fruit towards the stem); pedicels 4.4–6.3 mm long. *Calyx* of 5 lobes with 2–3 dorsal lobes 7.4–8 mm long, irregular fusing for up to 5 mm, lower lobes 6–8 by 1.3–1.8 mm, densely to very sparsely pubescent, margin hyaline. *Corolla* white, lobes very pale lilac or completely white, with uniseriate hairs outside on tube and lobes, glabrous inside, all lobes broadly orbicular, apices rounded to bluntly obtuse; tube ca 8 mm long to base of upper lobes, ca 10 mm long to base of lower lobes; upper lobes 2.6 by 3.7 mm; lateral

lobes 2.4 by 4 mm; lower lobe 1.8–3 by 4 mm. *Stamens* inserted at 3.2–4 mm from corolla base; filaments 2.2–2.5 mm long, glabrous; anthers 1.1–1.2 by 2.2–2.5 mm, cohering by apices, with dense hairs near junction of upper anther locules and filaments. *Disc* half surrounding base of ovary, 0.6 mm high. *Ovary* 5.5–6.5 mm long, papillose in lower half, densely pubescent in upper half; style 3.3–4 mm long, densely pubescent; stigma bifid, lobes 1 mm long.

Thailand.—NORTHERN: Phrae [Rong Kwang District, Tham Pha Nang Khoi, 210 m alt., 17 Aug. 2012, *Middleton, Karaket, Suddee & Triboun 5618* (**BKF, E, P, QBG, SING**)]; Lampang [Ngao District, near Tham Pha Thai, 520 m alt., 24 Sept. 2008, *Middleton, Karaket, Triboun, Kawatkul & Meeboonya 4580* (**BK, BKF, E, P, SING**)]; Chae Hom District, Bansa subdistrict, Bansa Village, road to Chae Hom, 400 m alt., 15 Oct. 2006, *Palee 1027* (**CMU**)].

Ecology.—Dry evergreen or mixed deciduous and bamboo forest on karst limestone at 210–520 m altitude.

Etymology.—*Microchirita suddee* is named in honour of Dr Somran Suddee, one of the collectors of the type specimen and who has given us such invaluable help and expertise in the field over many years.

Proposed IUCN conservation assessment.—Endangered (EN B1ab(iii)). The currently known Extent of Occurrence is less than 500 km² and the known populations are all in disturbed and fragmented habitats.

Note.—This species is most similar to *Microchirita karaketii* but has smaller flowers and no dark spots or yellow ventral line inside the corolla.

***Microchirita albiflora* D.J.Middleton & Triboun, sp. nov.**

Similar to the species currently called *Microchirita hamosa* but differing in the disc being a single wide lobe on the ventral side of the ovary and the ovary being papillose rather than pubescent in the lower 1/2 to 2/3. Also similar to *Microchirita karaketii* but differing in the lack of purple spots in the corolla and the glabrous anthers. — Type:

Chiang Rai, Mae Fa Luang District, Road to Doi Tung Royal Residence, 1000 m alt., 23 Sept. 2008, *Middleton, Karaket, Triboun, Kawatkul & Meeboonya 4567* (holotype **BKF**; isotypes **BK, E, K, P, QBG, SING**). Fig. 4B–D.

Herb, varying greatly in size and often flowering when only cotyledon present; stems fleshy, pale green, sometimes dark violet or brownish at base. *Leaves* opposite except for enlarged and solitary basal cotyledon; petioles 0.4–1.7 cm long; blades thin, mid green above, much paler beneath, ovate, 2.6–23 by 1.7–10.5 cm, base cordate, apex acute to shortly acuminate, midrib flat above, 7–11 pairs of secondary veins, steeply ascending, tertiary venation of weak intersecondary and laxly reticulate veins, above and beneath with sparse small 3–4-celled uniseriate hairs. *Inflorescence* epiphyllous, at petiole/blade junction or towards centre of petiole with immature flowers held down towards the midrib with the pedicels curving upwards as the corolla matures and opens and then continuing to curve back away from leaf blade as corolla falls (with the inflorescence therefore appearing as a crest with the immature flowers towards the midrib and developing fruit towards the stem), axes pale green, glabrous or with very occasional small uniseriate hair; pedicels 5–10 mm long. *Calyx* green, with upper 3 lobes fused for 2–3.7 mm, lower 2 lobes free; upper lobes 5–7.8 mm long, lower lobes 4–7.8 by 0.7–1.2 mm, sparsely pubescent with short uniseriate hairs throughout. *Corolla* white throughout or sometimes with thin vertical yellow line ventrally in tube, tube flaring fairly evenly from lower tube to upper tube, slightly curved downwards, outside glabrous in lower half of tube and pubescent in upper half and on lobes, all lobes broadly orbicular, apices rounded; tube 6.5–13 mm long; upper lobes 1.6–1.9 by 2.2–3.1 mm; lateral lobes 1.6–2.7 by 2–3 mm; lower lobe 1.4–2 by 2.6 mm. *Stamens* inserted at 2.7–4.7 mm from corolla base; filaments 2.1–3.1 mm long, glabrous; anthers 0.6–1.1 by 1–2 mm, glabrous, cohering apically or free from each other; staminodes simple filaments inserted near base of corolla tube, 2 laterals 0.6 mm long, medial 0.4 mm long. *Disc* a single wide lobe encircling half of the ventral side of the ovary, 0.3–0.7 mm high. *Ovary* fusiform, 4.7–6 mm long, papillose in lower 2/3, densely pubescent in upper 1/3; style 4 mm long, densely pubescent; stigma bifid into 2 lobes, 0.7–0.8 mm

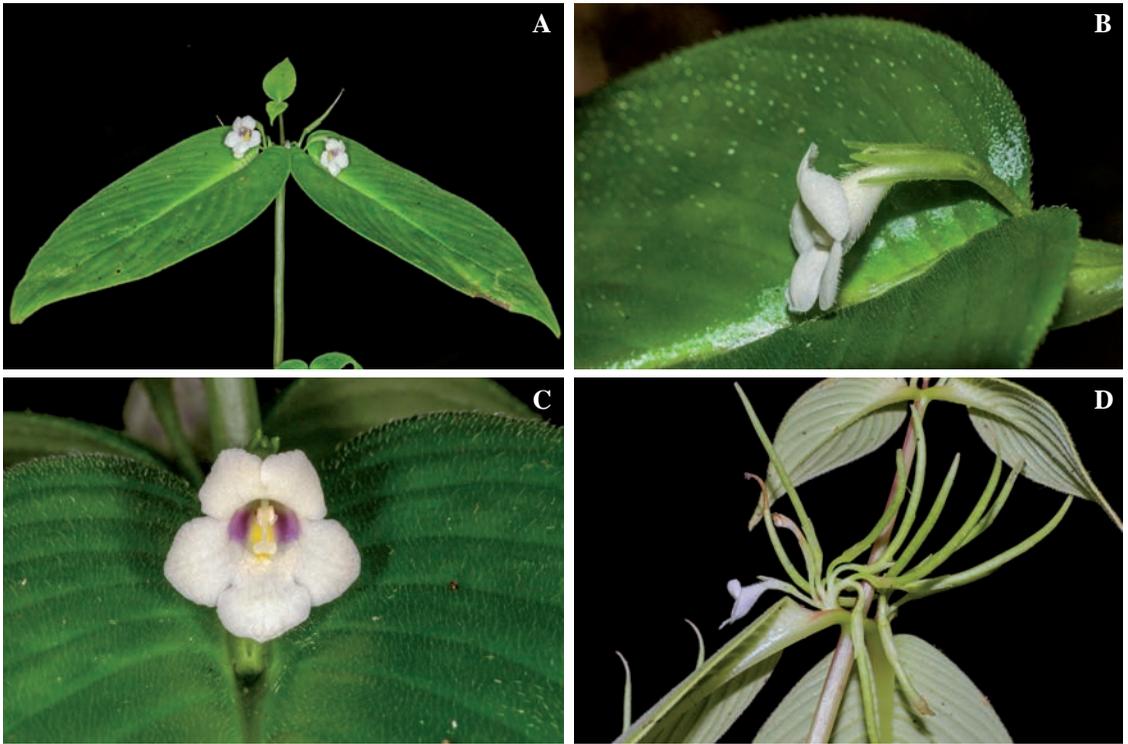


Figure 3. *Microchirita karaketii* D.J.Middleton & Triboun. A. Leaves and epiphyllous inflorescences; B. Flower from side; C. Corolla throat; D. Young fruit. Photos A and C by Preecha Karaket, B and D by David Middleton.

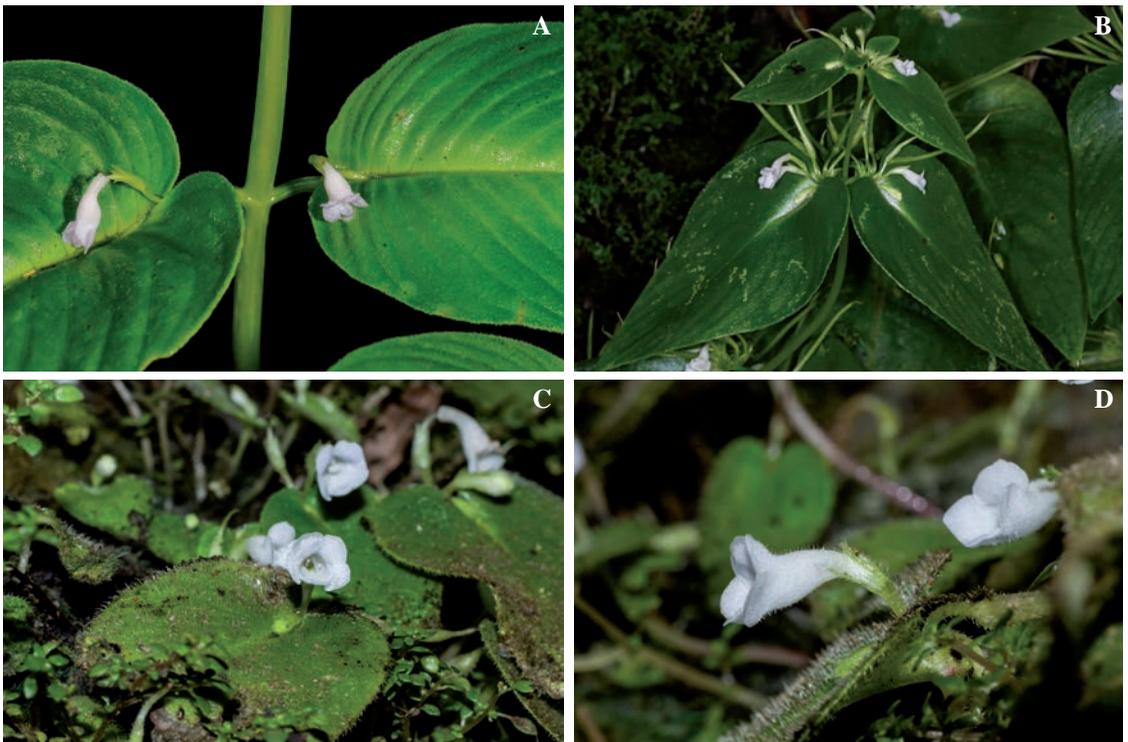


Figure 4. *Microchirita suddeei* D.J.Middleton & Triboun. A. Epiphyllous inflorescences. *Microchirita albiflora* D.J.Middleton & Triboun. B. Habit; C. Corolla throat; D. Flower from side. Photos A and B by Preecha Karaket, C and D by David Middleton.

long. *Fruit* green, not-twisted, curved, to 5 cm long, 1.7 mm wide.

Thailand.— NORTHERN: Chiang Rai [Mae Fa Luang District, Road to Doi Tung Royal Residence, 1000 m alt., 23 Sept. 2008, *Middleton, Karaket, Triboun, Kawatkul & Meeboonya 4567* (**BK, BKF, E, K, P, QBG, SING**); Mae Sai District, Wat Tham Pha Jom, 500 m alt., 24 Sept. 2008, *Middleton, Karaket, Triboun, Kawatkul & Meeboonya 4577* (**BK, BKF, E**); Mae Sai District, Pong Ngam, San Pa Sak Village, Wat Tham Boom, 525 m alt., 7 Sept. 2006, *Maxwell 06-646* (**CMU, QBG**); Mae Sai District, Pong Ngam, Ban Tham, Tham Pla, 400 m alt., 28 Oct. 2005, *Maxwell 05-607* (**CMU**); Mae Sai District, Tham Ban Santisuk, 550 m alt., 23 Sept. 1989, *Maxwell 89-1120* (**CMU-Pharmacy, E**)].

Ecology.— In shade on limestone boulders and outcrops in mixed evergreen and deciduous forest, or disturbed areas on concrete, at 500–1000 m altitude.

Etymology.— Referring to the white corolla.

Proposed IUCN conservation assessment.— Endangered (EN B1ab(iii)). The currently known Extent of Occurrence is less than 300 km² and the known populations are all in disturbed and fragmented habitats. In a similar situation to *Microchirita karaketii*, however, the known distribution of *M. albiflora* is close to the Burmese border and the possible distribution in Burma is unknown. The situation may need to be reassessed once information from Burma is available.

Notes.— Most specimens of *Microchirita albiflora* share the unusual (for *Microchirita*) character of free anthers with the species currently called *M. hamosa* but one specimen was found (*Maxwell 05-607*) in which the anthers were apically united. Both *Microchirita albiflora* and the species currently called *M. hamosa* also have glabrous anthers (which are densely hairy in the other species discussed here). They differ in *Microchirita albiflora* having a single wide disc lobe on the ventral side of the ovary and the ovary being papillose rather than pubescent in the lower 1/2 to 2/3. Most specimens of *Microchirita albiflora* also have a completely white corolla whereas there is always a ventral yellow line in the species currently called *M. hamosa*.

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