

Four more new species of *Microchirita* (Gesneriaceae: Didymocarpoideae) from Thailand

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ABSTRACT

Four new species of *Microchirita* (Gesneriaceae) from Thailand are described: *Microchirita orothaiae*, *M. puglisiae*, *M. radiata* and *M. simia*. With the addition of these species, 41 species are now recorded for Thailand.

KEYWORDS: endemic, karst limestone, *Microchirita purpurea*, *M. tubulosa*, taxonomy.

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INTRODUCTION

Microchirita is a genus of about 50 species in India, Myanmar, South China, Thailand, Vietnam, Laos, Cambodia, Peninsular Malaysia, Sumatra, Java and Borneo (Middleton *et al.*, 2023). They are terrestrial herbs, almost always on limestone substrates, the stems are usually slightly fleshy, the leaves are opposite except for a solitary leaf-like macrocotyledon as the lowermost leaf, the inflorescences are dichasial or form a sessile crested inflorescence at the base of the petiole or along the petiole or at the base of the lamina, the corolla is tubular but quite variable, there are two fertile stamens, and the fruit is a dehiscent capsule. Eight new species of *Microchirita* (C.B. Clarke) Yin Z. Wang from Thailand were described in 2023 (Middleton *et al.*, 2023) but even in the short period since, further exploration and taxonomic study has led to the discovery of an additional four species. Two of these species, *Microchirita puglisiae* D.J. Middleton, Daonurai, Poompayak & Suddee and *M. simia* D.J. Middleton, Thananth., Tetsana & Suddee, are extremely distinctive and instantly distinguishable from all other species in the genus (see diagnoses below). The other two

species, *Microchirita orothaiae* Suddee, D.J. Middleton, Tetsana & Puudjaa and *M. radiata* D.J. Middleton, Daonurai, Poompayak & Suddee, are more akin to, but distinct from, *M. purpurea* D.J. Middleton & Triboun and *M. tubulosa* (Craib) A. Weber & D.J. Middleton respectively. With these new species, there are now 41 species recorded for Thailand and it is likely more as-yet undiscovered new species will be found over the coming years. It is the second largest genus of Gesneriaceae in Thailand after *Paraboea* (C.B. Clarke) Ridl. which has more than 70 species in Thailand (Triboun, pers. comm. 2024).

MATERIALS AND METHODS

The new species described here are based on an examination of recent field collections made in Central and South-Eastern Thailand. The newly available herbarium material has been compared to previously described species from Thailand and other countries (Middleton & Triboun, 2013; Puglisi *et al.*, 2016; Puglisi & Middleton, 2017; Middleton *et al.*, 2023).

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DESCRIPTIONS

Microchirita orathaiiae Suddee, D.J.Middleton, Tetsana & Puudjaa, **sp. nov.**

Similar to *Microchirita purpurea* D.J.Middleton & Triboun in general appearance but differs in the corolla tube pale yellow at the very base inside, dark bluish purple ventrally, somewhat dorsoventrally compressed making corolla mouth wider than high, lateral lobes strongly reflexed (dark purple throughout or only slightly paler inside at base, not or only slightly dorsoventrally compressed with the corolla mouth mostly as wide as high, lateral lobes erect, not reflexed in *M. purpurea*) and anthers glabrous (anthers densely long pubescent near junction of upper anther locules and filaments in *M. purpurea*). Type: Thailand, Rayong, Khao Chamao District, Khao Noi Subdistrict, Tham Khao Bot Temple, 170 m, 17 Sept. 2021, *Tetsana, Suddee, Puudjaa, Thananthaisong, Hemrat, Phankien & Daonurai 2256* (holotype **BKF** [SN232950]; isotypes **BKF** [SN232949], **E, SING**). Fig. 1.

Herb to ca 40 cm tall; stem succulent, dark purple at base, green higher, glabrescent to sparsely hirsute. *Leaves* opposite apart from the basal leaf; petioles 0.5–1 cm long, glabrescent to sparsely hirsute; blades extremely thin, subglossy green above, pale green below, ovate, ovate-elliptic or ovate-oblong, 3–14 × 2–12 cm, base rounded or subcordate, apex acute to acuminate, margin entire, ciliate, 5–16 pairs of secondary veins, tertiary venation reticulate, inconspicuous, sparsely pubescent to tomentose above and beneath. *Inflorescences* cristate, 1–12-flowered; peduncles reduced; bracts absent; pedicels 14–18 mm long, elongate in fruit, 18–23 mm long, sparsely hirsute with eglandular hairs. *Calyx* pale green, lobes lanceolate, 8–8.5 × 0.8–1.5 mm, enlarged in fruit, 10–12 × 1.5–2 mm, apex acute or acuminate, hirsute with eglandular hairs outside towards apex, glabrous or glabrescent at base, inside with a few hairs near apex. *Corolla* 20–25 mm long, bluish purple, tube inside pale yellow at the very base, dark bluish purple ventrally, tube narrow at base and strongly curved downwards in lower $\frac{2}{3}$, then abruptly widening into wide upper tube, becoming ventrally pouched, somewhat dorsoventrally compressed at mouth, upper lip erect with lobes laterally strongly reflexed, tomentose eglandular hairy outside, with shortly-stalked glands inside upper tube and base of upper lobes; tube 12–14 mm long dorsally, 16–20 mm long ventrally, 14–18 mm

laterally between lips; lobes broadly ovate, ovate or ovate-elliptic, apices rounded, upper lobes ovate-elliptic, 4.5–5 × 4–5 mm, overlapping, lateral lobes ovate, 5–8 × 6–8 mm, ventral lobe broadly ovate, 7–10 × 8–11 mm. *Stamens* attached at 7–9 mm above corolla base; filaments curved, 1.8–2 mm long, glabrous; anthers white, glabrous, 1.8–2 × 1.9–2.2 mm, apically joined by a connective; staminodes inconspicuous. *Disc* annular, margin entire to slightly crenate, 1–1.5 mm high. *Pistil* enantiostylous, 12–15 mm long; ovary 5–7 mm long, 0.8–1 mm diameter, glabrous; style slightly curved, 8–9 mm long, glabrous; stigma ca 0.8 × 0.7 mm, bilobed, lobes oblong. *Fruit* glossy green, 1.5–4.5 cm long, 1–2.5 mm wide, glabrous.

Thailand.— SOUTH-EASTERN: Rayong [Khao Chamao District, Khao Noi Subdistrict, Tham Khao Bot Temple, 17 Sept. 2021, *Tetsana et al. 2256* (**BKF**); *ibid.*, 27 Nov. 2020, *Tetsana et al. 1968* (**BKF**)].

Distribution.— Only known from the type locality.

Ecology.— On limestone rocks in front of a cave.

Vernacular.— Yat o ra thai (หยาดอรัทัย)(proposed here).

Etymology.— The specific epithet is given in honour of the botanical artist Mrs Orathai Kerdkaw, a long-time staff member at BKF.

Provisional IUCN conservation assessment.— Vulnerable VU D2 (IUCN Standards and Petitions Committee, 2024). Although its Extent of Occurrence (EOO) and Area of Occupancy (AOO) are not accurately known, this species is currently only known from the type locality which is not in a protected area. It may require a higher assessment when the area is better explored.

Notes.— This species is distinctive due to the combination of bluish purple corolla, the dorsoventrally compressed mouth of the corolla, and the glabrous anthers.

Microchirita puglisiae D.J.Middleton, Daonurai, Poompayak & Suddee, **sp. nov.**

Differs from all other *Microchirita* species in the combination of densely tomentose leaves, few-flowered inflorescences, white corolla lobes and narrow corolla tube flaring gradually towards the mouth. Type: Thailand, Saraburi, Phra Phutthabat



Figure 1. *Microchirita orathaiae* Suddee, D.J.Middleton, Tetsana & Puudjaa: A. Habit; B. Inflorescence; C. Flower, front view; D. Flower, back view. Photos by Naiyana Tetsana.

District, Khun Khlon Subdistrict, Tham Krabok Temple, 130 m, 31 Oct. 2023, *Thananthisong, Poompayak, Udomsripong, Khananthong, & Daonurai 1001* (holotype **BKF** [SN258491]; isotypes **BKF** [SN258491], **E**). Fig. 2.

Herb to ca 30 cm tall; stem succulent, dark purple or reddish purple at base, greenish purple higher, stems pubescent to tomentose. *Leaves* opposite apart from the basal leaf; petioles 0.8–3.4 cm long, tomentose; blades thin, dull dark greyish green above, pale green below, ovate, lanceolate or sometimes elliptic, 1.6–5.5 × 0.4–2.6 cm, base cuneate to attenuate, usually oblique, apex acute to acuminate, margin entire, ciliate, 3–6 pairs of secondary veins, tertiary venation reticulate, inconspicuous, densely tomentose above and beneath. *Inflorescences* cristate at base of leaf blade, 2–5-flowered; peduncles reduced; bracts absent; pedicels 4–10 mm long, elongate in fruit, 9–15 mm long, densely tomentose with occasional eglandular hairs. *Calyx* pale green, lobes lanceolate, 3–4.5 × 0.5–0.8 mm, enlarged in fruit, 4.2–5.8 × 0.8–1 mm, apex acute to acuminate, densely tomentose with eglandular hairs outside, glabrous inside, with a few hairs near apex. *Corolla* 10–13 mm long, tube pale yellow with purple patches on the outside of the throat, bright yellow inside ventrally, lobes white, tube narrow and curved downwards in lower ½, then slightly widening into wide upper tube, ventrally very slightly pouched, upper lip erect or reflexed with lobes laterally straight, pubescent with sparse eglandular hairs outside on upper tube, very shortly tomentulose with shortly-stalked glands inside upper tube; tube 8–10 mm long dorsally, 10–12 mm long ventrally, 11–12 mm laterally between lips; lobes slightly deltate or broadly elliptic, apices obtuse or rounded, upper lobes 3.5–5 × 4.5–5 mm, overlapping, lateral lobes 3.5–4 × 4–4.5 mm, spreading, ventral lobe 4.5–5.5 × 5.5–6 mm, straight. *Stamens* attached at 7–8 mm above corolla base; filaments curved, ca 1.5 mm long, glabrous; anthers white, glabrous, 0.8–1 × 1–1.2 mm, held at a right angle, apically joined by a connective; staminodes inconspicuous. *Disc* annular, margin entire, ca 0.4 mm high. *Pistil* enantiostylous, 10–11 mm long, pubescent; ovary 3.5–4 mm long, ca 0.8 mm diameter, pubescent throughout; style curved, 6–7 mm long; stigma ca 0.8 mm, bilobed, lobes elliptic. *Fruit* yellowish-green, 22–33 mm long, 1–2 mm wide, tomentose.

Thailand.— CENTRAL: Saraburi [Phra Phutthabat District, Khun Khlon Subdistrict, Tham Krabok Temple, 31 Oct. 2023, *Thananthisong et al. 1001* (**BKF**, **E**)].

Distribution.— Only known from the type locality.

Ecology.— On limestone hill in mixed deciduous forest.

Vernacular.— Yat tham kra bok (หยาดถ้ำกระบอบ) (proposed here).

Etymology.— The specific epithet is given in honour of Dr Carmen Puglisi (MO) for her contribution to the taxonomy of Thai Gesneriaceae, including in the genus *Microchirita*.

Provisional IUCN conservation assessment.— Vulnerable VU D2 (IUCN Standards and Petitions Committee, 2024). In recent decades the Phra Phutthabat limestone mountains have been heavily quarried for cement and marble resulting in the severe deterioration of the limestone vegetation in this region. The area immediately around the temple is likely to be reasonably protected but this is a relatively small portion of the wider locality. A survey for additional populations is needed to see whether a higher assessment is necessary based on an even more restricted Extent of Occurrence (EOO) and/or Area of Occupancy (AOO).

Notes.— This species is reminiscent of *Microchirita mollissima* from Peninsular Thailand in the densely tomentose leaves but is more erect with more distinct internodes, has smaller mostly paler flowers and lacks the distinctive large glandular hairs in the upper part of the corolla throat.

Microchirita radiata D.J.Middleton, Daonurai, Poompayak & Suddee, **sp. nov.**

Similar to *Microchirita tubulosa* (Craib) A.Weber & D.J.Middleton in general appearance and the large primarily white flowers but differs in the corolla tube orange inside, darker orange ventrally, with many radial brown lines dorsally and ventrally (white or very pale yellow inside, yellow ventrally, without brown lines or these only either side of yellow ventral stripe or rarely with additional very pale lines or dots ventrally in *M. tubulosa*) and the glabrous anthers (densely white pubescent in *M. tubulosa*). Type: Thailand, Saraburi, Kaeng Khoi



Figure 2. *Microchirita puglisiae* D.J.Middleton, Daonurai, Poompayak & Suddee: A. Habit; B. Inflorescences; C. Flower, side view; D. Flower, front view. Photos by Kerkwit Poompayak.

District, Thap Kwang Subdistrict, Tham Phra Phothisat Temple, 190m, 27 Oct. 2023, *Thananthaisong, Poompayak, Udomsiripong, Khananthong & Daonurai 1000* (holotype **BKF** [SN258493]; isotypes **BKF** [SN258494], **E, L, M, SING**). Fig. 3.

Herb to ca 50 cm tall; stem succulent, dark purple at base, purple to greenish purple higher or green throughout, stems sparsely hirsute. *Leaves* opposite apart from the basal leaf; petioles 0.3–1 cm long, hirsute; blades extremely thin, subglossy green above, pale green below, ovate to ovate-oblong, 5.7–14.2 × 2.2–6.8 cm, base broadly cuneate, rounded or subcordate, apex acute to acuminate, margin entire, ciliate, 6–15 pairs of secondary veins, tertiary venation reticulate, inconspicuous, sparsely pubescent to tomentose above and beneath. *Inflorescences* cristate, 1–8-flowered; peduncles reduced; bracts absent; pedicels 9–11 mm long, elongate in fruit, 20–22 mm, sparsely hirsute with eglandular hairs. *Calyx* pale green, lobes lanceolate, 9–12 × 1.5–2.8 mm, enlarged in fruit, 10–18 × 2–3 mm, apex acuminate, hirsute with eglandular hairs outside towards apex, glabrous at base, inside with a few hairs near apex. *Corolla* 19–24 mm long, white, tube inside orange, darker orange ventrally, with several thick longitudinal brown lines ventrally and dorsally, tube narrow at base and strongly curved downwards in lower $\frac{2}{3}$, then abruptly widening into wide upper tube, becoming ventrally pouched, longitudinally and shallowly grooved outside, upper lip erect with lobes laterally strongly reflexed, tomentose eglandular hairy outside on upper tube and lobes, with shortly-stalked glands inside upper tube and base of upper lobes; tube 19–21 mm long dorsally, 19–21 mm long ventrally, 17–21 mm laterally between lips; lobes broadly ovate, apices rounded, upper lobes 4–5 × 4.5–5 mm, overlapping, lateral lobes 4–4.5 × 5.5–6 mm, ventral lobe 4.8–6 × 4–6 mm. *Stamens* attached at 10–13 mm above corolla base; filaments curved, 4–5.5 mm long, glabrous; anthers white, glabrous, ca 2 × 2.2 mm, apically joined by a connective; staminodes inconspicuous. *Disc* annular, margin entire to slightly crenate, 0.7–0.8 mm high. *Pistil* enantiostylous, 16–19 mm long; ovary 5–8 mm long, ca 1 mm diameter, glabrous at base, pubescent towards apex; style curved, 10–11 mm long, pubescent from base to above the middle, glabrous near apex; stigma 0.8–1 × ca 1 mm, bilobed, lobes oblong. *Fruit* glossy pale green, 2.8–5.2 cm long, 2–3 mm wide, sparsely pubescent in upper half, hairs denser near apex.

Thailand.—CENTRAL: Saraburi [Kaeng Khoi District, Thap Kwang Subdistrict, Tham Phra Phothisat Temple, 27 Oct. 2023, *Thananthaisong et al. 1000* (**BKF, E**)].

Distribution.— Only known from the type locality.

Ecology.— On limestone hill in mixed deciduous forest.

Vernacular.— Yat phra pho thi sat (หยาดพระโพธิ์สัตว์)(proposed here).

Etymology.— The specific epithet refers to the brown lines radiating from the narrow part of the tube into the widened upper tube.

Provisional IUCN conservation assessment.— Vulnerable VU D2 (IUCN Standards and Petitions Committee, 2024). In recent decades the limestone mountains of Saraburi have been heavily quarried for cement and marble resulting in the severe deterioration of the limestone vegetation in this region. The area immediately around the temple is likely to be reasonably protected but this is a relatively small portion of the wider locality. A survey for additional populations is needed to see whether a higher assessment is necessary based on an even more restricted Extent of Occurrence (EOO) and/or Area of Occupancy (AOO).

Notes.— This species is particularly distinctive due to the several brown lines inside the corolla tube.

Microchirita simia D.J.Middleton, Thananth., Tetsana & Suddee, **sp. nov.**

Similar to *Microchirita purpurea* D.J.Middleton & Triboun in the shape and size of the corolla but differs in the distinctive bright yellow and purple corollas (purple throughout in *M. purpurea*) and glabrous stamens (hairy at filament insertion in *M. purpurea*). Type: Thailand, Lop Buri, Khao Phra Ngam, 81 m, 9 Sept. 2023, *Tetsana, Puudjaa, Kerdkaw, Hemrat & Jirakorn 2785* (holotype **BKF** [SN258499]; isotypes **BKF** [SN258500], **E, SING**). Fig. 4.

Herb to ca 30 cm tall; stem succulent, dark purple throughout, glossy, stems with dense short spreading hairs. *Leaves* opposite apart from the basal leaf; petioles 0.3–1 cm long, densely hirsute; blades thin, dull dark green above, dull pale green beneath, ovate to ovate-oblong, 3–9 × 1.5–6 cm, base subcordate to rounded, apex acute, margin entire, ciliate,



Figure 3. *Microchirita radiata* D.J.Middleton, Daonurai, Poompayak & Suddee: A. Habit; B. Inflorescence; C. Flower, front view; D. Flower, side view. Photos by Kerkwit Poompayak.



Figure 4. *Microchirita simia* D.J.Middleton, Thananth., Tetsana & Suddee. A. Habit; B. Flower, side view; C. Flower, front view with purple bar on lower lip; D. Flower, front view without purple bar on lower lip. Photos by Naiyana Tetsana.

5–14 pairs of secondary veins, tertiary venation reticulate but largely inconspicuous, densely pubescent with eglandular hairs above and beneath. *Inflorescences* cristate, 1–4-flowered; peduncles reduced; bracts absent; pedicels 1.5–1.7 mm long, hirsute. *Calyx* pale green, lobes lanceolate, 10–12 × 1.5–2 mm, apex acute to acuminate, ciliate with eglandular hairs and densely pubescent outside, inside with a few hairs near apex. *Corolla* 28–30 mm long, outside purple dorsally and bright yellow ventrally, paler towards base, inside upper tube and lobes purple dorsally, with lines of paler and darker purple lines at base of upper lobes, bright yellow in tube laterally except for purple spots at base, lateral lobes yellow at base, purple at apex, yellow ventrally in tube and on lower lobe but with a raised purple stripe in tube and a faint purple band across lower lobe, this band sometimes absent, tube narrow and strongly curved downwards in lower $\frac{2}{3}$, then abruptly widening into wide upper tube, ventrally only slightly pouched, upper lip erect with lobes laterally slightly reflexed, densely pubescent with eglandular hairs outside, with shortly-stalked glands inside upper tube and base of upper lobes; tube 18–20 mm long dorsally, 20–21 mm long ventrally, 18–19 mm laterally between lips; lobes ovate or elliptic-oblong, apices rounded, upper lobes ovate, 3.5–4.5 × 4.5–5.5 mm, overlapping, lateral lobes ovate, 4.5–5.5 × 6.5–7 mm, ventral lobe elliptic-oblong, 7.5–8 × 6.5–7 mm. *Stamens* attached at 9–10 mm above corolla base; filaments curved, 3.5–4 mm long, glabrous; anthers white, glabrous, 1.5–1.8 × 2–2.2 mm, held at a right angle, connected at the apices by a ligature; staminodes inconspicuous. *Disc* annular, margin subentire, 1–1.5 mm high. *Pistil* enantiostylous, 17–18 mm long, pubescent throughout; ovary 7–8 mm long, ca 1 mm diameter; style slightly curved, 9–10 mm long; stigma ca 0.8 mm, capitate. *Fruit* not seen.

Thailand.—CENTRAL: Lop Buri [Khao Phra Ngam, 9 Sept. 2023, *Tetsana et al.* 2785 (BKF, E)].

Distribution.— Only known from the type locality.

Ecology.— On karst limestone in mixed deciduous forest.

Vernacular.— Yat wa non pak (หยาดวานรพักตร์) (proposed here).

Etymology.— The specific epithet is Latin for monkey, in reference to the monkey-like face when viewing the corolla from the front.

Provisional IUCN conservation assessment.— Vulnerable VU D2 (IUCN Standards and Petitions Committee, 2024). As this species is only known from the type locality, which is not in a protected area, and with no evidence yet that it occurs more widely in the region, a provisional assessment of Vulnerable is given. A survey for additional populations is needed to see whether a higher assessment is necessary based on an even more restricted Extent of Occurrence (EOO) and/or Area of Occupancy (AOO).

Notes.— This species is particularly distinctive due to the bright yellow and purple corolla, the only species of *Microchirita* with this combination of colours.

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