

***Lepidagathis* (Acanthaceae) of Thailand: new species and updated synopsis**

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ABSTRACT

In this synopsis of the genus *Lepidagathis* for the Flora of Thailand, nine species are recognized. This includes *Lepidagathis argentea*, a new species collected from limestone bedrock in Tak Province, and three species newly recorded for Thailand, *L. dulcis*, *L. purpuricaulis* and *L. thorelii*. *Lepidagathis chiengmaiensis* and *L. thyrsiflora*, are reduced to synonyms of *L. incurva* and *L. fasciculata*, respectively. The following names have been lectotypified: *Lepidagathis chiengmaiensis*, *L. chlorostachya*, *L. dissimilis*, *L. dulcis*, *L. falcata* and *L. thorelii*. A genus description with key to species, nomenclatural notes, distributional data and specimens examined are provided.

KEYWORDS: Lamiales, lectotype, new record, new species, taxonomy

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INTRODUCTION

Lepidagathis Willd. is a pantropical genus in the family Acanthaceae, comprising 100–157 species. It is distributed in tropical and subtropical regions, mainly in the Old World (Mabberley, 2017; Manzitto-Tripp *et al.*, 2022; Kadam *et al.*, 2023; Comito *et al.*, 2025; POWO, 2025). The genus is characterized by a five-lobed and heteromorphic calyx, a bilabiate corolla and a thyse with dichasial branching including spikes bearing decussate flowers and secundiflorous spikes with both sterile and fertile bracts. The corolla exhibits quincuncial aestivation and the ovary contains two ovules per locule. The androecium comprises two fertile stamens, typically accompanied by two or three staminodes, with anthers ranging from entirely bitheous to dimorphic, where the longer pair is bitheous and the shorter pair monothecous. The capsules are oblong in outline and the seeds are covered with hygroscopic trichomes (McDade *et al.*, 2008; Hu *et al.*, 2011; Hirao *et al.*, 2019; Manzitto-Tripp *et al.*, 2022). Despite recent phylogenetic evidence indicating that *Lepidagathis s.l.* is

polyphyletic (Comito *et al.*, 2025), we adopt the circumscription of Manzitto-Tripp *et al.* (2022). Consequently, the species found in Thailand are treated here under the genus *Lepidagathis* pending further formal taxonomic revision.

Research on the taxonomy of the genus *Lepidagathis* in Thailand is relatively limited. Earlier publications mainly provided species checklists, brief descriptions or distributional records (Craib, 1911; Imlay, 1939; Bremekamp, 1961, 1965; Pooma & Suddee, 2014). Craib (1911), in his contributions to the flora of Siam reported two species: *Lepidagathis incurva* Buch.-Ham. ex D. Don and *L. parviflora* Blume. Imlay (1939) later described *Lepidagathis dissimilis* J.B. Imlay as a new species based on a Kerr collection from Nakhon Sawan Province. Bremekamp (1961, 1965) published two additional new species, *Lepidagathis chiengmaiensis* Bremek. and *L. thyrsiflora* Bremek. Pooma & Suddee (2014) recognized only four species: *Lepidagathis dissimilis*, *L. fasciculata*, *L. incurva*, and *L. thyrsiflora*. The objective of this paper is to provide

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a synoptic account of *Lepidagathis* as a precursory treatment for the upcoming Flora of Thailand account of Acanthaceae.

MATERIALS AND METHODS

The taxonomic treatment provided here is based on the study of herbarium materials and live specimens. Specimens from the following herbaria were examined: AAU, BK, BKF, BM, C, CMU, GZU, K, KGU, KYO, LD, LINN, P, PSU, QBG, SING, U and US. Vegetative and reproductive morphological characters were observed and measured under a stereomicroscope from dried and reconstituted (boiled) specimens. Lectotypes were designated after examining specimen images available from online databases, including JSTOR and virtual herbaria. Type localities cited in this article are based on the labels on the types and in the protologues. Herbarium acronyms follow Thiers (2025, continuously updated).

TAXONOMIC TREATMENT

LEPIDAGATHIS

Willd., Sp. Pl. ed. 4, 3: 400. 1800. Type: *Lepidagathis cristata* Willd.

Herbs or rarely subshrubs. *Leaves* opposite, cystoliths present, petiole glabrous or pubescent. *Inflorescences* spicate or capitate, axillary and terminal; pedunculate or sessile; bracts heteromorphic, mostly imbricate, 1–7-veined, glabrous or

pubescent, 2 bracts at each inflorescence node, one of them sterile and one fertile, each fertile bract subtending a single flower, usually longer than the calyx; bracteoles 2. *Calyx* 5-parted, heteromorphic, connate at base with free sepal lobes; posterior sepal broadest, lateral sepals 2, anterior sepals 2 free or fused at base. *Corolla* white, whitish pink, yellow or yellowish pink with purple, blue, pink, dark orange or brown markings; tube cylindrical, glabrous or pubescent; posterior lip 2-lobed; anterior lip 3-lobed. *Stamens* 4, didynamous, inserted near the apex of the corolla tube; anthers 4 and bitheous or 2 bitheous and 2 monotheous, glabrous or bearded. *Ovary* 2-locular, with 2 ovules per locule. *Capsules* glabrous or pubescent. *Seeds* 2–4, with hygroscopic trichomes, compressed, with retinacula.

Nine species are recognized in Thailand, including one new species and three new records.

1. *Lepidagathis argentea* Kantachot & Chantar., **sp. nov.**— Type: Thailand, Thee Mo Bo Waterfall, Umphang WS, Tha Song Yang, alt. 183 m, 6 Mar. 2019, *S. Kaitongsuk*, *S. Suddee*, *S. Rueangrea*, *W. Kiewbang* & *C. Hemrat* 162 (holotype **BKF!** [SN237486]; isotypes **BKF!** [SN237487], **KKU!**, **SING!**). Figs. 1&2.

Erect herb 20–50 cm tall. *Stems* terete, glabrescent or pubescent. *Leaves* with petiole 2–7 mm long; lamina elliptic, 6–13 × 1.3–2.5 cm, apex acute, base attenuate, margin entire, upper surface glabrous or glabrescent, lower surface glabrous; lateral veins 6–7 pairs. *Inflorescences* spicate, axillary

KEY TO THE SPECIES OF *LEPIDAGATHIS* FROM THAILAND

- | | |
|---|------------------------------------|
| 1. Plants less than 5 cm tall; sterile bracts obovate or orbicular, apex rounded or obtuse | 9. <i>L. thorelii</i> |
| 1. Plants more than 5 cm tall; sterile bracts not obovate or orbicular, apex bristle-like, acuminate, apiculate or acute | |
| 2. Inflorescence capitate, fertile bracts with glandular hairs; ovary pubescent or pubescent in the upper part | 6. <i>L. fasciculata</i> |
| 3. Fertile bracts 3-veined, apex acuminate or apiculate; anthers bearded | 8. <i>L. purpuricaulis</i> |
| 3. Fertile bracts 5–7-veined, apex bristle-like; anthers glabrous | |
| 2. Inflorescence spicate, fertile bracts without glandular hairs; ovary glabrous | |
| 4. Fertile bracts 1-veined, sterile bracts 1-veined | |
| 5. Sterile and fertile bracts densely covered with silver hairs, apex acute or apiculate; corolla brownish white with dark orange or brown markings | 1. <i>L. argentea</i> |
| 5. Sterile and fertile bracts not densely covered with silver hairs, apex bristle-like; corolla white with purple, pink or brownish markings | 7. <i>L. incurva</i> |
| 4. Fertile bracts 3–6-veined, sterile bracts 3–7-veined | |
| 6. Fertile bracts 3-veined; anterior sepals elliptic-lanceolate | 2. <i>L. cholorostachya</i> |
| 6. Fertile bracts 4–6-veined; anterior sepals asymmetrically semi-elliptic | |
| 7. Spike decurved; petiole more than 9 mm long | 5. <i>L. falcata</i> |
| 7. Spike erect; petiole less than 9 mm long | |
| 8. Sterile bracts deflexed, less than 8 mm wide; bracteoles less than 10 mm long | 3. <i>L. dissimilis</i> |
| 8. Sterile bracts not deflexed, more than 8 mm wide; bracteoles more than 10 mm long | 4. <i>L. dulcis</i> |

and terminal, 1.5–2.5 cm long, sessile to subsessile, peduncle when present pubescent; bracts subequal; sterile bract greenish yellow, elliptic or elliptic-oblong, 6–10 × 2–4 mm, with 1 vein, apex acute or acuminate, pubescent with dense silver hairs, margin hairy; fertile bract scarious, elliptic-lanceolate, 7–10 × 2–5 mm, with 1 vein, apex acute or apiculate, pubescent with dense silver hairs, margin hairy; bracteoles 2, oblong to oblanceolate, 5–8 × 2–3 mm, acute or acuminate, pubescent. *Calyx* 5-parted; posterior sepal oblong, 5–8 × 1.5–2 mm, with 3 veins, acute or apiculate; lateral sepals linear-lanceolate, 5–7 × ca 1 mm, with 1 vein; anterior sepals linear-oblong or linear-oblong, 5–9 × 1–1.5 mm, apex acuminate. *Corolla* brownish white with dark orange or brown markings, 8–12 mm long; tube 5–8 mm long, pubescent in upper part of tube; limb deeply divided into a 3-lobed anterior lip and a 2-lobed posterior lip; lobes elliptic-oblong or ovate-oblong. *Stamens* included; filaments glabrous; anthers oblong, bearded, all anthers bithecal. *Ovary* ellipsoid, glabrous; style 7–10 mm long, pubescent; stigma capitate. *Capsule* ellipsoid, 4–8 mm long, glabrous. *Seeds* orbicular or ovoid-ellipsoid, 1–3 × 1–3 mm; reticula ca 1 mm long.

Thailand.— NORTHERN: Tak [Thee Mo Bo Waterfall, Umphang WS, Tha Song Yang, alt. 183 m, 6 Mar. 2019, *Kaitongsuk et al.* 162 (BKF-4 sheets); *ibid.*, alt. 180 m, 7 Feb. 2025, *Kladwong & Kantachot 2025-1* (KKU-3 sheets); Ban Tha Song Yang, Doi Hua Mot Noi, alt. 120 m, 13 Jan. 2026, *Thammarong et al.* 5601 (QBG)].

Distribution.— Endemic to Thailand.

Ecology.— In mixed deciduous forest on limestone bedrock, along roadsides and scattered in moist areas along streams.

Etymology.— The specific epithet '*argentea*' refers to the silvery hairs on the fertile and sterile bracts.

Vernacular.— Sang korani ngoen (สังกรณีเงิน) (Proposed here).

Note.— *Lepidagathis argentea* is readily distinguished from other species in the genus by its sterile and fertile bracts, which are densely covered with silvery hairs and have acute or apiculate apices. The corolla is brownish white with dark orange or brown markings. This species is morphologically similar to *Lepidagathis incurva*, but in addition to

the densely silvery pubescent sterile and fertile bracts and acute or apiculate bracteole apex, it differs in having a posterior sepal with three veins, and glabrous anterior corolla lobes. *Lepidagathis argentea* is currently only known from limestone mountains in Tak Province, whereas *L. incurva* is widely distributed throughout Thailand. (Table 1, Figs 1&2).

2. *Lepidagathis chlorostachya* Nees in DC., Prodr. 11: 256. 1847.— Type: [Myanmar], Mergui, *Griffith s.n.* (lectotype **K!** [K000950046] photo seen, designated here; isoelectotypes **K!** [K000950047] photo seen, **GZU!** [GZU000250477] photo seen).

Thailand.— NORTHERN: Tak [Tak-Lampang Rd, km 453, Ban Nam Dip, 150 m, *Pooma 1286* (BKF)]; PENINSULAR: Chumphon [Thung Tako, 17 Jan. 1927, *Kerr 11483* (BK); Hot Spring Forest Park, Mueang, alt. 100 m, 26 Feb. 1983, *Koyama et al.* T-33746 (BKF, KYO)]; Ranong [Laemson NP, Ban Hin substation, alt. 50–100 m, 23 Feb. 1994, *Barfod et al.* 45250 (AAU); Between Hot Spring and Bunyabarn Waterfall, 5 Feb. 1979, *Koyama et al.* 15271 (AAU, BKF-2 sheets); Raksawarin Arboretum, Mueang Ranong, 11 Mar. 1987, *Niyomdham & Kubat 1389* (AAU, BKF); Kraburi, 12 Apr. 1967, *Sutheesorn 2303* (BK); *ibid.*, 29 Feb. 1968, *Vacharapong 177* (BK, KYO)]; Surat Thani [Phanom, alt. 50 m, 17 Mar. 1927, *Kerr 12366* (BK); Khao Sok NP, alt. 50–100 m, 12 Dec. 1979, *Shimizu et al.* T-27074 (BKF-2 sheets, KYO)]; Phangnga [Feb. 1893, *Curtis 2941* (SING-2 sheets); 29 Nov. 1918, *Haniff & Nur 3570* (SING); Khao Phra Mi, Khura Buri, alt. 150 m, 7 Jan. 1966, *Hansen & Smitinand 11805* (BKF-3 sheets)]; Krabi [Nai Chong, Mueang Krabi, 24 Mar. 1960, *Chirayupin 59* (BK); *ibid.*, 17 Dec. 1965, *Umpai 201* (BK); Nai Chong Rubber Research Station, 23 Feb. 1982, *Sutheesorn 5231* (BK); Ao Luek, alt. 40 m, 18 Jan. 1966, *Hansen & Smitinand 11984* (BKF, SING); Than Bok Khorani NP, Ao Luek, alt. 50 m, 16 Dec. 1979, *Shimizu et al.* T-27398 (BKF); *ibid.*, 23 Feb. 1959, *Umpai s.n.* (BK); Tha Khanon, Khiri Rat Nikhom, 27 Dec. 1982, *Sutheesorn 5520* (BK)]; Nakhon Si Thammarat [Krung Ching falls, Khao Luang NP, alt. 350 m, 1 Mar. 1986, *Maxwell 86-108* (BKF, PSU); *ibid.*, 21 Feb. 1991, *Niyomdham et al.* 2248 (BKF-9 sheets)].

Distribution.— India, Myanmar, Thailand.

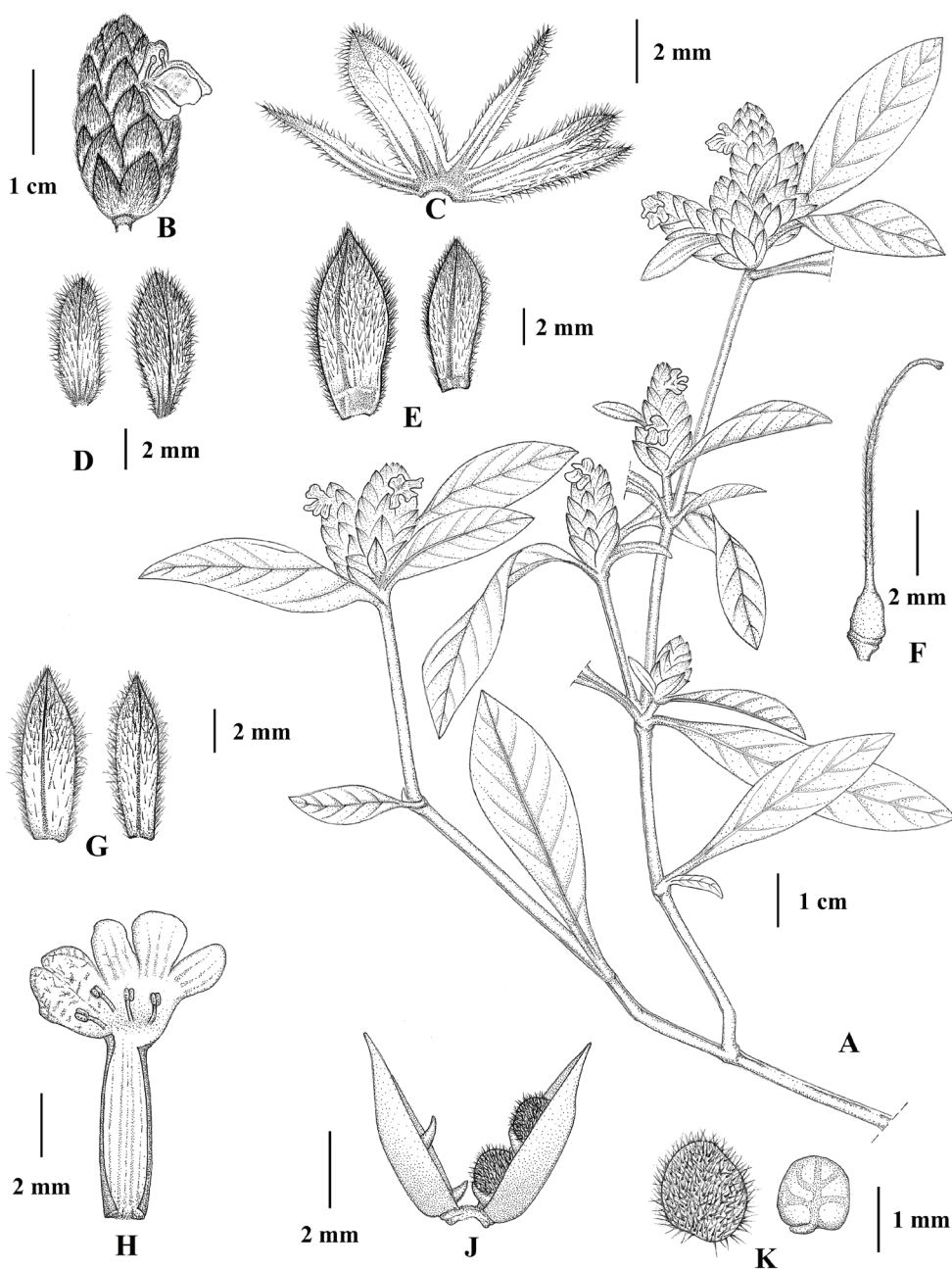


Figure 1. Drawing of *Lepidagathis argentea* Kantachot & Chantar. A. habit, B. inflorescence with flowers, C. external surface of calyx, D. bracteoles, E. sterile bracts, F. gynoeceum, G. fertile bracts, H. flower, J. capsule and seeds, K. seed and embryo. Drawn from *Kladwong & Kantachot 2025-1 (KKU)* by K. Tuanku.



Figure 2. *Lepidagathis argentea* Kantachot & Chantar. A. habitat, B. habit, C.-D. inflorescences with flowers. Photos by P. Kladwong, W. Kiewbang and S. Suddee.

Ecology.— Evergreen forest, deciduous forest or limestone hills, 40–350 m alt.

Vernacular.— Sang korani dong (สังกรณีดง) (Proposed here).

Note.— *Lepidagathis chlorostachya* is readily distinguished by its 3-veined fertile and sterile bracts, as well as by its glabrous petiole and lamina, which has an entire, undulate or slightly serrate margin. Nees (1847) described this species based on Griffith's collection in Herbarium Hookerianum, represented by two sheets. Of these, specimen K000950046 is designated here as the lectotype as

it is complete and bears mature leaves and inflorescences. A third sheet of the Griffith's type collection is housed at **GZU**.

3. *Lepidagathis dissimilis* J.B. Imlay, Bull. Misc. Inform. Kew 1939: 125. 1939.— Type: [Thailand], Nakhon Sawan, Raheng, alt. 100 m, 15 Nov. 1920, *Kerr 4576* (lectotype **K!** [K000950061] photo seen, designated here; isolectotypes **BK!**, **BM!** [BM000950038] photo seen).

Thailand.— NORTHERN: Sukhothai [Si Satchanalai NP, 3 Feb. 2015, *Maknoi 7293* (**BKF**);

ibid., alt. 190 m, 18 Nov. 2014, *Maknoi & Norsaengsri 11537* (BKF); Mueang Gao, Mueang Sukhothai, 5 Nov. 1971, *Maxwell 71-704* (AAU, BK, BKF); Sok Phraruang, Mueang Gao, Mueang Sukhothai, alt. 600 m, 22 Jan. 1974, *Maxwell 74-68* (BK); Nan [Ban Huai Hai, Fai Kaeo, Phu Sing, alt. 539 m, 22 Jan. 2018, *Phaosrichai et al. 843* (BKF-2 sheets)]; NORTH-EASTERN: Nong Khai [Along route 2186, Sangkhom, alt. 250 m, 16 Dec. 1982, *Koyama et al. T-31129* (BKF, KYO)]; Khon Kaen [Pha Nokkhao, Phu Pha Man NP, Chum Pae, alt. 418 m, 24 Dec 2012, *Norsaengsri & Thatana 8401* (BKF)]; Chaiyaphum [Phu Kiew WS, alt. 570 m, 14 Nov. 1983, *Smitinand & Nanakorn 143* (BKF-2 sheets)]; Sakon Nakhon [Phu Phan NP, *Chantaranothai et al. 6626* (AAU); ibid., 2 Nov. 1980, *Umpai 591* (BK)]; Mukdahan [Dongman Village, Mueang, alt. 220–300 m, 12 Dec. 1982, *Koyama et al. T-30939* (BKF, KYO)]; EASTERN: Chaiyaphum [Khon Sawan, alt.

244 m, 13 Nov. 2014, *Kertsawang 3465* (BKF-2 sheets); Khao Wong, 18 Oct. 1965, *Sutheesorn 650* (BK)]; SOUTH-EASTERN: Sa Kaeo [Nong Wang, Khok Sung, *Put 58* (BKF)].

Distribution.— Endemic to Thailand.

Ecology.— Dipterocarp forest and in bamboo thickets, 190–300 m alt.

Vernacular.— Ya takhap (หญ้าตะขาบ), ya thong pling (หญ้าท้องปลิง) (Prachin Buri).

Note.— *Lepidagathis dissimilis* is similar to *L. falcata* but differs in having short petioles, asymmetrically semi-elliptic anterior sepals and glabrous anthers. Furthermore, it possesses considerably more prominent, deflexed sterile bracts. Imlay (1939) described *Lepidagathis dissimilis* based on *Kerr 4576*, collected from a deciduous forest in Raheng, Nakhon Sawan Province, Thailand. The protologue

Table 1. Morphological comparison between *Lepidagathis argentea* and the similar species, *L. incurva*.

Characters	<i>L. argentea</i>	<i>L. incurva</i>
1. Sterile bracts		
Apex	acute or apiculate	bristle-like
Indumentum	pubescent with dense silver hairs	pubescent with moderately to densely brown hairy
2. Fertile bracts		
Apex	acute or apiculate	bristle-like
Indumentum	pubescent with dense silver hairs	pubescent with moderately to densely brown hairy
3. Bracteoles		
Shape	oblong and oblanceolate	elliptic and elliptic-lanceolate
Apex	acute or apiculate	bristle-like
4. Calyx		
Number of veins on each posterior sepal	3	1
Apex	acute or apiculate	bristle-like
5. Corolla		
Colour	brownish white with dark orange or brown markings	white with purple, pink or brown markings
Outside of anterior corolla lobes	glabrous	pubescent

did not specify the herbarium where the type was deposited. Three duplicates are extant at **BK**, **BM** and **K**. The specimen K000950061 is designated here as the lectotype as it bears more complete leaves, an inflorescence and flowers.

4. *Lepidagathis dulcis* Nees, Pl. Asiat. Rar. 3: 96. 1832.— Type: [Myanmar], in the mountains of Prome, 1826, *Wallich s.n.* [Numer. List no. 7167] (lectotype **GZU!** [GZU000251552] photo seen, designated here; isolectotypes **K-W!** [K001126814] photo seen, **BM!** [BM000950039] photo seen).

— *Ruellia dulcis* Wall., Numer. List no. 7167. 1832. **nom. inval.**

Thailand.— EASTERN: Mukdahan [Khamcha-I, alt. 300 m, 13 Dec. 1982, *Koyama et al. T-30973 (BKF)*; Phu Sra Dokbua NP, Don Tan, 19 Oct. 1998, *Suddee et al. 999 (BKF, K)*]; Ubon Ratchathani [Napho Klang, Khong Chiam, alt. 250 m, 11 Oct. 2024, *Kantachot et al. 2024-96 (KKU)*].

Distribution.— Myanmar, Thailand.

Ecology.— Evergreen forest, 250–300 m alt.

Vernacular.— Sang korani khok (สังกรณีโคก) (Proposed here).

Note.— *Lepidagathis dulcis* is morphologically similar to *L. dissimilis* but is distinguished by its straight sterile bracts, broader bract morphology (both sterile and fertile), short inflorescences and a pinkish or purplish white corolla with purple markings. Nees (1832) described *L. dulcis* based on specimens collected from Myanmar in 1826, citing *Wallich 7167* in the protologue. Among the three known duplicates housed at **BM**, **GZU** and **K**, the specimen GZU000251552 is designated here as the lectotype as it is the most complete material, has the most well-preserved leaves and inflorescences and has detailed floral dissections. *Lepidagathis dulcis* is a new record for Thailand.

5. *Lepidagathis falcata* Nees in Wallich, Pl. Asiat. Rar. 3: 96. 1832.— *Ruellia falcata* (Nees) Steud., Nomencl. Bot. ed. 2, 2: 481. 1841.— Type: [Myanmar], Taong Dong, 1826, *Wallich s.n.* [Numer. List no. 7166] (lectotype **K-W!** [K001126813] photo seen, designated here; isolectotypes **K** [Herb. Hook.]! [K000950063] photo seen, **BM!** [BM000950040] photo seen, **GZU!** [GZU000251171] photo seen).

— *Ruellia scariosa* Wall., Numer. List no. 7166. 1832. **nom. inval.**

Thailand.— NORTHERN: Mae Hong Son [9 Sept. 1974, alt. 500 m, *Larsen & Larsen 34314 (AAU, BKF)*; Tham Pla-Namtok Pha Suea NP, Mueang, alt. 300 m, 14 Jan. 1983, *Koyama et al. T-32470 (BKF)*; Huai San, Tham Pla-Namtok Pha Suea NP, Mueang, alt. 499 m, 19 Nov. 2013, *Lakoet 436 (BKF)*]; Chiang Mai [Ob Luang NP, Hot, alt. 400 m, 23 Nov. 2005, *Pooma et al. 5819 (BKF-2 sheets)*]; Nan [Along road 1168, 15–25 km E of Nan, 6 Sept. 1995, *Larsen et al. 46118 (AAU, SING)*]; Lampang [Doi Phra Phutthabhat, alt. 400 m, 18 Nov. 1920, *Kerr 4600 (BK)*]; Tak [Khuen Phumi Phon, alt. 270 m, Dec. 1959, *Bunnag 547 (BK)*]; *ibid.*, 1 Dec. 1959, *Sinchai 604 (BK)*]; NORTH-EASTERN: Khon Kaen [Tham Pha Puang Reservation Unit, Phu Pha Man NP, alt. 400–470 m, 21 Dec. 1982, *Koyama et al. T-31497 (KYO)*]; SOUTH-WESTERN: Kanchanaburi [Krateng Waterfall, Khao Laem NP, alt. 200 m, 28 Feb. 2017, *Muangyen 1716 (BKF)*].

Distribution.— Myanmar, Thailand.

Ecology.— Evergreen forest or deciduous forest, along limestone hills, 200–500 m alt.

Vernacular.— Sang korani pa (สังกรณีป่า) (Proposed here).

Note.— *Lepidagathis falcata* is distinguished from *L. dissimilis* by its ovate or ovate-elliptic lamina, a longer petiole, elliptic anterior sepals and bearded anthers. *Lepidagathis falcata* was described based on *Wallich 7166* from Myanmar. This collection comprises three sheets, housed at **BM** (BM000950040) and **K** (K001126813, K000950063). Specimen K001126813 is designated here as the lectotype as it is in good condition.

6. *Lepidagathis fasciculata* (Retz.) Nees in Wall., Pl. Asiat. Rar. 3: 95. 1832.— *Ruellia fasciculata* Retz., Observ. Bot. 5: 28. 1786.— Type: [Sri Lanka], Vicinia Thermarum Trinquemallensium, *König s.n.* (lectotype **LD!** [LD1801295] photo seen, designated by Fischer (1932); isolectotypes **LINN!** [LINN-HS1093-12] photo seen, **C!** [C10005034, C10005035] photo seen).

— *Lepidagathis thyrsoflora* Bremek., Dansk Bot. Ark. 23(2): 207. 1965. **syn. nov.**— Type: Thailand, Ratchaburi, Song Thaw, alt. 800 m, 1 Feb. 1962,

Larsen 9462 (holotype **U!** [U0000068] photo seen; isotype **C!** [C10005037] photo seen)

Thailand.—NORTHERN: Mae Hong Son [Huai Na, Khun Yuam, alt. 900 m, 26 Jan. 1964, *Hansen et al. 10951* (**BKF**); Pai, alt. 800 m, 17 Jan. 1983, *Koyama et al. T-32661* (**BKF**)]; Chiang Mai [Mae Pan Waterfall, Doi Inthanon NP, Mae Chaem, alt. 110 m, 8 Jan. 1983, *Koyama et al. T-32103* (**BK**, **BKF**); Huai Lat, Chiang Dao WS, alt. 800 m, 7 Dec. 1955, *Suvarnakoses 1010* (**BKF**)]; Tak [Lan Sang NP, Mueang Tak, 2 Jan. 1969, *Cheviwat & Nimanong 11* (**AAU**, **BKF**); Doi Hua Mod, Umphang, 17 Jan. 2004, *Mattapha 529* (**BKF**); *ibid.*, alt. 1,000 m, 4 Dec. 2021, *Thananthaisong et al. 627* (**BKF**)]; NORTH-EASTERN: Loei [Phu Luang WS, alt. 400 m, 3 Dec. 1965, *Tagawa et al. T-1064* (**BKF**)]; Mukdahan [Khamcha-i, alt. 300 m, 13 Dec. 1982, *Koyama et al. T-30976* (**BKF**)]; SOUTH-WESTERN: Kanchanaburi [Huai Lam Ton, Erawan NP, Sri Sawat, alt. 580–600 m, 26 Nov. 1982, *Koyama et al. T-30305* (**BKF**); *ibid.*, 26 Nov. 1982, *Koyama et al. T-30312* (**BKF**); Khao Leam Dam, Thong Pha Phum, alt. 200 m, *Koyama et al. T-49002* (**BKF**); Thungyai Naresuan WS, Sangkhla Buri, alt. 500 m, 19 Jan. 1994, *Maxwell 94-110* (**BKF**); Khao Laem NP, Sangkhla Buri, alt. 700 m, 22 Jan. 2009, *Middleton et al. 4749* (**BKF**); Tham Pla-Namtok Pha Suea NP, 13 Dec. 1971, *Phengklai 190* (**BKF**)]; CENTRAL: Nakhon Nayok [Haew Narok Waterfall, Khao Yai NP, alt. 381 m, 19 Feb. 2019, *Kaitongsuk et al. 133* (**BKF**)]; PENINSULAR: Surat Thani [Ban Nong Kum, Khlong Phanom NP, alt. 60 m, 21 Feb. 2001, *Chayamarit et al. 2628* (**BKF**)].

Distribution.—Pakistan, India, Sri Lanka, Bangladesh, Myanmar, China, Thailand.

Ecology.—Evergreen forest or deciduous forest, 60–1,100 m alt.

Vernacular.—Sang korani dong (สังกรณีตง) (Northern); ya haep (หญ้าแฮบ) (Phrae).

Note.—*Lepidagathis fasciculata* is readily distinguished by its capitate inflorescence, sterile and fertile bracts with three veins and glandular hairs and lamina with a mostly crenate-serrate or dentate margin.

7. *Lepidagathis incurva* Buch.-Ham. ex D. Don, Fl. Nepal.: 119. 1825.—Type: [Nepal], Narainhetty, 27 Jan. 1803, *Hamilton s.n.* (lectotype **BM!**

[BM001124550] photo seen, designated here; isoelectotypes **K!** [K000950074, K000951240] photo seen).

—*Lepidagathis chiengmaiensis* Bremek., Dansk Bot. Ark. 20: 72. 1961. **syn. nov.**—Type: Thailand, Chiang Rai [Chiang Rai], alt. 400 m, 1 Mar. 1958, *Sørensen et al. 1754* (lectotype **U!** [U0000065] photo seen, designated here; isoelectotypes **BK!**, **C!** [C10005043] photo seen).

Thailand.—NORTHERN: Mae Hong Son [Doi Chong, alt. 1,420 m, 20 Feb. 1968, *Hansen & Smitinand 12687* (**AAU**); Tham Pla-Namtok Pha Suea NP, alt. 300 m, 14 Jan. 1983, *Koyama et al. T-32471* (**KYO**); *ibid.*, alt. 670 m, 21 Jan. 2000, *Srisanga 16825* (**KYO**, **SING**); Mueang Sroi, Pai, alt. 800 m, 17 Jan. 1983, *Koyama et al. T-32660* (**BKF**, **KYO**); Lum Nam Pai WS, Pai, alt. 311 m, 15 Dec. 2007, *Tanaka HN 8397* (**KYO**)]; Chiang Mai [Ban Tin Tok, 8 Mar. 1965, *Charoenphol 297* (**BKF**); Doi Suthep, alt. 110 m, 10 Jan. 1994, *Fukuoka & Koyama T-62117* (**BKF**); *ibid.*, alt. 1,350–1,500 m, 9 Jan. 1966, *Iwatsuki & Fukuoka T-4475* (**KYO**); Doi Inthanon, alt. 1,331 m, 7 Mar. 2019, *Kaitongsuk et al. 172* (**BKF**); Mae Pan WS, Doi Inthanon, Mae Chan, alt. 1,110 m, 8 Jan. 1983, *Koyama et al. T-32101* (**KYO**); *ibid.*, 8 Jan. 1983, *Koyama et al. T-32109* (**KYO**); Along route 1099, Omkoi, alt. 1,050–1,150 m, 19 Jan. 1983, *Koyama et al. T-32234* (**BKF**, **KYO**); Mae Tho NP, Hot, alt. 900–1,200 m, 11 Jan. 1983, *Koyama et al. T-32294* (**KYO**); Namtok Maelid, Mae Tho NP, Hot, alt. 920 m, 13 Jan. 1938, *Koyama et al. T-32411* (**BKF**, **KYO**); *ibid.*, 13 Jan. 1983, *Koyama et al. T-32412* (**KYO**); Doi Chang, Mae Tang, alt. 1,500 m, 19 Jan. 1983, *Koyama et al. T-32751* (**KYO**); Doi Meeya, Mae Taeng, alt. 1,250–1,360 m, 19 Jan. 1983, *Koyama et al. T-32780* (**BKF**, **KYO**); Doi Chiang Dao WS, alt. 1,170–1,850 m, 7 Feb. 1983, *Koyama et al. T-33201* (**KYO**); *ibid.*, 9 Feb. 1983, *Koyama et al. T-33234* (**KYO**); Fang Hot Spring, Fang, alt. 640 m, 10 Feb. 1983, *Koyama et al. T-33313* (**KYO**); Mae Sa, Mae Rim, alt. 470–600 m, 15 Feb. 1983, *Koyama et al. T-33565* (**KYO**); Doi Pui, alt. 1,450–1,630 m, 27 Nov. 1984, *Koyama et al. T-39649* (**BKF**, **KYO**); Fang, alt. 350 m, 22 Feb. 1958, *Larsen & Hansen 1478* (**SING**); Pong Dueat Hot Spring, *Larsen et al. 44908* (**AAU**); Tard Mok Waterfall, Mae Rim-Sa Moeng road, alt. 500 m, 26 Jan. 1999, *Larsen & Larsen 47241* (**AAU**); Doi

Chiang Dao WS, alt. 800 m, 8 Feb. 1999, *Larsen & Larsen 47303 (AAU)*; Mae Klang Waterfall, Chom Thong, alt. 350 m, 19 Dec. 1965, *Tagawa T-2235 (KYO)*; Montha-Than Waterfall, Doi Suthep, alt. 730 m, 23–24 Jan. 2013, *Wongakson PW019 (BKF)*; Chiang Rai [alt. 582 m, 29 Dec. 2012, *Norsaengsri & Thatana 7399 (BKF)*]; Doi Tung, Mae Sai, alt. 1,400 m, 14 Feb. 1983, *Koyama & Nagamasu T-33497 (KYO)*; *ibid.*, alt. 425 m, 15 Feb. 2005, *Maxwell 05-116 (BKF)*; Ban Phamee, Huai Nam Dun, Mae Sai, alt. 566 m, 13 Jan. 2011, *Norsaengsri & Thatana 7519 (BKF)*; Phayao [Doi Luang NP, alt. 575 m, 26 Jan. 1999, *Petrmitr 425 (BKF)*]; Nan [Tha Wang Pha, alt. 300 m, 15 Mar. 2000, *Maxwell 00-132 (BKF)*]; Suan Ya Luang, Pha Thong, Tha Wang Pha, alt. 1,266 m, 23 Jan. 2018, *Phaosrichai et al. 680 (BKF)*; Doi PhuKa NP, Pua, alt. 1,500 m, 15 Jan. 2002, *Srisanga 2335 (BKF, KYO)*; Lamphun [Doi Khun Tan, Yaw 3, Mae Tha, alt. 1,250 m, 21 Nov. 1993, *Maxwell 93-1417 (BKF)*]; Lampang [Huai Prao, 27 Jan. 1965, *Hambananda 241 (BKF)*]; Huai Mae San, Hang Chat, alt. 600 m, 6 Jan. 1983, *Koyama et al. T-31965 (BKF, KYO)*; Tak [5 Feb. 1974, *Phengklai 3194 (AAU, KYO)*]; Doi Phang Kluay, alt. 630 m, 22 Dec. 1965, *Phengnaren s.n. (BKF)*; NORTH-EASTERN: Phetchabun [Nam Nao NP, Nam Nao, alt. 800–900 m, 26 Dec. 1982, *Koyama et al. T-31711 (BKF)*]; Pha Daeng Cliff, Nam Nao NP, Nam Nao, alt. 900–960 m, 26 Dec. 1982, *Koyama et al. T-31727 (BKF, KYO)*; *ibid.*, alt. 900 m, 26 Dec. 1982, *Koyama et al. T-31731 (KYO)*; Thung Salaeng Luang NP, alt. 500–550 m, 28 Dec. 1982, *Koyama et al. T-31875 (BKF)*; Loei [Phu Kradueng NP, 10 Nov. 1970, *Charoenphol et al. 4884 (AAU, BKF)*; *ibid.*, alt. 350–550 m, 17 Dec. 1982, *Koyama et al. T-31204 (KYO)*; *ibid.*, alt. 350–900 m, 20 Dec. 1982, *Koyama et al. T-31393 (KYO) & T-31396 (KYO)*; *ibid.*, alt. 900–1,200 m, 14 Nov. 1979, *Shimizu et al. T-22638 (KYO)*]; Sakon Nakhon [Phu Phan NP, alt. 350 m, 14 Dec. 1982, *Koyama et al. T-31042 (BKF, KYO)*; *ibid.*, alt. 300 m, 15 Nov. 1984, *Murata & Phengklai T-50505 (BKF, KYO)*]; Mukdahan [Along route 212, Mueang, alt. 220 m, 12 Dec. 1982, *Koyama et al. T-30864 (BKF, KYO)*]; EASTERN: Chaiyaphum [Namphrom, alt. 600 m, 11 Dec. 1971, *van Beusekom et al. 4153 (BKF)*; *ibid.*, 20 Dec. 1971, *van Beusekom et al. 4482 (BKF)*]; Si Sa Ket [Kanthararom, 13 Feb. 1959, *Suvarnakoses 1458 (BKF)*]; Ubon Ratchathani [Phibun Mangsahan,

alt. 250 m, 9 Dec. 1982, *Koyama et al. T-30691 (BKF, KYO)*; Det Udom, alt. 270 m, 10 Dec. 1982, *Koyama et al. T-30771 (BKF, KYO)*; Muang Sam Sip, alt. 220 m, 11 Dec. 1982, *Koyama et al. T-30800 (BKF, KYO)*; SOUTH-WESTERN: Uthai Thani [Huai Kha Kheng WS, Lan Sak, alt. 280–330 m, 12 Nov. 1979, *Shimizu et al. T-22278 (BKF)*]; Kanchanaburi [Sangkhla Buri, 10 Feb. 1960, *Bunpan 23 (BKF)*, 24 (BKF) & 25 (BKF)]; Pailok, Thong Pha Phum, alt. 900 m, 23 Jan. 1983, *Koyama et al. T-32945 (BKF, KYO)*; *ibid.*, 10 Jan. 1985, *Koyama et al. T-48958 (BKF)*; PENINSULAR: Chumphon [Hot spring, Mueang Chumphon, alt. 100 m, 26 Feb. 1983, *Koyama et al. T-33743 (KYO)*]; Ranong [alt. 160 m, 11 Jan. 1966, *Hansen & Smitinand 11906 (SING)*]; Khao Phota Luangkaew, Kapoe, alt. 400–100 m, 27 Feb. 1983, *Koyama et al. T-33793 (BKF, KYO)*; *ibid.*, alt. 600–900 m, 11 Dec. 1979, *Shimizu et al. T-26924 (BKF, KYO)*; *ibid.*, alt. 180–600 m, *Shimizu et al. T-27012 (BKF)*]; Krabi [Nai Chong, Mueang Krabi, alt. 30 m, 19 Jan. 1966, *Hansen & Smitinand 37293 (SING)*]; Than Bok Khorani NP, Ao Luek, alt. 25 m, 19 Jan. 1987, *Maxwell 87-101 (AAU, BKF, PSU)*; Nakhon Si Thammarat [Chawang, alt. 200 m, 24 Feb. 1987, *Maxwell 87-206 (AAU, PSU)*]; Trang [Ban Nam Phrai, alt. 20–200 m, 17 Dec. 1979, *Shimizu et al. T-27554 (BKF, KYO)*]; Satun [Thung Nui, Khuan Kalong, alt. 100 m, 6 Jan. 1985, *Maxwell 85-46 (BKF, PSU)*]; Songkhla [Hat Yai, alt. 0 m, 22 Feb. 1986, *Maxwell 86-80 (AAU, PSU)*].

Distribution.— India, Sri Lanka, Bangladesh, Bhutan, Myanmar, China, Thailand, Laos, Vietnam.

Ecology.— Dry evergreen forest or deciduous forest, along bamboo thicket, 100–1,400 m alt.

Vernacular.— Ya khon gai (หญ้าขนไก่) (Loei).

Note.— *Lepidagathis incurva* is recognised by its sterile and fertile bracts which are single veined and have a bristle at the apex. It is common throughout the country.

Bremekamp (1961) described *Lepidagathis chiengmaiensis* as a new species based on the collection *Sørensen et al. 1754* from Chiang Rai, Thailand. However, an examination of the type material at **BK**, **C** and **U**, alongside the original protologue, reveals that it is conspecific with *Lepidagathis incurva*. This species exhibits a wide range of morphological variation in habit, plant

height, leaf and inflorescence size, and corolla colour. Since *Lepidagathis incurva* is widely distributed across Thailand and its broad circumscription encompasses the characteristics of Bremekamp's taxon, *L. chiengmaiensis* is here reduced to a synonym of *L. incurva*.

8. *Lepidagathis purpuricaulis* Nees in Wallich, Pl. Asiat. Rar. 3: 96. 1832.— Type: [India], “in Burhi Simar”, 8 Mar. 1811, *Buchanan-Hamilton s.n.* [Numer. List 2366C] (lectotype **GZU** [GZU 000251525], designated by Deng *et al.* (2020); isolectotype **K-W!** [K001115762] photo seen).

Thailand.— NORTHERN: Mae Hong Son [Tham Pla-Namtok Pha Suea NP, alt. 300 m, 14 Jan. 1983, *Koyama et al. T-32468* (**BKF, KYO**); Lum Nam Pai WS, Pai, alt. 700–850 m, 16 Jan. 1983, *Koyama et al. T-32593* (**BKF, KYO**-2 sheets); Nai Soi, Tham Pla-Namtok Pha Suea NP, alt. 261 m, 6 Feb. 2013, *Norsaengsri 10166* (**BKF**); Chiang Mai [Doi Chiang Dao WS, 20 Jan. 1941, *Garrett 1233* (**BKF**); Phayao [Doi Pha Dam, Chiang Kham, alt. 853 m, 21 Jan. 2014, *La-onsri et al. 80587* (**BKF**); Lampang [Tham Pha Thai NP, Ngao, alt. 351 m, 25 Nov. 2014, *La-Onsri 3858* (**BKF**), Chae Son NP, Wang Nuea, 3 Feb. 1997, *Maxwell 97-122* (**BKF**)].

Distribution.— India, Nepal, Myanmar, Vietnam, Thailand.

Ecology.— Deciduous forest or bamboo forest, 260–850 m alt.

Vernacular name.— Sang korani muang (สังกรณีม่วง) (Proposed here).

Note.— *Lepidagathis purpuricaulis* is distinguished by its capitate inflorescence, glabrous petiole, 5–7-veined fertile bracts and monothealous posterior stamens. This species is a new record for Thailand; it was previously known only in India, Nepal, Myanmar (Bramhadande & Nandikar, 2023), and Vietnam (Benoist, 1935).

9. *Lepidagathis thorelii* Benoist, Notul. Syst. (Paris) 2: 22. 1911.— Type: [Vietnam], Cochinchine, Ti-Tinh, forêts, *Thorel 1410* (lectotype **P!** [P00719513] photo seen, designated here; isolectotypes **P!** [P00719514] photo seen, **US!** [US00432519] photo seen). Fig. 3.

Thailand.— EASTERN: Ubon Ratchathani [Phu Chong-Na Yoi NP, Na Chaluai, 22 Oct. 2005, *Kantachot 288* (**KKU**); *ibid.*, alt. 300 m, 24 Nov. 2005, *Suddee et al. 2608* (**BKF**-6 sheets, **QBG**); Yod Dom WS, Nam Yuen, alt. 200–300 m, 17 Jan. 2009, *Kantachot 454* (**KKU**); Reserve Area between Nong Khon and Nam Yuen, alt. 180 m, 11 Oct. 1984, *Murata et al. T-52133* (**BKF, QBG**); Phu Phralan, Buntharik, 18 Dec. 2008, *Puudja & Hemrat 1503* (**BKF**); *ibid.*, 19 Dec. 2008, *Puudja & Hemrat 1505* (**BKF**)].

Additional Examined Specimens.— Vietnam [Bà Rịa–Vũng Tàu, Xuyên Mộc, 5 Oct. 2005, 10°32'38.5" N 107°29'16.9" E, alt. 42 m, *HNK 1153* (**K!**); Cochinchine, Dec. 1866, *Pierre s.n.* (**K!**, **P!**-4 sheets)].

Distribution.— Vietnam, Thailand.

Ecology.— Evergreen forest or deciduous forest, 180–300 m alt.

Vernacular name.— Cho morakot (ช่อมรกต) (Proposed here).

Note.— *Lepidagathis thorelii* is characterized by sub-basal rosette leaves that are obovate or elliptic-obovate, sterile bracts obovate or orbicular with rounded or obtuse apices, and glabrous fertile bracts and asymmetrically semi-elliptic anterior sepals.

Benoist (1911) described this species from Vietnam, based on a *Thorel 1410* collection. Three duplicates of this collection are housed at **P** (P00719511, P00719513, P00719514) and one at **US** (US00432519). However, as one of the sheets at **P** (P00719511) originates from a different locality (Bien-hoa), it cannot be considered to be a duplicate of the others. The specimen P00719513, which has more complete leaves and inflorescences, is designated here as the lectotype. The remaining duplicates at **P** and **US** are designated as isolectotypes. *Lepidagathis thorelii* was previously only known from Vietnam (Benoist, 1911) and is now extended to Thailand.

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Figure 3. *Lepidagathis thorelii* Benoist. A. habit, B. close-up of corolla and fertile bracts, C. inflorescences and basal rosette, D. lateral and frontal views showing elongated peduncle, E. dorsal view showing the arrangement of bracts, F. frontal view of fertile bracts and flower. Photos by C. Kantachot.

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